Candida auris: is it here to stay?

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Association of Public Health Laboratories
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CBS News

Deadly fungus
Often drug-resistant
Difficult to identify

Candida Auris: Why This Fungus Is An Emerging Threat
By Bruce Y. Lee
Senior Contributor

The Desperate Race to Neutralize a Lethal Superbug Yeast
Candida auris spreads explosively in hospitals, but little is known about its origins. Figuring that out could help prevent a pandemic.

CDC identifies first US cases of drug-resistant fungal infection
Updated 3:03 PM ET, Fri November 4, 2016

This superbug is a 'serious global health threat.' Here's what you need to know about Candida auris
Published 8:43 p.m. ET April 10, 2019 | Updated 10:44 a.m. ET April 11, 2019

Every year these superbugs infect more than 2 million people in the United States,
Fungus Immune to Drugs Quietly Sweeps the Globe

Lethal Infection Adds Alarming Dimension to Dangers of Overusing Medicines
Dr. Shawn Lockhart, a fungal disease expert at the Centers for Disease Control and Prevention, holding a microscope slide with inactive Candida auris collected from an American patient.

Melissa Golden for The New York Times
Objective Points

- *Candida auris* is here
- *Candida auris* is deadly
- *Candida auris* can be slowed
## What do we know about *Candida*?

<table>
<thead>
<tr>
<th><em>Candida</em> species</th>
<th><em>Candida auris</em></th>
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<tbody>
<tr>
<td>They are gut bugs</td>
<td>It is a skin bug</td>
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<td>Mostly antifungal susceptible</td>
<td>Mostly antifungal resistant</td>
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<tr>
<td>Rarely causes outbreaks</td>
<td>Frequently causes outbreaks</td>
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C. auris in 2009
C. auris in 2015
C. auris in 2019
CDC issued a clinical alert to healthcare facilities – June 2016

### Fungal Diseases

<table>
<thead>
<tr>
<th>Fungal Diseases</th>
<th>CDC &gt; Fungal Diseases &gt; Types of Fungal Diseases &gt; Candidiasis</th>
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<tbody>
<tr>
<td>Types of Fungal Diseases</td>
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<tr>
<td>Aspergillosis</td>
<td>+</td>
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<tr>
<td>Blastomycosis</td>
<td>+</td>
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<tr>
<td>Candidiasis</td>
<td>-</td>
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<td>Oropharyngeal / Esophageal Candidias</td>
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<td>Genital / vulvovaginal candidiasis</td>
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<td>Invasive candidiasis</td>
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<td>Candida auris Q&amp;A</td>
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<td>Candida auris Alert</td>
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<tr>
<td>Coccioidiomycosis</td>
<td>+</td>
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<tr>
<td>C. neoformans/Infection</td>
<td>+</td>
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<tr>
<td>C. gattii/Infection</td>
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<tr>
<td>Fungal Eye Infections</td>
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### Clinical Alert to U.S. Healthcare Facilities

**Global Emergence of Invasive Infections Caused by the Multidrug-Resistant Yeast *Candida auris***

**Summary:** The Centers for Disease Control and Prevention (CDC) has received reports from international healthcare facilities that *Candida auris*, an emerging multidrug-resistant (MDR) yeast, is causing invasive healthcare-associated infections with high mortality. Some strains of *C. auris* have elevated minimum inhibitory concentrations (MICs) to the three major classes of antifungals, severely limiting treatment options. *C. auris* requires specialized methods for identification and could be misidentified as another yeast when relying on traditional biochemical methods. CDC is aware of one isolate of *C. auris* that was detected in the United States in 2013 as part of ongoing surveillance. Experience outside the United States suggests that *C. auris* has high potential to cause outbreaks in healthcare facilities. Given the occurrence of *C. auris* in nine countries on four continents since 2009, CDC is alerting U.S. healthcare facilities to be on the lookout for *C. auris* in patients.

