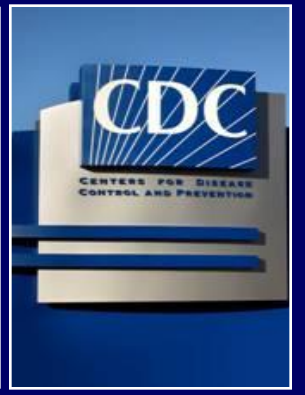
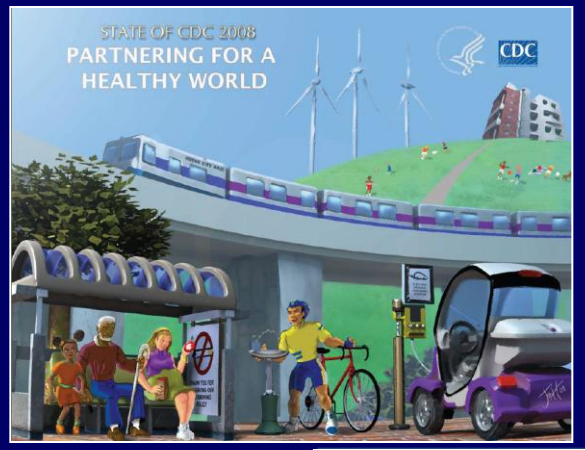
# The Centers for Disease Control and Prevention (CDC)

## *Partnering for a Healthy World*




**Judith R. Qualters, PhD**
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**National Center for Environmental Health**
**Centers for Disease Control and Prevention**
**September, 2009**

DEPARTMENT OF HEALTH & HUMAN SERVICES · USA

CDC Environmental Health

# Contributors

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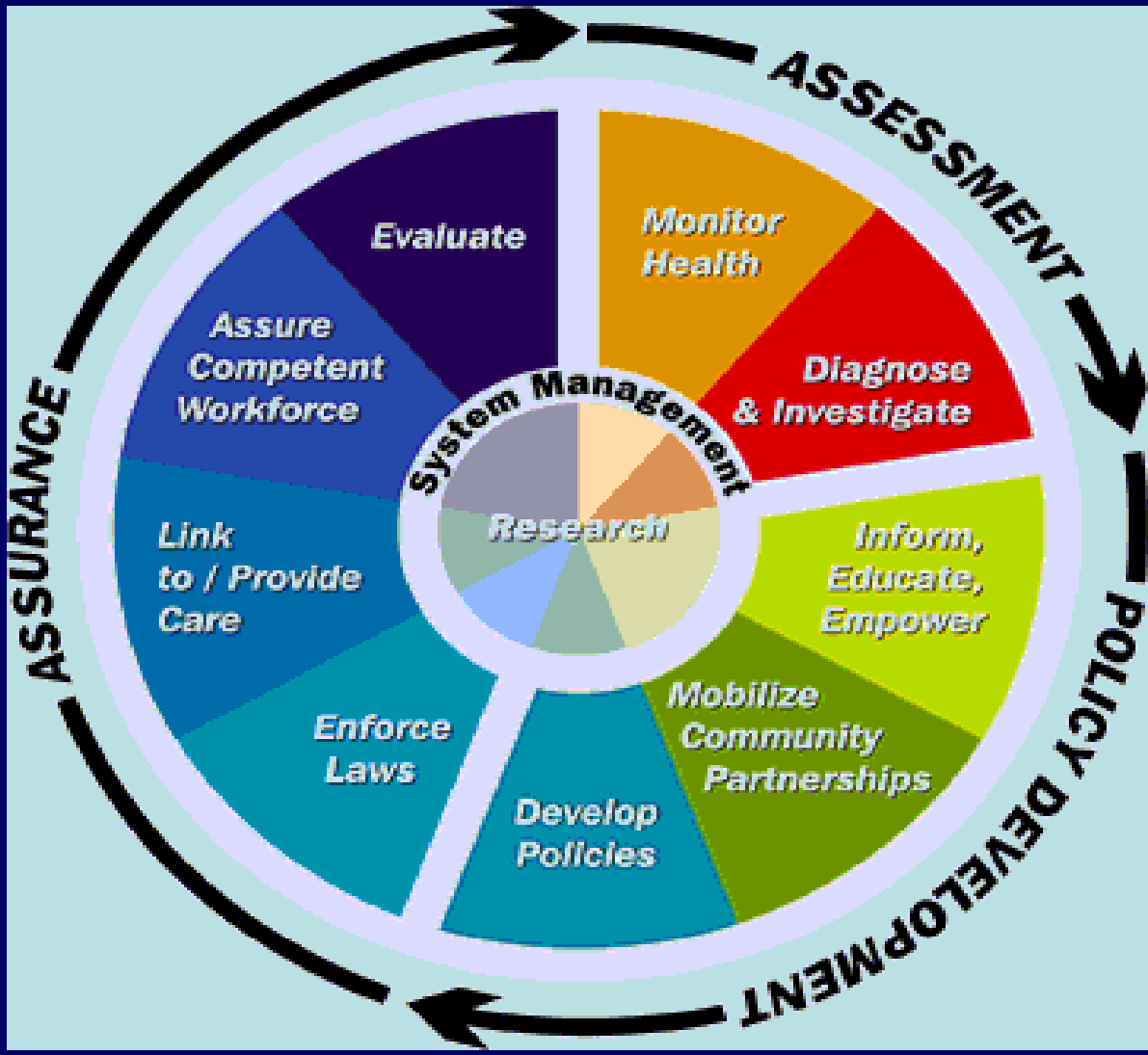
*The success or failure of any government in the final analysis must be measured by the well being of its citizens. Nothing can be more important to a state than its public health; the state's paramount concern should be the health of its people.*

Franklin Delano Roosevelt

# Three Core Functions of Public Health

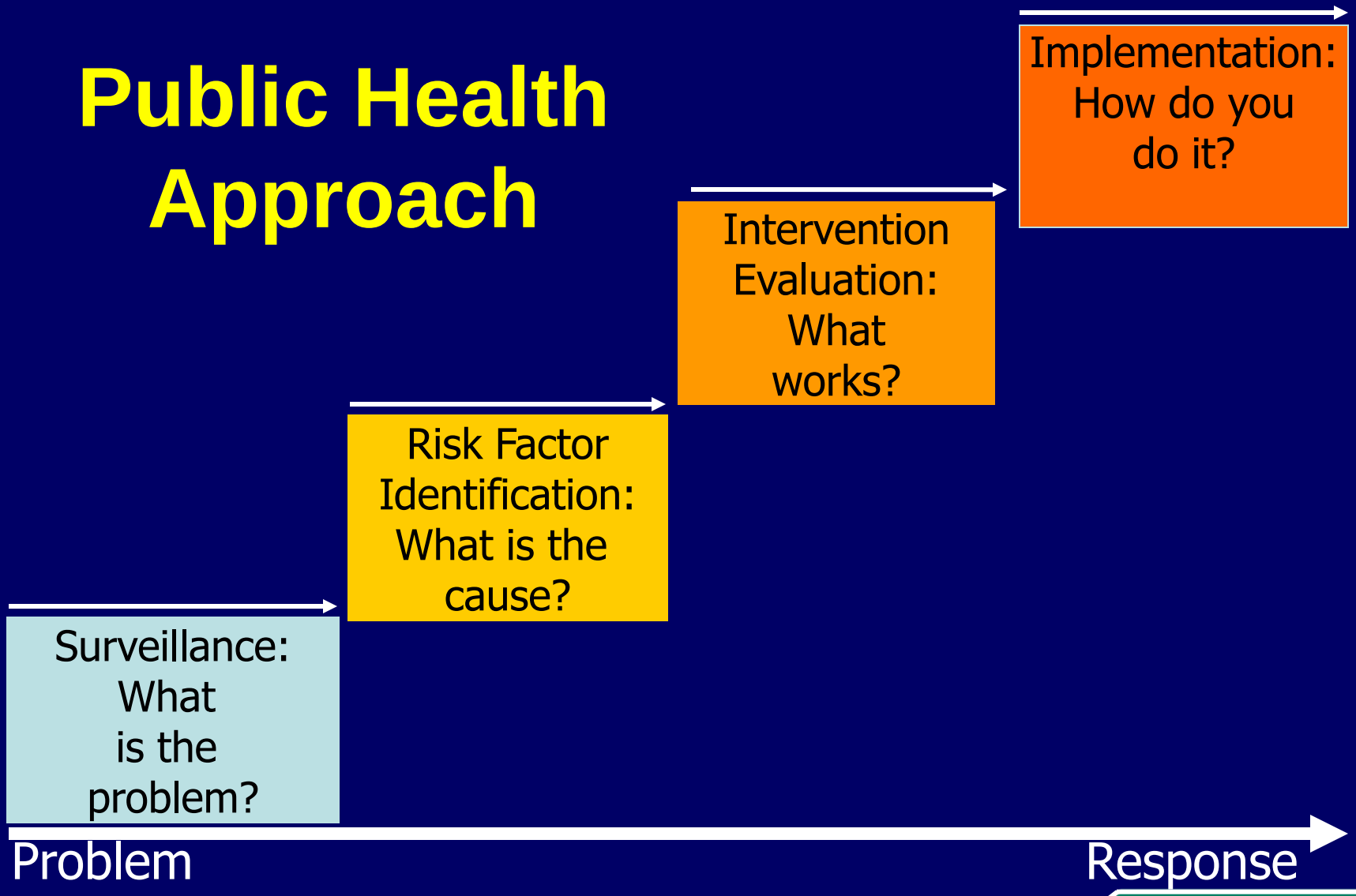
- Assessment
- Policy development
- Assurance

