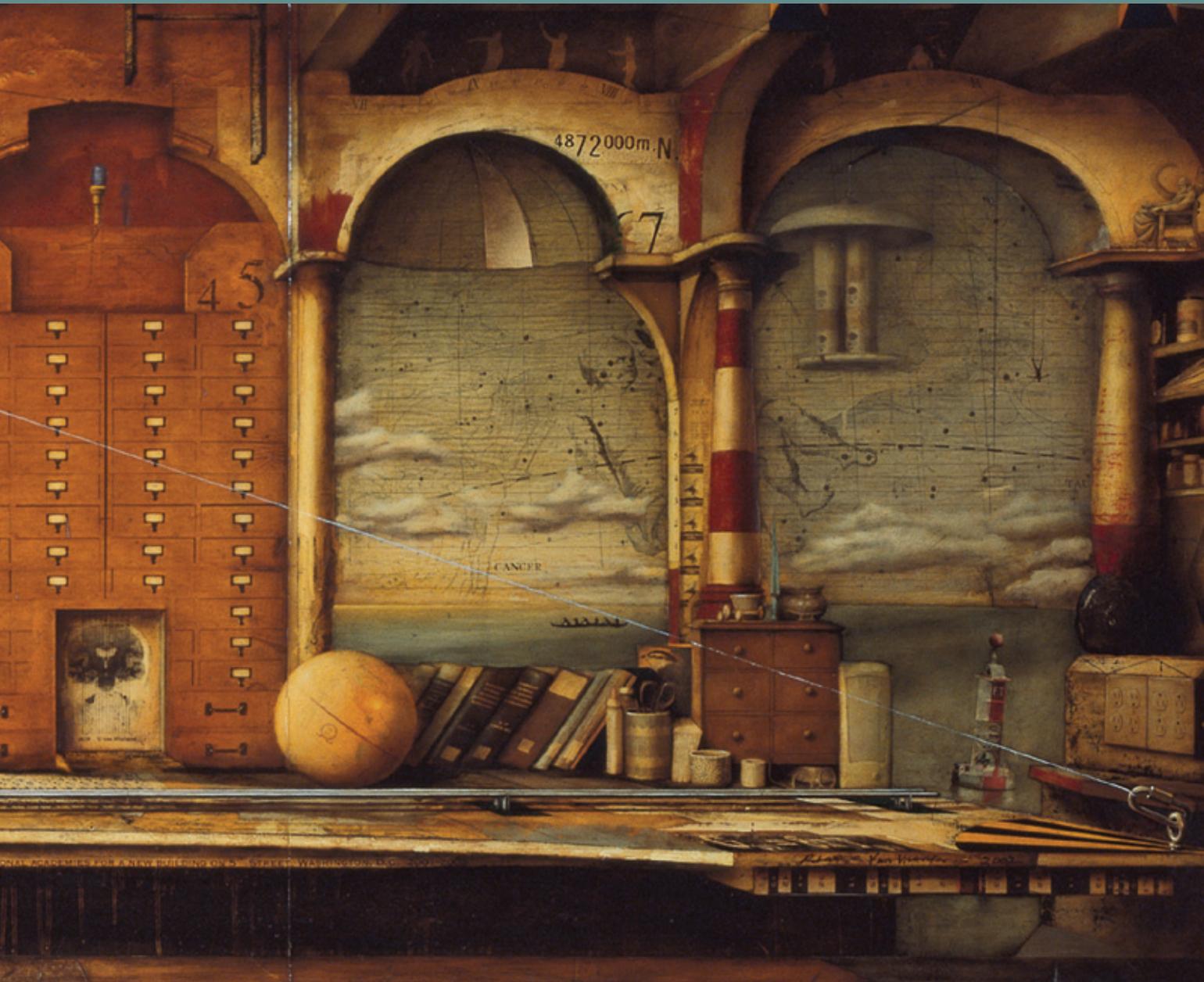


# THE NATIONAL ACADEMIES PRESS



**NEW BOOKS** SPRING 2012

[www.nap.edu](http://www.nap.edu)



# THE NATIONAL ACADEMIES PRESS

SPRING 2012

## New Releases 3

EDUCATION 3

MEDICINE 5

Pain Medicine 5

Preventative Medicine 6

Nutrition 9

Public Health 10

Health Policy 13

Diseases 15

Health Delivery 17

Evidence-Based Medicine 18

Medicare/Medicaid 19

Pharmacology 20

Veterinary Medicine: Food Animal 21

SCIENCE 22

Energy 22

Space Science 23

Index 24

Ordering Information 25

---

Cover art: Robert Van Vranken, *Untitled*, (Where do thoughts come from; where do they go?), detail, 2002, oil and paper on board, 150 x 58 inches, courtesy of the artist.

Robert Van Vranken's imagined laboratory is filled with a history of instruments of learning and scientific inquiry. This work was commissioned by the National Academies and is on display in the Keck Center at 500 Fifth Street, N.W., Washington, DC.

Photograph by Robert C. Lautman, ©2002.

## Successful K-12 STEM Education

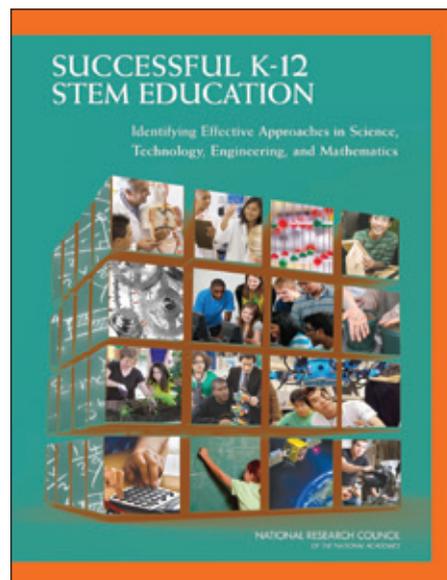
### Identifying Effective Approaches in Science, Technology, Engineering, and Mathematics

Science, technology, engineering, and mathematics (STEM) are cultural achievements that reflect our humanity, power our economy, and constitute fundamental aspects of our lives as citizens, consumers, parents, and members of the workforce. Providing all students with access to quality education in the STEM disciplines is important to our nation's competitiveness. However, it is challenging to identify the most successful schools and approaches in the STEM disciplines because success is defined in many ways and can occur in many different types of schools and settings. In addition, it is difficult to determine whether the success of a school's students is caused by actions the school takes or simply related to the population of students in the school.

*Successful K-12 STEM Education* defines a framework for understanding "success" in K-12 STEM education. The book focuses its analysis on the science and mathematics parts of STEM and outlines criteria for identifying effective STEM schools and programs. Because a school's success should be defined by and measured relative to its goals, the book identifies three important goals that share certain elements, including learning STEM content and practices, developing positive dispositions toward STEM, and preparing students to be lifelong learners. A successful STEM program would increase the number of students who ultimately pursue advanced degrees and careers in STEM fields, enhance the STEM-capable workforce, and boost STEM literacy for all students. It is also critical to broaden the participation of women and minorities in STEM fields.

*Successful K-12 STEM Education* examines the vast landscape of K-12 STEM education by considering different school models, highlighting research on effective STEM education practices, and identifying some conditions that promote and limit school- and student-level success in STEM. The book also looks at where further work is needed to develop appropriate data sources. The book will serve as a guide to policy makers; decision makers at the school and district levels; local, state, and federal government agencies; curriculum developers; educators; and parent and education advocacy groups.

*Committee on Highly Successful Schools or Programs in K-12 STEM Education*  
National Research Council



January 2012  
8½ × 11, 44 pages  
ISBN-13: 978-0-309-21296-0  
(ISBN-10: 0-309-21296-0)  
Paperback  
\$9.95

Education

### Also of Interest

#### A Framework for K-12 Science Education Practices, Crosscutting Concepts, and Core Ideas

2012  
8¼ × 10, 400 pages, index  
ISBN-13: 978-0-309-21739-2  
(ISBN-10: 0-309-21739-3)  
Paperback  
\$39.95

## Improving Adult Literacy Instruction

### Options for Practice and Research

A high level of literacy in both print and digital media is required for negotiating most aspects of 21st-century life, including supporting a family, education, health, civic participation, and competitiveness in the global economy. Yet, more than 90 million U.S. adults lack adequate literacy. Furthermore, only 38 percent of U.S. 12th graders are at or above proficient in reading.

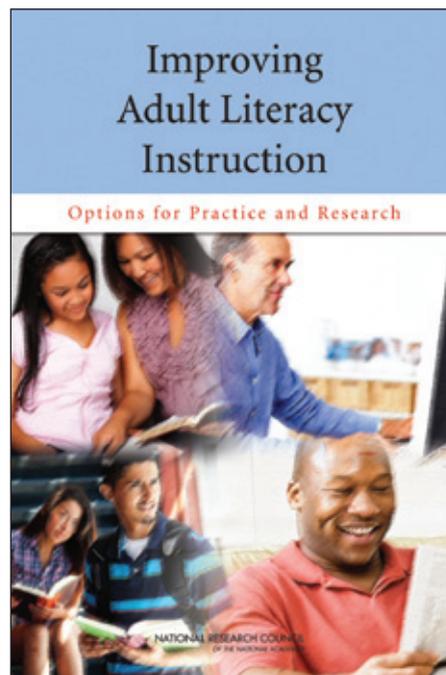
*Improving Adult Literacy Instruction* synthesizes the research on literacy and learning to improve literacy instruction in the United States and to recommend a more systemic approach to research, practice, and policy. The book focuses on individuals ages 16 and older who are not in K-12 education. It identifies factors that affect literacy development in adolescence and adulthood in general, and examines their implications for strengthening literacy instruction for this population. It also discusses technologies for learning that can assist with multiple aspects of teaching, assessment, and accommodations for learning.

There is inadequate knowledge about effective instructional practices and a need for better assessment and ongoing monitoring of adult students' proficiencies, weaknesses, instructional environments, and progress, which might guide instructional planning. *Improving Adult Literacy Instruction* recommends a program of research and innovation to validate, identify the boundaries of, and extend current knowledge to improve instruction for adults and adolescents outside school. The book is a valuable resource for curriculum developers, federal agencies such as the Department of Education, administrators, educators, and funding agencies.

