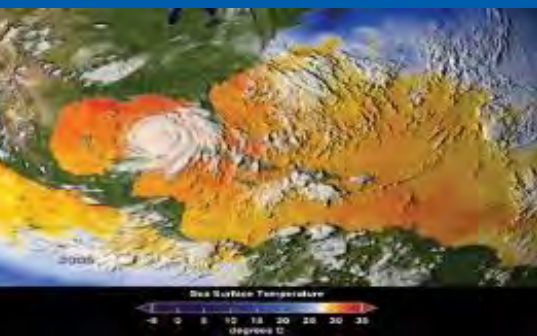


Climate Change Adaptation in the Public Health Sector



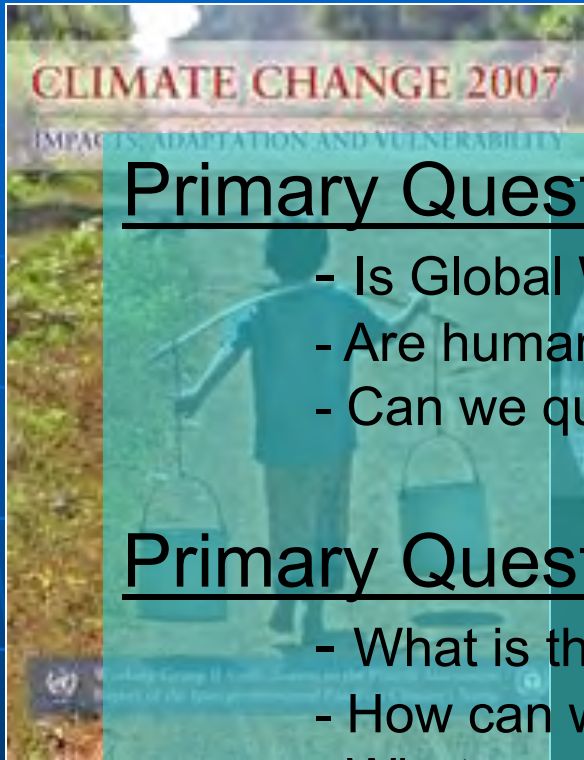
George Luber, PhD

**Associate Director for Climate Change
Division of Environmental Hazards and Health Effects
National Center for Environmental Health
Centers for Disease Control and Prevention**