**Background**

*Candida auris* is an emerging multidrug-resistant (MDR) yeast that can cause invasive infections and is associated with high mortality. It was first described in 2009 after being isolated from external ear discharge of a patient in Japan. Since the 2009 report, *C. auris* infections, specifically fungemia, have been reported from South Korea, India, South Africa, and Kuwait. Although published reports are not available, *C. auris* has also been identified in Colombia, Venezuela, Pakistan, and the United Kingdom.

It is unknown why *C. auris* has recently emerged in so many different locations. Molecular typing of strains performed by CDC suggests isolates are highly homogeneous despite geographic location. Additional studies are needed to understand the epidemiology and clinical significance of these emerging *Candida auris* isolates.
C. auris clinical cases reported — United States, June 2016

CDC’s clinical alert
C. auris clinical cases reported by state — United States, 2013–December 2016

CDC issued a clinical alert on C. auris.
C. auris clinical cases reported by state — United States, 2013–July 2019

~800 clinical cases
~2350 clinical + screening cases
Clinical cases of *C. auris* reported in the United States as of July 31, 2019

~800 cases
1550 colonized
WGS relationships among *C. auris* isolates

- Very different across regions
- Nearly identical within regions
WGS proof of independent introduction of the same clade across several states
Molecular epidemiology: are there more clades?

>1000 isolates
22 countries
South Africa

- 14% of candidemia in surveillance in South Africa was due to C. auris

Figure 4. Cases of Candida auris candidemia (N = 557), by epidemiologic week, Gauteng Province, South Africa, 2016–2017. Date of blood culture collection was missing for 123 cases.

C. auris can overwhelm a healthcare system

- C. auris cases are additive, increasing overall candidemia rate
- Published crude mortality ranges from 25% to >60%

https://www.eccmidlive.org/#resources/how-should-we-manage-the-c-auris-outbreak
Targets the most vulnerable

- Multiple healthcare stays (acute and long term)
- Multiple underlying conditions, indwelling devices
  - Tracheostomy
  - Ventilator
  - Peg tube
  - Central lines
  - On antibiotics and antifungals
*C. auris* persists in the healthcare environment
Mobile equipment has been heavily implicated in transmission
DEADLY GERMS, LOST CURES

Nursing Homes Are a Breeding Ground for a Fatal Fungus

Drug-resistant germs, including Candida auris, prey on severely ill patients in skilled nursing facilities, a problem sometimes amplified by poor care and low staffing.

By Matt Richtel and Andrew Jacobs

Published Sept. 11, 2019
Updated Sept. 12, 2019, 8:40 a.m. ET
Hotbed of *C. auris* activity

- LTACH
  - Long-term Acute Care Hospital
- vSNF
  - Ventilator Skilled Nursing Facility
Stays in certain types of post-acute care facilities is a major risk factor: vSNFs and LTACHs

- **C. auris prevalence in nursing home units with ventilator beds**: 7.7%
- **C. auris prevalence in regular nursing homes**: 0.7%

C. auris colonization can precede infection

- Colonization means patients are:
  - at risk for developing invasive infection
  - A source of transmission to others
- Almost 100 cases of BSI in colonized patients who were being followed 2016-2018
vSNF colonization March 2017

*C. auris* colonization prevalence = 1.5% (1/69)

- **C. auris** positive
- Screened negative for *C. auris*
- Not tested for *C. auris* (refused or not in room)

Slide courtesy of Chicago Department of Public Health.
vSNF colonization January 2018

C. auris colonization prevalence=43% (29/67)

- C. auris positive
- Screened negative for C. auris
- Not tested for C. auris (refused or not in room)

Slide courtesy of Chicago Department of Public Health.
vSNF colonization January 2018

C. auris colonization often associated with CRE carriage
Proactive Public Health response

California

- Performing proactive urine culture identification
- Discovered a case in an LTACH, performed extensive point prevalence surveys of LTACHS and vSNFs
  - Identified >100 colonized patients
  - Implemented extensive infection control
  - Has kept case count below 5
What don’t we know?
Laboratory updates
Laboratory Safety

• Lab coat and gloves, and eye protection if spatter or splash may occur

• Use a biological safety cabinet (BSL2) or glove box when manipulating known or suspected *C. auris* isolates.

