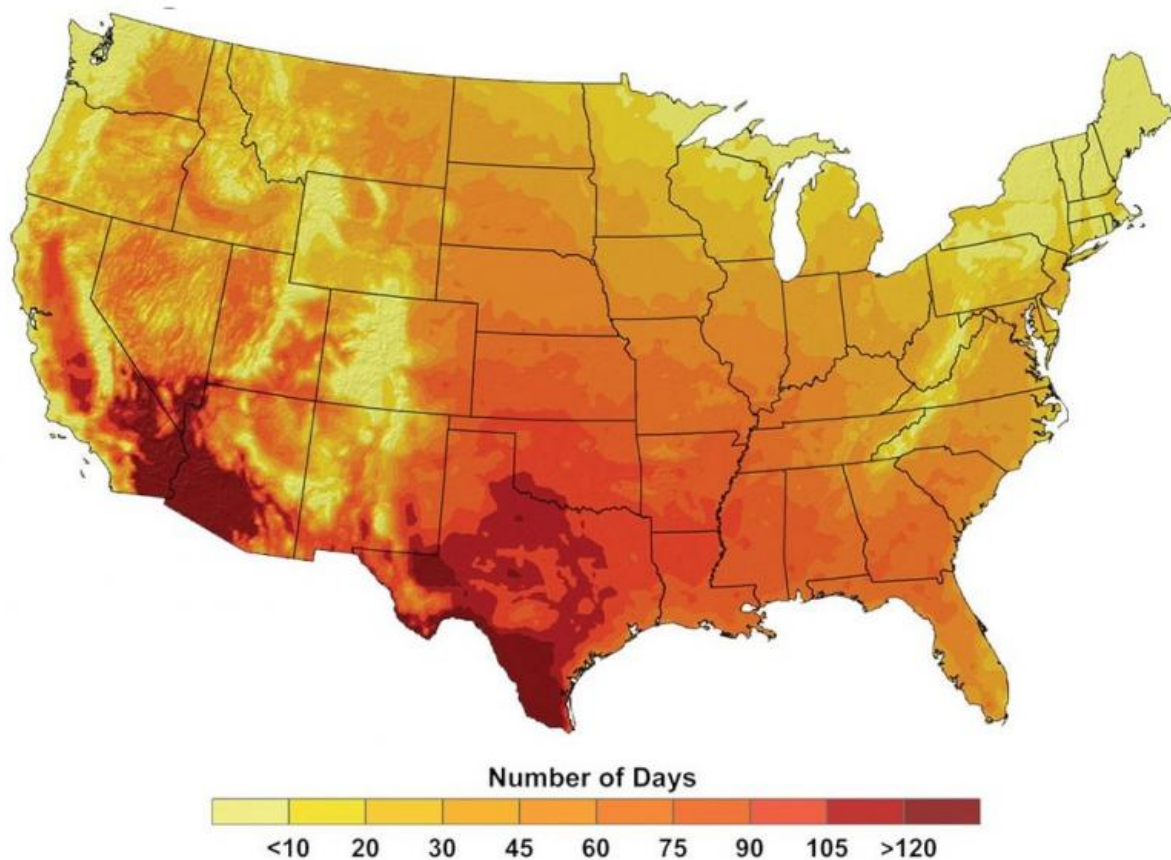


# Wide-ranging recommendations for mitigating the grave effects of climate change on human health

May 8 2017, by Jennie Dusheck



The map depicts an estimate of the number of days that various parts of the United States can expect temperatures topping 100 degrees by 2100 if greenhouse gas emissions continue to increase unabated. Credit: U.S. Global Change Research Program

A farmworker dies in 109-degree heat in a lemon orchard in California, in 2015. In Missouri, hospitalizations for heat-related illnesses skyrocket in 2006, a year of unusually high temperatures.

And since the arrival of Asian tiger mosquitoes in Memphis in 1983, the insects—capable of spreading Zika, dengue and West Nile Virus—have invaded 37 states. In the densely populated Northeast, Asian tiger mosquitoes are poised to triple their range before 2045—doubling the number of people potentially exposed to these diseases from 18 million to more than 30 million.

