Integrating Science and Policy

Baruch Fischhoff
Carnegie Mellon University

Extreme Weather and Climate Change:
How Can We Address Uncertainty?
The Rutgers Initiative on Climate and Society
March 28, 2012

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.

CONF-7904143

United States Department of Energy

October 1980

E 1.10:7904143

Assistant Secretary for Environment
Office of Health and Environmental Research

009

Carbon Dioxide Effects Research and Assessment Program

Workshop on Environmental and Societal Consequences of a Possible CO2 — Induced Climate Change

CO2

SOCIAL AND INSTITUTIONAL RESPONSES

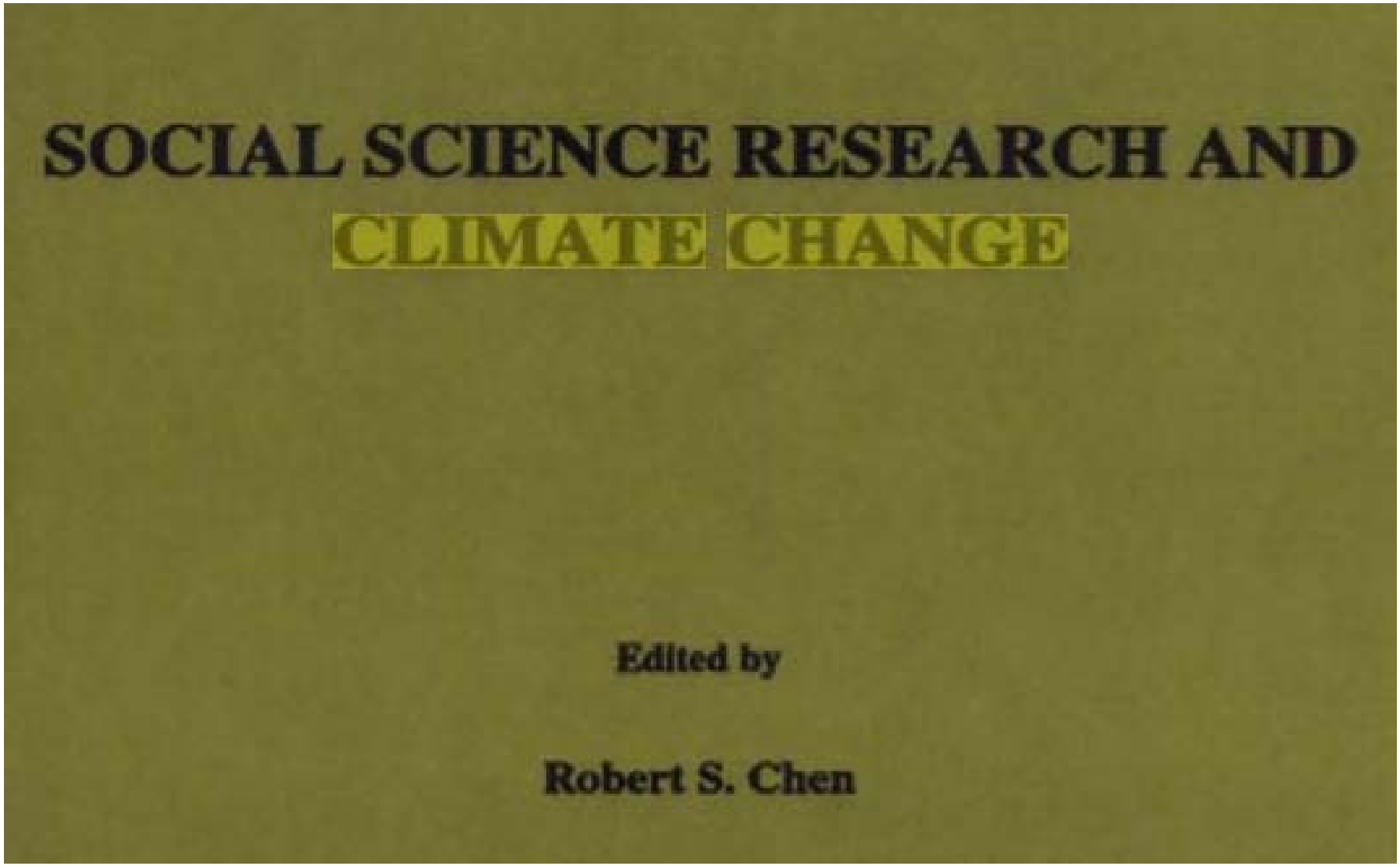
Elise Boulding, Sociology Department, Dartmouth, Co-Chairman
Stephen H. Schneider, National Center for Atmospheric Research, Boulder, Co-Chairman
Elizabeth Colson, Department of Anthropology, University of California, Berkeley
John G. Corbett, National Center for Atmospheric Research
John Durand, Population 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.

