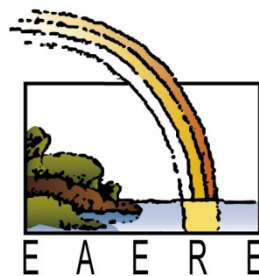


Methods for Research Synthesis: A Cross-Disciplinary Approach

Workshop Program

Harvard Center for Risk Analysis

October 3, 2013



Contents

Welcome Message.....1
Agenda.....2
Speakers and Presenters.....4

Methods for Research Synthesis: A Cross-Disciplinary Approach

Dear Colleagues,

We are pleased to welcome you to our workshop, “Methods for Research Synthesis: A Cross-Disciplinary Approach.” The methods we will be discussing today, including systematic review, meta-analysis, and expert elicitation, play an important role in almost every scholarly field as well as in policy development. We will be addressing difficult questions about how to choose among these methods and adapt them to different problems and data. We expect that, by bringing together those who work in diverse fields, we will develop a better understanding of how we might address common challenges as well as identify important innovations. The papers that are being presented today can be downloaded from our website, www.hcra.harvard.edu; we will post a summary of our discussions after the workshop.

The genesis of this event was a discussion at the 2010 Society for Risk Analysis Annual Meeting among a group that has played a vital role in developing and supporting this effort. They include:

- Elisabeth Gilmore, University of Maryland
- Julie Goodman, Gradient Corporation
- Sandra Hoffmann, U.S. Department of Agriculture
- Amber Jessup, U.S. Department of Health and Human Services
- Wilhelmine Miller, NORC at the University of Chicago
- Lorenz Rhomberg, Gradient Corporation
- Aylin Sertkaya, Eastern Research Group
- Katherine von Stackelberg, Harvard University
- Katherine Walker, Health Effects Institute

We are also indebted to those who have provided financial and other support, including the National Science Foundation, the Harvard Superfund Research Program Research Translation Core, the Harvard University Center for the Environment, the European Association of Environmental and Resource Economists, Gradient, the Health Effects Institute, the Texas Commission on Environmental Quality, the Society for Risk Analysis Economics and Benefits Analysis Specialty Group, and the U.S. Department of Agriculture Economics Research Service.

Finally, we would like to thank Elizabeth Guzy (Harvard Superfund Research Program) for her talented website assistance and Lisa Matthews (Harvard University Center for the Environment) for her extraordinary organizational skills.

We look forward to an interesting and productive day!

Sincerely,
James K. Hammitt and Lisa A. Robinson

Methods for Research Synthesis: A Cross-Disciplinary Approach

Knafel Center (Radcliffe Gymnasium)

October 3, 2013

Agenda

- 8:00-8:30 **Light Breakfast**
- 8:30-8:45 **Welcome and Overview** James K. Hammitt (Harvard University), Lisa A. Robinson (Harvard University)
- 8:45-9:15 **Introduction to Systematic Review and Meta-Analysis: A Health Care Perspective** Sally Morton (University of Pittsburgh)
- 9:15-9:45 **Introduction to Structured Expert Elicitation: A Risk Analysis Perspective** John Evans (Cyprus International Institute and Harvard University)
- 9:45-11:15 **Panel 1: Synthesis for Air Pollutant Risk Assessment** (Sally Morton, University of Pittsburgh, Chair)
- a) **Critical Issues in Combining Disparate Sources of Information to Estimate the Global Burden of Disease Attributable to Ambient Fine Particulate Matter Exposure** Hwashin H. Shin (Health Canada), Aaron Cohen (Health Effects Institute), C. Arden Pope III (Brigham Young University), Majid Ezzati (Imperial College London), Stephen S. Lim (Institute of Health Metrics Evaluation), Bryan Hubbell (U.S. Environmental Protection Agency), Richard T. Burnett* (Health Canada)
 - b) **Meta-Analytic Approaches for Multi-Stressor Dose-Response Function Development: Strengths, Limitations, and Case Studies** Jonathan I. Levy* (Boston University), M. Patricia Fabian (Boston University), Junenette L. Peters (Boston University)
 - c) **Rethinking Meta-Analysis: Applications for Air Pollution Data and Beyond** Julie E. Goodman* (Gradient), Catherine P. Boyce (Gradient), Sonja N. Sax (Gradient), Leslie Beyer (Gradient), Robyn L. Prueitt (Gradient)
 - d) **Characterizing the Long-Term PM_{2.5} Concentration Response Function: Comparing the Strengths and Weaknesses of Research Synthesis Approaches** Neal Fann (U.S. Environmental Protection Agency), Elisabeth A. Gilmore (University of Maryland), Katherine Walker* (Health Effects Institute)
- 11:15-11:30 **Break**
- 11:30-1:00 **Panel 2: Synthesis for Food Safety and Toxicology** (Jonathan I. Levy, Boston University, Chair)
- a) **Lessons for Research Synthesis from Developing a Global Expert Elicitation** Sandra Hoffmann*† (U.S. Department of Agriculture)
 - b) **Attributing Foodborne Illness Using Consumption Data and Expert Elicitation** Amber Jessup*† (U.S. Department of Health and Human Services), Aylin Sertkaya** (Eastern Research Group), Kara Morgan (U.S. Food and Drug Administration)
 - c) **“Hypothesis-Based Weight of Evidence:” An Approach to Assessing Causation and its Application to Regulatory Toxicology** Lorenz R. Rhomberg* (Gradient)
 - d) **Mixtures, Metals, Genes and Pathways: A Systematic Review** Katherine von Stackelberg* (Harvard University), Elizabeth Guzy (Harvard University), Tian Chu (Harvard University), Birgit Claus Henn (Harvard University)

