

ADAPTATION IN ACTION:

Grantee Success Stories from CDC's
Climate and Health Program

MARCH 2015



ADAPTATION: The adjustment in natural or human systems to a new or changing environment that exploits beneficial opportunities or moderates negative effects.¹

CLIMATE CHANGE: Any significant change in the measures of climate lasting for an extended period of time. In other words, climate change includes major changes in temperature, precipitation, wind patterns, or other weather-related effects that occur over several decades or longer.²

CLIMATE AND HEALTH ADAPTATION: Steps taken to protect people and communities from the health risks associated with a changing climate.

¹ United States Global Change Research Program

² U.S. Environmental Protection Agency

Why Adaptation?

Many factors affect communities; however, few are as far-reaching as the environment. A healthy environment is vital to building a healthy community. Yet protecting public health is more than preserving environmental resources like clean air and water. Protecting public health requires equipping communities with the knowledge and resources to successfully adapt to environmental changes and weather events. In the face of climate change, adaptation skills are needed now more than ever.

In 2014, the third National Climate Assessment clearly described climate change as a threat to human health and well-being. Climate change is predicted to result in more extreme heat events, more frequent and violent weather disasters, decreased air quality and more insect-related disease. And, the Assessment states that some of the health impacts of climate change are already happening in the United States. Health effects related to climate will worsen existing health problems as well as introduce new and serious risks to the public's health.

However, we are far from defenseless. Work is well underway to find new, low-cost and creative ways to adapt to the challenges of climate change, and protect our communities from related disease and injury. Leading such work is the Centers for Disease Control and Prevention's Climate and Health Program, as well as a handful of pioneering state and local public health departments across the country. Adapting to climate change will require collaborative action on a large scale and across many different sectors. Public health professionals are perfectly suited to this task. The field has a long and successful history of bringing together diverse stakeholders to improve public health, well-being and resiliency.

To guide the nation's public health workforce in preparing for climate change, CDC has developed a unique framework known as BRACE, or Building Resilience Against Climate Effects. BRACE is a process that allows public health departments to put complex atmospheric science and climate projections into their planning and response activities.

BRACE's five steps are: 1) forecasting climate impacts and assessing vulnerabilities; 2) projecting the future rates of disease and injury; 3) assessing and identifying suitable health interventions; 4) creating and implementing climate and health adaptation plans; and 5) evaluating the impact and continually improving the quality of adaptation activities. By following the BRACE framework, public health practitioners are better equipped to plan customized actions that will protect the communities they serve (see graphic for more on the five steps of the BRACE Framework).

The BRACE framework:

STEP 1:

Forecasting Climate Impacts and Assessing Vulnerabilities

Identify the scope of the most likely climate impacts, the potential health outcomes, and the populations and locations most vulnerable.

STEP 2:

Projecting the Disease Burden

Use tools to estimate the burden of health outcomes due to climate change to support prioritization and decision-making for adaptation planning.

STEP 3:

Assessing Public Health Interventions

Identify the health interventions most suitable to address the health outcomes of greatest concern.

STEP 4:

Developing and Implementing a Climate and Health Adaptation Plan

Develop plans that address health outcomes, gaps in critical public health functions/ services, and enhance local adaptive capacity.

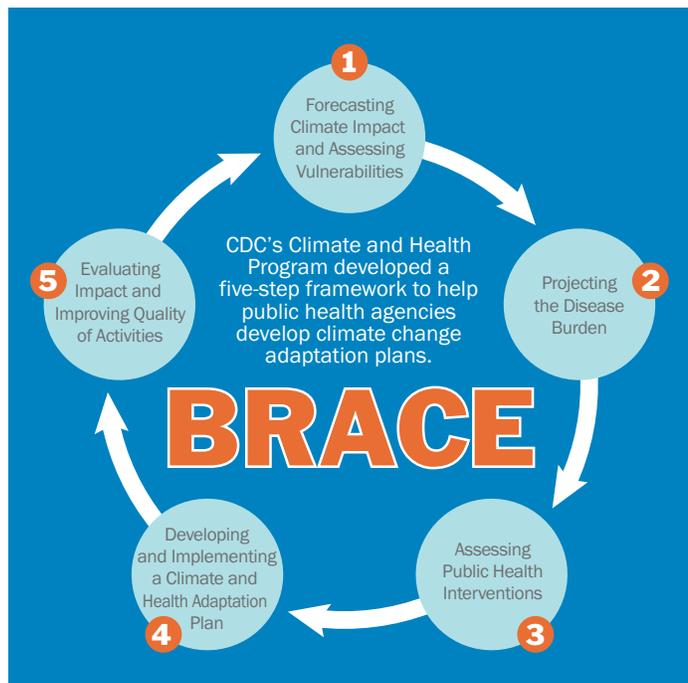
STEP 5:

