Things We've Known, Accomplished, Need to Fear, and Might Do

Baruch Fischhoff
Carnegie Mellon University
http://www.cmu.edu/dietrich/sds/people/faculty/baruch-fischhoff.html

National Research Council

March 24, 2016

Things We've Long Known

Risk characterization requires ethical (value, political) choices

Overview

Things we've long known
Progress we've made
Threats to the enterprise
Three proposals

WASH–1400
(NUREG 75/014)

REACTOR SAFETY STUDY

AN ASSESSMENT
OF ACCIDENT RISKS
in
U.S. COMMERCIAL NUCLEAR POWER PLANTS

U.S. NUCLEAR REGULATORY COMMISSION
OCTOBER 1975

NUREG/CR-0400

RISK ASSESSMENT REVIEW GROUP REPORT TO THE U. S. NUCLEAR REGULATORY COMMISSION

H. W. Lewis, Chairman
R. J. Budnitz
H. J. C. Kouts
W. B. Loewenstein
W. D. Rowe
F. von Hippel
F. Zachariasen

Ad Hoc Review Group

Prepared for
U. S. Nuclear Regulatory Commission

R I S K
O F E N E R G Y P R O D U C T I O N

by

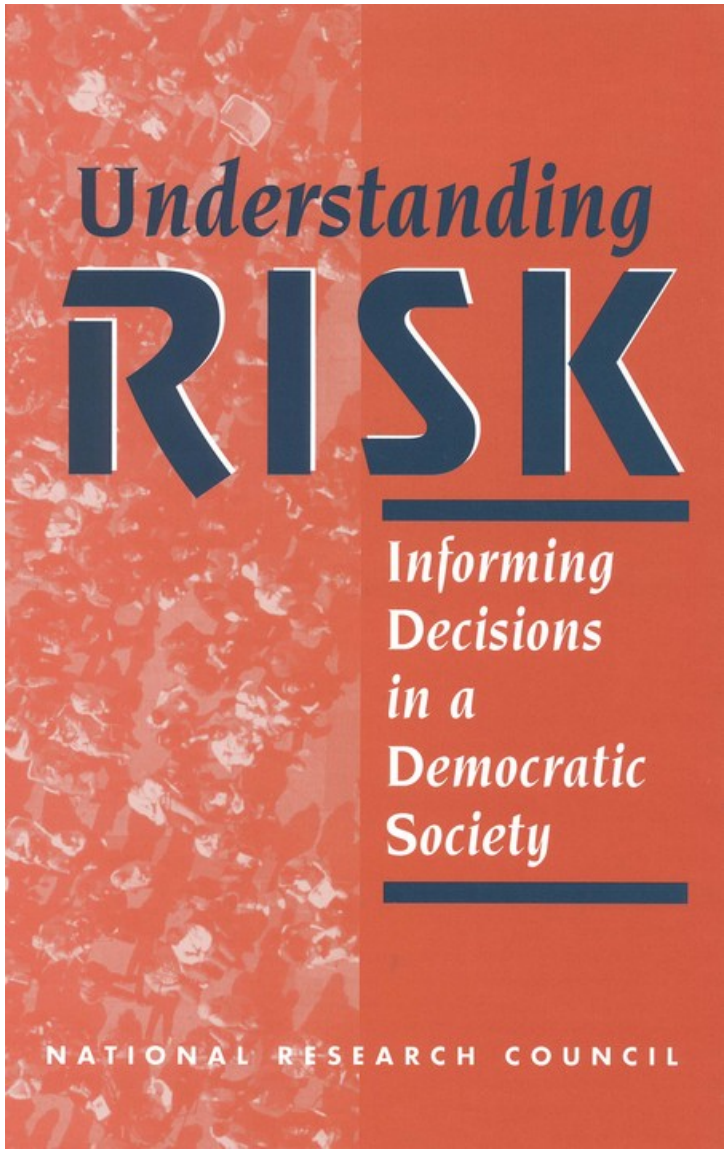
Herbert Inhaber
Atomic Energy Control Board

AECB 1119

Assessing Environmental Risks of Energy

PETER H. GLEICK, MS, AND JOHN P. HOLDREN, PHD

AJPH September 1981, Vol. 71, No. 9



http://www.nap.edu/catalog/5138/understanding-risk-informing-decisions-in-a-democratic-society

Defining “Risk”

The terms of all analyses embody values that favor some interests.

