Climate Change: The Public Health Response

APHA Session 4077 Climate Change: A Challenge to Public Health 6 November, 2007

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Potential Health Effects of Climate Change

Climate change:

- Temperature rise
- Sea level rise
- Hydrologic extremes

Adapted from J. Patz

SEVERE WEATHER

HEAT

AIR POLLUTION

ALLERGIES

VECTOR-BORNE DISEASES

WATER-BORNE DISEASES

WATER AND FOOD SUPPLY

MENTAL HEALTH

ENVIRONMENTAL REFUGEES Heat stress, cardiovascular failure

- Injuries, fatalities
- Asthma, cardiovascular disease
- Resp allergies, poison ivy

Malaria, dengue, hantavirus, encephalitis, Rift Valley fever

- Cholera, cryptosporidiosis, campylobacter, leptospirosis
- Alnutrition, diarrhea, harmful algal blooms
 - Anxiety, post-traumatic stress, depression, despair
 - Forced migration, civil conflict

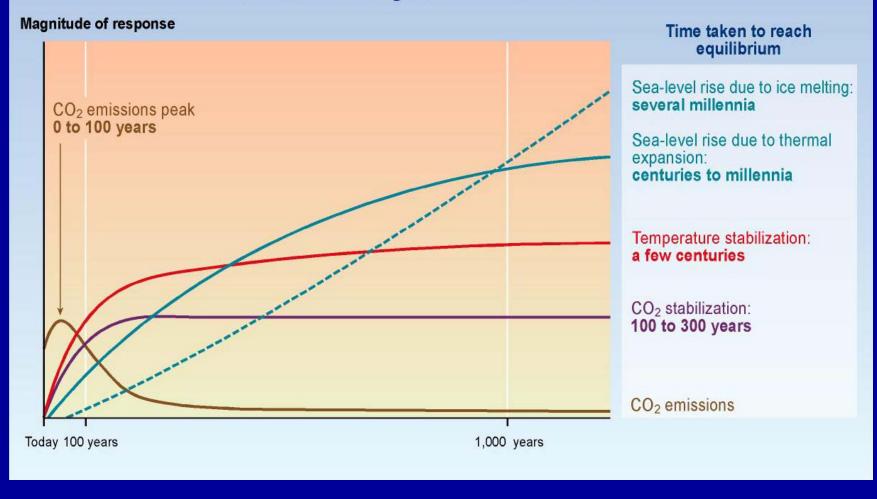
Looking over the horizon



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The climate change commitment

CO₂ concentration, temperature, and sea level continue to rise long after emissions are reduced



Source: IPCC

Intergenerational responsibility Stewardship

Evangelical Climate Initiative

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Statement FAQ Action Resources Press

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"For by Him (Christ) all things were created: things in heaven and on earth." (Col. 1:16)

The same love for God and neighbor that compels us to preach salvation through Jesus Christ, protect the unborn, preserve the family and the sanctity of marriage, and take the whole Gospel to a hurting world, also compels us to recognize that human-induced climate change is a serious Christian issue requiring action now.

To make clear our views and commitment, as evangelical leaders we have issued the statement *Climate Change: An Evangelical Call to Action*. We invite



A Christian environmental quarterly from the Evangelical Environmental Network



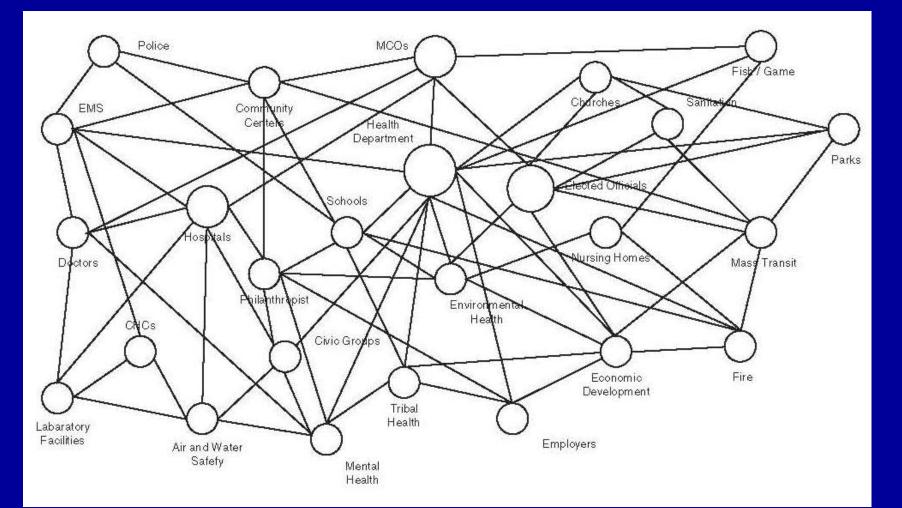
Renewing the Future

Renaveable ar orge: REAL SOLUTIONSTO CLIMATE CHANGE Earth's atmosphere: CREATION CAPITAL ON LOAN FROM GOD 'You Found Our Trail... DIDNTYN

