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Headline: Climate change could unleash new epidemics

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Long-dormant viruses brought back to life, the resurgence of deadly and disfiguring smallpox, and a dengue or zika “season” in Europe.

These could be disaster movie storylines, but they are also serious and increasingly plausible scenarios of epidemics unleashed by global warming, scientists say.

The coronavirus disease 2019 (Covid-19) pandemic that has swept the globe and claimed over 760,000 lives so far almost certainly came from a wild bat, highlighting the danger of humanity’s constant encroachment on the planet’s dwindling wild spaces.

But the expanding ecological footprint of our species could trigger epidemics in other ways too.

Climate change — already wreaking havoc with one degree Celsius of warming — is also emerging as a driver of infectious disease, whether by expanding the footprint of malaria- and dengue-carrying mosquitoes, or defrosting prehistoric pathogens from the Siberian permafrost.

“In my darkest moments, I see a really horrible future for Homo sapiens because we are an animal, and when we extend our borders things will happen to us,” said Birgitta Evengard, a researcher in clinical microbiology at Umea University in Sweden.

“Our biggest enemy is our own ignorance,” she added. “Nature is full of microorganisms.”

Think of permafrost, a climate change time bomb spread across Russia, Canada and Alaska that contains three times the carbon that has been emitted since the start of industrialization.

Even if humanity managed to cap global warming at under 2 degrees Celsius, the cornerstone goal of the 2015 Paris Agreement, the permafrost area would decrease by a quarter by 2100, according to the United Nations’ climate science panel, the Intergovernmental Panel on Climate Change.

And then there are the permafrost’s hidden treasures.

“Microorganisms can survive in frozen space for a long, long time,” said Vladimir Romanovsky, a professor of geophysics at the University of Alaska in Fairbanks.

As ground thaws, once-frozen soil particles, organic material and microorganisms that had been locked away for millennia are carried toward the surface by water flows, he explained.

There are already examples of ancient, long-frozen bugs coming to life.

“When you put a seed into soil that is then frozen for thousands of years, nothing happens,” said Jean-Michel Claverie, an emeritus professor of genomics at the School of Medicine of Aix-Marseille University in France.

“But when you warm the earth, the seed will be able to germinate,” he added. “That is similar to what happens with a virus.”

Claverie’s lab has successfully revived Siberian viruses that are at least 30,000 years old.

These reanimated bugs only attack amoebas, but tens of thousands of years ago there were certainly others that aimed higher up the food chain.

“Neanderthals, mammoths, woolly rhinos all got sick, and many died,” said Claverie. “Some of the viruses that caused their sicknesses are probably still in the soil.”

The number of bacteria and viruses lurking in the permafrost is incalculable, but the more important question is how dangerous they are.

And here, scientists disagree.

“Anthrax shows that bacteria can be resting in permafrost for hundreds of years and be revived,” said Evengard.

In 2016, a child in Siberia died from the disease, which had disappeared from the region at least 75 years earlier.

Other pathogens — such as smallpox or the influenza strain that killed tens of millions in 1917 and 1918 — may also be present in the sub-Arctic region.

But they “have probably been inactivated,” Romanovsky concluded in a study published earlier this year.

For Claverie, however, the return of smallpox — officially declared eradicated 50 years ago — cannot be excluded. 18th- and 19th-century victims of the disease “buried in cemeteries in Siberia are totally preserved by the cold,” he noted.

The real danger, he added, lies in deeper strata where unknown pathogens that have not seen daylight for two million years or more may be exposed by global warming.

If there were no hosts for the bugs to infect there would not be a problem, but climate change, indirectly, has intervened here, as well.

“With the industrial exploitation of the Arctic, all the risk factors are there — pathogens and the people to carry them,” Claverie said.

The revival of ancient bacteria or viruses remains speculative, but climate change has already boosted the spread of diseases that kill about half a million people every year: malaria, dengue, chikungunya and Zika.

For the moment, the signals for communicable tropical diseases “are worrying in terms of expanding vectors, not necessarily transmission,” said Cyril Caminade, an epidemiologist working on climate change at the Institute of Infection and Global Health at the University of Liverpool.

“That said, we’re only tasting the aperitif of climate change so far,” he added.