*Preparing New Jersey for Climate Change:
Rutgers, NJ, November 2011*



Intergovernmental Panel on Climate Change (IPCC) 2007 Landmark Reports

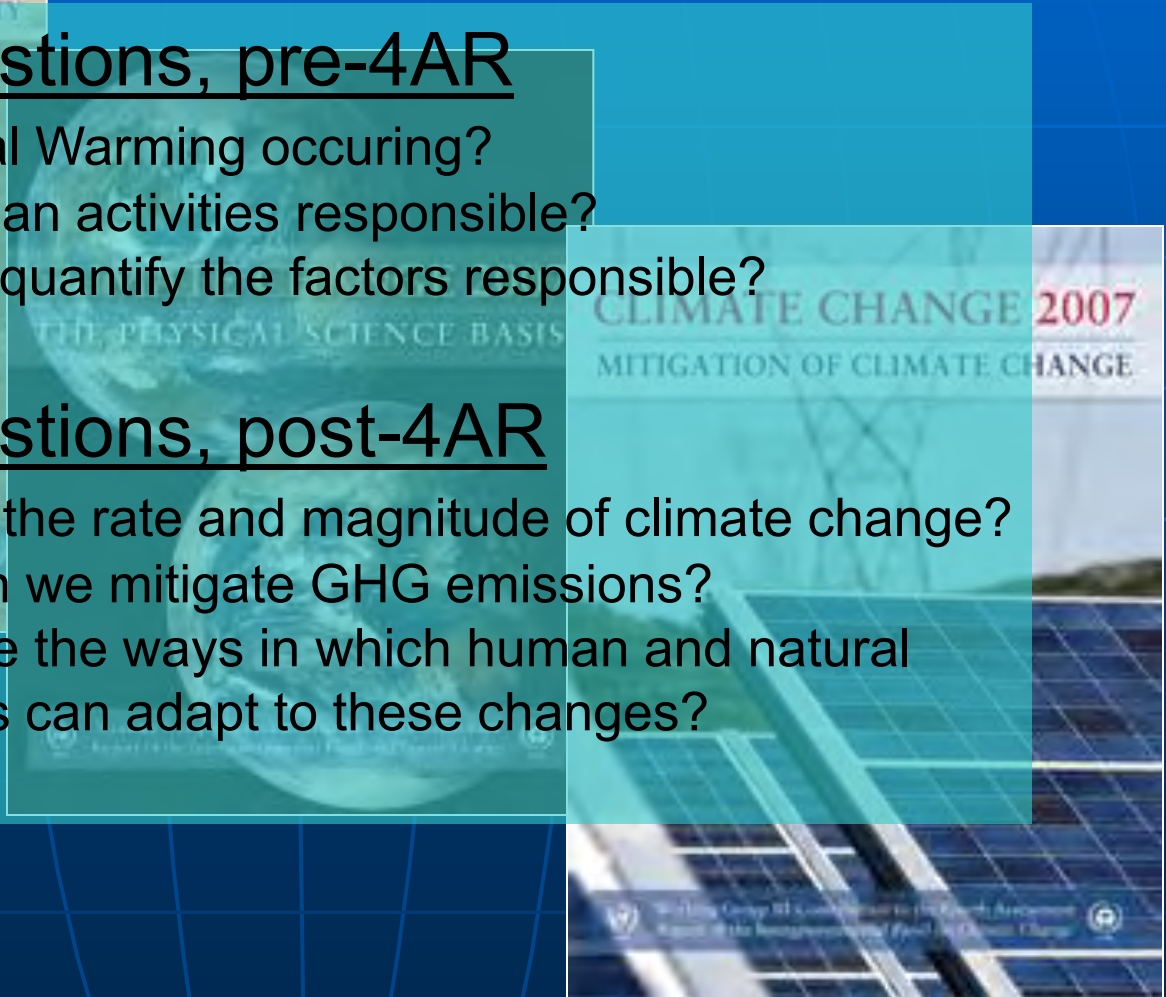


Primary Questions, pre-4AR

- Is Global Warming occurring?
- Are human activities responsible?
- Can we quantify the factors responsible?

Primary Questions, post-4AR

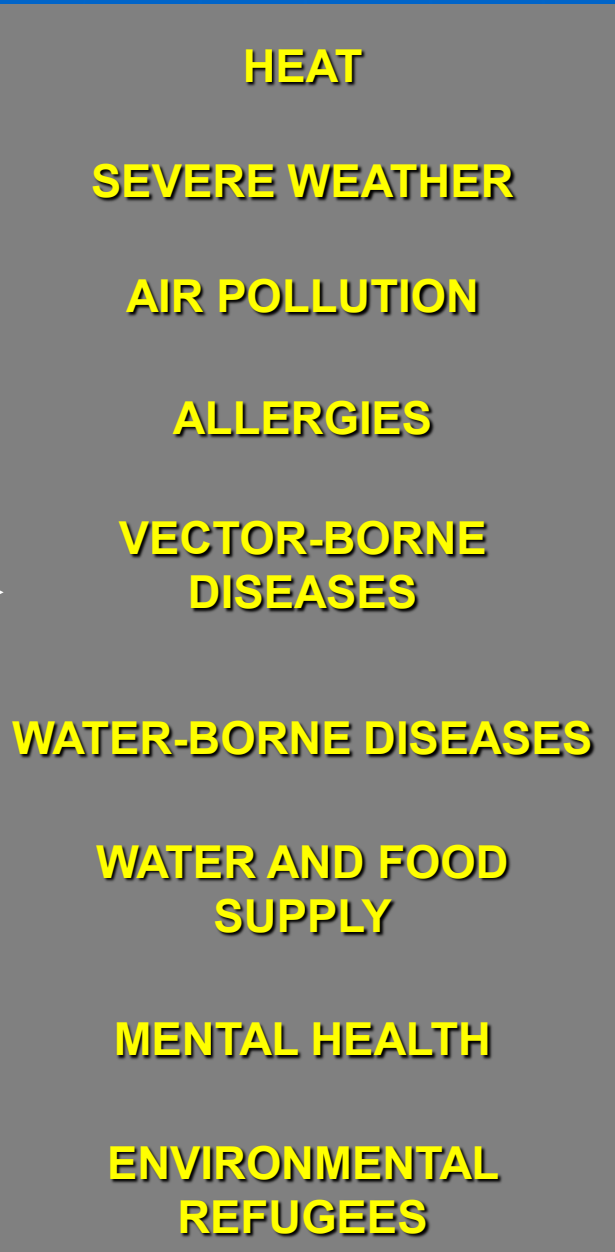
- What is the rate and magnitude of climate change?
- How can we mitigate GHG emissions?
- What are the ways in which human and natural systems can adapt to these changes?