Evaluating Impact and Improving Quality of Activities

Evaluate the interventions used and incorporate new inputs to ensure continuous quality improvement.

Our nation's public health workforce is uniquely positioned for this task, as it already has a deep understanding of the intersections between human health and a changing environment. However, for most health departments the science of climate change and its translation into effective public health practice and response are new territories that call for more expanded capacity and planning.

This work is vital. Our ability to successfully adapt to a changing climate and fend off preventable disease and injury will save lives and save money. Ultimately, healthier people today equal a healthier, more vibrant future for all.



We need to adapt for a healthier today and tomorrow.

The Need For Adaptation

Climate change is the result of rising levels of heat-trapping emissions from natural sources and human activity. These emissions are also known as greenhouse gases. These gases form a blanket around the Earth, trapping in heat and disrupting our climate. As the Earth experiences more rapid and intense warming, the planet will also experience more severe and frequent weather events. These events not only impact the shape of our physical landscapes — such as rising sea levels and melting glaciers — but our economy, our security and our health.

Worldwide, scientists and climatologists agree that the planet is warming and the climate is changing. Preparing today for the health effects of climate change will save lives, prevent injury and save millions in future health care costs. For example, one study³ calculated at \$14 billion the cost of premature death and illness related to six events — pollution, heat waves, flooding, hurricanes, wildfires and mosquito-borne disease — that are expected to worsen due to climate change.

Below is a brief overview of health threats related to climate change, and the role public health professionals — with the help of BRACE — play in protecting public health. Some of the public health responses build on traditional public health activities. However, with support and funding from CDC's Climate and Health Program, which began in 2009, many public health departments are now more efficiently using their existing capacity to better anticipate climate-related health threats. Public health departments are also incorporating this emerging information into longer-term planning efforts and adaptations that are specifically suited to their needs.

In addition to preparing for the direct health consequences of climate change, many adaptation activities offer other health benefits as well, or co-benefits. For instance, designing neighborhoods to reduce reliance on motor vehicles also lowers vehicle emissions that aggravate respiratory illness and contribute to climate change. Also, these neighborhoods inherit safer places to walk, bike and engage in regular physical activity.

Today, thanks to CDC's Climate-Ready States and Cities Initiative, 16 states and two cities are pioneering the use of the BRACE framework to lead their climate and health adaptation efforts. These efforts, while still young, are already making real progress.

“Public health actions, especially preparedness and prevention, can do much to protect people from some of the impacts of climate change. Early action provides the largest health benefits. As threats increase, our ability to adapt to future changes may be limited.”

