New Horizons in Modeling and Simulation for Social Epidemiology and Public Health

Daniel Kim, RAND Corporation

WHY TO BUY

This book provides an introduction to the state-of-the-art use of modeling and simulation approaches, particularly agent-based models and microsimulation models, to better understand the complex social and economic determinants of public and population health.

Author biography

Daniel Kim, MD, PhD is Associate Social Policy Scientist in the Behavioral and Social Science Department at RAND Corporation, a non-profit global policy think tank, and Adjunct Professor at the French School of Public Health.   His expertise is in the social determinants of health, particularly in estimating the effects of neighborhood socioeconomic and other area-level societal factors on health, and in identifying the influences of social and economic policies on population health.   Dr. Kim currently serves as Chair of a National Institutes of Health grant application panel on Systems Science and Health, which is an expert panel that reviews research grant proposals using methods including agent-based modeling (ABM) and microsimulation models (MSM).   He graduated with a Doctor of Public Health degree from the Harvard School of Public Health and a Doctor of Medicine degree from the University of Toronto.

Sales handles

- Provides a conceptual and methodological foundation for the application of agent-based modeling (ABM) and microsimulation models (MSM) to analyze the social determinants of health
- Includes a comprehensive and systematic survey of applications of ABM and MSM in   empirical research within the social sciences, social epidemiology, and public health
- Highlights future directions for empirical research using ABM and MSM modeling and simulation, including integrating these methods and discussing the policy implications of findings based on these more complex models
- Presents fundamental concepts and methods for MSM and empirical evidence using MSM in the social sciences, including labor/tax-benefit policy and demographic issues/social security policy, as well as in social epidemiology and public health, including healthcare policy and disease simulation
- Includes two chapters written by Ross A. Hammond, PhD, and Ann Harding, PhD, who are internationally-recognized experts in agent-based modeling and microsimulation respectively
- Targets a general audience of policymakers, modeling and simulation practitioners, researchers, and graduate students in public health and the social sciences

About the topic/technology

Microsimulation Models (MSM) are closely linked to Agent-Based Models (ABM), and both types of models represent key individual-level modeling and simulation approaches. The possible applications of ABM to the social and economic determinants of population health are vast.   ABM has been used to analyze the spread of infectious disease epidemics, model the social determinants of behaviors such as alcohol and drug use, and study population dynamics. In addition, ABM has been applied to simulate existing patterns of population sorting by geography such as residential segregation by income or race/ethnicity.   The application of MSM for simulating the effects of social and economic policies on population health also holds considerable promise. Within public health, MSM can help to advance our knowledge further and answer significant policy questions such as: what impacts will the implantation of new income tax policies or increases/decreases in public spending on welfare, education, and health care have on population health? Answering these types of questions in the present economy is paramount.

Market description   (Please include secondary markets)

As a reference and resource for policy analysts, public planners, and practitioners in public health and public policy, particularly in the fields of social epidemiology and social policy; also appropriate for researchers in other social science fields, including economics, sociology, demography, political sciences, and government studies due to the coverage of empirical evidence on the application of

ABM and MSM within the social sciences; as an upper-undergraduate and graduate level course book for social epidemiology and public policy courses as well as for medical and healthcare students who will need modeling and simulation techniques as future practitioners or trainers; and academic and corporate libraries.

New Horizons in Modeling and Simulation for Social Epidemiology and Public Health

Daniel Kim

About the book

An introduction to state-of-the-art modeling and simulation approaches for social and economic determinants of population health

New Horizons in Modeling and Simulation for Social Epidemiology and Public Health offers a comprehensive introduction to modeling and simulation that addresses the many complex research questions in social epidemiology and public health. This book highlights a variety of practical applications and illustrative examples with a focus on modeling and simulation approaches for the social and economic determinants of population health.

The book contains classic case examples in agent-based modeling (ABM) as well as essential information on ABM applications to public health including for infectious disease modeling, obesity, and tobacco control. This book also surveys applications of microsimulation (MSM) including of tax-benefit policies to project impacts of the social determinants of health.

