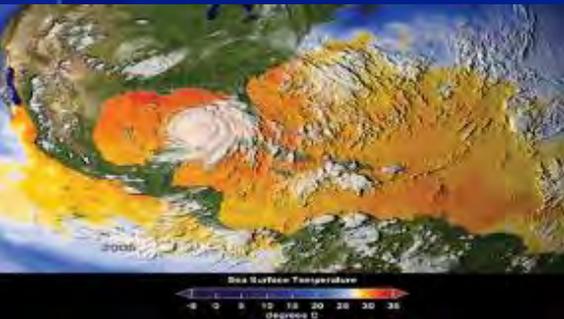


Climate Change and Human Health



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Climate Change Health Effects

Climate change effects:

- Temperature
- Sea level
- Precipitation
- Extreme events

Heat



Heat stress, cardiovascular failure

Air quality



Asthma, cardiovascular disease, respiratory allergies

Coastal flooding



Injuries, fatalities

Civil conflict



Forced migration, civil conflict



Anxiety, despair, depression

Food & water



Malnutrition, diarrhea, harmful algal blooms

Infectious Dz



Dengue, hantavirus, coccidioidomycosis



Cholera, cryptosporidiosis, leptospirosis

* Excludes major impacts on biodiversity and ecosystems

Some Recent Health Events

- ❑ 138 people died as a result of extreme heat in 2010 (10-year average of 115 annual heat mortalities)
- ❑ 2011 outbreaks of dengue hemorrhagic fever in Florida and Arizona
- ❑ *Cryptococcus gattii* has emerged in Washington and Oregon
- ❑ In NYC each single degree (Celsius) increase in surface temperature linked with:
 - 3% increase in same-day hospitalizations from respiratory diseases
 - 3.6% increase in hospitalizations due to cardiovascular diseases

Sources: CDC, National Weather Service; Lin et al 2009

Now the bad news

Despite existing breadth of organizations and sectors with initiatives on climate change...

Despite the likelihood of anticipated health effects of climate change...

Public health effects of climate change remain largely unaddressed

CDC's Climate & Health Program

- CDC's climate and health framework established in 2006
- Formally constituted as a Program in March 2009 with congressional appropriation

The CDC climate change and public health framework was established in 2006, due to a recognition by many scientists that there was a need to prepare for the inevitability of climate change, and the impact it would likely have on the health of US residents and the world population in general.

CDC formally established its Climate Change Program in FY2009. CDC's Climate Change Program leads efforts to prevent and adapt to the anticipated health impacts associated with climate change.

The program seeks to identify populations most vulnerable to these impacts, anticipate future trends, assure 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.

CDC Climate Ready States and Cities Initiative

Cat 1 Assessment and Planning to Develop Climate Change Programs

- Arizona Department of Health Services
Health effects due to extreme heat
- Massachusetts Department of Health
Water, food, and vector borne diseases, heat stress, hazardous weather events, respiratory diseases
- New York State Department of Health
Extreme weather, waterborne, food-borne, and vector disease
- North Carolina Department of Public Health
Temperature related morbidity and mortality; extreme weather; air pollution; water, food, and vector borne diseases
- San Francisco Department of Public Health
Heat stress morbidity and mortality associated with air quality impacts

Cat 2 Building Capacity to Implement Climate Change Programs and Adaptations

- Michigan Department of Community Health
Heat related disease, respiratory disease
- Minnesota Department of Health
Extreme heat events, vector borne disease
- New York City Department of Health and Mental Hygiene
Heat-related morbidity and mortality, respiratory illness, water-borne and vector-borne disease
- Oregon Department of Health
Water and food borne diseases, extreme weather, ecosystems
- State of Maine Department of Health and Human Services
Heat related extremes, vector-borne disease

Climate Change & Public Health

Centers for Disease Control and Prevention
National Center for Environmental Health

The Climate & Health Program's 3 critical roles:

- (1) **analyze and translate** climate science to our public health partners;
- (2) **apply findings to decision support tools** to aid state and local public health response (vulnerability maps, surveillance tools, communications tools)
- (3) **provide leadership** to ensure that public health concerns are represented in climate change adaptation strategies; create linkages between public health and other sectors

