

Roundtable on Population Health Improvement

Workshop: How Modeling can Inform Strategies to Improve Population Health

April 9, 2015

AGENDA

Location: National Academy of Sciences, Lecture Room

2101 Constitution Avenue NW, Washington, DC

WORKSHOP OBJECTIVES:

- (1) Identify how modeling could inform population health decision makers' strategies and decision making based on lessons learned from models that been used successfully (or not)
- (2) Identify opportunities and barriers to incorporating models into decision-making
- (3) Identify data needs and opportunities to leverage existing and collecting new data for modeling

8:15 am Welcome and overview of the day

David Kindig, professor emeritus of population health sciences, emeritus vice chancellor for health sciences, University of Wisconsin-Madison, School of Medicine and Public Health; co-chair, IOM Roundtable on Population Health Improvement

8:25 am Context-setting presentations

Moderator: Louise Russell, distinguished professor, Institute for Health, Health Care Policy and Aging Research and Department of Economics, Rutgers University

Talk 1: Why modeling matters in improving population health

Steven Teutsch, planning committee chair, former chief science officer, Los Angeles County Public Health

Talk 2: Why do we need models and how have they been used?

Ross Hammond, senior fellow, Economic Studies, and director, Center on Social Dynamics and Policy, Brookings Institution

9:05 am Q&A/Discussion

9:20 am Case studies of models used to inform health policy

Case studies will illustrate: (a) different kinds of models, (b) how they have been used, (c) effectiveness (or lack thereof) in informing decisions.

Moderator: Marthe Gold, professor emerita of community health and social medicine, Sophie Davis School of Biomedical Sciences, City College of New York; visiting scholar, New York Academy of Medicine

	Case study 1: Tobacco models <i>David Mendez, associate professor of health management and policy, University of Michigan</i> Case Study 2: EPA air standards <i>Pasky Pascual, former director, Council for Regulatory Environmental Modeling, Environmental Protection Agency (EPA)</i> Case Study 3: Regional health reform <i>Bobby Milstein, director, ReThink Health</i>
10:20	Break
10:35	Discussion of case studies
11:05	Remarks from the IOM President <i>Victor Dzau, President, Institute of Medicine</i>
11:20 am	What would population health decision makers like from models? <i>Gary VanLandingham, director, Pew-MacArthur Results First Initiative</i> Instructions for discussion groups <i>Steven Woolf, professor of family medicine and population health, and director, Center on Society and Health, Virginia Commonwealth University</i>
11:45 am	What would population health decision makers like from models? (Continued; 5 minutes to move to breakout rooms) Group 1 (Room 250): Health risk factors (e.g., obesity, substance abuse); <i>Facilitator: Karen Minyard, Georgia Health Policy Center</i> Group 2 (Room 118): Natural & built environments (e.g., air, water, transit, housing); <i>Facilitator: Pasky Pascual, EPA</i> Group 3 (East Court—outside Lecture Room): Social & economic conditions (e.g., education, income, discrimination); <i>Facilitator: Gary VanLandingham, Results First</i> Group 4 (Room 280): Integrated health systems (e.g., community conditions and clinical services); <i>Facilitator: Bobby Milstein, ReThink Health</i>
12:45 pm	Lunch (West Court)
1:15 pm	Discussion groups report back (10 minutes each group, followed by 20 minute discussion to explore action items for future model development) Rapporteurs: <i>Group 1: George Miller, fellow, Altarum Institute</i> <i>Group 2: JT Lane, assistant secretary, Louisiana Department of Health and Hospitals</i> <i>Group 3: Nick Macchione, director, San Diego Health and Human Services Agency</i> <i>Group 4: Louise Russell, Rutgers University</i>

2:15 pm	Barriers and opportunities for using models to inform population health interventions and policies <i>Moderator: Bobby Milstein, director, ReThink Health</i> Talk 1: Model validation and decision making <i>Michael Weisberg, associate professor, Department of Philosophy, University of Pennsylvania</i> Talk 2: Improving communication with policymakers on the use and usefulness of models <i>Karen Minyard, Director & Associate Research Professor, Department of Public Management and Policy, Georgia Health Policy Center</i> <i>Representative Sharon Cooper, chair, health and human services committee, Georgia State House of Representatives</i>
3:00 pm	Discussion of barriers and opportunities
3:30 pm	Break
3:45	Future Directions <i>Moderator: Steven Teutsch, former Chief Science Officer, Los Angeles County Public Health</i> Talk 1: Preventive and Population Health Models Group at the CMS Center for Medicare and Medicaid Innovation <i>Darshak Sanghavi, director, Preventive and Population Health Models Group, Center for Medicare and Medicaid Innovation/Centers for Medicare & Medicaid Services</i> Talk 2: Lessons for Using Modeling in Assessing Health Impact <i>Rajiv Bhatia, director, The Civic Engine</i>
4:30	Discussion with all workshop attendees on future directions and capacity building <i>Facilitator: Steven Teutsch</i>
5:00 pm	Reflections on and reactions to the day <i>George Isham, senior advisor, HealthPartners, senior fellow, HealthPartners Institute for Education and Research; co-chair, Roundtable on Population Health Improvement</i>
5:30 pm	Adjourn

For more information about the roundtable, visit www.iom.edu/pophealthrt or email pophealthrt@nas.edu.

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Roundtable on Population Health Improvement

HOW MODELING CAN INFORM STRATEGIES TO IMPROVE POPULATION HEALTH: A WORKSHOP April 9, 2015

Panning Committee Roster *and* Biosketches of Moderators and Planning Committee Members

Workshop Planning Committee Roster

Steven Teutsch, former chief science officer, Los Angeles County Public Health (planning committee chair)

Anna Diez-Roux, Dean, Drexel University School of Public Health

Marthe Gold, visiting scholar, New York Academy of Medicine; professor emerita of community health and social medicine, City College of New York; member, IOM Roundtable on Population Health Improvement

David Mendez, associate professor of health management and policy, Department of Health Management and Policy, University of Michigan School of Public Health

Bobby Milstein, Director, reThink Health

Pasky Pascual, Former Director, Council for Regulatory Environmental Modeling (CREM), EPA

Louise Russell, distinguished professor, Institute for Health, Health Care Policy and Aging Research and Department of Economics, Rutgers University

Steven Woolf, Director, Virginia Commonwealth University Center on Society and Health

Biosketches of Moderators and Planning Committee Members¹

Rajiv Bhatia, M.D., M.P.H., founder and director of The Civic Engine, is an internist and social medicine practitioner with two decades of experience in advancing population health needs, including environmental quality, economic opportunity, and political inclusion. He has broad experience and expertise in the generation, analysis, and communication of data and information to inform public policy, catalyze civic engagement, and monitor governmental accountability.

Representative Sharon Cooper, M.A., M.S.N., is the Chairman of Health & Human Services for the Georgia House of Representatives. Born in Houston, Texas, Sharon is proud to have called Georgia home for over 38 years. She was married to the late Dr. Tom Cooper for more than 33 years. She was first elected in 1996 as the State Representative for the 41st District of Georgia (now 43rd district). In 2000 Sharon was chosen as legislator of the year by the Georgia Republican Party and in 2002 she was elected Caucus Chairman by her Republican colleagues. In 2004 she was elected Majority Caucus Chairman, making her the highest ranking woman in the Georgia House. In 2007, in response to her ever increasing committee responsibilities, Rep. Cooper assumed the role of Caucus Chair Emeritus. Currently Rep. Cooper chairs the Health and Human Services committee, one of the busiest committees in the House. She was also appointed chairman of the Special Committee on Certificate of Need as well as chair of the Special Committee on Grady Hospital. Rep. Cooper is also a member of the Rules, Judiciary Non-Civil and Regulated Industries committees. Rep. Cooper holds several degrees, including a Bachelor of Science in Child Development, a Master of Arts in Education, and a Master of Science in Nursing. Sharon has written two textbooks on Psychiatric Nursing and in 1994 she authored *Taxpayer's Tea Party* – a how-to book that encouraged the average citizen to become politically active. Recently she was asked to update this book, available now in E-book. A graduate of the first class of the Coverdell Leadership Institute, Rep. Cooper was able to pass a major revision of the state's stalking law while still in her freshman term. In 2002, A.G. Ashcroft appointed her to the President's 30-member, National Advisory Committee on Violence Against Women. In 2006 Cobb County Commission Chairman Sam Olens credited Rep. Cooper as being the major catalyst behind the creation of Cobb County Police Department's Domestic Violence Unit. She has also served on Georgia's First Lady Mary Perdue's Advisory Committee on Foster Care. Rep. Cooper continues to author and foster legislation that promotes improved health care for Georgians such as: the HIV Screening Bill for Pregnant Women, Georgia Smoke free

¹Notes: Names appear in alphabetical order; "†" = member of the workshop planning committee; "*" = member of the IOM Roundtable on Population Health Improvement.

Air Act, and the "Health Share" Volunteers in Medicine Act. Rep. Cooper has earned the reputation of being one of the hardest working legislators at the Capitol as well as being honest, straightforward and committed. Former governor and U.S. Senator Zell Miller still calls her "the little legislator that tells it like it is".

Ana Diez Roux, M.P.H.,[†] is a physician and epidemiologist known worldwide for seminal research on multilevel determinants of population health. Her work has had a major impact on public health research and practice. Diez Roux was previously the chair of the Department of Epidemiology at the University of Michigan School of Public Health. She also directed two distinguished research and training centers focused on health inequalities: the Center for Integrative Approaches to Health Disparities (CIAHD) and the Center for Social Epidemiology and Population Health (CSEPH). Her own research is funded at a level of more than \$4 million annually. She has led research programs on health disparities and the social determinants of health, the impact of neighborhood environments on health, the role of psychosocial factors in health, environmental health, and urban health issues both nationally and globally. Her work on neighborhood health effects has had a major impact on policy discussions by highlighting the impact of urban planning and community development policies on health. Diez Roux is an elected member of the American Epidemiological Society, the Academy of Behavioral Medicine Research, and the Institute of Medicine of the National Academy of Sciences.

Marthe Gold, M.D., M.P.H.,^{†,*} is a Visiting Scholar at the New York Academy of Medicine (NYAM) and Professor Emerita of Community Health and Social Medicine at City College. A graduate of the Tufts University School of Medicine and the Columbia School of Public Health, her clinical training is in family medicine. Dr. Gold has been a primary care provider in urban and rural underserved settings. She served as Senior Policy Adviser in the Office of the Assistant Secretary for Health in the U.S. Department of Health and Human Services from 1990-1996 where her focus was on financing of clinical preventive services, the economics and outcomes of public health programs, and health care reform. Dr. Gold directed the work of the Panel on Cost-Effectiveness in Health and Medicine, an expert panel whose report remains an influential guide to cost-effectiveness methodology for academic and policy uses. Her current academic work focuses on patient, public and decision maker views on using economic and comparative effectiveness information to inform health policy. A member of the IOM, Dr. Gold served as chair of its Committee on Public Health Strategies to Improve Health, which was convened in 2009, and whose three reports on measurement, law and policy, and funding were released between 2010 and 2012.

Ross Hammond, Ph.D., is a senior fellow in Economic Studies at the Brookings Institution, where he is director of the Center on Social Dynamics and Policy. His primary area of

expertise is modeling complex dynamics in economic, social, and public health systems using mathematical and computational methods from complexity systems science. His current research topics include obesity etiology and prevention, food systems, tobacco control, behavioral epidemiology, crime, corruption, segregation, trust, and decision-making. Hammond received his B.A. from Williams College and his Ph.D. from the University of Michigan. He has authored numerous scientific articles, and his work has been featured in *New Scientist*, *Salon*, *The Atlantic Monthly*, *Scientific American*, and major news media. Hammond was a member of the authoring committee of the Institute of Medicine/National Research Council report *A Framework for Assessing Effects of the Food System*, and is a Public Health Advisor at the National Cancer Institute. He also currently serves on the editorial board of the journals *Behavioral Science & Policy* and *Childhood Obesity*, and is a member of the NIH-funded research networks MIDAS (Models of Infectious Disease Agent Study), ENVISION (part of the National Collaborative on Childhood Obesity Research), and NICH (Network on Inequality, Complexity, and Health). Hammond has been a consultant to the World Bank, the Asian Development Bank, the Institute of Medicine, and the National Institutes of Health. He has taught computational modeling at Harvard School of Public Health, the University of Michigan, Washington University, the National Cancer Institute, and the NIH/CDC Institute on Systems Science and Health. Hammond has previously held positions as the Okun-Model Fellow in Economics, an NSF Fellow in the Center for the Study of Complex Systems at University of Michigan, a visiting scholar at The Santa Fe Institute, and a Consultant at PricewaterhouseCoopers LLP.

J.T. Lane is the Assistant Secretary of Public Health at the Louisiana Department of Health and Hospitals. Prior to his current appointment, J.T. Lane served as Chief of Staff for the Louisiana Department of Health and Hospitals. He oversaw key functions of the agency and guided policy development, budget, planning, and management functions of the entire department. In that capacity, he also served as the Secretary's primary advisor and oversaw operations of the Office of the Secretary. Lane has also served in consulting and full-time roles for a variety of organizations, including Fortune 500s, internet technology start-ups, nonprofits, and government organizations across the country. He received his bachelor's degree from Louisiana State University.

Nick Macchione, M.P.H., F.A.C.H.E., is the Director of the County of San Diego's Health and Human Services Agency. In that role Mr. Macchione manages one of the largest health and human services networks in the nation, supporting the public health, safety, and well-being of the over 3.2 million residents of San Diego County. With an annual budget responsibility of \$2 billion, Mr. Macchione oversees a workforce of 6,000 employees, hundreds of volunteers and 1,000 contractors that collectively provide direct services to over one million clients annually. With a focus on innovation and service integration, he directs the

delivery of health and social service safety net programs, including public health services; behavioral health services; Medicaid managed care and other safety net health insurance programs; nutrition assistance for the indigent; child and adult protective services; and early childhood development programs. Mr. Macchione implements policy direction of an elected Board of Supervisors and oversees the operations of the County's Psychiatric Hospital; Edgemoor Skilled Nursing Facility (2014 winner of a Silver Achievement in Quality Award by the American Health Care Association and the National Center for Assisted Living); Polinsky Children's Center, a 24-hour facility for the temporary emergency shelter of children; and San Pasqual Academy, a first-of-its kind residential campus for foster youth. Under Mr. Macchione's leadership, in 2010 the Health and Human Services Agency and the rest of County government embarked on a bold and ambitious ten-year, county-wide wellness initiative known as Live Well San Diego. This groundbreaking initiative is being implemented throughout the region to build better health, encourage safer living, and promote economic vitality for all San Diego County residents. He is a Fellow of the American College of Healthcare Executives, having previously served a three-year term as the elected Regent for San Diego and Imperial Counties. He is a Public Health Leadership Scholar Alumnus with the federal Centers for Disease Control and Prevention and a Creating Healthier Communities Fellow Alumnus of the American Hospital Association's Health Forum. He is a Commissioner of the First Five Commission of San Diego and serves on numerous regional and national boards, including serving as vice chair of the National Association of Counties' Healthy Counties Initiative Advisory Board and steering committee for Harvard University's Human Services Summit. Mr. Macchione holds dual masters' degrees from Columbia University and New York University where he specialized in health services management and health policy. For the past 17 years, he has been an instructor and faculty member at San Diego State University's Graduate School of Public Health. In 2007, he was appointed as the School's John Hanlon Executive Scholar for the division of health management and policy.