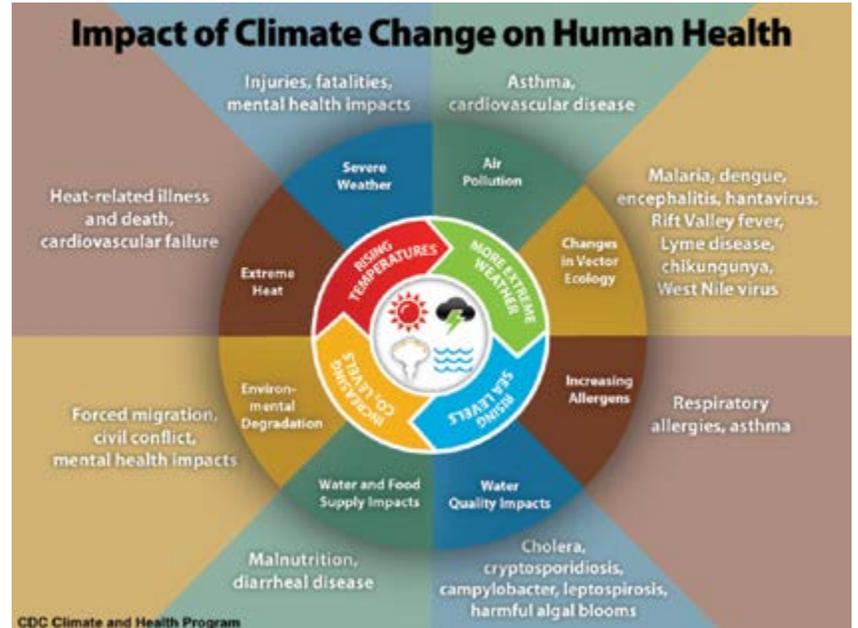
Third National Climate Assessment, U.S. Global Change Research Program

³ Natural Resources Defense Council: www.nrdc.org/health/accountingforcosts/files/accountingcosts.pdf

Health Threats

Let's take a look at some of the health threats from climate change and the public health responses that address them through climate and health adaptation.

CDC'S CLIMATE AND HEALTH PROGRAM DEVELOPED THIS GRAPHIC SHOWING 9 WAYS CLIMATE CHANGE AFFECTS HUMAN HEALTH



habitats supporting disease



HEALTH IMPACT → Warmer temperatures and greater rainfall create the ideal conditions for the spread of vector-borne diseases, which are transmitted by animals such as mosquitoes and ticks. Research finds that as temperature and rainfall change, vectors such as ticks are able to expand their territories and introduce disease risks to new regions.

PUBLIC HEALTH RESPONSE → Monitor the spread and incidence of vector-borne disease; partner with local officials, such as mosquito control program officers, to predict and pinpoint possible hot spots and protect public health; raise public awareness about the emerging threat of vector-borne disease and educate residents on ways to protect their health and prevent infection; educate local health care providers on how to recognize the early signs of vector-borne disease.

heavier rainfall & flooding



HEALTH IMPACT → More rainfall and flooding can overwhelm local sewage and drainage systems and increase the risk of drinking water contamination. Heavier rains also up the risk of recreational water contamination. Each increases the threat of water-borne illnesses. Conversely, some parts of the country will experience more severe droughts and restricted water use, which can spur some diseases.

PUBLIC HEALTH RESPONSE → Monitor and test drinking and recreational water quality for harmful contaminants; monitor the effect of water contamination on agricultural products that may lead to food-borne illness; track disease rates to help protect communities from disease risks; educate and notify the public about water-borne illness hazards; engage with local officials and planners to develop long-term community design solutions that prevent water contamination.

extreme heat

HEALTH IMPACT → Hotter temperatures raise the risk of serious heat-related illnesses, such as dehydration and heat stroke. The risk is especially high among already vulnerable populations, such as children and the elderly, and in regions not used to extreme heat. Extreme heat also aggravates respiratory and cardiovascular conditions.

PUBLIC HEALTH RESPONSE → Conduct surveillance and gather data on populations and neighborhoods with low capacity and few resources to adapt to extreme heat conditions; develop a heat response plan; partner with local organizations and agencies serving vulnerable residents to provide heat adaptation education and assistance by designating cooling centers; and engage with local officials and planners on long-term community design solutions that mitigate heat effects.

disasters

HEALTH IMPACT → Climate change is expected to increase the frequency and severity of natural disasters, such as hurricanes, floods, landslides, wildfires and heat waves. Such events come with numerous health risks, including injury and death as well as disease related to food and water contamination and poor sanitation. People who experience severe weather disasters may also suffer from mental health illnesses or stress-related disorders.