In every case, the root cause is [climate change](#).

But we're not helpless against such threats, according to a recent report co-authored by researchers at Stanford University. A few weeks before the 2016 election, the authors presented the report to the two presidential transition teams. Titled "[Health: The Human Face of Climate Change, Perspective and Recommendations for the Next U.S. President](#)," the report recommended that a future administration initiate a formal, decade-long emergency response to climate change, managed by the U.S. State Department, and frame climate change as a [global health](#) security issue—in other words, an acute [public health threat](#) to populations across the globe.

"The Human Face of Climate Change" report was one of a series of 14 climate reports that came out of a 2016 conference at Stanford titled "[Setting the Climate Agenda for the Next U.S. President](#)."

One of the report's three authors, Katherine Burke, MM, MSc, who is deputy director of the Center for Innovation in Global Health at Stanford, said that when she and her co-authors set out to write the report, they believed it was an extraordinary opportunity to make an impact. Her co-authors are Michele Barry, MD, a Stanford professor of

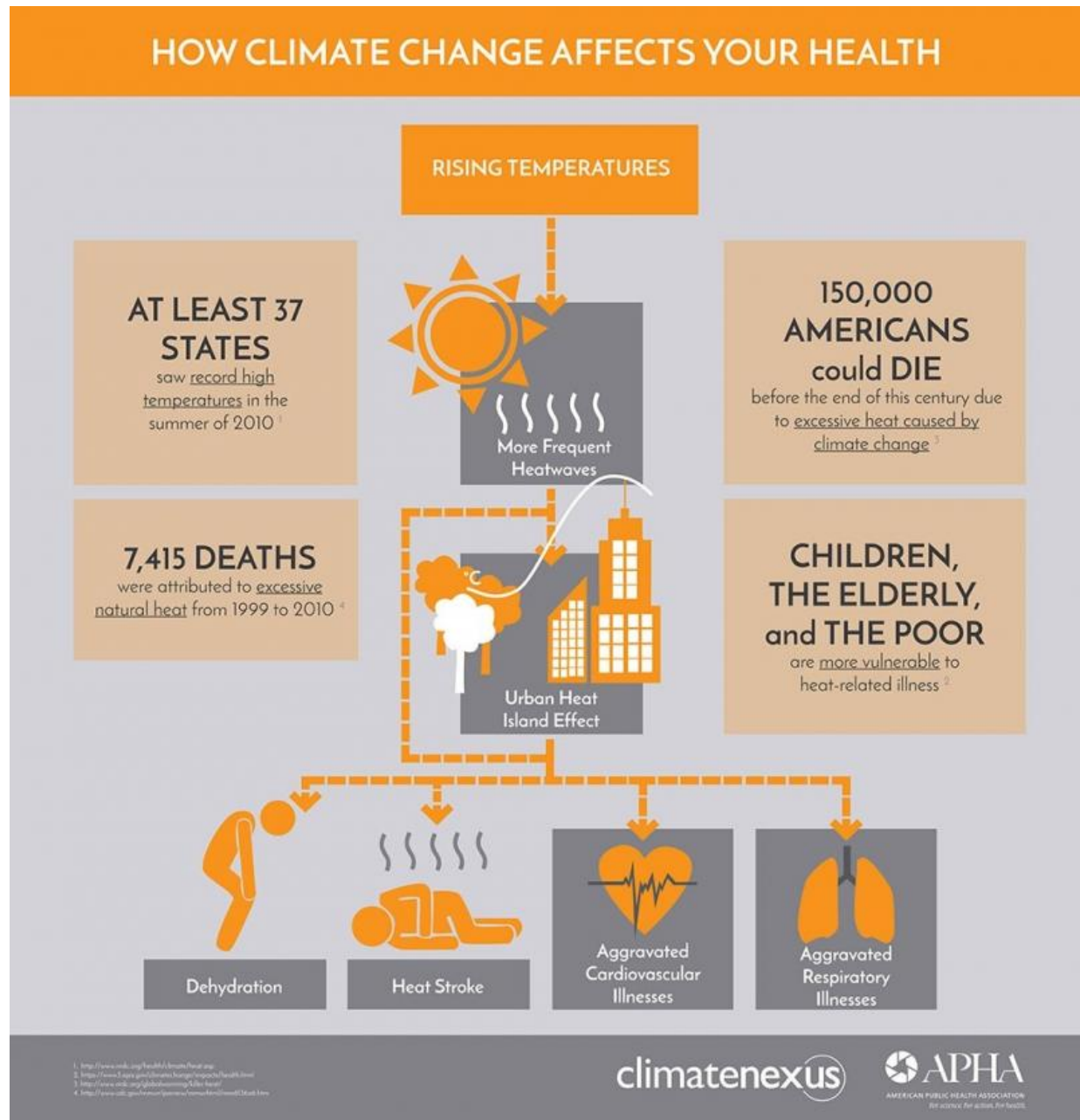
medicine and director of the Center for Innovation in Global Health; and Diana Chapman Walsh, PhD, senior adviser to the center and president emerita of Wellesley College.

