The Centers for Disease Control and Prevention (CDC)

Partnering for a Healthy World

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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

- **Surveillance:** What is the problem?
- **Risk Factor Identification:** What is the cause?
- **Intervention Evaluation:** What works?
- **Implementation:** How do you do it?
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
Healthy Communities
Safe Food
Healthy Homes

Safe Air
Global Climate Change
Proper Waste Management
“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

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

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

“How important are environmental factors in causing disease?”

- Very Important: 53%
- Somewhat important: 37%
- Not important: 9%
- Don't know: 1%

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

Race/Ethnicity

Residential Segregation

Residential Location

Neighborhood Resources

Community Stressors

Structural Factors

Environmental Hazards and Pollutants

Community stress

Exposure

Stress/Coping, Genetics
Life Stage/Style

Individual stressors

Internal dose

Biologically effective dose

Health effect (disparities)

Modified from Gee & Payne-Sturges, 2004
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
In public health, we can’t do anything without surveillance. That’s where public health begins.

Dr David Satcher
Tracking = Surveillance
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/epht_tracking](http://www.cdc.gov/epht_tracking)
National Tracking Network

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

Launched July 2009
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

![Image of emergency event]

![Image of emergency event]

![DANGER]
Using a generator indoors WILL KILL YOU IN MINUTES.
Exhaust contains carbon monoxide, a poison gas you cannot see or smell.

NEVER use in the home or in partly enclosed areas such as garages.
ONLY use outdoors and far from open windows, doors, and vents.
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
<table>
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<tr>
<th>Illness Name</th>
<th>2007</th>
<th>2008</th>
<th>2009 (to date)</th>
<th>Total</th>
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<tr>
<td>Ciguatera Fish Poisoning</td>
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<td>46</td>
<td>30</td>
<td>109</td>
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<tr>
<td>HAB-related Rash (toxin unknown)</td>
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<td>&lt;5</td>
<td>14</td>
<td>31</td>
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<td>HAB-related Illness (toxin unknown)</td>
<td>2</td>
<td>18</td>
<td>9</td>
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<td>Saxitoxin Poisoning from Ingestion (PSP)</td>
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CDC’s Public Health Built Environment Initiative
Community Design and Health

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

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

- Mental health impact
- Social capital
- Environmental justice

Related to land use

Related to automobile dependency

Related to social processes
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

Asthma outbreak hits kids
RISKS OF THE ‘RED ZONE’

Heat stalks city elderly

Fatalities a stark reminder of summer of ‘95
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

Adapted from J. Patz
Extremes impact people more than mean

Peterson et al., 2007b
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