

Dangerous fungus is becoming more prevalent. Scientists believe climate change could be to blame

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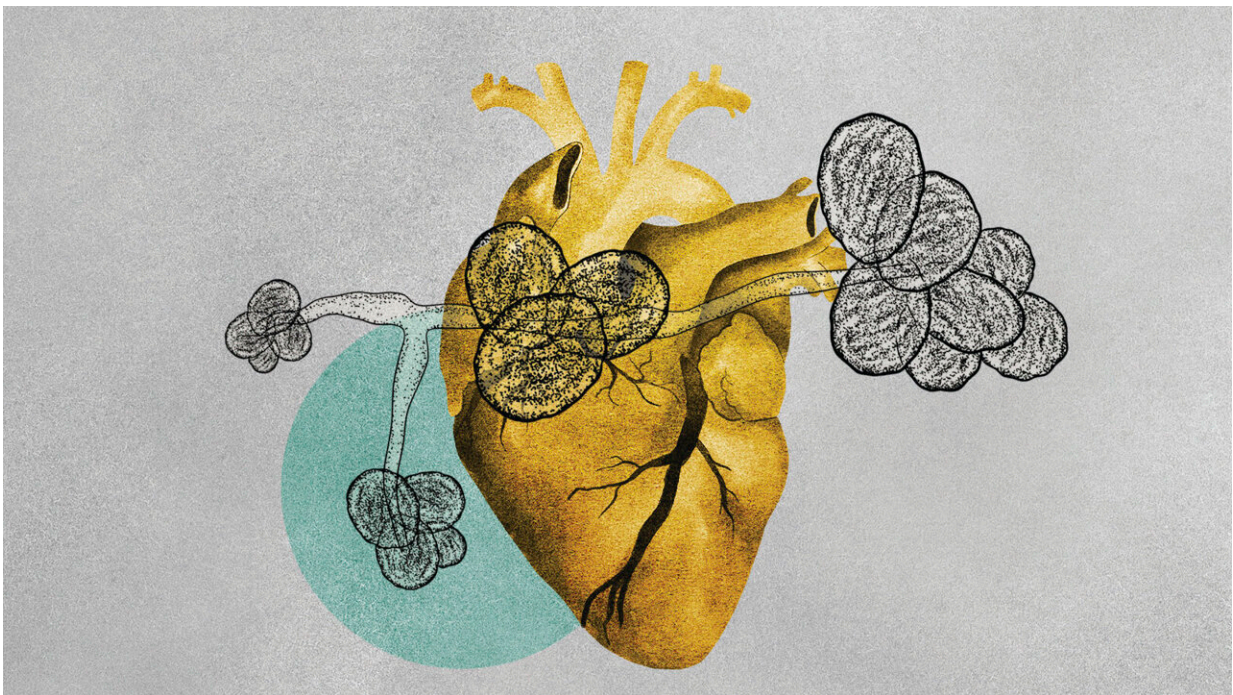


Illustration about the rise of a dangerous fungus called *Candida auris*. Credit: Illustration/Amelia Bates, Grist via AP

In 2016, hospitals in New York state identified a rare and dangerous fungal infection never before found in the United States. Research laboratories quickly mobilized to review historical specimens and found

the fungus had been present in the country since at least 2013.

In the years since, New York City has emerged as ground zero for *Candida auris* infections. And until 2021, the state recorded the most confirmed cases in the country year after year, even as the illness has spread to other places, according to Centers for Disease Control and Prevention (CDC) data analyzed by The Associated Press.

Candida auris is a globally emerging public health threat that can cause severe illness, including bloodstream, wound and respiratory infections. Its mortality rate has been estimated at 30% to 60%, and it's a particular risk in health care settings for people already with serious medical problems.

Last year, the most cases were found in Nevada and California, but the fungus was identified clinically in patients in 29 states. New York state remains a major hotspot.

A prominent theory for the sudden explosion of *Candida auris*, which was not found in humans anywhere until 2009, is [climate change](#).

Humans and other mammals have warmer body temperatures than most [fungal pathogens](#) can tolerate, so have historically been protected from most infections. However, rising temperatures can allow fungi to develop tolerance to warmer environments, and over time humans may lose resistance. Some researchers think this is what is already happening with *Candida auris*.

The pathogen emerged spontaneously 14 years ago on three continents, in Venezuela, India, and South Africa. Fungal disease expert Arturo Casadevall, a microbiologist, immunologist and professor at Johns Hopkins University, said this was puzzling, because the climates in these places are quite different.

