

Health Research and Policy

Courses offered by the Department of Health Research and Policy are listed under the subject code HRP on the (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=HRP&filter-catalognumber-HRP=on>) Stanford Bulletin's (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=HRP&filter-catalognumber-HRP=on>) ExploreCourses web site (<http://explorecourses.stanford.edu/CourseSearch/search?view=catalog&catalog=&page=0&q=HRP&filter-catalognumber-HRP=on>).

The Department of Health Research and Policy has three principal areas of scholarly interest:

1. Biostatistics deals with scientific methodology in the medical sciences, emphasizing the use of statistical techniques.
2. Epidemiology is the study of the distribution and determinants of illness and impairment in human populations. Epidemiology training provides analytic tools for clinical and translational research, including studies of disease etiology, prevention, and therapy.
3. Health Services Research is concerned with many aspects of health policy analysis in the public and private sectors

Graduate Programs in Health Research Policy

The Program in Epidemiology and the Program in Health Services Research are housed in the Department of Health Research and Policy. These programs offer M.S. degrees in Epidemiology and in Health Services Research. Students with an interest in pursuing advanced degrees with an emphasis on biostatistics can do so through programs offered by the Department of Statistics. Division of Biostatistics faculty participate in these programs.

For additional information, address inquiries to the Educational Coordinator, Department of Health Research and Policy, Stanford University School of Medicine, HRP Redwood Building, Room T-152F, Stanford, California 94305-5405.

Master of Science in Health Policy

The master's degree program in Health Policy seeks to train students in the quantitative analysis of issues in health and medical care. The program emphasizes an individually designed program of course work and completion of a master's project under the mentorship of a faculty member. The typical student in the program is either a physician who has completed residency training and is preparing for a research career, or a student with a strong background in policy analysis who wishes to focus on problems in health or medical care. Faculty interests include outcomes research, health economics, health care organization, health care access, quality of care, decision analysis, clinical guidelines, and assessment of patient preferences and quality of life.

University requirements for the M.S. degree are described in the "Graduate Degrees (<http://exploreddegrees.stanford.edu/graduatedegrees>)" section of this bulletin.

To receive the degree, students are expected to demonstrate knowledge of issues in health policy and the quantitative skills necessary for research in this area. Students must take at least 45 units of course work and write a University thesis. The course work requirements are:

1. At least 8 units from the following group of Health Research and Policy (HRP) core courses:

		Units
HRP 256	Economics of Health and Medical Care	5
HRP 391	Health Law: Finance and Insurance	3
HRP 392	Analysis of Costs, Risks, and Benefits of Health Care	4
Total Units		12

2. At least 6 units of graduate-level statistics courses.

		Units
HRP 261 & HRP 262	Intermediate Biostatistics: Analysis of Discrete Data and Intermediate Biostatistics: Regression, Prediction, Survival Analysis (strongly recommended)	6
Total Units		6

3. At least 3 units of:

		Units
HRP 283	Health Services Research Core Seminar	1
Total Units		1

4. At least 15 units:

		Units
HRP 299 or HRP 399	Directed Reading in Health Research and Policy Graduate Research	1-18
Total Units		1-18

5. An additional set of approved elective courses to complete the program total of at least 45 units.

For additional information, address inquiries to the Educational Coordinator, Department of Health Research and Policy, Stanford University School of Medicine, HRP Redwood Building, Room T138C, Stanford, California 94305-5405.

Master of Science in Epidemiology

The Graduate Program in Epidemiology offers instruction and interdisciplinary research opportunities leading to the M.S. degree in Epidemiology. Epidemiology is the study of the distribution and determinants of illness and impairment in human populations. It is important in its own right, and epidemiologic methods are used by clinical investigators and by other scientists who conduct observational and experimental research on the identification, prevention, and treatment of human disorders.

Core and affiliated faculty come from the Department of Health Research and Policy; other Stanford University departments, and notable Bay Area research facilities. The Program has particular strengths in cancer epidemiology, cardiovascular disease epidemiology, infectious disease epidemiology, musculoskeletal disease epidemiology, neuroepidemiology, and aspects of epidemiologic methods, genetic epidemiology, and reproductive epidemiology and women's health.

The mission of the Stanford University School of Medicine is to be a premier research-intensive medical school that improves health through leadership and collaborative discoveries and innovation in patient care, education and research. With support from a NIH Clinical and Translational Science Award, the graduate program in Epidemiology fosters this mission through the training of physician investigators in techniques of clinical research. The department also considers students from other disciplines who would benefit from formal training in epidemiologic methods.

A typical student has the M.D. degree and is in the fellowship stage of his or her postgraduate training, or in an early stage of faculty development. Other students may not have prior clinical training. These may include

behavioral, social, and life scientists; law students; and students with the baccalaureate degree. They may wish to bring an epidemiologic orientation to their research or practice, or they may be considering careers in epidemiology or a related discipline.

University requirements for the M.S. degree are described in the "Graduate Degrees (<http://exploreddegrees.stanford.edu/graduatedegrees>)" section of this bulletin. Other programmatic requirements are in Graduate Program in Epidemiology, Information and Guidelines, available from the educational coordinator in the Department of Health Research and Policy.