PUBLIC HEALTH RESPONSE → Identify vulnerable systems and communities in order to undertake activities to “harden” these systems and prepare measures to mitigate harm in the event of disaster.

poor air quality

HEALTH IMPACT → Warmer temperatures increase the concentration of allergens, such as pollen, as well as ground-level pollutants, such as ozone. These changes can aggravate allergies and increase the risk of respiratory and asthma complications and are linked to poor cardiovascular outcomes. In addition, energy demands stemming from more extreme heat will likely increase dangerous air pollutants.

PUBLIC HEALTH RESPONSE → Monitor local air quality; conduct surveillance and gather data on populations particularly vulnerable to the health effects of poor air quality and with few resources to adapt to such conditions and prevent health complications; partner with local organizations and agencies to educate residents about air quality and empower them with the knowledge to protect their health; engage with local officials and planners on long-term community design solutions that mitigate air pollution and which often provide co-benefits for overall public health.

Adaptation in Action

Success stories from public health departments

The following snapshots highlight grantee work through CDC's Climate-Ready States and Cities Initiative or CRSCI. These snapshots are not meant to be a full report of all of the CDC initiatives on climate adaptation activities.

MINNESOTA:

Adapting to the New Normal

“The difficulties we’re currently experiencing are only going to get much worse, and we need to start preparing now. Climate change is going to become such a huge, overarching issue — there will be nothing that won’t be affected by climate change in the future. We’ve spent a lot of time on education because awareness is the first step, and then we can work toward community and behavioral change.”

Kristin Raab

DIRECTOR, MINNESOTA CLIMATE AND HEALTH PROGRAM, MINNESOTA DEPARTMENT OF HEALTH

THE THREAT TO HEALTH:

- Minnesota has already observed three main climate changes: increases in temperatures and extreme heat events, increases in humidity and more extreme rainfalls.
- Minnesota is the third fastest warming state, unfortunately, many of its residents are not used to such heat and are ill-equipped to adapt to higher temperatures.
- Data from 2000 through 2011 show that higher summer temperatures coincide with higher rates of hospital admissions and emergency department visits. The summers of 2001 and 2011, which clocked higher-than-average temperatures, had the highest rates of hospital admissions and emergency visits for heat-related illness.

ADAPTATION IN ACTION:

- The Minnesota Climate and Health Program developed an Extreme Heat Toolkit to guide local health jurisdictions in responding to heat events. The toolkit offers education on warming temperatures in Minnesota, ways to adapt to extreme heat, how to partner with local organizations, and much more. When the toolkit was released in spring 2012, only two Minnesota communities had extreme heat response plans. A year later, four more local public health departments had put a plan on the books.
- The Minnesota Climate and Health Program provides technical assistance and GIS mapping for local health officials to identify vulnerable communities and high-risk neighborhoods. For example, staff have electronically mapped vulnerable populations along

with resources, such as locations where residents can go to cool off, for seven communities that include both rural and urban counties. The maps are tailored to local needs so local health officials can use them in public advisory and education efforts.

- The Minnesota program has developed a series of training modules related to climate change for public health professionals in local health departments. The in-person and online presentations cover a range of topics, including Climate Change and Public Health 101, extreme heat, water quality and quantity, air quality, agriculture and food security, and mental health.
- Part of adapting to climate change means assessing the built environment — the manmade structures that make up a community. The Minnesota Climate and Health Program is educating local planning officials on the need to consider the health impacts of building and zoning decisions. For example, staff reviewed more than 50 land-use plans from around the Twin Cities region for health and climate change issues. As a result, they developed training materials to help planning officials consider people’s health, both now and in the future, in their day-to-day work.
- The Minnesota Climate and Health Program published the first statewide climate change vulnerability report for five climate hazards: extreme heat events, air pollution, vector-borne diseases, flooding and flash flooding, and drought. The report reviewed and mapped the recent occurrence of the climate hazards and the populations vulnerable to the hazards. Next steps include helping local public health departments and emergency managers with the development of their own local vulnerability assessments.

To learn more about the Minnesota Climate and Health Program, visit www.health.state.mn.us/divs/climatechange/.

SAN FRANCISCO:

Bringing Health To The Forefront

“Climate change has very serious health implications for our present and future generations, and local health departments are the first line of defense in confronting this issue. Public health really does have a special role to play.”

