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Bird flu is highly lethal to some animals, but not to others. Scientists want to know why

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A dead sea bird lays beside a dead sea lion on the beach at Punta Bermeja, on the Atlantic coast of the Patagonian province of Río Negro, near Viedma, Argentina, Monday, Aug. 28, 2023. Government experts suspect that bird flu is killing sea lions along Argentina's entire Atlantic coastline, causing authorities to close many beaches in order to prevent the virus from spreading further. Credit: AP Photo/Juan Macri, File

In the last two years, bird flu has been blamed for the deaths of millions of wild and domestic birds worldwide. It's killed legions of seals and sea lions, wiped out mink farms, and dispatched cats, dogs, skunks, foxes and even a polar bear.

But it seems to have hardly touched people.

That's "a little bit of a head scratcher," although there are some likely explanations, said Richard Webby, a flu researcher at St. Jude Children's Research Hospital in Memphis, Tennessee. It could have to do with how infection occurs or because species have differences in the microscopic docking points that flu viruses need to take root and multiply in cells, experts say.

But what keeps scientists awake at night is whether that situation will change.

"There's a lot we don't understand," said Dr. Tom Frieden, a former CDC director who currently heads Resolve to Save Lives, a not-for-profit that works to prevent epidemics. "I think we have to get over the 'hope for the best and bury our head in the sand' approach. Because it could be really bad."

Some researchers theorize that flu viruses that originated in birds were the precursors to terrible scourges in humans, including pandemics in 1918 and 1957. Those viruses became deadly human contagions and spread in animals and people.

A number of experts think it's unlikely this virus will become a deadly global contagion, based on current evidence. But that's not a sure bet.

Just in case, U.S. health officials are readying vaccines and making other preparations. But they are holding off on bolder steps because the virus

isn't causing severe disease in people and they have no strong evidence it's spreading from person to person.

The flu that's currently spreading—known as H5N1—was first identified in birds in 1959. It didn't really begin to worry health officials until a Hong Kong outbreak in 1997 that involved severe human illnesses and deaths.

It has caused hundreds of deaths around the world, the vast majority of them involving direct contact between people and infected birds. When there was apparent spread between people, it involved very close and extended contact within households.

Like other viruses, however, the H5N1 virus has mutated over time. In the last few years, one particular strain has spread alarmingly quickly and widely.

In the United States, animal outbreaks have been reported at dozens of dairy cow farms and more than 1,000 poultry flocks, according to the U.S. Department of Agriculture. Four human infections have been reported among the hundreds of thousands of people who work at U.S. poultry and dairy farms, though that may be an undercount.

Worldwide, doctors have detected 15 human infections caused by the widely circulating bird flu strain. The count includes one death—a 38-year-old woman in southern China in 2022—but most people had either no symptoms or only mild ones, according to the U.S. Centers for Disease Control and Prevention.

There's no way to know how many animals have been infected, but certain creatures seem to be getting more severe illnesses.

Take cats, for example. Flu is commonly thought of as a disease of the

lungs, but the virus can attack and multiply in other parts of the body too. In cats, scientists have found the virus attacking the brain, damaging and clotting blood vessels and causing seizures and death.

Similarly gruesome deaths have been reported in other animals, including foxes that ate dead, infected birds.

The flu strain's ability to lodge in the brain and nervous system is one possible reason for "higher mortality rate in some species," said Amy Baker, an Iowa-based U.S. Department of Agriculture scientist who studies bird flu in animals. But scientists "just don't know what the properties of the virus or the properties of the host are that are leading to these differences," Baker said.

Unlike cats, cows have been largely spared. Illnesses have been reported in less than 10% of the cows in affected dairy herds, according to the USDA. Those that did develop symptoms experienced fever, lethargy, decreased appetite and increased respiratory secretions.

Cow infections largely have been concentrated in the udders of lactating animals. Researchers investigating cat deaths at dairy farms with infected cows concluded the felines caught the virus from drinking raw milk.

Researchers are still sorting out how the virus has been spreading from cow to cow, but studies suggest the main route of exposure is not the kind of airborne droplets associated with coughing and sneezing. Instead it's thought to be direct contact, perhaps through shared milking equipment or spread by the workers who milk them.

Then there's the issue of susceptibility. Flu virus need to be able to latch onto cells before they can invade them.

"If it doesn't get into a cell, nothing happens. ... The virus just swims around," explained Juergen Richt, a researcher at Kansas State University.

But those docking spots—sialic acid receptors—aren't found uniformly throughout the body, and differ among species. One recent study documented the presence of bird flu-friendly receptors in dairy cattle mammary glands.

Eye redness has been a common symptom among people infected by the current bird flu strain. People who milk cows are eye level with the udders, and splashes are common. Some scientists also note that the human eye has receptors that the virus can bind to.

A study published this month found ferrets infected in the eyes ended up dying, as the researchers demonstrated that the virus could be as deadly entering through the eyes as through the respiratory tract.

Why didn't the same happen in the U.S. farmworkers?

Some experts wonder whether people have some level of immunity, due to past exposure to other forms of flu or to vaccinations. However, a study in which human blood samples were exposed to the virus indicated there's little to no existing immunity to this version of the virus, including among people who'd had seasonal flu shots.

A more menacing question: What happens if the virus mutates in a way that makes it more lethal to people or allows it to spread more easily?

Pigs are a concern because they are considered ideal mixing vessels for bird flu to potentially combine with other flu viruses to create something more dangerous. Baker has been studying the current strain in pigs and found it can replicate in the lungs, but the disease is very mild.

But that could all change, which is why there's a push in the scientific community to ramp up animal testing.

Frieden, of Resolve to Save Lives, noted public health experts have been worried about a deadly new flu pandemic for a long time.

"The only thing predictable about influenza is it's unpredictable," he said.

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