# 10 Essential Services of Public Health




Adopted: Fall 1994, Source: Public Health Functions Steering Committee, Members (July 1995):

# Public Health Approach



# CDC's Vision for the 21st Century: "*Health Protection…Health Equity*"

1946: malaria control


2009: Prevention & control of infectious and chronic diseases, injuries, workplace hazards, disabilities, and environmental health threats

# Goals

## Healthy People in Every Stage of Life

All people, and especially those at greater risk of health disparities, will achieve their optimal lifespan with the best possible quality of health in every stage of life.

## Healthy People in Healthy Places

The places where people live, work, learn, and play will protect and promote their health and safety, especially those people at greater risk of health disparities.

## People Prepared for Emerging Health Threats

People in all communities will be protected from infectious, occupational, environmental, and terrorist threats.

## Healthy People in a Healthy World

People around the world will live safer, healthier, and longer lives through health promotion, health protection, and health diplomacy.

# Healthy People in Health Places

- **Environmental Public Health**
  - The science and service that promote human health by creating healthy human environments and protecting people from disease and other health effects related to the environment

# EPH Concerns

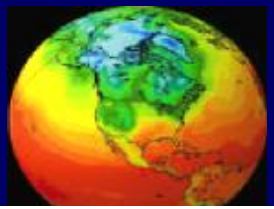
Safe Water

Safe Food

Healthy Communities

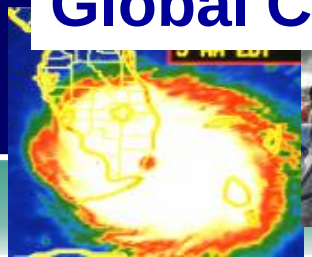
Healthy Homes

Safe Air

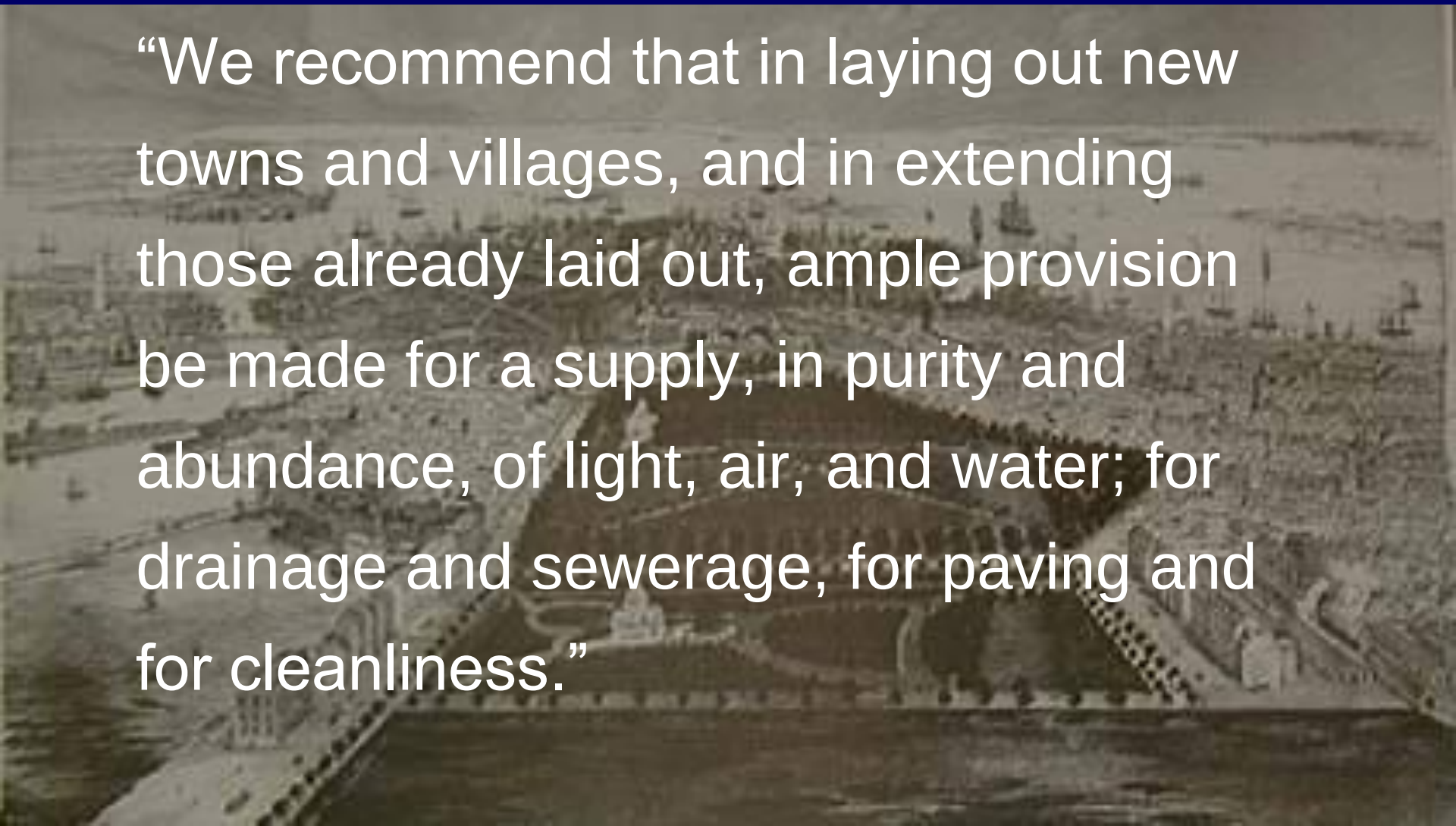


Global Climate Change

Proper Waste Management



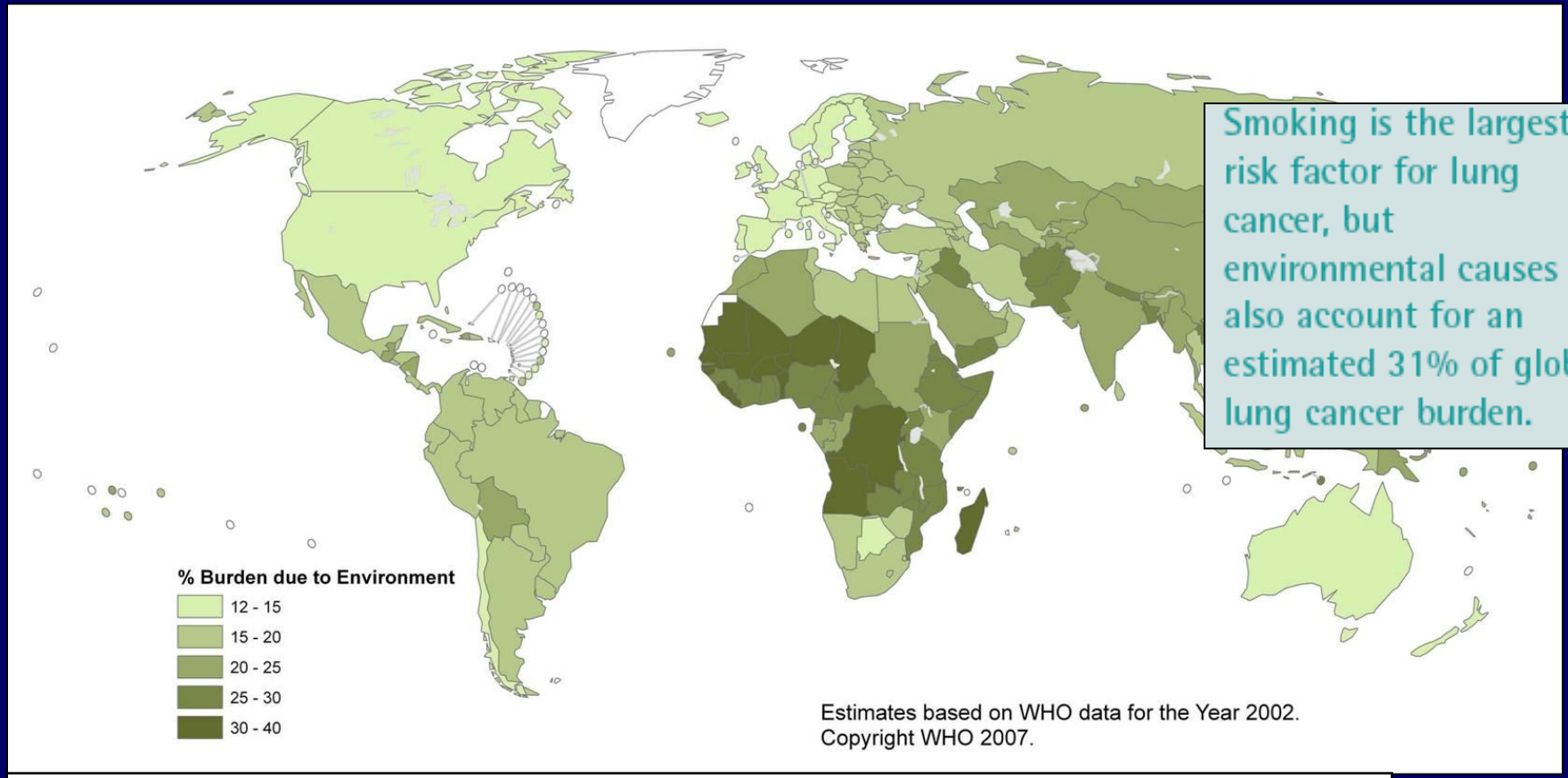
# Report of the Sanitary Commission of Massachusetts, 1850



"We recommend that in laying out new towns and villages, and in extending those already laid out, ample provision be made for a supply, in purity and abundance, of light, air, and water; for drainage and sewerage, for paving and for cleanliness."

# Percentage of the Total Disease Burden Attributable to the Environment

## *WHO, 2007*

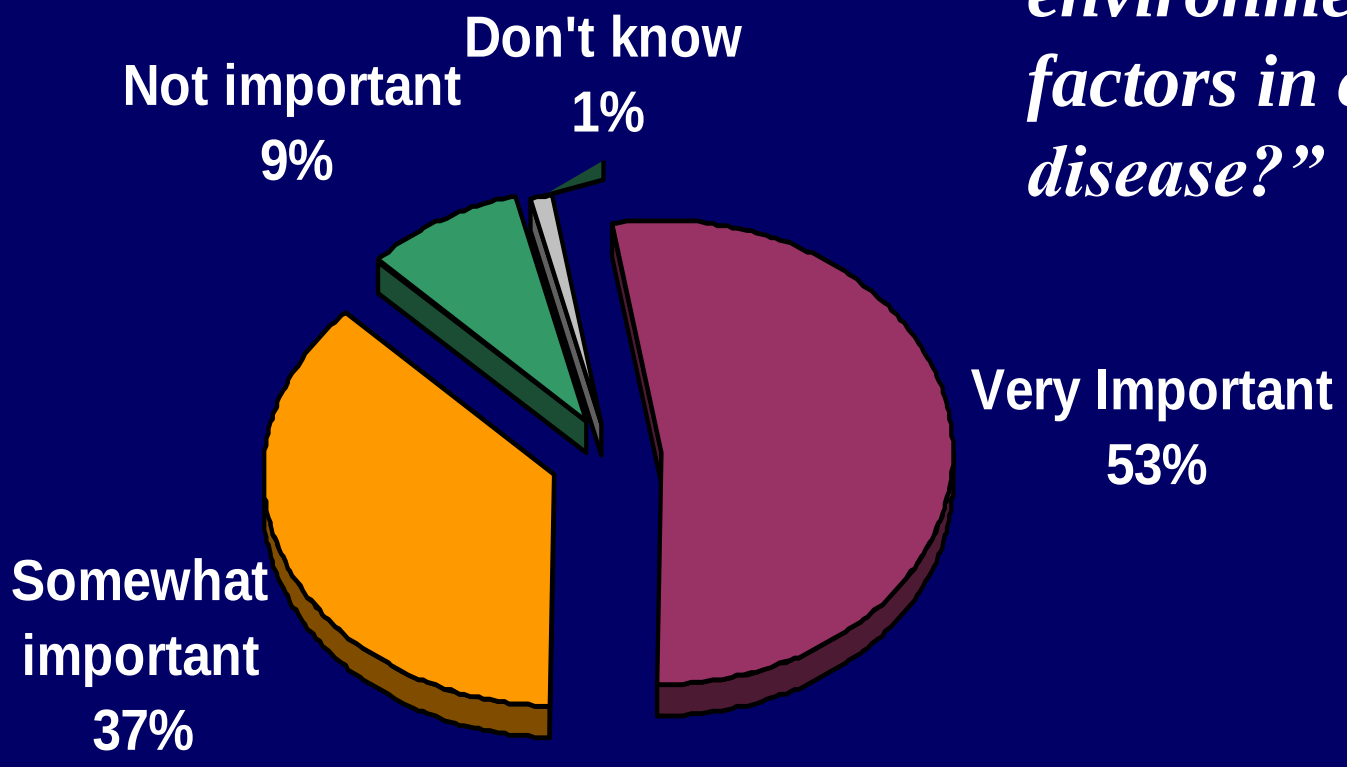



Smoking is the largest risk factor for lung cancer, but environmental causes also account for an estimated 31% of global lung cancer burden.