David Mendez, Ph.D.,[†] is an Associate Professor in the Department of Health Management and Policy at the University of Michigan School of Public Health. His research is in the areas of smoking control, product and service quality on demand, and policies regarding residential radon. Professor Mendez is the Director of the HMP Executive Master's Program. Dr. Mendez has conducted research on the impact of product and service quality on demand. He has also been involved in a research project to evaluate policies regarding residential radon. Currently he is engaged in a study to evaluate smoking cessation policies in the U.S.

George Miller, Ph.D., M.S.E., has served on the technical staff of Altarum Institute and one of Altarum's predecessor organizations, Vector Research, Inc., since 1972. He is currently affiliated with Altarum's Center for Sustainable Health Spending, where he participates in

the center's efforts to track national health spending, understand the drivers of spending growth, and quantify a sustainable spending growth rate. In other efforts, he has supported Altarum in applications of operations research to modeling and analysis of health care issues that have included topics in the value of prevention, disease management, medical responses to demand surges, cost-effectiveness of clinical interventions, beneficiary population forecasting, telemedicine, graduate medical education, medical logistics, medical staffing, medical facilities planning, and collections forecasting. His work has been published in the New England Journal of Medicine; the Journal of the American College of Cardiology; Health Affairs; Medical Decision Making; Advances in Health Economics and Health Services Research; Health Care Management Science; Infection Control and Hospital Epidemiology; the International Journal of Disaster Medicine; the Joint Commission Journal on Quality and Patient Safety; Interfaces; Management Science; IEEE Transactions on Systems, Man, and Cybernetics; and IIE Transactions. He frequently serves as a reviewer for several of these journals. Dr. Miller has chaired numerous sessions at national meetings of the Institute for Operations Research and the Management Sciences (INFORMS), served on INFORMS's Long-Range Planning Committee, and served for 7 years (3 years as Chair) of its committee to select the recipient of the Bonder Scholarship for Applied Operations Research in Health Services. Dr. Miller received his BSE, MSE, and PhD degrees in industrial and operations engineering from the University of Michigan, where he subsequently served as an adjunct assistant professor.

Bobby Milstein, Ph.D., M.P.H.,^{†,*} directs ReThink Health's work in dynamics, systems strategy, and sustainable financing. An expert in health system dynamics and policy, Dr. Milstein oversees the on-going development of the ReThink Health Dynamics Model. He spent 20 years at the Centers for Disease Control & Prevention, where he founded the Syndemics Prevention Network and coordinated planning and evaluation activities for a number of public health initiatives. Bobby has a Ph.D. in Public Health Science from Union Institute & University, an M.P.H. from Emory University, and a B.A. in Cultural Anthropology from the University of Michigan Honors College.

Karen Minyard, Ph.D., has directed the Georgia Health Policy Center (GHPC) at Georgia State University's Andrew Young School of Policy Studies since 2001. Minyard connects the research, policy, and programmatic work of the center across issue areas including: community and public health, end of life care, child health, health philanthropy, public and private health coverage, and the uninsured. Prior to assuming her current role, she directed the networks for rural health program at the GHPC. She has experience with the state Medicaid program, both with the design of a reformed Medicaid program and the external evaluation of the primary care case management program. She also has 13 years of experience in nursing and hospital administration. She is an advocate for the importance of community in national, state, and local policy and the power of communities to improve

health. Dr. Minyard maintains her connection with communities by working directly with local health collaboratives and serving on the boards of the National Network of Public Health Institutes, Physicians' Innovation Network, and Communities Joined in Action. Minyard's research interests include: financing and evaluation of health-related social policy programs; strategic alignment of public and private health policy on all levels; the role of local health initiatives in access and health improvement; the role of targeted external facilitation and technical assistance in improving the sustainability, efficiency, and programmatic effectiveness of non-profit health collaboratives; and public health systems and financing. Dr. Minyard frequently makes presentations and acts as a neutral convener and facilitator for groups and organizations. She often provides testimony for the state legislature and recently presented to congressional and executive agency staff at the National Health Policy Forum. Currently, she is spearheading a team of faculty and staff at Georgia State University dedicated to translating national health care reform. She received a bachelor's degree in nursing from the University of Virginia, a master's degree in nursing from the Medical College of Georgia, and a doctoral degree in business administration with a major in strategic management and minor in health care financing from Georgia State University.

Pasky Pascual, M.S., J.D.,[†] is an environmental scientist and lawyer who works for the U.S. Environmental Protection Agency. He served as the Director of the EPA's Council for Regulatory Environmental Modeling. His primary interest is in the area of regulatory decision-making, and he has published papers on the judicial review of regulatory science. Pasky began his work at EPA with the Climate Change Division, during which he worked with non-governmental organizations to help measure the greenhouse gases avoided through projects funded by the EPA. He followed this up with work on an initiative spearheaded by the Clinton Administration, leading stakeholders from industry, government, and the NGO sector to develop approaches to facility management that combined environmental performance, regulatory flexibility, and economic efficiency. He led efforts within EPA's Research and Development Office to look at the emerging risks and opportunities associated with bio- and nano-technology.

Louise B. Russell, Ph.D.,[†] is Distinguished Professor at the Institute for Health, Health Care Policy and Aging Research and in the Department of Economics at Rutgers University. Her research focuses on the methods and application of cost-effectiveness analysis. Before coming to Rutgers, Dr. Russell was a Senior Fellow at the Brookings Institution in Washington DC. Elected to membership in the Institute of Medicine (IOM) of the National Academy of Sciences in 1983, she has served on several IOM committees, including the National Cancer Policy Board (2001-2005) and the Committee on Valuing Community-Based, Non-Clinical Prevention Policies and Wellness Strategies (2011-2012). Dr. Russell co-chaired the U.S. Public Health Service Panel on Cost-Effectiveness in Health and

Medicine, which published recommendations for improving the quality and comparability of cost-effectiveness studies in a book (Cost-Effectiveness in Health and Medicine, Oxford University Press, 1996), and three articles in The Journal of the American Medical Association (October 1996). Since 2011 she has been one of a group of five leaders in the field who are organizing and facilitating the Second Panel on Cost-Effectiveness in Health and Medicine. The 14 members of the Second Panel were appointed in the fall of 2012 and are working to bring the book and the recommendations up to date with the many advances in cost-effectiveness since 1996. She is deputy editor of the journal Medical Decision Making and has published many articles and seven books, including Educated Guesses: Making Policy about Medical Screening Tests (California/Milbank, 1994), Is Prevention Better than Cure? (Brookings, 1986), and Technology in Hospitals: Medical Advances and Their Diffusion (Brookings, 1979). Dr. Russell received her Ph.D. in economics from Harvard University.

Darshak Sanghavi, M.D., is Director of the Population and Preventive Health Models Group at the Center for Medicare and Medicaid Innovation, where he oversees the development of large pilot programs aimed at improving the nation's health care costs and quality. Recently, he was the Richard Merkin fellow and a managing director of the Engelberg Center for Health Care Re-form at the Brookings Institution, where he directed efforts to better engage clinician in health care payment and delivery reform. Sanghavi is also associate professor of pediatrics and the former chief of pediatric cardiology and at the University of Massachusetts Medical School, where he was charged with clinical and research programs dedicated to children's heart defects. An award-winning medical educator, he also has worked in medical settings around the world and published dozens of scientific papers on topics ranging from the molecular biology of cell death to tuberculosis transmission patterns in Peruvian slums. A frequent guest on NBC's Today and past commentator for NPR's All Things Considered, Dr. Sanghavi is a contributing editor to Parents magazine and Slate's health care columnist, and often writes about health care for the New York Times, Boston Globe, and Washington Post. His best-seller, A Map of the Child: A Pediatrician's Tour of the Body, was named a best health book of the year by the Wall Street Journal. He speaks widely on medical issues at national conferences, advises federal and state health departments, and is a former visiting media fellow of the Kaiser Family Foundation and a winner of the Wharton Business Plan Competition. He previously worked for several years as a U.S. Indian Health Service pediatrician on a Navajo reservation.

Steven Teutsch, M.D., M.P.H.[†] is an independent consultant, Adjunct Professor at the Fielding School of Public Health, UCLA, and Senior Fellow, Schaeffer Center, University of Southern California. Until 2014 he was the Chief Science Officer, Los Angeles County Public Health where he continued his work on evidence-based public health and policy. From 1997 to 2009 he was in the Outcomes Research and Management program at Merck where

he was responsible for scientific leadership in developing evidence-based clinical management programs, conducting outcomes research studies, and improving outcomes measurement to enhance quality of care. Before joining Merck he was Director of the Division of Prevention Research and Analytic Methods (DPRAM) at CDC where he was responsible for assessing the effectiveness, safety, and the cost-effectiveness of disease and injury prevention strategies. DPRAM developed comparable methodology for studies of the effectiveness and economic impact of prevention programs, provided training in these methods, developed CDC's capacity for conducting necessary studies, and provided technical assistance for conducting economic and decision analysis. The Division also evaluated the impact of interventions in urban areas, developed the Guide to Community Preventive Services, and provided support for CDC's analytic methods. He has served as a member of the Community Preventive Services Task Force and the U.S. Preventive Services Task Force which develops the Guide to Clinical Preventive Services. He has also served on Americas Health Information Community Personalized Health Care Workgroup and the Evaluation of Genomic Applications in Prevention and Practice (EGAPP) Workgroup. He chaired the Secretary's Advisory Committee on Genetics Health and Society, and has served on and has chaired IOM panels, Medicare's Evidence Development and Coverage Advisory Committee, and on several subcommittees of the Secretary's Advisory Committee on Healthy People 2020. Dr. Teutsch joined CDC in 1977, where he was assigned to the Parasitic Diseases Division and worked extensively on toxoplasmosis. He was then assigned to the Kidney Donor and subsequently the Kidney Disease Program. He developed the framework for CDC's diabetes control program. He joined the Epidemiology Program Office and became the Director of the Division of Surveillance and Epidemiology where he was responsible for coordinating CDC's disease monitoring activities. He became Chief of the Prevention Effectiveness Activity in 1992. Dr. Teutsch received his undergraduate degree in biochemical sciences at Harvard University in 1970, an M.P.H. in epidemiology from the University of North Carolina School of Public Health in 1973, and his M.D. from Duke University School of Medicine in 1974. He completed his residency training in internal medicine at Pennsylvania State University, Hershey. He was certified by the American Board of Internal Medicine in 1977, the American Board of Preventive Medicine in 1995, and is a Fellow of the American College of Physicians and American College of Preventive Medicine. Dr. Teutsch has published over 200 articles and 8 books in a broad range of fields in epidemiology, including parasitic diseases, diabetes, technology assessment, health services research, and surveillance.

Gary VanLandingham, Ph.D., is director of the Pew-MacArthur Results First Initiative, a joint initiative of Pew and the John D. and Catherine T. MacArthur Foundation. He manages Pew's work to advance the use of cost-benefit analysis and to cultivate a climate for evidence-based decision-making that can enable states to eliminate ineffective programs and shift resources to those that generate the best outcomes. As lead on Pew's efforts to

improve the use of data on cost-effectiveness in state policy making, VanLandingham works with state partners to implement proven analytical tools that more accurately assess the true costs and benefits of public programs. He also helps policy makers use the findings to drive state dollars toward programs with the highest returns on taxpayer investments. Before joining Pew in January 2011, VanLandingham served for seven years as director of the Office of Program Policy Analysis and Government Accountability, the Florida Legislature's policy research and evaluation arm. He has over 30 years of experience conducting and leading policy studies at the state and local government levels. He has served as staff chair of the National Conference of State Legislatures, chair of the National Legislative Program Evaluation Society and president of the Southeast Evaluation Association, and the North Florida Chapter of the American Society for Public Administration. He also taught as an adjunct professor with the Askew School of Public Administration and Policy at the Florida State University. VanLandingham has a Ph.D. and a master's degree in public administration from the Florida State University and a bachelor's from the University of Florida.

Michael Weisberg, Ph.D., is Associate Professor and Graduate Chair of Philosophy at the University of Pennsylvania. Professor Weisberg is also a Distinguished Research Scholar at the Annenberg Center for Public Policy, and a faculty affiliate of the Institute for Research in Cognitive Science, the Center for Cognitive Neuroscience, and Penn Museum. His research focuses on the philosophy of science, especially modeling, tradeoffs, robustness analysis, the nature of the chemical bond, the division of cognitive labor, and public understanding of science.

Steven Woolf, M.D., M.P.H.,[†] is director of the Center on Society and Health and professor of family medicine, both at Virginia Commonwealth University. He is board certified in family medicine and in preventive medicine and public health. His work has focused on promoting effective health care services and on highlighting the importance of behavioral and social determinants of health, particularly with regard to the role of poverty, education, and racial and ethnic disparities in determining the health of Americans. In addition to his work as a researcher, he has also been involved with health policy issues. Dr. Woolf recently chaired the IOM committee that authored the report *U. S. Health in International Perspective: Shorter Lives, Poorer Health*. He has served as science adviser, member, and senior adviser to the U.S. Preventive Services Task Force. He is a member of the Institute of Medicine. He has an M.D. from Emory University and an M.P.H. from Johns Hopkins University.



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Roundtable on Population Health Improvement
How Modeling Can Inform Strategies to Improve Population Health
April 9, 2015

DISCUSSION GROUP GUIDANCE DOCUMENT

Purpose: To explore how modeling could be used to inform population health decisions.

Objective: To identify opportunities, barriers, and innovative approaches for using modeling to inform population health:

- For decision makers and population health researchers to gain a better understanding of where and how modeling could be a useful tool to inform decisions and identify data and research needs.
- For modelers to gain a better understanding of where models are needed in population health and the complex nature of the priorities in the field.

What is modeling? *In the context of this workshop:*

“A model is an idealized representation—an abstract and simplified description—of a real world situation that is to be studied and/or analyzed.”¹ Types of models include mental, iconic (like an architect's model of a building), analog, and mathematical. This workshop will mostly focus on quantitative mathematical models that look at relationships between causes/effects or interventions/outcomes.

Four discussion groups: Attendees' expertise and examples from their work will shape the content in each discussion group. There will be inherent overlap between these four groups, and there are no strict boundaries to the discussions; however, the planning committee described an area of focus to each group to help ensure breadth and variety among the discussion groups.

Description of Discussion Groups 1, 2, and 3: As is the case with all sectors, there is usually more than one optimal solution to any given problem. More information is needed on how the target population will react to those interventions; how other factors in the environment will help or hinder the interventions effectiveness; or which intervention will be the most cost effective. How could modeling be used to elucidate these pathways or to aid in deciding which interventions or policies to put forward? What are the key contextual issues surrounding complex problems in population health? How can models be used to either better understand these problems, or to forecast potential outcomes of specific interventions? How can a model help us understand the comparative merits of similar interventions? **Group 1** will discuss how modeling can be used to examine health risk factors. **Group 2** will discuss these issues in the context of the natural and build environments. **Group 3** will focus on the social and economic conditions that impact population health.

