

Despite 1993 cases, hantavirus remains mostly a mystery

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In his 30-plus years as a doctor, Bruce Tempest had never seen anything like it.

A Navajo man having trouble breathing showed up at the emergency room of a small hospital in Gallup, N.M. Less than an hour later, he was dead. The man had been young, athletic and otherwise healthy. His fiancée had died days before, also from sudden [breathing problems](#).

"This is something different," Tempest, now 76, remembered thinking of the 1993 illnesses. "It just doesn't fit."

Tempest contacted area doctors, looking for other cases. Then he asked the University of New Mexico for help. Soon, the patients were being flown to Albuquerque. They arrived with chills and aches but soon were in complete [respiratory distress](#). Physicians were at a loss: Was it [sepsis](#)? Influenza? [Bubonic plague](#)?

Doctors had a medical mystery, and they knew it had to be solved quickly. Patients were showing up at the hospital "not feeling well one day and being dead the next," said Gregory Glass, an [epidemiologist](#) at Johns Hopkins University.

When the cases hit television, a lucky clue came in. A doctor called and said the illness sounded a lot like a virus he had observed in Korea in the 1950s. It was called hantavirus.

This summer's hantavirus outbreak in [Yosemite National Park](#) is as a sobering reminder: Mystery still surrounds the disease.

"The biggest mystery is we don't have a good explanation," said Barbara Knust, a U.S. [Centers for Disease Control and Prevention](#) epidemiologist. "For Yosemite, why this year of all years is there an increased number of cases?"

Nearly 20 years after being identified in the U.S., hantavirus is better understood but no less vexing. Researchers now know it causes hantavirus pulmonary syndrome, a severe respiratory disease. It is transmitted through the droppings and urine of [deer mice](#), and not through person-to-person contact. Treated early, patients have a better chance of survival. But there is no cure, and more than one-third of patients die.

The Yosemite cases follow the pattern: Three of the eight visitors who fell ill died. Health officials have called the Yosemite outbreak unprecedented - more than one hantavirus infection from the same location in the same year is very rare.

The National Park Service has closed the cabins believed to be at the heart of the outbreak. State and federal scientists are scouring the park, trapping mice and conducting laboratory tests. Public health officials are warning doctors worldwide to watch for possible symptoms, which can be confused with the flu and can take weeks to show up.

And the California Department of Public Health said the risk of new cases remains, even as the summer surge of visitors wanes.

"These are not isolated cases in the hospitals in the mountains," said Daniel Uslan, assistant professor of infectious diseases at the University of California, Los Angeles medical school. "These are potentially people

coming back to Los Angeles or other urban centers where doctors are perhaps not as aware of the infection."

Officials investigating the Yosemite cases have more to go on than a lucky tip. But just like in 1993, they are under pressure to quickly learn more about a disease that is pervasive and deadly.

As patients continued dying in the Four Corners region, doctors and epidemiologists had to accomplish three monumental tasks: pinpoint the cause of the illness, determine why only some people were getting it and track down its origin.

The CDC analyzed tissue from survivors and those who had died. Researchers tested for antibodies against viruses and hoped for a hit, said Glass, the Johns Hopkins epidemiologist. When they tried hantavirus, they got a match.

Still, they didn't know why certain people got sick and others didn't. Paul Ettestad, part of the CDC team, visited homes throughout the Four Corners and asked relatives what the victims did in the days before they got sick. He also compared the victims' homes with neighbors' homes.

Researchers also tried to find the source of the disease. Knowing that rodents carried hantavirus, they trapped hundreds of small mammals and found the virus in nearly one-third of the deer mice, according to the CDC. By year-end, scientists isolated the specific type of hantavirus that caused the Four Corners cases and grew it in a laboratory.

"From an epidemiologist's point of view, this was amazing," Glass said. "We use it as a textbook case of how to do a really good epidemiology."

The CDC started tracking every case of hantavirus [pulmonary syndrome](#) across the U.S. In 1993, 48 people became ill. From 1994 to 2011, an

average of 28 people got the disease each year.

Cases are more common in the Southwest but still are rare, said Elisabeth Lawaczeck, a public health veterinarian for the state of Colorado. "You have to be in the wrong place, in the wrong time, do the wrong thing - and inhale," she said.

Scientists still don't know why certain deer mice get hantavirus or how they spread it. And even though deer mice are ubiquitous, they haven't figured out why outbreaks occur in certain areas at certain times.

The Four Corners cases were eventually linked to heavy rainfall that year, which meant more vegetation - and more food - for deer mice, causing a population boom. There were 10 times more deer mice in the Four Corners in May 1993 than a year earlier, according to the CDC.

Yosemite may provide more clues in the long-running hantavirus mystery. [Public health](#) officials and epidemiologists are compiling information about the cases, hoping they can determine the deadly combination of factors that led to the outbreak.

The construction of the cabins in Curry Village - with more insulation and less ventilation - may have contributed, said Stan Deresinski, an infectious disease specialist at Stanford University School of Medicine. Seven of Yosemite's eight hantavirus cases originated in those cabins.

Or perhaps there was something different about this year's deer mouse population. Were there more of them? Were they clustered closer to humans? Whatever the reason, experts warn that deer mice aren't going anywhere, so hantavirus isn't either.

"The Sierras are their home, and there are 4 million visitors a year to Yosemite," Deresinski said. "It is amazing there haven't been more

cases."

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