When transparent, those assumptions can be controversial.

An analytical-deliberative process is needed to create socially acceptable definitions.

RESEARCH

REVIEW

RISK ASSESSMENT

The realities of risk-cost-benefit analysis

Baruch Fischhoff

Fischhoff, B., (2015). The realities of risk-cost-benefit analysis. *Science, 350*(6260), 527
http://dx.doi.org/10.1126/science.aaa6516

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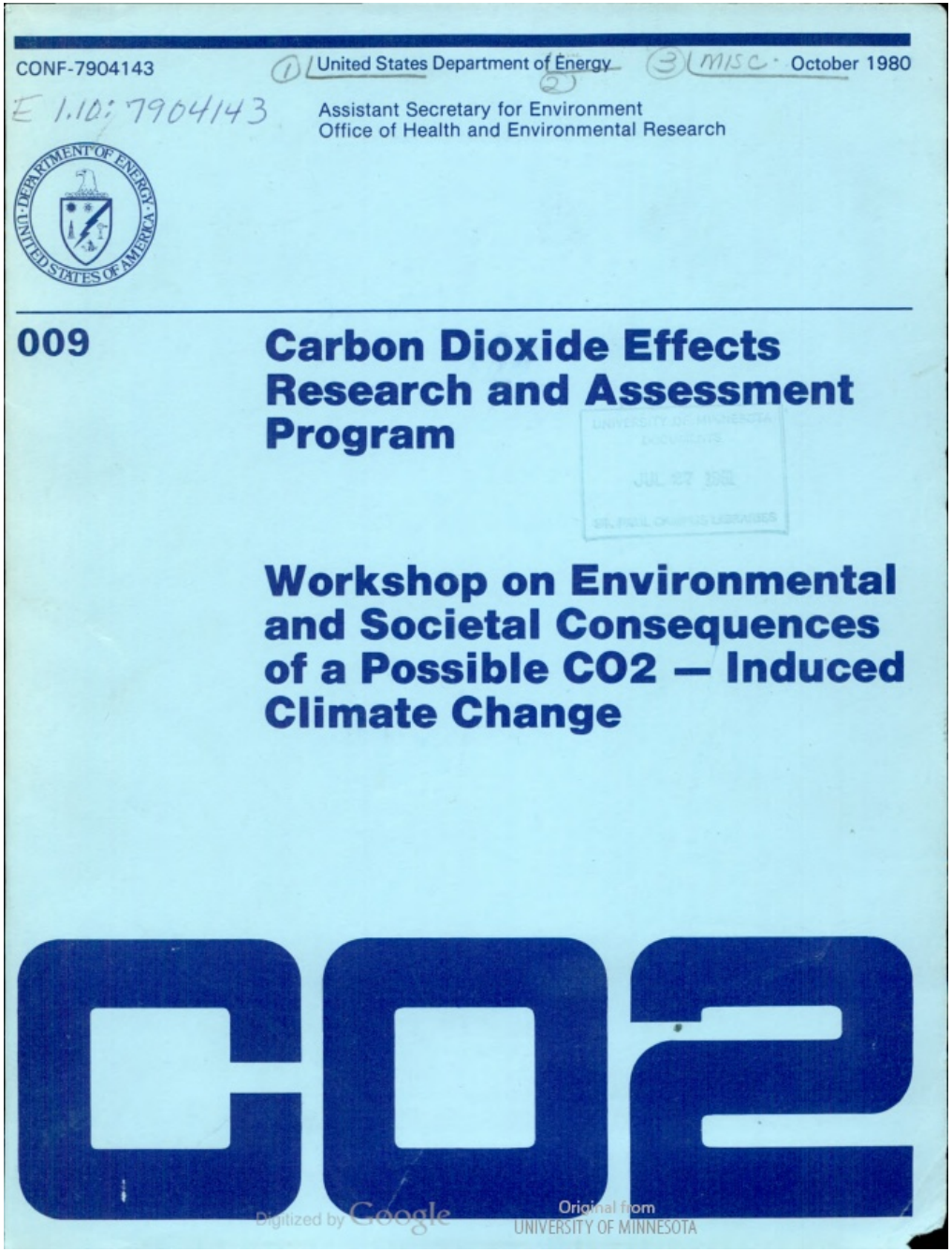
Risk characterization requires ethical (value, political) choices