¹From the Encyclopedia of Operations Research and Management Science

1) Health risk factors (e.g., obesity, substance abuse)

Facilitator: Karen Minyard, Georgia Health Policy Center

Rapporteur: George Miller, Altarum Institute

Location: Room 250 (IOM staff: Ayano Ogawa)

2) Natural & built environments (e.g., air, water, transit, housing)

Facilitator: Pasky Pascual, EPA

Rapporteur: JT Lane, Louisiana Department of Health and Hospitals

Location: Room 118 (IOM staff: Darla Thompson)

3) Social & economic conditions (e.g., education, income, discrimination)

Facilitator: Gary VanLandingham, Results First

Rapporteur: Nick Macchione, San Diego Health and Human Services Agency

Location: Lecture Room atrium (East Court) (IOM staff: Amy Geller)

Description of Breakout Group 4: Many challenges span multiple sectors and require models with broader boundaries that encompass a variety of relevant community conditions and clinical services. This group will consider how to represent integrated health systems with a focus on tracking overall health and economic trends, estimating the impact of interventions alone and in combination, as well as surfacing specific outcomes of interest to particular stakeholders. Such models are often used to help diverse constituents understand their shared system as well as their own roles as change agents within it.²

4) Integrated health systems (e.g., community conditions and clinical services):

Facilitator: Bobby Milstein, ReThink Health

Rapporteur: Louise Russell, Rutgers University

Location: Room 280 (IOM staff: Alina Baciuc)

Questions or points to consider during discussion groups

Policymakers and population health researchers:

- What are the main evidence gaps you encounter? Where do you need more support to inform your decisions, or where would results from quality modeling exercises help you—both with making decisions and relaying to others the importance of a potential decision?
- What are your concerns about using models?
- What is intriguing to you about using models?
- If you have used models, how have they been useful to you?

² NOTE: The last sentence could be true of any model, but it is especially relevant in this context, where the stakeholders often do not see themselves as connected within a larger, integrated health system.

Modelers:

- Based on the expressed needs of the policy makers and researchers, how do you think modeling could be helpful?
 - What information would you need from them?
 - What types of data (both qualitative and quantitative) would you need?
 - How resource intensive (in terms of both funds and human capital) should be expected?
 - Are there models that could be developed relatively quickly for these issues, or would they be long-term endeavor?

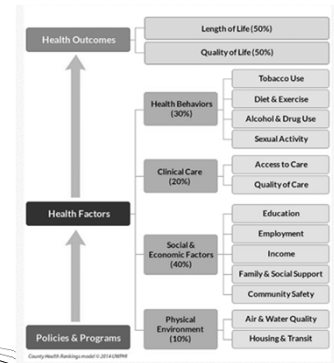
Overall guidance:

- Make note of data gaps and barriers in all groups
- Make note of communication requirements and challenges. How do we build trust in results and capitalize on the information to drive change?
- When should modeling take place? That is, when should development start? Models can be created in anticipation of a policy discussion, but there are potential risks with that, such as evaluating interventions that ultimately are not close enough to those being discussed. One can do it closer to the time the actual policy discussion takes place, but that leaves less time for modeling with concomitant limitations in scope and complexity.
- How and when should policymakers be involved in the modeling process?

Why Modeling Matters in Improving Population Health

Steven Teutsch, MD, MPH
Consultant
Adjunct Professor, UCLA
Senior Fellow, Public Health Institute
Senior Fellow, Schaeffer Center for Health Policy and Economic, USC

County Health Rankings



Challenges in Understanding the Effectiveness of Population Health Interventions

- › Interventions vary
- › Complex interactions among interventions; many are synergistic
- › Many interventions are not amenable to randomized trials
- › External factors change over time
- › Often long time lags between intervention and outcome

How Models Help Decision Makers

- › Can provide “best available” assessment of health (and other impacts) and costs
- › Can incorporate decision makers’ primary concerns
- › Can be adapted to different situations
- › Can incorporate the most up-to-date science and harness uncertainty
- › Can identify key research needs
- › Can address “what if” questions

What Models Can't Do

- ▶ Provide THE answer on what to do

What is a Model?

"A model is an idealized representation – an abstract and simplified description – of a real world situation that is to be studied and/or analyzed." They can be mental, iconic (like an architect's model of a building), analog, or mathematical.

Source: *Encyclopedia of Operations Research and Management Science*

Agenda

- ▶ Overview of modeling and how models have been used
- ▶ Case studies of how models have informed policy
- ▶ Interactive session on what decision makers want from models
- ▶ Overcoming skepticism, improving communication, and data science
- ▶ Future directions

Some Questions for the Day

For Decision Makers

- ▶ What important intractable or complex problems do you have that aren't being adequately addressed by current approaches?
- ▶ Can models help? What kind of model would be best suited for the purpose? How should you be involved in the process?
- ▶ Have models been readily accepted by scientists and decision makers? What factors increased their acceptability and usability?
- ▶ How can results best be communicated to you?

For Modelers

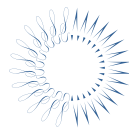
- ▶ What would you need to answer the questions?
- ▶ Do models need to be developed anew for each purpose or can we develop some more general models that can be applied to many questions?
- ▶ What human and financial resources will be required?
- ▶ How can models elucidate unexpected effects?
- ▶ How can modeling help us find the societal and health system ROI?
- ▶ How can modeling move from health care to health?
- ▶ Can it help develop a system to determine how and when to pay for the improvement in outcomes?

Also consider data issues: The data needed to inform models, capitalizing on available data, barriers to their use, and innovative ways to collect data



State Case Study

Mark Newman/Getty Images



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New Mexico's Evidence-based Approach to Better Governance

A Progress Report on Executing the Results First Approach

Overview

Since partnering with the Pew-MacArthur Results First Initiative in September 2011, New Mexico has become a leader in using sophisticated cost-benefit analysis to inform policy and budget decisions. Building on a strong history of investing in evidence-based programs and measuring their performance, the Results First approach has enabled state policymakers to get a clearer picture of the comparative value of potential taxpayer investments and to direct resources to the most effective programs.

New Mexico's Results First model uses state-specific data to compare the costs and long-term benefits of a range of programs and policies. The state's Legislative Finance Committee, working with the

New Mexico Sentencing Commission and Corrections Department, implemented the model with a focus on public safety programs; as the model grew to include other policy areas, additional state agencies also provided data. Over the past two years, the state has used the Results First approach to:

- Calculate and compare the long-term costs and benefits of portfolios of programs in adult and juvenile justice, child welfare, mental health and substance abuse, and early childhood.
- Help inform legislative funding decisions to direct \$49.6 million to evidence-based programs that will deliver high returns for New Mexico residents.
- Shift funds from an offender intervention program determined to be ineffective to an alternative that analysis showed would produce strong public safety outcomes.
- Promote the development of an inventory of the state's recidivism-reduction programs to identify the extent to which they are evidence-based.

This brief documents New Mexico's progress in implementing the Results First approach, highlights its accomplishments in using evidence-based policymaking, identifies challenges facing the state, and illustrates how this work complements other state efforts to use data to deliver better results.

Results First: A Model for Making More Cost-effective Policy Choices

The Results First approach uses a nationally recognized, peer-reviewed model with a three-step process:

- **Use the best national research** to analyze all available studies of similar programs across the country to identify what works, what doesn't, and how effective various programs are in achieving policy goals.
- **Apply state-specific data to the national results** to project the effect different program and policy approaches would have in the state.
- **Compare the costs of each program to its projected benefits** and produce a report that ranks programs by the relative value they would generate for taxpayers. This information enables policymakers to identify the best return on investment of public dollars.

The cost-benefit analysis model was developed by the Washington State Institute for Public Policy in partnership with the Pew-MacArthur Results First Initiative, a project of The Pew Charitable Trusts and the John D. and Catherine T. MacArthur Foundation. States and local governments can use the model to assess programs in many public policy areas, including adult criminal and juvenile justice, pre-K through 12th-grade education, general prevention programs for children and adolescents, child welfare, mental health, substance abuse, and public health.

Building the New Mexico Results First model

In 2011, staff of New Mexico's Legislative Finance Committee requested the assistance of the Pew-MacArthur Results First Initiative in implementing the cost-benefit analysis model. The state's goal was to better assess the long-term implications of its budget choices and to identify interventions that would achieve high returns on the investment of taxpayer dollars.

The Legislature assigned responsibility for the effort to the Legislative Finance Committee, which plays several critical roles in the state. As the Legislature's fiscal and management arm, the committee conducts program evaluations and issues performance report cards that assess whether taxpayer expenditures are delivering desired results. It produces an annual statewide policy analysis report on progress in key program areas and develops budget recommendations. Committee staff also regularly makes presentations to legislative committees, agencies, and stakeholder groups. These activities help to equip the Legislature to use the Results First model when making policy and budget decisions. As Kelly Klundt, fiscal analyst for the committee, noted, "It's a year-round educational experience. So when actual session happens, [legislators] have a better understanding of the evidence."

Personnel from Results First traveled to New Mexico in 2011 to train committee staff, led by Director David Abbey and Deputy Director Charles Sallee, on the cost-benefit approach. Results First provided ongoing technical assistance through subsequent site visits, conference calls, and webinars. The committee focused its initial effort on adult criminal justice programs with extensive help from staff of the state's Sentencing Commission and Corrections Department.

To implement the crime component of the Results First model, the committee partnered with the Sentencing Commission, which maintains a collection of independently reviewed criminal and juvenile justice data. Staff from the two offices gathered needed information from various state and federal sources, including the FBI, the U.S. Bureau of Justice Statistics, the state's Department of Public Safety, and its Administrative Office of the Courts. The committee also partnered with the state's Corrections Department to identify and analyze information on programs offered within the prison system and the costs of department services.

Following these successful collaborations, the committee collaborated with New Mexico's departments of Children, Youth, and Families; Public Education; Public Safety; and Health, to expand the model's scope to assess state child welfare, substance abuse and mental health, and early childhood education programs.

Reporting New Mexico's Results First findings

The Legislative Finance Committee has issued five evaluation reports presenting Results First findings on the relative costs and benefits of potential investments in programs for adult criminal justice, child welfare, and early childhood education. As the committee's Sallee stated, "we use evaluations to identify the problem areas in the state and use the Results First model to show how much it is costing and what programs can deliver promising outcomes at higher returns."

Criminal justice

The committee has issued two evaluation reports on New Mexico's adult criminal justice programs since summer 2012, *Reducing Recidivism, Cutting Costs and Improving Public Safety in the Incarceration and Supervision of Adult Offenders* and *Evidence-Based Programs to Reduce Recidivism and Improve Public Safety in Adult Corrections*. These reports used the Results First approach to calculate the cost-benefit ratio of the state's community-based, correctional, and alternative reentry programs.¹ Key findings included:

- More than 75 percent of the state's adult criminal justice programs lacked rigorous evidence of effectiveness.
- Reducing recidivism by 10 percent through investing in evidence-based programs could decrease prison costs by \$8.3 million and victimization costs by approximately \$40 million.²

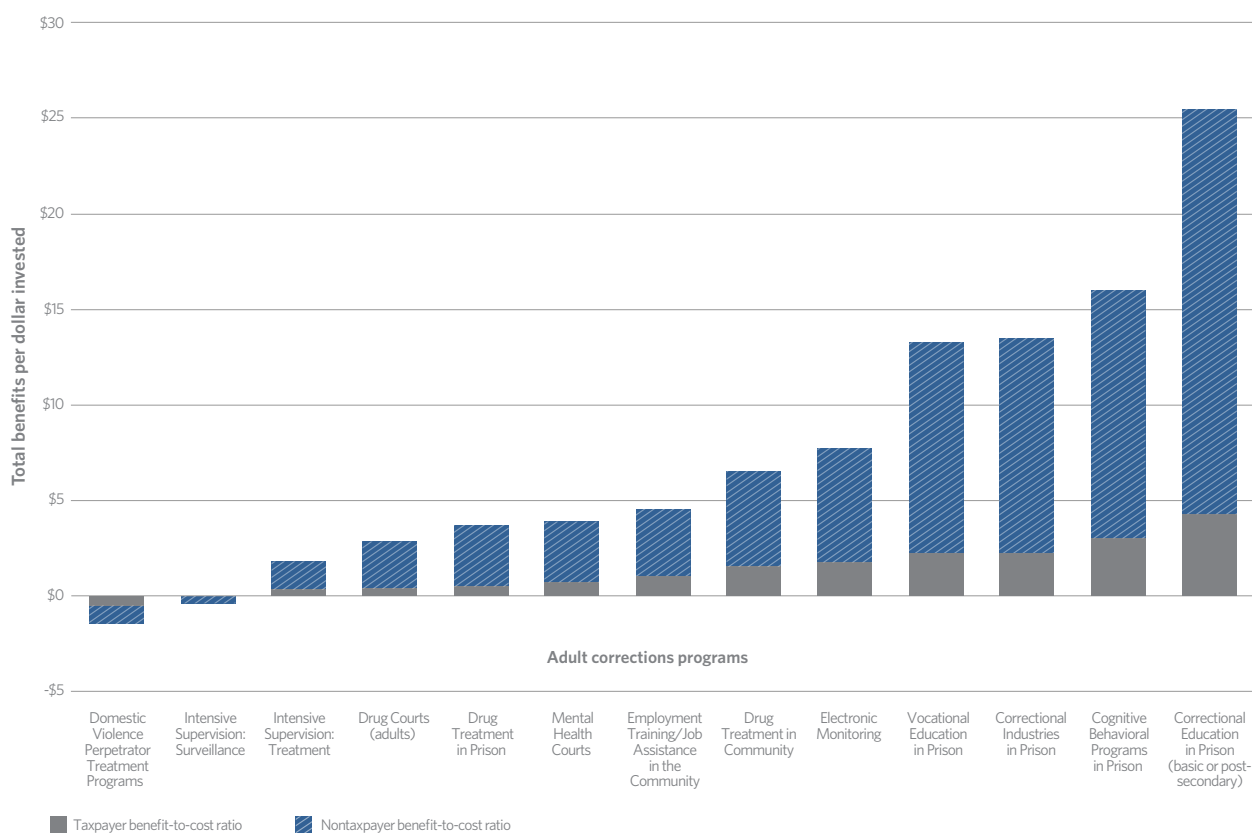
- Investing in evidence-based corrections programs proved to reduce recidivism could yield returns as high as \$26 for every \$1 invested.
- If current trends hold, offenders released in 2011 will cost taxpayers an estimated \$360 million in corrections costs over the next 15 years.³

The reports also calculated the impact of budget reductions. In fiscal 2011, the Corrections Department discontinued two programs shown to reduce recidivism—drug courts and corrections industries—as a part of budget cuts made in response to the Great Recession. Using the Results First model, the committee found that eliminating these programs cost the state \$2.8 million in annual taxpayer and crime victim benefits.⁴ “Having this information could have helped agencies make better and more informed decisions about what to cut,” said Sallee.

Figure 1

New Mexico's Cost-Benefit Analysis Model Compared Cost-Benefit Ratios for Prison Programs

Total benefit-to-cost ratio, by program



Source: New Mexico Legislative Finance Committee, *Evidence-Based Programs to Reduce Recidivism and Improve Public Safety in Adult Corrections* (July 2013), 3, <http://www.nmlegis.gov/lcs/lfc/lfcdocs/perfaudit/LFC%20Results%20First%20-%20Evidence-Based%20Programs%20to%20Reduce%20Recidivism%20and%20Improve%20Public%20Safety%20in%20Adult%20Corrections.pdf>.

