# HEALTH RESEARCH AND POLICY

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*Co-Chair:* Robert Tibshirani
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*Associate Professors:* Laurence Baker, Lorene M. Nelson, David Rogosa
*Assistant Professors:* M. Kate Bundorf, Marc Coram, Mei-Chiung Shih
*Assistant Professors (Clinical):* Rita Popat, Kristin Sainani
*Courtesy Professors:* Stephen P. Fortmann, Alan M. Garber, Mary Goldstein, Daniel Kessler, Alex Macario, Douglas Owens, Paul Wise
*Courtesy Associate Professors:* Michael K. Gould, Paul Heidenreich, Yvonne Maldonado, Mark McClellan (on leave), David R. Rogosa, Marilyn Winkleby
*Courtesy Assistant Professors:* Jay Bhattacharya, Grant Miller
*Senior Lecturer:* Irene Corso
*Lecturers:* Raymond Balise, Ellen Chang, Christina Clarke-Dur, Scarlett Gomez, Laurel Habel, Lisa Herrington, Theresa Keegan, 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, Joseph Selby
*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

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Courses given in Health Research and Policy have the subject code HRP. For a complete list of subject codes, see Appendix.

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

The Program in Epidemiology and the Program in Health Services Research are housed in the Department of Health Research and Policy. These programs, which offer M.S. degrees in Epidemiology and in Health Services Research, are described separately in the relevant sections of this bulletin. 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 T138C, Stanford, California 94305-5405.

## COURSES

Course and lab instruction in the Department of Health Research and Policy conforms to the "Policy on the Use of Vertebrate Animals in Teaching Activities," the text of which is available at http://www.stanford.edu/dept/DoR/rph/8-2.html.

**HRP 89Q. Introduction to Crosscultural Issues in Medicine**—Stanford Introductory Seminar. Preference to sophomores. Crosscultural issues that impact health care delivery such as ethnicity, immigration, language barriers, and service expectations. Focus is on culturally unique and non-English speaking populations and developing interpersonal and communication skills with diverse ethnic groups. GER:EC-AmerCul
*3 units, Win (Corso, I)*

**HRP 199. Undergraduate Research**—Investigations sponsored by individual faculty members. Prerequisite: consent of instructor.
*1-18 units, Aut, Win, Spr, Sum (Staff)*

**HRP 207,208. Issues and Methods of Health Services and Policy Research**—Primarily for students in the Health Services and Policy Research scholarly track. Health care systems and institutions, health insurance, regulation, cost effectiveness analysis, and medical decision making.
*2 units,* **207:** *Aut (Baker, L; McDonald, K; Haberland, C),*
**208:** *offered occasionally*

**HRP 209. FDA's Regulation of Health Care**—(Same as LAW 458.) Open to law or medical students; 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.
*3-4 units, Win (Greely, H)*

**HRP 210. Health Law and Policy I**—(Same as LAW 313.) Open to law or medical students and to qualified undergraduates by consent of instructor. Introduction to the American health care system and its legal and policy problems. Topics: the special characteristics of medical care compared to other goods and services, the difficulties of assuring quality care, the complex patchwork of the financing system, and the ethical problems the system raises.
*3-4 units, Aut (Greely, H)*

**HRP 211. Law and the Biosciences**—(Same as LAW 368.) For medical students; graduate students by consent of instructor. Legal, social, and ethical issues arising from advances in the biosciences. Focus is on human genetics; also advances in assisted reproduction and neuroscience. Topics include forensic use of DNA, genetic testing, genetic discrimination, eugenics, cloning, pre-implantation genetic diagnosis, neuroscientific methods of lie detection, and genetic or neuroscience enhancement.
*3 units, Win (Greely, H)*

**HRP 212. Crosscultural Medicine**—Interviewing and behavioral skills needed to facilitate culturally relevant health care across all population groups. Explicit and implicit cultural influences operating in formal and informal medical contexts.
*3 units, Spr (Corso, I)*

**HRP 213. Research Protocol Development for Clinical and Translational Research**—Primarily for medical students in the Clinical Research Scholarly concentration; open to graduate students except in Epidemiology. 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.
*2-3 units, not given this year*

**HRP 214. Scientific Writing**—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.
*2-3 units, Win (Sainani, K)*

**HRP 215. Scientific Writing for Basic and Translational Scientists**—Teaches students in the basic sciences how to write clearly, concisely, and effectively. Focuses on the process of writing and publishing a scientific manuscript. Not intended for epidemiology graduate students.