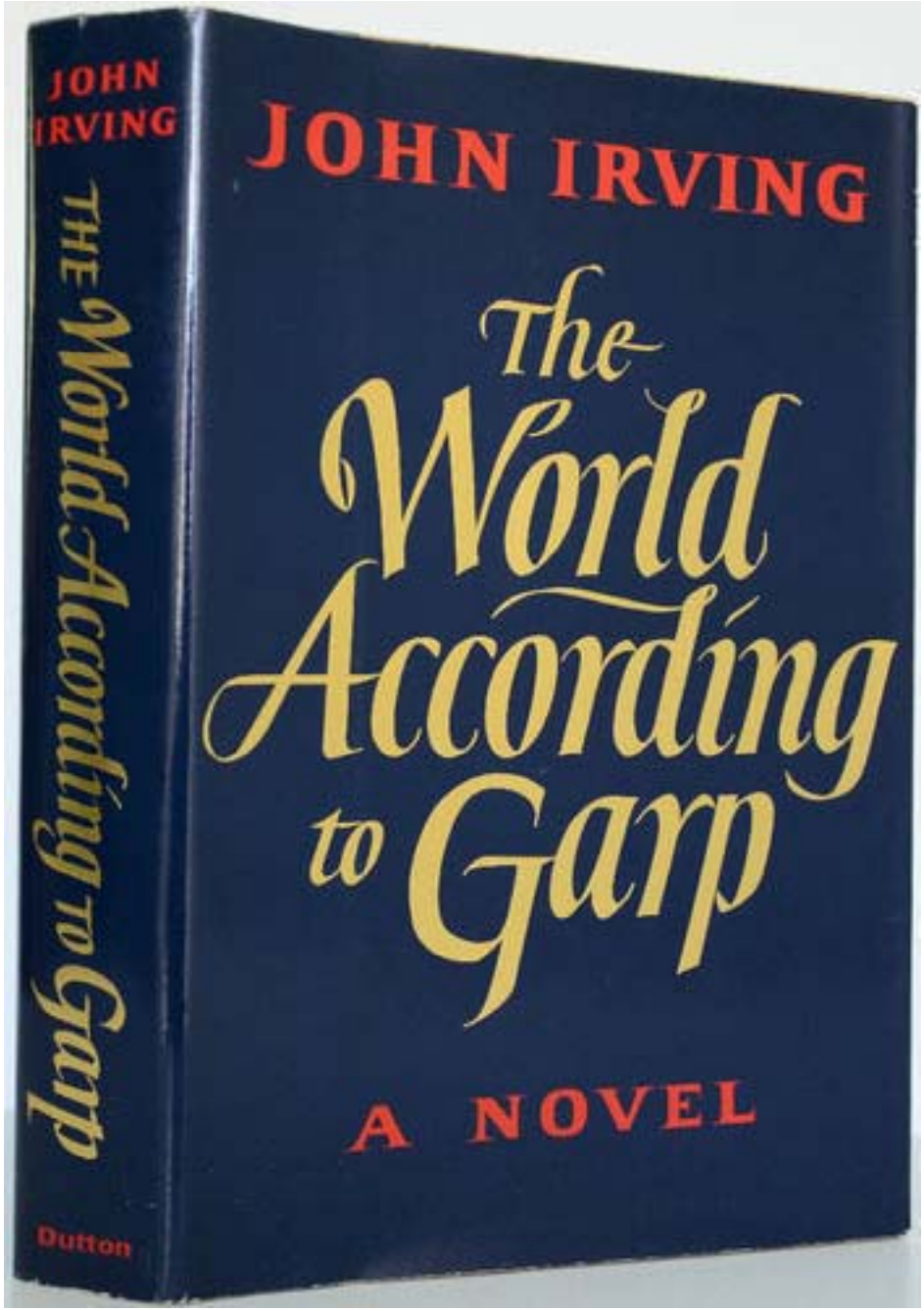
9 Hot Air: The Psychology of CO_2-Induced Climatic Change

Baruch Fischhoff
Decision Research
A Branch of Perceptronics

Fischhoff, B. (1981). Hot air: The psychology of CO-induced climatic change. In J. Harvey (Ed.), *Cognition, social behavior and the environment* (pp. 163-184). Hillsdale, NJ: Erlbaum



R. S. Chen, E. Boulding and S. H. Schneider (Eds.), *Social science research and climate change: An interdisciplinary perspective* (pp. 183-203). Dordrecht, Holland: D. Reidel.


JOHN IRVING
THE World According to Garp
Dutton
JOHN IRVING
The World According to Garp
A NOVEL

° 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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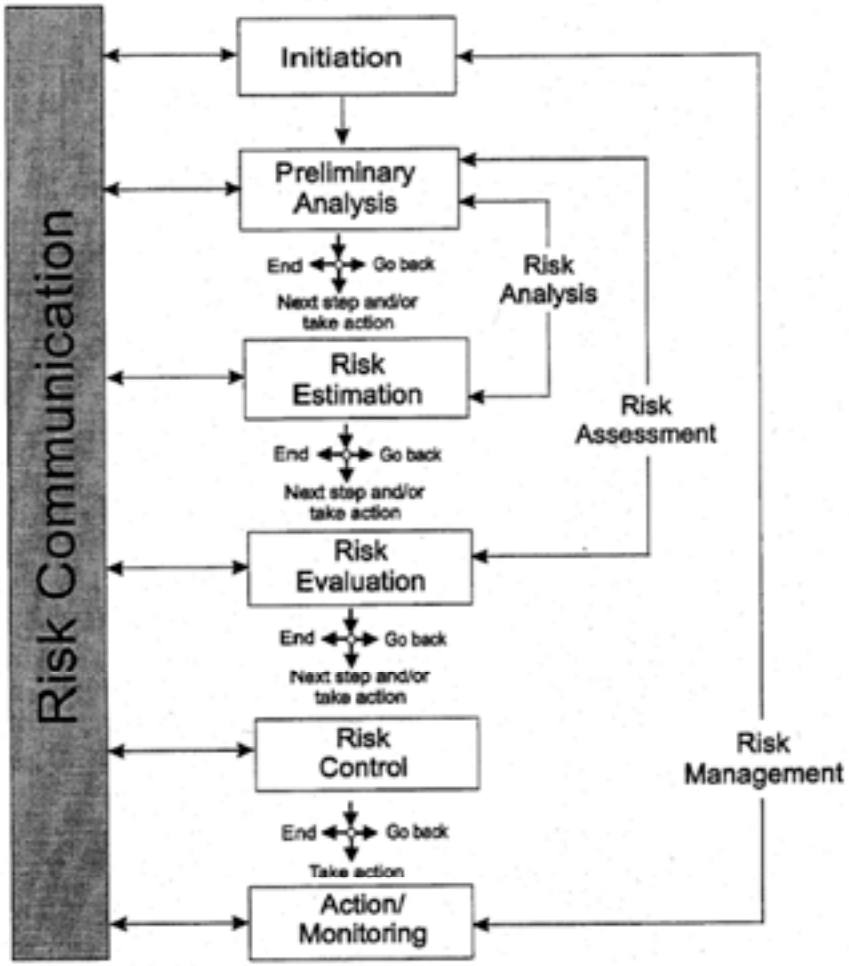
A Model for Integrating Science and Policy

CAN/CSA-Q850-97

Risk Management: Guideline for Decision-Makers

A National Standard of Canada



Note: *Risk communication with stakeholders is an important part of each step in the decision process.*

Figure 2
Steps in the Q850 Risk Management Decision-Making Process — Simple Model

In this view

Public involvement is a sustained, two-way process that is essential to creating relevant policy options and the supporting science.

The social, behavioral, and decision sciences can guide that process – and make progress through the work.

Three Design Principles

Design Principle 1: Treat public involvement as a scientific activity.

RADIOLOGICAL ATTACK
DIRTY BOMBS AND OTHER DEVICES

—Making the Nation Safer
National Research Council (2002)

WHAT IS IT?

A radiological attack is the spreading of radioactive material with the intent to do harm. Radioactive materials are used every day in laboratories, medical centers, food irradiation plants, and for industrial uses. If stolen or otherwise acquired, many of these materials could be used in a "radiological dispersal device" (RDD).