Cyndy Comerford

MANAGER, PLANNING AND FISCAL POLICY, ENVIRONMENTAL HEALTH BRANCH,
SAN FRANCISCO DEPARTMENT OF PUBLIC HEALTH

THE THREAT TO HEALTH:

- According to climate models, San Francisco will experience nearly 40 extreme heat events annually by 2050 and more than 100 annually by 2100.
- San Francisco's traditionally temperate weather means many residents, and especially vulnerable populations, such as the elderly and homeless, are not prepared to cope with extreme heat.
- A review of weather and medical data from the previous decade in San Francisco found that hospitalizations and emergency department visits increase alongside outdoor temperatures, revealing a link between heat and illness.

ADAPTATION IN ACTION:

- The San Francisco Climate and Health Program embarked on its very first heat vulnerability index to pinpoint neighborhoods most susceptible to the health effects of extreme heat. Staff analyzed surface temperature data alongside 21 social and environmental vulnerabilities, such as social isolation and tree density. The resulting map found that neighborhoods that already suffer from poor health were also most vulnerable to heat. Today, the index is being used in a variety of adaptation efforts such as guiding where to designate cooling centers and where to conduct education and outreach efforts. Other local agencies are using the index, too. For example, city planners use the index to determine where more trees should be planted to offer shade and boost cooling effects.

- To better understand health hazards associated with climate change, the program is developing indicators to measure resilience to climate change. Indicators have been divided into eight sections. Examples include: environment, such as trees and air quality; health outcomes, such as preventable hospitalizations; housing, such as households with a person living alone; adaptation, such as determining whether residents can access cooling centers; and community, such as measures of social connectedness.
- Thanks to funding through CRSCI, San Francisco created its first extreme heat response plan. Public health staff worked with emergency management staff to develop a Heat Wave Disaster Response Plan, which is an official annex to the city's Emergency Operation Plan. The heat wave plan includes issuing public advisories, notifying hospitals and health care facilities, and connecting with groups that assist vulnerable residents, such as elderly residents.
- Public health staff created a report on the health co-benefits of climate action and shared it with community and government stakeholders. The report explained how climate planning and mitigation could help narrow existing health disparities and improve overall health. For example, reducing vehicle emissions can reduce asthma complications and the emissions that cause climate change.
- The culmination of the Climate and Health Program's work highlights the fact that every agency has a role in improving health. The program also grows interdepartmental coordination and collaboration to address adaptation risks and build resiliency.

MAINE: Tracking New Disease Risks

“For the first time in public health, we can really be focused on the impact of climate on health and the potential strategies for dealing with those impacts. It really is a fundamental change — we’re thinking about climate change as a public health issue, and that’s a very different thought process than what we’ve been engaged in before.”

Andrew Smith

STATE TOXICOLOGIST AND DIRECTOR OF THE ENVIRONMENTAL AND OCCUPATIONAL HEALTH PROGRAM, MAINE CENTER FOR DISEASE CONTROL AND PREVENTION

THE THREAT TO HEALTH:

- Climate change is making the state more hospitable to ticks that transmit Lyme disease. Surveillance shows such ticks are expanding their geographic territory in Maine, and every year cases of Lyme disease are going up, increasing from about a dozen cases 20 years ago to more than 1,100 in 2012.
- Data show that the rate of warming in Maine is on the rise. Climate models predict Maine will experience warmer and wetter conditions throughout most of the year during the 21st century.
- Warmer temperatures are expected to result in more heat-related illness, especially as Maine’s population is not accustomed to extreme heat. Already, data show a link between very hot days and increases in heat-related hospitalizations and emergency department admissions.

ADAPTATION IN ACTION:

- Maine public health workers have a syndromic surveillance system for tracking extreme heat and gaining a better understanding of heat-related vulnerability. The change means the Maine Climate and Health Program can more effectively target prevention education to those who need it most. For example, staff learned that only about half of Maine homes have air conditioning, with older residents less likely to have cooling systems in their homes.