*Committee on Learning Sciences: Foundations and Applications to Adolescent and Adult Literacy*

Alan M. Lesgold and Melissa Welch-Ross, Editors

National Research Council



March 2012  
6 × 9, 640 pages, index  
ISBN-13: 978-0-309-21959-4  
(ISBN-10: 0-309-21959-0)  
Paperback  
\$64.95

Education

### Also of Interest

#### How People Learn

Brain, Mind, Experience, and School,  
Expanded Edition

2000  
7 × 10, 384 pages, index  
ISBN-13: 978-0-309-07036-2  
ISBN-10: 0-309-07036-8  
Hardcover  
\$24.95

## Relieving Pain in America

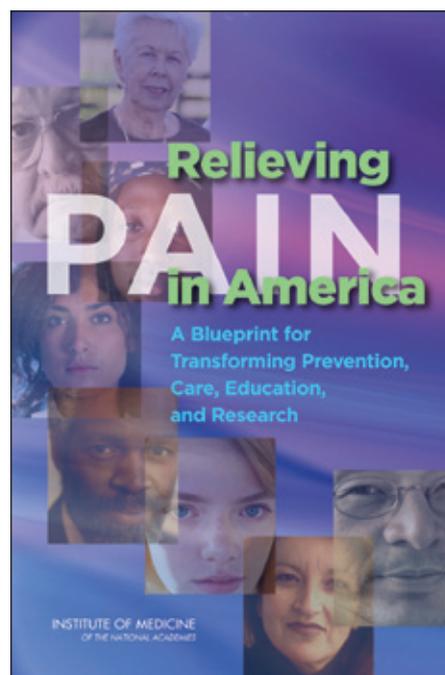
A Blueprint for Transforming Prevention, Care, Education, and Research

Chronic pain affects at least 116 million American adults—more than the total affected by heart disease, cancer, and diabetes combined. It costs the nation up to \$635 billion each year in medical treatment and lost productivity. Pain is a uniquely individual and subjective experience that depends on a variety of biological, psychological, and social factors, and different population groups experience pain differently. Because pain varies from person to person, health care providers should tailor pain care to each person's experience, and self-management of pain should be promoted.

A cultural transformation in the way clinicians and the public view pain and its treatment is necessary to better prevent, assess, treat, and understand pain of all types. *Relieving Pain in America* assesses the state of the science regarding pain research, care, and education and offers a blueprint for developing a population-level strategy to increase awareness about pain and its treatments. The book asserts that the National Center for Health Statistics, the Agency for Healthcare Research and Quality, other government agencies, and private organizations should accelerate the collection of data on pain incidence, prevalence, and treatments. In addition, training programs for dentists, nurses, physicians, psychologists, and other health professionals should include pain education in their curricula and promote interdisciplinary learning.

Successful treatment, management, and prevention of pain require an integrated approach that responds to all the factors that influence pain. Government agencies, health care providers, health care professional associations, educators, patient advocacy groups, and public and private funders of health care must collaborate to address the issue of pain in America.

*Committee on Advancing Pain Research, Care, and Education*  
*Institute of Medicine*



January 2012  
6 × 9, 382 pages, index  
ISBN-13: 978-0-309-21484-1  
(ISBN-10: 0-309-21484-X)  
Hardcover  
\$59.95

Medicine: Pain Medicine

### Also of Interest

**Rare Diseases and Orphan Products**  
**Accelerating Research and Development**

2011  
6 × 9, 442 pages, index  
ISBN-13: 978-0-309-15806-0  
ISBN-10: 0-309-15806-0  
Paperback  
\$44.00

## Adverse Effects of Vaccines

### Evidence and Causality

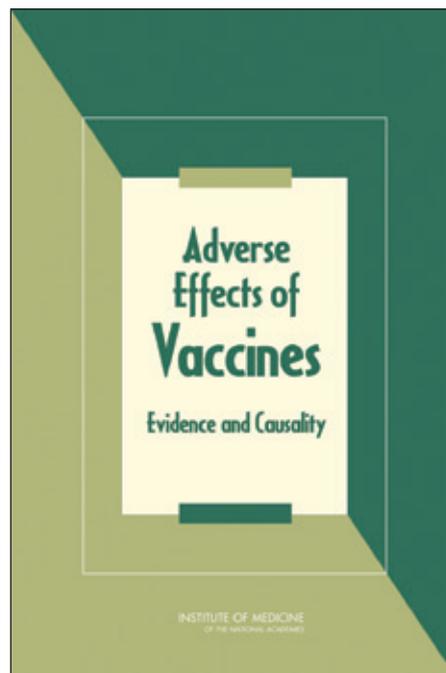
In 1900, for every 1,000 babies born in the United States, 100 would die before their first birthday, often due to infectious diseases. Today, vaccines exist for many viral and bacterial diseases. The National Childhood Vaccine Injury Act, passed in 1986, was intended to bolster vaccine research and development through the federal coordination of vaccine initiatives and to provide relief to vaccine manufacturers facing financial burdens. The legislation also intended to address concerns about the safety of vaccines by instituting a compensation program, setting up a passive surveillance system for vaccine adverse events, and by providing information to consumers. A key component of the legislation required the U.S. Department of Health and Human Services to collaborate with the Institute of Medicine to assess concerns about the safety of vaccines and potential adverse events, especially in children.

*Adverse Effects of Vaccines* reviews the epidemiological, clinical, and biological evidence regarding adverse health events associated with specific vaccines covered by the National Vaccine Injury Compensation Program (VICP), including the varicella zoster vaccine, influenza vaccines, the hepatitis B vaccine, and the human papillomavirus vaccine, among others. For each possible adverse event, the report reviews peer-reviewed-primary studies, summarizes their findings, and evaluates the epidemiological, clinical, and biological evidence. It finds that while no vaccine is 100 percent safe, very few adverse events are shown to be caused by vaccines. In addition, the evidence shows that vaccines do not cause several conditions. For example, the MMR vaccine is not associated with autism or childhood diabetes. Also, the DTaP vaccine is not associated with diabetes and the influenza vaccine given as a shot does not exacerbate asthma.

*Adverse Effects of Vaccines* will be of special interest to the National Vaccine Program Office, the VICP, the Centers for Disease Control and Prevention, vaccine safety researchers and manufacturers, parents, caregivers, and health professionals in the private and public sectors.

*Kathleen Stratton, Andrew Ford, Erin Rusch, and Ellen Wright Clayton, Editors*

*Committee to Review Adverse Effects of Vaccines  
Institute of Medicine*



April 2012  
6 × 9, 868 pages, index  
ISBN-13: 978-0-309-21435-3  
(ISBN-10: 0-309-21435-1)  
Hardcover  
\$80.95

Medicine: Preventative Medicine

### Also of Interest

#### Priorities for the National Vaccine Plan

2010  
6 × 9, 368 pages  
ISBN-13: 978-0-309-14653-1  
ISBN-10: 0-309-14653-4  
Paperback  
\$57.00

## Prepositioning Antibiotics for Anthrax

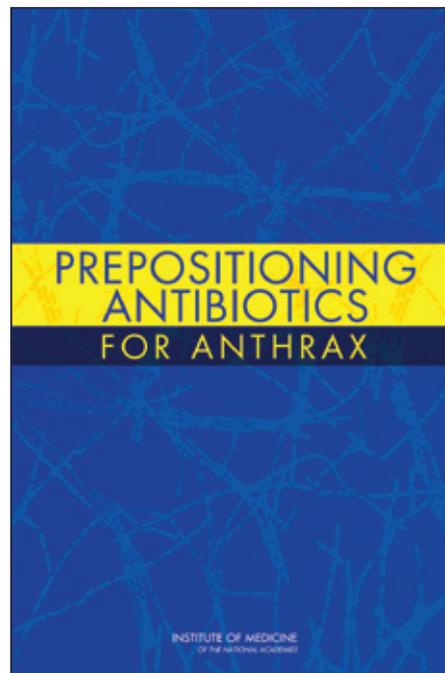
If terrorists released *Bacillus anthracis* over a large city, hundreds of thousands of people could be at risk of the deadly disease anthrax—caused by the *B. anthracis* spores—unless they had rapid access to antibiotic medical countermeasures (MCM). Although plans for rapidly delivering MCM to a large number of people following an anthrax attack have been greatly enhanced during the last decade, many public health authorities and policy experts fear that the nation's current systems and plans are insufficient to respond to the most challenging scenarios, such as a very large-scale anthrax attack. The U.S. Department of Health and Human Services' Office of the Assistant Secretary for Preparedness and Response commissioned the Institute of Medicine to examine the potential uses, benefits, and disadvantages of strategies for prepositioning antibiotics. This involves storing antibiotics close to or in the possession of the people who would need rapid access to them should an attack occur.

*Prepositioning Antibiotics for Anthrax* reviews the scientific evidence on the time window in which antibiotics successfully prevent anthrax and the implications for decision making about prepositioning, describes potential prepositioning strategies, and develops a framework to assist state, local, and tribal public health authorities in determining whether prepositioning strategies would be beneficial for their communities. However, based on an analysis of the likely health benefits, health risks, and relative costs of the different prepositioning strategies, the book also develops findings and recommendations to provide jurisdictions with some practical insights as to the circumstances in which different prepositioning strategies may be beneficial. Finally, the book identifies federal- and national-level actions that would facilitate the evaluation and development of prepositioning strategies.

Recognizing that communities across the nation have differing needs and capabilities, the findings presented in this report are intended to assist public health officials in considering the benefits, costs, and trade-offs involved in developing alternative prepositioning strategies appropriate to their particular communities.