To receive the M.S. degree, students are expected to obtain a grounding in epidemiologic methods and applied biostatistics and to demonstrate research skills through the completion of a thesis. Students must complete at least 45 units of course work:

1. Epidemiologic methods:

		Units
HRP 225	Design and Conduct of Clinical and Epidemiologic Studies	3-4
HRP 226	Advanced Epidemiologic and Clinical Research Methods	3-4
HRP 251	Design and Conduct of Clinical Trials	3

2. Biostatistics:

		Units
HRP 259	Introduction to Probability and Statistics for Epidemiology	3-4
HRP 261	Intermediate Biostatistics: Analysis of Discrete Data	3
HRP 262	Intermediate Biostatistics: Regression, Prediction, Survival Analysis	3

3. Research seminars:

		Units
HRP 236	Epidemiology Research Seminar (at least 3 units)	1

4. Research:

		Units
HRP 399	Graduate Research (at least 12 units)	1-18

5. Research conduct:

		Units
MED 255	The Responsible Conduct of Research	1
	Attend a Human Subjects Institutional Review Board meeting.	

6. Additional approved selective and elective courses to complete the program total of at least 45 units.

Students are assigned a methodology mentor from the Department of Health Research and Policy, and they also select a research mentor, who may be from another department. For physicians, the research mentor is often an affiliated faculty member from the department of the student's clinical specialty.

Ph.D. in Health Policy

A Ph.D. program in Health Policy has been approved to be effective in 2014-15. Degree requirements will appear here shortly.

Ph.D. in Epidemiology and Clinical Research

Overview

The field of epidemiology is poised to undergo major changes, and this Ph.D. program offers a cutting-edge curriculum that reflects this shift. Driven by technological advancements, the availability of very large

datasets, and the omics revolution, epidemiology is moving toward what some have called Big Epidemiology, where epidemiologists partner with other scientists to study vast amounts of data. Thus, this program will train epidemiologists and clinical researchers to be savvy in technology, computing, data mining, bioinformatics, and genomics. The curriculum capitalizes on Stanford's unique strengths in these disciplines.

After matriculating, students will meet with their academic advisers to plan out an individually tailored curriculum. Students who matriculate with prior training in epidemiology and statistics may replace introductory core courses with more advanced courses, subject to approval. Beyond core course requirements, students select electives that delve deeper into a particular area of specialization of their choosing. Innovative online learning approaches will help meet the needs of physician-students, who will also be busy with clinical duties.

Students will take core courses in epidemiology and biostatistics. In addition to these core courses, Ph.D. students must additionally take 3 "big epidemiology" elective courses in three key areas:

1. an advanced quantitative course (encompassing statistics, computer science, or economics)
2. a big data course
3. a genetics/genomics/bioinformatics course.

Degree Requirements

University requirements for the Ph.D. are described in the "Graduate Degrees (<http://stanford.edu/dept/registrar/bulletin/4901.htm>)" section of this bulletin.

Ph.D. students must complete a minimum of 135 units (as per University requirements), including 45 course units exclusive of HRP 236 Epidemiology Research Seminar, HRP 299 Directed Reading in Health Research and Policy, and HRP 399 Graduate Research .

		Units
Epidemiologic methods sequence		
HRP 225	Design and Conduct of Clinical and Epidemiologic Studies	3-4
HRP 226	Advanced Epidemiologic and Clinical Research Methods	3-4
HRP 251	Design and Conduct of Clinical Trials	3
Biostatistics sequence		
HRP 259	Introduction to Probability and Statistics for Epidemiology	3-4
HRP/STATS 261	Intermediate Biostatistics: Analysis of Discrete Data	3
"Big Epidemiology" elective course		
Take one of the following advanced quantitative courses		3-4
Any 200-level STATS course (other than STATS 260)		
STATS 116	Theory of Probability	
HRP 216	Analytical and Practical Issues in the Conduct of Clinical and Epidemiologic Research	
HRP/STATS 262	Intermediate Biostatistics: Regression, Prediction, Survival Analysis	
HRP 252	Outcomes Analysis	
HRP 392	Analysis of Costs, Risks, and Benefits of Health Care	
HRP/MED 206/STATS 211	Meta-research: Appraising Research Findings, Bias, and Meta-analysis	
Big data course		
Take one of the following big data courses		3-4
BIOMEDIN 215	Data Driven Medicine	

CS 246	Mining Massive Data Sets	
STATS 202	Data Mining and Analysis	
CS 229A		
Genetics/genomics/bioinformatics course		
Take one of the following genetics/genomics/bioinformatics courses		3-4
HRP 228	Genetic Epidemiology	
BIOMEDIN/ 217/CS 275	Translational Bioinformatics	
GENE 244	Introduction to Statistical Genetics	
BIOMEDIN 258		
GENE 224	Principles of Pharmacogenomics	
CS 262	Computational Genomics	
BIOMEDIN/ DBIO/CS 273A	A Computational Tour of the Human Genome	
GENE 210/ DBIO 220	Genomics and Personalized Medicine	
STATS 345	Statistical and Machine Learning Methods for Genomics	
GENE 245	Statistical and Machine Learning Methods for Genomics	
STATS 166		
Other core courses/requirements		
HRP 236	Epidemiology Research Seminar ((take at least 6 quarters))	6
MED 255	The Responsible Conduct of Research	1
Electives		
Take electives chosen in consultation with the academic adviser to total		64-71
135 units.		
Total Units Required		135

Additional Requirements

- Attendance at one meeting of the Human Subjects Panel (Institutional Review Board).
- Attendance at one meeting of the GCRC Protocol Review Committee.
- R Proficiency: students must show proficiency in the computing language R or must take an approved course in R.
- Each doctoral student must also serve as a teaching assistant for at least one quarter in either an epidemiology core course, a biostatistics course, or an approved elective course.
- Doctoral students fulfill the remaining University unit requirements through doctoral dissertation work.

