

# Drug-resistant fungus

Nearly half of 643 cases nationwide diagnosed in NY

BY DELTHIA RICKS  
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By the time New York's health commissioner announced the emergence of a multi-drug-resistant fungus two years ago, the microbe already was infecting the sickest of the sick in hospitals and nursing homes.

New York to date has recorded more cases of the multi-drug-resistant fungus *Candida auris*, known as *C. auris*, than any state in the country. Of the 643 cases diagnosed nationwide, almost half — 323 — have occurred in New York. The numbers include confirmed and probable cases, and health officials could not definitively say how many deaths have come as a result of the fungus.

Most of the infections have been concentrated in New York City, according to the state Department of Health. But hospitals and nursing homes in surrounding areas — Nassau, Westchester and Rockland — also have had cases. All date from the time when the fungus was first reported as a threat by state Health Commissioner Howard Zucker in 2017.

Medical scientists are scrambling to develop a diagnostic because the pathogen is difficult to detect with current hospital laboratory methods. Others are at work on a new type of antifungal medication they hope won't be repelled by the organism.

"We don't know why it emerged," said Dr. Maurizio Del Poeta, a professor of molecular genetics and microbiology at Stony Brook University's Renaissance School of Medicine. At the very least, he is recommending hospitals develop stricter rules on foot traffic in and out of patients' rooms because the microbe can be carried on the bottom of shoes.

The pathogen clings to surfaces in hospital rooms, flourishes on floors, and adheres to patients' skin, phones and food trays. It is odorless, invisible —



Dr. Maurizio Del Poeta, a leading expert in fungi, with colleague Cristina Lazzarini at Stony Brook University. ■ Video: [newsday.com/health](https://www.newsday.com/health)

## ABOUT CANDIDA AURIS

- *C. auris*, as it is known, became entrenched in New York about eight years after its initial detection in Japan in 2009. Doctors there isolated the microbe from a patient who had an ear infection. However, studies in South Korea of archived biological specimens suggest *C. auris* may have been evident in that country as early as 1995. "Auris means ear in Latin," said Dr. Maurizio Del Poeta of Stony Brook University, noting how the fungus got its name. How it became the source of a New York outbreak is still a matter of debate.

- Some scientists posit that *C. auris* spread around the world after its discovery in Japan. Others, such as Del Poeta, suggest simultaneous infections that began globally, all around the same time.

- The microbe clings to surfaces in hospital rooms, flourishes on floors, and adheres to patients' skin, phones and food trays. It is odorless and invisible.

- *C. auris* can cause lethal bloodstream infections in people with weakened immunity, which include organ transplant recipients, anyone with cancer, HIV/AIDS or other forms of immune suppression.

Source: *Centers for Disease Control and Prevention/Newsday research*

and unlikely to vanish from health care institutions anytime soon.

"It can survive on a hospital floor for up to four weeks," Del Poeta said of *C. auris*. "It attaches to plastic objects and doorknobs."

*C. auris* can cause lethal

bloodstream infections in people with weakened immunity, which include organ transplant recipients, anyone with cancer, HIV/AIDS or other forms of immune suppression. The mortality rate for *C. auris* has been about 35 percent, but most patients who succumb to the

pathogen have other debilitating conditions.

While Del Poeta and scientists nationwide search for answers, public health experts worry about the explosive problem of multi-drug-resistant pathogens of all kinds — especially bacteria — and the looming threat of having no drugs capable of conquering them.

The bugs not only have learned how to fight, they've learned how to win. "This is survival of the fittest," said Dr. Tom Chiller, who heads the division of fungal diseases at the Centers for Disease Control and Prevention in Atlanta.

Chiller defined *C. auris*, which took the public health community by surprise, as relatively rare compared with multi-drug-resistant bacteria. Each year in the United States, 2 million people become infected with bacteria that repel antibiotics. About 23,000 die as a direct result, and countless others experience long-term complications.

"We look at this as another wake-up call. These bugs have adapted to be resistant," said

Chiller, who added *C. auris* has developed mechanisms to thwart medications in each class of antifungal drugs.