Potential Health Effects of Climate Change

Climate Change:

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



- ➔ Heat stress, cardiovascular failure
- ➔ Injuries, fatalities
- ➔ Asthma, cardiovascular disease
- ➔ Respiratory allergies, poison ivy
- ➔ Malaria, dengue, encephalitis, hantavirus, Rift Valley fever
- ➔ Cholera, cryptosporidiosis, campylobacter, leptospirosis
- ➔ Malnutrition, diarrhea, harmful algal blooms
- ➔ Anxiety, despair, depression, post-traumatic stress
- ➔ Forced migration, civil conflict

CDC's Climate Change Program

Formally constituted as a Program in March 2009 with a congressional appropriation

Leads efforts to:

- identify the health impacts of climate change and the populations most vulnerable to these impacts;
- anticipate future trends;
- assures that systems are in place to detect and respond to emerging health threats;
- and takes steps to assure that these health risks can be managed now and in the future.



The Climate Change Program at CDC fills three critical roles:

- (1) to **analyze and translate** the latest findings in climate science to our public health partners;
- (2) to apply these findings to **decision support tools** that will aid in the state and local public health response (i.e.: vulnerability maps, surveillance tools, adaptation planning); and
- (3) to **provide leadership** inside and outside CDC to ensure that public health concerns are represented in climate change adaptation and mitigation strategies and to create linkages between public health and efforts in other sectors

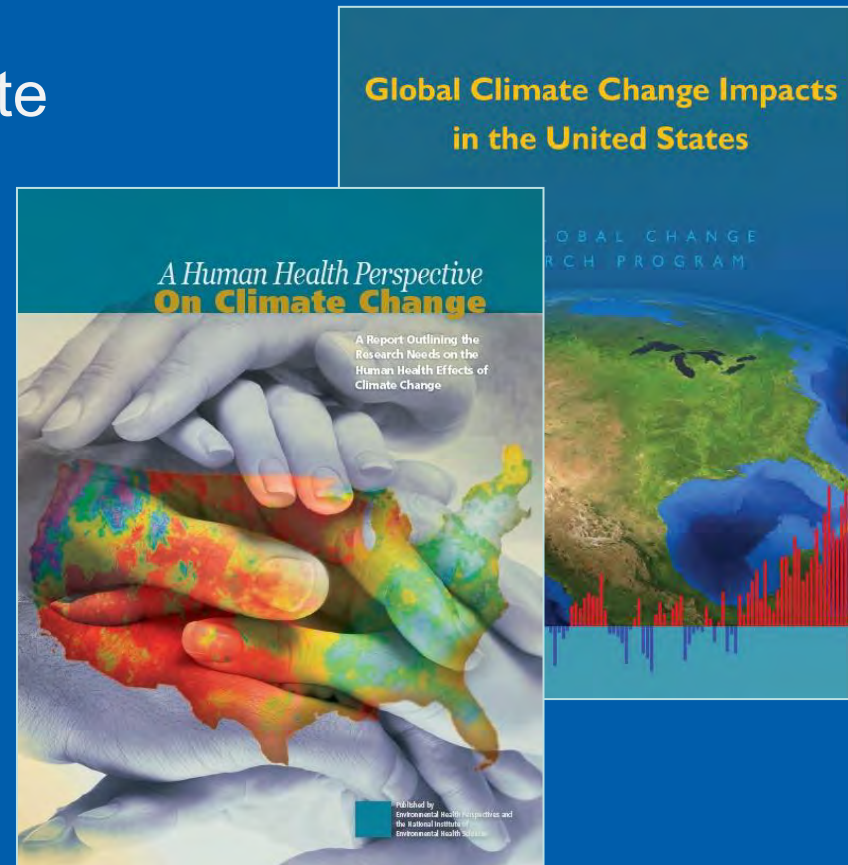


CDC's Priority Actions for Climate Change: Translate Climate Science to our Public Health Partners