- The program is working with the University of Maine Climate Change Institute to develop fine-scale climate models specific to Maine. Such modeling helps public health workers predict disease rates, assess vulnerabilities and target resources. For example, the regional models predict extreme rainfall, which can help public health workers prepare for floods and their impact on drinking water. The regional models also provide data for local response planning.
- All response is local. In turn, state health workers identified counties in particular need of heat response plans — something most of Maine’s health jurisdictions don’t have. Program staff began working with health officials in Cumberland County, where heat had already been tapped as a priority health issue. As of 2013, work was underway to develop a localized heat response plan, with the hope that it will eventually be used as a template for other local health jurisdictions.
- Thanks to CDC support, Maine strengthened its ability to monitor vector-borne disease and especially tick-borne Lyme disease. Armed with data showing that Lyme disease is increasing and the risk for infection is spreading to new communities, public health workers are educating health care providers and paving the way for quicker reporting of disease incidence. State health workers are also hosting community forums to teach residents and health professionals about preventing and controlling the risk of Lyme disease.

ARIZONA: Readying for Extremes

“Arizona is a beautiful place to live, where extreme heat, drought, monsoons and dust storms are the norm. Our program helps residents learn to respect and adapt to these extremes.”

Matthew Roach

ENVIRONMENTAL EPIDEMIOLOGIST, EXTREME WEATHER AND PUBLIC HEALTH PROGRAM, ARIZONA DEPARTMENT OF HEALTH SERVICES

THE THREAT TO HEALTH:

- Extreme heat is the nation's number-one weather-related cause of death, and Arizona is home to some of the country's hottest communities. From 2000 through 2012, 1,500 heat-related deaths occurred in Arizona. About 500 heat-related inpatient admission visits and 2,000 emergency department visits happen in Arizona every year.
- Arizona has a primarily arid climate; however, during the monsoon season of June-September, flooding is a real danger in the state.
- Persistent drought conditions and high temperatures have contributed to an increase in the amount of wildfires occurring and acres burned. Arid conditions also contribute to frequent dust storms that can cause motor vehicle accidents and worsen respiratory illnesses.
- Arizona is experiencing an increase in the number and extent of extreme heat days. In fact, research conducted in the aftermath of an Arizona heat wave found that every 1-degree increase in temperature was associated with a 6 percent increase in mortality risk.

ADAPTATION IN ACTION:

- The Arizona Extreme Weather and Public Health Program conducted a department-wide assessment to measure the agency's overall capacity to monitor climate and health effects and to pinpoint gaps. Staff also reached out to local public health departments with the same assessment, which covered topics such as assessments, outreach and education, and policy development. The results will eventually be used to shape an extreme weather action plan.

- The Arizona program is boosting public health's capacity to partner across sectors and reach as many residents as possible. For example, in the spring of 2013, health officials convened the first statewide heat preparedness meeting to exchange information and best practices. Participants included decision-makers from federal, state and local government agencies, universities and non-profits. Public health staff also partner with all four of the state's National Weather Service offices — each of which use different criteria to issue heat warnings — to update the state's heat response plan. In an example of community-level action, public health staff are partnering with the state OSHA office to educate workers and employers on heat safety.
- The Arizona program piloted a heat emergency communication plan that has since become agency protocol. The communication plan simultaneously sends National Weather Service heat warnings and related health protection messaging to health care facilities, schools and the general public via email and social media.
- Public health staff developed heat safety toolkits targeted at two populations particularly susceptible to heat illness: children and older adults. Another toolkit is planned for residents who work outdoors. The Heat Illness Prevention School Project toolkit was distributed to schools throughout the state to educate students, school staff, coaches and parents on preventing heat-related illness.
- Because of the program's preparedness efforts, safety information was available on Arizona's top climate impacts, allowing residents to adapt and respond to record flooding in September 2014 and deadly wildfires in the summer of 2013.

To learn more about the Arizona Extreme Weather and Public Health Program, visit www.azdhs.gov/phs/oeh/extreme/heat/illness.php.