Climate science requires collaboration among multiple disciplines



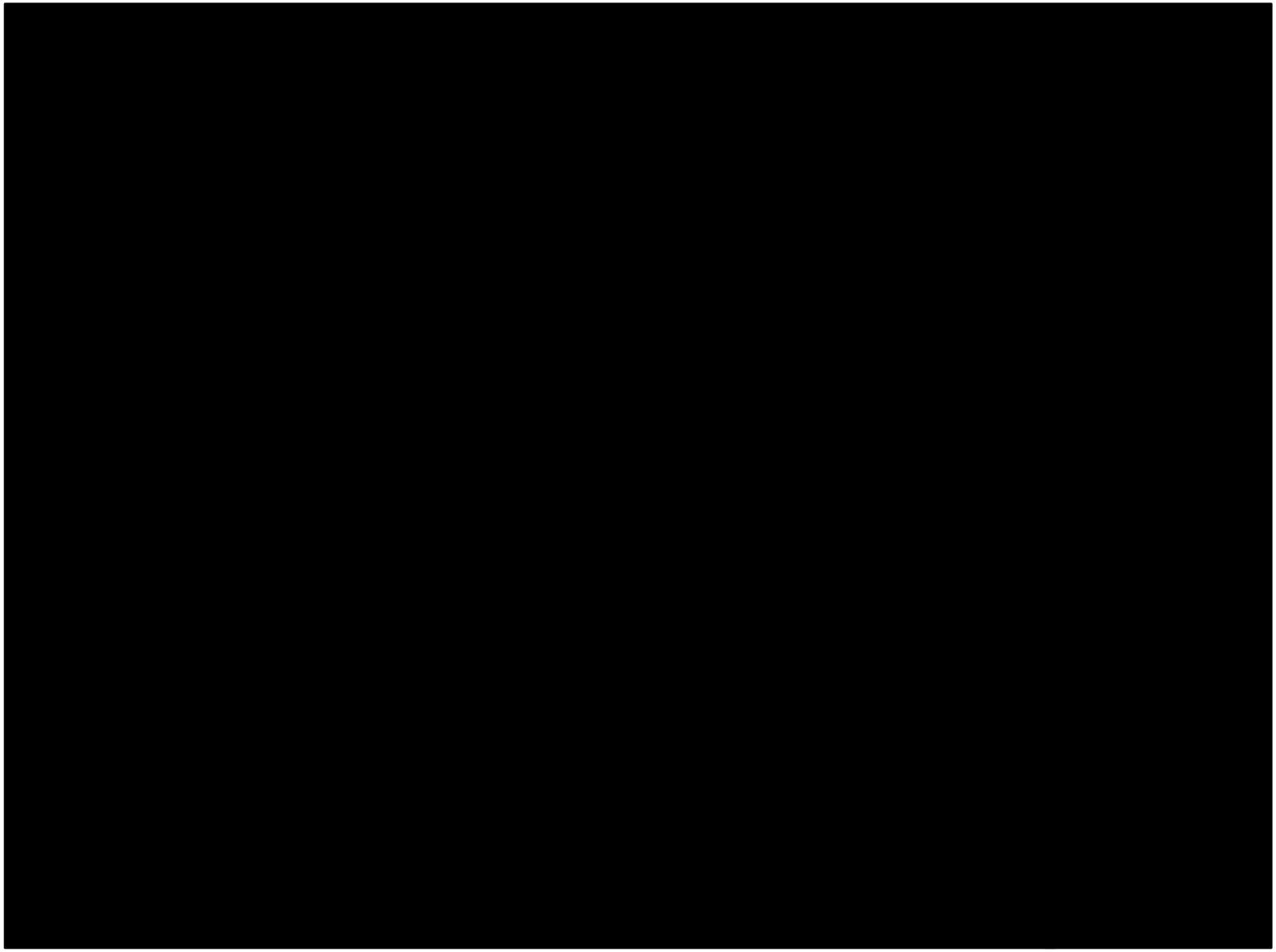
http://www.osti.gov/scitech/biblio/6728173/