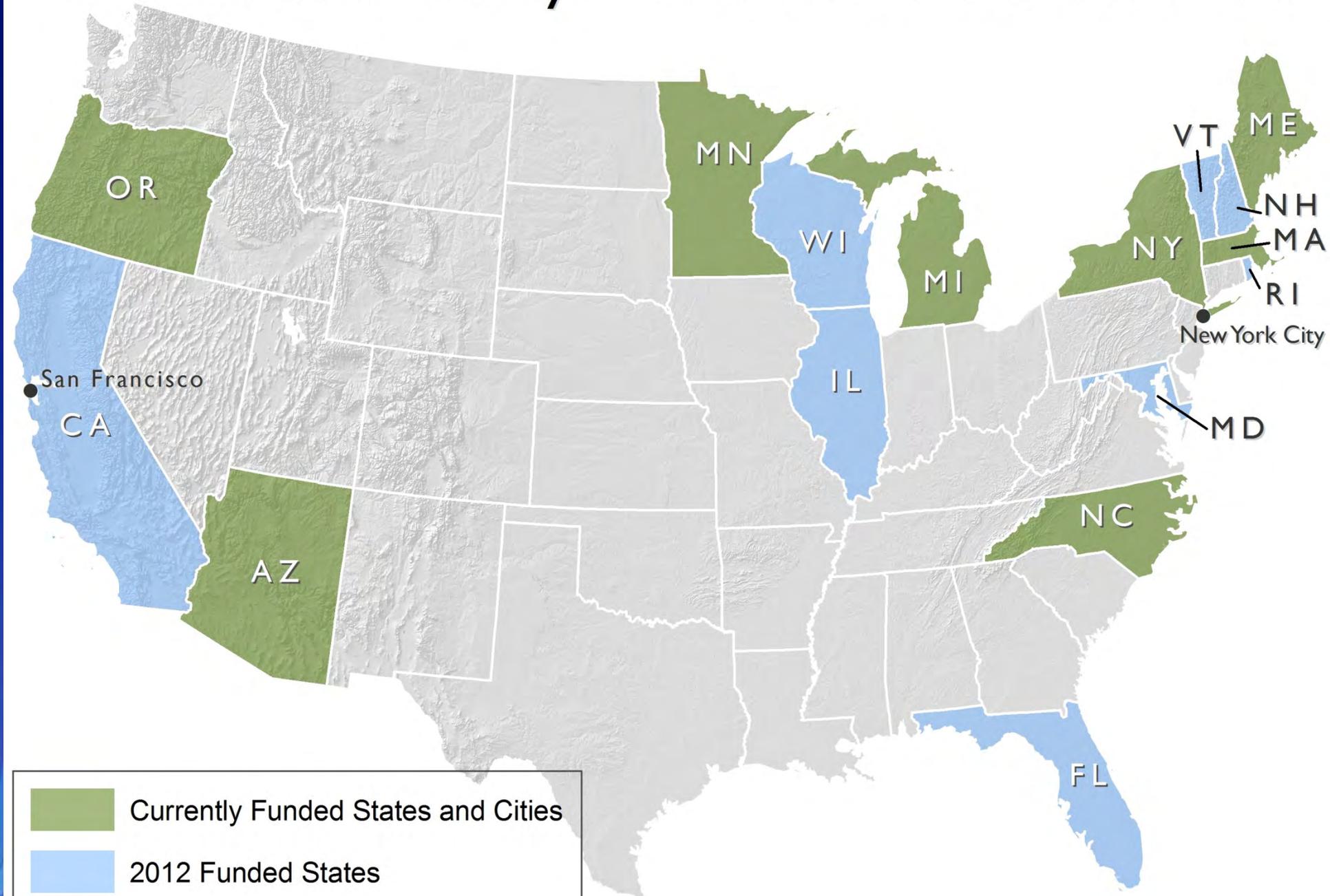
CHP Science Activities

- ❑ Translation of science for public health applications
- ❑ Epidemiological tool development
- ❑ Vulnerability assessment tool development
- ❑ Monitoring and analysis of climate and health science
- ❑ Expert consultation on climate and health to third parties (other federal agencies, health departments)
- ❑ Scientific technical assistance