There are only three classes in existence, and the microbe in the best of cases is resistant to only a few of them. In the worst, it's resistant to all.

"Multi-drug resistance is something that we have never seen before in a fungus," said Del Poeta, who specializes in fungi and fungal diseases. He and his colleagues are working on an antifungal treatment at Stony Brook, and have developed a startup company around it called Microrid. The drug, which they define as a "small molecule" medication, already has defeated the fungi in animal models.

But as Del Poeta and his team double down on drug development, the microbe continues to spread. The situation has grown precipitously dire in recent weeks, state data show.

Last month, New York became the first state to confirm patients had died of "pan-resistant" *C. auris* infections, which means the pathogen was resis-

# problem for hospitals

## C. auris on global list of tough-to-kill superbugs

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*Candida auris*, apathogenic fungus that has been spreading throughout the United States, was discovered in Japan a decade ago after its isolation from a patient with an ear infection.

Shortly afterward, the fungus — which was new to medicine — was identified around the globe.

It was detected elsewhere in Asia and as far south as Australia. By 2013, it was in Britain, where it spread to 55 hospitals, and by 2017 had infected more than 200 patients, a report in the scientific journal *Public Health England* revealed.

British doctors remarked about the tenacity of the fungus and the difficulty of removing it from hospital surfaces.

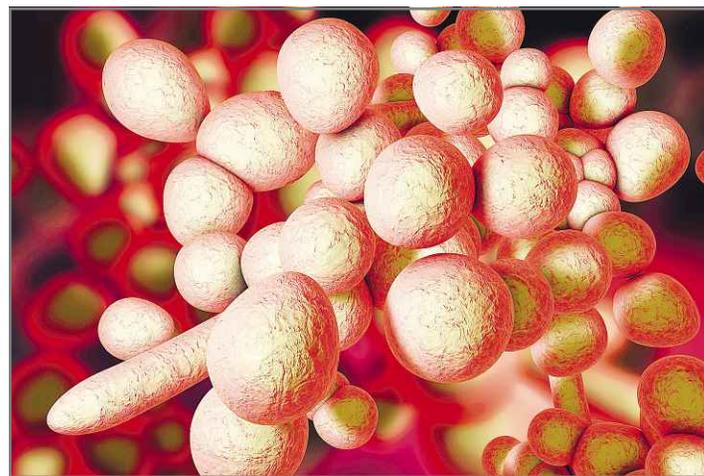
Dr. Tom Chiller, who heads the fungal division at the Centers for Disease Control and Prevention in Atlanta, believes the drug-resistant pathogen emerged in multiple sites simultaneously.

“This bug has a predilection for being resistant,” Chiller said. “Most of the isolates we find are resistant right out of the gate. We don’t understand why this bug likes to be resistant and is happy being resistant, but it may have something to do with its ability to spread.”

Other medical experts see the overuse of human antifungal medications in agriculture and floriculture as potential reasons for resistance in *Candida auris*, known as C. auris, and possibly other fungi.

Dr. Matt McCarthy, a specialist in infectious diseases at Weill Cornell Medicine in Manhattan, said tulips, signature flowers of the Netherlands, are dosed with the same antifungal medications developed to treat human infections.

“Antifungals are pumped into tulips in Amsterdam to achieve flawless plants,” he said. “As a



Computer illustration of the unicellular fungus *Candida auris*.

fungal expert, I know that we have very few antifungal medications, and this is a misuse of the drugs.”

Studies conducted at Trinity College in Ireland support McCarthy’s argument and have demonstrated that tulip and narcissus bulbs from the Netherlands may be vehicles that spread drug-resistant fungi.

Trinity scientists, who examined resistance in another potentially deadly fungus, *Aspergillus fumigatus*, uncovered why the bugs repelled the drugs known as triazoles. The fungi became resistant because of the overuse of triazoles in floriculture. As with C. auris, drug-resistant A. fumigatus can be deadly in people with poor immunity.

When patients need treatment with triazole-class medications, the drugs don’t work because the fungi have been overexposed in the environment, McCarthy said.

