CLINICAL AND EPIDEMIOLOGIC RESEARCH (MAS)

Visit program website. (https://epibiostat.ucsf.edu/masters-degree-clinical-research/)

Degree Offered: MAS (Master's of Advanced Studies)
Program Leadership:
Elaine Ku, MD, MAS, Director
Admissions Inquiries:
Clair Dunne, Program Administrator

Program Description

Master's Degree Program in Clinical and Epidemiologic Research (https://epibiostat.ucsf.edu/masters-degree-clinical-research/) is a two-year program that through enhanced coursework and precepting provides trainees with mastery of clinical and epidemiologic research methods and culminates in a number of required products including a comprehensive literature review, a presentation at a national or international scientific conference, and publication of a peer-reviewed scientific paper.

For complete information on the Master's Degree Program in Clinical and Epidemiologic Research and degree tracks, please visit our website (https://epibiostat.ucsf.edu/masters-degree-clinical-research/).

Admission Requirements

Possession of an undergraduate degree from an accredited institution with a minimum grade point average (GPA) of 3.0 (equal to a letter grade of "B"). Preference will be given to scholars who have demonstrated knowledge or experience in some aspect of a health-related field (e.g., clinical practice, public health, health promotion) by virtue of either possession of a graduate or professional doctoral degree (MD, DDS, PharmD, PhD or international equivalent), being currently enrolled in such a program, or relevant work experience. Although not required, this prior knowledge or experience is preferred because program scholars will be required to perform original research in an area of their choosing to fulfill graduation requirements. Prior substantive knowledge or experience in a health-related field can be very helpful in identifying a research area of interest and in maintaining motivation for the work.

Established relationship with a research mentor at UCSF, defined as a faculty member in either of the Schools of Medicine, Nursing, Pharmacy, or Dentistry. Scholars already at UCSF should have this established by the time of application. Those who are applying from outside UCSF should have this established by the beginning of the program. Applicants applying from outside UCSF are encouraged to identify and contact UCSF research mentors on their own or, after acceptance into the program, may request assistance from the TICR Program to help them identify a research mentor.

For scholars who are primarily based in other training programs or positions at UCSF, supervisor's assurance that at least 70% of time will be available August through May to divide between the activities of this program and the conduct of the trainee's clinical research projects.

Affirmation of the Professional Conduct Statement (https://ticr.ucsf.edu/documents/Professional%20Conduct%20Statement%202014_03_11.pdf) (signed during orientation).

Find application information on our website (https://epibiostat.ucsf.edu/admissions-0/).

Learning Outcomes

To complete the program, scholars must satisfy program objectives, which are to:

a. Acquire a mastery of a broad set of clinical research methods;
b. Plan and implement one or more clinical research projects;
c. Present research findings at a national or international meeting;
d. Write a comprehensive literature critique and publish one or more first-authored peer-reviewed original research papers; and
e. Obtain experience in the instruction of clinical research methods.

Additional Information

Career Outcomes

- *Find* career outcomes and other data on master's programs *(*https://graduate.ucsf.edu/clinical-mas-statistics*/) on the Graduate Division website.*

Degree Requirements

a. **Courses**

   At least 36 quarter-units of coursework are needed for graduation. Trainees will take the majority of their coursework in the first year allowing for focus on performing independent research in the second year. Grading policy is determined by the UCSF Graduate Division. In particular, scholars should note that UCSF graduate students must maintain at least a 3.0 (B average) and that letter grades cannot be converted to "S/U" after the deadline for the respective quarter. It is the policy of the TICR Program that one "C" grade or less (or one "U" grade) will trigger a discussion between the program director and the student about the expected level of performance in the program. Two or more grades of "C" or less (or two or more "U" grades) will trigger a formal review by the program and the chair of the scholar's master's committee. This formal review will develop an individualized remediation plan to address the deficiencies. A memorandum of understanding will be generated that clearly outlines specific steps and associated timeline that the scholar must fulfill in order to return to satisfactory performance. The memorandum will be signed by the following parties: the scholar, the master's committee chair, and the program director. Should a scholar be unable to fulfill the expectations according to the timeline outlined in the memorandum, the student will be subject to dismissal from the program.

