

Ecologists question effects of climate change on infectious diseases

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Recent research has predicted that climate change may expand the scope of human infectious diseases. A new review, however, argues that climate change may have a negligible effect on pathogens or even reduce their ranges. The paper has sparked debate in the ecological community.

In a forum in the April issue of *Ecology*, Kevin Lafferty of the U.S. Geological Survey's Western Ecological Research Center suggests that instead of a net expansion in the global range of diseases, [climate change](#) may cause poleward range shifts in the areas suitable for diseases as higher latitudes become warmer and regions near the equator become too hot.

The newly suitable areas for diseases will tend to be in more affluent regions where medicines are in widespread use and can more readily combat the diseases, Lafferty says. He cites model estimations that the most dangerous kind of malaria will gain 23 million human hosts outside of its current range by the year 2050, but will lose 25 million in its current range.

"The dramatic contraction of malaria during a century of warming suggests that economic forces might be just as important as climate in determining pathogen ranges," Lafferty says.

Mercedes Pascual of the University of Michigan sees the situation very differently. Pascual is the lead author of one of five Forum papers published in response to Lafferty. Although she agrees that disease

expansion in some areas could be accompanied by retraction in others, she emphasizes that disease range does not always correlate with the number of humans infected. In regions of Africa and South America, for example, humans have historically settled in high latitudes and altitudes. If climate change makes these areas more fit for mosquito breeding and for pathogen development, she writes, then a number of infections could expand. She notes that scientists are already seeing evidence of this pattern.

"It would be very unfortunate if the conclusions in Lafferty's paper were taken as evidence that climate change does not matter to [infectious diseases](#)," Pascual says. "Range shifts will matter and should be better understood."

Lafferty agrees that range shifts mean there will be winners and losers among human populations. Knowing how disease ranges will shift, instead of assuming a global expansion of diseases, will be the key to distributing resources effectively, he says.

Scientists have used the fact that infectious diseases are most prevalent in the tropics to argue that warmer, wetter conditions that might occur under climate change would lead to an increase in infectious disease transmission. However, Lafferty points out that climate change isn't making the whole world warmer and wetter: Warming trends over the last 60 years have led instead to an increase in hot, dry, desert-like climates. Further, he says, infectious diseases don't all increase during warm, wet weather. Meningitis peaks during the tropical dry season, for example, and influenza is an obvious staple of winter weather in temperate climes.

Pascual argues, however, that humans have a history of altering the landscape to suit their needs and thus might unintentionally create better habitat for disease carriers. For example, humans seldom leave

accessible arid areas alone; instead, they irrigate them for use as farmlands. According to Pascual, the creation of water sources could provide havens for [mosquitoes](#), and thus malaria parasites, to remain in areas that would otherwise dry out.

"We live in a world in which urban and rural areas are increasingly interfacing with each other," says Pascual. "This underscores the challenges for predicting the Earth's changing environment."

Lafferty agrees that climate isn't the only issue that affects disease ecology, and maintains that climate may play only a small part in determining disease ranges.

"If we over-emphasize the role of climate, which we have little control over, at the expense of other factors that drive disease dynamics, we may be missing the forest for the trees," he says.

Source: Ecological Society of America

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