

A new drug-resistant fungus is spreading in hospitals. Is it 'The Last of Us' in real life?

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Outterson says this fungus isn't going to make him "start wearing a hazmat suit and stocking up food in my basement" like in HBO's *The Last of Us* (above), but it's an urgent problem for researchers to untangle. Credit: HBO

Here's a scenario that may sound familiar to fans of the postapocalyptic TV drama "The Last of Us": a hard-to-kill fungus is beginning to spread among—and infect—vulnerable populations. Only this time, it's real.

A multidrug-resistant fungus is rapidly advancing in hospitals and [health care facilities](#), posing a serious risk of infection for patients. Unlike the cordyceps in the video game-turned-HBO hit show, this fungus, *Candida auris*, isn't turning people into zombies. But it's still a serious threat, and one that researchers need to heed sooner rather than later, says Kevin Outterson, executive director of CARB-X, a Boston University–led nonprofit funding the world's most scientifically diverse, early development pipeline of new antibiotics and vaccines.

"This may not take over the country like 'The Last of Us' and cause a zombie apocalypse tomorrow, but it's the sort of thing that if we want to have a new solution in a decade, then researchers need to have started last week," says Outterson, who is also the BU School of Law Austin B. Fletcher Professor of Law and codirector of the health law program.

Clinical cases of infections caused by *C. auris* almost doubled in 2021, according to research published this month in the *Annals of Internal Medicine*. And the number of cases resistant to echinocandins, the first-line treatment for *C. auris* infections, tripled. While the fungus generally isn't a threat for healthy people, it can be dangerous for those with weakened or compromised immune systems, and people using feeding tubes or catheters—in other words, a large proportion of patients in hospitals. The fungus can cause a [bloodstream infection](#) whose symptoms include fever, chills, sweats, and low blood pressure. It's still rare in the U.S., but roughly one in three patients with an invasive infection will die from it; the fungus poses an "[urgent threat](#)," according to the US Centers for Disease Control and Prevention.

The Brink spoke to Outterson about the threat that *C. auris* poses, and what we need to do to prevent future drug-resistant outbreaks.

The Brink: Fungi are the enemy in "The Last of Us" and, for many hospital patients with infections, in real life. But lots of fungi are

beneficial—and even delicious. What distinguishes the two groups?

Outterson: Fungi are one of the most abundant life-forms on Earth. They're everywhere. It's really the decomposition machinery for planet Earth. We love fungi, just like we love bacteria, because they do many things that are really beneficial. There's an ecosystem here. The problem is always when something is operating outside of its ecological niche—something has shifted or changed, that makes something suddenly more dangerous to people.

Is that what happened with *Candida auris*?

There have been a few macro-level things that happen around the world that cause these shifts. One is just global urbanization, which can lead to more zoonotic infections—COVID might well be something in this category, if it passed from bats to humans.

Another one is [climate change](#). This could really affect fungi, too, because as the climate gets warmer, the range for fungi expands and changes.

The third cause is just the global application of antibiotic and antifungal drugs, which ultimately selects for resistant pathogens. Antifungals are used aggressively in agriculture. Many of the things that you eat require antifungals in order to produce them. So, things like strawberries, but also fruit trees, are treated with antifungals. There's a significant issue with fungi when it comes to wheat—wheat rust is a common [fungus](#).

So, if you push into the environment—on a planetary scale—millions of kilograms of antifungals and then have a rapidly urbanizing and warming world, you're going to have this problem. It would be more surprising if we didn't have the emergence of new fungi that are resistant to existing

therapies and troubling people in ways that they didn't before. For people that watch this space, this is the least surprising news. It's still serious, but not a shock by any means.

How did this become an issue in hospitals? What's the threat to patients?

During [the height of] COVID, hospitals had to focus dramatically on COVID. You remember the run on personal protective equipment, while some nurses were using garbage sacks. It was terrible there for a while.

While it has stabilized more now, what happened as a result of that initial pivot is that a lot of other infection-control practices in hospitals [changed or] fell to the wayside. Not out of lack of interest, but because the infectious disease people were just crushed with the work of doing the COVID response. And so many of those same people got sick and [so] many died that hospitals kind of let the foot off the gas when it came to standard hospital infection-control practices—necessarily so; I'm not blaming them.

The [CDC reported](#) last year that for the first time in more than a decade, we had significant increases in hospital-associated infections, predominantly bacterial, but some antifungal, because there's just limited capacity.

How do we move forward to address the threat from bacterial and fungal infections?

If you want the U.S. to be more resilient to these sorts of threats, one thing you do is to develop new drugs, which is what CARB-X does.

The second thing you do is to train and hire more infectious disease

doctors and nurses, so that you have the capacity to respond to whatever the next thing is.

Obviously, in a hospital, there's a lot of people that are very sick and who have a reduced immune response because of the treatment or the condition that they have. And for somebody to go to a hospital to get cured from whatever it is they have, only then to get sick and prolong their stay, or worse, die, because of a hospital infection that they caught—well that just violates the do-no-harm ethic of medicine. So, this is a serious issue.

I coauthored [an article](#) two years ago on antimicrobial resistance in cancer—both bacteria and fungi—which was published in the clinical journal of the American Cancer Society. What we know is that the second leading cause of death for people with cancer is [infection](#), [from] bacteria and fungi. These people, because of their treatments, have a compromised immune system, which makes it easier for these things to kill them.

So, I'm not going to start wearing a hazmat suit and stocking up food in my basement. It is not like the TV show. But it is a serious issue: we now have data showing that both bacteria and [fungi](#) are growing threats in every [hospital](#) around the world.

More information: Meghan Lyman et al, Worsening Spread of *Candida auris* in the United States, 2019 to 2021, *Annals of Internal Medicine* (2023). [DOI: 10.7326/M22-3469](https://doi.org/10.7326/M22-3469)

Provided by Boston University

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