He added that the use of antifungal medications in floriculture is similar to the overuse of antibiotics in the poultry and beef industries, which have helped drive resistance to those drugs.

The floriculture example is just one way that drug-resistant fungi can spread around the world. Global trade networks,

human travel and the movement of animals and crops are others.

C. auris, studies have revealed, resists antifungals by way of “efflux pumps” that have evolved over time to efficiently force antifungal drugs out as soon as they flow in. The pumps render the fungi impervious to being killed.

Global health experts view C. auris as yet another threat in the rapidly growing number of health care-associated superbugs.

Unless multi-drug-resistant microbes of all kinds are defeated, they will kill more people by 2050 than cancer does now, according to experts at the World Health Organization. The agency has declared drug resistance one of the most pressing medical problems today.

Deaths worldwide from all types of drug-resistant superbugs could rise from the estimated 700,000 now to 10 million in 30 years, WHO researchers estimate, noting that the economic impact could be similar to the 2008 financial crisis because drug-resistant infections are difficult and expensive to treat. A superbug infection can add 30 days to a hospital stay, which inevitably drives up costs.



The *Candida auris* fungus, seen here through a microscope.

tant to every antifungal developed.

While doctors are sometimes able to use combinations of antifungals to effectively treat some patients with drug-resistant C. auris, two people who were hospitalized in New York City were so overwhelmingly infected that the pathogen repelled every medication used against it. Both patients died, but neither the state nor city health departments would identify the hospital or hospitals where the deaths occurred.

The pan-resistant C. auris cases were the first in the nation. They also were determined to be rare, and medical experts are predicting they probably will not be the last.

“If we don’t want it to become like *Staphylococcus aureus*, then we have to act now,” said Del Poeta, referring to the bacteria that became the poster child of drug resistance when it developed the ability to defeat the antibiotic methicillin, garnering the name methicillin-resistant *Staphylococcus aureus*, or MRSA.

Once concentrated only in

hospitals, MRSA now can be found in gyms, schools — virtually anywhere people congregate. C. auris is the first fungus to develop characteristics associated with the worst bacterial superbugs: multi-drug resistance, high mortality in susceptible populations and the capacity to spread.

“In order to get *Candida auris* out of a room, you have to take away everything — door-knobs, plastic items, everything. It is very difficult to eradicate it in a hospital,” Del Poeta said. He said his institution has never had a patient with C. auris.

All of Long Island’s cases have been diagnosed in Nassau, according to state health department data.

“There have been nine C. auris cases diagnosed in Nassau County facilities since the start of the outbreak. One was diagnosed in 2017, six in 2018 and two in 2019,” Jill Montag, a spokeswoman for the state Department of Health, said in a statement.

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CRISTINA LAZZARINI

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# REMEMBERING FALLEN NY OFFICERS

## Fraternal Order of Police adds 80 to stone memorial

BY RACHEL UDA

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Eighty law enforcement officers who died on duty or due to 9/11-related illnesses were honored Saturday at the New York State Fraternal Order of Police headquarters in Hicksville.

The names of the fallen New York officers, etched onto a stone wall outside headquarters, were read off during the ceremony. There are more than 1,300 names on the walls that are commemorated in an annual event, according to New York Fraternal Order of Police president Michael Essig.

The majority of officers honored Saturday died of 9/11-related illness from 2016 to 2018.

"There's a common wording we say in law enforcement — all gave some, some gave all," Essig said to the audience. "This ceremony's to honor those who gave all."

The crowd was seated under canopies shielding them from a light drizzle. As the names of



Motorcycles roll past the assembled honor guards at the Fraternal Order of Police memorial service.

DAVID L. PORRESS

their loved ones were called, they were escorted to the wall by NYPD and New York State Police officers and placed red carnations in front of the

memorial.

A Nassau County police helicopter flew overhead, and two trumpeters played taps to close the service.

Georgina Valentin, 57, of Hamilton, New Jersey, walked to the wall with her two sons by her side, left a flower in a vase, and read the name of her

late husband, NYPD Det. Harry Valentin.