The Panel first met at a major interdisciplinary workshop organized by the AAAS at Annapolis, Maryland in April of 1979. Using as a reference a hypothetical scenario of how the climate might change as the result of CO_2 emissions, the panel identified a variety of important issues and research questions pertaining to the nature of possible societal perception of and responses to a climate change. The Panel's report, published in a DOE document, *Workshop on Environmental and Societal Consequences of a Possible CO_2-Induced Climate Change* (Carbon Dioxide Effects Research and Assessment Program, Report 009, U.S. Department of Energy, CONF-7904143, 1980), emphasized the unusual characteristics of the "CO_2 problem", including its long-term, slowly developing, and irreversible aspects, and underscored the importance of viewing the problem in the general context of other societal problems and rapid societal change.

SOCIAL AND INSTITUTIONAL RESPONSES

Elise Boulding, Sociology Department, Dartmouth, Co-Chairman
Stephen H. Schneider, National Center for Atmospheric Research, Boulder, Co-Chairman
Elizabeth Colson, Department of Anthropology, University of California, Berkeley
John G. Corbett, National Center for Atmospheric Research
John Durand, Population Studies Center, University of Pennsylvania
Baruch Fischoff, Decision Research, Eugene, Oregon
Michael H. Glantz, National Center for Atmospheric Research
Dean E. Mann, Political Science Department, University of California, Santa Barbara
Klaus Meyer-Abich, (AUGE), Universität Essen, West Germany
Thomas H. Moss, Staff Director & Science Advisor, Congressman George E. Brown, Washington
Haraldur Olafsson, Faculty of Social Science, University of Iceland, Reykjavik
John Opie, Department of History, Duquesne University
Robert I. Rotberg, Department of History, Massachusetts Institute of Technology, Cambridge
Howard J. Taubenfeld, Temple University School of Law, Philadelphia
Eric G. Walther, Visibility Research Center, University of Nevada, Las Vegas
Richard Warrick, Graduate School of Geography, Clark University, Worcester
Chris Bernabo, Office of Congressman George Brown, Washington
Robert Chen, Massachusetts Institute of Technology, Cambridge, Rapporteur

° Panel IV Social and Institutional Responses. The CO_2 issue appears to be a gradually developing problem that is so far proceeding too slowly to attract significant public notice. Yet it does have aspects that are linked to other high-priority social problems, including the development of alternative energy systems and certain environmental threats. Uncertainties inhibit precise definition of the social costs and benefits of CO_2-induced climate change. Impacts of climate change will not be distributed uniformly; consequently, the economic and social effects for each region would vary greatly. Prevention of CO_2 build-up is a global matter, but individual nations or other political units could act independently to adapt to changing climates. As scientific research on CO_2 progresses, information regarding the risks and benefits of climate change should be diffused through the hierarchy of social units -- ranging from individuals, families, and communities to nations and international groups. Institutions then will be better able to identify and implement appropriate strategies for dealing with the situation. Because of the varied geophysical, biological, and societal effects that may result from CO_2 build-up, the problem calls for an unprecedented interdisciplinary research effort. The format used in this undertaking can perhaps be applied to other complex social problems as well.