Health Research and Policy

Emeriti: (Professors) Dan Bloch, John Farquhar, Victor R. Fuchs

Chair: Phil Lavori

Co-Chair: Robert Tibshirani

Professors: Laurence Baker, Bradley Efron, Trevor Hastie, Victor W. Henderson, Mark Hlatky, John Ioannidis, Iain M. Johnstone, Abby C. King, Philip W. Lavori, Ying Lu, Yvonne Maldonado, Richard A. Olshen, Julie Parsonnet, Robert Tibshirani, Alice S. Whittemore, Dee W. West, Wing Wong

Associate Professor: M. Kate Bundorf, Lorene M. Nelson, Chiara Sabatti

Assistant Professors: Marc Coram, Allison Kurian, Mei-Chiung Shih, Weiva Sieh, Lu Tian

Assistant Professors (Clinical): Rita Papat, Kristin Sainani

Courtesy Professors: Mary Goldstein, Paul Heidenreich, Daniel Kessler, Alex Macario, Douglas Owens, Paul Wise

Courtesy Associate Professors: Jay Bhattacharya, David R. Rogosa

Courtesy Assistant Professors: Grant Miller

Senior Lecturer: Irene Corso

Lecturers: Raymond Balise, Scarlett Gomez, Laurel Habel, De Kun Li, David Lilienfeld, Cynthia O'Malley, Caroline Tanner, Stephen Van Den Eeden

Consulting Professors: Gary Friedman, Elizabeth Holly, Marion Lee, George Lundberg, Peggy Reynolds

Consulting Associate Professors: Paul Barnett, Sally Glaser, Pamela Horn-Ross, Esther John, Ciaran Phibbs

Consulting Assistant Professors: Ellen Chang, Christina Clarke-Dur, Theresa Keegan, Bang Nguyen, Ingrid Oakley-Girvan, Rudy Rull, Todd Wagner

Health Services Research

Director: Mark Hlatky (Professor, Health Research and Policy, and Medicine)

Executive Committee: Laurence Baker (Professor, Health Research and Policy), M. Kate Bundorf (Associate Professor, Health Research and Policy), Mary Goldstein (Professor, Medicine), Mark Hlatky (Professor, Health Research and Policy, and Medicine), Douglas Owens (Professor, Medicine)

Participating Faculty and Staff by Department:

Anesthesia: Alex Macario (Professor)

Business: Alain Enthoven (Professor, emeritus)

Health Research and Policy: Laurence Baker (Professor), Paul Barnett (Consulting Associate Professor), M. Kate Bundorf (Associate Professor), Victor Fuchs (Professor, emeritus), Trevor Hastie (Professor), Mark Hlatky (Professor), Philip Lavori (Professor), Richard Olshen (Professor), Ciaran Phibbs (Consulting Associate Professor), Joseph Selby (Consulting Professor), Robert Tibshirani (Professor)

Law: Henry Greely (Professor), Daniel Kessler (Professor)

Management Science and Engineering: Margaret Brandeau (Professor)

Medicine: Jay Bhattacharya (Associate Professor), Jeremy Goldhaber-Fiebert (Assistant Professor), Mary Goldstein (Professor), Michael Gould (Associate Professor), Paul Heidenreich (Associate Professor), Mark Hlatky (Professor), Grant Miller (Assistant Professor), Douglas Owens (Professor), Wolfgang Winkelmayr (Associate Professor)

Pediatrics: Paul Wise (Professor)

Psychiatry: Rudolph Moos (Professor, emeritus)

Sociology: Richard Scott (Professor, emeritus)

Epidemiology

Director: Victor W. Henderson (Professor, Health Research and Policy, and Neurology and Neurological Sciences)

Core Faculty and Academic Teaching Staff: Raymond R. Balise (Lecturer, Health Research and Policy), Gary D. Friedman (Consulting Professor, Health Research and Policy), Victor W. Henderson (Professor, Health Research and Policy, and Neurology and Neurological Sciences), Abby C. King (Professor, Health Research and Policy, and Medicine), Allison Kurian (Assistant Professor, Medicine, and Health Research and Policy), Philip Lavori (Professor, Health Research and Policy), Yvonne A. Maldonado (Professor, Pediatrics), Lorene M. Nelson (Associate Professor,

Health Research and Policy), Julie Parsonnet (Professor, Medicine, and Health Research and Policy), Rita A. Popat (Clinical Assistant Professor, Health Research and Policy), Kristin L. Sainani (Clinical Assistant Professor, Health Research and Policy), Weiva Sieh (Assistant Professor, Health Research and Policy), Dee W. West (Professor, Health Research and Policy), Alice S. Whittemore (Professor, Health Research and Policy)

Courses

HRP 28SI. Alternative Spring Break: Prevention, Treatment, and Policy Perspectives on Alzheimer's Disease. 1 Unit.