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Child welfare

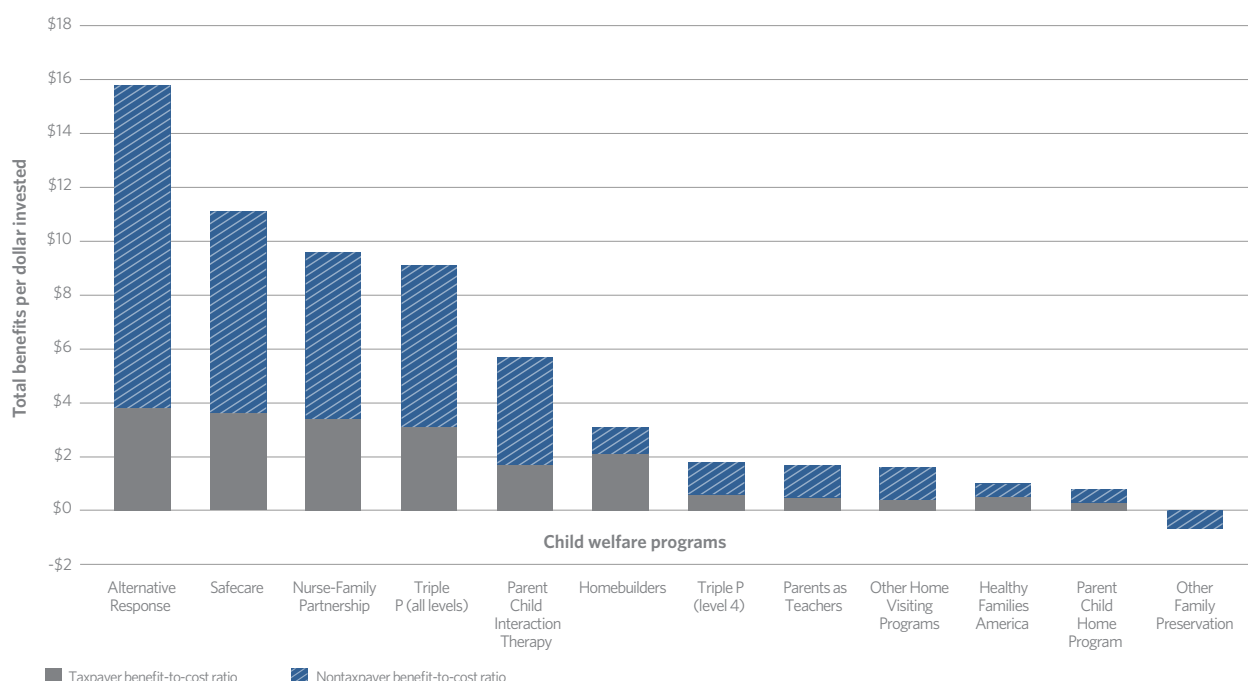
Since 2012, New Mexico's Legislative Finance Committee has released two evaluation reports—*Improving Outcomes for Pregnant Women and Infants Through Medicaid* and *Evidence-Based Programs to Reduce Child Maltreatment*—that used the Results First model to assess the state's child welfare investments and the potential benefits of investing in evidence-based programs to reduce child maltreatment.⁵ They found that:

- New Mexico spends about \$113 million annually through the Child Protective Services Division responding to child maltreatment (including investigation, in-home services, foster care, adoption, and administrative costs) and that reducing child maltreatment and placement in foster care by 10 percent could save tens of millions of dollars.
- Only 5 in every 1,000 children in the New Mexico child protection system receive preventive services, compared with the national average of 43 per 1,000.

Figure 2

New Mexico's Cost-Benefit Analysis Model Compared Returns for Child Welfare Programs

Total returns on investment, by program



Source: New Mexico Legislative Finance Committee, *Evidence-Based Programs to Reduce Child Maltreatment* (April 2014), 13, <http://www.nmlegis.gov/lcs/lfc/lfcdocs/perfaudit/LFC%20Results%20First%20Report%20-%20Evidence-Based%20Programs%20to%20Reduce%20Child%20Maltreatment.pdf>.

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- Evidence-based programs could generate returns as high as \$15.64 for every \$1 invested and reduce child maltreatment and its recurrence by up to 26 percent.
- Foster care placement costs approximately \$21,000 per year per child compared with \$3,700 for proven in-home services.
- Evidence-based home visiting programs would yield a range of returns of up to \$9.70 for every \$1 invested.

Table 1

Results First New Mexico Used the Results First Approach to Produce a Consumer Report for Early Childhood Programs

Ranking of New Mexico programs to improve education outcomes

Program	Benefits to participants	Benefits to taxpayers	Other beneficiaries	Other indirect benefits	Total benefits	Costs	Benefit-cost net present value	Benefit-cost ratio	Percent of time net present value is > 0
Nurse-Family Partnership	\$9,974	\$9,868	\$8,946	\$0	\$28,789	(\$2,967)	\$25,822	\$9.70	89%
Head Start	\$11,239	\$7,167	\$7,186	(\$3,139)	\$22,452	(\$8,564)	\$13,888	\$2.62	89%
Parents as Teachers	\$2,282	\$1,282	\$997	\$0	\$4,561	(\$2,966)	\$1,595	\$1.54	68%
Other home visiting programs	\$2,210	\$1,035	\$1,173	\$0	\$4,419	(\$2,970)	\$1,449	\$1.49	69%
New Mexico PreK	\$1,618	\$690	\$801	\$0	\$3,110	(\$2,900)	\$210	\$1.07	48%
Model early childhood programs	\$15,143	\$10,168	\$11,050	\$0	\$36,361	(\$34,332)	\$2,028	\$1.06	53%
4-Star	\$1,602	\$683	\$806	\$0	\$3,092	(\$6,532)	(\$3,441)	\$0.47	30%
Early Head Start	(\$602)	\$2,844	\$132	\$0	\$2,375	(\$12,042)	(\$9,667)	\$0.20	28%
5-Star	(\$351)	(\$150)	(\$172)	\$0	(\$673)	(\$6,864)	\$7,537	(\$0.10)	6%
Even Start	(\$572)	(\$244)	(\$276)	\$0	(\$1,093)	(\$4,061)	(\$5,153)	(\$0.27)	10%
3-Star	(\$973)	(\$415)	(\$479)	\$0	(\$1,868)	(\$6,120)	(\$7,988)	(\$0.31)	17%
2-Star	(\$1,640)	(\$699)	(\$812)	\$0	(\$3,151)	(\$5,269)	(\$8,420)	(\$0.60)	3%
Registered Homes	(\$3,098)	(\$1,322)	(\$1,535)	\$0	(\$5,995)	(\$2,904)	(\$8,859)	(\$2.06)	0%

Source: New Mexico Legislative Finance Committee, *Evidence-Based Early Education Programs to Improve Education Outcomes* (April 2014) 9, <http://www.nmlegis.gov/lcs/lfc/lfcdocs/perfaudit/LFC%20Results%20First%20Report%20-%20Evidence-Based%20Early%20Education%20Programs%20to%20Improve%20Education%20Outcomes.pdf>.

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Early childhood education

The Legislative Finance Committee also used its Results First model to develop the findings featured in an April 2014 report, *Evidence-Based Early Education Programs to Improve Education Outcomes*.⁶ The report used state-specific data to calculate and rank the return on investment that the state would achieve through a range of evidence-based programs designed to improve educational outcomes and found that:

- Only two of the state's six home visiting programs, which can lead to improved school readiness, were evidence-based.
- Evidence-based early education programs yield a range of results, including reducing remediation needs in public and higher education, special education, juvenile rehabilitation, welfare assistance, and juvenile and adult criminal activities.
- In contrast, the state's programs that were not evidence-based demonstrated losses of as much as \$2 for every \$1 invested.

Using Results First to target funding

New Mexico also used its Results First model analyses to identify opportunities for strategic investments in quality programs, which were included in its legislative budget recommendations for fiscal 2013-14 and 2014-15. Results First data helped inform decisions to target \$49.6 million over the two-year period, including:

- \$41.9 million to evidence-based early childhood programs. This included \$35.8 million directed toward early education (\$16.5 million for pre-K, \$10 million to the K-3 Plus extended school year program, \$6 million toward early literacy programs, \$3.3 million to improve the quality of early childhood programs) and \$6.1 million targeted to support evidence-based home visiting programs.
- \$7.7 million to evidence-based criminal justice programs. These funds included \$4.4 million for a new evidence-based drug treatment program to replace one the analysis showed was not delivering the expected return on investment. Targeted funds also included \$1.5 million for inmate education, \$1.5 million for community resources for job training and mental health, and \$300,000 for a corrections industries program that provides training and work experience opportunities for inmates.

Using Results First to improve services

In addition to assisting in the development of the Results First model, the New Mexico Corrections Department is using the approach to gain a better understanding of the programs it operates and to identify opportunities for improvement. In 2012, the department's Office of Recidivism Reduction conducted an inventory of its state-funded adult criminal justice programs and partnered with the Legislative Finance Committee to determine the level of evidence of effectiveness for each. This analysis found that fewer than 10 of the more than 40 programs studied were evidence-based.⁷



It's a no-brainer analytical model; we should be using programs that are effective."

Douglas Carver, New Mexico Courts, Corrections, and Justice Committee

The study revealed that one of the department's drug abuse prevention programs—Therapeutic Communities—was not operating according to its evidence-based design and as a result was not achieving desired outcomes. The department subsequently replaced the program with an alternative—Residential Drug Abuse Treatment—that the Results First analysis showed would generate a return of \$4 in benefits for every \$1 invested. “We can’t afford to spend money on programs that are not effective. This heightened the need to use our resources to evaluate our local programs that we haven’t had outcome evaluations for,” said Linda Freeman, deputy director of the New Mexico Sentencing Commission.

Over the next year, the Corrections Department plans to begin using the New Mexico Results First model to support additional management initiatives. After receiving training, agency staff will perform further cost-benefit assessments and identify opportunities for program improvements. The department plans to implement Correctional Offender Management Profiling for Alternative Sanctions, also known as COMPAS, a risk and needs assessment tool, to supplement this approach. Results will be shared with senior staff each quarter to foster discussions on evidence-based programs.

Lessons learned in New Mexico

The Results First approach has had a significant impact on improving the way budget and policy decisions are made in New Mexico, but the effort has not been without challenges. State officials identified five key lessons learned during the first three years.

Building a state's Results First model requires resources and flexibility

New Mexico has sought various data sources to integrate into Results First, but each source requires its own level of preparation for inclusion in the model. Jon Courtney, a program evaluator with the Legislative Finance Committee who has worked on Results First since 2011, emphasized the importance of dedicating sufficient resources to ensure good data are used in the model. “While some data is readily usable, other data requires substantial analysis to make it model-ready,” Courtney said.

To ensure the quality of New Mexico's Results First data, the committee designated two program evaluation staff to Results First to coordinate collection with executive agencies, identify external sources (such as federal entities, surveys, and research studies), populate the model, and run cost-benefit analyses. The Corrections Department and Sentencing Commission committed to providing ongoing resources to this effort, such as developing an annual inventory of state-run corrections programs, including costs and participation data, and assisting the Legislative Finance Committee with data analyses. In June 2014, all three entities signed a memorandum of understanding that sets forth their respective responsibilities and the ongoing assistance the Pew-MacArthur Results First Initiative will provide.

Strong interbranch communication is essential

Throughout the implementation process, communication and collaboration between the legislative and executive branches was critical to maximizing the impact of the Results First approach. Regular communication among the Corrections Department, Sentencing Commission, and Legislative Finance Committee was important to clarify the process, identify and address concerns, and build support for the approach among stakeholders.

To support this collaboration, the Legislative Finance Committee briefed agency staff on how the approach was working, discussed the required data, and explained how the results would inform budget and policy decisions.

This was particularly important because evaluations and cost-benefit analyses may identify programs that are not achieving expected results, which could be seen to reflect negatively on agencies and providers. Corrections Department officials and committee staff stressed the importance of presenting findings in ways that helped agencies improve performance and shift resources to more effective programs, rather than placing blame.

To ensure that evidence is used to inform budget and policy decisions, New Mexico's experience shows that it is also important to develop a broad coalition of champions across government. The New Mexico Sentencing Commission's diverse membership of law enforcement officials, criminal defense lawyers, and representatives from citizen interest groups made it a valuable partner in communicating the benefits of the approach and facilitating agency and legislative buy-in.



Results First has allowed us to have an ongoing conversation with policymakers about the power of good data to show where we can both save money and reduce recidivism."

Tony Ortiz, New Mexico Sentencing Commission

To strengthen this communication and establish additional partnerships, the commission is developing a stakeholder group to collaborate on and advance the Results First approach.

Transitioning to evidence-based programs takes time

Policymakers understandably want to see the results from investments they have made in programs and expect outcomes to be reported on a regular basis. The compressed time periods of legislative sessions create pressure to quickly deliver data that demonstrate program effectiveness and inform budget deliberations, but collecting and analyzing the data needed to show these results often cannot be done on a similarly expedited schedule. Sufficient time must be allotted to ensure a complete and accurate analysis process.

For example, recidivism is a key outcome that is typically measured 36 months after an inmate's release. New Mexico's Corrections Department partnered with PB&J Family Services in 2007 to implement an animal welfare program for rescued dogs—Heeling Hearts—that provides therapeutic and skills training for incarcerated women. The department is currently evaluating the program, but the results, particularly its effect on reducing recidivism, will not be available for several months. David Huerta, former director of recidivism reduction at the department, said, "It's hard to convince legislators or businessmen that we need time to give results."

Identifying evidence-based programs for specific populations can also be difficult. For example, the Corrections Department's priorities include expanding evidence-based interventions for female offenders, but limited information was available to identify effective programs for this population. To help address this gap, the Pew-MacArthur Results First Initiative compiled a database of evidence-based programs identified by several national research clearinghouses, which states can use to increase their menu of available programs. Agencies can also use the database and the Results First model to identify effective programs that meet specific criteria, such as serving certain populations, and then incorporate key elements into their non-evidence-based interventions to improve outcomes.