Radiological Dispersal Devices, a.k.a. Dirty Bombs

A "dirty bomb" is one type of RDD that uses a conventional explosion to disperse radioactive material over a targeted area. The term dirty bomb and RDD are often used interchangeably in technical literature. However, RDDs could also include other means of dispersal such as placing a container of radioactive material in a public place, or using an airplane to disperse powdered or aerosolized forms of radioactive material.

A Dirty Bomb is Not a Nuclear Bomb

A nuclear bomb creates an explosion that is thousands to millions of times more powerful than any conventional explosive that might be used in a dirty bomb. The resulting mushroom cloud from a nuclear detonation contains fine particles of radioactive dust and other debris that can blanket large areas (tens to hundreds of square miles) with "fallout." By contrast, most of the radioactive particles dispersed by a dirty bomb would likely fall to the ground within a few city blocks or miles of the explosion.

How an RDD Might be Used

It is very difficult to design an RDD that would deliver radiation doses high enough to cause immediate health effects or fatalities in a large number of people. Therefore, experts generally agree that an RDD would most likely be used to:

- contaminate facilities or places where people live and work, disrupting lives and livelihoods.
- cause anxiety in those who think they are being, or have been, exposed.

What is ionizing radiation?

When radioactive elements decay, they produce energetic emissions (alpha particles, beta particles, or gamma rays) that can cause chemical changes in tissues. The average person in the United States receives a "background" dose of about one-third of a rem* per year—about 60% from natural sources including earth materials and cosmic radiation, and the remaining 20% from man-made radiation sources, such as medical x-rays. There are different types of radioactive materials that emit different kinds of radiation:

Gamma and X-rays can travel long distances in air and can pass through the body exposing internal organs; it is also a concern if gamma emitting material is ingested or inhaled.

Beta radiation can travel a few yards in the air and in sufficient quantities might cause skin damage; beta-emitting material is an internal hazard if ingested or inhaled.

Alpha radiation travels only an inch or two in the air and cannot even penetrate skin; alpha-emitting material is a hazard if it is ingested or inhaled.

** A rem is a measure of radiation dose, based on the amount of energy absorbed in a mass of tissue. Dose can also be measured in Sieverts (1 Sievert=100 rem).*

www.nae.edu/Activities/20676/20726/.../RadiologicalAttack.aspx

BE INFORMED

NUCLEAR BLAST

1. Take cover immediately, below ground if possible, though any shield or shelter will help protect you from the immediate effects of the blast and the pressure wave.

2. Consider if you can get out of the area;

3. Or if it would be better to go inside a building and follow your plan to "shelter-in-place".

(http://www.ready.gov/america/_downloads/nuclear.pdf) [removed]

DHS to Scrap Color Code Terror Alerts by April

Homeland Security Advisory System criticized for "scaring, not preparing"

By PIERRE THOMAS and JASON RYAN
January 26, 2011

abc NEWS

Russia Adopts Color-Coded Terror Alert System

By ELLEN BARRY
Published: January 28, 2011

The New York Times

Design Principle 2: Adopt an analytical, empirical, pan-theoretic approach to the science.

Analytical research is needed because

We need to identify the facts most relevant to others' decisions, from among all those that we could conceivably produce and convey.

[illegible] allergy. As rodents hypersensitivity reactions or contact dermatitis may occur after the intranasal administration of budesonide. Rare instances of wheezing, nasal irritation, perforation and increased intraocular pressure have been reported following the topical use application of steroidal glucocorticosteroids.

Like other glucocorticosteroids, budesonide is absorbed into the circulation. Use of excessive doses of glucocorticosteroids may lead to signs or symptoms of hypercorticism, suppression of HPA function and/or suppression of growth in children or teenagers. In short-term studies of the acute effect of inhaled budesonide 800 µg/day on lower leg growth (kneemetry), like other inhaled corticosteroid particularly, which have been attributed to a decrease in the rate of linear leg growth. The clinical significance of the finding is not known. In two one-year studies in 80 children receiving recommended doses of Rhinocort Nasal Inhaler, height and skeletal sizers were consistent with chronological age. Physicians should closely follow the growth of children taking corticosteroids by any route, and weigh the benefits of continued therapy against the possibility of growth suppression if a child's growth appears stunted.

Although systemic effects have been observed with recommended doses of Rhinocort Nasal Inhaler, the potential risk increases with larger doses. Therefore, larger than recommended doses of Rhinocort Nasal Inhaler are not to be exceeded.

When used in larger doses, systemic glucocorticosteroid effects such as hypercorticism and adrenal suppression may appear. If such changes occur, the dosage of Rhinocort Nasal Inhaler should be discontinued slowly, consistent with accepted procedures for discontinuing oral glucocorticosteroid therapy.

In clinical studies with budesonide administered intranasally, the development of localized infections of the nose and pharynx with Candida albicans was encountered only rarely. When such an infection develops, it may require treatment with appropriate local therapy and discontinuation of treatment with Rhinocort Nasal Inhaler. Patients using Rhinocort Nasal Inhaler over several months or longer should be examined periodically for evidence of Candida infection or other signs of adverse effects on the nasal mucosa.

Rhinocort Nasal Inhaler should be used with caution, if at all, in patients with active or quiescent tuberculous infections, untreated fungal, bacterial, or systemic viral infections, or ocular herpes simplex.

Because of the inhibitory effect of glucocorticosteroids on wound healing, patients who have had recent nasal septum ulcers, nasal surgery, or nasal trauma should not use a nasal glucocorticosteroid until healing has occurred.

Information for Patients: Patients being treated with Rhinocort Nasal Inhaler should receive the following information and instructions.

Patients should use Rhinocort Nasal Inhaler as prescribed. A decrease in symptoms may occur as soon as 24 hours after starting glucocorticosteroid therapy and generally does not proceed to arrive within a few days of obtaining therapy in allergic rhinitis. The patient should consult the physician if symptoms do not improve [illegible] three weeks, or if the condition worsens. Nasal irritation and/or burning after use of the spray rarely may occur with the product. The patient should contact the physician if they occur repeatedly.

Patients who are on corticosteroids should be warned to avoid exposure to chicken pox or measles. Patients should also be advised that if they are exposed they should consult their physician without delay.

For the proper use of this unit and to obtain maximum improvement, the patient should read and follow the instructions in the patient instructions carefully.