b. **Accomplishment of the Following Products of Clinical Research:**

   - **Preparation of a comprehensive literature critique:** For this requirement, the scholar will compose a comprehensive and systematic review and critique of the literature pertinent to a specific research question (or set of related questions) in his or her research field. "Comprehensive and systematic" means a complete and unbiased search for all relevant sources with explicit description of how this search was done. Questions that have already been adequately reviewed by others should be avoided. This review should take the form of a five to ten

page double-spaced report (not including tables, figures, or references) that demonstrates the scholar's mastery of the field's literature. In some cases, but not all, the review will provide the rationale for the scholar's primary research project (the first authored manuscript requirement). Emphasis should be placed not only on describing the nominal findings of prior work but also on providing a methodologic critique of the prior research. Importantly, the fundamental objective of this literature review requirement is for the scholar to demonstrate that he/she can evaluate a number (at least 4, but preferably more) of papers/reports regarding a particular substantive question (or set of related questions), provide high-level critique of the threats to validity in the individual papers, and then come to a conclusion about the question(s) in hand. The conclusion could be that the research question can be answered with the available literature (and state what the answer is) or that because of too many threats to validity the question cannot be answered and hence needs more research. If appropriate, a quantitative meta-analysis can be performed, but this is not required. This report should be constructed with an eye towards formal publication, but this is not required. It is expected, although not required, that this requirement be completed by the end of the first year in the program. Achievement of the requirement will be considered complete upon satisfactory review by the scholar's master's committee.

- **First-authored oral or poster presentation at a national or international meeting:** This requirement involves submission of a first-authored abstract to a nationally or internationally recognized scientific meeting/conference within the scholar's academic field and acceptance of that abstract for either poster or oral presentation. The abstract should describe a study of either a) descriptive nature within a highly relevant population using representative sampling techniques or b) comparative or analytic nature. Case reports or case series are not acceptable unless case-only analytic techniques are used. Data for this abstract must be analyzed but not necessarily collected during residence in the master's program. It may be acceptable in selected cases, with pre-approval by the scholar's master's committee, to complete work that was started prior to enrollment in the program. It is expected that the work represent a substantive contribution to the scholar's research field. The format should follow that suggested by the conference to which submission is intended. Achievement of this requirement will be considered complete upon satisfactory review by the scholar's master's committee and upon written confirmation indicating acceptance of the abstract by a committee-approved conference.
- **Submission as first author of a peer-reviewed manuscript:** Using data analyzed (but not necessarily collected) during residence in the master's program, the scholar will prepare and submit a first-authored manuscript for publication in a peer-reviewed journal that is approved by the master's committee. It may be acceptable in selected cases, upon approval of the scholar's committee, to submit work that was started prior to enrollment in the program. The manuscript should describe a study of either a) descriptive nature within a highly relevant population using representative sampling techniques or b) comparative or analytic nature. Case reports or case series are not acceptable unless case-only analytic techniques are used. The manuscript may be a comprehensive extension of the work submitted in abstract form to a national or international meeting. It is expected that the work represent a substantive contribution to the scholar's research field. The format should follow that suggested by the journal to which submission is intended. Achievement of this requirement will be considered complete upon satisfactory review by the scholar's master's committee and upon written correspondence indicating receipt of the manuscript by an approved peer-reviewed journal. Of note, it is not acceptable for a scholar to present an already submitted, accepted, or published manuscript to his/her committee and expect automatic approval. The final arbiters of the soundness of the work will be the Master's Committee members and not the journal editors or its reviewers.

Core Courses

Program of Study for the Master's Degree Program in Clinical and Epidemiologic Research

Course	Title	Units
Year 1		
Summer		
EPIDEMIOL 201	Responsible Conduct of Research	0.5
EPIDEMIOL 202	Designing Clinical Research (Two Month)	2
EPIDEMIOL 218	Data Collection and Management for Clinical Research	1
BIOSTAT 212	Introduction to Statistical Computing in Clinical Research	1
	Units	**4.5**
Fall		
EPIDEMIOL 203	Epidemiologic Methods	4
EPIDEMIOL 204	Clinical Epidemiology *	3
BIOSTAT 200	Biostatistical Methods in Clinical Research I	3
EPIDEMIOL 220	Master's Seminar I	1
	Units	**11**
Winter		
EPIDEMIOL 205	Clinical Trials	2
EPIDEMIOL 222	Social Determinants of Health and Health Disparities	1
BIOSTAT 208	Biostatistical Methods II	3
EPIDEMIOL 220	Master's Seminar I	1
	Units	**7**
Spring		
EPIDEMIOL 212	Publishing and Presenting Clinical Research	1
EPIDEMIOL 214	Systematic Reviews	1
BIOSTAT 209	Biostatistical Methods III	3
EPIDEMIOL 220	Master's Seminar I	1
	Units	**6**
Year 2		
Fall		
BIOSTAT 210	Biostatistical Methods IV	2
EPIDEMIOL 221	Master's Seminar II	1
	Units	**3**
Winter		
EPIDEMIOL 221	Master's Seminar II	1
	Units	**1**
Spring		
EPIDEMIOL 221	Master's Seminar II	1
Electives (Sufficient number of other TICR Program Courses to achieve at least 36 quarter units)		2.5
	Units	**3.5**
	Total Units	**36**

* MAS students can opt to take EPI 204 in MAS year 1 or MAS Year 2

See a sample course schedule (https://epibiostat.ucsf.edu/MAS_curriculum/).