Information needs to be clear and understandable for policymakers

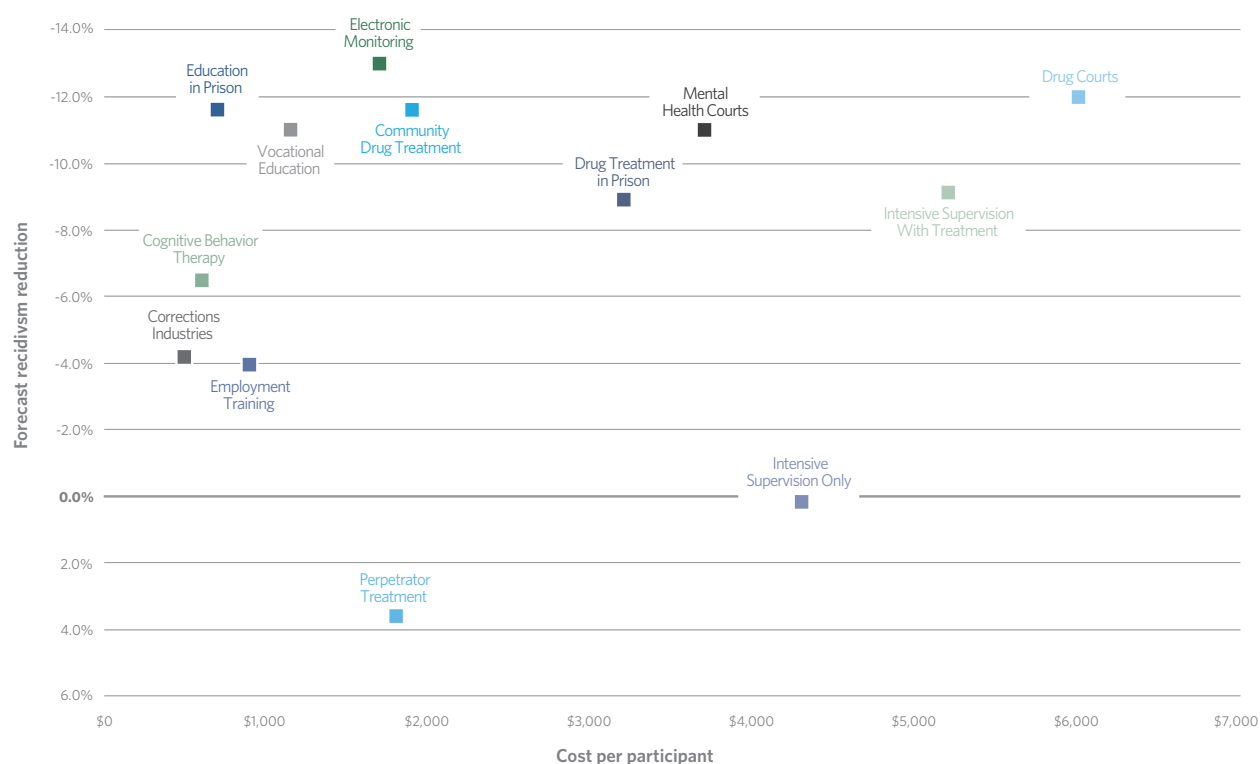
The Legislative Finance Committee designs its reports and presentations to communicate findings in clear, accessible formats, such as graphics depicting program outcomes, costs, and benefits. Staff note that this is essential to gaining policymakers' attention on important issues that might not otherwise be on their radar.

Eric Chenier, a fiscal analyst responsible for making recommendations on the criminal justice budget, noted that policymakers are often focused on education and Medicaid issues, which account for the largest portion of the state's budget. "If it's not those two issues," said Chenier, "it's harder to break through the noise. I think the most important thing is having an edge on everything with the right kind of data such as Results First." With Results First analysis, Chenier could easily illustrate to policymakers the costs and recidivism effects of fiscal 2015 budget recommendations, shown in Figure 3, reproduced from the committee's report.⁸

Figure 3

Results First New Mexico Calculated Prison Program Cost-effectiveness to Inform Budget Recommendations

Programs' costs and anticipated impact on recidivism reduction



Source: New Mexico Legislative Finance Committee, *Supplemental Tables and Graphs, Vol. 3*, (2014) 37, <http://www.nmlegis.gov/lcs/lfc/lfcdocs/budget/2015RecommendVolIII.pdf>.

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Resources must be dedicated to program implementation and monitoring

It is important for policymakers to recognize that investments in evidence-based interventions will not achieve desired outcomes unless the programs are well managed and implemented with fidelity to their designs. As noted earlier, the Legislative Finance Committee's 2012 report on New Mexico's criminal justice programs found that one of the state's evidence-based programs was not achieving its intended outcome of reducing recidivism due to poor implementation. Accordingly, it is important for states to establish strong program monitoring systems, particularly when, as in New Mexico, private providers deliver many programs. Finding the necessary resources to carry out this oversight can be a challenge for many agencies because funding for monitoring is often not built into provider contracts. New Mexico officials acknowledged the need to establish clear guidelines for fidelity monitoring, and committee staff are discussing this issue with agencies.

Next steps for Results First in New Mexico

New Mexico achieved significant benefits from implementing its Results First cost-benefit model, providing state policymakers and agency leaders with critical information about the effectiveness and return on investment from criminal justice, early education, and child welfare programs. Moving forward, New Mexico plans to:

- Convene a multiagency stakeholder group. The New Mexico Sentencing Commission will organize a stakeholder group consisting of representatives from the Corrections Department, New Mexico Sentencing Commission, and the Legislative Finance Committee to collaborate on and advance the Results First approach.
- Support ongoing criminal justice reforms. In response to presentations by Results First and other groups, New Mexico recently formed a Criminal Justice Reform Subcommittee to explore effective means for reducing crime at lower costs. Results First data will feed into subcommittee deliberations on courses of action.
- Continue to expand the Results First model into additional policy areas. The Legislative Finance Committee plans to continue using the model to inform program evaluations and budget recommendations and to expand its use in budget deliberations in other policy areas such as juvenile justice, behavioral health, and public education.



The only way you can really determine if you're getting the value of your resources is to gather information, assess it, and try to determine the outcomes. I think the evidence-based approach that we take will give us the information we need to fund the programs that work."

Representative Luciano "Lucky" Varela (D)

Endnotes

- 1 New Mexico Legislative Finance Committee, *Reducing Recidivism, Cutting Costs and Improving Public Safety in the Incarceration and Supervision of Adult Offenders* (June 2012), <http://www.nmlegis.gov/lcs/handouts/BHS%20101812%20NM%20Corrections%20Department%20LFC%20Program%20Evaluation.pdf>; New Mexico Legislative Finance Committee, *Evidence-Based Programs to Reduce Recidivism and Improve Public Safety in Adult Corrections* (July 2013), <http://www.nmlegis.gov/lcs/lfc/lfcdocs/perfaudit/LFC%20Results%20First%20-%20Evidence-Based%20Programs%20to%20Reduce%20Recidivism%20and%20Improve%20Public%20Safety%20in%20Adult%20Corrections.pdf>.
- 2 New Mexico Legislative Finance Committee, *Evidence-Based Programs to Reduce Recidivism*. This is based on an 18-month average stay of Corrections Department inmates.
- 3 New Mexico Legislative Finance Committee, *Reducing Recidivism, Cutting Costs*. The report also showed that, based on the state's projections, New Mexico's prison population will exceed current capacity over the next 10 years with half of the 3,440 offenders released in fiscal 2011 expected to return to prison within five years.
- 4 New Mexico Legislative Finance Committee, *Reducing Recidivism, Cutting Costs*.
- 5 New Mexico Legislative Finance Committee, *Improving Outcomes for Pregnant Women and Infants Through Medicaid* (September 2012), <http://www.nmlegis.gov/lcs/lfc/lfcdocs/perfaudit/Human%20Services%20Department%20-%20Improving%20Outcomes%20for%20Pregnant%20Women%20and%20Infants%20Through%20Medicaid.pdf>; New Mexico Legislative Finance Committee, *Evidence-Based Programs to Reduce Child Maltreatment* (April 2014), <http://www.nmlegis.gov/lcs/lfc/lfcdocs/perfaudit/LFC%20Results%20First%20Report%20-%20Evidence-Based%20Programs%20to%20Reduce%20Child%20Maltreatment.pdf>.
- 6 New Mexico Legislative Finance Committee, *Evidence-Based Early Education Programs to Improve Education Outcomes* (April 2014), <http://www.nmlegis.gov/lcs/lfc/lfcdocs/perfaudit/LFC%20Results%20First%20Report%20-%20Evidence-Based%20Early%20Education%20Programs%20to%20Improve%20Education%20Outcomes.pdf>.
- 7 New Mexico Legislative Finance Committee, *Reducing Recidivism, Cutting Costs*.
- 8 New Mexico Legislative Finance Committee, *Supplemental Tables and Graphs, Vol. 3* (2014), <http://www.nmlegis.gov/lcs/lfc/lfcdocs/budget/2015RecommendVolIII.pdf>.



Contact: Gary VanLandingham, director, Pew-MacArthur Results First Initiative
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Phone: 202-540-6207

Pew-MacArthur Results First Initiative, a project of The Pew Charitable Trusts and the John D. and Catherine T. MacArthur Foundation, works with states to implement an innovative cost-benefit analysis approach that helps them invest in policies and programs that are proven to work.

PEW | MacArthur Foundation

*Overview of the
Pew-MacArthur Results First Initiative:*
**Modeling Evidence-Based Programs in
Multiple Policy Areas**

March 18, 2015

Results First Overview

- Provides portfolio analysis of current & alternative programs
- Uses both state-specific data & national meta-analytic results
- Focuses on outcomes & return on investment
- Can assess adult & juvenile justice, child welfare, substance abuse & mental health, early & K-12 education & health care interventions



**Example: Community-Based
Functional Family Therapy**



OUTCOMES FROM PARTICIPATION		MAIN SOURCE OF BENEFITS
Reduced crime	\$29,340	Lower state & victim costs
Increased high school graduation	\$9,530	Increased earnings
Reduced health care costs	\$398	Lower public costs
Total Benefits	\$37,587	
Cost	\$3,333	
Net Present Value	\$34,254	
Benefits per Dollar of Cost	\$11.28	

Washington State results

**Conduct Analysis on Portfolio
Basis - "Consumer Reports"**



ADULT PROGRAMS	COST	LONG-TERM BENEFITS	BENEFIT/COST RATIO
Cognitive behavioral therapy	\$419	\$9,954	\$24.72
Electronic monitoring	\$1,093	\$24,840	\$22.72
Correctional education in prison	\$1,149	\$21,390	\$19.62
Vocational education in prison	\$1,599	\$19,531	\$13.21
Drug court	\$4,276	\$10,183	\$3.38
Domestic Violence treatment	\$1,390	-\$7,527	-\$4.41
JUVENILE PROGRAMS			
Aggression replacement training	\$1,543	\$55,821	\$37.19
Coordination of services	\$403	\$6,043	\$16.01
Drug court	\$3,154	\$11,539	\$4.66
Scared Straight	\$66	-\$12,988	-\$195.61

Washington State results

Participation in Results First



Results First Outcomes (through 2014)



14 Jurisdictions	Completed implementation of the model
11 Jurisdictions	Released 20 reports or briefs
4 States	Enacted legislation incorporating Results First into their policymaking process
5 States	Used the approach to target \$80 million in funding

Keys to impact

- Address real-world concerns of policymakers
- Embed approach in policy process
 - Honest broker close to policymakers
 - Timing is critical
 - Requires ongoing outreach & training
- Identify potential policy levers to promote use & impact



Gary VanLandingham, Director

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www.pewtrusts.org/ResultsFirst

Computational Models in Tobacco Control

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Page 1

Acknowledgment

Many thanks to **Dr. David Levy**, from Georgetown University for providing slides about the SimSmoke model,
and to **Dr. Rafael Meza**, from the University of Michigan for providing the slides about the CISNET models.

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Page 2

Why Model?

- ◆ To fully understand the problem
 - Models provide a coherent framework to analyze a situation and integrate different data sets
- ◆ To monitor and forecast
- ◆ To evaluate the consequences of policies
- ◆ To guide data collection

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Example of questions that models can help to address

- ◆ If current conditions continue, what is the likely trajectory of smoking prevalence?
- ◆ If we fully implement all the tobacco control measures known to be effective, what is the likely trajectory of the smoking prevalence?

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Example of questions that models can help to address

- ◆ What would be the population health impact of removing menthol cigarettes from the market?
- ◆ What would be the consequences of increasing the minimum purchasing age for tobacco products?

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Page 5

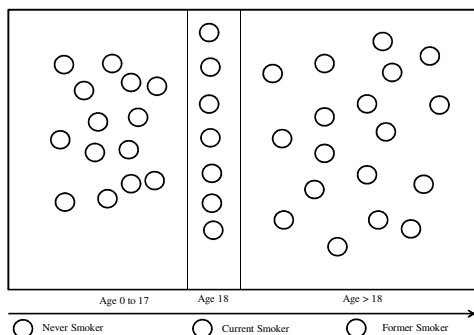
Example of questions that models can help to address

- ◆ What would be the impact of reducing nicotine in combustible tobacco products to non-addictive levels?
- ◆ What is the estimated impact of tobacco control policies on avoided mortality?

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Smokers in the Population



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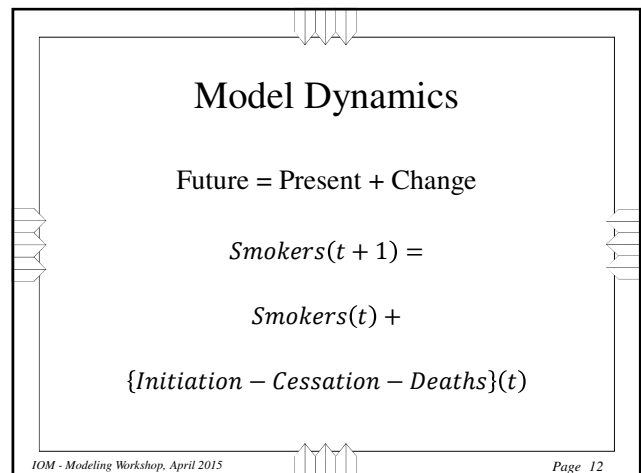
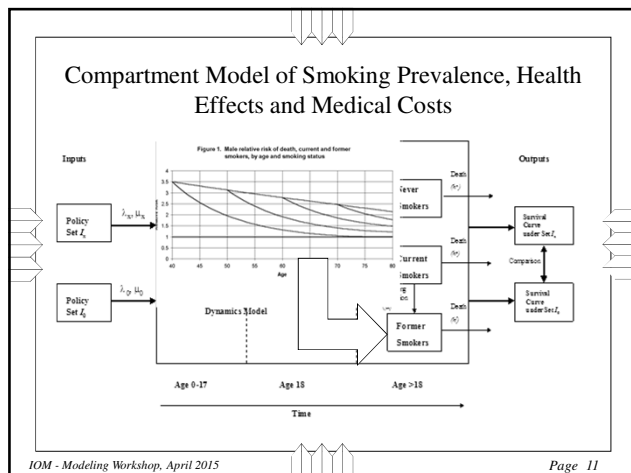
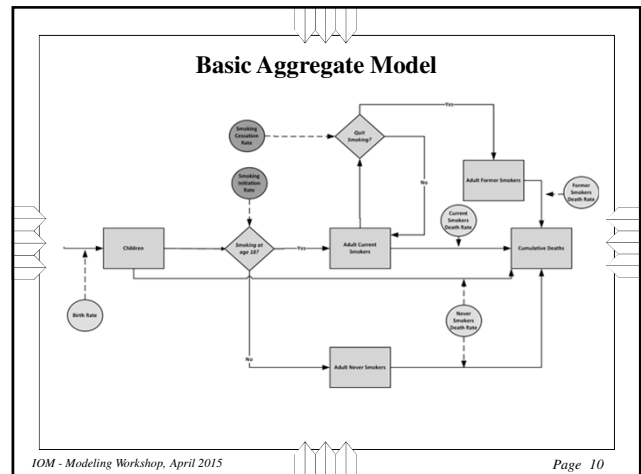
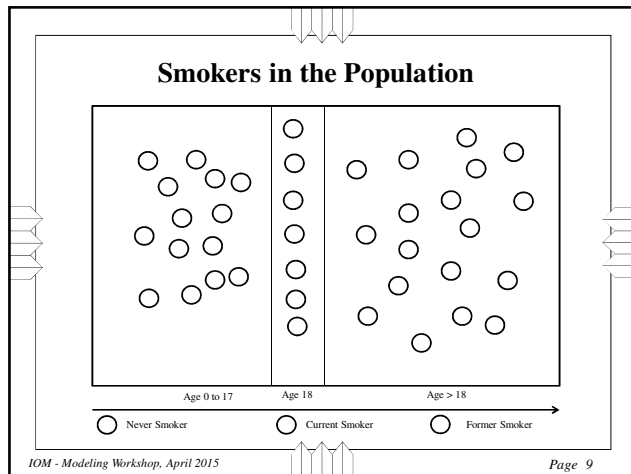
Page 7

