

## Are viruses on the rise or does it just seem that way? Yes and yes

March 24 2015, by Alan Bavley, The Kansas City Star

---

The man wasn't any sicker at first than many of the other patients who arrive at University of Kansas Hospital, infectious disease specialist Dana Hawkinson recalls.

But he went downhill fast. Fever spiking, kidneys failing, breath so short he needed supplemental oxygen.

He had been bitten by ticks while working outdoors, so he probably had one of the many diseases commonly spread by bug bites in the Midwest, Hawkinson figured. But the tests the doctor ran - for ehrlichiosis, Rocky Mountain spotted fever, Lyme disease, West Nile [virus](#) - all turned up negative.

Maybe, Hawkinson thought, this patient had Heartland virus, a severe infection discovered just a few years earlier in St. Joseph. As the man lay dying in intensive care, Hawkinson sent a blood sample to the federal Centers for Disease Control and Prevention.

The CDC delivered a shocker. The patient didn't have Heartland virus. He had another virus - one nobody had ever seen before.

"It was very much a surprise," Hawkinson said. "Everyone here at the hospital hopes to help, but we couldn't. It was very hard. We just didn't have any answers."

That new pathogen - named Bourbon virus after the county in southeast

Kansas where the patient lived - is just the latest virus grabbing headlines, joining Ebola, SARS and MERS, West Nile virus and strains of flu that can mutate before vaccine manufacturers have time to respond. Now, too, there's [chikungunya virus](#), which is carried by mosquitoes and appears poised to establish a beachhead in the United States.

Are we really under siege from a growing number of new exotic and lethal viruses? Or does it just seem that way?

The answers are yes - and yes.

The world we live in now, with its changing climate, burgeoning population and constant travel, is introducing us to all kinds of viruses that once hid in animals inhabiting the world's obscure corners, scientists say.

Meanwhile, new laboratory technologies have made it possible to quickly and easily identify old viruses that may have gone incognito for hundreds or thousands of years while afflicting untold generations of people.

"In a lot of cases, they're not new viruses. We just didn't have the tools to identify them," said Rafal Tokarz, a research scientist at Columbia University's Center for Infection and Immunity. "In the past, it was probably something that would be missed or misdiagnosed."

Bourbon and Heartland viruses probably fall into this category.

It's possible that countless other people have gotten ill from the Bourbon virus but typically recovered, Hawkinson said.

"They may have been misdiagnosed (with a different illness) or the doctor may have said, 'I don't know what you have, but you got better.'"

That happens a lot."

And those undiagnosed Bourbon cases could have been happening for a very long time.

"It's reasonable to say decades or centuries, for sure, maybe longer," Hawkinson said.

Answering basic questions such as how common Bourbon virus is and even whether it's spread by ticks will have to await further research. The Kansas Department of Health and Environment is in discussions with the CDC on such studies.

That kind of research already is underway on Heartland virus in Missouri. The virus got its name from Heartland Regional Medical Center, the St. Joseph hospital, now known as Mosaic Life Care, where the first cases were reported.

In June 1999, two farmers showed up with fever, fatigue, diarrhea and low levels of white blood cells and platelets. Both men had been bitten by ticks. Scott Folk, the hospital's infectious disease expert, suspected ehrlichiosis, a bacterial illness carried by ticks, and put the patients on antibiotics.

Usually, patients start feeling better in a day or two, Folk said. But these two were slow to recover.

Folk sent their blood to the CDC. A cell culture didn't grow bacteria but showed signs there might be a virus.

Heartland became the first new human virus identified in the United States since 1993, when hantavirus was found in the Four Corners region, where Arizona, New Mexico, Colorado and Utah meet.

The U.S. now has nine confirmed Heartland cases. They include a Tennessee farmer who died in August 2013 and an Oklahoma man who died last May.

Laboratory technology has taken leaps and bounds in the past decade or so, and that's "a significant factor in identifying these viruses," Folk said.

Polymerase chain reaction testing makes it possible to take the DNA of a virus and produce thousands of copies to make the virus easier to identify. The same kind of genetic sequencing technology that made it possible to map the human genome allows scientists to map the genetics of viruses. And computer databases let scientists rapidly compare an unknown virus to hundreds of known viruses.