Care for the individue Care for th patie Care for comr future THE CLINICAL THE RUB denerations **APPROACH** HEAL APPROACH

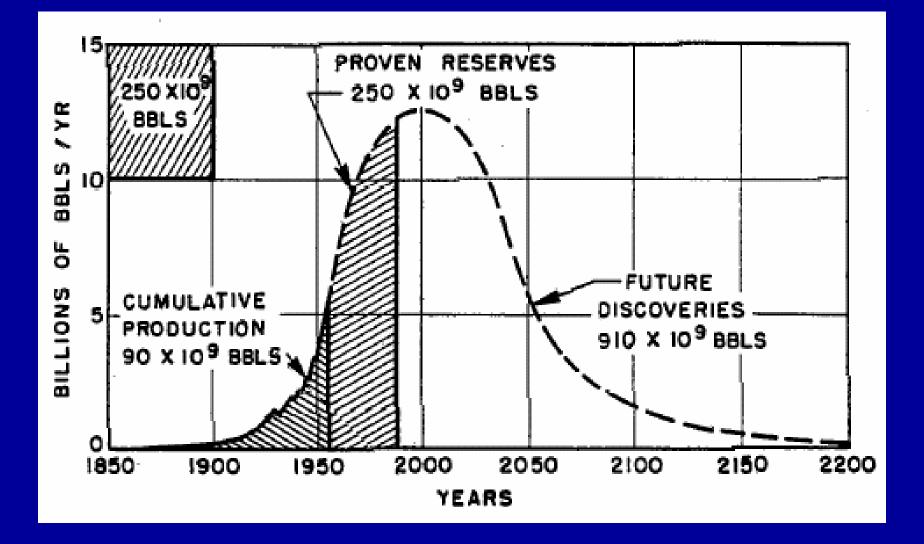
THE LEGACY APPROACH

Systems thinking



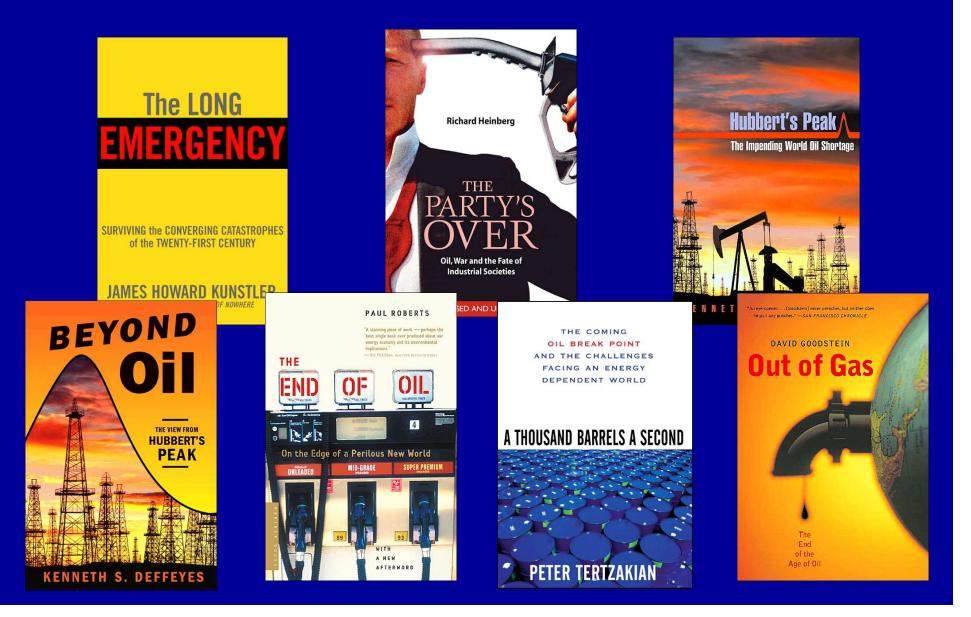
Reality (simplified)

"Hubbert's peak"



Source: Hubbert, 1956

Peak petroleum



Peak petroleum and public health

- Medical supplies and equipment
 - Medications
 - Supplies
- Transportation
 - Health services
 - e.g. ambulances
 - Workforce transportation
- Energy
- Food