In developed countries, it was estimated that 16% (10–34%) of cancers in men (other than lung cancers), and 13% (10–23%) in women, were attributable to the environment. In developing countries, the

# Public Perceptions of Environmental Health Risks

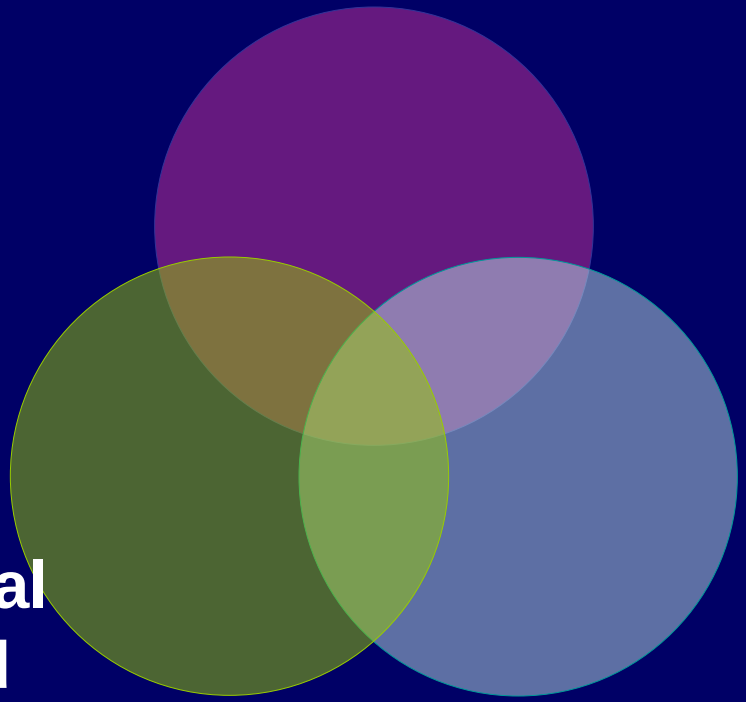
*"How important are environmental factors in causing disease?"*




Princeton Survey Research Associates, 2000; Margin of error: ±3%

# Understanding the Role of the Environment on Health

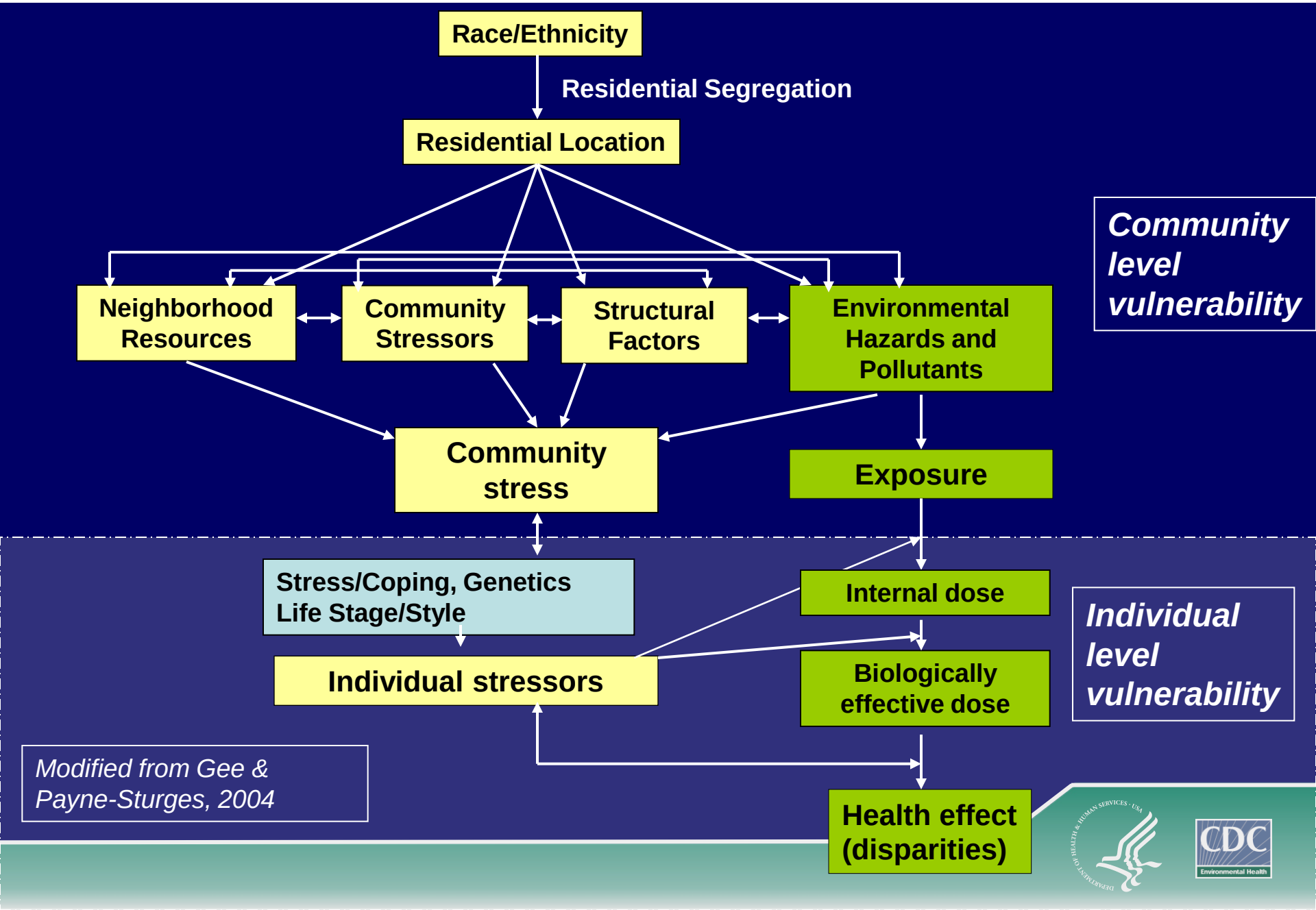
Genetics/Life stage



Environmental hazards and amenities

Behavior

# Exposure-Disease-Stress Framework for Environmental Health Disparities



# Memorandum of Understanding: CDC, ATSDR, and NASA

*Exploring Applications of Earth Science Research and Development for Environmental Public Health*

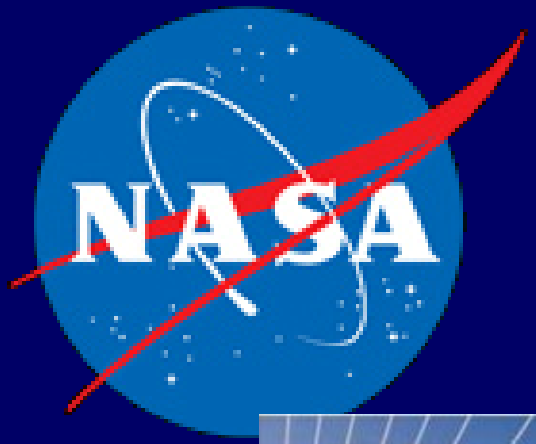
- Evaluate the use of NASA Earth system science, technology and data as potential solutions to characterizing high priority environmental hazards and other risk factors to be measured and tracked by CDC/ATSDR
- Verify, validate, and benchmark the potential solutions
- Identify education, training and communications needs
- Establish an interagency working group

# CDC/NASA Partnership in Environmental Health

- ***Damn it Jim, I'm a doctor not an engineer*** **– Dr. Leonard McCoy**

- ***Coming together is a beginning, staying together is progress, and working together is success*** **- Henry Ford**

# Outcomes



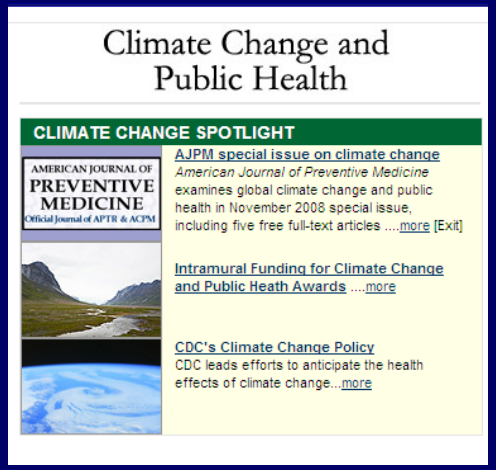

- Improved data
- Better tools and methods
- Available technical expertise/resources
- Increased workforce capacity