Examines four aspects of Alzheimer's disease. Goal is to give participants a clearer sense of the struggle that patients actually feel and experience during the progression of the disease. Also explores difficulties and issues that many relatives face in assuming the responsibility of full-time caregiver for an Alzheimer's patient. Addresses ethical considerations on genetic testing, should these advances be embraced or should we be wary of the knowledge they may bring? Finally, explores the notion of service through engaged scholarship by exposing oneself to cutting-edge discoveries as researchers attempt to unravel the puzzle.

HRP 89Q. Introduction to Cross Cultural Issues in Medicine. 3 Units.

Preference to sophomores. Introduction to social factors that impact health care delivery, such as ethnicity, immigration, language barriers, and patient service expectations. Focus is on developing a framework to understand culturally unique and non-English speaking populations in the health care system.

HRP 198. Unite, Empower, Experience: Understanding the Universality of Women's Health. 1 Unit.

Directed reading course reading. Focus is on the impact of the unique challenges women face in the healthcare system on women and their communities. Examines the current state of women's health from global perspective, considering: community health, health policy, and the medical technology sector.

HRP 199. Undergraduate Research. 1-18 Unit.

Students undertake investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

HRP 201A. Health Policy PhD Core Seminar I--First Year. 2 Units.

Seminar series is the core tutorial for first-year Health Policy and Health Services Research graduate students. Major themes in fields of study including health insurance, healthcare financing and delivery, health systems and reform and disparities in the US and globally, health and economic development, health law and policy, resource allocation, efficiency and equity, healthcare quality, measurement and the efficacy and effectiveness of interventions. Blocks of session led by Stanford expert faculty in particular fields of study.

Same as: MED 215A

HRP 201B. Health Policy PhD Core Seminar II--First Year. 2 Units.

Second in a three-quarter seminar series is the core tutorial for first-year Health Policy and Health Services Research graduate students. Major themes in fields of study including health insurance, healthcare financing and delivery, health systems and reform and disparities in the US and globally, health and economic development, health law and policy, resource allocation, efficiency and equity, healthcare quality, measurement and the efficacy and effectiveness of interventions. Blocks of session led by Stanford expert faculty in particular fields of study.

Same as: MED 215B

HRP 201C. Health Policy PhD Core Seminar III--First Year. 2 Units.

Third in a three-quarter seminar series is the core tutorial for first-year Health Policy and Health Services Research graduate students. Major themes in fields of study including health insurance, healthcare financing and delivery, health systems and reform and disparities in the US and globally, health and economic development, health law and policy, resource allocation, efficiency and equity, healthcare quality, measurement and the efficacy and effectiveness of interventions. Blocks of session led by Stanford expert faculty in particular fields of study.

Same as: MED 215C

HRP 206. Meta-research: Appraising Research Findings, Bias, and Meta-analysis. 3 Units.

Open to graduate, medical, and undergraduate students. Appraisal of the quality and credibility of research findings; evaluation of sources of bias. Meta-analysis as a quantitative (statistical) method for combining results of independent studies. Examples from medicine, epidemiology, genomics, ecology, social/behavioral sciences, education. Collaborative analyses. Project involving generation of a meta-research project or reworking and evaluation of an existing published meta-analysis. Prerequisite: knowledge of basic statistics.

Same as: CHPR 206, MED 206, STATS 211

HRP 207. Introduction to Concepts and Methods in Health Services and Policy Research I. 2 Units.

Primarily for medical students in the Health Services and Policy Research scholarly concentration. Topics include health economics, statistics, decision analysis, study design, quality measurement, cost benefit and effectiveness analysis, and evidence based guidelines.

HRP 208. Introduction to Concepts and Methods in Health Services and Policy Research II. 3 Units.

Primarily for medical students in the Health Services and Policy Research scholarly concentration; continuation of 207. Topics include health economics, statistics, decision analysis, study design, quality measurement, cost benefit and effectiveness analysis, and evidence based guidelines. Recommended: 207.

HRP 209. Health Law: The FDA. 2-3 Units.

(Same as LAW 458) Open to law and medical students; other graduate students by consent of instructor. The FDA's regulatory authority over drugs, biologics, medical devices, and dietary supplements. The nature of the pharmaceutical, biotech, medical device, and nutritional supplement industries.

HRP 210. Health Law and Policy. 3 Units.

(Same as Law 313) Open to law, medicine, business, and graduate students. Focus this term is on the physician/patient relationship, medical ethics, and public health law.

HRP 211. Law and the Biosciences: Neuroscience. 3 Units.

(Same as LAW 368) Legal, social, and ethical issues arising from advances in neuroscience, including effects upon law and society through improvements in predicting illnesses and behaviors, reading minds through neuroimaging, understanding responsibility and consciousness, treating criminal behavior, and cognitive enhancement.

HRP 212. Cross Cultural Medicine. 3 Units.

Developing interviewing and behavioral skills needed to facilitate culturally relevant health care across all population groups. Discussions focus on explicit and implicit cultural influences operating in formal and informal medical contexts.

HRP 213. Writing in the Sciences. 2-3 Units.

Primarily for medical students in the Clinical Research Scholarly concentration; open to graduate students except Epidemiology graduate students. Development of research questions and plans for statistical analysis. Study design, sample size and power calculations, and statistical analysis of study data. Analytic methods to carry out statistical power and sample size calculations. Prerequisites: 225, and 258 or 259, or consent of instructor.

HRP 214. Scientific Writing. 2-3 Units.

Step-by-step through the process of writing and publishing a scientific manuscript. How to write effectively, concisely, and clearly. Preparation of an actual scientific manuscript. Students are encouraged to bring a manuscript on which they are currently working to develop and polish throughout the course.

