

Waterborne disease risk upped in Great Lakes

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An anticipated increased incidence of climate-related extreme rainfall events in the Great Lakes region may raise the public health risk for the 40 million people who depend on the lakes for their drinking water, according to a new study.

In a report published today (Oct. 7, 2008) in the *American Journal of Preventive Medicine*, a team of Wisconsin researchers reports that a trend toward extreme weather such as the monsoon-like rainfall events that occurred in many parts of the region this past spring is likely to aggravate the risk for outbreaks of waterborne disease in the Great Lakes region.

"If weather extremes do intensify, as these findings suggest, our health will be at greater risk," according to Jonathan Patz, a University of Wisconsin School of Medicine and Public Health professor of population health and an expert on the health effects of climate change.

A primary threat to human health, says Patz, are the extreme precipitation events that overwhelm the combined urban storm water and sewage systems such as those in Milwaukee and Chicago, resulting in millions of gallons of raw sewage being diverted to Lake Michigan. Adding to the risk throughout the region, Patz notes, is the growing concentration of livestock operations where heavy rainfall can wash large amounts of animal waste into the rivers and streams that drain into the Great Lakes, the world's greatest concentration of fresh surface water.

"It's the perfect storm," notes Patz. "Deteriorating urban water infrastructure, intensified livestock operations, and extreme climate change-related weather events may well put water quality, and thereby our health, at risk."

Waterborne diseases caused by pathogenic bacteria, viruses and parasites are among the most common health risks of drinking water. In 1993, Milwaukee experienced an outbreak in city drinking water of the parasite *Cryptosporidium* that exposed more than 400,000 people and killed more than 50.

Patz, who is also affiliated with UW-Madison's Nelson Institute for Environmental Studies' Center for Sustainability and the Global Environment, conducted the study with Stephen Vavrus, a climatologist and director of the UW-Madison Center for Climatic Research, also part of the Nelson Institute.

Changes in regional weather patterns and, in particular, an increase in the number and intensity of severe rainfall events are predicted to accompany global warming. Climatologists have already cataloged a decades-long trend toward more tempestuous weather, says Vavrus.

"We have seen an uptick in the incidence of severe precipitation events in the last couple of years, but this has been a trend for decades," says Vavrus, noting an increased frequency of both major storms and total precipitation in the late 20th century. "And we are expecting climate (in the Great Lakes region) to change significantly in the future, so we'll very likely see an increase in these extreme precipitation events."

Climate change, scientists know, will prompt extremes of the hydrologic cycle, causing intensified precipitation as well as drought. Using the best available computer climate models, the Wisconsin researchers found that southern Wisconsin is likely to experience a 10 to 40 percent increase in

the strength of extremely heavy precipitation events, leading to greater potential for flooding and the waterborne diseases that accompany the high discharge of sewage into Lake Michigan.

Previously, Patz led a U.S. Environmental Protection Agency-funded study linking outbreaks of waterborne disease in the U.S. to extreme rainfall. That study, published in 2001, showed that two-thirds of waterborne disease outbreaks between 1948 and 1994 were correlated with heavy rainfall.

The new study, say Patz and Vavrus, points to a need to strengthen public health infrastructure and improve aging urban drinking water and sewage systems, and to improve land use planning to reduce the amount of runoff that occurs in urban areas during major precipitation events.

"This is where climate policy, land use policy and public health come together," Patz argues.

Source: University of Wisconsin-Madison

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