Harry Valentin was a detective for 30 years and a first responder of the Sept. 11 terrorist attacks. He was a gym rat, a marathoner in perfect health when he was diagnosed with glioblastoma in February 2017, his wife said. He died 15 months later at the age of 58.

"All through this ordeal I felt so alone, but today I felt such camaraderie," said Georgina Valentin, who was an NYPD detective for 23 years. "It was a beautiful ceremony. I felt very comfortable."

Krysten Volpe, 29, of Melville, came to honor her uncle, Michael Hance, an NYPD officer and 9/11 first responder who died of brain cancer at age 44 in March 2017. Hance, of Bethpage, was a 17-year veteran of the NYPD who appeared in a viral video dancing in uniform at the New York City Pride Parade in 2015.

Volpe said Hance's death has been difficult for her family, but that the ceremony helped comfort them, reassuring them that he won't be forgotten.

"It's great to know that he was my hero and a bunch of other people's hero, too," Volpe said.

## Drug-resistant fungus affecting hospitals

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"Seven of the patients who had *C. auris* passed away, but it is difficult to say whether [or] how much *C. auris* contributed to their deaths because the patients had other serious illnesses."

Though the health department will not reveal the names of the Nassau hospitals, the agency plans to list the pathogen as a serious infectious agent in its next Hospital-Acquired Infections report, which is to be made available to the public later this year, Montag said.

Some experts in infectious diseases contend a web of secrecy has engulfed the issue of *C. auris*, masking critical details about the pathogen. A similar veil of secrecy has surrounded other deadly

pathogens, such as "nightmare bacteria," carbapenem-resistant Enterobacteriaceae, or CRE.

Just as *C. auris* has infected the sickest of the sick, so has CRE, an often deadly bacterial infection that has contaminated hospital equipment and infected patients worldwide, said Lawrence Muscarella, a medical safety expert in Montgomeryville, Pennsylvania. He was the first to blow the whistle on CRE contamination of duodenoscopes, an endoscope used for examining and performing therapies on the bile ducts, pancreas and the duodenum, the first section of the small intestine.

Now, he contends, too much secrecy surrounds *C. auris*.

"Hospitals don't want to disclose the number of *Candida* cases they have had because

they are afraid that patients won't go to those facilities," Muscarella said. "One of the biggest problems in U.S. health care is the total lack of disclosure."

Muscarella accuses government health agencies of being more interested in protecting hospitals' bottom lines than disclosing useful information to consumers.

Scientists who are working on ways to defeat multi-drug-resistant fungal infections describe their research as a race against the clock.

In New Jersey, which is grappling with more than 100 *C. auris* cases, Dr. Neeraj Chauhan, a microbiologist at Rutgers University, is working on a diagnostic to spot *C. auris* in patients' specimens.

Chauhan said the fungus, which is a yeast, closely resem-

bles *Candida albicans*, a yeast commonly found on human skin. *C. albicans* is what's known as a commensal organism, which means it's a friendly fungus, not a foe.

Not having a precision diagnostic delays detection of the fungus, and studies have shown that a delayed diagnosis carries a mortality rate of more than 35 percent. If *C. auris* can be quickly and definitively diagnosed, Chauhan added, it would speed the isolation of infected patients and prompt drug treatment.

"We know of four different *C. auris* clades," he said, referring to groups of the organism, which are known to have evolved from a single ancestor. "There are the East Asian, the Southeast Asian, South African and South American clades.

"Around here, we see mostly

the Southeast Asian clade," Chauhan said, underscoring that he has no definitive way of telling how a yeast first identified in Southeast Asia made inroads into hospitals on the Eastern Seaboard of the United States.

The emergence of drug-resistant fungi marks a new chapter in the growing and often deadly saga of microbial resistance, which is best known as the strategy that bacteria use to circumvent antibiotics.

Scientists such as Del Poeta contend it's time for new methods of addressing resistant microbes of all kinds because infectious pathogens have developed the power to outwit, outpace and outmaneuver humankind's most potent agents of chemical warfare, many of them developed in the 20th century.