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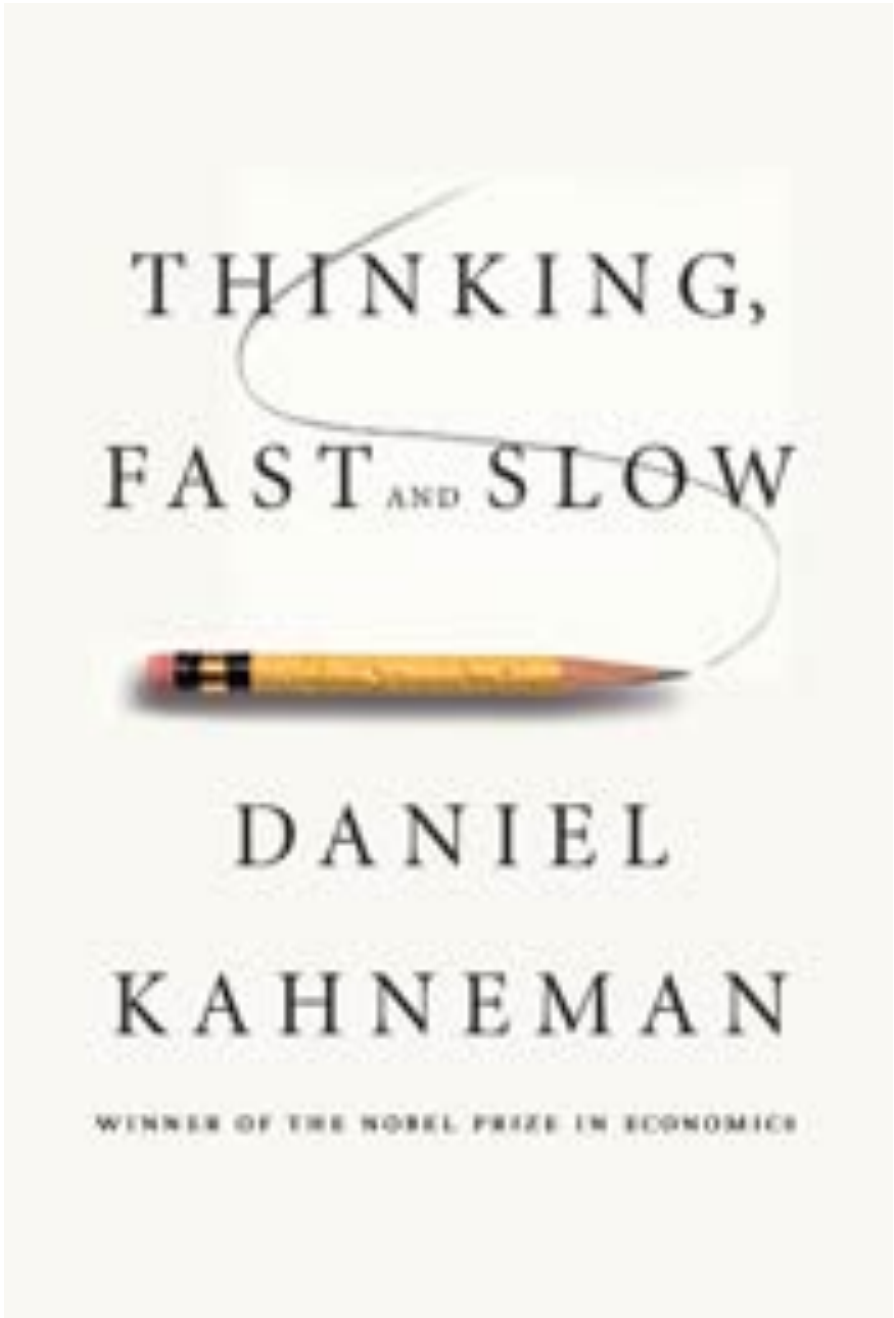
Communication occurs on multiple levels


THINKING,
FAST AND SLOW
DANIEL
KAHNEMAN
WINNER OF THE NOBEL PRIZE IN ECONOMICS

http://www.nap.edu/catalog/1189/improving-risk-communication

http://www.pnas.org/content/110/Supplement_3

http://www.pnas.org/content/111/Supplement_4

http://www.nap.edu/catalog/6034/toward-environmental-justice-research-education-and-health-policy-needs

BOX 1-1 THREE PRINCIPLES FOR PUBLIC HEALTH RESEARCH TO ADDRESS ENVIRONMENTAL JUSTICE ISSUES

1. **Improve the science base.** More research is needed to identify and verify environmental etiologies of disease and to develop and validate improved research methods.
2. **Involve the affected populations.** Citizens from the affected population in communities of concern should be actively recruited to participate in the design and execution of research.
3. **Communicate the findings to all stakeholders.** Researchers should have open, two-way communication with communities of concern regarding the conduct and results of their research activities.

http://www.nap.edu/catalog/6034/toward-environmental-justice-research-education-and-health-policy-needs

Haraldur Ólafsson
http://starfsfolk.hi.is/en/simaskra/96

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Progress We've Made

NCA: readable, accessible, available, relevant
Increasing demand for the evidence, especially when "last-mile" connections are made
Demonstrations of collaborative processes
Increasing mutual respect among disciplines