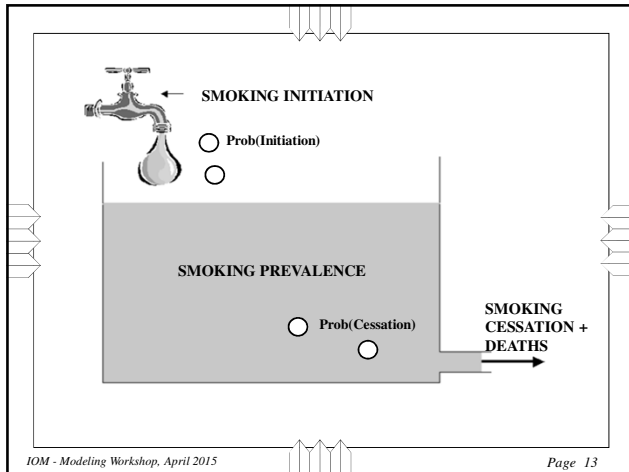
Model Structure

- ◆ Individual vs. Aggregate
- ◆ Static vs. Dynamic
- ◆ Deterministic vs. Stochastic
- ◆ Linear vs. Non-Linear

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Michigan Model of Smoking Prevalence and Health Effects

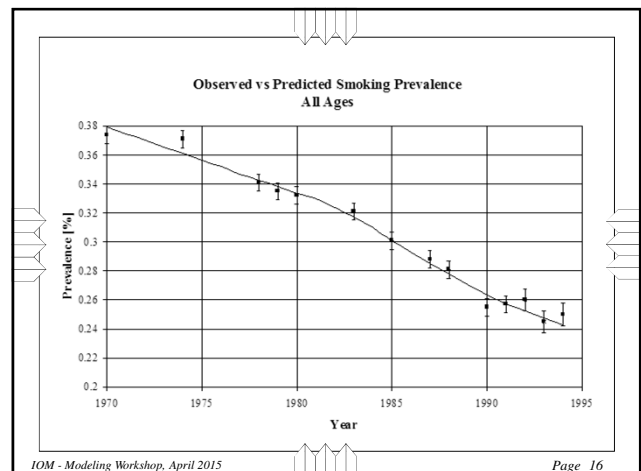
- ◆ Aggregate (Compartmental)
- ◆ Dynamic
- ◆ Deterministic / Stochastic
- ◆ Linear / Non-Linear

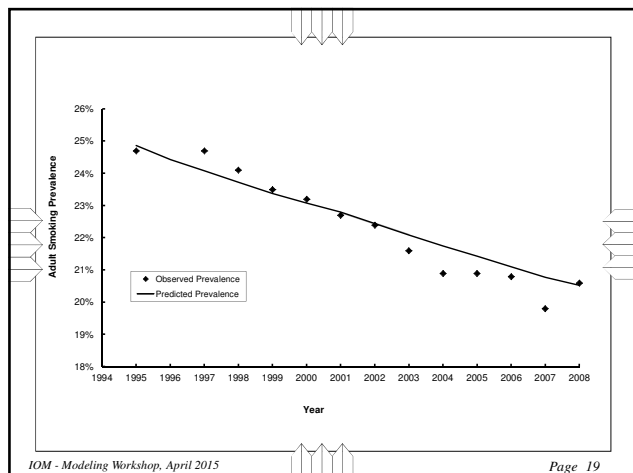
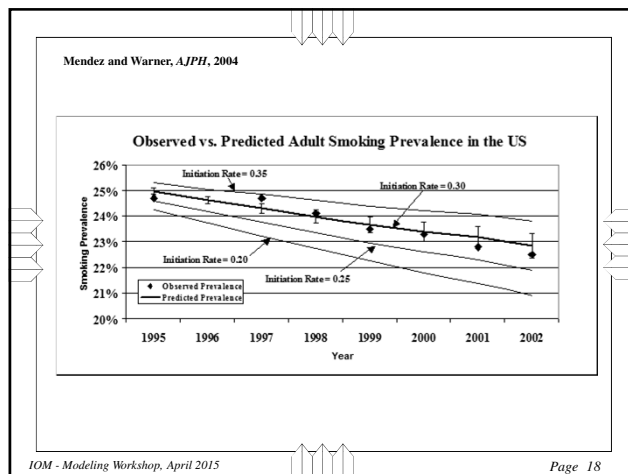
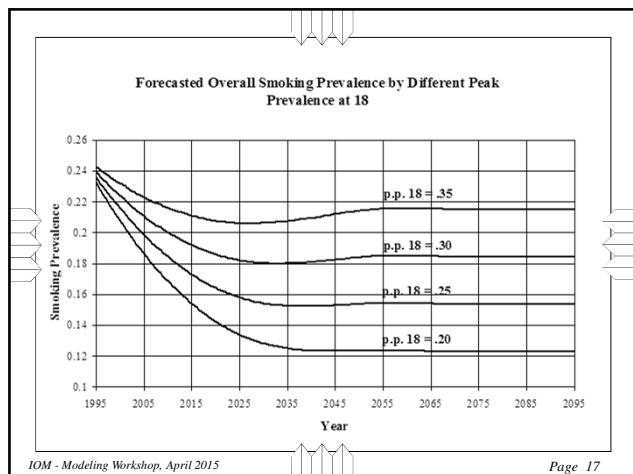
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Building Confidence on the Model

- ◆ Fitting the model to observed data
- ◆ Comparing predictions with observed data

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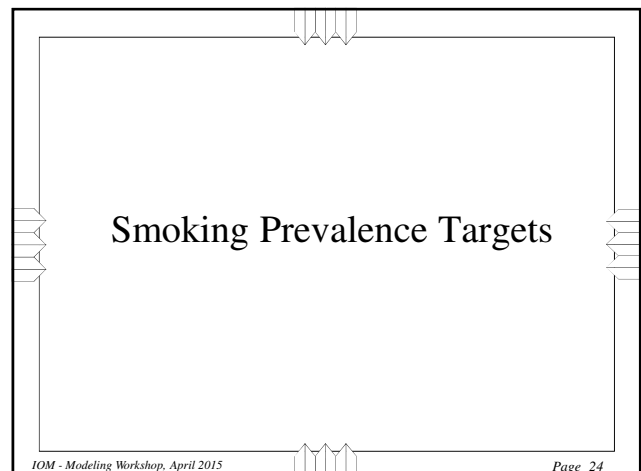
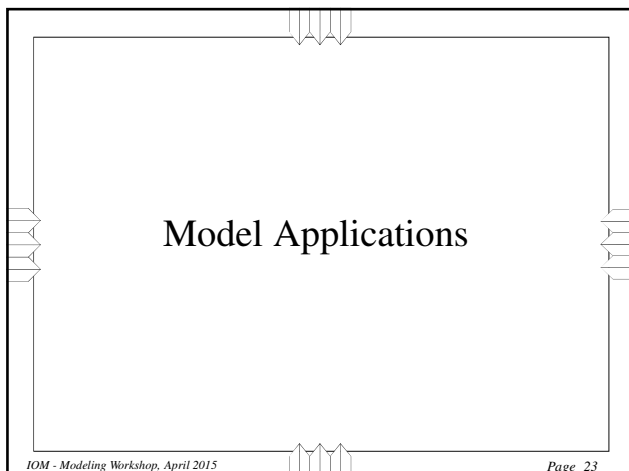
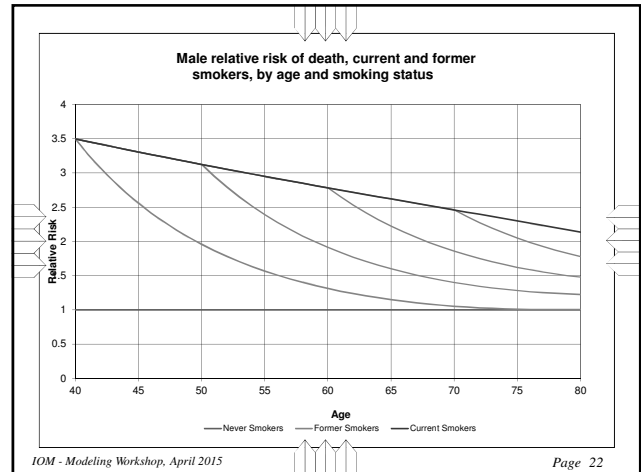
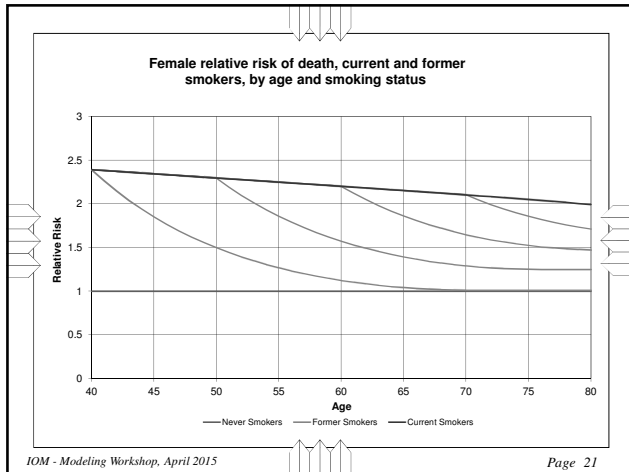




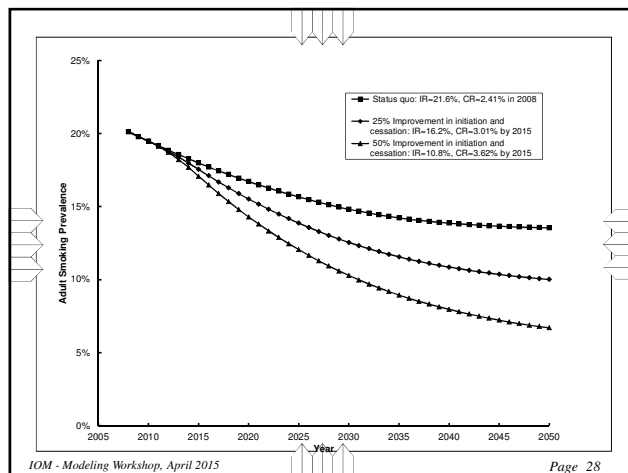
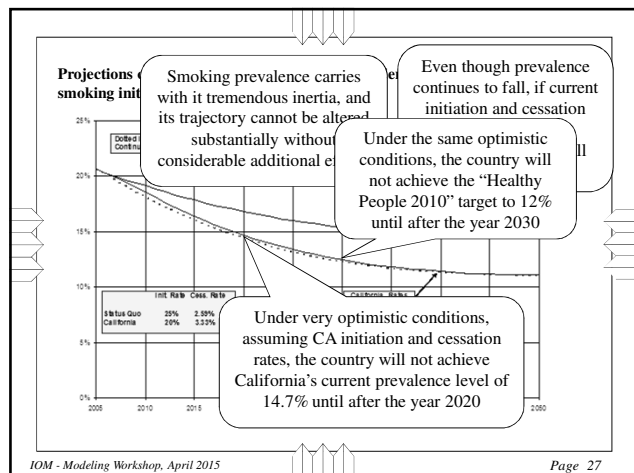
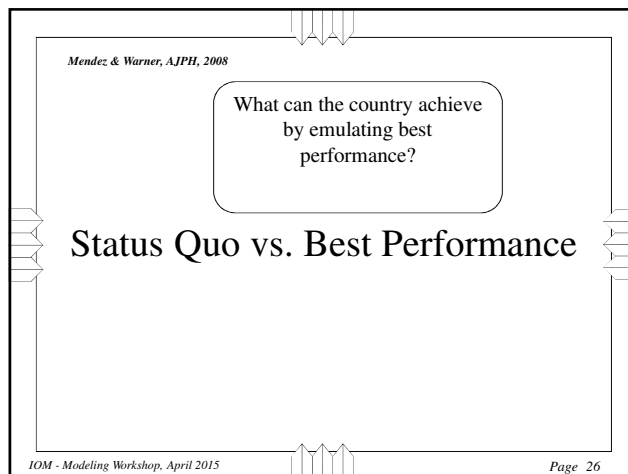
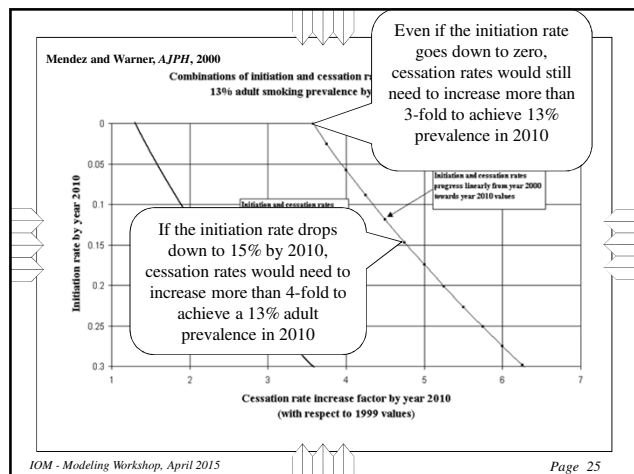
Including Health Effects

- ◆ Relative Risks derived from the Cancer Prevention Study II (CPS II) data

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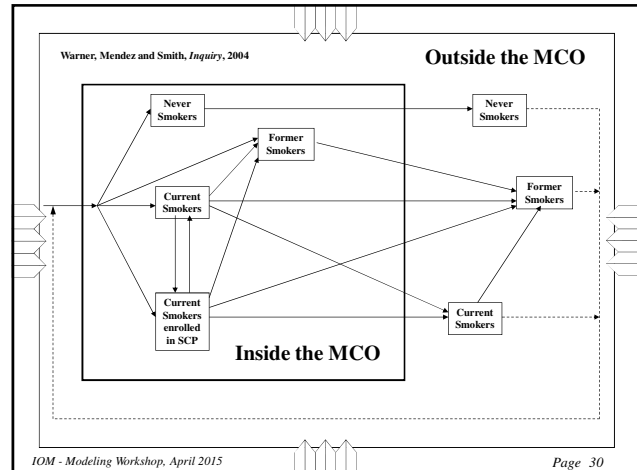
Dynamic Model of Smoking Prevalence