Carcinogenesis, Mutagenesis, Impairment of Fertility: Long-term studies were conducted in mice and rats using oral administration to evaluate the carcinogenic potential of budesonide.

There was no evidence of a carcinogenic effect when budesonide was administered orally for 21 weeks to mice at doses up to 200 µg/kg/day (800 µg/m²/day).

In a 104-week carcinogenicity study in Sprague-Dawley rats at 12, a statistically significant increase in the incidence of pituitary adenomas was observed in male rats receiving 50 µg/kg/day (2000 µg/m²/day) orally. No such changes were seen in males rats receiving doses of 12 and 25 µg/kg/day (480 and 1000 µg/m²/day) or in female rats at any dose. Two additional carcinogenicity studies have been performed each using subsequent studies at doses of 30 µg/kg/day (300 µg/m²/day) in male Sprague-Dawley and Wistar rats. These studies did not demonstrate an increased glioma incidence in budesonide treated animals as compared with concurrent controls or reference glucocorticosteroid treated groups (prednisolone and triamcinolone acetonide).

Compared with concurrent control male Sprague-Dawley rats there was a statistically significant increase in the incidence of hepatocellular tumors. This finding was confirmed in all three period groups (budesonide pretreatment, transcurbine adenosis) in the second study in male Sprague-Dawley rats.

The mutagenic potential of budesonide was evaluated in six different test systems. Ames' Salmonella microsome plate test, mouse micronucleus test, mouse lymphoma test, chromosome aberration test in human lymphocytes, sex-linked recessive lethal test in Drosophila melanogaster, and DNA repair enzymes in rat hepatocyte culture. No mutagenic or clastogenic properties of budesonide were found in any of the tests.

The effect upon fertility and general reproductive performance was studied in rats given budesonide subcutaneously. At 20 µg/kg/day (160 µg/m²/day) and higher dose levels, a decrease in maternal body weight gain was observed along with a decrease in promoted viability and viability in the young at birth and during lactation. No such effects were noted at the dose level 5 µg/kg/day (30 µg/m²/day).

Pregnancy: Teratogenic Effects: Pregnancy Category C. As with other glucocorticoids, budesonide has been shown to be teratogenic and embryocidal in rodents and rats when given subcutaneously at doses exceeding 5 and 100 µg/kg/day, (30 and 600 µg/m²/day), respectively. In these studies budesonide at 25 µg/kg/day (150 µg/m²/day) given to rabbits and 200 µg/kg/day (2000 µg/m²/day) given to rats was found to produce fetal loss, decreased pup weights and skeletal abnormalities. The teratogenic or embryocidal effects have been seen in rats when budesonide was administered by inhalation at doses of 100–250 µg/kg/day (600–1500 µg/m²/day, approximately 21–48 times the human [illegible] dosing dose based on µg/kg/day, or 4–10 times the human dose based on µg/m²/day).

There are no adequate and well-controlled studies in pregnant women. Budesonide should be used during pregnancy only if the potential benefit justifies the potential risk to the fetus.

Experience with oral glucocorticosteroids gives their introduction in pharmacologic, as opposed to physiologic, doses suggests that mothers who have given birth to infants born glucocorticosteroids, their humans. In addition, because there is a natural increase in glucocorticosteroid production during pregnancy, most women will require a lower exogenous glucocorticosteroid dose and may not [illegible] during pregnancy.

Nonteratogenic effects: Hypoadrenalism may occur in infants born of mothers receiving glucocorticosteroids during pregnancy. Such infants should be carefully observed.

Nursing Mothers: It is not known whether budesonide is excreted in human milk. Because other glucocorticosteroids are excreted in human milk, caution should be exercised when Rhinocort Nasal Inhaler is administered to nursing women.

Pediatric Use: Safety and effectiveness in children below 6 years of age have not been established. Oral glucocorticosteroids have been shown to cause growth suppression in children and teenagers with [illegible] rate. If a child or teenager on any glucocorticosteroid appears to have growth suppression, the possibility that they are particularly sensitive to the effect of glucocorticosteroids should be considered (see PRECAUTIONS).

ADVERSE REACTIONS

Adverse reaction information is derived from placebo-controlled clinical trials (see Clinical Trials), open label studies, and marketing experience. In the descriptions below, rates of rare events are derived principally from marketing experience and publications, and accurate estimates of incidence are not possible.

The incidence of common adverse reactions is based upon controlled clinical trials in 406 patients (101 girls and 140 boys 6–16 years of age) and 203 female and 117 male adults) treated with Rhinocort Nasal Inhaler 128 µg twice daily over 2–4 weeks. The most common adverse reactions were symptoms or irritation of the nasal mucous membranes. All common adverse reactions were reported with approximately the same frequency by placebo patients suggesting the possibility that the vehicle or the device itself was responsible for the symptoms. Sneezing after use of the inhaler occurred in 3% of Rhinocort treated patients and in 11% of patients using the placebo.

Systemic glucocorticosteroid side-effects were not reported during controlled clinical studies with Rhinocort Nasal Inhaler. If recommended doses are exceeded, however, or if individuals are particularly sensitive, symptoms of hypercorticism, i.e., Cushing's syndrome, could occur.

Incidence Greater than 1% (Based on controlled clinical trials)

Respiratory: nasal irritation* pharyngitis*, cough increased*, epistaxis*

Digestive: dry mouth, dyspepsia.

*Incidence 3 to 5%, incidence of remaining reactions 1 to 3%.

Incidence less than 1% Causal Relationship Probable (Adverse reactions reported only in the literature or from marketing experience, and presumably rare are italicized)

Respiratory: membrane, hoarseness, wheezing, nasal pain, nasal septum mucosal [illegible], nasal septum perforation.

Special Senses: reduced sense of smell, bad taste.

Digestive: nausea.

Skin and Appendages: facial edema, rash, pruritus, purpuric dermatitis, herpes simplex.

Incidence less than 1% Causal Reasonable Unknown (Adverse reactions reported only in the literature or from marketing experience, and presumably rare are italicized)

Respiratory: dyspnea	Skin and Appendages: alopecia
Nervous System: somnolence	Musculoskeletal: myalgia, arthralgia

OVERDOSAGE

Acute overdosage with the dosage form is unlikely since one canister of Rhinocort Nasal Inhaler only contains approximately 12.7 mg of budesonide. Chronic overdosage may result in signs/symptoms of hypercorticism (see WARNINGS and PRECAUTIONS).

DOSAGE AND ADMINISTRATION

Adults and children 6 years of age and older: The recommended starting dose is 256 µg daily, given as either two sprays in each nostril morning and evening or as four sprays in each nostril in the morning.