HRP 215. Scientific Writing for Basic and Translational Scientists. 2-3 Units.

Teaches students in the basic sciences how to write clearly, concisely, and effectively. Focuses on the process of writing and publishing a scientific manuscript. 3 unit option requires work on a manuscript. Not intended for epidemiology graduate students.

HRP 216. Analytical and Practical Issues in the Conduct of Clinical and Epidemiologic Research. 2-3 Units.

Topics include: advanced aspects of study design and data analyses; evaluating confounding and interaction; modeling continuous characteristics of exposure; building prediction models; methods of summarizing literature and quantifying effect sizes (meta-analysis); handling missing data; and propensity score methods. 3 units requires a data analysis project. Prerequisites: 258 or 261, or consent of instructor.

HRP 218. Methods for Health Care Delivery Innovation, Implementation and Evaluation. 2 Units.

Preference given to postgraduate fellows and graduate students. Focus is on implementation science and evaluation of health care delivery innovations. Topics include implementation science theory, frameworks, and measurement principles; qualitative and quantitative approaches to designing and evaluating new health care models; hybrid design trials that simultaneously evaluate implementation and effectiveness; distinction between quality improvement and research, and implications for regulatory requirements and publication; and grant-writing strategies for implementation science and evaluation. Students will develop a mock (or actual) grant proposal to conduct a needs assessment or evaluate a Stanford/VA/community intervention, incorporating concepts, frameworks, and methods discussed in class. Priority for enrollment for CHPR 212 will be given to CHPR master's students.

Same as: CHPR 212, MED 212

HRP 219. Evaluating Technologies for Diagnosis, Prediction and Screening. 3 Units.

New technologies designed to monitor and improve health outcomes are constantly emerging, but most fail in the clinic and in the marketplace because relatively few are supported by reliable, reproducible evidence that they produce a health benefit. This course covers the designs and methods that should be used to evaluate technologies to diagnose patients, predict prognosis or other health events, or screen for disease. These technologies can include devices, statistical prediction rules, biomarkers, gene panels, algorithms, imaging, or any information used to predict a future or a previously unknown health state. Specific topics to be covered include the phases of test development, how to frame a proper evaluation question, measures of test accuracy, Bayes theorem, internal and external validation, prediction evaluation criteria, decision analysis, net-utility, ROC curves, c-statistics, net reclassification index, decision curves and reporting standards. Examples of technology assessments and original methods papers are used. Software used in the course is R or Stata. Open to graduate students with a solid understanding of introductory biostatistics, epidemiologic and clinical research study design, and of medical conditions and related technologies required. Basic understanding of Stata or R is also required. Undergraduates may enroll with consent of instructor.

HRP 220. BIOTECHNOLOGY LAW AND POLICY. 3 Units.

(Same as LAW 440) Open to all law or medical students; other graduate students by consent of the instructor. Focuses on the biotechnology industry, with some discussion of the "med tech" or medical device industry and the pharmaceutical industry. The life cycle of a biotech firm, from a good idea to a start-up company to FDA approval and beyond. Guest speakers. In addition to a final exam, students are required to participate in a group project during the term, making law and business recommendations about a biotech firm.

HRP 221. Law and the Biosciences: Genetics. 3 Units.

(Same as LAW 480) Open to all law or medical students; other graduate students by consent of the instructor. Focus is on ethical, legal, and social issues arising from advances in our knowledge of human genetics. Includes forensic uses of genetics, genetic testing, widespread whole genome sequencing, the consequences of genetics for human reproduction, and the ethics of genomic biobanks for research. Research paper required.

HRP 222A. Advising Congress on Health Policy. 1 Unit.

(Same as LAW 413L) Focus on conducting research on national health policy problems for the Medicare Payment Advisory Commission, or MedPAC. Students work in teams with lawyers and PhD economists from MedPAC, resident and fellow physicians from Stanford Hospital, and other students from throughout the University on expanding the healthcare workforce through reform of states' scope of practice regulation or designing antitrust policy to achieve the benefits of coordination and avoid the costs of consolidation. Application required.

HRP 222B. Advising Congress on Health Policy. 2 Units.

(Same as LAW 413L) Focus on conducting research on national health policy problems for the Medicare Payment Advisory Commission, or MedPAC. Students work in teams with lawyers and PhD economists from MedPAC, resident and fellow physicians from Stanford Hospital, and other students from throughout the University on expanding the healthcare workforce through reform of states' scope of practice regulation or designing antitrust policy to achieve the benefits of coordination and avoid the costs of consolidation. Application required.

HRP 223. Introduction to Data Management and Analysis in SAS. 2 Units.

Provides hands-on introduction to basic data management and analysis techniques using SAS. Data management topics include: Introduction to SAS and SAS syntax, importing data, creating and reading SAS datasets, data cleaning and validation, creating new variables, and combining data sets. Analysis techniques include: basic descriptive statistics (e.g., means, frequency) and bivariate procedures for continuous and categorical variables (e.g., t-tests, chi-squares).

HRP 225. Design and Conduct of Clinical and Epidemiologic Studies. 3-4 Units.

Intermediate-level. The skills to design, carry out, and interpret epidemiologic studies, particularly of chronic diseases. Topics: epidemiologic concepts, sources of data, cohort studies, case-control studies, cross-sectional studies, sampling, measures of association, estimating sample size, and sources of bias. Prerequisite: A basic/introductory course in statistics or consent of instructor.