Identify the health impacts of climate change and the populations most vulnerable to these impacts

Identify regional climate trends that impact health

Model future health impacts

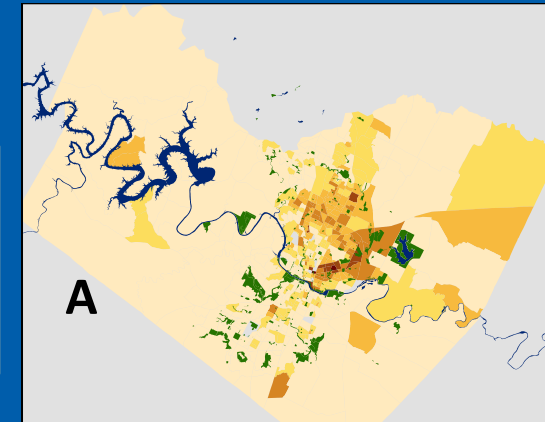
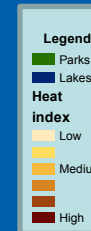
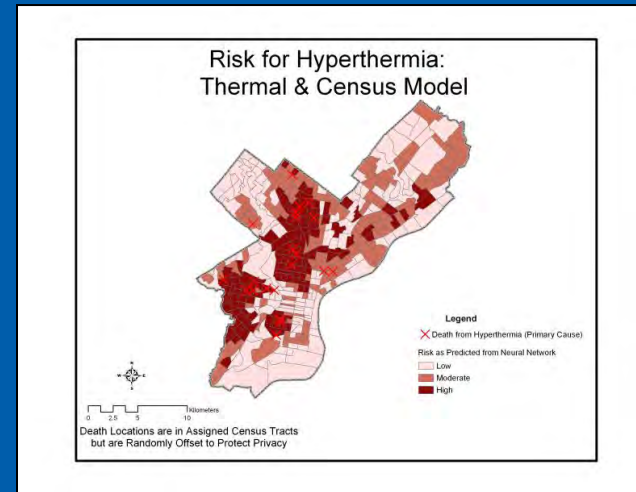


CDC's Priority Actions for Climate Change: Develop Support Tools for State and Local Public Health

Technical guidance
and support for
adaptation planning

Create vulnerability
maps

Enhance surveillance
tools

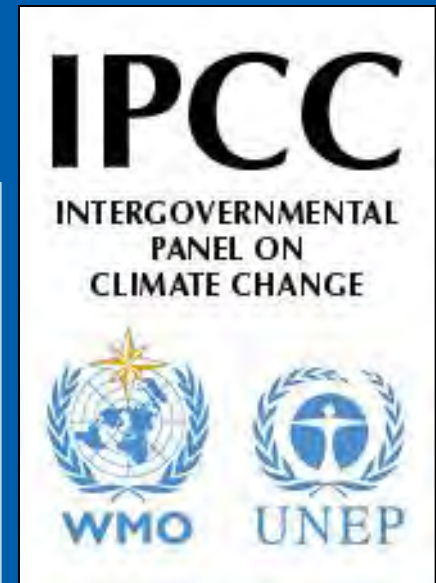


CDC's Priority Actions for Climate Change: Leadership and Collaboration

Establish and communicate the key importance of public health in the climate change response



Create linkages between public health and efforts in other sectors



Program Highlight #1: Enhance the Science Base

7 Extramural research grants were awarded totaling 2.1 mil. per year for 3 years

Research Institution	Environmental Factor	Health impact
University of California, Davis	Increase temperature	Mosquito-borne arbovirus transmission
University of Florida	Algal bloom	Ciguatera Ecology and the Atlantic Warm Pool
Wisconsin State Department of Health/Family Services	Precipitation	Gastrointestinal illness linked to environmental contamination
University of Washington	Heat event, air pollution	Mortality and morbidity
New York State Department of Health: Center for Environmental Health	Spatial Synoptic Classification II system - composite weather index	Tick-borne and water/food-borne diseases, adverse birth outcomes, and cold-related diseases
Georgia Institute of Technology	Land use scenario in urban areas	Heat-related morbidity and mortality
Emory University	Heat wave, Ozone and PM 2.5	Cumulative climate-related health risks in the Eastern U.S.