Although the report has received no response from President Trump or his administration, the advice it contains still provides a valuable framework for tackling climate change and health, said Walsh.

## **Defining the problem**

Experts agree that the Earth is warming dangerously and that this warming is due to the burning of fossil fuels and other human activities. The damage in ecosystem disruptions, rising sea levels and ever-more intense storms are all well-documented. So, increasingly, are the rapidly changing climate's effects on [human health](#).

Both greater average temperature and searing heat waves have immediate effects on morbidity and mortality through heat-related illnesses such as heat stroke and heat exhaustion. "The single thing that's clearest is the impact of rising ambient temperature," said Mark Cullen, MD, professor of medicine and of biomedical data science "With every degree centigrade rise in summer high temperatures, there's a predictable increase in total mortality."



This infographic depicts some of the expected health effects of rising temperatures. Credit: Climate Nexus and American Public Health Association

Added Cullen, who did not contribute to the report but is an expert on population health, "Most of it is a 'reaping function' like influenza,

which is to say, it's less often completely healthy people who suffer or die; it's people with other chronic diseases who are at risk of dying sooner during heat waves."

In addition, healthy people who normally work outdoors during the heat of the day can be sickened or even killed by extreme heat. Farm workers, road workers and roofers are among those at risk. In a warmer world, the number of days when it's too hot to safely work outside are expected to increase dramatically. Places like Texas, which once had 10 to 20 days a year of temperatures greater than 100 degrees, might see more than 100 a year by the end of the century, according to the National Oceanic and Atmospheric Administration.

Infectious disease will also get worse, as disease vectors such as mosquitoes and ticks grow in numbers and spread. And climate change has hundreds of other indirect effects on health. For example, our cattle and chickens are as vulnerable as we are to 100-plus-degree temperatures that increasingly persist for days or weeks.

Ocean warming and acidification are together killing coral reefs and collapsing marine fisheries, the primary food for some 2 billion people in Asia and the Pacific. Valuable agricultural lands around the world are threatened by drought or, in places such as Bangladesh, inundation from rising seas and flooding.

"If your food basket isn't producing, then your city is going to be in serious trouble," said Burke.

The consequences of shattered food supplies spread outward, causing economic privation, social upheaval, food shortages and the displacement and forced migration of millions. These in turn lead to violence, trauma and physical and mental health disability.