# In this meeting….

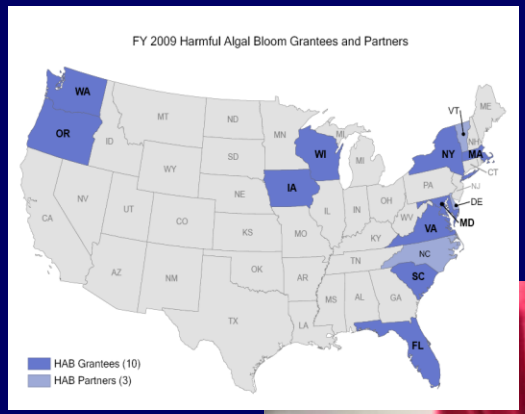
- Fine particulate matter exposure modeling and epidemiology
- Pollen and dust
- Land use
- Predicting heat mortality
- Monitoring and forecasting cyanobacterial blooms

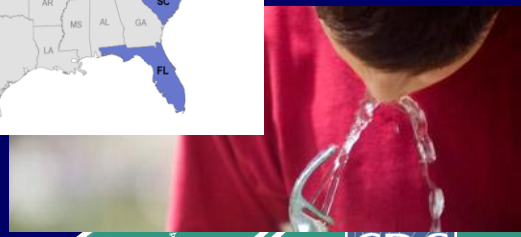
# Environmental Health Programs

NATIONAL
Environmental Public Health Tracking Program




HEALTHY COMMUNITY DESIGN

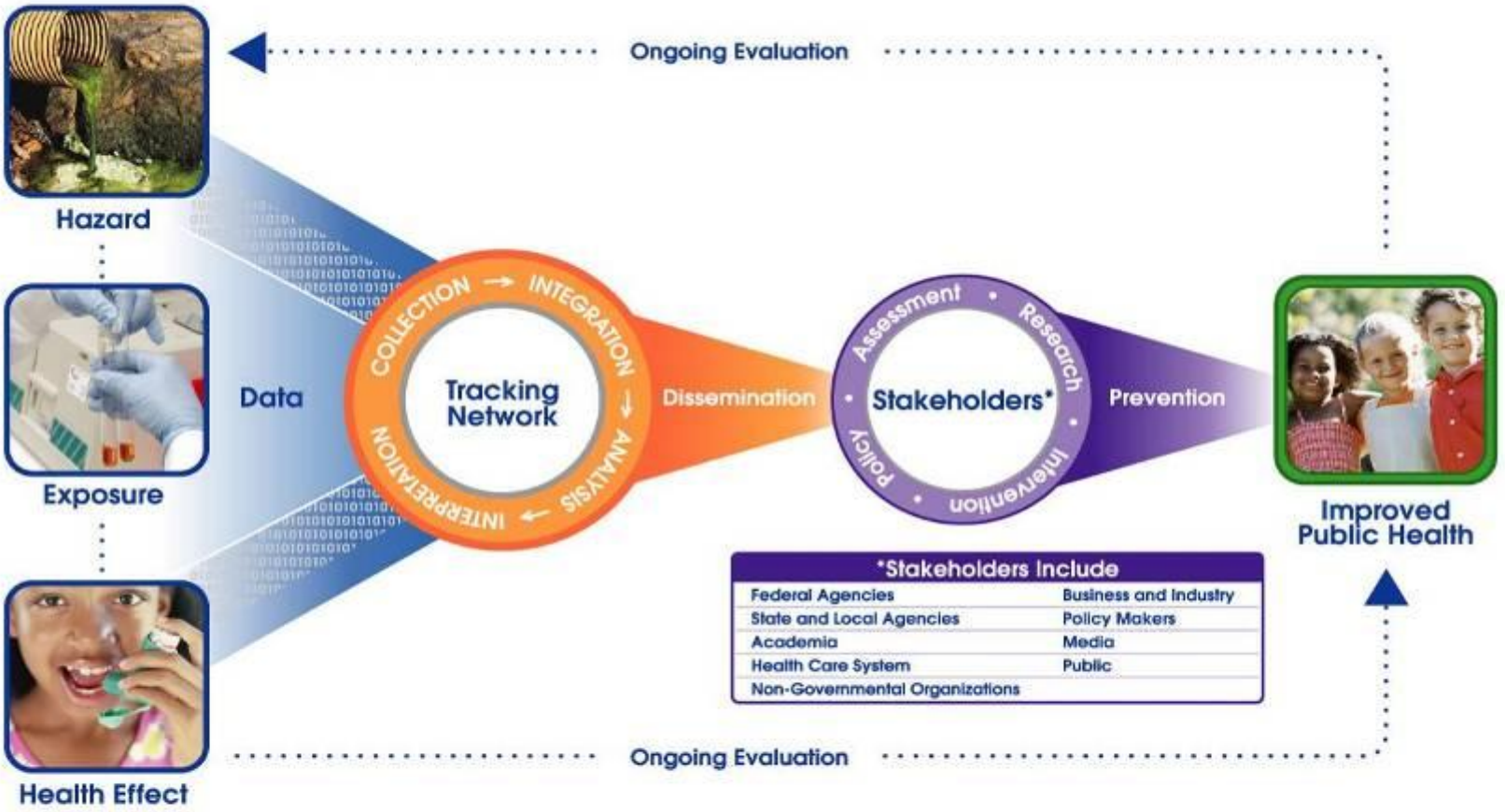



CDC Environmental Health

*In public health, we can't do anything without surveillance. That's where public health begins.*

