Deadly fungal infection *Candida auris*, now reported in U.S.

**Candida auris**

Nearly three dozen people in the United States have been diagnosed with a deadly and highly drug-resistant fungal infection since federal health officials first warned U.S. clinicians last June to be on the lookout for the emerging pathogen that has been spreading around the world.

The fungus, a strain of a kind of yeast known as *Candida auris*, has been reported in a dozen countries on five continents starting in 2009, where it was first found in an ear infection in a patient in Japan. Since then, the fungus has been reported in Colombia, India, Israel, Kenya, Kuwait, Pakistan, South Korea, Venezuela and the United Kingdom.

Unlike garden variety yeast infections, this one causes serious bloodstream infections, spreads easily from person to person in health-care settings, and survives for months on skin and for weeks on bed rails, chairs and other hospital equipment. Some strains are resistant to all three major classes of antifungal drugs. Based on information from a limited number of patients, up
to 60 percent of people with this infection have died. Many of them also had other serious underlying illnesses.

Those at greatest risk are individuals who have been in intensive care for a long time or who are on ventilators or have central line catheters inserted into a large vein.

In the United States, the largest number of infections has been reported in New York, with at least 28 cases, according to the Centers for Disease Control and Prevention. Infections have also been reported in Illinois, Maryland, Massachusetts and New Jersey. Last June, the CDC sent an urgent alert to clinicians to start looking for the infections, which are difficult to identify with standard laboratory methods.

"As soon as we put out that alert, we started to get information about cases and now we know more about how it spreads and how it's acting," Tom Chiller, the CDC's top fungal expert, said in an interview Thursday. The CDC now tracks the number of infections, updating the case count every few weeks.

In addition to the 35 infected patients, an additional 18 were carrying the organism but weren't sickened by it.

The microbe is among a group of newly emerging drug-resistant threats, health officials said.

"These pathogens are increasing, they're new, they're scary and they're very difficult to combat," said Anne Schuchat, CDC's acting director, during a briefing in Washington this week about growing antimicrobial resistance.

Of the first seven cases that were reported to the CDC last fall, four patients had bloodstream infections and died during the weeks to months after the pathogen was identified. Officials said they couldn't be sure whether the deaths were caused by the infection because all the individuals had other serious medical conditions. Five patients had the fungus initially isolated from blood, one from urine, and one from the ear.

The infection is still relatively rare. "It's really hitting the sickest of the sick," Chiller said.

So far, the fungus doesn't seem to be evolving into new strains within the United States. Because the country doesn't yet have any "homegrown" strains of the deadly fungus, "it gives us a better opportunity to contain it and stop it from spreading," Chiller said.

In other countries, infections have been resistant to all three major types of antifungal drugs, but so far the U.S. cases have been treatable with existing drugs.
Because invasive bloodstream infections with Candida are common in hospitalized patients in the United States, health officials are concerned that this deadly strain could "get into that mix," Chiller said. Unlike Candida infections in the mouth, throat or vagina (which are typically called yeast infections), invasive yeast infections can affect the blood, heart, brain, eyes, bones and other parts of the body and are more dangerous. DNA genome similarities below:

Among infectious disease clinicians and laboratory personnel, infections involving fungi don't typically ring the same kind of alarm bells as antibiotic-resistant bacteria - until now.

"This is a paradigm shift, because Candida is not generally thought of as highly resistant or passed person to person," he said.

Since the CDC issued its alert in June, the agency has provided funds and additional expertise to help regional laboratories and hospitals identify the organism.
The Centers for Disease Control and Prevention (CDC) is alerting U.S. healthcare facilities about a multidrug-resistant type of yeast, known as *Candida auris*, that causes fatal infections and has been found in nine countries (and possibly the U.S.) since 2009.

Patients who have diabetes, who are taking powerful antibiotics and antifungal medications, or have catheters are at risk. According to a [CDC news release](https://www.cdc.gov), the most common infections associated with the deadly strain include bloodstream infections, wound infections and otitis (inflammation of the ear). It typically occurs several weeks into a patient’s hospital stay.

**Aggressive and potentially deadly**

When we think of fungus we think of athlete’s foot or a yeast infection, but this strain is much worse. Instead, it invades sterile parts of the body that don’t normally respond to over-the-counter fungal drugs. Plus, it’s difficult to identify with standard laboratory methods. What’s particularly worrying is that — for the first time — infections seem to be causing hospital outbreaks. This particular yeast is aggressive and potentially deadly, especially for those in intensive care or having surgery.

The first case was found in a Japanese patient with an ear infection in 2009, according to the [Center For Infectious Disease Research and Policy](https://www.cidrap.umn.edu) (CIDRAP) at University of Minnesota. But since that time, cases have been reported in eight other countries. Two unnamed countries have also reported healthcare outbreaks involving more than 30 patients each, according to CDC. The agency says it’s aware of one isolate of *C. auris* that was detected in the U.S. in 2013, but it’s unclear if that isolate came from a patient.