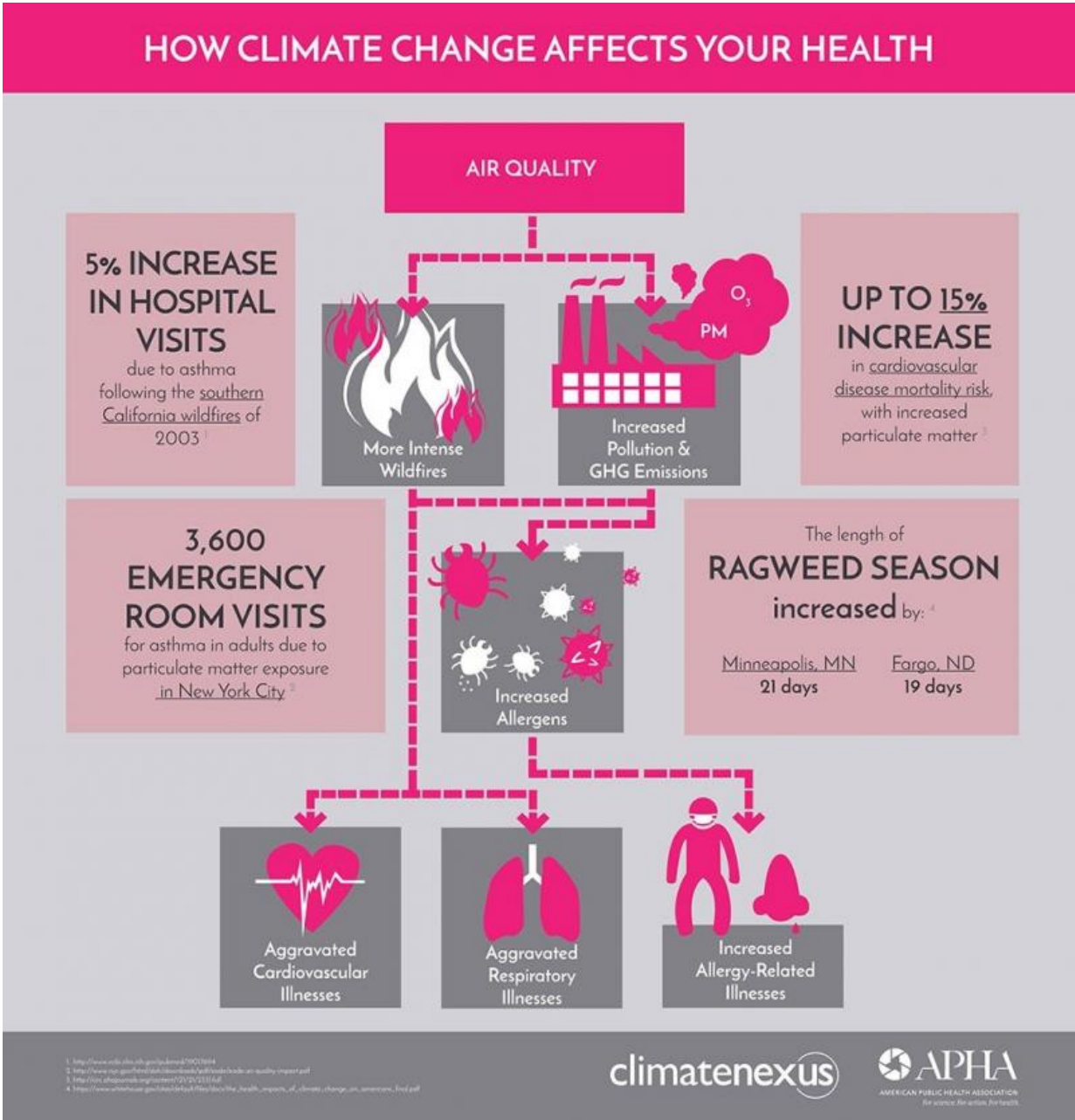
For example, an extreme drought in Syria between 2006 and 2009—which experts believe was due to climate change—caused massive crop failures, which, in turn, triggered the migration of 1.5 million people from farms to cities. Such displacement played a role in the subsequent uprising against President Bashar al-Assad in 2011, experts have argued.

## **What is being done?**

The [health care](#) community already recognizes that tracking, studying and addressing the health impacts of climate change are critically important to strengthening the resilience of societies around the world.

Many institutions have begun integrated programs to consolidate what is known and what questions need to be answered. For example, *The Lancet*, a medical journal, has instituted an international research collaboration called "Lancet Countdown: Tracking progress on health and climate change."





The chart depicts some of the expected effects of climate change on health due to worsening air quality. Credit: Climate Nexus and American Public Health Association

The American Public Health Association—a 25,000-member

organization of public health professionals—designated 2017 the year of climate change and health. And in March, the *New England Journal of Medicine* published an appeal to the administration to stay the course on climate change and health.