HRP 226. Advanced Epidemiologic and Clinical Research Methods. 3-4 Units.

The principles of measurement, measures of effect, confounding, effect modification, and strategies for minimizing bias in clinical and epidemiologic studies. Students enrolled for 4 units complete an additional assignment or paper. Prerequisite: 225 or consent of instructor.

HRP 228. Genetic Epidemiology. 2 Units.

Provides framework for physicians, epidemiologists, and other scientists to interpret the literature and incorporate genetic information into human disease research. Topics include: common genetic measures, approaches to finding disease genes, study design and analysis issues, genome-wide association studies, meta-analysis of genetic studies, genetic risk prediction, and applications of new genomic technologies. Includes reading seminal papers in genetic epidemiology.

HRP 229. Spectrum Scholars Seminar. 1 Unit.

Preference to trainees awarded Stanford internal KL2, TL1 grants. Focus is on students and junior faculty who have received a Spectrum KL2 or TL1 Award. Discussions include progress and challenges involved in starting and conducting clinical research, current courses, time management and resources; support from peers; education and professional development. All scholars are required to attend a weekly seminar series meeting throughout the year that will cover an array of cross-cutting methodological topics with published examples of implementation. Prerequisite: Awarded a Spectrum KL2, TL1 Grant or Spectrum UL1.

HRP 230. Cancer Epidemiology. 2-3 Units.

Descriptive epidemiology and sources of incidence/mortality data; the biological basis of carcinogenesis and its implications for epidemiologic research; methodological issues relevant to cancer research; causal inference; major environmental risk factors; genetic susceptibility; cancer control; examples of current research; and critique of the literature. 3 units requires paper or project. Prerequisite: 225, or consent of instructor.

HRP 231. Epidemiology of Infectious Diseases. 3 Units.

Principles of the transmission of the infectious agents (viruses, bacteria, rickettsiae, mycoplasma, fungi, and protozoan and helminth parasites). The role of vectors, reservoirs, and environmental factors. Pathogen and host characteristics that determine the spectrum of infection and disease. Endemicity, outbreaks, and epidemics of selected infectious diseases. Principles of control and surveillance.

HRP 235. Designing Research-Based Interventions to Solve Global Health Problems. 3-4 Units.

The excitement around social innovation and entrepreneurship has spawned numerous startups focused on tackling world problems, particularly in the fields of education and health. The best social ventures are launched with careful consideration paid to research, design, and efficacy. This course offers students insights into understanding how to effectively develop, evaluate, and scale social ventures. Using TeachAIDS (an award-winning nonprofit educational technology social venture used in 78 countries) as a primary case study, students will be given an in-depth look into how the entity was founded and scaled globally. Guest speakers will include world-class experts and entrepreneurs in Philanthropy, Medicine, Communications, Education, and Technology. Open to both undergraduate and graduate students.

Same as: AFRICAST 135, AFRICAST 235, EDUC 135, EDUC 335, HUMBIO 26, MED 235

HRP 236. Epidemiology Research Seminar. 1 Unit.

Weekly forum for ongoing epidemiologic research by faculty, staff, guests, and students, emphasizing research issues relevant to disease causation, prevention, and treatment. May be repeated for credit.

HRP 237. Practical Approaches to Global Health Research. 3 Units.

Enrollment limited to graduate students; undergraduates in their junior or senior year may enroll with consent of instructor only. Introduces research methods for conducting studies involving health in low-income context. Focuses on developing a concept note to support a funding proposal. addressing research question of student's interest. Skills developed include developing a compelling research question; synthesizing a focused literature review; selecting and adapting appropriate study design, target population, sampling methods, data collection and analysis; addressing human subject issues; developing productive cross-collaboration.

Same as: IPS 290, MED 226

HRP 238. Genes and Environment in Disease Causation: Implications for Medicine and Public Health. 2-3 Units.

The historical, contemporary, and future research and practice among genetics, epidemiology, clinical medicine, and public health as a source of insight for medicine and public health. Genetic and environmental contributions to multifactorial diseases; multidisciplinary approach to enhancing detection and diagnosis. The impact of the Human Genome Project on analysis of cardiovascular and neurological diseases, and cancer. Ethical and social issues in the use of genetic information. Prerequisite: basic course in genetics; for undergraduates, Human Biology core or equivalent or consent of instructor.

Same as: HUMBIO 159

HRP 239. Statistical Methods for Group Comparisons and Causal Inference. 3 Units.

Critical examination of statistical methods in social science and life sciences applications, especially for cause and effect determinations. Topics: mediating and moderating variables, potential outcomes framework, encouragement designs, multilevel models, matching and propensity score methods, analysis of covariance, instrumental variables, compliance, path analysis and graphical models, group comparisons with longitudinal data. See <http://rogosateaching.com/stat209/>. Prerequisite: intermediate-level statistical methods.

Same as: EDUC 260A, STATS 209

HRP 251. Design and Conduct of Clinical Trials. 3 Units.

The rationale for phases 1-3 clinical trials, the recruitment of subjects, techniques for randomization, data collection and endpoints, interim monitoring, and reporting of results. Emphasis is on the theoretical underpinnings of clinical research and the practical aspects of conducting clinical trials.

HRP 252. Outcomes Analysis. 4 Units.