A decrease in symptoms may occur as soon as 24 hours after onset of treatment with Rhinocort Nasal Inhaler but generally it takes 3–7 days to reach maximum benefit.

If no improvement has been obtained by the third week of treatment with Rhinocort Nasal Inhaler, treatment should be discontinued.

After the desired clinical effect has been observed, the maintenance dose should be reduced to the smallest amount necessary for control of symptoms (see Individualization of Dosage, CLINICAL PHARMACOLOGY section).

If glucocorticosteroids are discontinued when they still are needed, symptoms may not recur for several days.

At recommended doses, Rhinocort's therapeutic effects are localized to the nose, therefore concomitant treatment may be necessary to counteract allergic eye symptoms.

Doses exceeding 256 µg daily (4 sprays/nostril) are not recommended. Rhinocort Nasal Inhaler is not recommended for children below 6 years of age or for children with congenital growing months, because adequate numbers of these children have not been studied.

Directions for Use: Illustrated Patient's Instructions for Use accompany each package of Rhinocort Nasal Inhaler.

HOW SUPPLIED

Rhinocort Nasal Inhaler is supplied in a 7.2 g canister containing 200 metered doses provided with a metering valve and nasal adapter together with Patient's Instructions for Use. Each actuation delivers approximately 32 µg of [illegible] budesonide from the nasal adapter (0.14 [illegible]).

Caution: Federal (USA) law prohibits dispensing without prescription.

Rhinocort Nasal Inhaler should be stored between 15°C (59°F) and 30°C (86°F) with the valve downwards. Shake well before use.

Each inhaler with actuator is packaged in an aluminium foil pouch to protect the product from moisture. After opening the aluminium pouch, the product should be used within 6 months and storage in an area of high humidity should be avoided.

Contents under pressure. Do not puncture. Do not use or store near heat or open flame. Exposure to temperatures above 50°C (120°F) may cause the canister to explode. Never throw in incinerator. Do not [illegible] keep out of reach of children.

Risks: The [illegible] statement below is required by the Federal government's Clean Air Act for all products containing or manufactured with chlorofluorocarbons (CFCs):

WARNING: Contains [illegible] dichlorotetrafluoroethane, and dichlorodifluoromethane, substances which harm public health and environment by destroying ozone in the upper atmosphere.

A notice similar to the above WARNING has been placed in the patient information leaflet of this product pursuant to EPA regulations.

Manufactured for:

ASTRA Astra USA, Inc. Westborough, MA 01581

[illegible]

DETACH HERE FOR PATIENT'S INSTRUCTIONS FOR USE

WARNING: Contains trichloromonofluoromethane, dichlorotetrafluoroethane, and dichlorodifluoromethane, substances which harm the environment by destroying ozone in the upper atmosphere. Your physician has determined that this product is likely to help your personal health. USE THIS PRODUCT AS DIRECTED UNLESS INSTRUCTED TO DO OTHERWISE BY YOUR PHYSICIAN. If you have any questions about alternatives, consult with your physician.

N.B.

Follow your doctor's directions and do not use Rhinocort Nasal Inhaler more often than prescribed. Contact your doctor if you find the effect strongly reduced.

Rhinocort Nasal Inhaler does not give immediate relief. Generally it will take a few days to achieve full effect. It is therefore very important that Rhinocort is used regularly.

To be used within 6 months after the aluminium pouch has been opened. After opening the pouch, avoid storage in areas of high humidity.

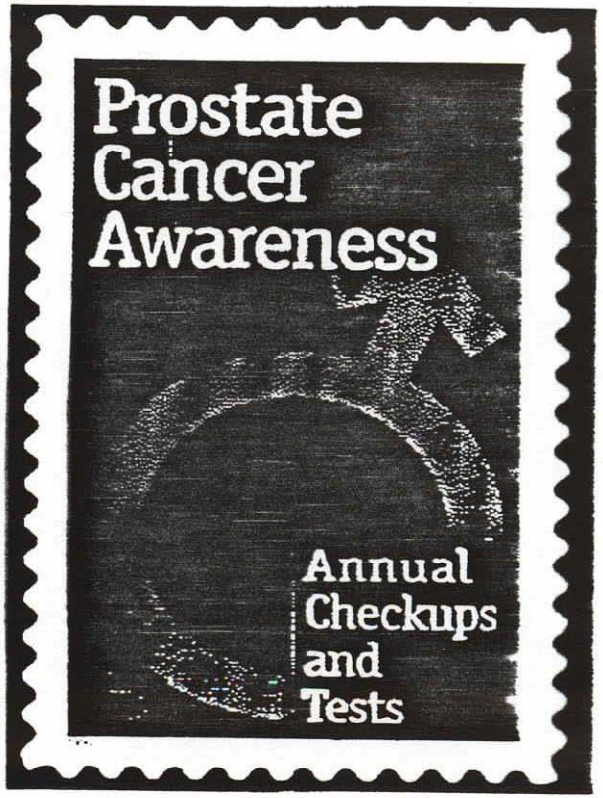
Cleaning: Remove the aerosol container and wash the plastic parts regularly in warm—not hot—water with addition of mild detergent if necessary. Allow the plastic parts to dry completely and then replace the container.

Contents under pressure. Do not puncture or throw container into incinerator. Using or storing near open flame or heating above 120°F (50°C) may cause container to burst.

Manufactured for: Astra USA, Inc., Westborough, MA 01581

[illegible] (1/95)


FUND THE FIGHT
FIND A CURE
USA


Prostate
Cancer
Awareness
Annual
Checkups
and
Tests

Empirical research is needed because we can’t trust our intuitions

Empirical research is needed because we can't trust our intuitions

common knowledge effect
false consensus effect
fundamental attribution error
self-serving biases
myths (panic, adolescents' unique sense of invulnerability, …)
poor feedback (absent, distorted, delayed)
…

A pan-theoretic approach is needed because basic research is indeterminate in applied settings.

Basic research is indeterminate

Decision making follows simple principles.

Basic research is indeterminate

Decision making follows simple principles.

However,

- the set of principles is large,
- the contextual triggers are subtle, and
- the interactions are complex

As a result, decision-specific research is needed.

Some Principles of Judgment

People are good at tracking what they see, but not at detecting sample bias.

People have limited ability to evaluate the extent of their own knowledge.