CHP Policy & Program Activities

- ❑ Cooperative agreements with State and Local Health Departments (CRSCI)
- ❑ External partnership development
- ❑ Public health practice guidance
- ❑ Policy development
- ❑ Program communications, marketing and outreach
- ❑ Coordination of technical assistance

CDC Climate Ready States and Cities Initiative



BUILDING RESILIENCE AGAINST CLIMATE EFFECTS (BRACE)



Step 1. Forecasting Climate Impacts & Assessing Vulnerabilities

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: Projecting the Disease Burden

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: Assessing Public Health Interventions

Goal: Identify the most suitable health interventions

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

Step 4: Developing and Implementing a Climate and Health Adaptation Plan

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

- Apply agency procedures to developing a unified plan of action
- Disseminate the plan to stakeholders that play a part in executing the interventions
- Incorporate adaptations into executing the interventions

Step 5. Evaluating Impact and Improving Quality of Activities

- 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

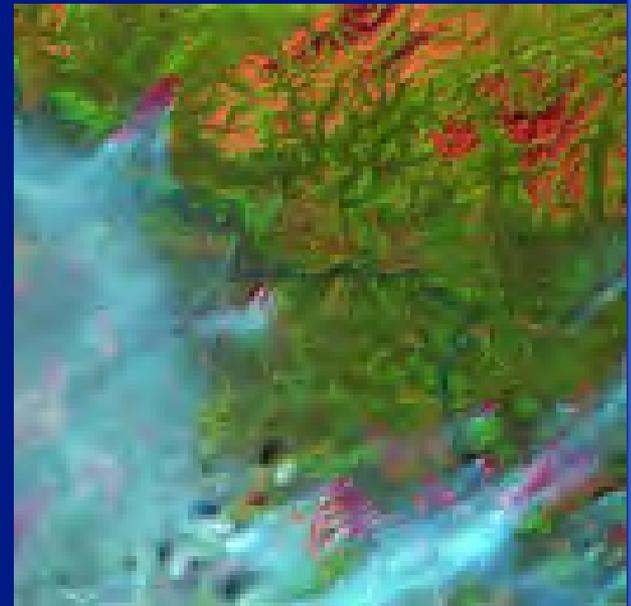
NEW TOOLS AND DEVELOPMENTAL PROJECTS

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

- ❑ Augment current Heat Watch/Warning System (HWWS) with NASA data and models
- ❑ Development of “Extreme Heat Vulnerability Index” (includes socioeconomic and mortality data)

Will model surface temperatures during extreme heat events in 3 U.S. cities using:

- ❑ The MODerate resolution Imaging Spectroradiometer (MODIS)
- ❑ Landsat Enhanced Thematic Mapper (ETM+)
- ❑ Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER)
- ❑ The Visible/Infrared Imager/Radiometer (VIIRS) system



Extreme Heat Media Toolkit

- ❑ Suite of communications materials
 - websites, public service announcements, press releases
 - downloadable/customizable materials
- ❑ Supplement existing emergency management plans
- ❑ Targets vulnerable populations to reduce deaths during Extreme Heat Events

The screenshot displays the Extreme Heat Media Toolkit website. On the left is a vertical banner with the text "IT'S HOT OUTSIDE" and "STAY COOL. STAY HYDRATED. STAY INFORMED." Below the banner is a "FREE MATERIALS" button. The main content area is divided into three columns:

- WATCH FOR THE SIGNS**: Includes the text "Seek medical care immediately if you or someone you know experiences symptoms of heat sickness." and a close-up image of a person's eye.
- INFORMATION IN YOUR AREA**: Includes the text "Find local information, health department contacts and air-conditioned shelters in your area." and a map of a city street grid.
- STAY COOL.**: Features a thermometer icon and the text "Keep your body temperature cool to avoid heat-related illness." followed by a list of tips: "Spend time in air-conditioned buildings.", "Find an air-conditioned shelter.", "Do not rely on a fan as your primary cooling device.", "Avoid direct contact with the sun.", "Wear lightweight, light-colored clothing.", "Take cool showers or baths.", and "Check on those most at-risk twice a day."
- STAY HYDRATED.**: Features a water drop icon and the text "You can become dehydrated during times of extreme heat as your body loses fluids through sweat." followed by a list of tips: "Drink more water than usual.", "Don't wait until you're thirsty to drink more fluids.", "Drink two to four cups of water every hour while working or exercising outside.", "Avoid alcohol or liquids containing high amounts of sugar.", and "Remind others to drink enough water."
- STAY INFORMED.**: Features a lightbulb icon and the text "Stay informed of local weather forecasts so you can plan safe activities when it's hot outside." followed by a list of tips: "Check local news for extreme heat alerts and safety tips.", "Find an air-conditioned shelter.", "Sign up for free weather alerts to your phone or email.", "Share heat safety information with others.", and "Learn the symptoms of heat sickness."