*Clare Stroud, Kristin Viswanathan, Tia Powell, and Robert R. Bass, Editors*

*Committee on Prepositioned Medical Countermeasures for the Public Institute of Medicine*



January 2012  
6 × 9, 338 pages, index  
ISBN-13: 978-0-309-21808-5  
(ISBN-10: 0-309-21808-X)  
Paperback  
\$42.00

Medicine: Preventative Medicine

### *Also of Interest*

#### **BioWatch and Public Health Surveillance**

**Evaluating Systems for the Early Detection of Biological Threats: Abbreviated Version**

2011  
6 × 9, 252 pages  
ISBN-13: 978-0-309-13971-7  
ISBN-10: 0-309-13971-6  
Paperback  
\$50.50

## Toward Precision Medicine

### Building a Knowledge Network for Biomedical Research and a New Taxonomy of Disease

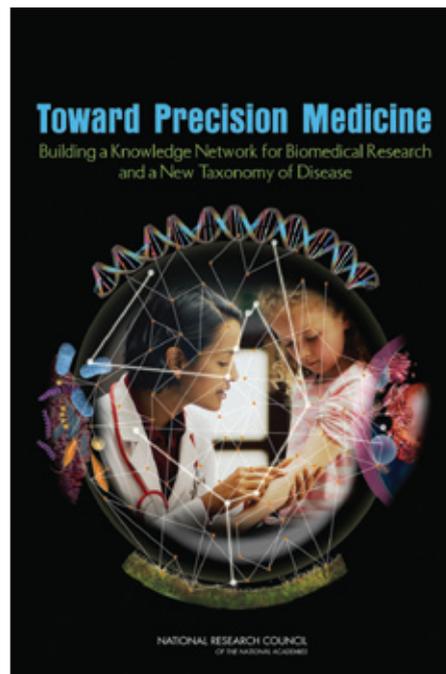
Motivated by the explosion of molecular data on humans—particularly data associated with individual patients—and the sense that there are large, as-yet-untapped opportunities to use this data to improve health outcomes, *Toward Precision Medicine* explores the feasibility and need for “a new taxonomy of human disease based on molecular biology” and develops a potential framework for creating one.

The book says that a new data network that integrates emerging research on the molecular makeup of diseases with clinical data on individual patients could drive the development of a more accurate classification of diseases and ultimately enhance diagnosis and treatment. The “new taxonomy” that emerges would define diseases by their underlying molecular causes and other factors in addition to their traditional physical signs and symptoms. The book adds that the new data network could also improve biomedical research by enabling scientists to access patients’ information during treatment while still protecting their rights. This would allow the marriage of molecular research and clinical data at the point of care, as opposed to research information continuing to reside primarily in academia.

*Toward Precision Medicine* notes that moving toward individualized medicine requires that researchers and health care providers have access to very large sets of health- and disease-related data linked to individual patients. These data are also critical for developing the information commons, the knowledge network of disease, and ultimately the new taxonomy.

*Committee on a Framework for Development a New Taxonomy of Disease*

*National Research Council*



January 2012  
 8½ × 11, 120 pages  
 ISBN-13: 978-0-309-22222-8  
 (ISBN-10: 0-309-22222-2)  
 Paperback  
 \$38.00

Medicine: Preventative Medicine

### Also of Interest

#### Women’s Health Research

Progress, Pitfalls, and Promise

2011  
 6 × 9, 438 pages  
 ISBN-13: 978-0-309-15389-8  
 ISBN-10: 0-309-15389-1  
 Paperback  
 \$66.00

## Early Childhood Obesity Prevention Policies

Childhood obesity is a serious health problem that has adverse and long-lasting consequences for individuals, families, and communities. The magnitude of the problem has increased dramatically during the last three decades and, despite some indications of a plateau in this growth, the numbers remain stubbornly high. Efforts to prevent childhood obesity to date have focused largely on school-aged children, with relatively little attention to children under age 5. However, there is a growing awareness that efforts to prevent childhood obesity must begin before children ever enter the school system.

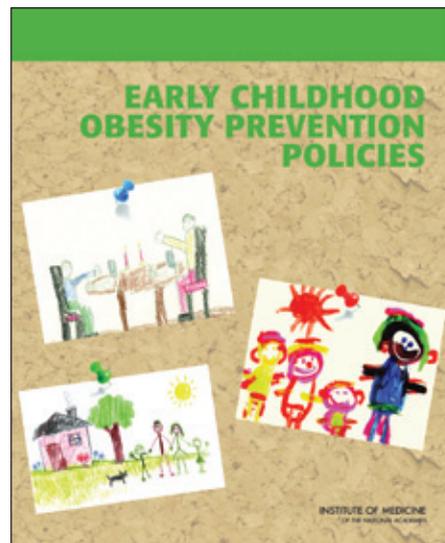
*Early Childhood Obesity Prevention Policies* reviews factors related to overweight and obese children from birth to age 5, with a focus on nutrition, physical activity, and sedentary behavior, and recommends policies that can alter children's environments to promote the maintenance of healthy weight. Because the first years of life are important to health and well-being throughout the life span, preventing obesity in infants and young children can contribute to reversing the epidemic of obesity in children and adults. The book recommends that health care providers make parents aware of their child's excess weight early. It also suggests that parents and child care providers keep children active throughout the day, provide them with healthy diets, limit screen time, and ensure children get adequate sleep.

In addition to providing comprehensive solutions to tackle the problem of obesity in infants and young children, *Early Childhood Obesity Prevention Policies* identifies potential actions that could be taken to implement those recommendations. The recommendations can inform the decisions of state and local child care regulators, child care providers, health care providers, directors of federal and local child care and nutrition programs, and government officials at all levels.

*Committee on Obesity Prevention Policies for Young Children*

*Leann L. Birch, Lynn Parker, and Annina Burns, Editors*

*Institute of Medicine*



January 2012  
 8¼ × 10, 202 pages  
 ISBN-13: 978-0-309-21024-9  
 (ISBN-10: 0-309-21024-0)  
 Paperback  
 \$34.00

Medicine: Nutrition

### *Also of Interest*

#### **Bridging the Evidence Gap in Obesity Prevention** **A Framework to Inform Decision Making**

2010  
 8½ × 11, 336 pages, index  
 ISBN-13: 978-0-309-14989-1  
 ISBN-10: 0-309-14989-4  
 Paperback  
 \$48.00

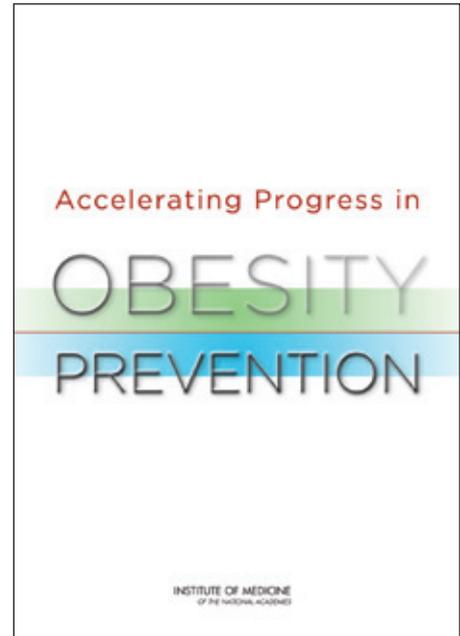
## Accelerating Progress in Obesity Prevention

One-third of adults are now obese and children's obesity rates have climbed from 5 to 17 percent in the past 30 years. The percentage of overweight and obese adults and children continues to grow in the United States. The causes of obesity are multi-factorial, including everything from cultural norms to the availability of sidewalks or affordable foods. The broad societal changes that are needed to prevent obesity will inevitably affect eating and activity environments and settings for all ages. Many aspects of the obesity problem have been identified and discussed; however, there is not complete agreement on what needs to be done or how to make all of the current efforts work together.

*Accelerating Progress in Obesity Prevention* reviews previous studies and their recommendations and presents key recommendations to accelerate meaningful change on a societal level during the next decade. The book suggests five recommendations that will independently accelerate obesity prevention, although the report offers that the simultaneous implementation of these recommendations will also lead to the acceleration of obesity prevention.

The *Accelerating Progress in Obesity Prevention* recommendations include the implementation of consistent nutrition education policies, ensuring food literacy and physical education in schools, and increasing health insurance incentives. The key audiences for the recommendations are public policy makers, private-sector decision makers, and leaders in institutions such as foundations, health agencies, and professional and community-based organizations.

*Committee on Accelerating Progress in Obesity Prevention*  
*Institute of Medicine*



May 2012  
 7 × 10, 280 pages, index  
 ISBN-13: 978-0-309-22154-2  
 (ISBN-10: 0-309-22154-4)  
 Paperback  
 \$59.00

Medicine: Public Health

### Also of Interest

#### Local Government Actions to Prevent Childhood Obesity

2009  
 8¼ × 10, 140 pages  
 ISBN-13: 978-0-309-13927-4  
 ISBN-10: 0-309-13927-9  
 Paperback  
 \$29.00

## For the Public's Health

### Revitalizing Law and Policy to Meet New Challenges

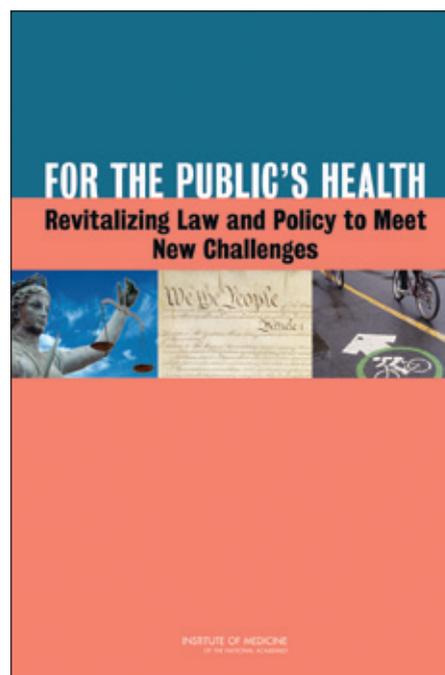
The Robert Wood Johnson Foundation asked the Institute of Medicine (IOM) to examine three topics in relation to public health: measurement, the law, and funding. IOM prepared a three book series—one book on each topic—that contain actionable recommendations for public health agencies and other stakeholders that have roles in the health of the U.S. population.