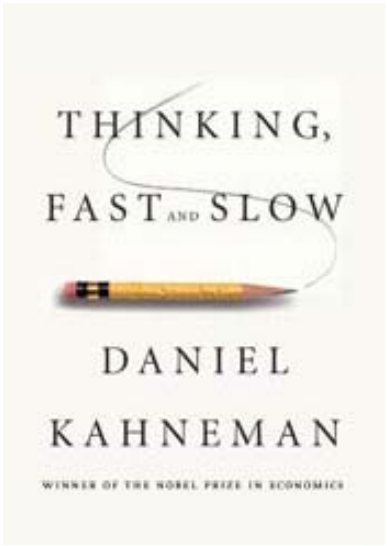
People have difficulty imagining themselves in other visceral states.

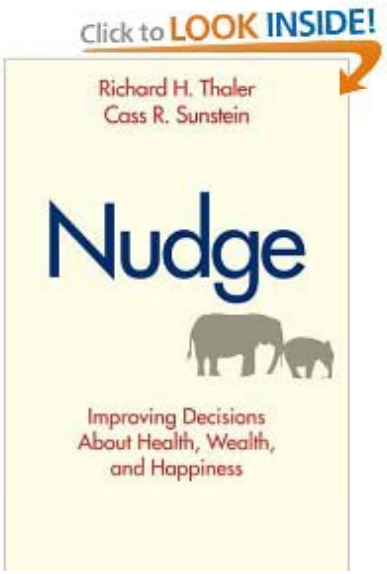
People have difficulty projecting non-linear trends.

People confuse ignorance and stupidity.

Some Principles of Choice

People dislike uncertainty,
but can live with it.
People consider the return on their
investment in making decisions.
People are insensitive to opportunity costs.
People are prisoners to sunk costs,
hating to recognize losses.
People may not know what they want,
especially with novel questions.


THINKING,
FAST AND SLOW
DANIEL
KAHNEMAN
WINNER OF THE NOBEL PRIZE IN ECONOMICS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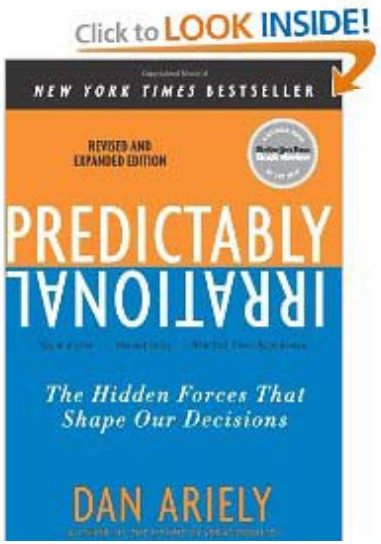
Richard H. Thaler
Cass R. Sunstein
Nudge
Improving Decisions
About Health, Wealth,
and Happiness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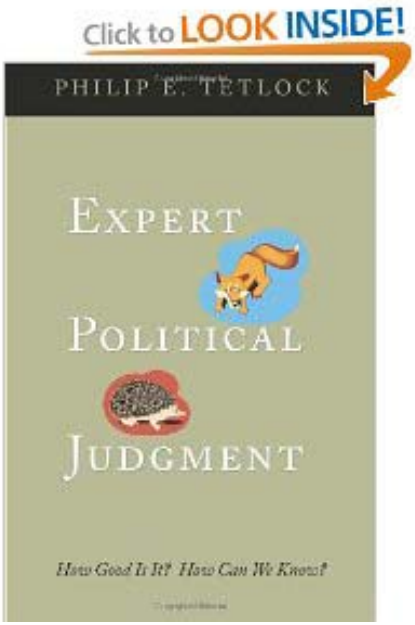
NEW YORK TIMES BESTSELLER
REVISED AND
EXPANDED EDITION
PREDICTABLY
IRRATIONAL
The Hidden Forces That
Shape Our Decisions
DAN ARIELY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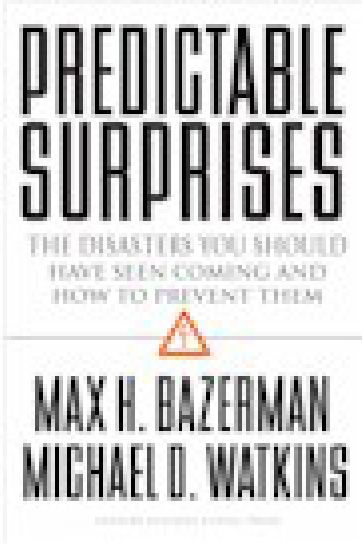
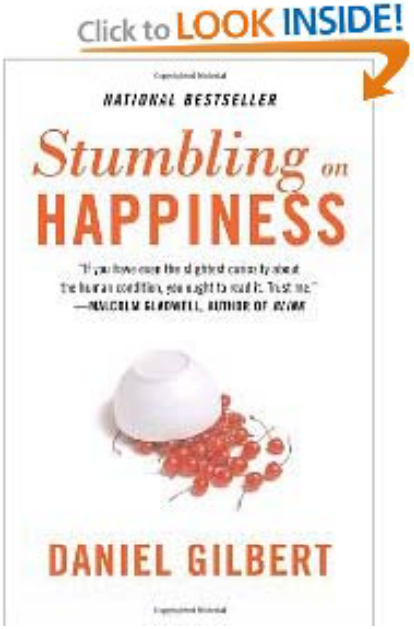
PHILIP E. TETLOCK
EXPERT
POLITICAL
JUDGMENT
How Good Is It? How Can We Know?


PREDICTABLE
SURPRISES
THE DISASTERS YOU SHOULD
HAVE SEEN COMING AND
HOW TO PREVENT THEM
MAX H. BAZERMAN
MICHAEL D. WATKINS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NATIONAL BESTSELLER
Stumbling on
HAPPINESS
DANIEL GILBERT

Design Principle 3: Treat the science as a strategic activity.