Methods of conducting empirical studies which use large existing medical, survey, and other databases to ask both clinical and policy questions. Econometric and statistical models used to conduct medical outcomes research. How research is conducted on medical and health economics questions when a randomized trial is impossible. Problem sets emphasize hands-on data analysis and application of methods, including re-analyses of well-known studies. Prerequisites: one or more courses in probability, and statistics or biostatistics.

Same as: BIOMEDIN 251, MED 252

HRP 255. Observational Studies. 2-3 Units.

This course will cover statistical methods for the design and analysis of observational studies. Topics for the course will include the potential outcomes framework for causal inference; randomized experiments; methods for controlling for observed confounders in observational studies; sensitivity analysis for hidden bias; instrumental variables; tests of hidden bias; coherence; and design of observational studies.

Same as: STATS 355

HRP 256. Economics of Health and Medical Care. 5 Units.

Institutional, theoretical, and empirical analysis of the problems of health and medical care. Topics: demand for medical care and medical insurance; institutions in the health sector; economics of information applied to the market for health insurance and for health care; measurement and valuation of health; competition in health care delivery. Graduate students with research interests should take ECON 249. Prerequisites: ECON 50 and either ECON 102A or STATS 116 or the equivalent. Recommended: ECON 51.

Same as: BIOMEDIN 156, BIOMEDIN 256, ECON 126

HRP 258. Introduction to Probability and Statistics for Clinical Research. 3 Units.

Open to medical and graduate students; required of medical students in the Clinical Research Scholarly Concentration. Tools to evaluate medical literature. Topics include random variables, expectation, variance, probability distributions, the central limit theorem, sampling theory, hypothesis testing, confidence intervals, correlation, regression, analysis of variance, and survival analysis.

HRP 259. Introduction to Probability and Statistics for Epidemiology. 3-4 Units.

Topics: random variables, expectation, variance, probability distributions, the central limit theorem, sampling theory, hypothesis testing, confidence intervals. Correlation, regression, analysis of variance, and nonparametric tests. Introduction to least squares and maximum likelihood estimation. Emphasis is on medical applications. Differential between 3 and 4 units is the amount of out-of-class work required.

HRP 260A. Workshop in Biostatistics. 1-2 Unit.

Applications of statistical techniques to current problems in medical science. To receive credit for one or two units, a student must attend every workshop. To receive two units, in addition to attending every workshop, the student is required to write an acceptable one page summary of two of the workshops, with choices made by the student.
Same as: STATS 260A

HRP 260B. Workshop in Biostatistics. 1-2 Unit.

Applications of statistical techniques to current problems in medical science. To receive credit for one or two units, a student must attend every workshop. To receive two units, in addition to attending every workshop, the student is required to write an acceptable one page summary of two of the workshops, with choices made by the student.
Same as: STATS 260B

HRP 260C. Workshop in Biostatistics. 1-2 Unit.

Applications of statistical techniques to current problems in medical science. To receive credit for one or two units, a student must attend every workshop. To receive two units, in addition to attending every workshop, the student is required to write an acceptable one page summary of two of the workshops, with choices made by the student.
Same as: STATS 260C

HRP 261. Intermediate Biostatistics: Analysis of Discrete Data. 3 Units.

Methods for analyzing data from case-control and cross-sectional studies: the 2x2 table, chi-square test, Fisher's exact test, odds ratios, Mantel-Haenzel methods, stratification, tests for matched data, logistic regression, conditional logistic regression. Emphasis is on data analysis in SAS. Special topics: cross-fold validation and bootstrap inference.
Same as: BIOMEDIN 233, STATS 261

HRP 262. Intermediate Biostatistics: Regression, Prediction, Survival Analysis. 3 Units.

Methods for analyzing longitudinal data. Topics include Kaplan-Meier methods, Cox regression, hazard ratios, time-dependent variables, longitudinal data structures, profile plots, missing data, modeling change, MANOVA, repeated-measures ANOVA, GEE, and mixed models. Emphasis is on practical applications. Prerequisites: basic ANOVA and linear regression.
Same as: STATS 262

HRP 263. Advanced Decision Science Methods and Modeling in Health. 3 Units.

Advanced methods currently used in published model-based cost-effectiveness analyses in medicine and public health, both theory and technical applications. Topics include: Markov and microsimulation models, model calibration and evaluation, and probabilistic sensitivity analyses. Prerequisites: a course in probability, a course in statistics or biostatistics, a course on cost-effectiveness such as HRP 392, a course in economics, and familiarity with decision modeling software such as TreeAge.
Same as: MED 263

HRP 267. Life Course Epidemiology. 2 Units.

The focus of this course is on understanding the evidence for how exposure at multiple levels and at multiple ages influences an individual's health at any given time. The course emphasizes the primary theories used to examine life course determinants of health and how these theories both facilitate and impede research. A secondary focus is on understanding the methodological challenges to studying health from a life course perspective, as well as how knowledge of life course determinants of health can inform interventions to improve health from a population perspective.

HRP 268. Genetics and Reproductive Technologies. 2 Units.

(Same as LAW 568) Examines the complex interrelationship among legal, political, ethical, and social issues shaping the intersection of genetics, reproductive technologies and reproductive rights. Issues discussed may include, but are not limited to: the commercialization and sale of reproductive materials like sperm, ovum, and surrogacy services; genetic technologies, prenatal genetic screening, and diagnostic testing of offspring; criminalization of reproductive decision-making such as sex-selection and genetic enhancement; stem cells, cloning, and abortion; DNA databanks and collection of genetic information; in vitro fertilization and other emerging reproductive technologies.