At the bottom of the page, there are four small circular portraits of diverse individuals.

Environmental Public Health Tracking Portal

- ❑ System of integrated health, exposure, and hazard information and data from national, state, and local sources
- ❑ Maps, tables, charts
 - Environmental exposure
 - Health outcomes



Environmental Public Health Tracking Portal

- ❑ **Heat Vulnerabilities** - Measures that put people at greater risk for heat-related health effects (diabetes, CVD, age, race, poverty, social isolation, access to green space, etc)
- ❑ **Heat-Related Mortality** - Data from death certificates; heat as underlying or contributing cause
- ❑ **Temperature Distribution** - Daily temperature and heat index county
- ❑ **On the horizon:**
 - Refined heat indicators
 - Pollen indicator

Metadata Access Tool for Climate & Health



The screenshot shows the MATCH website interface. At the top left is the logo for the United States Global Change Research Program, Human Health. The main title is "MATCH Metadata Access Tool for Climate and Health". A navigation bar includes links for HOME, ABOUT, SEARCH, BROWSE, HELP, and CONTRIBUTE. A featured article titled "New Orleans Underwater" is displayed with a photo of people wading through floodwaters. Below this are sections for "What is MATCH?", "What You Can Do With MATCH", and "Create An Account". The footer contains contact information for the US Global Change Research Program and the University Corporation for Atmospheric Research (UCAR).

United States Global Change Research Program
Human Health

MATCH Metadata Access Tool for Climate and Health

Login Feedback

HOME ABOUT SEARCH BROWSE HELP CONTRIBUTE

New Orleans Underwater

Here is a sample description for this news item. A short blurb, no more than a sentence or two.

Click image to read more...

What is MATCH?

MATCH stands for Metadata Access Tool for Climate and Health. MATCH is a gateway to information that can be used to solve public health problems, support research, enable scientific collaboration in a One Health approach, and promote good data stewardship to enhance the quality and application of climate and health research.

What You Can Do With MATCH

MATCH is a searchable clearinghouse of publicly available Federal metadata and links for datasets and tools. MATCH includes:

- Monitoring and surveillance data sets
- Early warning systems
- Tools for characterizing the health impacts of global climate change

Search MATCH

Search

Create An Account

Creating an account will allow you to:

- Contribute to MATCH
- Save your searches
- Receive updates
- Provide feedback

Get Started

U.S. Global Change Research Program, Suite 250, 1717 Pennsylvania Ave, NW, Washington, DC 20006
This website is operated by the University Corporation for Atmospheric Research (UCAR) in support of the USGCRP.
Disclaimer | Privacy | Contact Us | Version

- Online, searchable clearinghouse of federal metadata related to climate change and human health
- Includes NASA metadata

Southeast Regional Workshop

- Feb 13-14, 2012. Charleston, SC
- Sponsored by CDC, NOAA, NIH, and the USGCRP
- Climate change experts, public health experts, climate/health stakeholders
 - Inform the 2013 U.S. NCA report
 - Increase understanding of climate and health science in the region
 - Raise awareness of ongoing climate and health activities in the region
 - Improve tools for public health decision making
 - Serve as a pilot for ongoing assessment process
- Synthesis report and presentations available online:
www.joss.ucar.edu/ohhi/se_nca_health_sector_feb12

Summary

- Climate change impacts human health
- Projected increase in negative human health effects
- Adaptation measures are needed
- CDC is working to predict and adapt to the health effects of climate change

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.