NEW YORK CITY: Creating Resilient Communities

“The events of the past few years show the serious public health threats New York City’s 8.2 million residents already face from extreme weather events like heat waves and coastal storms. With climate change, the severity of these risks will increase. It is imperative that citywide climate adaptation and mitigation measures include health-focused strategies.”

Andriana Azarias

ACTING DIRECTOR, CLIMATE AND HEALTH PROGRAM,
NEW YORK CITY DEPARTMENT OF HEALTH AND MENTAL HYGIENE

THE THREAT TO HEALTH:

- Average summer temperatures in New York City are increasing, and more heat waves are predicted for the future, which increases the risk of heat-related deaths and illness among vulnerable populations.
- Hotter temperatures coupled with poor air quality may lead to increased hospital admissions for cardiovascular and respiratory problems.
- Flooding from coastal storms is projected to increase in frequency and severity and can result in more power outages and home displacements.
- Power outages, from coastal storms or increased demand on the electrical grid during hot weather, can lead to a variety of health and safety hazards, including food and drinking water contamination and heat illness.

ADAPTATION IN ACTION:

- The Climate and Health Program has conducted health risk assessments on rising summer temperatures, extreme heat and ground-level ozone, and coastal storm flooding and power outages to help inform citywide climate adaptation planning and improve public health resilience.

- Focus groups and a heat-health behavior survey conducted by the Climate and Health Program found that while many New York City residents are aware of heat warnings, they do not always think they are at risk. About half of heat-vulnerable people surveyed reported staying home during very hot weather even if they could not stay cool. These findings led to improved heat safety messaging and the creation of the “Be a Buddy” campaign.
- Public health staff are working with partner agencies and social service providers to strengthen outreach networks and protect vulnerable populations.
- The Climate and Health Program is enhancing the Health Department’s surveillance capacity to better predict and prepare for future climate emergencies. As an example, surveillance activities were conducted during widespread utility and power outages following Superstorm Sandy to track cold-related illnesses in near-real time and better target health and safety messaging.



MICHIGAN:

Responding to Local Needs

“Climate change is a global and national issue, but its impacts are felt at the local level, affecting the health and well-being of people in every community. Public health needs to engage with community partners, emergency response and citizen groups to advocate for the protection of the vulnerable and to promote tools and adaptations that make our community healthy, resilient and desirable places to live and work.”

Lorraine Cameron

MANAGER, EPIDEMIOLOGY AND SURVEILLANCE SECTION, DIVISION OF ENVIRONMENTAL HEALTH, MICHIGAN DEPARTMENT OF COMMUNITY HEALTH

THE THREAT TO HEALTH:

- Extreme heat events are associated with increased health care use. During April-August 2013, Michigan health officials recorded more than 4,500 heat-related emergency department visits.
- During a 2013 heat wave in Michigan, dehydration complaints increased nearly 80 percent, sun-associated complaints (i.e. sun burn, sun poisoning or sunscreen reactions) rose by nearly 127 percent and heat-associated complaints (i.e. heat exhaustion, heat stroke or heat reaction) went up 900 percent.
- In Detroit alone, climate models predict the city will experience 30 to 50 days per year of 90 degrees or hotter and 25 to 50 days with temperatures above 97 degrees.

ADAPTATION IN ACTION:

- Thanks to CDC support, the Michigan Climate and Health Adaptation Program is improving state and local capacity to conduct climate change-related health impact assessments (HIA). An HIA is a process that helps evaluate the potential health effects of a plan, project or policy before it is built or implemented.⁴ Such assessments help public health officials more effectively protect people's health. As of 2013, the program had funded two local assessment projects: one in East Lansing and another in Grand Rapids. In East Lansing, local public health officials assessed and offered recommendations to enhance nonmotorized transportation improvements, which can help reduce the emissions that cause climate change. These recommendations also offer safe opportunities for physical activity and reducing pedestrian and bicyclist