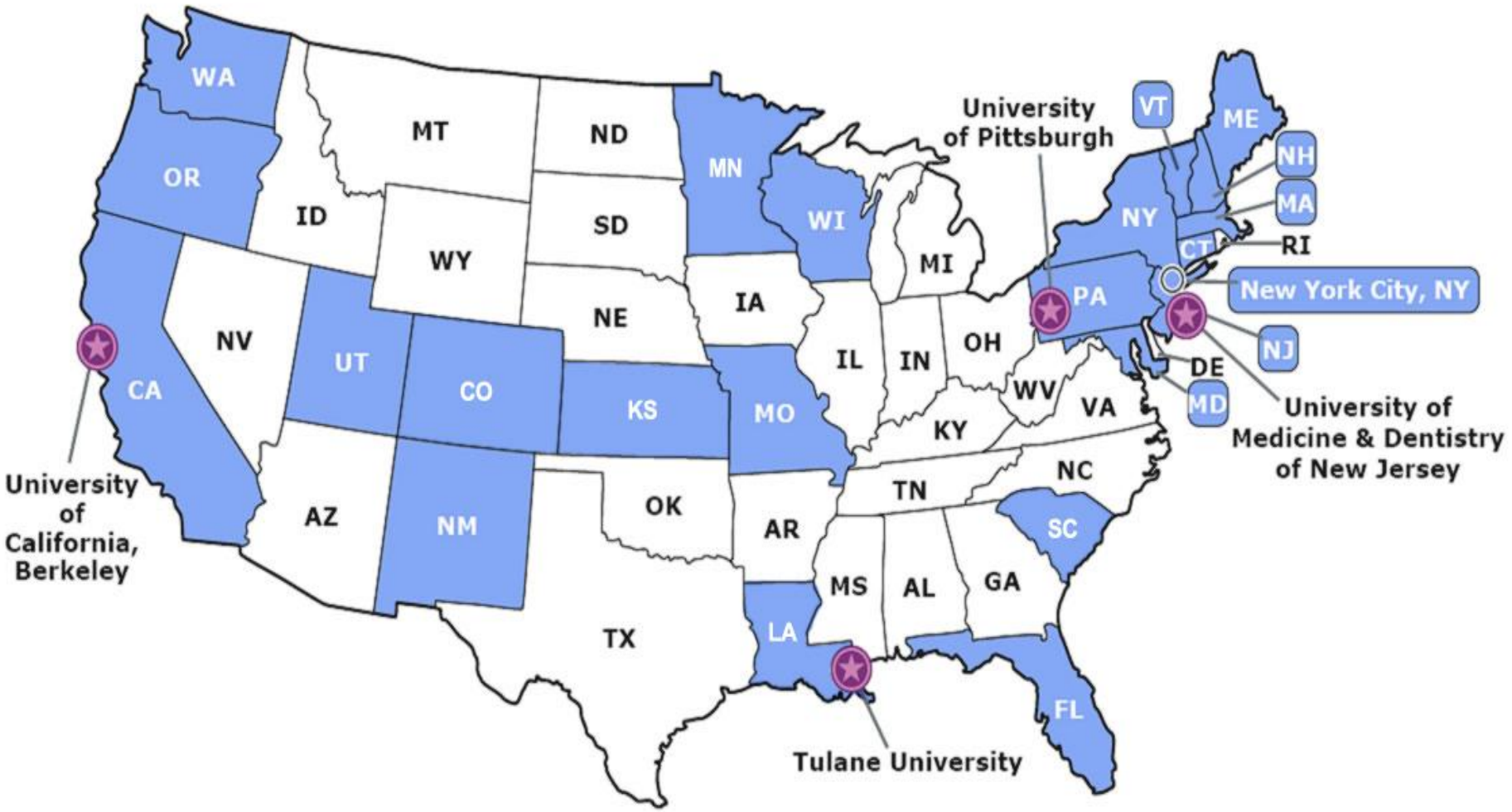
Dr David Satcher

# Environmental Public Health Tracking




Tracking = Surveillance

# National Environmental Public Health Tracking Program - 2009



# Tracking Network: At-A-Glance


**A web-based information system that exists at the local, state, and national level that serves the public, environmental public health agencies, health care providers and researchers**

**Tracking Network: www.cdc.gov/ephtracking**

# National Tracking Network

Launched
July 2009

## Public Portal

- One-stop access to health and environmental information
- Risk and prevention messages + query system
- Design based on extensive user testing

## Secure Portal

- Supporting secure collaboration among multiple partners
- Integrating health, exposure, hazard, and other data
- Sharing of methods, tools, and ideas
- Drawing board for turning data into information

# Current Data

**Directly from States:**

- Asthma, MI, CO hospitalizations
- CO ED
- Drinking water
- Birth defects

**Requested from Federal partners:**

- Childhood lead poisoning
- Vital statistics
- Cancer
- Air
- USGS water

• Obtaining state health data from Feds – data steward involvement

# New Directions

- Pesticides
- Climate Change
- Health Impact Assessment
- Health and Environment Linkages
- Population parameters (e.g. SES)
- Other risk factors

# Air Pollution Epidemiology

# Goals

- Characterize the impact of indoor and outdoor air quality on human health, particularly respiratory health.
- Translate air pollution and respiratory health research into sound public health programs and practice.
- Reduce morbidity and mortality due to carbon monoxide exposure.

# Impact of Air Quality on Human Health: Examples of Activities

*Epidemiologic studies*

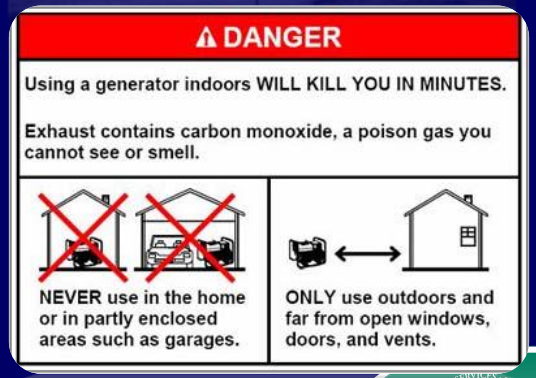
**Understand the relationship between ambient air pollution, lung function, and respiratory symptoms**

- **Children with sickle cell anemia**
- **Commuters with asthma**

# Impact of Air Quality on Human Health: Examples of Activities (cont'd)

***Response-related activities:***

**Provide assistance and technical response to emergency events**



# Impact of Air Quality on Human Health

*Other activities:*

- Provide support in the development / design of appropriate environmental interventions

- Collaborate with the environmental health laboratory and other groups working on air quality and health

# Harmful Algal Blooms


- Appear to be increasing along the coastlines and in US surface waters
- CDC
  - Investigates how blooms of cyanobacteria, marine microalgae, and *P. piscicida* may affect public health
  - Conducts surveillance (HABISS)

# Harmful Algal Bloom-related Illness Surveillance System (HABISS)

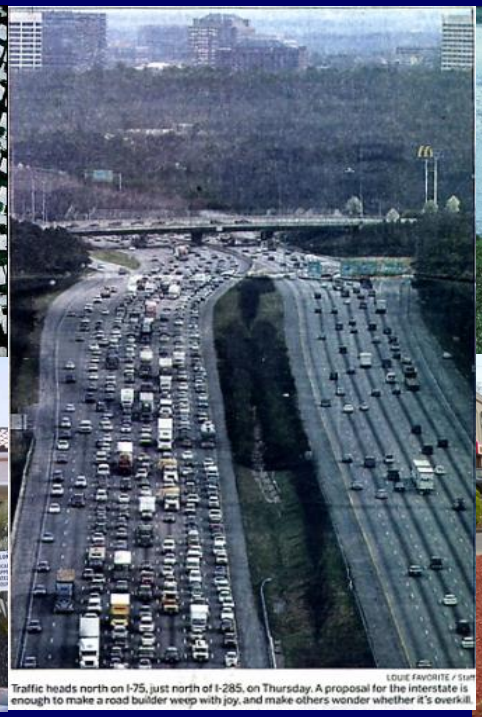
- **Purpose: To reduce the public health impacts from HAB-related human and animal illnesses**
- **Goals**
  - **Detection: identify early cases**
  - **Mitigation: limit exposures**
  - **Prevention: prevent further cases**
  - **Link cases of illness with environmental data**

# Human Illnesses related to Harmful Algae (reported between Jan 1, 2007 and Sept 10, 2009)

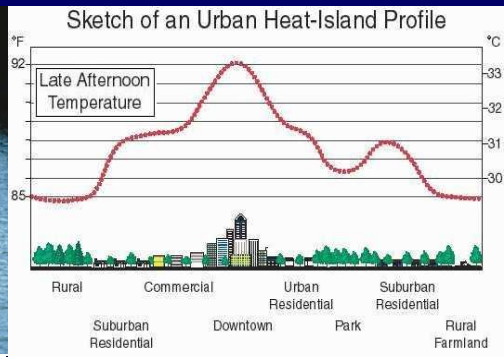
| Illness Name | 2007 | 2008 | 2009 (to date) | Total |
|---|---|---|---|---|
| Ciguatera Fish Poisoning | 33 | 46 | 30 | 109 |
| HAB-related Rash (toxin unknown) | 16 | <5 | 14 | 31 |
| HAB-related Illness (toxin unknown) | 2 | 18 | 9 | 29 |
| Saxitoxin Poisoning from Ingestion (PSP) | 4 | 11 | 6 | 21 |
| Microcystin Poisoning | 0 | <5 | <5 | 5 |
| Anatoxin-a Poisoning | 0 | 0 | <5 | <5 |
| Brevetoxin Poisoning NSP | <5 | 0 | 0 | <5 |
| Domoic Acid Poisoning from Ingestion (ASP) | 0 | 0 | <5 | <5 |

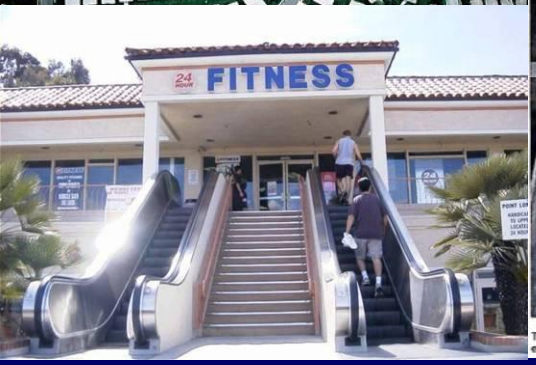
# CDC's Public Health Built Environment Initiative