*For the Public's Health: Revitalizing Law and Policy to Meet New Challenges* is the second in the *For the Public Health's Series*, and reflects on legal and public policy reform on three levels: first, laws that establish the structure, duties, and authorities of public health departments; second, the use of legal and policy tools to improve the public's health; and third, the health effects of laws and policies from other sectors in and outside government.

The book recommends that states enact legislation with appropriate funding to ensure that all public health departments have the mandate and the capacity to effectively deliver the Ten Essential Public Health Services. The book also recommends that states revise their laws to require public health accreditation for state and local health departments through the Public Health Accreditation Board accreditation process. The book urges government agencies to familiarize themselves with the public health and policy interventions at their disposal that can influence behavior and more importantly change conditions—social, economic, and environmental—to improve health. Lastly, the IOM encourages government and private-sector stakeholders to consider health in a wide range of policies (a health in all policies approach) and to evaluate the health effects and costs of major legislation.

This book, as well as the other two books in the series, is intended to inform and help federal, state, and local governments, public health agencies, clinical care organizations, the private sector, and community-based organizations.

*Committee on Public Health Strategies to Improve Health*  
Institute of Medicine



January 2012  
6 × 9, 140 pages  
ISBN-13: 978-0-309-18691-9  
(ISBN-10: 0-309-18691-9)  
Paperback  
\$39.00

Medicine: Public Health

### *Also of Interest*

#### **Priority Areas for National Action**

##### **Transforming Health Care Quality**

2003  
8½ × 11, 160 pages  
ISBN-13: 978-0-309-08543-4  
ISBN-10: 0-309-08543-8  
Paperback  
\$35.00

## For the Public's Health

### The Report on Funding

The Robert Wood Johnson Foundation asked the Institute of Medicine (IOM) to examine three topics in relation to public health: measurement, the law, and funding. IOM prepared a three report series—one report on each topic—that contains actionable recommendations for public health agencies and other stakeholders with roles in the health of the U.S. population.

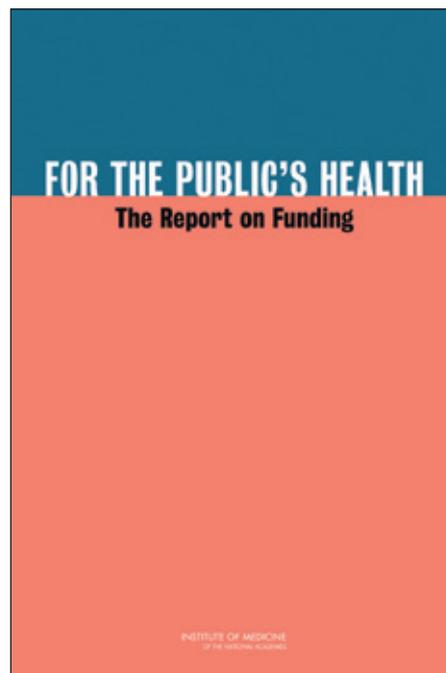
*For the Public's Health: The Report on Funding*, the final book in the series, assesses the financial challenges facing the governmental public health infrastructure. The book provides recommendations about what is needed for stable and sustainable funding, and for its optimal use by public health agencies.

Building on the other two volumes in the series, this book makes the argument that adequate and sustainable funding for public health is necessary to enable public health departments across the country to inform and mobilize action on the determinants of health, to play other key roles in protecting and promoting health, and to prepare for a range of potential threats to population health.

The final book in the *For the Public's Health* series will be useful to federal, state, and local governments; public health agencies; clinical care organizations; and community-based organizations.

*Committee on Public Health Strategies to Improve Health*

*Institute of Medicine*



April 2012  
6 × 9, 200 pages  
ISBN-13: 978-0-309-22107-8  
(ISBN-10: 0-309-22107-2)  
Paperback  
\$44.75

Medicine: Public Health

### Also of Interest

## The Future of the Public's Health in the 21st Century

2002  
6 × 9, 536 pages, index  
ISBN-13: 978-0-309-08704-9  
ISBN-10: 0-309-08704-X  
Paperback  
\$29.95

## Improving Health in the United States

### The Role of Health Impact Assessment

Factoring health into decision making is essential to confronting the nation's health problems and to enhancing public well-being. Some policies and programs historically not recognized as relating to health are thought to or are now known to have important health consequences. For example, public health has been linked to an array of policies that determine the quality and location of housing, availability of public transportation, land use and street connectivity, agricultural practices and the availability of various types of food, and development and location of businesses and industry.

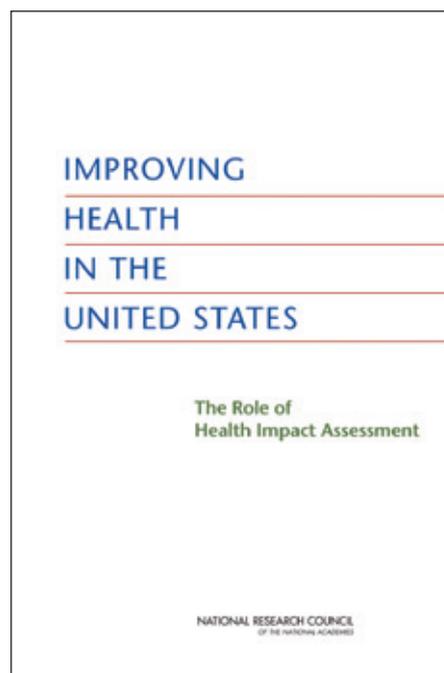
*Improving Health in the United States* offers guidance to officials in the public- and private-sectors on conducting health impact assessments (HIAs) to evaluate the public health consequences of proposed decisions—such as those to build a major roadway, plan a city's growth, or develop national agricultural policies—and suggests actions that could minimize adverse health impacts and optimize beneficial ones.

Several approaches could be used to incorporate aspects of health into decision making, but HIAs hold particular promise because of their applicability to a broad array of programs, consideration of both adverse and beneficial health effects, ability to consider and incorporate various types of evidence, and engagement of communities and stakeholders in a deliberative process. The book notes that HIAs should not be assumed to be the best approach to every health policy question, but rather should be seen as part of a spectrum of public health and policy-oriented approaches.

The book presents a six-step framework for conducting HIAs of proposed policies, programs, plans, and projects at federal, state, tribal, and local levels, including within the private sector. In addition, the report identifies several challenges to the successful use of HIAs, such as balancing the need to provide timely information with the realities of varying data quality, producing quantitative estimates of health effects, and engaging stakeholders.

*Committee on Health Impact Assessment*

*National Research Council*



January 2012  
6 × 9, 208 pages  
ISBN-13: 978-0-309-21883-2  
(ISBN-10: 0-309-21883-7)  
Paperback  
\$39.00

Medicine: Health Policy

### *Also of Interest*

#### **Science and Decisions Advancing Risk Assessment**

2009  
7 × 10, 424 pages  
ISBN-13: 978-0-309-12046-3  
ISBN-10: 0-309-12046-2  
Paperback  
\$54.95

## Essential Health Benefits

### Balancing Coverage and Costs

In 2010, an estimated 50 million people were uninsured in the United States. A portion of the uninsured reflects unemployment rates; however, this rate is primarily a reflection of the fact that when most health plans meet an individual's needs, most times, those health plans are not affordable. Research shows that people without health insurance are more likely to experience financial burdens associated with the utilization of health care services. But even among the insured, underinsurance has emerged as a barrier to care.

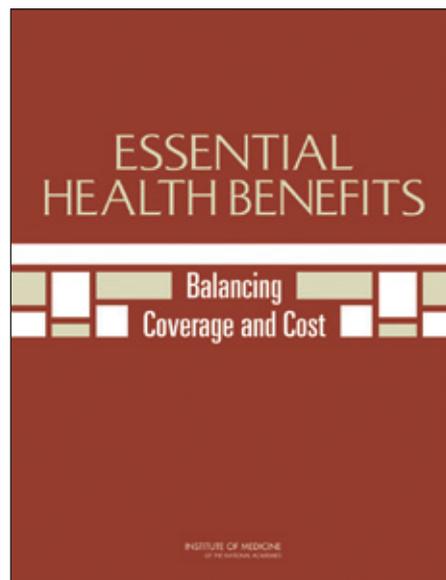
The Patient Protection and Affordable Care Act (ACA) has made the most comprehensive changes to the provision of health insurance since the development of Medicare and Medicaid by requiring all Americans to have health insurance by 2016. An estimated 30 million individuals who would otherwise be uninsured are expected to obtain insurance through the private health insurance market or state expansion of Medicaid programs. The success of the ACA depends on the design of the essential health benefits (EHB) package and its affordability.

*Essential Health Benefits* recommends a process for defining, monitoring, and updating the EHB package. The book is of value to Assistant Secretary for Planning and Evaluation (ASPE) and other U.S. Department of Health and Human Services agencies, state insurance agencies, Congress, state governors, health care providers, and consumer advocates.

*Cheryl Ulmer, John Ball, Elizabeth McGlynn, and Shadia Bel Hamdounia, Editors*

*Committee on Defining and Revising an Essential Health Benefits Package for Qualified Health Plans*

*Institute of Medicine*



January 2012  
 8½ × 11, 258 pages  
 ISBN-13: 978-0-309-21914-3  
 (ISBN-10: 0-309-21914-0)  
 Paperback  
 \$45.00

Medicine: Health Policy

### Also of Interest

#### America's Uninsured Crisis Consequences for Health and Health Care

2009  
 6 × 9, 236 pages  
 ISBN-13: 978-0-309-12789-9  
 ISBN-10: 0-309-12789-0  
 Paperback  
 \$44.00

## Breast Cancer and the Environment

### A Life Course Approach

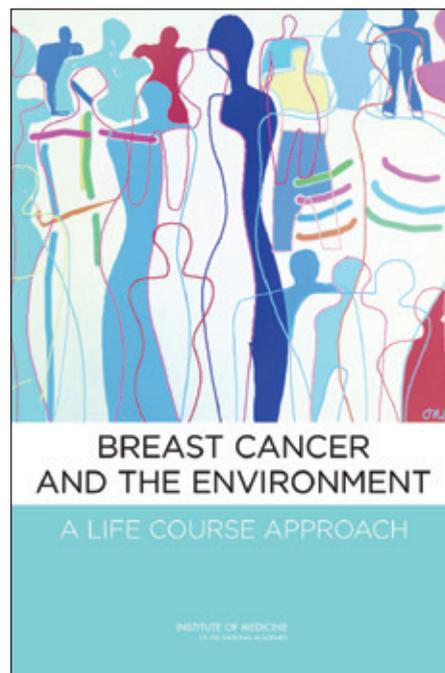
Breast cancer remains the most common invasive cancer among women. The primary patients of breast cancer are adult women who are approaching or have reached menopause; 90 percent of new cases in U.S. women in 2009 were diagnosed at age 45 or older. Growing knowledge of the complexity of breast cancer stimulated a transition in breast cancer research toward elucidating how external factors may influence the etiology of breast cancer.