Peak Petroleum and Public Health

Howard Frumkin, MD, DrPH Jeremy Hess, MD, MPH Stephen Vindigni, MPH

COMMENTARY

ETROLEUM IS A UNIQUE ENERGY SOURCE; IT IS ENERGY-dense, relatively stable, portable, and abundant. Since large-scale production began about 150 years ago, petroleum has become central to modern life. It is the precursor of nearly all transportation fuel, the source of hosting oil, propane, and other fuels, and the starting point for chemical-building blocks such as ethylene, propylene, and sylene, which become polymers, resins, and other compounds, which in turn form products as diverse as plastics. olvents, textiles, lubricants, pesticides, and medications Petroleum is also a finite resource. Because it formed over millions of years and is being used faster than it is being formed, petroleum is nonrenewable on any human time scale. supply will at some point fall short of demand. The point at which petroleum production reaches its maximum is known as peak petroleum. Thereafter, perhaps following a plateau of a year or more, production in evitably declines. The concept of peak petroleum was introduced by petroleum geologist Hubbert in the mid-1950s.1 Hubbert hypoth-

esized that if total supplies and production rates are known (or assumed), the date of peak production can be predicted. He correctly forecast peak petroleum production in the con-tiguous 48 US states, which occurred in the early 1970s. A global Hubbert peak is inevitable, but its timing has been the subject of debate. Hubbert predicted the peak would occur between 1996 and 2006.1 Most current estimates place the peak before 2030 (many before 2010), and some authorities believe that it is occurring now.² The varied estinates reflect scientific uncertainty in measuring petroleum reserves, lack of standard protocols for reporting, and incentives for governments and private firms not to report their reserves accurately.²⁴ Advances in petroleum extraction technologies, such as high-pressure steam extraction, and techniques that allow production from unconventional sources such as tar sands and oil shale, have in creased recoverable reserves, modestly delaying the peak. Nevertheless, the peak is not far off.

The years following peak petroleum will be challenging. Demand for petroleum will increase thanks to population growth, rising demand in wealthy nations, and growing pros-

1688 JAMA, October 10, 2007-Vol 298, No. 14 (Reprinted)

perity in developing nations, even as the petroleum supply falls. Prices of petroleum products will be volatile, rising in the long run, but dropping from time to time when high prices cause destruction of demand. Alternative sources such as tar sands, the production of which releases large amounts of carbon dioxide (a potent greenhouse gas), will be disfa-vored, given the threat of global climate change. Geopolitical instability in petroleum-producing regions could threaten the supply of petroleum, causing sudden interruptions in supply and aggravating long-term scarcity. In a society that depends heavily on automobile travel, petroleum scarcity could be profoundly unsettling.

An extensive literature, ranging from the apocalyptic to the reassuring, has explored various scenarios and offered wide-ranging solutions. 34 However, little of this literature addresses the implications of peak petroleum for health

Petroleum, Public Health, and Health Care

Petroleum scarcity will affect the health system in at least 4 ways: through effects on medical supplies and equipment sportation, energy generation, and food produ

Medical Supplies and Equipment. Many pharmaceuti cals, from aspirin to antibiotics to antineoplastics, are made from petroleum derivatives. However, most can be synthesized through alternate chemical pathways. This may increase production costs, but because production cost is a small part of the market price of most medications, final prices are unlikely to be substantially affected. However, changes in synthetic pathways require Food and Drug Administra-tion approval, which could be time-consuming.

Many medical supplies contain plastics derived from pe-roleum such as bandages and prosthetic devices, syringes and tubing, oxygen masks and meculums, radiological dyes and hearing aids." Accordingly, petroleum scarcity will re sult in rising prices and, in case of abrupt interruptions of supply, possible shortages of some supplies. During the 1973 oil crisis, plastic syringe manufacturers reported shortfalls in benzene and ethylene feedstocks, increased prices, and