*2-3 units, not given this year*

**HRP 216. Analytical and Practical Issues in the Conduct of Clinical and Epidemiologic Research**—Topics include: advanced aspects of study design and data analyses; development of health measurement instruments; methods of summarizing literature and quantifying effect sizes; and multivariable nature of health events in human populations. 3 units requires a term paper. Prerequisites: 225, and 258 or 259, or consent of instructor.

*2-3 units, Spr (Popat, R)*

**HRP 223. Epidemiologic Analysis: Data Management and Statistical Programming**—The skills required for management and analysis of biomedical data. Topics include importing and exporting data from multiple database systems, visualizing and cleaning data, data management for multicenter projects, and data security. Introduction to applied statistical programming relevant to epidemiologic and clinical research. No previous programming experience required.

*2-3 units, Aut (Balise, R)*

**HRP 225. Design and Conduct of Clinical and Epidemiologic Studies**—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, estimating sample size, questionnaire design, and the effects of measurement error. Prerequisite: 159/259 or equivalent, or consent of instructor.

*3-4 units, Aut (Popat, R)*

**HRP 226. Advanced Epidemiologic and Clinical Research Methods**—The principles of measurement, measures of effect, confounding, effect modification, and strategies for minimizing bias in epidemiologic studies. Prerequisite: 225 or consent of instructor.

*3-4 units, Win (Nelson, L)*

**HRP 229. Chronic Disease Epidemiology**—Descriptive epidemiology and sources of incidence and mortality data; biological bases of neurological, musculoskeletal, cardiovascular, and other chronic diseases except cancer; methodological issues relevant to chronic epidemiologic research; causal inference; major environmental risk factors; genetic susceptibility; and examples of current research and critiques of literature. Prerequisite: 225 or consent of instructor.

*2-3 units, alternate years, not given this year*

**HRP 230. Cancer Epidemiology**—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.

*2-3 units, Win (West, D)*

**HRP 231. Epidemiology of Infectious Diseases**—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.

*3 units, alternate years, not given this year*

**HRP 234. Foundations of Pharmacoepidemiology**—Historical development of the field, the drug development process and pharmacoepidemiology's role in it, pharmacovigilance/drug safety systems, epidemiology in outcomes research, the role of pharmacoepidemiology in risk management, and classic examples of pharmacoepidemiologic investigations.

*2-3 units, alternate years, not given this year*

**HRP 236. Epidemiology Research Seminar**—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.

*1 unit, Aut, Win, Spr (Friedman, G; Henderson, V; Whittemore, A)*

**HRP 239. Understanding Statistical Models and their Social Science Applications**—(Same as EDUC 260X, STATS 209.) Information that statistical modeling can provide in experimental and non-experimental settings emphasizing misconceptions in social science applications such as causal modeling. Text is *Statistical Models: Theory and Practice*, by David Freedman. See http://www-stat.stanford.edu/~rag/stat209. Prerequisite: intermediate-level statistical methods including multiple regression, logistic regression, and log-linear models.

*3 units, Win (Rogosa, D)*

**HRP 251. Design and Conduct of Clinical Trials**—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.

*3 units, Spr (Henderson, V; Lavori, P)*

**HRP 252. Outcomes Analysis**—(Same as BIOMEDIN 251.) Methods of conducting empirical studies which use large existing medical, survey, and other databases to ask 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.

*3 units, Spr (Bhattacharya, J)*

**HRP 256. Economics of Health and Medical Care**—(Same as BIOMEDIN 156/256, ECON 126.) Graduate students with research interests should take ECON 248. Institutional, theoretical, and empirical analysis of the problems of health and medical care. Topics: institutions in the health sector; measurement and valuation of health; nonmedical determinants of health; medical technology and technology assessment; demand for medical care and medical insurance; physicians, hospitals, and managed care; international comparisons. Prerequisite: ECON 50 and 102A or equivalent statistics, or consent of instructor. Recommended: ECON 51.

*5 units, Aut (Bhattacharya, J)*

**HRP 258. Introduction to Probability and Statistics for Clinical Research**—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.

*3 units, Spr (Sainani, K)*

**HRP 259. Introduction to Probability and Statistics for Epidemiology**—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.