Research Priorities and Gaps for Climate Change and Health

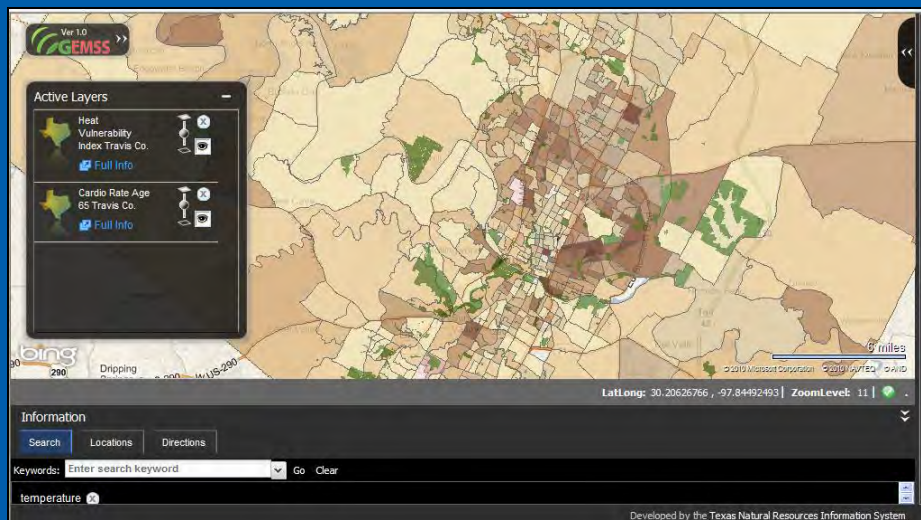


Categories of human health consequences of climate change:

1. Asthma, Respiratory Allergies, and Airway Diseases
2. Cancer
3. Cardiovascular Disease and Stroke
4. Foodborne Diseases and Nutrition
5. Heat-Related Morbidity and Mortality
6. Human Developmental Effects
7. Mental Health and Stress-Related Disorders
8. Neurological Diseases and Disorders
9. Vectorborne and Zoonotic Diseases
10. Waterborne Diseases
11. Weather-Related Morbidity and Mortality

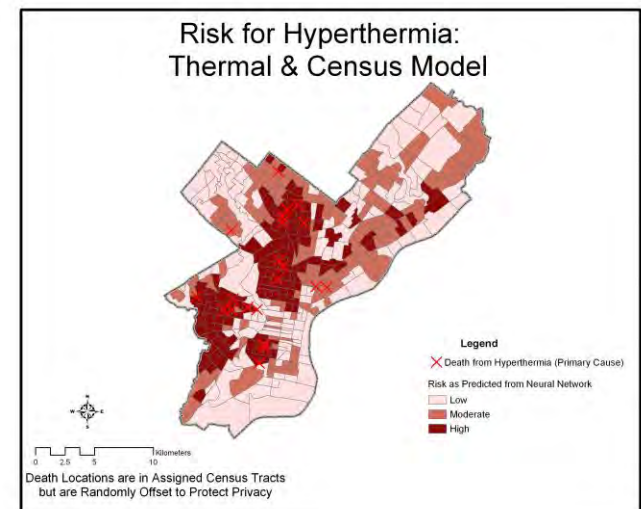
Program Highlight #2: Development of Tools to Support the Public Health Response

Vulnerability Assessments and Mapping



Local Environmental Public Health Indicators for Climate Change

Using NASA Data and Models to Improve Heat Watch Warning Systems for Decision Support



Program Highlight #3: Climate-Ready States and Cities Initiative

Objective: To enhance the capability of state and local health agencies to deal with the challenges associated with climate change

Cooperative Agreements with State and Local HDs:

“Developing Public Health Capacity and Adaptations to Reduce Human Health Effects of Climate Change”

Developing Decision Support Tools:

Communications and Educational Tools

Vulnerability Mapping Tools



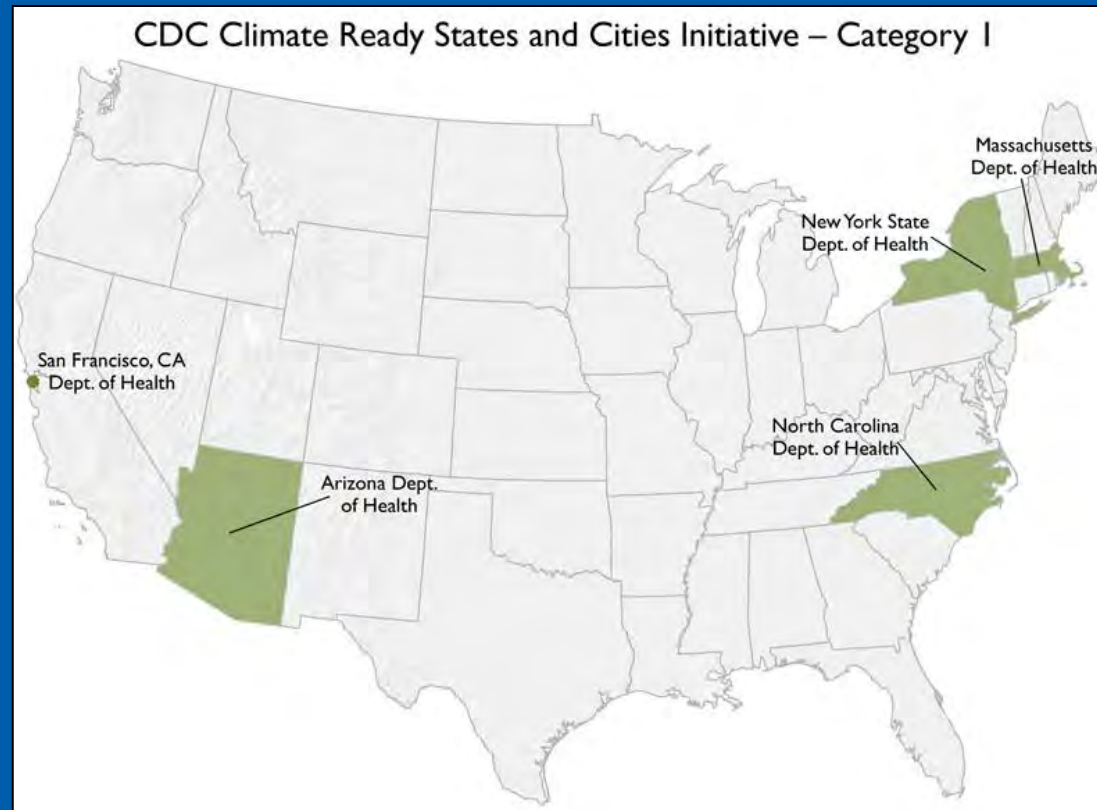
Program Highlight #3: Climate-Ready States and Cities Initiative

Category 1: Assessment and Planning to Develop Climate Change Programs

4 States and 1 City HD

Activities

- Agency needs assessment
- Early strategic plan implementation
- Partnership building & engagement with other initiatives
- Strategic plan development



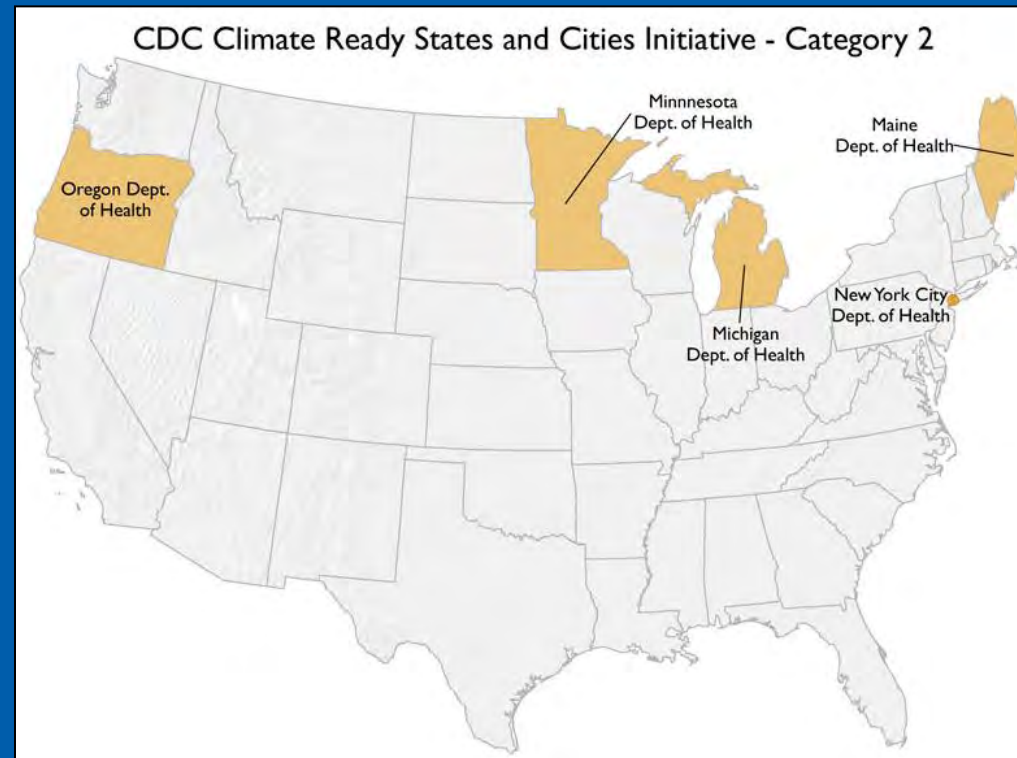
Program Highlight #3: Climate-Ready States and Cities Initiative