Tracks

The master's degree program currently has two optional tracks of specialized instruction in which scholars can elect to enroll. There is one track in Data Science in Clinical Research and one track in Implementation Science. Scholars in these tracks will be required to take the core set of courses in epidemiologic and biostatistical methods that underlie clinical research and will use their elective courses for focused instruction in their track's specific objectives. Scholars may choose to join these tracks at any time during their residence in the program.

Data Science in Clinical Research Track

Data Science in Clinical Research is an emerging discipline — for which there is not a standard definition — in response to the explosion of available and complex data in biomedicine and related streams. Examples of complex data include those from the laboratory (e.g., genomics and other "-omics"), biomedical imaging, electronic medical records, and other "found" data (e.g., social media). The TICR Program believes data science in the context of clinical research is best understood as an interdisciplinary hybrid of the fields of informatics, computer science, biostatistics, and epidemiology. As such, a data scientist has a broad background and expertise in accessing data, manipulating data, and forming inferences (i.e., summarizing raw data into meaningful messages) from data. A data scientist may typically not have as deep an expertise as a dedicated computer scientist, bio/clinical informatician, biostatistician, or epidemiologist in their respective fields, but instead she/he brings unique value because of his/her broad skill set accessing complex data, manipulating complex data, visualizing complex data, and being able to perform a broad array of analytic techniques.

The Data Science in Clinical Research Track of the master's degree program is tailored for researchers who seek to work in complex data environments (sometimes referred to as "Big Data") and who desire to become facile in the manipulation of large (and perhaps unstructured and unwieldly) data structures and the summarization of data into meaningful messages. Coursework in the track (https://epibiostat.ucsf.edu/sites/g/files/tkssra2066/f/Program%20Track%20details.pdf) extends upon the basic foundation of epidemiology and biostatistics in the base master's degree program to include required and elective courses in advanced data manipulation, prediction, clustering/pattern recognition and data reduction. The Data Science in Clinical Research Track distinguishes itself from other data science training programs by being embedded into the context of human subjects-based health-related research and a solid base of epidemiology and clinical research. Many of the contextual examples used in the courses and student projects are from the life sciences and clinical care. Graduates of the Data Science in Clinical Research Track are poised to work in either leadership or supportive roles in academia, industry, or municipal health systems.

The Data Science in Clinical Research Track is directed by Dr. John Kornak. Scholars completing this track may list "Master of Advanced Study, Clinical Research with Specialization in Data Science" on their curriculum vitae.

Implementation Science Track

Implementation science (IS) aims to improve the adoption of evidence-based practices and policies in clinical care and public health, and the development of best evidence through community engagement. The master's program IS Track responds to the increasing concern of the World Health Organization (WHO), U.S. National Institutes of Health and Institute of Medicine that the tremendous advances we have achieved in developing effective tests, treatments and preventive measures are not being fully translated into improved population health. IS research relates to the second arm of what is popularly known as translational research: the first arm ("T1") being the translation of knowledge from the laboratory to human subjects, and the second arm ("T2") involving the translation of clinical research (behaviors, therapies, or devices) into practice in real-world settings.

The IS Track is ideal for researchers who plan to pursue the development, implementation or evaluation of policies, practice-based interventions and/or community-based programs designed to:

a. improve uptake/safety/quality/access;
b. reach diverse populations;
c. reduce the overuse of diagnostic tests or treatments; or
d. provide preventative medicine or health promotion programs.

Coursework in the track is guided by a conceptual framework (https://ticr.ucsf.edu/documents/IDS_Framework_Nov2009.ppt) that illustrates the different groups and organizations targeted by implementation research, and emphasizes the importance of interdisciplinary collaboration and community participation for the effective translation of evidence into practice. Master's program scholars who elect the IS Track typically begin coursework in the spring quarter of their first year and typically enroll in at least one IS course per quarter during the second year. In addition to course requirements (https://epibiostat.ucsf.edu/sites/g/files/tkssra2066/f/Program%20Track%20details.pdf), IS Track scholars receive career mentoring and specialized feedback on their research protocols. Scholars completing this track may list "Master of Advanced Study, Clinical Research with Specialization in Implementation Science" on their curriculum vitae.

The IS Track is co-sponsored by the UCSF Implementation Science Program and is directed by Dr. Maria Garcia (https://profiles.ucsf.edu/maria.garcia/) and Dr. Priya Shete (https://directory.ucsf.edu/people/search/id/52258/) . One distinction of IS research is its emphasis on multidisciplinary collaboration and teamwork. The IS track increases scholars' exposure to and contact with a broad spectrum of UCSF faculty conducting IS research — an important step in developing a research network that scholars can call upon throughout their careers.