• To disinfect surfaces contaminated with *C. auris*, use 10% bleach (made fresh daily) or other bleach-based products. Alternatively, disinfectants on the USA Environmental Protection Agency List K

• After work with *C. auris* is complete, decontaminate the biological safety cabinet with 10% bleach

Update on lab methods for detecting *C. auris*

- FDA approvals
  - VITEK MS MALDI-TOF
  - Bruker Biotyper MALDI-TOF
  - GenMark ePlex BCID-FP panel blood culture test
- Other available tests
  - VITEK 2 8.01 update
  - PCR
  - Bruker FungiPlex

https://www.cdc.gov/fungal/candida-auris/recommendations.html
Identification of *Candida auris* using the updated 8.01 VITEK®2 yeast identification system: a multi-laboratory evaluation study. Ambaraghassi G\(^{1,2}\), Dufresne PJ\(^3\), Dufresne SF\(^{1,2,4}\), Vallières É\(^{2,5,6}\), Muñoz JF\(^7\), Cuomo CA\(^7\), Berkow EL\(^8\), Lockhart SR\(^8\), Luong ML\(^9,2\).

Still difficulties distinguishing between *C. auris* and *C. duobushaemulonii* especially for isolates from East Asia and Africa

- South Asia – 74%
- East Asia – 0%
- Africa – 7%
- South America – 100%
Resistance: *C. glabrata*

8% Azoles

3% Micafungin

7/1700 resistant to fluconazole and micafungin
Global *C. auris* antifungal resistance

- Echinocandins
- Amphotericin B
- Fluconazole

N=912

% Resistance
US Resistance: *C. auris*

- 33% multidrug-resistant

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<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Azoles</td>
<td>Polyenes</td>
<td>Echinocandins</td>
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<tr>
<td>88%</td>
<td>34%</td>
<td>3%</td>
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Pan-resistance

- First 2 confirmed pan-resistant *C. auris* cases found in NY
- Identified by ARLN NE regional lab (Wadsworth/NY)
- Cases were unrelated
- Acquired resistance on treatment
- No transmission of resistance seen
- Pan-resistance has also been reported from a few other countries
Nationally notifiable

- *C. auris* nationally notifiable as of 2019
- In pilot testing phase for message mapping guide
- Contact your local or state PHL for information on reporting
Surveillance possibilities
Colonization screening

- Current recommendations are for a single swab of axilla x 2 and groin x 2
  - Some data that suggests also screening the nares can be advantageous

- Screening can be accomplished through culture of the swab in Sab salt dulcitol broth
- PCR

https://www.cdc.gov/fungal/candida-auris/recommendations.html
Screening: Consider screening -

- **Close healthcare contacts** of patients with newly identified *C. auris* infection or colonization

- Patients who have had an **overnight stay in a healthcare facility outside the United States** in the previous one year, especially if in a **country with documented *C. auris* cases**.
  - Strongly consider screening patients colonized with carbapenemase-producing Gram-negative bacteria. *C. auris* co-colonization with these organisms has been observed regularly.

Identifying the species of Candida from urine and other non-sterile body sites

- Yeast from urine usually tossed out because not considered an infection

Only about 50% of clinical C. auris cases are from blood
Periodic point prevalence surveys in LTACHs and vSNFs

- One state is conducting periodic PPS at LTACHs bordering a high prevalence state
- Detected 4 cases of *C. auris* colonization within first few rounds of screening
If you identify a *C. auris*, please notify your PHL and/or regional ARLN lab.
More information can be found:

https://www.cdc.gov/fungal/candida-auris/

Thank you! Questions?

For more information, contact CDC
1-800-CDC-INFO (232-4636)

Contact us at:
candidaauris@cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.