*Breast Cancer and the Environment* reviews the current evidence on a selection of environmental risk factors for breast cancer, considers gene–environment interactions in breast cancer, and explores evidence-based actions that might reduce the risk of breast cancer. The book also recommends further integrative research into the elements of the biology of breast development and carcinogenesis, including the influence of exposure to a variety of environmental factors during potential windows of susceptibility during the full life course, potential interventions to reduce risk, and better tools for assessing the carcinogenicity of environmental factors. For a limited set of risk factors, evidence suggests that action can be taken in ways that may reduce risk for breast cancer for many women: avoiding unnecessary medical radiation throughout life, avoiding the use of some forms of postmenopausal hormone therapy, avoiding smoking, limiting alcohol consumption, increasing physical activity, and minimizing weight gain.

*Breast Cancer and the Environment* sets a direction and a focus for future research efforts. The book will be of special interest to medical researchers, patient advocacy groups, and public health professionals.

*Committee on Breast Cancer and the Environment: The Scientific Evidence, Research Methodology, and Future Directions*

*Institute of Medicine*



March 2012  
 6 × 9, 180 pages  
 ISBN-13: 978-0-309-22069-9  
 (ISBN-10: 0-309-22069-6)  
 Paperback  
 \$41.75

Medicine: Diseases

### Also of Interest

#### **Saving Women's Lives** **Strategies for Improving Breast Cancer** **Detection and Diagnosis**

2005  
 6 × 9, 384 pages, index  
 ISBN-13: 978-0-309-09213-5  
 ISBN-10: 0-309-09213-2  
 Hardcover  
 \$47.95

## Living Well with Chronic Disease

### A Call for Public Health Action

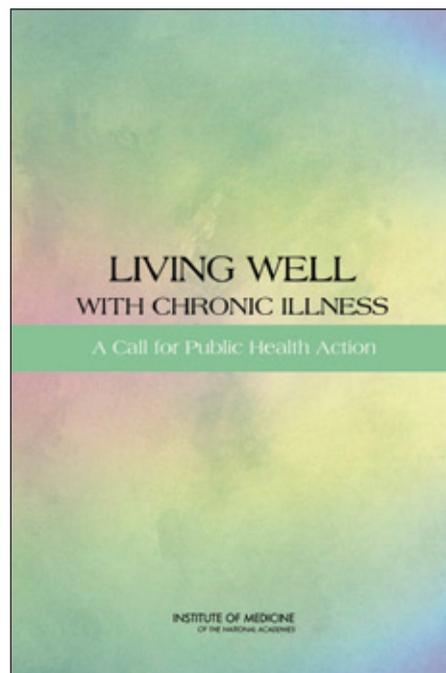
In the United States, chronic diseases currently account for 70 percent of all deaths, and close to 48 million Americans report a disability related to a chronic condition. Today, about one in four Americans have multiple diseases and the prevalence and burden of chronic disease in the elderly and racial/ethnic minorities are notably disproportionate. Chronic disease has now emerged as a major public health problem and it threatens not only population health, but our social and economic welfare.

*Living Well with Chronic Disease* identifies the population-based public health actions that can help reduce disability and improve functioning and quality of life among individuals who are at risk of developing a chronic disease and those with one or more diseases. The book recommends that all major federally funded programmatic and research initiatives in health include an evaluation on health-related quality of life and functional status. Also, the book recommends increasing support for implementation research on how to disseminate effective long-term lifestyle interventions in community-based settings that improve living well with chronic disease.

*Living Well with Chronic Disease* uses three frameworks and considers diseases such as heart disease and stroke, diabetes, depression, and respiratory problems. The book's recommendations will inform policy makers concerned with health reform in public- and private-sectors and also managers of community-based and public-health intervention programs, private and public research funders, and patients living with one or more chronic conditions.

*Committee on Living Well with Chronic Disease: Public Action to Reduce Disability and Improve Functioning and Quality of Life*

*Institute of Medicine*



February 2012  
6 x 9, 300 pages  
ISBN-13: 978-0-309-22127-6  
(ISBN-10: 0-309-22127-7)  
Paperback  
\$61.75

Medicine: Diseases

### Also of Interest

#### Evaluation of Biomarkers and Surrogate Endpoints in Chronic Disease

2010  
6 x 9, 336 pages  
ISBN-13: 978-0-309-15129-0  
ISBN-10: 0-309-15129-5  
Paperback  
\$47.00

## Health IT and Patient Safety

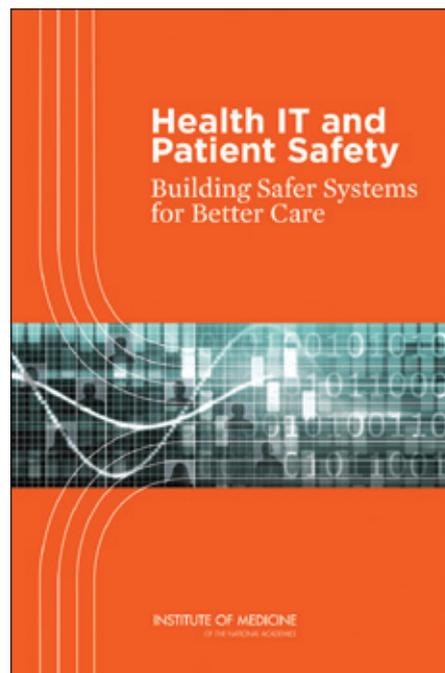
### Building Safer Systems for Better Care

The Institute of Medicine's 1999 landmark study *To Err Is Human* estimated that between 44,000 and 98,000 lives are lost every year due to medical errors. This call to action led to a number of efforts to reduce errors and provide safe and effective health care. Information technology (IT) has been identified as a way to enhance the safety and effectiveness of care. In an effort to catalyze its implementation, the U.S. government has invested billions of dollars toward the development and meaningful use of effective health IT.

By design and proper application, health IT can be a positive transformative force for delivering safe health care, particularly with computerized prescriptions and medication safety. However, if it is designed and applied inappropriately, health IT can add an additional layer of complexity to the already complicated delivery of health care. Poorly designed health IT can introduce risks that may lead to unsafe conditions, serious injury, or even death. Unsuccessful human-computer interactions could result in wrong dosing decisions and wrong diagnoses. Safe implementation of health IT is a complex, dynamic process that requires a shared responsibility between vendors and health care organizations. *Health IT and Patient Safety* makes recommendations for developing a framework for patient safety and health IT. The book focuses on finding ways to mitigate the risks of health IT-assisted care and identifies areas of concern to better position the nation to realize the potential benefits of health IT.

*Health IT and Patient Safety* is both comprehensive and specific in terms of recommended options and opportunities for public and private interventions that may improve the safety of care that incorporates the use of health IT. The book will be of interest to the health IT industry, the federal government, health care providers and other users of health IT, and patient advocacy groups.

*Committee on Patient Safety and Health Information Technology  
Institute of Medicine*



January 2012  
6 × 9, 220 pages  
ISBN-13: 978-0-309-22112-2  
(ISBN-10: 0-309-22112-9)  
Paperback  
\$36.00

Medicine: Health Delivery

### Also of Interest

#### Computational Technology for Effective Health Care Immediate Steps and Strategic Directions

2009  
6 × 9, 120 pages  
ISBN-13: 978-0-309-13050-9  
ISBN-10: 0-309-13050-6  
Paperback  
\$35.00

## Learning What Works

### Infrastructure Required for Comparative Effectiveness Research Workshop Summary

It is essential for patients and clinicians to have the resources needed to make informed, collaborative care decisions. Despite this need, only a small fraction of health-related expenditures in the United States have been devoted to comparative effectiveness research (CER). To improve the effectiveness and value of the care delivered, the nation needs to build its capacity for ongoing study and monitoring of the relative effectiveness of clinical interventions and care processes through expanded trials and studies, systematic reviews, innovative research strategies, and clinical registries, as well as improving its ability to apply what is learned from such study through the translation and provision of information and decision support.

As part of its *Learning Health System* series of workshops, the Institute of Medicine's Roundtable on Value & Science-Driven Health Care hosted a workshop to discuss capacity priorities to build the evidence base necessary for care that is more effective and delivers higher value for patients. *Learning What Works* summarizes the proceedings of the seventh workshop in the *Learning Health System* series. This workshop focused on the infrastructure needs—including methods, coordination capacities, data resources and linkages, and workforce—for developing an expanded and efficient national capacity for CER. *Learning What Works* also assesses the current and needed capacity to expand and improve this work, and identifies priority next steps.

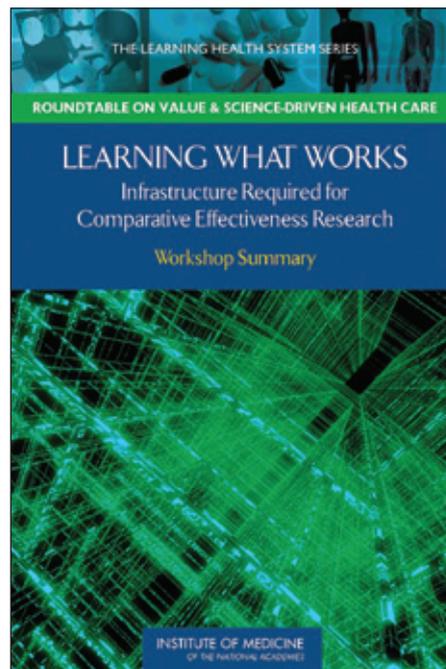
*Learning What Works* is a valuable resource for health care professionals, as well as health care policy makers.