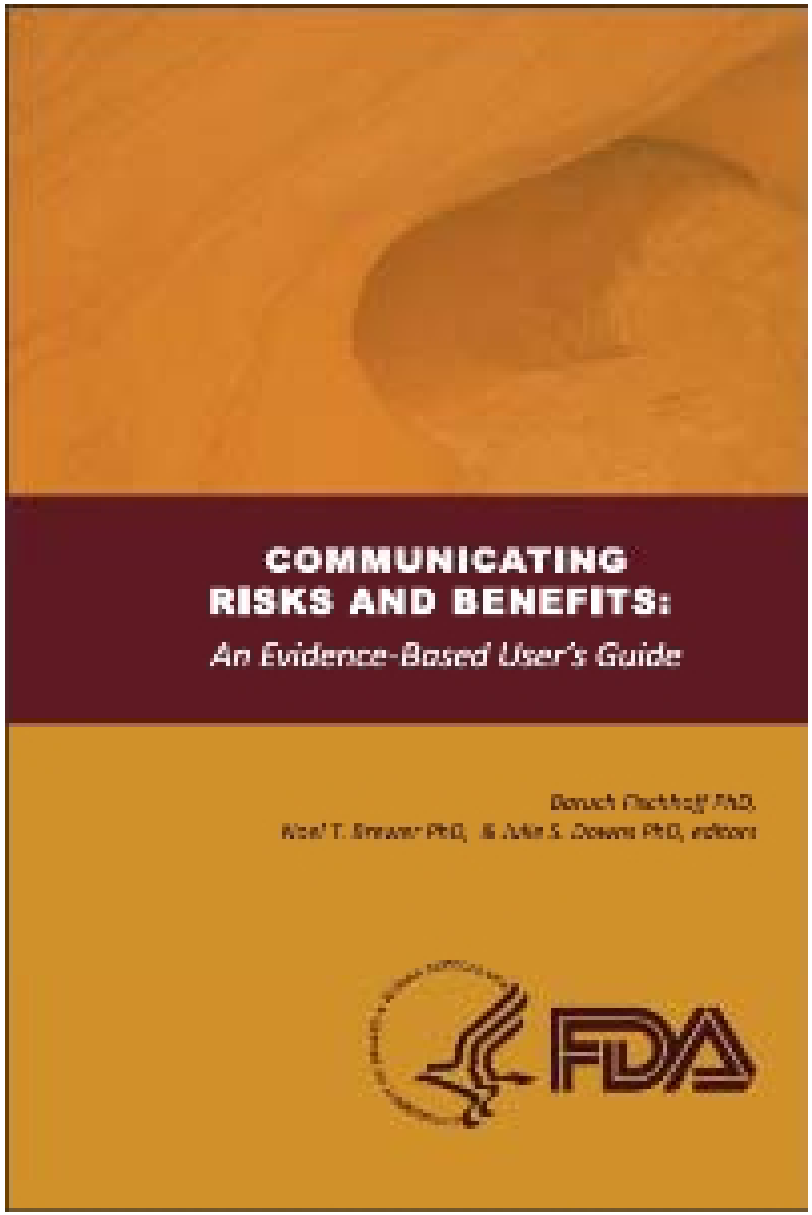
FDA'S
STRATEGIC PLAN
FOR
RISK COMMUNICATION

Fall, 2009

Communication Recommendations for Emerging Events

Have a consistent policy in all domains
Provide useful, timely information
Address: risks and benefits, uncertainty, personal actions, FDA actions
Audience needs should drive agency analyses
Use standard formats; evaluate routinely
Consider needs of diverse populations

http://www.fda.gov/oc/advisory/OCRCACACpg.html



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

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Arthur M. Sackler Colloquium on

THE SCIENCE OF SCIENCE COMMUNICATION

May 21–22, 2012
at the newly restored
National Academy of Sciences building
2101 Constitution Avenue, NW
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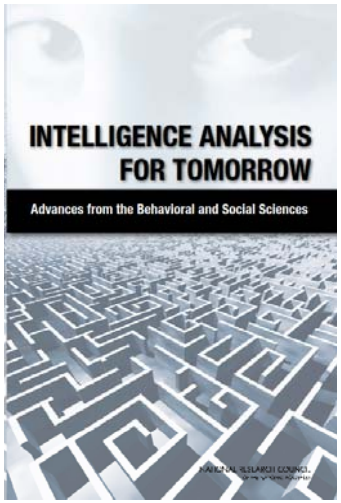
HEALTHNEWSREVIEW.ORG

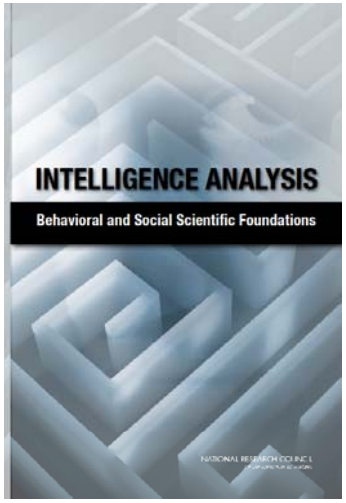
INDEPENDENT EXPERT REVIEWS OF NEWS STORIES

+ What's the total cost?
+ How often do benefits occur?
+ How often do harms occur?
+ How strong is the evidence?
+ Is this condition exaggerated?
+ Are there alternative options?
+ Is this really a new approach?
+ Is it available to me?
+ Who's promoting this?
+ Do they have a conflict of interest?

Decision Science in Intelligence Analysis



Analysis, Recommendations, & Immediate Actions (100 pages)



Introduction to Methods and Evidentiary Base (350 pages)

Intelligence Analysis for Tomorrow (Consensus Report): http://www.nap.edu/catalog.php?record_id=13040
Intelligence Analysis: Behavioral and Social Scientific Foundations (Collection of Readings):http://www.nap.edu/catalog.php?record_id=13062

