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## Will Climate Change Unleash More Animal Viruses on Humans?

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Zombie Viruses. Drug-resistant fungi. “Super-shedding” animals.

Even as officials around the world are scrambling to control a [new and increasingly deadly coronavirus](#) outbreak, public health and infectious disease experts are sounding the alarm about climate change making the risk of other novel afflictions much more explosive.

In recent years, scientists have [linked](#) most emerging infectious diseases to animals, especially wildlife. Much of that wildlife is being displaced by [global warming](#) and [habitat loss](#), putting stressed species that are more susceptible to infection in closer contact with humans. [Recent efforts](#) have revealed a large reservoir of worrisome viruses and other microbes in animals that could spell disaster if they spill over and infect humans.

“We can’t just keep closing down markets and disinfecting,” said Christine K. Johnson, professor of epidemiology and ecosystem health at the University of California at Davis. “We need to work in a more proactive way.”

The market grabbing global headlines in recent weeks was a major seafood distributor in Wuhan, China, epicenter of the deadly outbreak that by Tuesday had killed more than 100 and sickened roughly 4,700 in 16 countries, including at least five cases in the United States. But even before this latest crisis, a major effort called PREDICT funded by the U.S. Agency for International Development (USAID) had, over 10 years, uncovered nearly 1,000 new animal-borne viruses of concern in Asia and Africa alone. Johnson said the project looked specifically

for viruses that belong to families with known human pathogens like the deadly Ebola and Nipah viruses.

She noted the tally counted 92 coronaviruses, the family that includes SARS, MERS, and the new Wuhan coronavirus. The latter virus has been [tentatively linked](#) to horseshoe bats, perhaps via intermediate animals like snakes that were sold at the now-shuttered market where the disease likely jumped to humans.

Global surveillance efforts may need to look elsewhere for support, however. While some components of the PREDICT program were expected to continue, USAID [discontinued](#) its funding for the core surveillance and pandemic prevention work at the close of 2019. In other words, the infrastructure put in place to keep tabs on future pandemics is being slashed even as this new scare gains traction.

Global warming can accelerate displacement by thawing, burning, flooding, or drying out habitats in response to hotter temperatures and stronger storms. “As habitats change and people move and wildlife moves, they’re going to be coming into contact more with each other,” said Jeanne Fair, a biosecurity and public health expert at Los Alamos National Laboratory in Los Alamos, New Mexico. Increasingly close contact, in turn, significantly raises the risk that an animal disease will spill over into humans.

In the 1998-1999 Nipah virus outbreak in Malaysia that killed more than 100 people, for example, researchers [concluded](#) that fruit bats dislodged by forest fires and an El Niño-related drought began feeding on fruit trees grown on the same farms as pigs. The close proximity allowed the virus to jump from bats to pigs to farmers.

Fair said stressed animals, whether due to displacement or confinement in live animal markets, are more susceptible to disease. “When you’re stressed, you’re immunocompromised, and therefore you shed more virus,” she said. This “super-shedder” effect, as it’s known, can further increase the danger of a spillover event.

The risk of pathogens emerging due to climate change isn’t limited to the tropics, either.

Researchers [recently announced finding](#) 33 viruses—28 of which were new to science—that had been entombed for 15,000 years in ice cores within a melting glacier in Tibet. In a worst-case scenario, the researchers reported, “This ice melt could release pathogens into the environment.” Many microbes never cause disease in humans, of course, but the specter of “zombie viruses” waking up after being frozen for millennia in glaciers and permafrost has inspired urgent calls for more surveillance.

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