The Stanford report recommends the establishment of a State Department-based Presidential Emergency Response to Climate Change, conceptually similar to the 2003 Presidential Emergency Plan for AIDS Relief, which has saved millions of lives. Climate change's impacts on human health compare to that of the AIDS epidemic, said Walsh, one of the report's three co-authors. "Climate change is a huge threat to humanity, a threat to world security and a threat to health security. We have to see it on that scale," she said.

With a \$90 billion budget over 10 years, the report's authors suggested, a federal climate change and health program could develop initiatives including a global climate health surveillance system; vulnerability maps and tools to create projections and early warning programs; plans for adapting to climate change; the integration of health science and climate science; and ways to increase the resilience of at-risk countries to infectious diseases and water insecurity.

Moving to renewable energy is on the table, too. Hospitals in the United States are second only to restaurants in the intensity of their energy use. The Stanford report recommended reducing the health sector's carbon emissions by powering it with renewable energy and increasing energy efficiency, as well as making hospitals and clinics more resilient to storms.

## **Health is the human face of climate change**

The report also recommended framing climate change as a human health issue—partly because it is a health issue and partly to better engage the



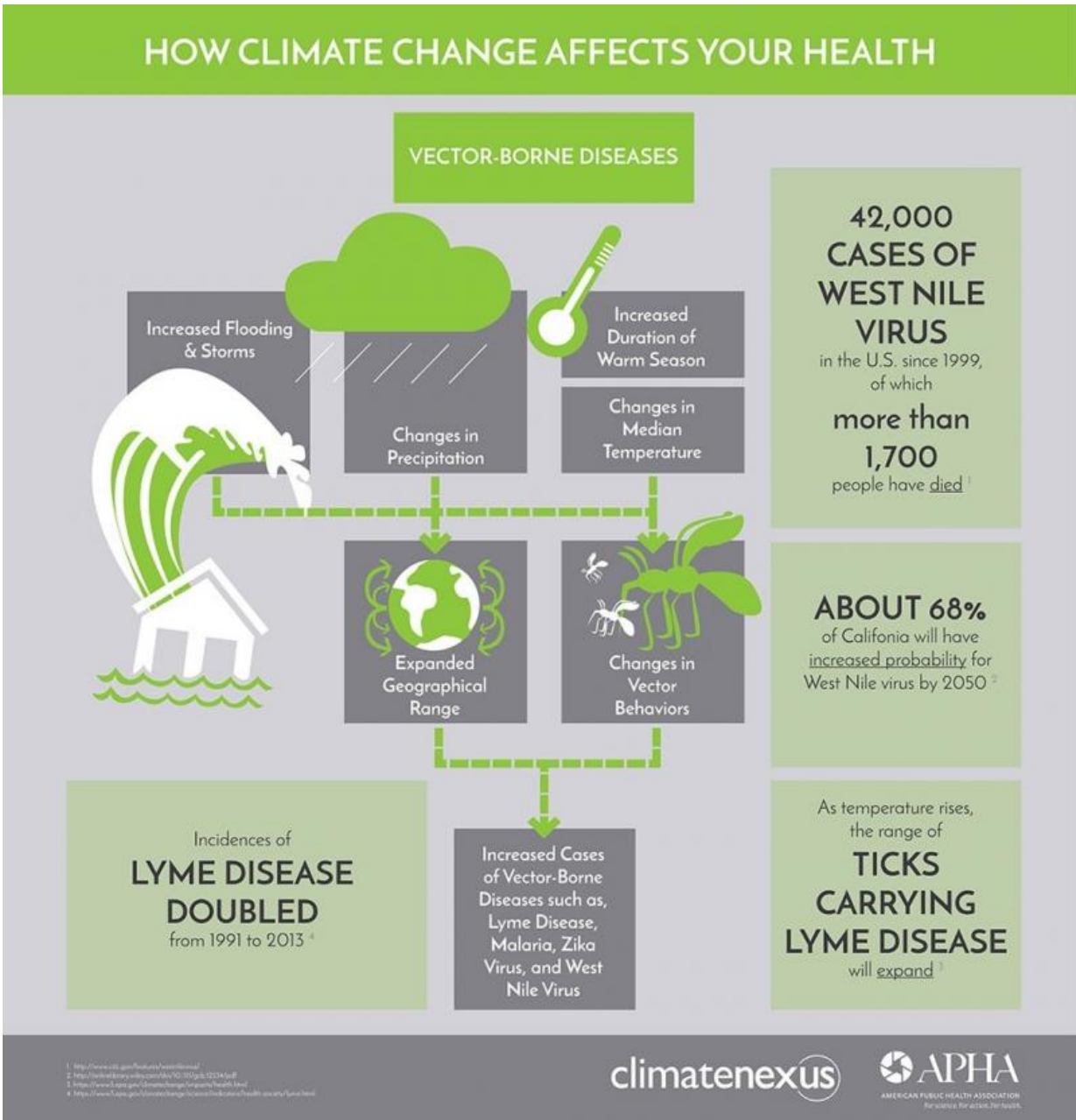
public and the health care community in action that will slow the root cause.