† Unable to attend due to U.S. government shutdown.

* Presenting author (replacements indicated by **).

Agenda (cont.)

- 1:00-2:15 **Lunch Speaker: The Role of Research Synthesis in Federal Policy Decisions** Kathryn Stack (U.S. Office of Management and Budget)†
- 2:15-3:30 **Panel 3: Synthesis for Program Evaluation** (David L. Weimer, University of Wisconsin-Madison, Chair)
- a) **Energy Technology Expert Elicitations for Policy: Their Use in Models and What Can We Learn from Workshops and Meta-analysis** Laura Diaz Anadon* (Harvard University), Valentina Bosetti (Bocconi University and Fondazione Eni Enrico Mattei), Gabriel Chan (Harvard University), Gregory Nemet (University of Madison-Wisconsin), Elena Verdolini (Fondazione Eni Enrico Mattei)
 - b) **Relationship between the Data Collection Approaches and the Application of Health Economics Models in Practice: A Case Study Approach** Jacqueline Mallender* (Matrix), Evelina Bertranou (Matrix)
 - c) **Combining Systematic Reviews with Decision Models to Inform Public Health Decision-Making: Case Study of the Childhood Obesity Intervention Cost-Effectiveness Study** Stephen C. Resch* (Harvard University), Y. Claire Wang (Columbia University), Michael Long (Harvard University), Catherine Giles (Harvard University), Angie Cradock (Harvard University), Steve Gortmaker (Harvard University)
- 3:30-3:45 **Break**
- 3:45-5:15 **Panel 4: Synthesis for Economic Analysis** (Jennifer R. Baxter, Industrial Economics, Incorporated, Chair)
- a) **Synthesizing Econometric Evidence: The Case of Demand Elasticity Estimates** Philip DeCicca (McMaster University), Don Kenkel* (Cornell University)
 - b) **Synthesizing Research for Benefit Transfer: Valuing Mortality Risk Reductions** Lisa A. Robinson** (Harvard University), James K. Hammitt (Harvard University), Kevin Haninger*† (U.S. Department of Health and Human Services)
 - c) **Macroeconomics of Natural Disasters: Meta-Analysis and Policy Options** Peter A.G. van Bergeijk* (Erasmus University), Sara Lazzaroni (Università Cattolica del Sacro Cuore)
 - d) **The Thin Reed: Accommodating Weak Evidence for Critical Parameters in Cost-Benefit Analysis** David L. Weimer* (University of Wisconsin-Madison)
- 5:15-5:30 **Wrap-up:** James K. Hammitt (Harvard University), Lisa A. Robinson (Harvard University)

† Unable to attend due to U.S. government shutdown.

* Presenting author (replacements indicated by **).