“We think of candida as something you are colonized with in your GI [gastrointestinal] tract and that you bring in to a hospital environment,” said [Dr. Tom Chiller](https://www.cdc.gov/mycoticdiseases), deputy chief of the Mycotic Diseases Branch at the CDC, to CIDRAP News. Those who are very ill and at higher risk of infection often “auto-infect” themselves, said Chiller. But when talking with officials at a hospital in Pakistan that had reported *C. auris* infections, it became clear that the patients had actually contracted the infections from the hospital environment, Chiller said.
Another cause for concern is that finding treatment options for C. auris infections could be limited. And a fungus that is resistant to major classes of antifungal drugs, including azoles, echinocandins and polyenes “could be a real management challenge,” Chiller added.

**Not the first warning**

The CDC’s announcement is actually not the first warning regarding these drug-resistant fungal infections. The first announcement came via a high-profile project called the Review on Antimicrobial Resistance, created by Britain’s newly exited Prime Minister David Cameron.

After concern with the rise of antibiotic resistance around the world, the U.K. Prime Minister asked economist Jim O’Neill to analyze the global problem of antimicrobial resistance and propose concrete actions to tackle it internationally.

“If we fail to act, we are looking at an almost unthinkable scenario where antibiotics no longer work and we are cast back into the dark ages of medicine,” Prime Minister Cameron said.

Last December, the group published their concerns that the overuse of fungicides on food crops — and build-up of the drugs in the environment — would help create a multi-drug resistance in the population.
But how the virus moves within the healthcare facility is not known, says the CDC. However, experience during these outbreaks suggest that C. auris contaminates the hospital room environment of infected patients. Therefore, good infection control practices and environmental cleaning clearly needs to be in place to help prevent transmission.

**How can we protect ourselves?**

Ultimately, the CDC doesn’t know why the aggressive yeast has recently emerged in so many different locations around the world. And that’s terrifying, because that means they can’t control the spread, beyond implementing infection control practices in healthcare environments and hoping for the best. So, when it comes to our own personal health we must — now more than ever — get informed and take control.

We’ve only just begun to wrap our heads around the idea of an antibiotic-resistant “nightmare bacteria” on the loose in the U.S. Now we have to contend with a multidrug-resistant “nightmare fungi” as well. Molecular biologist Carol Kumamoto at Tufts University School of Medicine has studied the common yeast strain C. albicans and says drug resistance in any yeast strain poses a tough challenge. “There are relatively few drug classes that are available to treat fungi, as opposed to bacteria,” suggests Kumamoto, and “this organism is cause for great concern because it has resistance to all of the classes of drugs that we have.”

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So what can we do about it? How can we protect ourselves and our families? But just as important as trying to figure out what we can do, is figuring out why C. auris has emerged. One possibility, according to Chiller, is the use of environmental fungicides, which were flagged in the British review.

Another possibility could be that the same overuse of antibiotics, which is driving antibiotic resistance, could also be killing the good bacteria that keeps fungi at bay. Antibiotics, both in prescription form and those found in conventionally raised meats, can deplete healthy bacteria
in the gut. In fact, in an antifungal resistance report, the CDC suggests that antibacterial medications can contribute to antifungal resistance. This happens for a number of reasons, one of which is that antibacterial medications reduce bacteria in the gut, creating an environment in the body that encourages candida growth.

Take control of your health

Fortunately, there are natural treatments for yeast. Yeast in the gut is generally controlled by other organisms in the gut microbiota. But when that balance is thrown off by a course of antibiotics or other causes, bad yeast can get out of control and cause serious health issues.

A study at the University of Pennsylvania found that a healthy balance of bacteria in your gut will actually boost your immune system to fight opportunistic pathogens. “One of the complications of antibiotic therapy is secondary infection,” explains senior author Dr. Jeffrey Weiser, professor of microbiology and pediatrics. “This is a huge problem in hospitals, but there hasn’t been a mechanistic understanding of how that occurs,” says Dr. Weiser. “We suggest that if the immune system is on idle, and you treat someone with broad-spectrum antibiotics, then you turn the system off. The system is de-primed and will be less efficient at responding quickly to new infections.”
S. boulardii, a non-pathogenic probiotic-yeast, won’t take up permanent residence in your gut, but it will stimulate your gut’s production of an immune molecule that makes it difficult for “bad” yeast to stick to your gut wall, suggests Alliance For Natural Health.

The bottom line, this emerging yeast infestation is multidrug resistant, so the best course of action is to protect your immune system now. Eat probiotic-rich foods or choose a good quality probiotic supplement. In addition, choose organic, non-GMO foods that are free of fungicides, whenever possible.

If you or a family member is a hospital patient, be sure everyone cleans their hands before entering your room, suggests the CDC. In addition, if you have a catheter, ask the doctor or nurse each day if it is necessary. Stay safe!

Plants that have anti-fungus activity, herbs and herbal extracts, spices, roots
There are countless plants that can ill fungi or prevent their growth. In fact, one of the reasons certain plants survived for so long is that they had the ability to create substances that could fight a fungus infections. I will add to this list of fungus fighters with time.
Clove herb
Garlic bulb and clove.
   Appl Microbiol Biotechnol. 2014. Antifungal effect and mechanism of garlic oil on Penicillium funiculosum. The high antifungal effects of garlic oil makes it a broad application prospect in antifungal industries.
Kava root
Onions
Yellow Dock herb

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