HRP 274. Design for Service Innovation. 4 Units.

(Same as OIT 343/01) Open to graduate students from all schools and departments. An experiential project course in which students work in multidisciplinary teams to design new services to address the needs of medically patients. Project teams partner with "safety net" hospitals and clinics to find better ways to deliver care to the low income and uninsured patients these institutions serve. Students learn proven innovation processes from experienced GSB, d. school, and SoM faculty, interface with students from across the university, and have the opportunity to see their ideas translated into improvements in the quality and efficiency of healthcare in the real world. Prerequisite: admission to the course is by application only. Applications available at <http://DesignForService.stanford.edu>. Applications must be submitted by November 16, 2011.
Same as: BIOE 372, MED 274

HRP 280. Spanish for Medical Students. 2-3 Units.

First quarter of three-quarter series. Goal is a practical and culturally appropriate command of spoken Spanish. Emphasis is on taking the medical history. Topics include the human body, hospital procedures, diagnostics, food, and essential doctor-patient phrases when dealing with Spanish-speaking patients. Series can be taken independently, depending on the level of prior knowledge. Offered to undergraduates for 3 units(2 units for medical students).
Same as: SPANLANG 121M

HRP 281. Spanish for Medical Students. 2 Units.

Second quarter of three-quarter series. Goal is a practical and culturally appropriate command of spoken Spanish. Emphasis is on performing a physical examination. Topics include the human body, hospital procedures, diagnostics, food, and essential doctor-patient phrases when dealing with Spanish-speaking patients. Series can be taken independently, depending on the level of prior knowledge. Offered to undergraduates for 3 units(2 units for medical students).
Same as: SPANLANG 122M

HRP 282. Spanish for Medical Students. 2-3 Units.

Third quarter of three-quarter series. Goal is a practical and culturally appropriate command of spoken Spanish. Emphasis is on different specialties and medical conditions. Topics include the human body, hospital procedures, diagnostics, food, and essential doctor-patient phrases when dealing with Spanish-speaking patients. Series can be taken independently, depending on the level of prior knowledge. Offered to undergraduates for 3 units(2 units for medical students).
Same as: SPANLANG 123M

HRP 283. Health Services Research Core Seminar. 1 Unit.

Presentation of research in progress and tutorials in the field of health services research.

HRP 290. Advanced Medical Spanish Oral Communication. 2 Units.

Enrollment limited to medical students. Designed to further develop linguistic skills, covering all medical specialties according to student needs. Sessions also include topics on patient education and diseases, such as diabetes, asthma, TB, and CVDs.

HRP 295. Advanced Topics in Epidemiologic and Clinical Research. 2 Units.

Topics include alternative study designs, causal inference methods, instrumental variables, time-varying confounding, registry-based research, missing data, and repeated events. Weekly readings and discussions will consider how these methods apply to numerous substantive areas including pharmacoepidemiology, reproductive and perinatal epidemiology, and many areas of chronic disease epidemiology. Prerequisite: HRP 225 and HRP 226 or permission of instructor.

HRP 296. Current Topics in Bioethics. 3 Units.

(Same as LAW 596) Explores the ethical, legal, and public policy issues arising from recent advances in biomedicine and the biosciences. Approaches to bioethical reasoning including casuistry, social justice, resource allocation, and individual rights in areas such as refusal of treatment conception. Topics include: the use of forensic genetics in criminal law, neuroscience and national security, race and ethnicity in genetic research, experimentation on human subjects and prisoners, privacy of medical and genetic information in the information age, synthetic biology, and do-it-yourself medical and genetic testing. No prior knowledge in science, medicine, philosophy or related disciplines is required.

HRP 299. Directed Reading in Health Research and Policy. 1-18 Unit.

Epidemiology, health services research, preventive medicine, medical genetics, public health, economics of medical care, occupational or environmental medicine, international health, or related fields. May be repeated for credit. Prerequisite: consent of instructor.

HRP 370. Medical Scholars Research. 4-18 Units.

Provides an opportunity for student and faculty interaction, as well as academic credit and financial support, to medical students who undertake original research. Enrollment is limited to students with approved projects.

HRP 391. Health Law: Finance and Insurance. 3 Units.

(SAME AS LAW 348, MGTECON 331) Provides the legal, institutional, and economic background necessary to understand the financing and production of health services in the U.S. Potential topics include: health reform, health insurance (Medicare and Medicaid, employer-sponsored insurance, the uninsured), medical malpractice and quality regulation, pharmaceuticals, the corporate practice of medicine, regulation of fraud and abuse, and international comparisons.

Same as: PUBLPOL 231

HRP 392. Analysis of Costs, Risks, and Benefits of Health Care. 4 Units.

(Same as MGTECON 332) For graduate students. How to do cost/benefit analysis when the output is difficult or impossible to measure. How do M.B.A. analytic tools apply in health services? Literature on the principles of cost/benefit analysis applied to health care. Critical review of actual studies. Emphasis is on the art of practical application.

Same as: BIOMEDIN 432

HRP 399. Graduate Research. 1-18 Unit.

Investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

HRP 801. TGR Project. 0 Units.

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HRP 802. TGR Dissertation. 0 Units.

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