Climate Change and Environmental Health Research

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The NIEHS Mission

To reduce the burden of human illness and disability by understanding how the environment influences the development and progression of human disease.
“ENVIRONMENT” includes:

- Industrial chemicals
- Agricultural chemicals
- Physical agents (heat, radiation)
- By-products of combustion and industrial processes (dioxin)
- Foods and nutrients
- Prescription drugs
- Lifestyle choices and substance abuse
- Social and economic factors
Diseases with a known or suspected environmental component include:

- Cancers
- Birth defects
- Reproductive dysfunction
- Lung dysfunction
- Neurodevelopmental disorders
- Neurodegenerative diseases
Complexity – Why do certain people develop disease when challenged with environmental toxicants, while others remain healthy?

Environmental Toxicants

- Poor Nutrition
- Genetic Vulnerability
- Other Diseases

Adverse Health Outcome

- Obesity
- Development and Age
- Drugs
Complexity—
Tackling climate change and health becomes even more complex in light of other realities:

Global trends: globalization, urbanization, shifts in global burden of disease...

Special consideration of vulnerable groups

Warming expected to continue even if we stabilize GHG emissions today -- sense of urgency, and the unknown
Potential health effects of climate change

Direct and Indirect

Heat
Severe weather

Air pollution
Allergies
Vector-borne diseases
Water-borne diseases
Water and Food Supply
Mental Health
Environmental refugees….

(adapted from J. Patz)
The Fifth Horseman

“I believe that climate change will ride across this landscape as the fifth horseman. It will increase the power of the four horsemen that rule over war, famine, pestilence, and death – those ancient adversaries that have affected health and human progress since the beginning of recorded history.”

--Margaret Chan, MD, Director-General, WHO, at NIH, December 10, 2007
What we can do NOW --
Enhance public health systems
What we can do NOW

Enhance public health systems, including:

Preparedness for heat waves, natural disasters

Surveillance systems for infectious disease

Training of personnel
But....

Do we need more knowledge on climate change and its impact on human health?

If so, how should we begin to develop it? Do we know which questions to ask?
Potential areas of pursuit

Better predictive tools – globally, locally

Better understanding of the effects of increased temperature on air, water, soil conditions and related risk factors for illness and disease – ecosystem approaches, atmospheric chemistry, oceans

Genetics

Gender issues and climate change

Other areas

*** Impacts of mitigation strategies on human health
Alternative fuel strategies and human health - 1

- Energy policies changing to address climate change
- Transport fuel is significant part of the picture
- New strategies should take into account potential health impacts as part of the equation -- along with economic and other realities
Alternative transport fuel strategies and human health -2

Some questions:

• Biofuels: food vs. fuel; pesticide use and runoff related to fuel crops; combustion products and health (relevant also to biofuels as additive beyond 10%)

• “Green” gasoline – process to develop involves many solvents

• Batteries – disposal issues

Do we have the requisite knowledge base on human health impacts of alternative fuels?
Alternative transport fuel strategies and human health -3

Some hard lessons learned:

MTBE as additive

Gasoline and Ethanol in time of Henry Ford
Conclusions

Developing new knowledge requires new thinking, and new partnerships

• Bring health providers and researchers into discussions on climate change action plans along with energy, transport, economic interests

• Promote locally relevant health research on impacts of climate change

• Be forward thinking on possible health impacts of mitigation strategies!
Institute of Medicine Roundtable on Transport Fuel and Health, Nov. 2007 (www.iom.edu)

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Your Environment Is Your Health