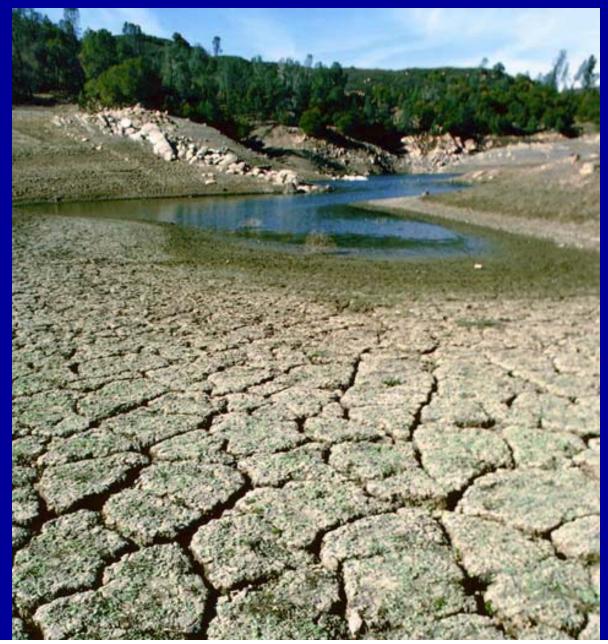
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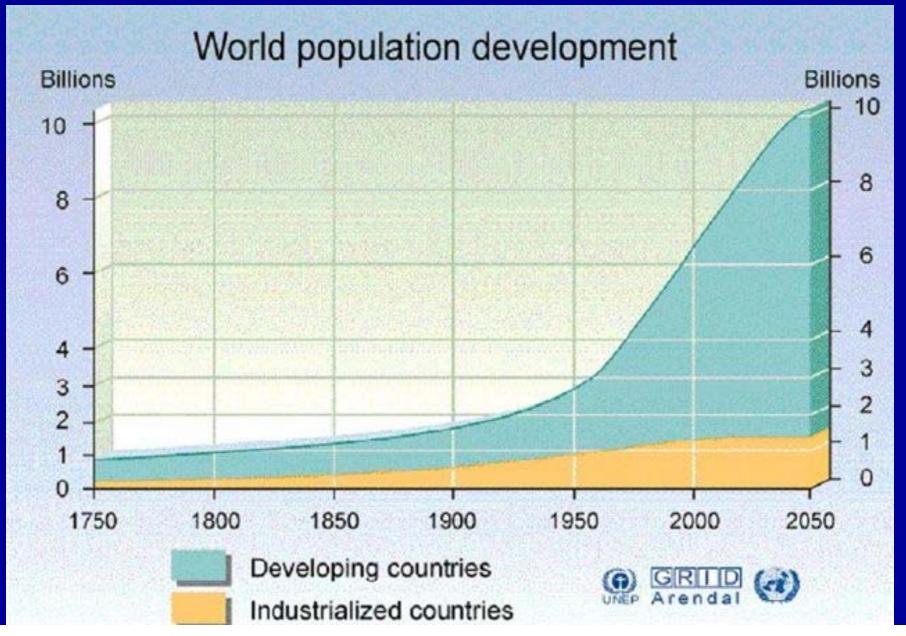




Limits on water



Population growth

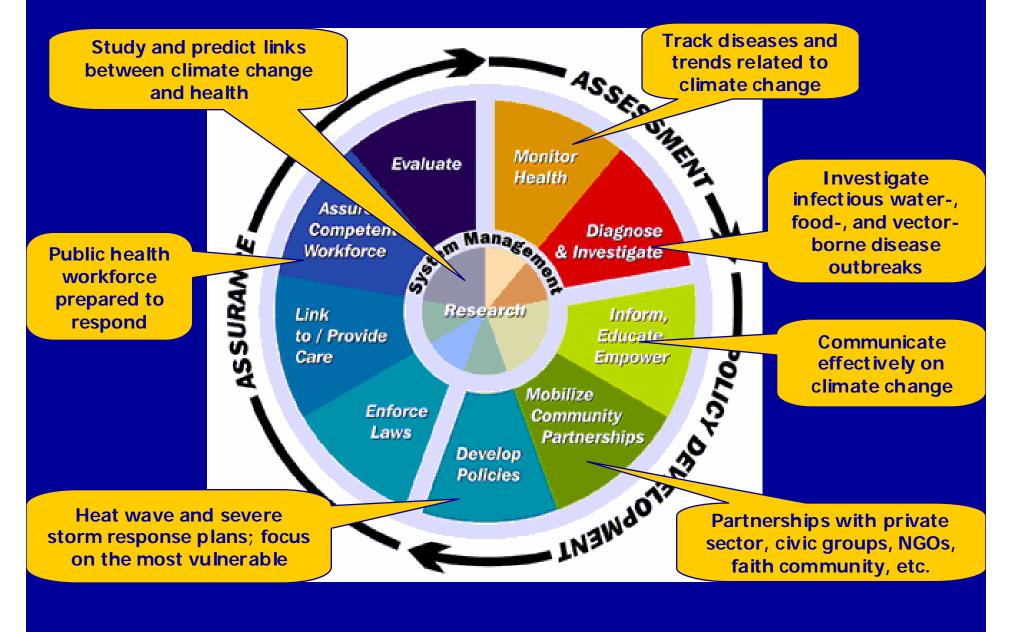


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Public health frameworks

- Prevention
- Preparedness
- Acting the face of uncertainty
- Risk management
- Co-benefits
- Economics
- Ethics

