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[www.afgazad.com](http://www.afgazad.com)

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Philip Guelpa  
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## ***Climate change will lead to increasing spillover of viruses to humans, potentially causing new pandemics***

A groundbreaking study newly published in the journal *Nature* (Carlson, Albery et al., “Climate change increases cross-species viral transmission risk”) concludes that ongoing climate change will dramatically increase the potential for viruses that already exist among animal populations to be spread to humans, as has already happened with SARS-CoV-2, and others such as HIV and Ebola, collectively known as zoonotic (animal derived) disease spillovers.

This alarming finding is based on the development of a model by these researchers which projects how the warming of the planet will likely cause displacement in a sample of over 3,000 mammal species over the next 50 years, assuming a likely increase of 2 degrees Celsius (3.6 degrees Fahrenheit) in average global temperature.

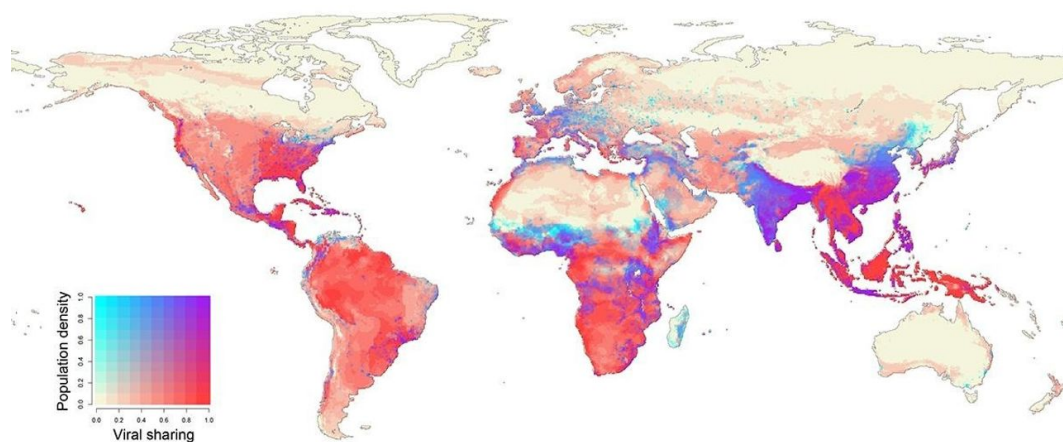
Geographically shifting ecozones will force animals, plants and other organisms to adjust their territorial distributions as the spatial limits of the habitats to which they are adapted are altered. This will involve the actual movement of individuals and/or the gradual adjustment of ranges as some populations die off and others, located in more favorable environments, are more successful.

These changes will not, due to a whole variety of factors (e.g., topography, latitude, rainfall patterns), simply displace existing ecozones intact. Rather, wholesale alterations

will result in “mixing and matching” of varied environmental constituents, consequently bringing together species not previously in close proximity to each other and creating adaptive stresses which will likely favor some species over others, resulting in extinctions. Overall, the result will be a significant decrease in the stability of ecosystems.

As a result, the opportunity for viruses to spread not only between different, formerly dispersed populations of the same species but also between species, including to humans, will be increased.

An estimated 40,000 viruses exist that infect mammals. Of these, 10,000 are thought to have the potential to infect humans but are currently only found in animals. The model projects that climate change will result in approximately 300,000 “first encounters” between species not previously in contact. It is estimated that cross-species dispersal of viruses will occur on the order of 15,000 times, with over 4,000 of these among mammals alone, within the model’s timespan.



This map visualizes projected novel viral-sharing events near human population centers in equatorial Africa, south China, India and Southeast Asia in 2070. These will increasingly overlap with projected hotspots of cross-species viral transmission in wildlife. (Image courtesy of Colin Carlson/GUMC)

Furthermore, as new host species are infected, creating new selective environments for the viruses, it can be anticipated that novel variants will evolve, as we are currently experiencing with SARS-CoV-2. It must also be anticipated that viral exchanges between

non-human species will also severely affect wild animal populations, resulting in their own unanticipated impacts.

Many factors influence whether any given interaction between species will result in effective viral transfer. The study does not project how many viruses will ultimately cause disease in humans, but the potential is significant. These findings augment earlier studies that examined how other forms of habitat disturbance and human incursion into existing wild areas will also increase the potential for animal to human viral transmission.

The effects will likely be especially pronounced, at least initially, in species-dense areas with high human population densities and significant economic inequality, such as tropical Africa and Asia, which experience massive numbers of “climate migrants” and thus a growing “interface” between animals and humans.

A co-author of the study, Gregory Albery, a disease ecologist at Georgetown University, told *The Guardian* that already occurring climate change is “shaking ecosystems to their core,” which means that significant animal to human viral transmission is already underway and likely to worsen.

In an interview with *The Atlantic*, another co-author of the study, Georgetown global-change biologist Colin Carlson, stated that the planetary network of viruses and wildlife “is rewiring itself right now.” He found the revelations “so large and heavy to behold that even as we were writing them, we didn’t want to.”

Commenting on the study to *The Guardian*, Aaron Bernstein, interim director of the Center for Climate, Health, and the Global Environment at Harvard University, said, “Vaccines, drugs and tests are essential but without major investments in primary pandemic prevention, namely habitat conservation, strictly regulating wildlife trade, and improved livestock biosecurity, as examples, we will find ourselves in a world where only the rich are able to endure ever more likely infectious disease outbreaks.”

The outbreak of pandemic diseases has been projected for decades. Urgent warnings that preparations should be made in advance have been issued repeatedly, and largely ignored, with the interests of business having been taken as paramount. Responses to every new outbreak have been short-lived. When the peak of the crisis has passed or pretended to

have passed, as is currently the case with COVID-19, resources are quickly redirected into more profitable undertakings for the capitalist class. As a result, the rapid mobilization which should be undertaken to stop the spread of a new disease early in its development is significantly hampered.

The anticipated scenario based on the new model is truly sobering, Carlson told *The Atlantic*. It predicts that the COVID-19 pandemic is likely only the beginning of repeated outbreaks of new diseases, some of which may reach pandemic proportions. Given the disastrous response to COVID-19 by most nations of the world, the consequences of which are still unfolding, the prospect of wave after wave of such catastrophes would devastate humanity, not to mention a good portion of other living things on earth. The rate of change is such that multiple deadly pandemics may occur simultaneously.

The effects of climate change extend well beyond the spread of zoonotic diseases. The wholesale disruption of ecosystems and consequent ecological instability will certainly result in widespread extinctions, possibly the earth's sixth mass extinction, but, in contrast to the previous five, this will be anthropogenic in origin. The biological systems on which humans rely for food will be severely impacted, if not totally devastated.

The growing understanding of the processes driving the increasing appearance of zoonotic diseases provides another nail in the coffin of reactionary attempts to blame China for somehow being responsible for the spread of COVID-19.

Only a massive, globally coordinated and scientifically based mobilization of resources can stem this otherwise inevitable disaster. As has been demonstrated, capitalism is utterly incapable of and unwilling to mount the necessary effort. The only way forward is for the international working class to take power and implement a socialist reorganization of society.

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