

# Climate Change and Environmental Health Research

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# National Institute of Environmental Health Sciences



## 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:

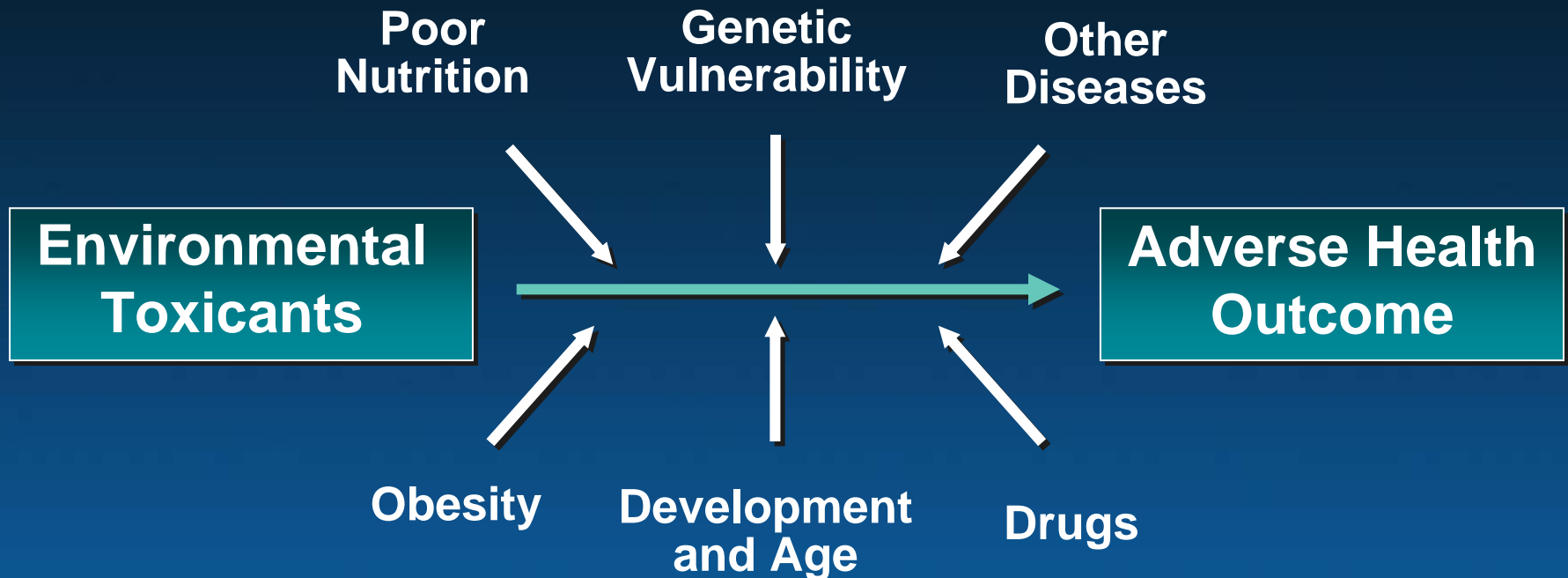
- Industrial chemicals
- Agricultural chemicals
- Physical agents  
(heat, radiation)
- By-products of combustion  
and industrial processes  
(dioxin)
- Foods and nutrients
- Prescription drugs
- Lifestyle choices and  
substance abuse
- Social and economic factors

## 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?



## **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 in to discussion 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!

NIEHS [www.niehs.nih.gov](http://www.niehs.nih.gov)

Institute of Medicine Roundtable on Transport Fuel and Health,  
Nov. 2007 ([www.iom.edu](http://www.iom.edu))

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