Epidemiologic Methods

EPI 203 Fall 2020 (4 units)

Course Director: Jeffrey N. Martin, MD, MPH
Professor
Department of Epidemiology & Biostatistics

OBJECTIVES

Human subject-based health-related research — regardless if classified as patient-oriented, clinical, translational, epidemiologic, comparative effectiveness, behavioral, outcomes, or health services research — has individual human beings or groups of human beings as its unit of observation. As such, principles of epidemiology (in addition to biostatistics) serve as the basic scientific methodology. That is, the sciences of epidemiology and biostatistics are the predominant means of knowledge generation (i.e., the underlying epistemology) in human subject-based health research.

The objectives of this course are to provide a detailed understanding of the basic principles of epidemiology including:

- diverse array of study designs, and their theoretical interrelatedness, available in clinical and epidemiologic research;
- importance of measurement;
- different types of measures of disease occurrence used for description;
- methods to measure exposure/treatment - disease/outcome association for studies of causation;
- measures of attribution;
- interaction;
- mediation;
- approaches to identify and minimize selection, measurement & confounding bias;

and

- conceptual motivation for more sophisticated methods (e.g., regression or marginal structural approaches) to manage confounding, which are increasingly common tools in epidemiologic analyses.

We will apply these principles to research on human health, for which we use the World Health Organizations's now classic definition: Health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity. That is, the principles of epidemiology can be applied to a variety of aspects of health and disease.

View the Course Introduction video for a further description of course objectives and logistics.

PREREQUISITES

*Designing Clinical Research* (EPI 202), or equivalent experience, and *Introduction to Statistical Computing in Clinical Research* (BIOSTAT 212), or equivalent experience with the Stata software program, are
Each week, new material is introduced via a recorded lecture and recommended readings. After beginning to study the lecture and reading, the class gathers for a large group discussion in which the lecture is briefly reviewed and students have the opportunity to pose questions to course faculty or prompt discussion on any aspect of the material. Homework, in the form of a problem set, is assigned each week. The goal of the homework is to reinforce the main points brought forth in lecture as well as to cover more detailed nuances found in the readings. The problem sets are discussed in detail with course faculty in the small group discussion sections that occur at the end of the weekly cycle. Every other week, Journal Club sessions reinforce learning by applying the material to contemporary biomedical literature. The philosophy of the course is to steadily build a knowledge base over the course of the academic quarter, and that ample time is needed between each new installment of material to optimize comprehension. Learning is facilitated by engaging a variety of senses and motor functions. The small group discussion section is, in particular, viewed as a critical venue for learning. Many students have also found that student-run study groups enhance their learning.
Large Group Discussion:
Content: Brief formal review of lecture followed by question and answer discussion. Recorded lecture should be viewed prior to this session.
Time: Thursdays, 3:30 to 5:00 PM, beginning September 17

Small Group Discussion:
Content: Overview and discussion of lectures, and review of homework assignments. In the event that not all homework problems are discussed, a detailed answer key is always made available online shortly after the session.
Time: Tuesdays, 1:30 to 3:00 PM, beginning September 22

Journal Clubs
Content: Apply methodologic topics from the course to the critical dissection of the contemporary biomedical literature.
Time: Every other Tuesday, 3:15 to 4:15 PM, beginning September 29

Drop-In Help:
Content: Course faculty are available to address questions on course content.
Time: Mondays, 1:00 to 2:30 PM, beginning September 21

The weekly learning cycle, therefore,
a) begins on a Tuesday when the recorded lecture, detailing the content, is released on video;
b) has curricular emphases noted and clarifications provided on Thursday with a Large Group Discussion;
c) reinforces learning for the next several days with applied problem sets, self-study, and group study; and

d) ends the following Tuesday with a high-level discussion between students and faculty in both Small Group Discussions and Journal Clubs.

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<td>Lecture and Problem Set released</td>
<td>View Lecture</td>
<td>Large Group Discussion</td>
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<td>Work on Problem Set in student groups</td>
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All course materials and handouts will be posted on the course's online syllabus.

View the Course Introduction video for a further description of course objectives and logistics.

Epidemiology: Beyond the Basics by M. Szklo and F. Nieto (S & N). Jones and Bartlett Publishers. 4th edition. 2019. This is the textbook followed most closely by the course, although we stray considerably from it towards the end of the course. Some students find the slide notes and other articles that accompany each lecture to be sufficient for their understanding of the weekly material, while others benefit from the additional perspective provided by this text.

Stata Statistical Software (Stata Corporation, College Station, TX) will be used; version 13 or higher is acceptable. A six-month student license for Stata/IC is the least expensive option that will be suitable to
complete all course assignments, but Stata/SE is recommended for robust future use. The TICR Program has arranged for a sizeable discount for UCSF-affiliated personnel.

dagitty.net, an open source browser-based environment for creating, editing, and analyzing directed acyclic graphs.

Books may be purchased either through the publisher or a variety of commercial venues (e.g., Amazon.com).

Students may find other textbooks useful to enhance their learning. Textbooks which discuss the material at a slightly less advanced level than our course include:

**Epidemiology Matters** by K. Keyes and S. Galea. Oxford University Press. 2014.


Textbooks which cover the material at a more advanced level include:


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**GRADING**

Grades will be based on total points achieved on the weekly problem set homework assignments (~75%) and the final exam (~25%). The lowest weekly problem set score will be dropped. Weekly problem sets are due at the start of the Small Group Section. **Please note that late assignments are not accepted.** Scholars unable to attend Small Group Sections are expected to email their assignments to their section leader by the beginning of the session. Answer keys to problem sets will be posted following the Small Group Section.

Students not in full-year TICR Programs who satisfactorily pass all course requirements will, upon request, receive a Certificate of Course Completion.

**UCSF Graduate Division Policy on Disabilities**

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**TO ENROLL**

This course is sponsored by the Training in Clinical Research (TICR) Program, and space is limited. Preference is given to UCSF-affiliated personnel. We regret that auditing in the classroom is not permitted, but most of the course materials (with the exception of videotapes, answer keys, examinations, and copyrighted documents) are freely available (without formal enrollment) on the course’s online syllabus. Many students can glean the majority of the course’s content from this free access, but, importantly, formal enrollment also provides access to faculty for questions and individual-level extension of the curriculum, a community of other engaged students for in-person real-time discussion, and personalized correction and feedback on homework and projects.

To enroll in this course, please fill out and submit the application below. Please see our fees page for cost information. The deadline for application is September 7, 2020. Only one application needs to be completed for all courses desired during the quarter.

The application is best completed using the latest version of Firefox, Chrome or Safari.
| APPLICATION | Information for how to pay; please read before applying |