- injuries. In Grand Rapids, local health officials assessed a major traffic corridor undergoing redevelopment. The recommendations from the assessment are helping city planners to better consider the health impacts of these activities.
- The program is involved in the Detroit Climate Action Collaborative, which works to ensure that the city's climate action plan protects and benefits all residents. Among its many activities, the collaborative is partnering with the Great Lakes Integrated Sciences and Assessments Center to develop Detroit-specific climate projections. The collaborative is also working with the University of Michigan College of Architecture and Urban Planning to assess the characteristics of climate vulnerable neighborhoods.
- The program works with academic and private sectors to translate research into practice. For example, health officials helped pilot a tool called I-HEAT, which involves the spatial mapping of heat and social vulnerabilities. Health officials also helped pilot a dynamic heat model developed by researchers at Michigan State University. The model considers heat-related social and behavioral factors, such as what prevents or motivates residents from going to cooling centers.
- To tailor adaptations to community needs, the program funded two local health departments to assess residents' heat readiness. Altogether, more than 3,000 surveys were conducted, and the results are already shaping local response and outreach efforts. For example, in Ingham County, health officials learned that local food banks were an ideal venue to reach vulnerable residents with cooling center information.

To learn more about the Michigan Climate and Health Adaptation Program, visit www.michigan.gov/mdch.

⁴ US Centers for Disease Control and Prevention: <http://www.cdc.gov/healthyplaces/hia.htm>

CALIFORNIA:

Integrating Climate Change Into Everyday Public Health

“Public health officials recognize that climate change represents the biggest threat to public health in this century, and so we see addressing climate change as part of our mission to enhance and protect the health of the people of California.”

Neil Maizlish

EPIDEMIOLOGIST AND BRACE PRINCIPAL INVESTIGATOR,
CALIFORNIA DEPARTMENT OF PUBLIC HEALTH

THE THREAT TO HEALTH:

- Based on climate models, California is expected to experience more frequent extreme heat events as well as warmer temperatures overall. For example, models predict an increase in July average temperatures of up to 5 degrees by the 2050s and up to 10 degrees in many California regions by the end of the century. Residents in traditionally cooler areas may be particularly vulnerable to extreme heat. During California's 2006 heat wave, a greater increase in heat-related emergency department visits and hospitalizations was reported in cooler, coastal communities.
- Climate change is expected to increase the number of days in California with poor air quality, which will impact the health of residents living with respiratory and other chronic diseases.
- California public health workers are particularly concerned about the indirect effects of climate change. For example, knowing that income is associated with health status, warmer temperatures could force some residents to divert income to higher energy and food costs.

ADAPTATION IN ACTION:

- To fully leverage funding to strengthen local capacity, the California Department of Public Health's Climate and Health Program is taking a regional approach to climate change planning. The state program is

partnering closely with local health departments within each of California's 10 climate regions and offering assistance with a variety of adaptation endeavors, such as conducting health risk and vulnerability assessments. Given the resource constraints of many local public health agencies, many will not be able to create a position solely dedicated to climate change planning. As such, a main goal of the state effort is helping local public health agencies integrate climate change-related work into already existing programs and activities.

- In addition to building local public health capacity around climate change, the program is partnering across sectors and with regional climate change efforts, ensuring public health considerations are taken into account. For example, the state program is a partner in the Bay Area Climate & Energy Resilience Project, a collaboration of more than 100 public, private and nonprofit stakeholders in the San Francisco Bay Area. Another example is new extreme heat guidance for governmental organizations that the California Department of Public Health developed in partnership with the California Environmental Protection Agency and other state agencies.
- The California Climate and Health Program is providing education and training to fellow health department staff to help them connect the dots between their programmatic focus and the impacts of climate change. Nearly all areas of public health will be affected by climate change, and all agency divisions have a role in adaptation and planning.

A Call for Continued Adaptation

The scientific consensus is clear: climate change is happening. What is also clear: the environmental consequences associated with climate change pose serious threats to human health. As such, CDC's Climate and Health Program is a natural extension of the agency's mission to protect the public's health by safeguarding the nation against preventable disease, disability and mortality. In facing health threats, CDC depends on its state and local partners to tailor efforts to meet the unique needs of diverse communities. CDC's Climate-Ready States and Cities Initiative is a vital part of preparing the nation for climate change.

To learn more about climate change and human health, visit www.cdc.gov/climateandhealth.



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