*LeighAnne Olsen, Claudia Grossman, and J. Michael McGinnis*

*The Learning Health System Series*

*Roundtable on Value & Science-Driven Health Care*

*Institute of Medicine*



January 2012  
6 × 9, 588 pages  
ISBN-13: 978-0-309-12068-5  
(ISBN-10: 0-309-12068-3)  
Paperback  
\$63.00

Medicine: Evidence-Based Medicine

### Also of Interest

#### Finding What Works in Health Care

Standards for Systemic Reviews

2011  
6 × 9, 340 pages  
ISBN-13: 978-0-309-16425-2  
ISBN-10: 0-309-16425-7  
Paperback  
\$61.00

## Geographic Adjustment in Medicare Payment

### Phase I: Improving Accuracy

Medicare is the largest health insurer in the United States, providing coverage for 39 million people aged 65 and older and 8 million people with disabilities, and reaching more than an estimated \$500 billion in payments in 2010. Although Medicare is a national program, it adjusts fee-for-service payments according to the geographic location of a practice. While there is widespread agreement about the importance of providing accurate payments to providers, there is disagreement about how best to adjust payment based on geographic location.

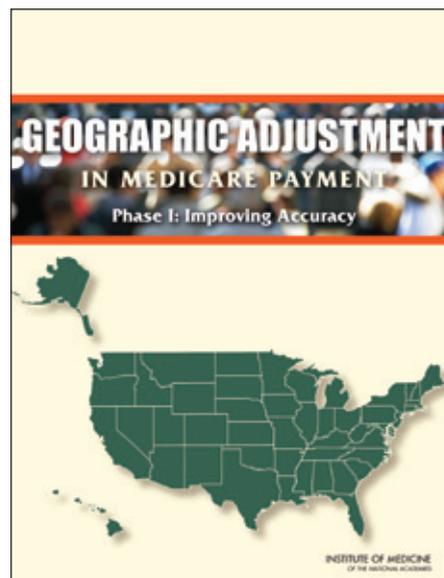
At the request of Congress and the U.S. Department of Health and Human Services (HHS), the Institute of Medicine examined ways to improve the accuracy of data sources and methods used for making the geographic adjustments to payments. The book recommends an integrated approach that includes moving to a single source of wage and benefits data; changing to one set of payment areas; and expanding the range of occupations included in the index calculations. The first of two books, *Geographic Adjustment in Medicare Payment: Phase I: Improving Accuracy* assesses existing practices in regards to accuracy, criteria consistency, evidence for adjustment, sound rationale, transparency, and separate policy adjustments to reform the current payment system. Adopting the recommendations outlined in the report will mean a change in the way that the indexes are calculated, and will require a combination of legislative, rule-making, and administrative actions, as well as a period of public comment.

*Geographic Adjustment in Medicare Payment* will inform the work of government agencies such as HHS, the Centers for Medicare and Medicaid Services, congressional members and staff, the health care industry, national professional organizations and state medical and nursing societies, and Medicare advocacy groups.

*Committee on the Geographic Adjustment Factors in Medicare Payment*

*Board on Health Care Services*

*Institute of Medicine*



February 2012  
 8½ × 11, 230 pages  
 ISBN-13: 978-0-309-21145-1  
 (ISBN-10: 0-309-21145-X)  
 Paperback  
 \$42.00

Medicine: Medicare/Medicaid

### *Also of Interest*

#### **Rewarding Provider Performance**

##### **Aligning Incentives in Medicare**

2007  
 6 × 9, 272 pages, index  
 ISBN-13: 978-0-309-10216-2  
 ISBN-10: 0-309-10216-2  
 Hardcover  
 \$43.95

## Ethical and Scientific Issues in Studying the Safety of Approved Drugs

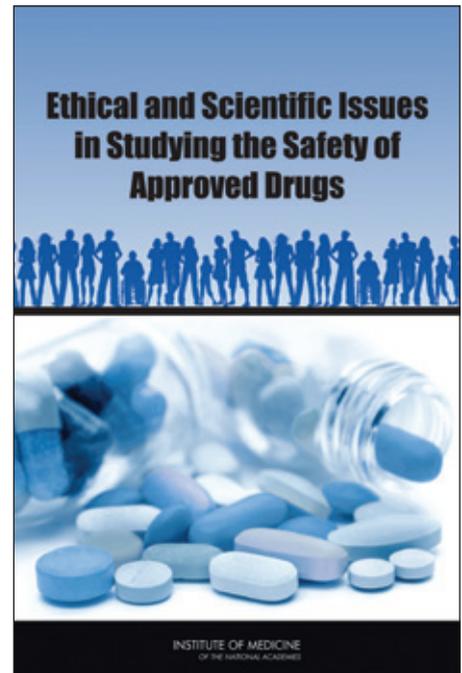
An estimated 48 percent of the population takes at least one prescription drug in a given month. Drugs provide great benefits to society by saving or improving lives. Many drugs are also associated with side effects or adverse events, some serious and some discovered only after the drug is on the market. The discovery of new adverse events in the postmarketing setting is part of the normal natural history of approved drugs, and timely identification and warning about drug risks are central to the mission of the Food and Drug Administration (FDA). Not all risks associated with a drug are known at the time of approval, because safety data are collected from studies that involve a relatively small number of human subjects during a relatively short period.

Written in response to a request by the FDA, *Ethical and Scientific Issues in Studying the Safety of Approved Drugs* discusses ethical and informed consent issues in conducting studies in the postmarketing setting. It evaluates the strengths and weaknesses of various approaches to generate evidence about safety questions, and makes recommendations for appropriate follow-up studies and randomized clinical trials. The book provides guidance to the FDA on how it should factor in different kinds of evidence in its regulatory decisions.

*Ethical and Scientific Issues in Studying the Safety of Approved Drugs* will be of interest to the pharmaceutical industry, patient advocates, researchers, and consumer groups.

*Committee on Ethical and Scientific Issues in Studying the Safety of Approved Drugs*

*Institute of Medicine*



February 2012  
6 × 9, 200 pages  
ISBN-13: 978-0-309-21813-9  
(ISBN-10: 0-309-21813-6)  
Paperback  
\$44.75

Medicine: Pharmacology

### Also of Interest

#### **Integrity in Scientific Research** Creating an Environment That Promotes Responsible Conduct

2002  
6 × 9, 216 pages, index  
ISBN-13: 978-0-309-08523-6  
ISBN-10: 0-309-08523-3  
Hardcover and Paperback  
\$34.95

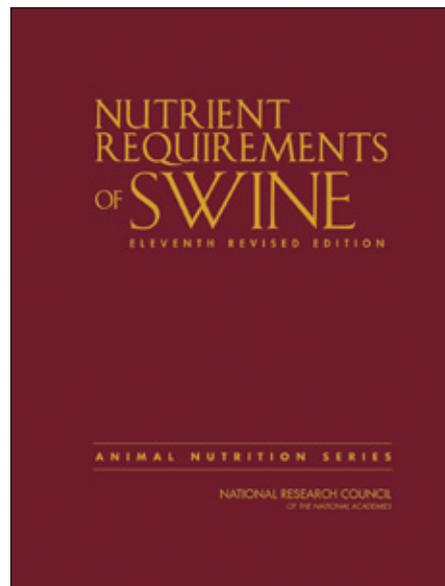
## Nutrient Requirements of Swine

Since 1944, the National Research Council has published 10 editions of the *Nutrient Requirements of Swine*. This reference has guided nutritionists and other professionals in academia and the swine and feed industries in developing and implementing nutritional and feeding programs for swine. The swine industry has undergone considerable changes since the tenth edition was published in 1998 and some of the requirements and recommendations set forth at that time are no longer relevant or appropriate.

The eleventh revised edition of the *Nutrient Requirements of Swine* builds on the previous editions published by the National Research Council. A great deal of new research has been published during the last 15 years and there is a large amount of new information for many nutrients. In addition to a thorough and current evaluation of the literature on the energy and nutrient requirements of swine in all stages of life, this volume includes information about feed ingredients from the biofuels industry and other new ingredients, requirements for digestible phosphorus and concentrations of it in feed ingredients, a review of the effects of feed additives and feed processing, and strategies to increase nutrient retention and thus reduce fecal and urinary excretions that could contribute to environmental pollution. The tables of feed ingredient composition are significantly updated.

*Nutrient Requirements of Swine* represents a comprehensive review of the most recent information available on swine nutrition and ingredient composition that will allow efficient, profitable, and environmentally conscious swine production.

*Subcommittee on Swine Nutrition, Committee on Animal Nutrition  
National Research Council*



**April 2012**  
**8½ × 11, 400 pages, index**  
**ISBN-13: 978-0-309-22423-9**  
**(ISBN-10: 0-309-22423-3)**  
**Hardcover**  
**\$149.95**

**Medicine:** Veterinary Medicine: Food Animal

**Replaces prior edition:**  
 Nutrient Requirements of Swine:  
 10th Revised Edition  
 ISBN-13: 978-0-309-05993-0  
 ISBN-10: 0-309-05993-3

### Also of Interest

#### Nutrient Requirements of Fish and Shrimp

**2011**  
**8½ × 11, 392 pages, index**  
**ISBN-13: 978-0-309-16338-5**  
**ISBN-10: 0-309-16338-2**  
**Hardcover**  
**\$149.95**

## Renewable Fuel Standard

### Potential Economic and Environmental Effects of U.S. Biofuel Policy

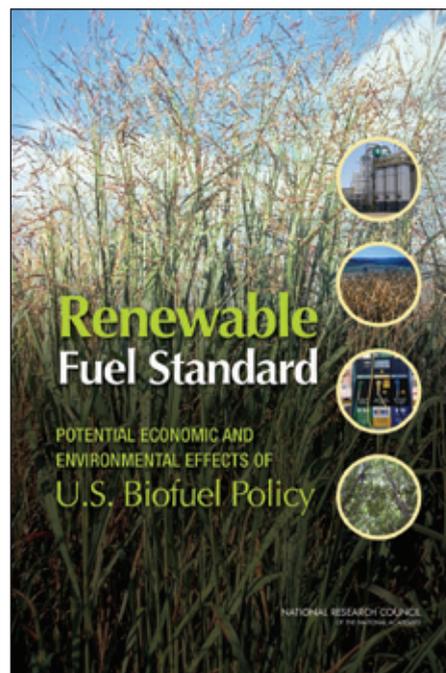
Liquid transportation fuels have always been critical to economic development. In the United States, we have come to depend on plentiful and inexpensive energy to support our economy and lifestyles. However, volatile oil prices and abrupt changes in global climate have led to concerns about U.S. energy security and greenhouse gas emissions from using fossil fuels. The United States has a long history with biofuels and the nation is on a course charted to improve energy security and reduce greenhouse gas emissions by increasing biofuel production and use.