Specifically, this book:

- Provides an overview of the social determinants of health and the public health significance of addressing the social determinants of health
- Gives a conceptual foundation for the application of ABM and MSM to study the social determinants of health
- Offers methodological introductions to both ABM and MSM approaches with illustrative examples
- Includes cutting-edge systematic reviews of empirical applications of ABM and MSM in the social sciences, social epidemiology, and public health
- Discusses future directions for empirical research using ABM and MSM, including integrating aspects of both ABM and MSM and implications for public health policies

Written for a broad audience of policy analysts, public planners, and researchers and practitioners in public health and public policy including social epidemiologists, *New Horizons in Modeling and Simulation for Social Epidemiology and Public Health* offers a fundamental guide to the social determinants of health and state-of-the-art applications of ABM and MSM to studying the social and economic determinants of population health.

Marketing

Appropriate conferences include JSM, ENAR, and INFORMS. Space ads are appropriate in the following journals: Communications in Numerical Engineering, Artificial Organs, and Genetic Epidemiology. Possible government sales for field practitioners, i.e. public planners and analysts who conduct or depend on modeling and simulation methods within state and local department. Marketing Matrix: Tier 2, P&R.

Previous works by author/editor (Title; Author; ISBN; Price; Pub Date; Net Sales; Publisher; Comments)

- *Social Capital and Health* by Ichiro Kawachi, S.V. Subramanian, and Daniel Kim. List Price: $79.95. Paperback -- 304 pages (October 2010). Springer; 9781441924353.

Competition top three (Title; Author; ISBN; Price; Pub Date; Net Sales; Publisher; Comments)

(This is the first book solely dedicated to modeling and simulation, in particular ABM and MSM, in relation to study of the social determinants of health/public health.) •*Clinical Simulation: Operations, Engineering, and Management* by Richard Kyle and W. Bosseau Murray. List Price: $114.00. Cloth - 848 pages (December 2007). Academic Press; 9780123725318. (Has a focus on clinical aspects and does not address public policy or public health.)

- *Social Determinants of Health* by Michael Marmot and Richard G. Wilkinson. List Price: $69.95. paperback -- 376 pages (November 2005). Oxford University Press; 9780198565895. (Provides only an overview of the determinants in public health.)

Books dedicated to ABM include:

- *Agent-Based Models* by Nigel Gilbert. List Price: $18.00. Paperback -- 112 pages (September 2007). Sage Publications; 9781412949644. (Focuses only on the development of agent-based models and does review empirical literature.)

Books dedicated to MSM include:

- *New Frontiers in Microsimulation Modelling by* Asghar Zaidi, Ann Harding, and Paul Williamson. List Price: $99.95.   Paperback -- 640 pages (October 2009).   Ashgate; 9780754676478.   (Is not as comprehensive in terms of providing empirical studies and evidence gaps.)

Related titles (Add sales information)

- *Physiological Control Systems: Analysis, Simulation, and Estimation* by Michael C. K. Khoo. List Price: $184.00.   Cloth - 344 pages (October 1999).   Wiley-IEEE Press; 9780780334083.   Lifetime Sales: 2,143.
- *EEG Signal Processing* by Dr Saeid Sanei and J. A. Chambers.   List Price: $130.00. Cloth - 312 pages (September 2007). John Wiley & Sons, Ltd.; 9780470025819.   Lifetime Sales: 1,269.
- *Modeling in Medical Decision Making: A Bayesian Approach* by Giovanni Parmigiani. List Price: $140.00. Cloth - 280 pages (March 2002).   John Wiley & Sons, Ltd.; 9780471986089.   Lifetime Sales: 1,191.
- *Nonlinear Biomedical Signal Processing, Vol. 2, Dynamic Analysis and Modeling* by Metin Akay. List Price: $194.00. Cloth - 344 pages (September 2000).   Wiley-IEEE Press; 9780780360129.   Lifetime Sales: 573.
- *Modeling and Simulation in the Medical and Health Sciences* by John A. Sokolowski and Catherine M. Banks.   List Price: $84.95.   Cloth -- 304 pages (June 2011).   John Wiley & Sons; 9780470769478.   Lifetime Sales: 234.

New Horizons in Modeling and Simulation for Social Epidemiology and Public Health

Daniel Kim

Table of contents