"We have tremendous protection against environmental fungi because of our temperature. However, if the world is getting warmer and the fungi begin to adapt to higher temperatures as well, some ... are going to reach what I call the temperature barrier," Casadevall said, referring to the way mammals' warm body temperatures historically protected them.

When *Candida auris* was first spreading, said Meghan Marie Lyman, a CDC medical epidemiologist for the mycotic diseases branch, the cases were linked to people who had traveled to the U.S. from other places. Now, most cases are acquired locally—generally spreading among patients in health care settings.

In the U.S., there were 2,377 confirmed clinical cases diagnosed last year—an increase of over 1,200% since 2017. But *Candida auris* is becoming a global problem. In Europe, a [survey](#) last year found case numbers nearly doubled from 2020 to 2021.

"The number of cases has increased, but also the geographic distribution has increased," Lyman said. She noted that while screenings and surveillance have improved, the skyrocketing case numbers do reflect a true increase.

In March, a [CDC press release](#) noted the seriousness of the problem, citing the pathogen's resistance to traditional antifungal treatments and the alarming rate of its spread. Public health agencies are focused primarily on strategies to urgently mitigate transmission in health care settings.

"It's kind of an active fire they're trying to put out," Lyman said.

Dr. Luis Ostrosky, a professor of infectious diseases at McGovern Medical School at UTHealth Houston, thinks *Candida auris* is "kind of our nightmare scenario."

"It's a potentially multi-drug resistant pathogen with the ability to spread very efficiently in health care settings," he said. "We've never had a pathogen like this in the fungal infection area."

It is nearly always resistant to the most common class of antifungal medication, and is sometimes also resistant to another medication primarily used for severe catheter fungal infections in hospitals.

"I've encountered cases where I'm sitting down with the family and telling them we have nothing that works for this infection your loved one has," Ostrosky said.

Ostrosky has treated about 10 patients with the fungal infection but has consulted on many more. He said he has seen it spread through an entire ICU in two weeks.

Researchers, academics, and public health groups are discussing and investigating theories that explain the emergence of *Candida auris*. Ostrosky said that climate change is the most widely accepted one.

The CDC's Lyman said it's possible the fungus was always among the microorganisms that live in the human body, but because it wasn't causing infection, no one investigated until it recently started causing health problems. She also said there are reports of the fungus in the natural environment—including soil and wetlands—but environmental sampling has been limited, and it's unclear whether those discoveries are downstream effects from humans.

"There are also a lot of questions about there being increased contact with humans and intrusion of humans into nature, and there have been a lot of changes in the environment, and the use of fungi in agriculture," she said. "These things may have allowed *Candida auris* to escape into a new environment or broaden its niche."

Wherever and however it originated, the fungus poses a significant threat to human health, researchers say. Immunocompromised patients in hospitals are most at risk, but so are people in long-term care centers and nursing homes, which generally have less access to diagnostics and infection control experts.

Candida auris is not only challenging to treat, but also difficult to diagnose. It is quite rare and many clinicians are not aware it exists.

Common symptoms of infection include sepsis, fever, and [low blood pressure](#), which all can have many causes. The fungus is diagnosed with a blood test. Blood is placed in a nutrient-rich medium to allow any infectious organism to grow and become more detectable.

But Ostrosky notes this misses about half the cases. "Our gold standard is a little bit better than flipping a coin," he said, adding there is a newer technology that improves bloodstream detection but it's expensive and not widely available in hospitals.

Beyond the increase in cases, popular culture has helped increase awareness of fungal infections. A popular HBO series, "The Last of Us," is a drama about the survivors of a fungal outbreak. A fungal [infection](#) that can transform humans into zombies is a work of fiction, but addressing climate change, which is altering the kinds of diseases seriously threatening human health, is a real world challenge.

"I think the way to think about how global warming is putting selection pressure on microbes is to think about how many more really [hot days](#) we are experiencing," said Casadevall of Johns Hopkins. "Each day at (100 degrees Fahrenheit, or 37.7 degrees Celsius) provides a selection event for all microbes affected—and the more days when high temperatures are experienced, the greater probability that some will adapt and survive."

"We've been flying under the radar for decades in mycology because fungal infections didn't used to be frequently seen," said Ostrosky of UTHealth Houston.

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