*Renewable Fuel Standard* discusses the possible outcome of increasing biofuels production to meet the biofuel consumption mandated by the Renewable Fuel Standard (RFS2), as amended by the Energy Independence and Security Act (EISA). The book describes biofuels produced in 2010 and those projected to be produced and consumed by 2022, reviews model projections and other estimates of the relative impact on the price of land, and discusses the potential environmental harm and benefits of biofuels production and the barriers to achieving the RFS2 consumption mandate.

Policy makers, investors, leaders in the transportation sector, and others with concerns for the environment, economy, and energy security can rely on the recommendations provided in this report.

*Committee on Economic and Environmental Impacts of Increasing Biofuels Production*

*National Research Council*



January 2012  
7 × 10, 250 pages  
ISBN-13: 978-0-309-18751-0  
(ISBN-10: 0-309-18751-6)  
Paperback  
\$68.00

Science: Energy

### Also of Interest

#### Liquid Transportation Fuels from Coal and Biomass Technological Costs, Status, and Environmental Impacts

2009  
8 × 10, 388 pages  
ISBN-13: 978-0-309-13712-6  
ISBN-10: 0-309-13712-8  
Paperback  
\$49.95

## Recapturing a Future for Space Exploration

Life and Physical Sciences Research for a New Era

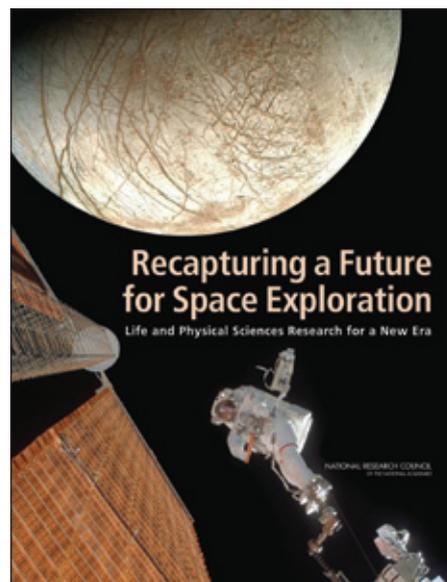
More than four decades have passed since a human first set foot on the Moon. Since then great strides have been made in our understanding of what is required to support an enduring human presence in space, as evidenced by progressively more advanced orbiting human outposts, culminating in the current International Space Station (ISS). However, of the more than 500 humans who have so far ventured into space, most have gone only as far as near-Earth orbit, and none have traveled beyond the orbit of the Moon. Achieving further progress into the solar system has proved far more difficult than imagined in the heady days of the Apollo missions, but the potential rewards remain substantial.

The Committee for the Decadal Survey of Biological and Physical Sciences acknowledges the many achievements of NASA, which are all the more remarkable given budgetary challenges and changing directions within the agency. In the past decade, however, a consequence of those challenges has been a life and physical sciences research program that was dramatically reduced in both scale and scope, with the result that the agency is poorly positioned to take full advantage of the scientific opportunities offered by the now fully equipped and staffed ISS laboratory, or to effectively pursue the scientific research needed to support the development of advanced human exploration capabilities.

Although its review has left it deeply concerned about the current state of NASA's life and physical sciences research, the Committee is nevertheless convinced that a focused science and engineering program can achieve successes that will bring the space community, the U.S. public, and policy makers to an understanding that we are ready for the next significant phase of human space exploration. The goal of this book is to lay out steps and develop a forward-looking portfolio of research that will provide the basis for recapturing the excitement and value of human spaceflight.

*Committee for the Decadal Survey on Biological and Physical Sciences in Space*

*National Research Council*



January 2012  
 8½ × 11, 442 pages  
 ISBN-13: 978-0-309-16384-2  
 (ISBN-10: 0-309-16384-6)  
 Paperback  
 \$85.75

Science: Space Science

### *Also of Interest*

#### **New Worlds, New Horizons in Astronomy and Astrophysics**

2010  
 7 × 10, 324 pages, index  
 ISBN-13: 978-0-309-15802-2  
 ISBN-10: 0-309-15802-8  
 Hardcover and Paperback  
 \$54.95

## Index

- Accelerating Progress in Obesity Prevention** . . . . . 10
- Adverse Effects of Vaccines:**  
**Evidence and Causality** . . . . . 6
- America's Uninsured Crisis:  
 Consequences for Health and Health Care . . . . . 14
- BioWatch and Public Health Surveillance: Evaluating  
 Systems for the Early Detection of Biological Threats:  
 Abbreviated Version . . . . . 7
- Breast Cancer and the Environment:**  
**A Life Course Approach** . . . . . 15
- Bridging the Evidence Gap in Obesity Prevention:  
 A Framework to Inform Decision Making . . . . . 9
- Computational Technology for Effective Health Care:  
 Immediate Steps and Strategic Directions . . . . . 17
- Early Childhood Obesity Prevention Policies** . . . . . 9
- Essential Health Benefits:**  
**Balancing Coverage and Costs** . . . . . 14
- Ethical and Scientific Issues in Studying the  
 Safety of Approved Drugs** . . . . . 20
- Evaluation of Biomarkers and Surrogate Endpoints in  
 Chronic Disease . . . . . 16
- Finding What Works in Health Care:  
 Standards for Systemic Reviews . . . . . 18
- For the Public's Health: Revitalizing Law and  
 Policy to Meet New Challenges** . . . . . 11
- For the Public's Health: The Report on Funding** . . . . . 12
- Framework for K-12 Science Education: Practices,  
 Crosscutting Concepts, and Core Ideas, A . . . . . 3
- Future of the Public's Health in the  
 21st Century, The . . . . . 12
- Geographic Adjustment in Medicare Payments:**  
**Phase I: Improving Accuracy** . . . . . 19
- Improving Adult Literacy Instruction:**  
**Options for Practice and Research** . . . . . 4
- Improving Health in the United States:**  
**The Role of Health Impact Assessment** . . . . . 13
- Integrity in Scientific Research: Creating an  
 Environment that Promotes Responsible Conduct . . . 20
- Health IT and Patient Safety:**  
**Building Safer Systems for Better Care** . . . . . 17
- How People Learn: Brain, Mind, Experience,  
 and School, Expanded Edition . . . . . 4
- Learning What Works: Infrastructure Required for  
 Comparative Effectiveness Research** . . . . . 18
- Liquid Transportation Fuels from Coal and Biomass:  
 Technological Costs, Status, and  
 Environmental Impacts . . . . . 22
- Living Well with Chronic Disease:**  
**A Call for Public Health Action** . . . . . 16
- Local Government Actions to Prevent  
 Childhood Obesity . . . . . 10
- New Worlds, New Horizons in Astronomy  
 and Astrophysics . . . . . 23
- Nutrient Requirements of Fish and Shrimp . . . . . 21
- Nutrient Requirements of Swine** . . . . . 21
- Prepositioning Antibiotics for Anthrax** . . . . . 7
- Priorities for the National Vaccine Plan . . . . . 6
- Priority Areas for National Action:  
 Transforming Health Care Quality . . . . . 11
- Rare Diseases and Orphan Products:  
 Accelerating Research and Development . . . . . 5
- Recapturing a Future for Space Exploration: Life  
 and Physical Sciences Research for a New Era** . . . 23
- Relieving Pain in America: A Blueprint for  
 Transforming Prevention, Care, Education,  
 and Research** . . . . . 5
- Renewable Fuel Standard: Potential Economic and  
 Environmental Effects of U.S. Biofuel Policy** . . . . 22
- Rewarding Provider Performance:  
 Aligning Incentives in Medicare . . . . . 19
- Saving Women's Lives: Strategies for Improving Breast  
 Cancer Detection and Diagnosis . . . . . 15
- Science and Decisions: Advancing Risk Assessment . . . 13
- Successful K-12 STEM Education:**  
**Identifying Effective Approaches in Science,  
 Technology, Engineering, and Mathematics** . . . . 3
- Toward Precision Medicine: Building a Knowledge  
 Network for Biomedical Research and a New  
 Taxonomy of Disease** . . . . . 8
- Women's Health Research:  
 Progress, Pitfalls, and Promise . . . . . 8

# THE NATIONAL ACADEMIES PRESS

500 Fifth Street, NW, Lockbox 285, Washington, DC 20055

Tollfree 1-888-624-7654 • (202) 334-3313 in Washington, DC • Fax (703) 661-1501 • www.nap.edu

## Ordering Information

**Where to Order:** Unless otherwise noted (see sections below), orders should be directed to THE NATIONAL ACADEMIES PRESS using the information above.

Books may also be purchased at our bookstore, located at 500 Fifth St., NW, Washington, DC 20001. Call (202) 334-2612 for store hours and title availability.

**Payment:** Make check or money order in U.S. dollars payable to The National Academies Press. Book purchases over \$10.00 may be made by institutional purchase order or charged to VISA/MasterCard/American Express accounts. Telephone orders will be accepted only when charged to VISA/MasterCard/American Express accounts or from bookstores with established accounts.

**Prices:** Prices in this catalog apply in the United States, Canada, Puerto Rico, and Mexico and are subject to change without notice.

**Standing Orders:** Customers with a standing order for all publications sold by the National Academies Press (100–150 titles per year) receive a 25% discount, automatic shipment upon publication, and 90-day credit terms. Write to the address above or call for information and an order form.