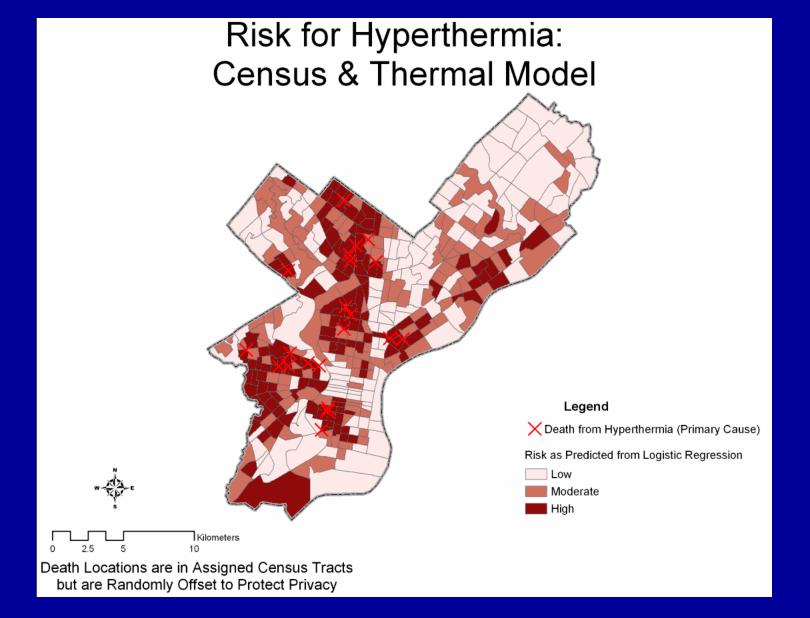
Public Health Action on Climate Change



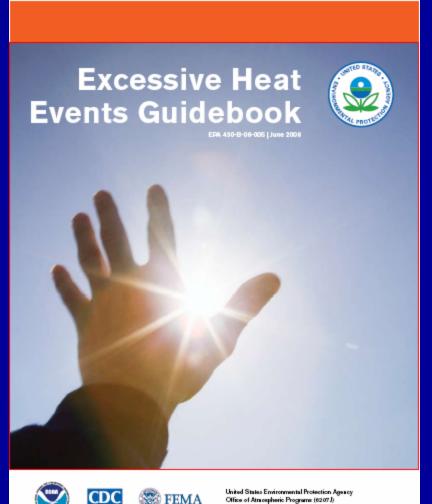
Public Health Action on Climate Change

- Predicting threats to public health
- Acting to protect public health
- Communicating effectively
- Promoting co-benefits
- Mobilizing partnerships

Vulnerability analysis



Planning and acting to protect public health



MA Office of Arnoophenic Programs (2207.) 1200 Pennsylvania Avenue NW, Washington, DC 20460

Green health care



Best Practices for Creating High Performance Healing Environments™

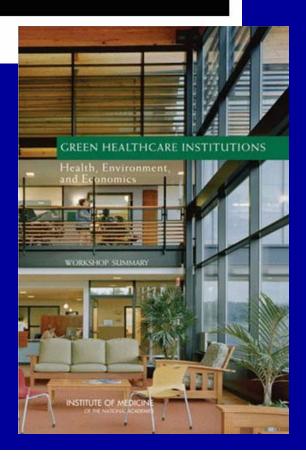




Green Building Priorities for Healthcare

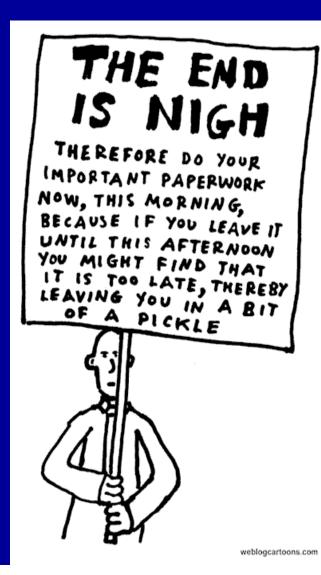
Health care institutions' core mission of protecting human health provides the basis for them to speak with their words and actions on the health implications of building construction and operation. The healthcare industry has a leadership opportunity to move the larger building industry toward a healthier approach by demonstrating the best in healthy, sustainable design, construction, operations and maintenance practices in its own buildings.