Threats to the Enterprise

Still more supply than demand for SBD
Supply of SBD not secure
Lack of standardization in risk characterization and disclosure
Misplaced precision and imprecision in climate science

[SBD=social, behavioral, and decision science]

Three Proposals

Pilot studies, modeling how to apply what we've long known

FDA'S
STRATEGIC PLAN
FOR
RISK COMMUNICATION

Fall, 2009

The Voice of the Patient

A series of reports from the U.S. Food and Drug Administration's (FDA's)
Patient-Focused Drug Development Initiative

Chronic Fatigue Syndrome and Myalgic Encephalomyelitis

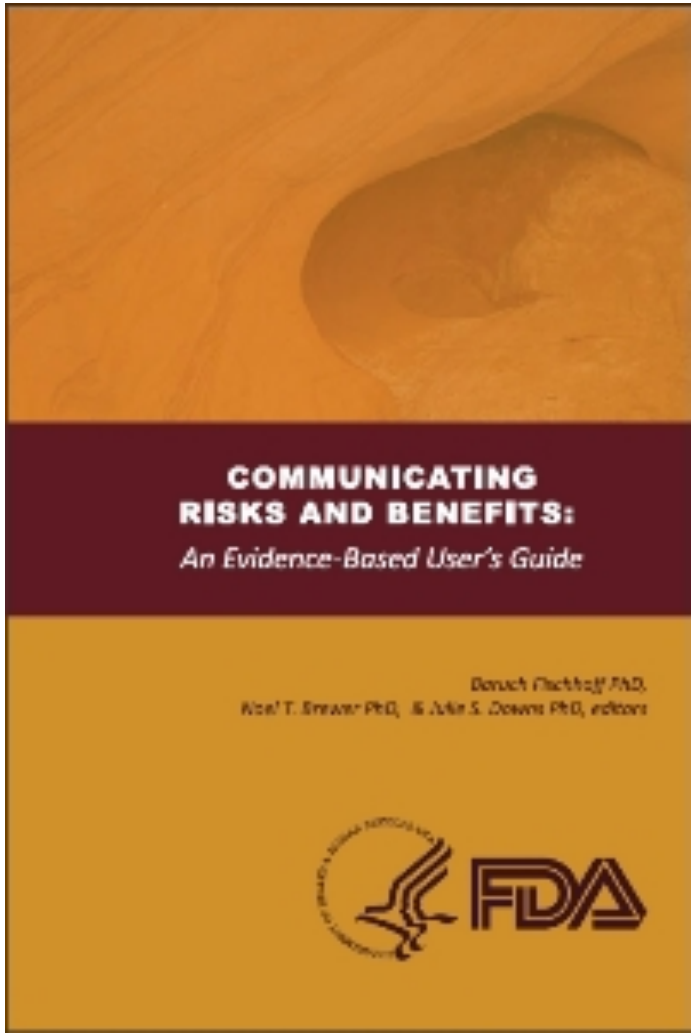
Public Meeting: April 25, 2013
Report Date: September 2013