**Schedule of Discounts:** Only books coded “trade” carry a trade discount for booksellers. Only one discount is allowed per order. Discounts are not allowed on those titles marked “no other discounts apply.” Please call customer service to find out what discounts might apply to you.

**Booksellers:** The National Academies Press has special discount policies and an agency plan for booksellers. Write to the above address or call for information.

**Booksellers’ Return Policy:** It is not necessary to ask permission to return books. However, all returns must be accompanied by a copy of the original invoice or the original invoice information. Books returned without invoice information will be credited at the maximum allowable discount. Books must be unmarked and in salable condition. There are no return privileges for Publication-on-Demand titles or for books that have been declared out of print. Upon receipt of books in salable condition, a credit memo will be issued. Returns should be shipped prepaid to: The National Academies Press, 22883 Quicksilver Drive, Dulles, VA 20166; Attn: Returns/Receiving Department. Claims of short shipments, damaged copies, incorrect titles, or nonreceipt of publications should be made within 60 days from the date of invoice.

**Individual Return Policy:** This policy is the same as for booksellers, except books must be returned within 3 months of the shipping date.

## Sales Representatives

### United States

#### Mid-Atlantic and New England

Chesapeake & Hudson, Inc., 115 West Potomac Street, Brunswick, MD 21716. Telephone: (301) 834-7170/(800) 231-4469. Fax: (800) 307-5163. Internet: www.cheshud.com. E-mail: Office@cheshud.com. Covering CT, DC, DE, MA, MD, ME, NH, NJ, NY, PA, RI, VT.

#### West Coast

Faherty & Associates, Inc., 6665 SW Hampton Street, #100, Portland, OR 97223. Telephone: (503) 639-3113/(800) 824-2888. Fax: (503) 598-9850/(800) 257-8646. E-mail: faherty@fahertybooks.com. Covering AK, AZ, CA, CO, HI, ID, MT, NM, NV, OR, UT, WA, WY.

## THE NATIONAL ACADEMIES PRESS

## Ordering Information

## European Union

**How to Order:** *Booksellers* should order through the sales representative for their area or direct from Marston Book Services, Ltd. (see address below). *Libraries* should order through their local and usual supplier or through Marston Book Services, Ltd. (see address below). *Individuals* may obtain National Academies Press books from most good bookshops. In case of difficulty, books may be ordered directly from Marston Book Services, Ltd. (see address below). Order electronically via Internet at <http://www.marston.co.uk>.

**Where to Order:** All United Kingdom and European orders should be mailed or faxed to:

Marston Book Service, Ltd.  
PO Box 269  
160 Milton Park  
Abingdon, Oxfordshire, OX14 4YN, United Kingdom  
Telephone: +44 (0) 1235 465500  
Fax: +44 (0) 1235 465555  
Internet: [www.marston.co.uk](http://www.marston.co.uk)

**Shipping and Handling:** For orders from individuals within the UK or via overseas surface mail, please add £2.50 for the first book and £1.00 for each additional book. For overseas airmail, add £4.50 for the first book and £2.00 for each additional book.

**Payment Methods:** Payment must be in £ Sterling and cheques must be drawn on a UK clearing bank. All major credit cards are accepted. Orders from individuals must be prepaid and include the shipping and handling charges described above.

**Value Added Tax:** Clearly state your VAT number on all orders. Customers who are not registered for VAT may be charged VAT at their appropriate national rate. Customers making payment in advance should check with Marston as to whether VAT will be payable and, if so, how much, before sending their prepayment.

**Returns Policy:** Returns are accepted on written application only and all returns must be accompanied by a copy of the original invoice. Returned books must be in mint condition. We reserve the right to withhold credit on the titles returned without permission.

**Information and Review Requests:** For inspection copies, review and catalogue requests, and general information about the National Academies Press publications, please contact the marketing agent for the National Academies Press in the United Kingdom and Europe:

Oxford Publicity Partnership  
5 Victoria House  
138 Watling Street East  
Towcester  
NN12 6BT, United Kingdom  
Telephone: +44 (0) 1327 357770  
Fax: +44 (0) 1327 359572

## Sales Representatives

**Continental Europe and Ireland:** Durnell Marketing, 2 Linden Close, Turnbridge Wells, Kent, TN4 8HH, UK. Telephone: +44 (0) 1892 544272. E-mail: [mail@durnell.co.uk](mailto:mail@durnell.co.uk).

**India:** Viva Group, 4737/23 Ansari Road, Daryaganj, New Delhi 110 002, INDIA. Telephone: +91 (11) 4224 2200. Fax: +91 (11) 4224 2240. Internet: [www.vivagroupindia.net](http://www.vivagroupindia.net). E-mail: [viva@vivagroupindia.net](mailto:viva@vivagroupindia.net).

**Japan:** Maruzen Co., Ltd., P.O. Box 5050, Tokyo International 100-31, JAPAN. Telephone: +81 (3) 3275-8585. Fax: +81 (3) 3274-3238.

Kinokuniya Co., Ltd., Book Import Department, 38-1, Sakuragaoka 5-Chome, Setagaya-Ku, Tokyo 156, JAPAN. Telephone: +81 (3) 3439-0161. Fax: +81 (3) 3439-0839.

**Brunei, Hong Kong, India, Indonesia, Korea, Malaysia, People's Republic of China, Philippines, Singapore, Taiwan, and Thailand:** World Scientific Publishing Co. Pte. Ltd., Farrer Road, PO Box 128, SINGAPORE 912805. Telephone: +65 6466-5775. Fax: +65 6467-7667. Internet: [www.worldscientific.com](http://www.worldscientific.com). E-mail: [sales@wspc.com.sg](mailto:sales@wspc.com.sg).

**Mexico, Puerto Rico and the Caribbean, South America, and Central America:** U.S. PubRep, Inc., Craig Falk, 311 Dean Drive, Rockville, MD 20851-1144. Telephone: +1 (301) 838-9276. Fax: +1 (301) 838-9278. Internet: [www.uspubrep.com](http://www.uspubrep.com). E-mail: [c.falk@ieee.org](mailto:c.falk@ieee.org).

**Australia and New Zealand:** Footprint Books Pty Ltd., Unit 4/92A Mona Vale Rd., Mona Vale, NSW 2103, Australia. Telephone: +61 02-9997-3973. Fax: +61 02-9997-3185. E-mail: [simonpl@footprint.com.au](mailto:simonpl@footprint.com.au).

**Countries Other Than Those Listed Above:** All orders destined for shipment outside the United States must be prepaid, except for customers with established institutional accounts. Pro forma invoices will be provided on request. Payment must be made by a check drawn on a U.S. bank payable in U.S. dollars or by international money order. When placing your order, instruct your bank that it must bear all bank charges. Send orders to the National Academies Press at the U.S. address:

500 Fifth Street, NW, Lockbox 285  
Washington, DC 20055  
Telephone: +1 (202) 334-3313  
Fax: +1 (703) 661-1501

**Foreign Rights Availability:** Inquiries concerning translation and all other subsidiary rights should be sent to the Rights Department at the National Academies Press at the U.S. address above.

**Prices and Availability:** Sterling prices in this catalog are for the European Union; U.S. dollar prices are for all other countries. All prices shown are subject to alteration without notice. Publication dates for books not yet published are provisional and for guidance only.

# THE NATIONAL ACADEMIES

*Advisers to the Nation on Science, Engineering, and Medicine*

## **About the National Academies Press**

The National Academies Press publishes the reports issued by the National Academies—the National Academy of Sciences, the National Academy of Engineering, the Institute of Medicine, and the National Research Council, all operating under a charter granted by the Congress of the United States.

The **National Academy of Sciences** is a private, nonprofit, self-perpetuating society of distinguished scholars engaged in scientific and engineering research, dedicated to the furtherance of science and technology and to their use for the general welfare. Upon the authority of the charter granted to it by the Congress in 1863, the Academy has a mandate that requires it to advise the federal government on scientific and technical matters. Dr. Ralph J. Cicerone is president of the National Academy of Sciences.

The **National Academy of Engineering** was established in 1964, under the charter of the National Academy of Sciences, as a parallel organization of outstanding engineers. It is autonomous in its administration and in the selection of its members, sharing with the National Academy of Sciences the responsibility for advising the federal government. The National Academy of Engineering also sponsors engineering programs aimed at meeting national needs, encourages education and research, and recognizes the superior achievements of engineers. Dr. Charles M. Vest is president of the National Academy of Engineering.

The **Institute of Medicine** was established in 1970 by the National Academy of Sciences to secure the services of eminent members of appropriate professions in the examination of policy matters pertaining to the health of the public. The Institute acts under the responsibility given to the National Academy of Sciences by its congressional charter to be an adviser to the federal government and, upon its own initiative, to identify issues of medical care, research, and education. Dr. Harvey V. Fineberg is president of the Institute of Medicine.

The **National Research Council** was organized by the National Academy of Sciences in 1916 to associate the broad community of science and technology with the Academy's purposes of furthering knowledge and advising the federal government. Functioning in accordance with general policies determined by the Academy, the Council has become the principal operating agency of both the National Academy of Sciences and the National Academy of Engineering in providing services to the government, the public, and the scientific and engineering communities. The Council is administered jointly by both Academies and the Institute of Medicine. Dr. Ralph J. Cicerone and Dr. Charles M. Vest are chair and vice chair, respectively, of the National Research Council.

**[www.national-academies.org](http://www.national-academies.org)**



THE NATIONAL ACADEMIES PRESS  
500 Fifth Street, NW  
Washington, DC 20001  
[www.nap.edu](http://www.nap.edu)

---

Nonprofit  
U.S. Postage  
PAID  
Washington, DC  
Permit 2962

---



## THE NATIONAL ACADEMIES™

*Advisers to the Nation on Science, Engineering, and Medicine*

The nation turns to the National Academies—National Academy of Sciences, National Academy of Engineering, Institute of Medicine, and National Research Council—for independent, objective advice on issues that affect people's lives worldwide.

[www.national-academies.org](http://www.national-academies.org)