Whole system look to maximize impact: The optimal approach to green design involves a whole system look at the facility, incorporating all aspects of design and all disciplines working



Communicating effectively

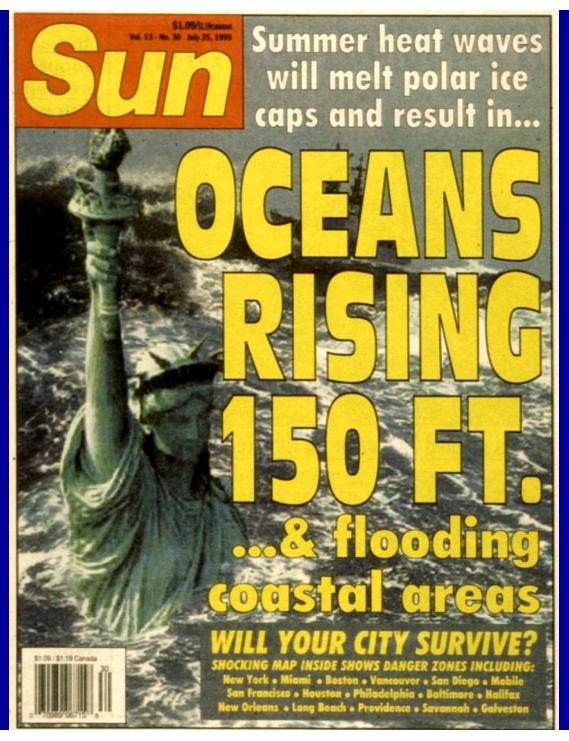








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Climate change and human health: Challenges to our thinking

- Bad news, apocalyptic visions
- Highly technical and complex
- Beyond anyone's experience or imagination
- Terrifying to contemplate
- Resistance to behavioral changes
- Misinformation actively disseminated

When we don't communicate effectively...



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Despair

Anxiety

Edvard Munch does Climate Change

The Scream



washingtonpost.com

Climate Change Scenarios Scare, and Motivate, Kids

By <u>Darragh Johnson</u> Washington Post Staff Writer Monday, April 16, 2007; Page AD1

The boy has drawn, in his third-grade class, a global warming timeline that is his equivalent of the mushroom cloud.

"That's the Earth now," the 9-year-old says, pointing to a dark shape at the bottom. "And then," he says, tracing the progressively lighter stripes across the page, "it's just starting to fade away."



Last Updated: Tuesday November 14 2006 11:15 GMT ■ E-mail this to a friend ■ Printable version Climate change is kids' top fear



How we're damaging the environment is more of a worry to you than getting a girl or boyfriend, says a survey.

The results showed three quarters of 11 to 14-year-olds worry about climate change, compared to 41% who are worried about going out with someone.

And it looks like you lot aren't just all talk - 63% turn off the lights when you leave a room, 82% of you recycle, and 75% say we should recycle more.

The survey quizzed 1,554 kids on their views on the



"This past summer, I got deeply depressed about our planet—as if I didn't have enough problems of my own."



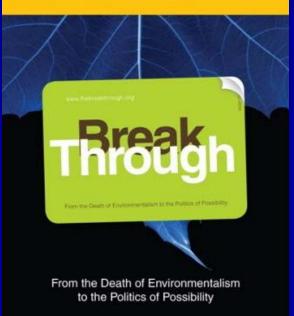
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Elements of Social Marketing

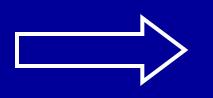
- Understanding the competition
- Understanding target markets
- Creating mutually beneficial exchanges
- Segmenting markets and targeting based on anticipated return

Maibach E. Recreating communities to support active living: A new role for social marketing. *Am J Health Promot* 2003;18:114-19.

Ted Nordhaus & Michael Shellenberger



"Think of the verbs associated with environmentalism and conservation: 'stop,' 'restrict,' 'reverse,' prevent,' 'regulate,' and 'constrain.' All of them direct our thinking to stopping the bad, not creating the good."



The need for positive, aspirational messages.