HEALTHY COMMUNITY DESIGN










CDC Environmental Health

# Community Design and Health

**Related to land use**

- Obesity, physical activity, CVD
- Water quantity and quality

**Related to automobile dependency**

- Air pollution and asthma
- Climate change contribution
- Car crashes
- Pedestrian injuries

**Related to social processes**

- Mental health impact
- Social capital
- Environmental justice

# Public Health Built Environment Initiative Goals

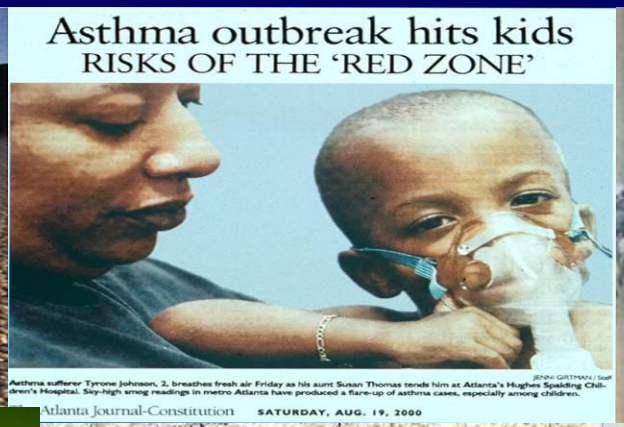
- Conduct and Support Scientific Research
- Support Public Health Efforts
- Create Tools

# Community design and land use choices can either promote or harm human health

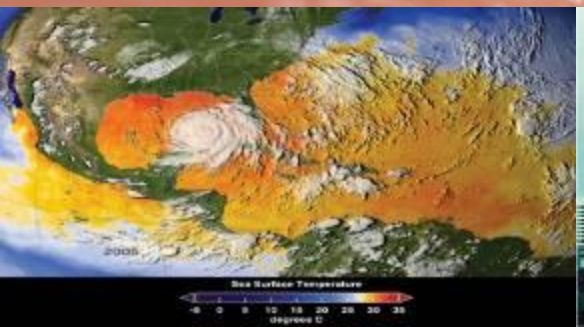
# Healthy Community Design

- Promote physical activity
- Improve air quality
- Lower risk of injuries
- Increase social connection and sense of community
- Reduce contributions to climate change
- Create social equity for all residents regardless of income, age and ability
- Allow people to age in place

# Climate Change and Human Health



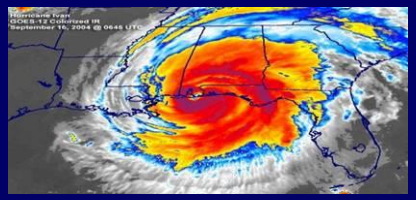





# Some Projections of Future Changes in Climate (IPCC 2007)

- Very likely that heat waves, will become more intense and frequent. [> 90% probability]

- Very likely that heavy precipitation events will become more frequent. [> 90% probability]



- Likely that tropical cyclones will become more intense, with larger peak wind speeds and more heavy rainfall [> 66% probability]

- Likely increase in areas affected by drought. [> 66% probability]

- Likely increase in incidence of extremely high sea level [> 66% probability]

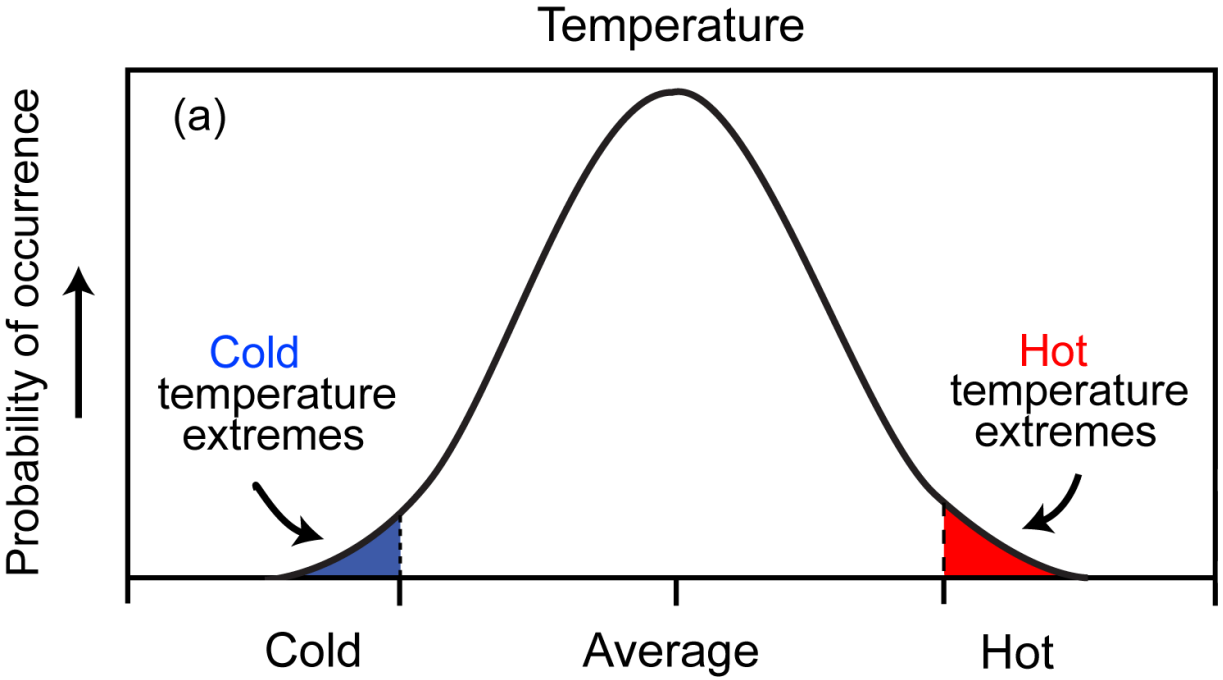
# Potential Health Effects of Climate Change

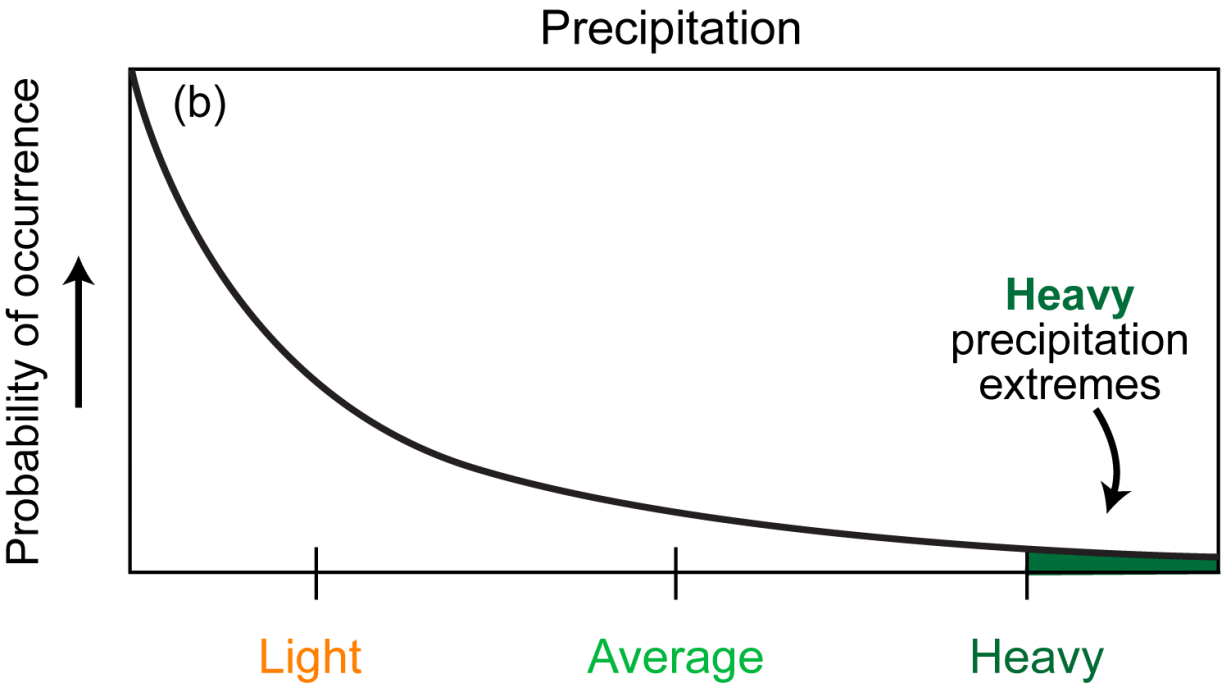
Climate Change:

- **Temperature rise**
- **Sea level rise**
- **Hydrologic extremes**

| | |
|---|---|
| HEAT | **Heat stress, cardiovascular failure** |
| SEVERE WEATHER | **Injuries, fatalities** |
| AIR POLLUTION | **Asthma, cardiovascular disease** |
| ALLERGIES | **Respiratory allergies, poison ivy** |
| VECTOR-BORNE DISEASES | **Malaria, dengue, encephalitis, hantavirus, Rift Valley fever** |
| WATER-BORNE DISEASES | **Cholera, cryptosporidiosis, campylobacter, leptospirosis** |
| WATER AND FOOD SUPPLY | **Malnutrition, diarrhea, harmful algal blooms** |
| MENTAL HEALTH | **Anxiety, despair, depression, post-traumatic stress** |
| ENVIRONMENTAL | **Forced migration, civil** |

Adapted from J. Patz



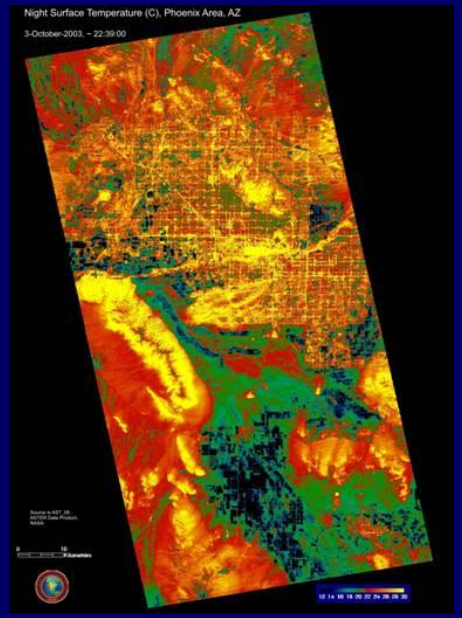




# Extremes impact people more than mean

Peterson *et al.*, 2007b

# Climate Change and Urban "Built" Environments

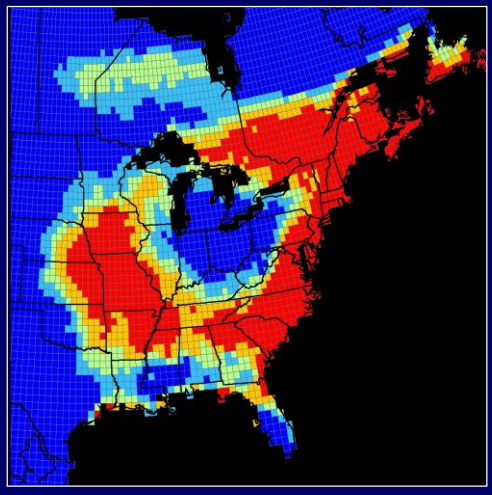
- Cities and climate are co-evolving in a manner that will place more populations at risk.




- Increase in vulnerable populations:
  - Today, more than half of the world's population lives in cities, up from 30% in 1950.
  - By 2100 there will be 100 million more people > 65 years old (relative to 2000) (Ebi et al. 2006).
- Intensification of exposures: Urban heat islands

# CDC's Priority Health Actions for Climate Change

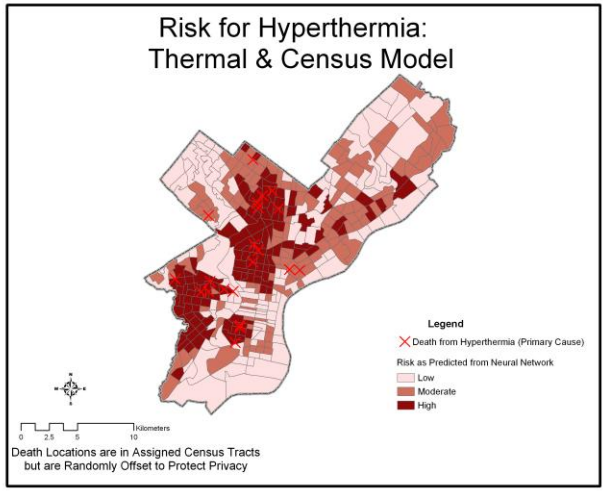
- Serve as a credible source of information
- Track data on environmental conditions, disease risks, and disease occurrence related to climate change
- Expand capacity for modeling and forecasting health effects
- Enhance the science to better understand the relationship between climate change and health

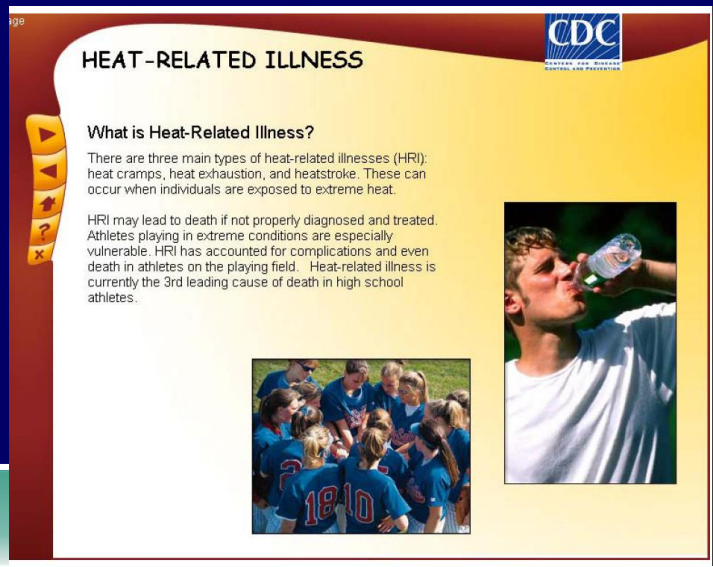


Lyme Disease – 2080
Brownstein et al., 2005

# CDC's Priority Health Actions for Climate Change

- Identify locations and population groups at greatest risk
- Communicate the health-related aspects of climate change
- Develop partnerships to address U.S. and global health aspects of climate change
- Provide leadership regarding health protection from climate change effects



# CDC's Priority Health Actions for Climate Change

- Develop and implement preparedness and response plans for health threats
- Provide technical advice and support implementing national and global preparedness measures
- Promote workforce development

# Multiple Opportunities for Future Collaboration

- *Do what you can, with what you have, where you are* – Theodore Roosevelt
- *The great thing in this world is not so much where we are, but in what direction we are moving* – Oliver Wendell Holmes Jr.
- *Men make history, and not the other way around. In periods where there is no leadership, society stands still. Progress occurs when courageous, skillful leaders seize the opportunity to change things for the better* – Harry S. Truman
- *The only limit to our realization of tomorrow will be our doubts of today. Let us move forward with strong and active faith* – Franklin D. Roosevelt

# For more information:

**Tracking Program: www.cdc.gov/nceh/tracking**
**Tracking Network: www.cdc.gov/ephtracking**

**Air Pollution and Respiratory Health Branch:**
**www.cdc.gov/nceh/airpollution**

**HABISS: www.cdc.gov/hab**

**Built Environment: www.cdc.gov/healthyplaces**

**Climate Change: www.cdc.gov/climatechange**

# Thank You!

***Be sincere; be brief; be seated* - Franklin D. Roosevelt**