Smoking Cessation in Managed Care Organizations

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Parameter	Assumed value
Size of initial (year 2000) cohort	450,000
Initial number of current smokers	71,538
Initial number of former smokers	72,178
Initial smoking initiation rate	30%
Annual number of new enrollees	100,000
Average annual turnover rate	15%
Average participation rate in the smoking cessation program (SCP)	10%
Average permanent quit rate attributable to SCP participation	15%
Annual per participant cost of the SCP	\$350
Ratio of current smokers' to never smokers' medical cost	1.32
Price markup (over medical costs to determine MCO premiums)	15%
Initial medical cost inflation factor	3%
Discount rate for financial analysis	11.22%
Discount rate for social analysis	3%

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Coverage-induced outcomes	5-year results		10-year results		30-year results	
	Total	Per member per month	Total	Per member per month	Total	Per member per month
Cessation program costs	\$15.5 million	\$0.63	\$26.4 million	\$0.59	\$36.8 million	\$0.55
Change in medical costs	-\$0.5 million	-\$0.02	-\$2.7 million	-\$0.06	-\$7.5 million	-\$0.11
Program + net medical costs	\$15.0 million	\$0.61	\$23.8 million	\$0.53	\$29.3 million	\$0.44
Change in MCO revenue	\$0.0 million	\$0.00	\$0.2 million	\$0.00	\$1.8 million	\$0.03
Total Net Costs	\$15.0 million	\$0.61	\$23.5 million	\$0.53	\$27.6 million	\$0.41

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Parameter	Sensitivity analysis values		Discounted net cost PMPM (Base case financial discount rate = 11.22%)					
			5-year results		10-year results		30-year results	
	Low	High	Low	High	Low	High	Low	High
Base case			\$0.61		\$0.53		\$0.41	
Average turnover rate	5%	25%	\$0.60	\$0.62	\$0.51	\$0.55	\$0.31	\$0.48
Average participation rate in the smoking cessation program	5%	15%	\$0.41	\$0.81	\$0.36	\$0.69	\$0.28	\$0.54
Average permanent quit rate attributable to participation	10%	20%	\$0.63	\$0.59	\$0.57	\$0.48	\$0.49	\$0.33
Annual per participant cost	\$250	\$450	\$0.43	\$0.79	\$0.36	\$0.69	\$0.25	\$0.57
Ratio of current smokers' to never smokers' medical cost	1.21	1.44	\$0.62	\$0.60	\$0.55	\$0.50	\$0.46	\$0.36
Price markup (over medical costs to determine MCO premiums)	10%	20%	\$0.61	\$0.61	\$0.53	\$0.53	\$0.41	\$0.41
Financial discount rate	9.22%	13.22%	\$0.61	\$0.61	\$0.52	\$0.53	\$0.39	\$0.43
Background smoking initiation rate declines up to ... by year 2015	0.1	0.3	\$0.61	\$0.61	\$0.53	\$0.53	\$0.40	\$0.42
No MCO members ≥ 65 years old (No Medicare option)			\$0.47		\$0.48		\$0.53	

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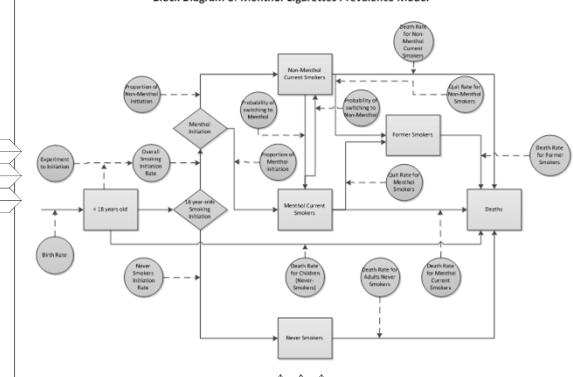
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Impact of Menthol Cigarettes on the Population

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Block Diagram of Menthol Cigarettes Prevalence Model



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Input Parameters General Population

Parameter	Min	TPSAC Estimate	Max
Proportion of Menthol among Initiators	0.35	0.40	0.45
Proportion of Menthol among Experimenters (K_1)	0.38	0.45	0.60
Ratio of "Proportion of Menthol Experimenters that become Established Smokers" / "...Non-menthol...." (K_2)	1.00	1.68	1.85
Cessation Rates Ratio (Menthol/Non-menthol)	0.92	0.95	1.10
Mortality Risk Ratio (Menthol/Non-menthol)	0.80	1.00	1.20
Switching Rate from Menthol to Non-menthol (among Menthol smokers)	0.9%	1.8%	2.7%
Switching Rate from Non-menthol to Menthol (among Non-menthol smokers)	0.4%	0.8%	1.2%

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Results for the General Population Model

TPSAC Estimates

[illegible]

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Results from the Menthol Model

- ◆ If menthol cigarettes did not exist, an estimated 328,000 premature deaths and 9 million new smokers would be avoided over a 40 year period.

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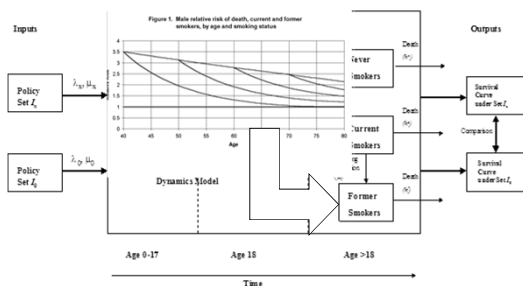
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Analysis of Global Smoking Prevalence

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Compartment Model of Smoking Prevalence, Health Effects and Medical Costs



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Effectiveness of MPOWER Policies on Initiation and Cessation Rates

Policy	Description	Effect on Cessation (Relative Risk)	Effect on Initiation (Relative Risk)
P (Protect)	Clean Air Laws	1.38 ⁵	0.926
O (Offer Help)	Cessation Support	1.061	Not Applicable
W (Warn)	Mass Media and Package Warnings	1.25	0.8
E (Enforce)	Enforce Ad Bans	Not Available	0.94 ⁵
R (Raise)	Raise Taxes	Price Elasticity = 0.375	Price Elasticity = -0.7 ⁵

Mendez, Althamqity & Warner, Tob Ctrl, 2012

Table 3. Estimated Smoking Prevalence in 2020 and 2030 under Base Case Scenario

WHO Region	Prevalence in 2010	Estimated prevalence in 2020 if no additional non-tobacco policies are implemented after 2010			Estimated prevalence in 2030 if no additional non-tobacco policies are implemented after 2010		
		Best Case	Expected	Worst Case	Best Case	Expected	Worst Case
AFRO	15.5	16.7	19.4	23.0	18.2	21.9	26.5
AMRO	20.5	17.0	18.0	18.9	15.8	16.7	17.8
EMRO	22.4	21.7	22.9	24.3	22.0	23.7	25.7
EURO	21.2	20.9	20.2	21.4	20.1	20.7	21.2
SEARO	20.1	18.5	18.7	19.2	17.0	17.6	18.4
WPRO	23.5	22.8	27.6	29.3	24.1	26.3	29.5
All Regions	22.7	22.1	22.7	23.3	21.2	22.8	22.7

Table 4. Estimated Prevalence in 2020 and 2030 under MPOWER Policies with 100% Price Increase

WHO Region	Prevalence in 2010	Estimated prevalence in 2020 with MPOWER package implemented in 2010 with 100% price increase			Estimated prevalence in 2030 with MPOWER package implemented in 2010 with 100% price increase		
		Best Case	Expected	Worst Case	Best Case	Expected	Worst Case
AFRO	15.5	11.6	12.1	12.4	10.6	11.3	11.9
AMRO	20.5	11.1	11.6	12.0	9.3	9.9	9.4
EMRO	22.4	13.9	15.1	16.3	11.3	13.0	14.6
EURO	21.2	17.1	18.2	19.2	13.7	15.1	16.4
SEARO	20.1	13.3	13.5	13.7	11.4	11.7	12.0
WPRO	23.5	19.2	19.4	19.6	16.7	17.0	17.4
All Regions	22.7	16.0	16.4	16.8	12.6	13.2	13.7

SimSmoke

- **SimSmoke** simulates the dynamics of smoking rates and smoking-attributed deaths in a State or Nation, and the effects of policies on those outcomes.
- **Focus on tobacco control policies**
 - Effects vary depending a) on the way the policy is implemented, b) by demographics
 - Dynamic, nonlinear and interactive effects of policies
- **Compartmental (macro) model** with smokers, ex-smokers and never smokers evolving through time by age and gender.
- **Deterministic uni-causal model** with sensitivity analysis

Models

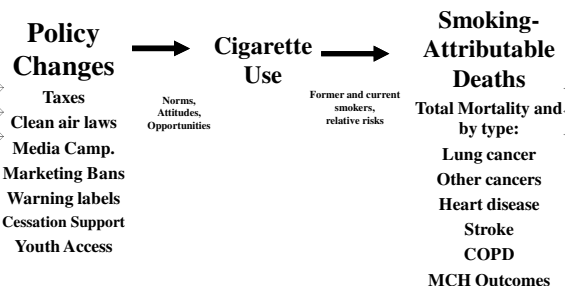
Countries:

Albania, Argentina, Bangladesh, Brazil, China, Czech Republic, Egypt, Finland, France, Germany, Great Britain, India, Indonesia, Ireland, Italy, Japan, Korea, Malaysia, Mexico, Netherlands, Pakistan, Poland, Philippines, Taiwan, Russia, Spain, Sweden, Thailand, Turkey, Ukraine, US, Vietnam

States:

Arizona, Calif, Kentucky, Massachusetts, Minnesota, NY, Missouri

Basic Approach



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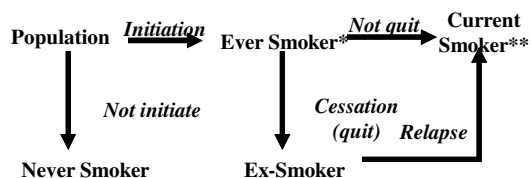
Basic Structure of Model

- ♦ Population model begins with initial year population (by age and gender) and moves through time (by year) with births and deaths (1st order discrete Markov process)
- ♦ Smoking model distinguishes population into never smokers, smokers, and ex-smokers and moves through time with initiation, cessation and relapse (Markov)
- ♦ Smoking-attributable deaths depend on death rates, smoking rates and relative risks from CPS-II
- ♦ Policy modules for each policy with interdependent effects on smoking rates

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Smoking Model: Evolution of Smokers



* Usually as smoked 100 cigarettes lifetime ** usually smoked some or all days

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Relationship between policies and smoking rates based on:

- ♦ Evidence from tobacco and other risky behavior literature,
- ♦ Theories (Economics, Sociology, Psych, Epidemiology, etc), and
- ♦ Advice by a multidisciplinary expert panel

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Policy Effects

- ◆ Initial impact on cessation through smoking prevalence (1+PR), PR = percent reduction.
Based on prevalence studies
- ◆ Maintained through initiation rates (1+PR) and increased through cessation rates (1-PR): based on limited information
- ◆ Effects may differ by age and gender: from studies distinguishing demographics
- ◆ Effects depend on the way in which policy is implemented: level, degree of enforcement, other policies (synergies, e.g., through publicity): found through variation in results
- ◆ Interactions between policies (percent reductions multiplicative) with some built in interactions : based on limited information

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Policies based on FCTC MPOWER

- ◆ *Cigarette taxes- through price*
- ◆ *Smoke-Free Air Laws*
 - *Worksite*
 - *Restaurant and bars*
 - *Other public places*
- ◆ *Tobacco control/media campaigns*
- ◆ *Marketing Bans*
- ◆ *Health Warnings*

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MPOWER policies (cont)

- ◆ *Cessation Treatment*
 - Availability of pharmacotherapy
 - Cessation treatment access (hospital etc)
 - Quitlines (and web-based treatment)
 - *Health care provider involvement (not in MPOWER)*
- ◆ *Youth access policies*
includes enforcement, and vending AND self-service bans
Interactions of Publicity through media campaigns on health warnings and cessation treatment.

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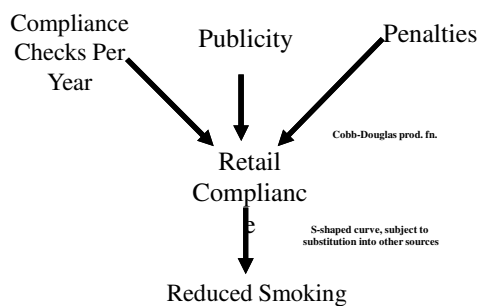
Youth Access Policy

- ◆ Policies to reduce cigarette sales to underage
- ◆ Past literature suggests youth access policies lead to increased retail compliance.
- ◆ Effects on actual smoking rates are unclear. Two potential reasons
 - Role of non-retail sources of cigarettes (parents older friends theft)
 - Level and extent of policies

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Policy Components Affecting Retail Compliance

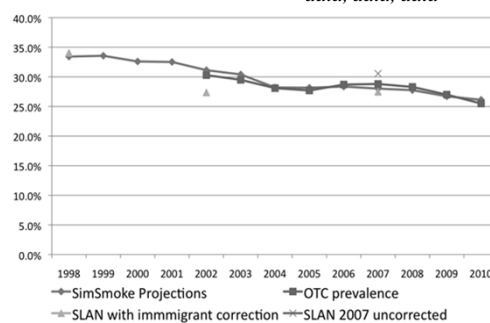


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Ireland Male Smoking Prevalence, 1998-2010

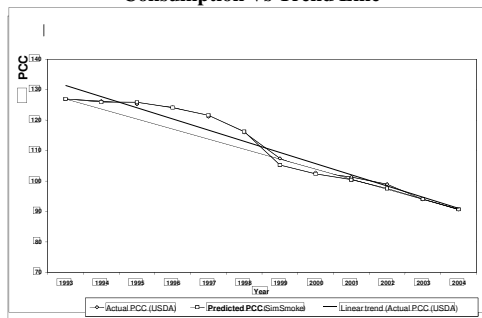
data, data, data



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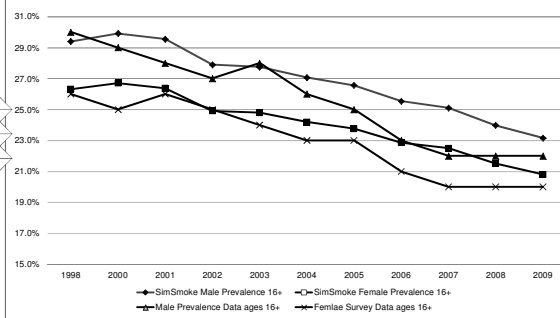
U.S. Model Validation: Actual Vs Predicted Per Capita US Consumption Vs Trend Line



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Great Britain SimSmoke, Predicted vs Survey, 1999-2009

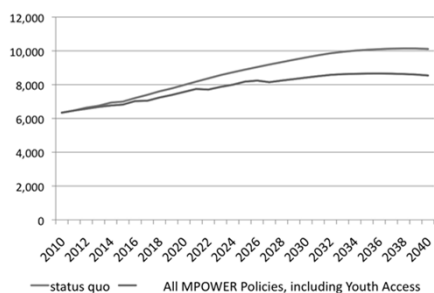


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Dynamic Model of Smoking Prevalence

