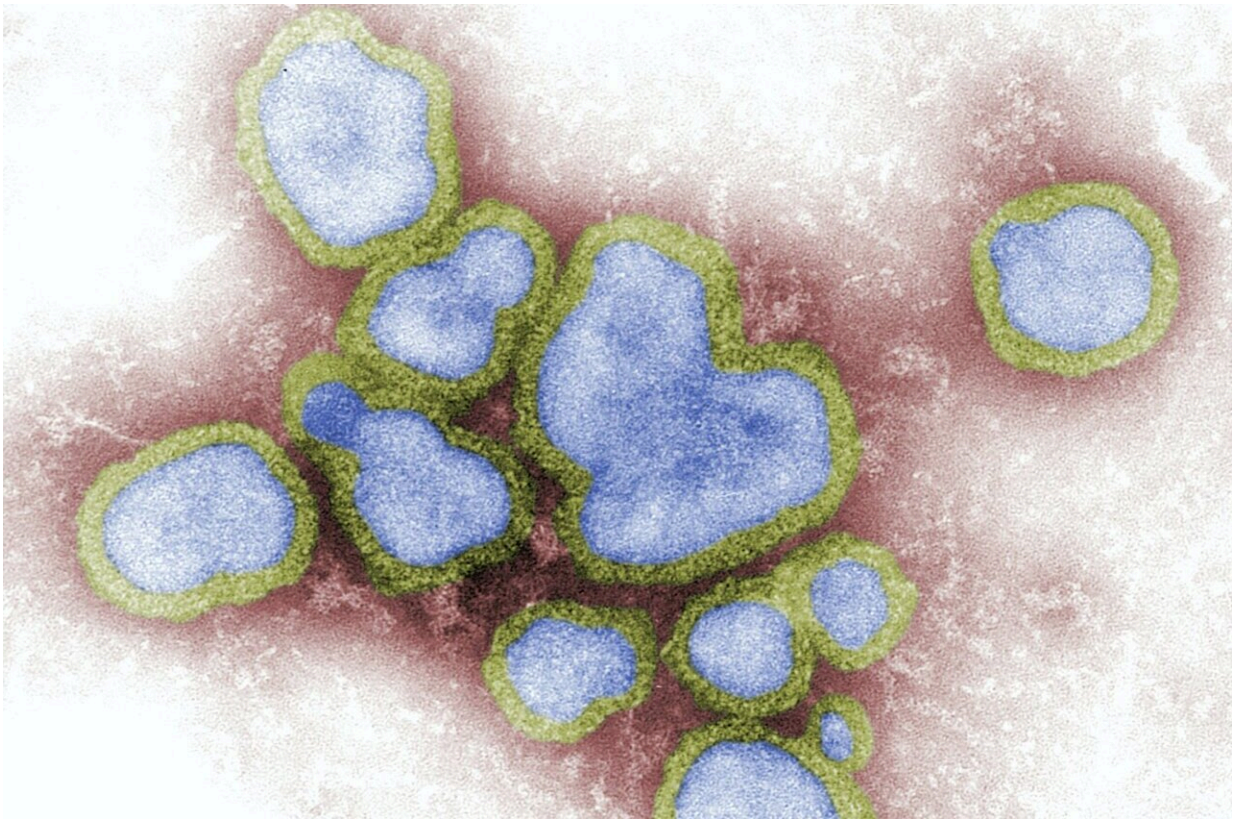


A rare and lethal virus is spreading in Europe, prompting hunt for tests and cures

April 14 2023, by Anthony King



Credit: Unsplash/CC0 Public Domain

As a deadly disease that people can catch from ticks moves across the continent, the EU is seeking new tests and a vaccine for the infection.

A 62-year-old man was bitten by a tick while hiking through fields in Spain. Two days later he began to feel ill and was taken to a hospital in Madrid, where his condition deteriorated rapidly. He died on the ninth day of his illness.

This was in 2016 and proved to be the first fatality in Spain caused by Crimean-Congo hemorrhagic fever (CCHF), a disease spread by ticks that starts with flu-like symptoms and often can end in organ failure.

Northward advance

"The ticks are moving up through Europe due to climate change, with longer and drier summers," said Professor Ali Mirazimi, a virologist at the Karolinska Institute in Sweden.

The initial case was challenging to diagnose for Spanish doctors because the hemorrhagic fever had been absent from western Europe. A nurse at the patient's hospital also contracted the fever from him, but survived after weeks in intensive care.

Then, in [July 2022](#), another man in Spain was hospitalized with the same disease. Scientists are now warning that CCHF, which can kill between 10% and 40% of patients, is spreading northward and westward in Europe.