*4-5 units, Aut (Balise, R)*

**HRP 260A,B,C. Workshop in Biostatistics**—(Same as STATS 260A,B,C) Applications of statistical techniques to current problems in medical science. Enrollment for more than 2 units of credit involves extra reading or consulting and requires consent of instructor.

*1-2 units,* **A:** *Aut,* **B:** *Win,* **C:** *Spr (Olshen, R)*

**HRP 261. Intermediate Biostatistics: Analysis of Discrete Data**—(Same as BIOMEDIN 233, STATS 261.) The 2x2 table. Chi-square test. Fisher's exact test. Odds ratios. Sampling plans; case control and cohort studies. Series of 2x2 tables. Mantel Hantzel. Other tests. k x m tables. Matched data logistic models. Conditional logistic analysis, application to case-control data. Log-linear models. Generalized estimating equations for longitudinal data. Cell phones and car crashes: the crossover design. Special topics: generalized additive models, classification trees, bootstrap inference.

*3 units, Win (Sainani, K)*

**HRP 262. Intermediate Biostatistics: Regression, Prediction, Survival Analysis**—(Same as STATS 262.) 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.

*3 units, Spr (Sainani, K)*

**HRP 280,281,282. Spanish for Medical Students**—(Same as SPANLANG 121M,122M,123M.) Goal is a practical and rapid command of spoken Spanish. Topics: the human body, hospital procedures, diagnostics, food, and essential phrases for on-the-spot reference when dealing with Spanish-speaking patients. Series can be taken independently, depending on the level of prior knowledge.

*3 units,* **280:** *Aut,* **281:** *Win (Corso, I),* **282:** *Spr (Corso, I)*

**HRP 283. Health Services Research Core Seminar**—Presentation of research in progress and tutorials in the field of health services research.

*1 unit, Aut (Bundorf, M; Baker, L), Win (McDonald, K), Spr (Baker, L; Hlatky, M), Sum (McDonald, K)*

**HRP 290. Advanced Spanish Conversation**—Oral language skills covering pediatric, gynecological, and other specialty exams; patient health education and counseling; and diseases such as diabetes, asthma, and TB. Prerequisite: Spanish proficiency or consent of instructor.

*3 units, Aut, Win, Spr (Corso, I)*

**HRP 299. Directed Reading in Health Research and Policy**—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.

*1-18 units, Aut, Win, Spr, Sum (Staff)*

**HRP 351. Innovation and Management in Health Care**—(Same as GSBGEN 351.) The workings of the major institutions such as hospitals, health insurance companies, HMOs, Medicare and Medicaid, federal regulators, and the medical establishment. National health expenditures and alternative models for healthcare financing and delivery. Trends in treatment innovations provided by biopharmaceuticals, medical devices, and surgical procedures; delivery innovations facilitated by information systems and new processes. Policy and business challenges raised by these innovations and the health care ecosystems they promote.

*4 units, Win (Zenios, S; Chess, R)*

**HRP 391. Political Economy of Health Care in the United States**—(Same as MGTECON 331, PUBLPOL 231.) The economic tools and institutional and legal background to understand how markets for health care products and services work. Moral hazard and adverse selection. Institutional organization of the health care sector. Hospital and physician services markets, integrated delivery systems, managed care, pharmaceutical and medical device industries. Public policy issues in health care, medical ethics, regulation of managed care, patients' bill of rights, regulation of pharmaceuticals, Medicare reform, universal health insurance, and coverage of the uninsured. International perspectives, how other countries' health care systems evolved, and what the U.S. can learn from their experiences.

*4 units, Spr (Kessler, D; Bundorf, K)*

**HRP 392. Analysis of Costs, Risks, and Benefits of Health Care**—(Same as BIOMEDIN 432, MGTECON 332) For graduate students. The principal evaluative techniques for health care, including utility assessment, cost-effectiveness analysis, cost-benefit analysis, and decision analysis. Emphasis is on the practical application of these techniques. Group project presented at end of quarter. Guest lectures by experts from the medical school, pharmaceutical industry, health care plans, and government.

*4 units, Aut (Garber, A; Owens, D)*

**HRP 399. Graduate Research**—Investigations sponsored by individual faculty members. Prerequisite: consent of instructor.

*1-18 units, Aut, Win, Spr, Sum (Staff)*