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The Baffling Nexus of Climate Change and Health

By [DYLAN WALSH](#)

In 2004, a rare tropical fungus caused a string of respiratory failures and neural disorders along the Pacific Northwest coast, baffling the health community. That same year, Alaskan cruise ship passengers dining on local oysters fell sick with a gastric virus typically found in warm water estuaries. Now Texas, after an unusually wet spring and dry summer, is battling what may become the country's worst recorded outbreak of West Nile virus.

Meteorological and ecological shifts driven by climate change are creating a slow and often unpredictable bloom of novel public health challenges across the United States. The American Public Health Association has [declared](#) climate change "one of the most serious public health threats facing our nation," although the precise nature of that threat remains uncertain.

"This is a relatively research-poor area," said [John Balbus](#), a senior adviser on public health at the National Institute of Environmental Health Sciences. In 1999, the nation's first reported cases of West Nile virus spurred interest in the subject, but this soon faded.

Then in 2007, the release of the Fourth Assessment Report by the [Intergovernmental Panel on Climate Change](#) laid out the scientific consensus on the foundation and widespread consequences of climate change. That "gave public health more confidence to again move forward," said George Luber, associate director for climate change at the Centers for Disease Control.

The C.D.C. formally established its [climate and health program](#) in 2009, and the National Institutes of Health [followed suit](#) in 2011.

The short-term challenge, Dr. Balbus said, is making it clear that climate change is not a separate field but rather a background constant with far-reaching health implications. "Just like diet or air pollution, climate influences a whole lot of other factors," he said.

Infectious disease, waterborne and foodborne pathogens, air pollution, allergies, violent weather and extreme heat waves are all public health concerns potentially affected by climate change. Discerning the degree of this effect, however, means tracing a tortuous path between global climate trends and intensely local demographics and epidemiology.

"Vulnerabilities change tremendously by location," said Dr. Luber, who cited the different risk profiles of Boston, Miami and Phoenix as an example. So the C.D.C. is working with 18 states to develop regional adaptation plans for emerging public health risks. That involves integrating environmental data like surface temperature and land-use type with social and economic data to create a map of future public health vulnerabilities.

But predicting the future is never easy. [Tony Goldberg](#), a professor at the University of Wisconsin-Madison who studies the ecology and evolution of infectious disease, said the introduction of West Nile into the United States showed how challenging it can be to forecast new public health risks.

"West Nile refers to a particular region in Uganda," he said. "If you had polled experts at the C.D.C. and the N.I.H. in 1998, saying a virus from equatorial Uganda was going to take hold in the U.S., where might we see it first, the answer would have been something like Florida.

But in fact West Nile was first reported in New York, where the habitat proved more suitable to American robins, who host the disease, and mosquitoes capable of carrying and transmitting the disease. "To predict the occurrence of a vector-borne disease in a new climate, you have to know how the host and vectors will respond to that climate, and that requires intensive research on the ground," Dr. Goldberg said.

The diversity of the threats also makes it challenging to set priorities for response and adaptation plans. It is difficult, for example, to rank the public health risk of stronger hurricanes against the risk of cardiovascular complications from prolonged heat. "One is an acute intense disaster, the other an insidious chronic impact of heat stress," Dr. Balbus said. "It's very hard to compare these two."

Given the complexity, he said, the most promising solutions should yield multiple benefits, short- and long-term. The simple act of planting trees might reduce ambient temperatures, scrub particulates from the air and help prevent flooding that can contribute to waterborne disease.

Public health also remains a less politically contentious subject than climate change, making it a potential spoonful of sugar for the bitter medicine of climate change policy.

"When it comes to health, most people feel like we should be protecting it," Dr. Balbus said. "Tying things that are good for sustainability to short-term benefits for vulnerable kids with asthma, and children in general, presents a potentially strong policy motivator."

The introduction of public health-related policies may be a few years off, as most efforts are currently focused on research, planning and communication between federal and state agencies.

"We've just started to pry open the door to get public health a seat at the table," Dr. Lubber said.