UWTASP
tele-antimicrobial stewardship program

Candida auris
An Emerging MDR Fungal Threat in Healthcare

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March 17, 2026

Project ECHO®
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Learning Objectives

1. Describe the history

Explain how and when C. auris emerged globally and why it is considered a novel pathogen

2. Understand the threat

Identify why C. auris is uniquely dangerous in healthcare settings compared to other Candida species

3. Recognize patient impact

Describe mortality rates, risk factors, and the patient populations most affected

4. Navigate antifungal resistance

Understand resistance patterns and the rationale for first-line treatment choices

5. Apply treatment strategies

Select appropriate antifungal therapy and understand when to consult infectious disease

6. Implement infection control

Apply CDC-recommended measures to prevent nosocomial transmission in your facility

What Is Candida auris?

A novel yeast pathogen

C. auris is a species of ascomycetous fungus that grows as a budding yeast. It rarely forms hyphae or pseudohyphae. Named from the Latin *auris* (ear), it was first isolated from an ear canal.

Genetically distinct

More closely related to *C. haemulonii* than to the common C. albicans. It belongs to the CTG clade (translates the CTG codon as serine rather than leucine).

Unique biology

Grows at 42°C · Tolerates high salt concentrations · Thrives on skin · Can switch between White and Brown cell states with different resistance and virulence properties

CRITICAL
WHO Priority

URGENT THREAT
CDC Classification

42°C
Max Growth Temp

5
Clades

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History & Global Emergence

1996	Earliest known isolate — retrospectively identified from a Korean pediatric bloodstream infection (unrecognized at the time)
2009	First formal description: isolated from ear canal of a 70-year-old Japanese woman at Tokyo Metropolitan Geriatric Hospital (Satoh et al.)
2011	First confirmed invasive infections reported from South Korea; isolates initially misidentified as C. haemulonii and Rhodotorula glutinis
2012–2015	Simultaneous emergence on 3 continents confirmed by whole-genome sequencing (South Asia, Africa, South America) — each clade arising independently
2016	CDC issues first clinical alert to US healthcare facilities; first US cases confirmed. C. auris reported in >35 countries by 2019
2022	WHO designates C. auris a Critical Priority Pathogen — one of only 19 fungal pathogens on the first-ever fungal priority list
2023	CDC reports 4,514 new US clinical cases — year-over-year increases continuing since first detection in 2013. Clade I now predominant in the US

Why We Care

Five features that make C. auris uniquely dangerous

Multidrug Resistance

Resistant to ≥1 antifungal class in most isolates; pan-resistant to all three classes in growing number of cases

Diagnostic Evasion

Misidentified by standard biochemical methods (API 20C, Vitek 2, Phoenix) as C. haemulonii or other species; requires MALDI-TOF or molecular testing

Silent Colonization

Patients may be asymptomatically colonized on skin and body for months to years, serving as reservoirs for ongoing transmission

Environmental Persistence

Survives on hospital surfaces for weeks to months; resistant to many common disinfectants; found on high- and low-touch surfaces

High Mortality

30–60% mortality in invasive infections; nearly 50% of infected patients died within 90 days in early US outbreak reports

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Patient Impact & Risk Factors

30–60%
Mortality in invasive infections

~90%
US isolates resistant to fluconazole

>19 days
Median time from admission to infection

73%
Patients with central venous catheter

Patient Risk Factors

- ICU admission / critical illness
- Central venous catheter (CVC)
- Recent surgery or invasive procedures
- Prolonged broad-spectrum antibiotic use
- Prior antifungal therapy (especially fluconazole)
- Diabetes mellitus (present in ~41% of cases)
- Immunocompromised state (malignancy, transplant, HIV)
- Mechanical ventilation
- Long-term care facility or hospital exposure
- International healthcare travel or transfer

Diagnosis: The Identification Challenge

Standard laboratory methods can MISIDENTIFY C. auris as other, less dangerous species — a critical barrier to timely treatment and infection control

❌ Conventional Methods (FAIL)

- API 20C AUX → C. haemulonii
- Vitek 2 → C. haemulonii or C. famata
- Phoenix → C. haemulonii
- MicroScan → C. guilliermondii
- BD BBL Crystal → C. lusitaniae
- Sensititre YeastOne → misID

✅ Accurate Methods

- MALDI-TOF mass spectrometry (Bruker Biotyper or Vitek MS) — requires updated database
- Sequencing of ITS region / D1/D2 of 26S rDNA
- C. auris-specific PCR panels
- Chromogenic selective media (C. auris CHROMID)
- Salt Sabouraud Dulcitol broth at 42°C (screening)

⚡ Clinical Pearl

- Alert your lab if C. auris is suspected
- Bloodstream infections are most common presentation
- Antifungal susceptibility testing required for ALL clinical isolates
- Report ALL cases to state or local health department
- Contact DOH or CDC if confirmation needed

Antifungal Resistance

A three-class problem — and it's getting worse

AZOLES
(Fluconazole, Voriconazole)

~90%

of US isolates resistant

Mechanism:

ERG11 gene mutations; upregulation of efflux pumps (CDR1/CDR2/MDR1)

✗ Do NOT use fluconazole for C. auris treatment

ECHINOCANDINS
(Micafungin, Caspofungin, Anidulafungin)