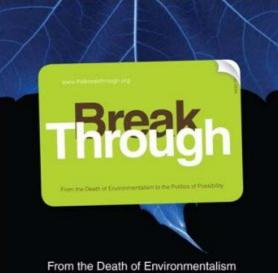


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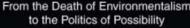


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Ted Nordhaus & Michael Shellenberger

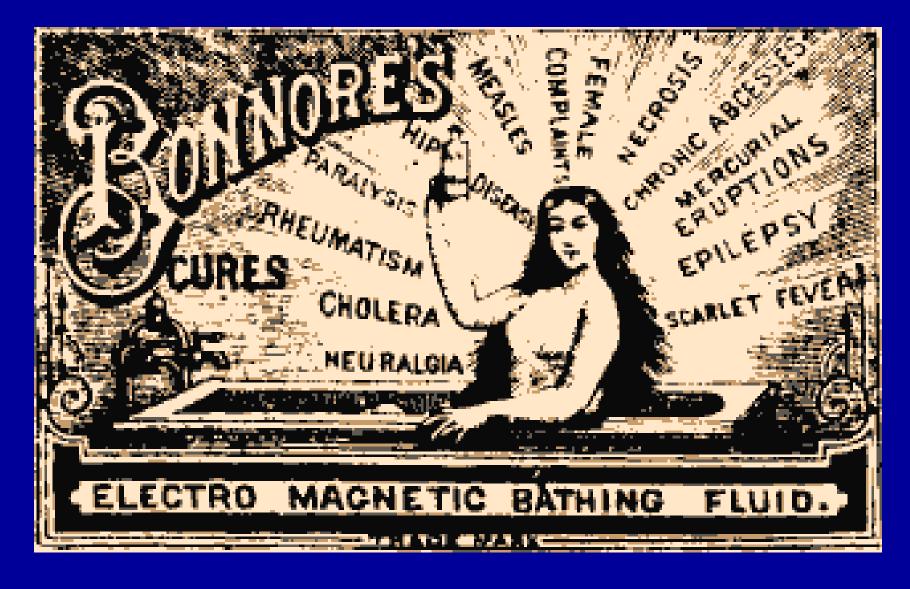


"The challenge of climate change is so massive, so global, and so complex that it can only be overcome if we look beyond the issue categories of the past and embrace a grand new vision for the future."





Promoting co-benefits

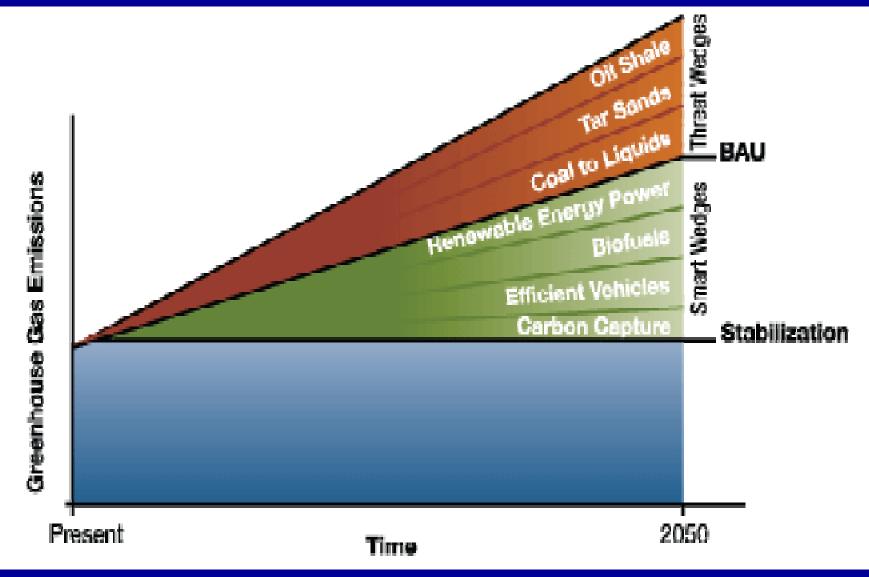


Climate Change Synergies

Heat wave plans including "buddy systems"	↑ social capital	
↓ Vehicular travel	↓ car crashes; clean air; ↑ physical activity	
↑ Fuel efficiency	↓ air pollution	
Locally grown food	Fresh food; ↓ pesticide exposure; local business	
Energy-efficient buildings	↓ operating costs	
Alternative energy sources	Business opportunities	

L Depression \downarrow CO₂ emissions ↓ Air pollution ↑ Physical activity ↓ Osteoporosis Injuries And by the way... ↑ Social capital Infrastructure costs CONTRACTOR AND A REPORT OF

Mitigation: Climate stabilization wedges



Pacala S, Socolow R. Stabilization wedges: Solving the climate problem for the next 50 years with current technologies. *Science* 2004:305;968-72