Methods for Research Synthesis: A Cross-Disciplinary Approach

Speakers

Introduction to Systematic Review and Meta-Analysis: A Health Care Perspective

[Sally C. Morton](#) is Professor and Chair of Biostatistics, and Director of the Comparative Effectiveness Research Core at the University of Pittsburgh. Previously, she was Vice President for Statistics and Epidemiology at RTI International and Head of the RAND Corporation Statistics Group. Her interests include the use of statistics in evidence-based medicine, particularly meta-analysis. Her current methodological research addresses standards for systematic reviews and observational studies, and strength of evidence in literature synthesis. Her current applied projects focus on comparative effectiveness in mental health care and spinal stenosis. Dr. Morton serves as a statistical expert for the Patient-Centered Outcomes Research Institute (PCORI) Methodology Committee, and as an evidence synthesis expert for Agency for Healthcare Research and Quality Evidence-Based Practice Centers. She has been a member of Institute of Medicine committees on comparative effectiveness research, geographic variations in Medicare, and systematic reviews; the Census Scientific Advisory Committee; and the National Academy of Sciences Committee on National Statistics. Dr. Morton is Chair of Section U (Statistics) of the American Association for the Advancement of Science (AAAS), and was the 2009 president of the American Statistical Association (ASA). She is a Fellow of the ASA and the AAAS, and an Elected Member of the Society for Research Synthesis Methodology. She received her Ph.D. in statistics from Stanford University.

Introduction to Structured Expert Elicitation: A Risk Analysis Perspective

[John S. Evans](#) is Director of the Cyprus International Institute for Environment and Public Health and Adjunct Professor of Environmental Health at the Harvard School of Public Health. His research focuses on risk assessment, uncertainty analysis, and decision making in environmental health. His early work concentrated on improving the models used to estimate the health impacts of accidental releases of radionuclides from nuclear power plants and on understanding the evidence from cross-sectional and time-series studies of the mortality impacts of airborne particulate matter. He has been interested in characterization of uncertainty in estimates of environmental health risks and in the potential for using the value of information paradigm to analyze the potential benefits of environmental health research. This effort has included the use of structured expert judgment to characterize the carcinogenic potency of chloroform and the mortality impacts of exposure to smoke from the Kuwait oil fires. His research group has studied the calibration of expert judgments of industrial hygienists and experts in exposure assessment. Most recently, he directed a program of study to assess the public health impacts of Iraq's 1990 invasion and occupation of Kuwait. Dr. Evans received his Sc.D. from Harvard University.

The Role of Research Synthesis in Federal Policy Decisions

Kathryn Stack recently became the Advisor for Evidence-Based Innovation at the U.S. Office of Management and Budget, helping Federal agencies strengthen their capacity to use and build evidence to improve their effectiveness. From 2005 to July 2013, she was OMB's Deputy Associate Director for Education, Income Maintenance, and Labor, overseeing budget, policy, legislation, regulations, and management issues concerning the U.S. Departments of Education and Labor, the Social Security Administration, the Food and Nutrition Service of the U.S. Department of Agriculture, and the Administration on Children and Families within the U.S. Department of Health and Human Services. In recent years, she was instrumental in helping the Obama Administration design several new grant-making models that allocate funding based on evidence and evaluation quality, and in building consensus across a number of Federal agencies for adoption of common evidence guidelines. Prior to becoming Division Director, she served as an examiner and as Chief of the Education Branch of OMB, and held several management and budget positions at the U.S. Department of Education. She is a graduate of Cornell University and a fellow of the National Academy of Public Administration.

Presenters

[Jennifer R. Baxter](#) is a Principal at the Cambridge, MA consulting firm Industrial Economics, Incorporated. Her work focuses on analyzing the costs and benefits of complex and innovative federal regulatory programs affecting public and private natural resource and land use, homeland security, and public health and safety.

Richard T. Burnett is a Senior Research Scientist with Health Canada, where he has been working on issues relating to environmental risk assessment. Dr. Burnett has served on numerous U.S. National Academy of Sciences committees and university program advisory committees. He is a member of the Global Burden of Disease 2012 committee and a recent recipient of the Federal Public Service Excellence in Science 2012 Award and the Queen's Diamond Jubilee Medal.

[Laura Diaz Anadon](#) is Assistant Professor of Public Policy, Associate Director of the Science Technology, and Public Policy program, and co-faculty chair of the Energy Technology Innovation Policy research group, all at the Harvard Kennedy School. A chemical engineer by training, she focuses on energy innovation and seeks to quantify the benefits of innovation policies, map the complex factors that contribute to innovation, and create tools to manage uncertainty.

[Julie E. Goodman](#) is an epidemiologist and board-certified toxicologist specializing in human health risk assessment. She is a Principal at Gradient, an environmental consulting firm, and an adjunct faculty member at the Harvard School of Public Health. Her primary responsibilities at Gradient include weight-of-evidence analyses and the evaluation of chemical exposures, toxicity and epidemiology data, and apparent disease clusters.

[James K. Hammitt](#) is Professor of Economics and Decision Sciences at the Harvard School of Public Health, Director of the Harvard Center for Risk Analysis, and Visiting Professor at the Toulouse School of Economics. He holds degrees in applied mathematics and public policy from Harvard and develops quantitative methods to evaluate health and environmental policies.