Category 2: Building Capacity to Implement Climate Change Programs and Adaptations

4 States and 1 City HD

Activities

- Strategic Plan Implementation
- Identification and prediction of health impacts & population & system vulnerabilities
- Develop & tailor health programs
- Identify co-benefits and nintended consequences of policies, programs and projects in other sectors (HIA)



Types of Climate Change Adaptation

Two general types*

- Anticipatory / planned
 - Reactive / autonomous.
-
- A recent survey of several sectors found few anticipatory adaptation activities though there is considerable evidence of intention to act (e.g. vulnerability assessments) (Berrang-Ford, Ford et al. 2010).
 - Extreme events are a relatively common stimulus for adaptation (i.e. much adaptation to date is at least in part reactive)

* Carter, T., M. Parry, et al., Eds. (1994). [Technical Guidelines for Assessing Climate Change Impacts and Adaptations, Report of Working Group II of the Intergovernmental Panel on Climate Change.](#)





Towards and Anticipatory Framework for Climate Change Adaptation Planning



- The BRACE (Building Resilience Against Climate Effects) Framework.
- A series of actions for Health Departments to take that will lead to a formal Climate Change Adaptation Plan.



BRACE's 5 Steps



- Forecasted Impact & Vulnerability Assessment
- Health Risk Assessment
- Intervention Assessment
- Health Adaptation Planning & Implementation
- Evaluation



Step 1. Forecasted Impact & Vulnerability Assessment



Goal: Identify the range of climate impacts, associated potential health outcomes, & vulnerable populations and locations within a jurisdiction

- Determine the geographic and temporal scope of the assessment
- Assess localized forecasted climate impacts
- Assess health outcomes sensitive to these climate impacts



Step 2: Health Risk Assessment



Goal: Estimate/quantify the additional burden of health outcomes due to Climate Change

- Identify data sources for climate related mortality/ morbidity assessment
- Employ qualitative and quantitative approaches to assessing the data
- Quantify potential magnitude of individual health risks (absolute or relative)



Step 3: Intervention Assessment



Goal: Identify the most suitable health interventions

- List the range of health interventions available for each health outcome
- Assess capacity to deliver each intervention
- Prioritization of health interventions deemed most suitable for the jurisdiction



Step 4: Health Adaptation Planning & Implementation



Goal: Develop and implement a plan that introduces health system program changes that address the health impacts of climate change

- Applying agency procedures to developing a unified plan of action
- Disseminating the plan to stakeholders that play a part in executing the interventions
- Incorporating adaptations into executing the interventions



Step 5. Evaluation



- Process evaluation goal: Periodic review to ensure that the projections continue to be sound and the adaptations are still suitable.
- Outcome evaluation goal: Ensure that climate change is considered in broader PH planning and implementation activities. To ensure that PH is considered in broader climate change planning and implementation activities.



Key Points to Consider



- Stakeholder Engagement
 - ◆ Critical throughout
 - ◆ Appropriate stakeholders may change by stage.
- Prioritization of health impacts
 - ◆ Can occur at Stage 1, 2 or 3
 - ◆ Dependant on level of prior analysis
 - ◆ Available evidence
 - ◆ Political considerations

Thank You

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The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

