

MODELING AND SIMULATION IN PUBLIC HEALTH: A LITTLE HELP CAN GO A LONG WAY

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ABSTRACT

The United States spends more per capita on health than any other nation, yet has worse health outcomes than many other countries. Moreover, expenditures on health in the U.S. are growing rapidly, and are taking up an increasingly larger share of per capita gross domestic product. Elsewhere in the world, some nations struggle with basic health issues such as sanitation and control of infectious diseases, while others are beginning to see epidemics of “Western style” diseases such as obesity, heart disease and cancer. In all cases, resources for health are insufficient to meet the need for disease prevention and treatment, so difficult resource allocation choices must be made.

This talk will describe examples from past and ongoing model-based analyses of public health policy questions, emphasizing the role that simulation can play. For example, how should the Centers for Disease Control and Prevention revise national immunization recommendations so that gaps in immunization coverage will be filled in a cost-effective manner? What is the most cost effective way to use limited HIV prevention and treatment resources? How much contact tracing should public health departments perform in their attempts to control infectious diseases? What logistical plans should local communities make to prepare for response to a potential bioterror attack? We describe example policy problems, the simulation analyses and resulting policy findings. We also provide perspectives on key elements of a successful policy analysis, ways in which such analysis can influence policy, and modeling and policy challenges for the future.



AUTHOR BIOGRAPHY

Margaret Brandeau is Professor of Management Science and Engineering and Professor of Medicine (by Courtesy) at Stanford University. Her research focuses on the development of applied mathematical and economic models to support health policy decisions. Her recent work has focused on HIV prevention and treatment programs, programs to control the spread of Hepatitis B virus, and evaluating preparedness plans for bioterror response. She has received a Presidential Young Investigator Award from the National Science Foundation, and the Pierskalla Prize from the Institute for Operations Research and the Management Sciences (INFORMS) for research excellence in health care management science. Professor Brandeau earned a B.S. in Mathematics, an M.S. in Operations Research from MIT, and a PhD in Engineering-Economic Systems from Stanford University. Her email address is [<brandeau@stanford.edu>](mailto:brandeau@stanford.edu).