Three Proposals

Pilot studies modeling how to apply what we've long known

SBD seal of approval

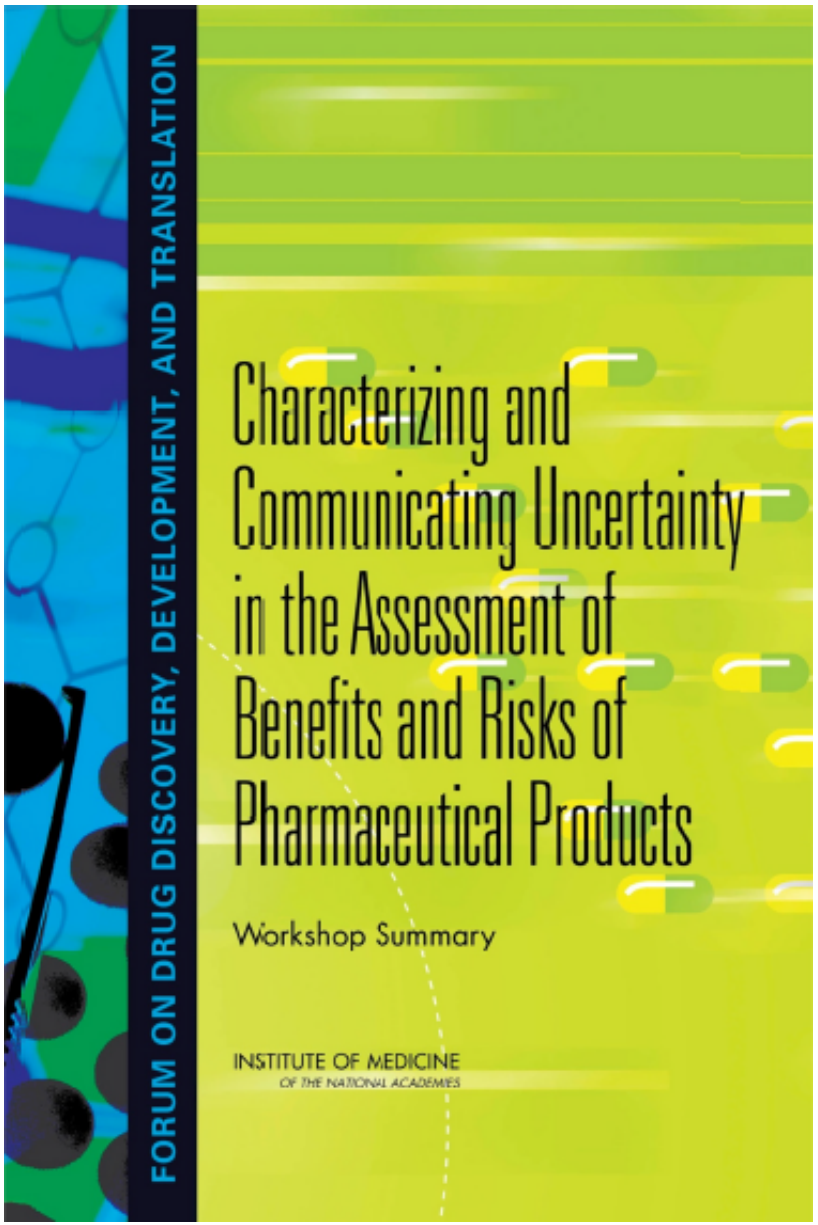
FDA Risk Communication Advisory Committee



http://www.fda.gov/AboutFDA/ReportsManualsForms/Reports/ucm268078.htm

Each Chapter

Problem
State of the science
Best guesses at best practices
Evaluation
- no money
- a little money
- resources commensurate with stakes



http://www.nap.edu/catalog.php?record_id=18870

Three Proposals

Pilot studies modeling how to apply what we've long known

SBD seal of approval

Standard high-level characterization of risk

Structured Approach to Benefit-Risk Assessment in Drug Regulatory Decision-Making

Draft PDUFA V Implementation Plan - February 2013
Fiscal Years 2013-2017

FDA

Figure 1: FDA Benefit-Risk Framework

Decision Factor	Evidence and Uncertainties	Conclusions and Reasons
Analysis of Condition		
Current Treatment Options		
Benefit		
Risk		
Risk Management		
Benefit-Risk Summary Assessment		

FDA. (2013). *Structured approach to benefit-risk assessment for drug regulatory decision making*. Draft PDUFA V implementation plan (2/13). FY2013-2017.

Three Proposals

Pilot studies modeling how to apply what we've long known

SBD seal of approval

Standard high-level characterization of risk

Some Sources

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National Research Council. (2011). Intelligence Analysis for Tomorrow. Washington, DC: National Academy Press http://www.nap.edu/catalog.php?record_id=13040

Pidgeon, N., & Fischhoff, B. (2011). The role of social and decision sciences in communicating uncertain climate risks. *Nature Climate Change, 1(1)*, 35-41.

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Carnegie Mellon Electricity Center: http://wpweb2.tepper.cmu.edu/ceic/
Center for Climate and Environmental Decision Making: http://cedm.epp.cmu.edu/index.php
Center for Risk Perception and Communication: http://sds.hss.cmu.edu/risk/
Center for Human Rights Science: http://www.cmu.edu/chrs/