Americans recognize that climate change is a major threat, said Burke. But the subject lacks immediacy, and it's often low on people's lists of concerns. Talking about current impacts on health is a way to engage the public's support for action. "It's no longer an abstract thing"—not vaguely about the health of future generations, Burke said. "It's now. It's our own children and grandchildren; they are growing up in a very different world."

At a recent climate policy meeting, Emily Wimberger, chief economist at the California Air Resources Board, said that when it comes to action, people respond most readily to direct threats to human health and security. People who don't necessarily want to talk about climate change, she said, will pay more attention to the problem when it's framed as a matter of keeping everyone healthy. For instance, as California reduces fossil fuel use, CARB frames the issue as both a way to slow climate change and also a health-centric reduction in smog—one that lowers population risks for asthma, heart disease and dementia.

## Looking forward

Experts agree that addressing the health aspects of [climate](#) change needn't depend on the federal government; it can happen at the level of cities, states, local governments, businesses or institutions, as well as through regional collaborations. "It's not game over; it's game on," said Wimberger.



The chart depicts some of the expected effects of climate change on diseases borne by vectors such as mosquitoes and ticks. Credit: Climate Nexus and American Public Health Association

Hospitals and health care systems have some specific challenges to

tackle, according to the Stanford report. "When a crisis such as a deadly heat wave or a hurricane occurs in a community, two things happen," said Walsh. "First of all, it puts stress on the health care system when the system needs to be able to respond quickly and effectively. But secondly, it's the place that people turn to. It can be a kind of resource. It's a 24/7 organization that is still there and still running when everything else is uncertain.

"Hospitals can be a kind of beacon in a community, a place people can turn to," she added.

## **Need for resilient health systems**

Health care systems need to be especially resilient in times of crisis. Hospitals may need to be able to withstand Katrina-type hurricanes, floods and heat waves. For example, in recent decades, hospitals in Chicago and New Orleans have had to deal with patients developing heat stroke while in hospital beds because of insufficient air conditioning. Staff reportedly couldn't distinguish patients who were suffering from overheating from those who had fevers from infections. Organizationally, a health care system needs to be able to continue to function effectively when things are at their worst.

Some of the solutions will come from the technology sector, others from an understanding of how organizations work and how people function during crisis. Just establishing what the questions are will take research.

Cities also need to think ahead. Cullen, who is also a professor of [health](#) research and policy, said that the effects of heat waves can be anticipated and mitigated. "For example, some big cities, like Chicago, have developed air conditioning shelters for elderly people in urban areas to deal with [heat waves](#)," he said. Chicago also has cooling buses that can pick people up wherever they live.

Walsh said that while she was doing research prior to the election, contacts at the U.S. State Department told her that they "liked the idea in our report of a big coordinated effort that would bring together all these pieces—the data and trying to define more precisely where the vulnerabilities are, including which populations are most at risk and what those risks are."

"And that's a big-data, population problem, something that Stanford does well. This could be a place where Stanford could lead," she said.

Provided by Stanford University Medical Center

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