It is caused by a virus in a type of tick that feeds on [small animals](#) when it's a juvenile and then moves to larger ones, including livestock, as an adult.

CCHF was first described during an outbreak in 1944 among soldiers in Crimea on the northern coast of the Black Sea and sporadic outbreaks are still recorded today, especially in Africa, eastern Europe, Turkey, central Asia and India. The disease is spreading globally.

One infected tick can produce thousands of infected eggs. The young ticks feed on small mammals such as rabbits as well as on birds.

The avian link allows the ticks to hitch a ride and the virus to colonize new areas.

Dangerous arrivals

"Once we find the infected ticks, we know that sooner or later there will be an outbreak," said Mirazimi

The virus is currently in ticks in, for example, Italy, but there have been no outbreaks. Its arrival in new countries is dangerous because it can be difficult for doctors to identify the new disease in patients.

"We don't have good medical cures," said Mirazimi. "There is no good antiviral, no approved vaccine and knowledge of the disease is not complete."

This means that doctors have no choice but to rely on general medical treatment, which consists of fluids, medication and intensive care if needed.

Another challenge is that a person infected with the hemorrhagic fever can spread it to close contacts through saliva and sweat. That poses a risk to family members as well as to the doctors and nurses treating the person.

So the sooner a patient is diagnosed, the better it is for everyone, because rapid diagnosis allows patients to be properly isolated.

Testing 1, 2, 3

All of which highlights the importance of a project that Mirazimi led called [VHFMoDRAD](#) to develop tests for the disease. The initiative, funded by the EU and industry, ran from 2019 through 2022.

One resulting approach uses [polymerase chain reaction](#)—or PCR—tests, which usually require sophisticated laboratory equipment and trained personnel. But here it taps into a special machine that's easier and faster.

In another approach, the project developed easy-to-use tests like those that became readily available for COVID-19 rapid checks.

An added benefit of these tests is that they aim to detect not just CCHF but also other viral hemorrhagic fevers—a group that includes Ebola, Marburg and Lassa viruses. As recently as February and March this year, two distinct outbreaks of [Marburg virus](#) were reported in Equatorial Guinea and Tanzania.

But the most notorious is Ebola. This virus infected more than 28 000 people in [an outbreak](#) that began in Guinea in 2014. It spread to seven other countries and killed more than 11 000 people by the time the outbreak ended in 2016.

Outbreaks of hemorrhagic fevers in general need to be identified urgently, according to Professor Roger Hewson, an expert on CCHF and other hemorrhagic viruses at the Liverpool School of Tropical Medicine in the UK.

"They cause very profound and devastating [mortality rates](#)," said Hewson, who collaborated with Mirazimi in the VHFMoDRAD project. "If you have rapid diagnosis, patients can be rapidly isolated and lives saved."

CCHF isn't the only hemorrhagic fever that can be spread as a result of

close contact via, for example, saliva or sweat, making other forms easy to pass on during, say, medical care or funerals.

This happened in West Africa during the Ebola outbreak. Crucially, VHFMoDRAD found a way to deactivate any virus present as the blood sample is drawn, making it safer to test for these diseases.

In the past, deadly outbreaks of Ebola in isolated communities in Africa likely occurred without getting reported. Today, better transport links enable such viruses to spread rapidly to large urban areas.

Once identified, patients can often be saved with appropriate treatment.

In Turkey, CCHF is so common that doctors readily identify the illness and administer appropriate life-saving care to patients. As a result, according to scientists, the mortality rate from CCHF in Turkey is a relatively low 7%.

Fierce fight

Viruses that cause hemorrhagic fevers usually live in animals such as bats—which is true for Ebola and Marburg—and rarely jump to people. Once such infections occur, many people's immune systems fight the invader so fiercely that fatal organ damage occurs.

"The viruses are often removed from the body after a few weeks, but the [immune response](#) then causes hemorrhaging," said Hewson.

His lab is studying CCHF to understand immune responses to the virus. This research is feeding into another project, [CCHFVaccine](#), to develop a vaccine.

This initiative, also run from Sweden, began in 2017 and is due to wrap

up in June this year. So far, two types of vaccines have been pursued.

In planned follow-up work, vaccine safety trials will be carried out in Sweden towards the end of this year or in early 2024. Phase III trials to prove a vaccine is effective could then move to Turkey.

The vaccine would be aimed at people on the frontlines most at risk. These include doctors, nurses, veterinarians, workers in livestock slaughter facilities and perhaps even tourists in endemic areas.

While still rare in Europe, CCHF is posing serious challenges.

"The consequences are really huge for anyone who gets infected," said Mirazimi.

More information:

- [VHFMoDRAD](#)
- [CCHFVaccine](#)
- [EU-funded health research and innovation](#)

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