Sequencing a virus's DNA might have taken weeks of lab work 10 or 15 years ago. Now it can be done in minutes.

"We have new technology that allows us to dive deeper," said Nirav Patel, an infectious disease expert at St. Louis University. "Things that used to be very esoteric have become commonplace."

In the past a doctor might just tell a patient, "You have a virus," without being able to identify it, Patel said. "The disease was a black box. All the tests would come out negative. New technologies come online and we find new viruses."

Unlike bacteria, which are single-cell organisms, viruses are strands of genetic material, DNA or RNA, that invade the cells in an organism and hijack their biological machinery to replicate thousands of copies that go on to infect other cells.

While there are more bacteria and fungi than viruses that are known to

cause human illnesses, viruses account for two-thirds of recently discovered human pathogens. Bacteria are less likely to jump from animals to people, scientists say. The reason is that viruses evolve far more rapidly and can adapt to people faster than other kinds of pathogens.

In a 2012 report, a group of British scientists counted 219 species of viruses that are known to be able to infect people. They estimated that three or four new virus species were being found every year, with at least dozens and possibly many more left to discover.

"There's way more (viruses) that we don't know about. Almost every organism carries viruses," Tokarz said.

His colleagues at Columbia recently estimated that the world's mammals, the kinds of animals most likely to pass their infections to people, carry at least 320,000 so-far-undiscovered viruses.

"That doesn't necessarily mean they're all pathogenic to us," Tokarz said. "There is no way to know if they could infect people. It's probably a very, very small percentage. The vast majority of viruses that scientists find don't infect people."

But as the growing human population moves into more animal habitats, the viruses that can infect people seem to find us.

"By extending our range, we encounter viruses we wouldn't have otherwise," Tokarz said. "It's the nature of the world we live in now. It's how it is, unfortunately."

The current Ebola epidemic has been traced to a remote village in a forested region of Guinea, where a 2-year-old boy may have come in contact with fruit contaminated by infected bats. The disease, which

caused a U.S. panic last summer, is still out of control in the West African nations of Sierra Leone and Guinea.

In the southwest U.S., a prolonged drought followed by abundant snow and rainfall in 1993 produced a bumper crop of vegetation for deer mice to eat in the Four Corners region. The population of deer mice and other rodents that carry hantavirus exploded, bringing more of them into contact with people and triggering an outbreak.

Easier travel has turned viruses into jet-setters that can spread around the world. In 2003, the virus causing a serious pneumonia called SARS, severe acute respiratory syndrome, made its way from China to at least 17 other countries in under a week. About 8,000 people were infected and 774 died. It took a global effort to control the virus.

Scientists think West Nile virus may have entered the U.S. in 1999 with an infected mosquito that hitched a flight from the Middle East to New York City. The mosquito infected birds that became virus "reservoirs." As the birds traveled across the country, they were bitten by other mosquitoes that picked up the virus and spread it to people, as well as more birds.

A similar scenario may be playing out now with chikungunya virus, which causes fever and joint pain. Europe, Asia and Africa experienced chikungunya outbreaks in the past. But the Americas had been spared until late 2013, when the virus was discovered on Caribbean islands. The risk to the mainland U.S., according to the CDC, comes from the arrival of infected travelers who are bitten by mosquitoes that pass the virus on to other people.

The first such locally acquired case of chikungunya was reported last July in Florida. It's thought to be the first time that mosquitoes in the continental United States have spread the virus to a non-traveler, the

CDC said.

How quickly chikungunya virus spreads remains to be seen. But scientists say more [viruses](#) are an inevitable part of our future.

"It's just the reality of how these bugs are," said Patel, the St. Louis University infectious disease expert. "We are in a situation where there will be more bugs. There are going to be more outbreaks. It's going to be something other than Ebola next time. We have to stay vigilant."

©2015 The Kansas City Star (Kansas City, Mo.)  
Distributed by Tribune Content Agency, LLC

Citation: Are viruses on the rise or does it just seem that way? Yes and yes (2015, March 24)  
retrieved 15 May 2024 from <https://medicalxpress.com/news/2015-03-viruses.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--