5–10%

of US isolates resistant (increasing)

Mechanism:

FKS1/FKS2 hot-spot mutations; reports of pan-resistant strains are rising

⚠ First-line treatment — but resistance is emerging

POLYENES
(Amphotericin B)

~17%

of isolates resistant globally

Mechanism:

ERG3/ERG6/ERG11 mutations disrupting ergosterol biosynthesis

⚠ Reserve for echinocandin failure; monitor renal function

☣ **PAN-RESISTANT C. auris (resistant to all 3 classes) is confirmed in multiple US facilities. Consider investigational agents (rezafungin, fosmanogepix, ibrexafungerp).**

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Treatment Approach

STEP 1 — FIRST-LINE: Echinocandin (adults & children >2 months)

Micafungin 100 mg IV daily | Caspofungin 70 mg IV load → 50 mg IV daily | Anidulafungin 200 mg IV load → 100 mg IV daily

No Response After 5 Days / Persistent Fungemia

Switch to Liposomal Amphotericin B 5 mg/kg IV daily
Consider combination therapy; consult Infectious Disease

Pan-Resistant Isolates: Investigational Agents

Rezafungin · Ibrexafungerp (Brexafemme) · Fosmanogepix · Olorofim | Contact company expanded access programs | Report to CDC

Key Treatment Pearls

★ Susceptibility testing MANDATORY for all clinical isolates — do not rely on species alone

★ Do NOT treat colonization without signs/symptoms of active infection

★ Patients remain colonized long-term (possibly indefinitely) even after successful treatment — maintain infection control measures

★ Consult Infectious Disease for all confirmed C. auris infections | Report all cases to your state/local health department

Infection Control: Stopping Nosocomial Spread

Hand Hygiene

Soap & water preferred (C. auris may persist on hands after alcohol gel alone). Follow WHO 5-moments. Gloves do not replace hand hygiene.

Patient Isolation

Single-patient room required. Contact precautions (gown + gloves) for all care. Maintain for entire inpatient stay; deisolation criteria rarely met.

Environmental Disinfection

Use EPA-approved List P disinfectants. Standard quaternary ammonium compounds are INEFFECTIVE. Chlorine-based products (≥1,000 ppm), UV-C, and accelerated hydrogen peroxide have demonstrated efficacy.

Screening & Surveillance

Screen close contacts of newly identified cases. Composite skin swabs (axilla + groin) per CDC SOP. Report immediately to state/local public health. Track contacts across facility transfers.

Equipment & Transfer

Dedicate non-critical equipment to C. auris patients if possible. Communicate C. auris status at ALL patient transitions (transfer, discharge, referral). Receiving facilities must be notified.

Staff Education

Train all staff who may enter room. Audit PPE compliance. Engage pharmacy in antifungal stewardship. Multidisciplinary approach essential for outbreak control.

Future Outlook

Where is this heading — and what should rural healthcare prepare for?

📈 Cases Will Continue to Rise

CDC data shows uninterrupted year-over-year case increases since 2016. Rising from scattered cases to endemic in some US regions. Rural facilities will encounter this.

🧬 New Clades May Emerge

Clade V confirmed in Iran. Genomic surveillance is detecting new subclades. The pattern of simultaneous independent emergence on multiple continents is not fully understood.

💊 Pipeline Drugs Are Coming

Rezafungin (weekly dosing), ibrexafungerp, fosmanogepix, and olorofim represent new classes and mechanisms. FDA approved ibrexafungerp; others in Phase III trials for C. auris.

🌡️ Climate Change Connection

C. auris uniquely grows at 42°C. Casadevall et al. hypothesize its emergence is linked to global warming enabling thermal adaptation. This may drive further fungal pathogen emergence.

🔬 Diagnostics Will Improve

Rapid molecular panels (PCR) increasingly available. MALDI-TOF databases being updated routinely. Point-of-care testing under development — critical for rural hospitals.

🤝 Stewardship Is Essential

Antifungal stewardship programs will become standard of care. Pharmacists and ID-trained clinicians in rural settings are the frontline. Regional networks are forming.

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Key Takeaways & Resources

C. auris is a real and growing threat — it has reached all US regions and every rural facility should have a response plan.

Standard lab methods fail to identify it — know your lab's capabilities; update MALDI-TOF databases and establish ID pathways.

Echinocandins are first-line — but resistance is rising. All clinical isolates require susceptibility testing. Call ID.

Infection control is your most powerful tool — contact precautions, correct disinfectants (EPA List P), and prompt public health notification are essential.

Colonized patients remain colonized — infection control measures continue for the entire hospitalization, regardless of treatment response.

Questions? Consult your infectious disease team or state health department when C. auris is suspected or confirmed in your facility.

Key Resources

- **CDC C. auris Hub**
  cdc.gov/candida-auris
- **IDSA Candidiasis Guidelines**
  idsociety.org (2016 + updates)
- **WHO Fungal Priority List**
  who.int, 2022
- **MMWR C. auris Reports**
  cdc.gov/mmwr
- **EPA List P Disinfectants**
  epa.gov/pesticide-registration
- **APHL C. auris Guidance**
  aphl.org
- **State Health Dept (report cases)**
  Contact your state HD

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