Health Impact Assessment

Health Impact Assessment Guidance

OXFORD

health impact assessment

JOHN KEMM JAYNE PARRY STEPHEN PALMER

A Handbook for Practitioners

Environment Impact Asses

Edited by Robert G. H. Turn

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Mobilizing partnerships

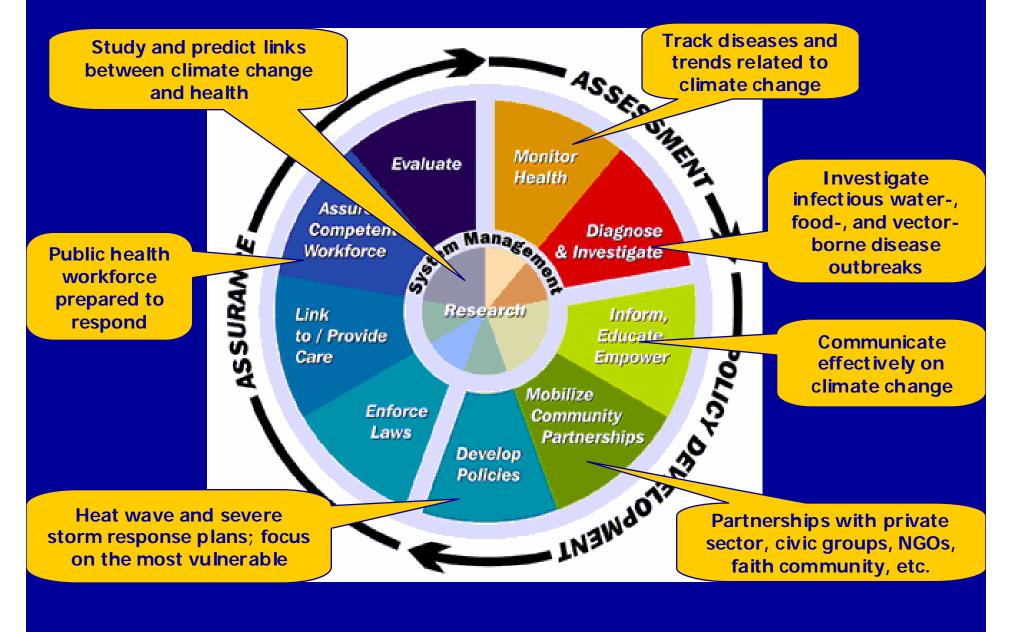
- Within government: Federal state local
- More broadly:
 - Energy
 - Transportation
 - Urban planning
 - Manufacturing
 - Architecture
 - Faith
 - Environmental



Public health thinking about climate change

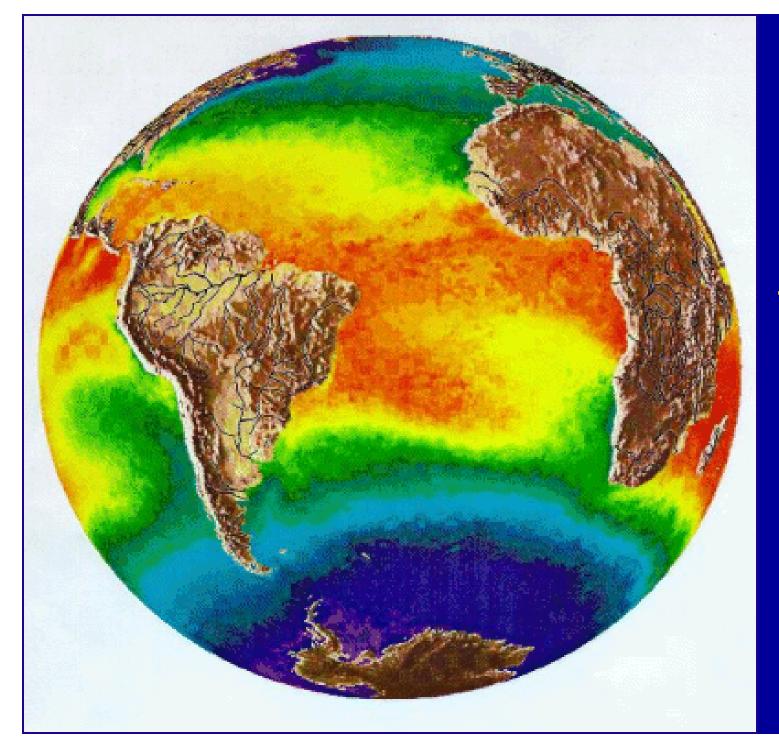
Thinking on a long time frameBroad systems thinking

Public Health Action on Climate Change



Public Health Action on Climate Change

- Predicting threats to public health
- Acting to protect public health
- Communicating effectively
- Promoting co-benefits
- Mobilizing partnerships



Thank you!