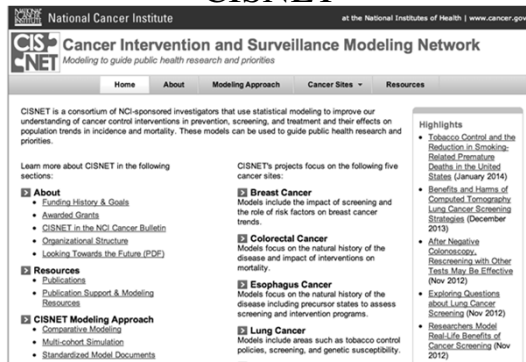
**SimSmoke Projections Male and Female Smoking-Attributable Deaths 2010-2040
Status Quo vs. All MPOWER Policies**



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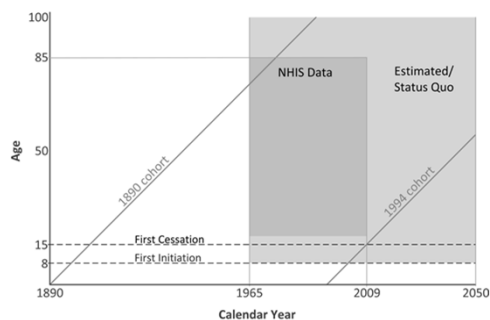
CISNET



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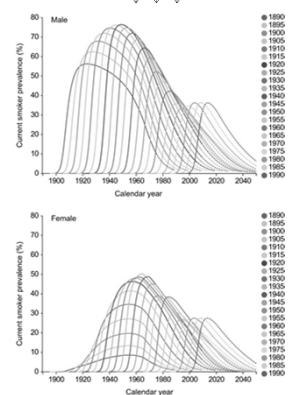
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CISNET Smoking History Generator



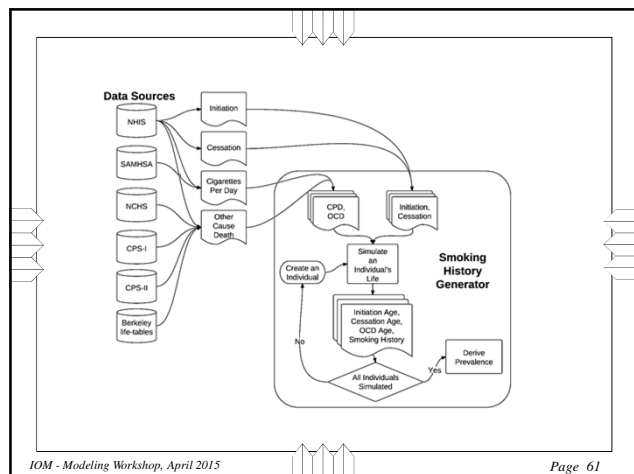
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Holford et al PAM 2014



Tobacco Control and the Reduction in Smoking-Related Premature Deaths in the United States, 1964-2012

Theodore R. Holford, Rafael Meza; Kenneth E. Warner, Clare Meernik, Jiyoung Jeon, Suresh H. Moolgavkar, David T. Levy

JAMA. 2014;311(2):164-171

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Approach

- ◆ Reconstruct smoking experience in the US from 1864-2012
 - By gender, age, birth-cohort
- ◆ Simulate counterfactual assuming no reductions in smoking due to tobacco control since 1964
- ◆ Model attributed smoking mortality under “actual” and “counterfactual” scenarios
 - Mortality rates by smoking status

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Impact of Tobacco Control in the US since 1964

- ◆ In 1964-2012, an estimated **17.7 million deaths** were related to smoking
- ◆ Tobacco control was estimated to be associated with **avoidance of 8 million** premature deaths and an estimated **extended mean life span of 20 years (two decades of life)**
- ◆ Although tobacco control represents an important public health achievement, efforts must continue to reduce the effect of smoking on the US’ death toll

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**Models in Tobacco Control
Areas for further Development**

- ◆ Increasing complexity and heterogeneity of the tobacco landscape
- ◆ Interaction among individuals is important in determining tobacco use behavior
- ◆ Need to develop models that account for the effects of those unique individual interactions.

Thank you



IMPROVING COMMUNICATION ON USEFULNESS OF MODELS TO POLICYMAKERS

Karen J. Minyard, Ph.D.
Georgia Health Policy Center
Andrew Young School of Policy Studies
Georgia State University

 Georgia Health Policy Center

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GEORGIA HEALTH POLICY CENTER

Integrating research, policy, and programs to advance health and well-being

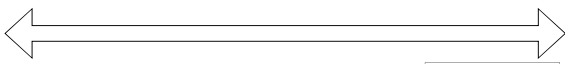
- A research center within the Andrew Young School of Policy Studies at Georgia State University in Atlanta
- Provides evidence-based research, program development, and policy guidance locally, statewide, and nationally
- Celebrating our 20th anniversary in 2015, we have worked in more than 800 communities across the United States



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 Georgia Health Policy Center

Adaptive v. Routine Challenges



Routine/technical Problems

- Easily defined
- An obvious, proven solution
- Often an expert on whom we can call to solve the problem for us

There is, in other words, a routine for dealing with the problem.

Adaptive Challenges

- Often hard to define
- No clear solution, and different people hold different views about its source
- No expert who can solve the problem for us

They are fundamentally different.

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FOUR LEVELS OF LEARNERS

Different learning needs:

- Level 1: Basic
- Level 2: “Hot” Issues
- Level 3: Legislative Health Policy Certificate Program
- Level 4: Leadership

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LEGISLATIVE HEALTH POLICY CERTIFICATE PROGRAM

- Program for state lawmakers who want to improve their understanding of health and health care
- Use systems dynamics and systems thinking to encourage broader and more systemic approaches to policymaking
- More than 130 Georgia legislators and staff have attended the course and 96 have received certificates



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LEGISLATIVE HEALTH POLICY CERTIFICATE PROGRAM

2008, 2009, 2011, & 2013

Core Sessions:

- Evaluating Health Policy: *The Framework*
- The Impact of Health Status on the State
- Financing Health Care: *Challenges and Opportunities*
- Health Coverage and Access to Care

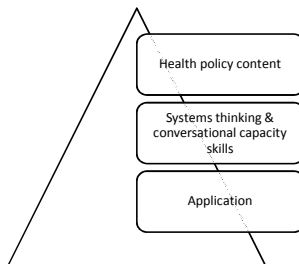
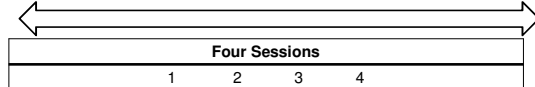
Issue Specific Sessions:

- Children's Behavioral Health
- The Mental Health System
- Addressing Georgia's Trauma Care Network
- Public Health Challenges
- Interventions to Reduce Childhood Obesity
- Health Care Reform

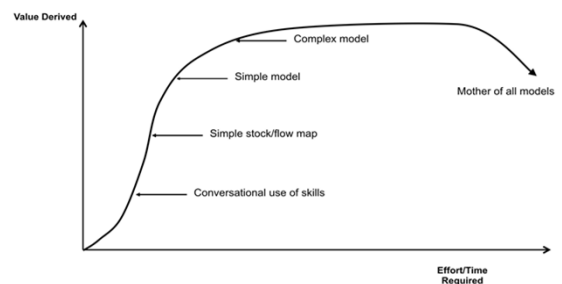
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Course Curriculum



Barry Richmond's Value per Effort Graph



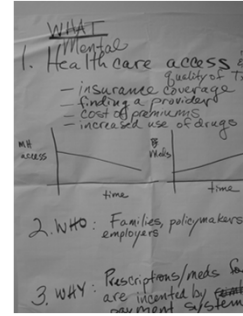
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A SIX-QUESTION FRAMEWORK FOR EVALUATING POLICY

1. What is the important (perhaps troublesome) trend related to health in Georgia? What is the shape of this trend over the past several years?
2. Who are the stakeholders concerned about the trend?
3. Why this trend (what's the cause, what is responsible)?
4. Where is there leverage (some policy) to address the underlying cause of the trend?
5. How will it work? How will it play out over time? How might unintended consequences occur? How might the policy positively or negatively impact...
 - a) Health status?
 - b) State health spending?
 - c) Health care system?
 - d) Health equity?
6. When would the policy create an impact on health status? When would you see an improvement in some other indicators (i.e., spending, services)?

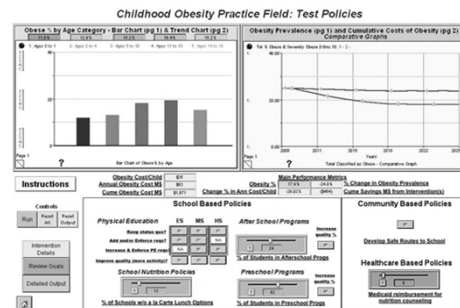
BEHAVIOR OVER TIME GRAPHS



STOCK AND FLOW MAPS



SYSTEM DYNAMICS MODELS





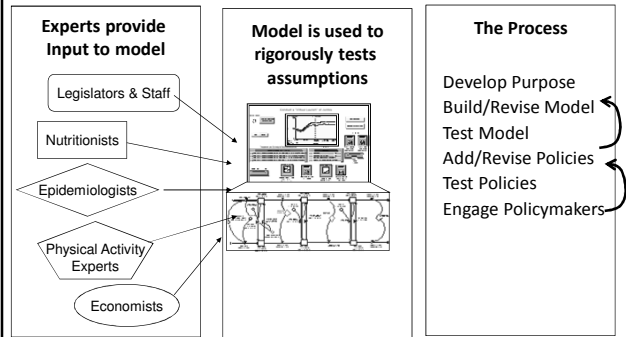
APPLYING SYSTEMS THINKING TO ADDRESS CHILDHOOD OBESITY IN GEORGIA

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GROUP MODEL BUILDING



POLICY AREAS MODELED

- 1) Ensuring safe routes to school
- 2) Improving school food options
- 3) Improving school physical education
- 4) Improving nutrition/physical activity education in preschool programs
- 5) Improving nutrition/physical activity education in after school programs
- 6) Reimbursing Medical Nutrition Therapy for obese children insured by Medicaid

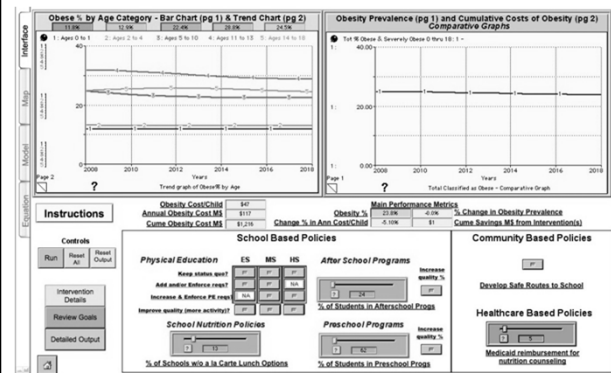


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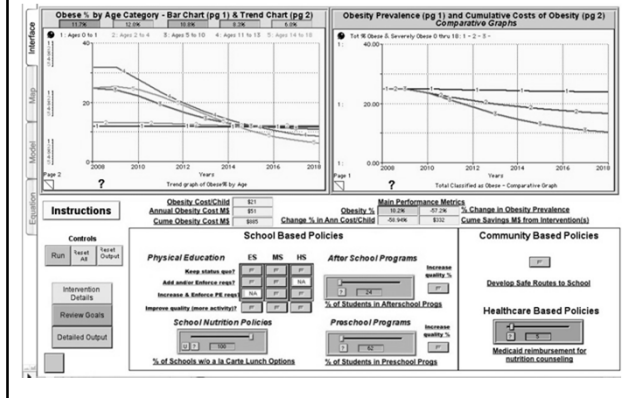
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PRACTICE FIELD: TEST POLICIES



PRACTICE FIELD: TEST POLICIES



SYSTEMS THINKING PROJECTS

- Legislative Health Policy Certificate Program
- Collaborative Systems Inquiry Model for Childhood Obesity
- Collaborative Modeling to Reduce Low Birth Weight
- Systems Thinking for Georgia Injury Prevention
- Mapping
 - Interdisciplinary Collaboration
 - Dynamics in the Dual Eligible Population
 - Sustainability and Technical Assistance
- PRISM Model
- Georgia's Child-Serving Agencies System of Care Map and Strategy
- ReThink Health Evaluation
- Teen Pregnancy Modeling
- Motor Vehicle Injury Prevention

GUIDING PRINCIPLES

- Using system dynamics tools for impact: context, engagement and skills matter
- Systems thinking tools (such as models and maps) are most effective and impactful in catalyzing change when:
 - the purpose for using a model is clearly identified and supported by the client;
 - it is developed in a collaborative process;
 - they are as simple as possible, but no simpler;
 - they can be tailored to the readiness and the level of engagement of participants, as well as the goals and the outcome of the process;
 - the modeler/facilitator has the adaptive and technical skills to use the tools; and
 - they are used as a part of a larger change process.

THANK YOU

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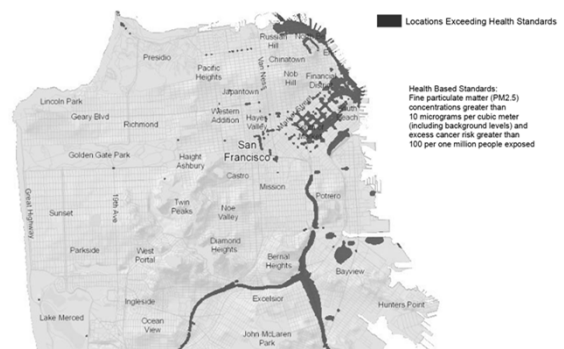
Models for Population Health

Observations on Model Design
and Information Value from Health
Impact Assessment Practice

Health Impact Assessment (HIA) is a
trans-disciplinary decision-support
practice that characterizes the
prospective health effects of a
decision.

Health Impact Assessment uses
conceptual models to identify and
prioritize research questions and
quantitative models to estimate
decision impacts on health
determinants and outcomes.

Air Pollution Health Risks



Modeling Air Pollution Health Risks

Outcomes	Ambient Particulate Matter / All-cause Mortality
Exposure Model	Physical dispersion
Mortality Model	Logistic Regression
Inputs	Air Pollution Emissions, Meteorology, Crude mortality, Exposure-response function, Population
Validation	Field Air Pollution Measures
Applications:	Land use regulation; Road Pricing; Weatherization programs;

Pedestrian Injuries & Fatalities



Modeling Pedestrian Injuries

Outcomes	Pedestrian Injuries & Fatalities
Type	Binomial Regression
Predictors	Vehicle and pedestrian volumes; traffic speed; road and intersection characteristics; area population characteristics
Validation	Police Reported Injuries
Applications	Traffic Engineering; Land Use Regulation; Road Pricing; Infrastructure Funding

Minimum Wage Health Impacts



Modeling Minimum Wage Health Impacts

Outcome	Avoidable Mortality
Income Model	OLS Regression
Mortality Model	Logistic Regression
Inputs	Minimum wage rate; income distribution; income-mortality exposure-response function
Validation	None
Applications	Wage and Tax Policy

Modeling was purpose driven; in most cases, the demand for information existed *before* model development

Available data on population health “risk factors” was often disconnected from actionable policy outcomes

Innovation involved “joining up” models of health determinants and health outcomes.

Information value arose from connecting
policy and health outcomes; from
attributing and localizing risks; and from
supporting policy implementation.

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The Civic Engine
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