Kevin Haninger is an economist within the Office of the Assistant Secretary for Planning and Evaluation at the U.S. Department of Health and Human Services. His research examines theoretical and empirical questions on the value of risks to health and life, the economic evaluation of public programs, and the development of quantitative methods to address ethical issues in regulatory policy. He received his Ph.D. from Harvard University in 2006.

[Sandra Hoffmann](#) is a senior economist with the USDA Economic Research Service. Her research focuses on food safety, valuation of the health benefits of public policies, and integration of economic analysis and risk assessment. She is recognized for her research on the attribution of foodborne illness to its food sources and on children's environmental health.

Amber Jessup is an economist in the Office of the Assistant Secretary for Planning and Evaluation in the Department of Health and Human Services. She previously worked as an economist at the Food and Drug Administration. Examples of her work include incentives for medical product innovation, food safety, economics of tobacco regulation, and methods for regulatory impact analysis. She received her Ph.D. in Economics from the University of North Carolina at Chapel Hill.

[Don Kenkel](#) is a Professor in the Department of Policy Analysis and Management and the Department of Economics at Cornell University. He studies the economics of public health policies, including those to prevent alcohol problems and decrease smoking. Another area of research and teaching interest is cost-benefit analysis of public policies, especially those that affect health.

[Jonathan I. Levy](#) is Professor and Associate Chair in the Department of Environmental Health at Boston University School of Public Health. His research focuses on topics related to air pollution exposure assessment, epidemiology and risk assessment. He received his Sc.D. from Harvard School of Public Health in Environmental Science and Risk Management.

[Jacqueline Mallender](#) is Founder and Director at Matrix. Her experience includes the economics of public health; evidence informed service and care-pathway design; and the economics of healthcare systems including contracting and financing. She is a co-convenor of the joint Campbell and Cochrane Economics Methods Group and the Campbell Crime and Justice Coordinating Group.

[Stephen Resch](#) is Lecturer in Health Decision Science and Deputy Director of the Center for Health Decision Science at the Harvard School of Public Health. His primary research interests include the evaluation of public health programs and the improvement of health care operations through the application of decision analytic methods. Dr. Resch has had a longstanding commitment to evidence-based policy, closely coupling his research with program development and evaluation in the field.

[Lorenz R. Rhomberg](#) is a Principal at Gradient, an environmental consulting firm. He is recognized for contributions to methodology and science policy in human health risk assessment, especially in the areas of animal-to-human extrapolation of toxic effects, and weight-of-evidence analysis. He earned his Ph.D. in from the State University of New York at Stony Brook and his B.Sc. in biology from Queen's University in Ontario.

[Lisa A. Robinson](#) is a Research Associate affiliated with the Center for Risk Analysis and the Center for Health Decision Science at the Harvard School of Public Health, and a Senior Fellow at the Harvard Kennedy School's Mossavar-Rahmani Center for Business and Government as well as an Affiliate Fellow of its Regulatory Policy Program. She specializes in the economic analysis of environmental, health, and safety regulation.

[Katherine Walker](#) is a Senior Staff Scientist at the Health Effects Institute in Boston where she has been responsible for the oversight and review of HEI-funded studies designed to increase understanding of the exposures to and health effects of ambient air pollution. In a previous life, she designed and conducted the expert elicitations on PM2.5-mortality for the U.S. Environmental Protection Agency.

[Peter A.G. van Bergeijk](#) is full Professor of International Economics and Macroeconomics at the international Institute of Social Studies of Erasmus University Rotterdam, the Netherlands, where he heads the research program in Economics of Development and Emerging Markets. His most recent book is *Earth Economics: An Introduction to Demand Management, Long-Run Growth and Global Economic Governance* (Edward Elgar 2013).

[Katherine von Stackelberg](#) specializes in developing risk-based tools and methods to support sustainable approaches to environmental decision-making. She is a Principal at NEK Associates LTD and a Research Scientist at the Harvard Center for Risk Analysis, where she is Leader of the Superfund Research Translation Core. She serves as Chair of the U.S. Environmental Protection Agency's Board of Scientific Counselors, and was recently elected Treasurer for the Society for Risk Analysis.

[David L. Weimer](#) is the Edwin E. Witte Professor of Political Economy, University of Wisconsin–Madison. He is a past president of the Association for Public Policy Analysis and Management, a Fellow of the National Academy of Public Administration, and current president of the Society for Benefit-Cost Analysis.