Define events clearly and consistently

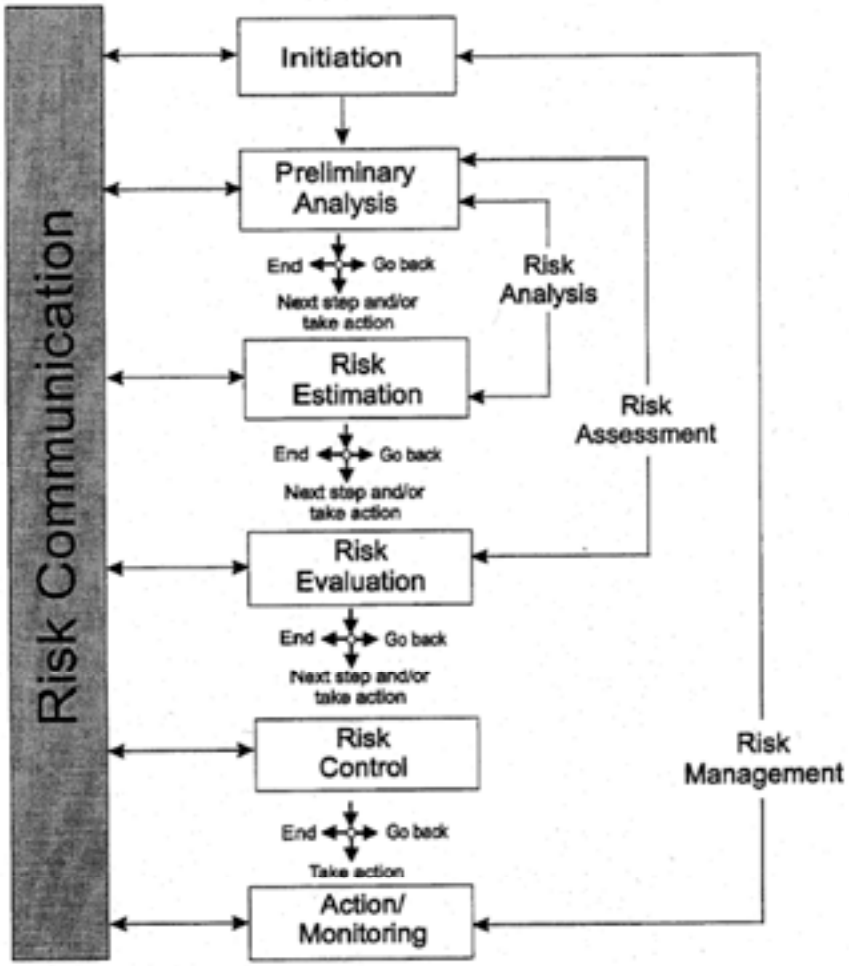
Misinterpretations of Precipitation Probability Forecasts

Allan H. Murphy [1], Sarah Lichtenstein [2], Baruch Fischhoff [2], and Robert L. Winkler [3]

Bulletin of the American Meteorological Society. 1980, 61, 696-701.

Three Design Principles

Treat public involvement as a scientific activity.
Adopt an analytical, empirical, pan-theoretic approach to that science.
Treat that science as a strategic activity.



Note: *Risk communication with stakeholders is an important part of each step in the decision process.*

Figure 2
Steps in the Q850 Risk Management Decision-Making Process — Simple Model

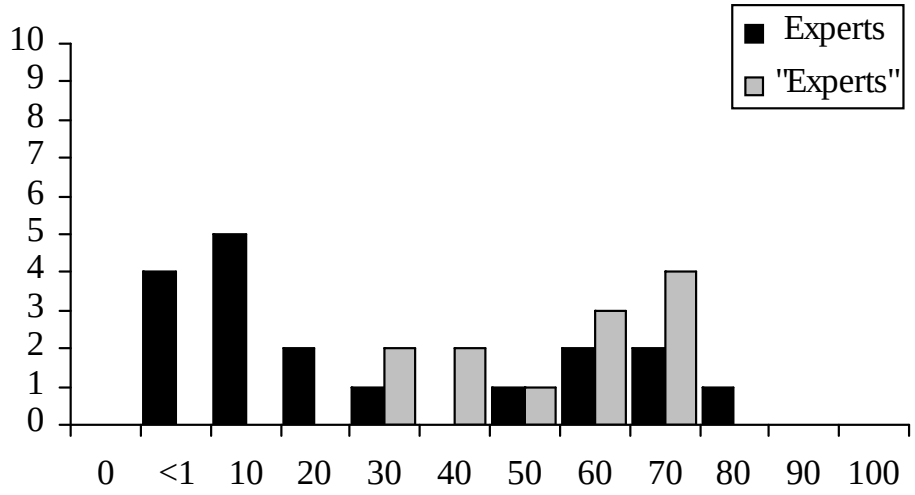
Use numbers to guide perceptions

Avian Flu Predictions

1. What is the probability that H5N1 will become an efficient human-to-human transmitter (capable of being propagated through at least two epidemiological generations of affected humans) sometime during the next 3 years?

Overall
Median = 40 %
No idea = 6
Expert Median = 15 %
No idea = 1
"Expert" Median = 60 % *
No idea = 5

*** Mann-Whitney U, p < .05**



Bruine de Bruin, W., Fischhoff, B., Brilliant, L., & Caruso, D. (2006). Expert Judgments of pandemic influenza. *Global Public Health 1*(2), 178-193

Prescription Drug Facts: Lunesta (Eszopiclone)

What is this drug for?	To make it easier to fall or to stay asleep
Who might consider taking it?	Adults age 18 and older with insomnia for at least 1 month
Who should NOT take it?	People under age 18
Recommended testing	No blood tests, watch out for abnormal behavior
Other things to consider doing	Reducing caffeine (especially at night), exercise, regular bedtime, avoid daytime naps

LUNESTA Study Findings

788 healthy adults with insomnia for at least 1 month -- sleeping less than 6.5 hours per night and/or taking more than 30 minutes to fall asleep-- were given LUNESTA or a sugar pill nightly for 6 months. Here's what happened:

What difference did LUNESTA make?	**People given a sugar pill**	**People given LUNESTA (3 mg each night)**
Did LUNESTA help?		
LUNESTA users fell asleep faster (15 minutes faster)	45 minutes to fall asleep	30 minutes to fall asleep
LUNESTA users slept longer (37 minutes longer)	5 hours 45 minutes	6 hours 22 minutes
Did LUNESTA have side effects?		
Life threatening side effects		
No difference between LUNESTA and a sugar pill	None observed	
Symptom side effects		
More had unpleasant taste in their mouth (additional 20% due to drug)	6% 6 in 100	26% 26 in 100
More had dizziness (additional 7% due to drug)	3% 3 in 100	10% 10 in 100
More had drowsiness (additional 6% due to drug)	3% 3 in 100	9% 9 in 100
More had dry mouth (additional 5% due to drug)	2% 2 in 100	7% 7 in 100
More had nausea (additional 5% due to drug)	6% 6 in 100	11% 11 in 100

How long has the drug been in use?

Lunesta was approved by FDA in 2005. As with all new drugs we simply don't know how its safety record will hold up over time. In general, if there are unforeseen, serious drug side effects, they emerge after the drug is on the market (when a large enough number of people have used the drug).

Words of Estimative Probability

Sherman Kent (1964)
https://www.cia.gov/library/center-for-the-study-of-intelligence/csi-publications/books-and-monographs/sherman-kent-and-the-board-of-national-estimates-collected-essays/6words.html (accessed 11/6/11)

National Intelligence Estimate

Prospects for Iraq's Stability: A Challenging Road Ahead

January 2007

Some Additional Sources

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http://www.hss.cmu.edu/departments/sds/src/faculty/fischhoff.php

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/