

# GUIDE TO INFECTION CONTROL IN THE HEALTHCARE SETTING

## *Candida auris*

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## **DEFINITION**

*Candida auris* is an emergent multidrug-resistant pathogen capable of causing outbreaks of severe invasive disease, associated with high mortality rates.

## **KEY ISSUES**

- Emergent, rapidly spreading pathogen with outbreak causing potential.

- Propensity to colonize the skin, persist in the hospital environment, cause nosocomial outbreaks, and cause severe disease.
- Frequently exhibits multidrug resistance.

## KNOWN FACTS

- In the most recent 12 months, there were 2,377 clinical cases and 5,754 screening cases in the United States (January 2022 - December 2022).
- Candida bloodstream infections (BSIs) are the third to fourth most common cause of healthcare-associated BSIs.
- In 2009, a new fluconazole-resistant species, *Candida auris*, was identified in East Asia and has now been isolated on five continents.
- First human pathogenic fungus to be subject to international health alerts because of its propensity to colonize the skin, persist in the hospital environment, cause nosocomial outbreaks, and cause severe disease.
- *C. auris* can be challenging to identify in the clinical laboratory, and this species frequently exhibits multidrug resistance.
- Clinical *C. auris* isolates have been recovered from a variety of specimen types, including normally sterile body fluids, respiratory sections, urine, bile, tissues, wounds, and mucocutaneous swabs. BSI is the most commonly observed invasive infection, with in-hospital mortality rates reported on the order of 30 to 60%.
- Germination, adherence, biofilm formation, phospholipase, mannosyl transferases, oligopeptide, siderophore-based iron transporters, and proteinase production (strain-dependent) are all known to contribute to Candida pathogenesis.
- Candida isolates from normally sterile body sites should be identified to the species level in order to guide initial therapy based on predictable species-specific susceptibility. Additionally, the CDC recommends considering identifying Candida isolates from nonsterile sites in select situations, such as when a case of *C. auris* has been identified in a healthcare facility or when a patient has health care exposure in a location outside the United States where *C. auris* has been reported.
- Misidentifications of *C. auris* as other Candida species by commercial biochemical methods have been widely reported, likely because of a lack of representative organisms in currently available databases. Clinical laboratories should be especially alert to the possibility of *C. auris* when an isolate is cannot be identified by standard biochemical methods or when identified as as *Candida haemulonii*, *Candida parapsilosis*, *Candida guilliermondii*, *Candida lusitanae*, and *Candida famata*.

- Currently, there are no species-specific antifungal susceptibility breakpoints established for *C. auris*.
- The isolates tested to date have uniformly displayed elevated fluconazole MICs along with varied susceptibilities to other azoles, amphotericin, and the echinocandins
- Resistance to at least two antifungal classes is observed in  $\geq 40.0\%$  of *C. auris* and approximately 4.0% displayed resistance to all three classes of drugs.
- Treatment is indicated only if clinical disease is present or if the organism is isolated from a sterile site.
- The treatment of colonization without evidence of active infection is strongly discouraged.
- Echinocandins are used as first-line therapy for *C. auris*, pending antifungal susceptibility test results, unless the patient is an infant less than 2 months of age, in which case amphotericin B deoxycholate is recommended.
- Because resistance of *C. auris* to antifungal agents has been shown to emerge while a patient is receiving therapy, repeated susceptibility testing should be performed if a laboratory isolates *C. auris* on subsequent cultures.
- Healthy individuals can be carriers of *C. auris*, and can transmit infection to another person.
- Spread from the patient or their environment to the hands of health care workers seems highly plausible, but colonization of healthcare workers is rare (<1% during outbreaks).
- The transmissibility of *C. auris* within hospitals, especially critical-care settings, has been established.
- Skin or mucosal colonization of affected patients appears to be common, and the organism has been recovered from a variety of high-touch patient contact points, such as mattresses, furniture, sinks, and medical equipment.
- Patients who have undergone recent surgery, with chronic disease, and/or with recent use of a broad-spectrum antibiotic or antifungal are at a heightened risk of mortality.
- Evidence suggests that immune system suppression attributable to malignancy or immunosuppressive agents (eg, corticosteroids) is a risk factor for *C. auris* infection and may contribute to dissemination of infection in the compromised host.
- Patients who recently had an organ transplant, are on immunosuppressant medication, have diabetes, have a history of receiving antibiotics, had indwelling devices such as catheters, and prolonged hospital or nursing home stays have the highest risk for acquiring *C. auris* infection.
- *C. auris* outbreaks in pediatric or neonatal ICUs have been rare.

- *C. auris* has been shown to persist on plastics ex vivo for at least 14 days, with viability testing indicating that cells are also capable of entering a metabolically active, but non-culturable, state that persisted for 4 weeks.

## SUGGESTED PRACTICE

- Adherence to good hand hygiene combined with standard and contact precautions.
- Adequate hand hygiene should be performed with soap and water, alcohol-based hand cleansers, or chlorhexidine hand rub use.
- Housing of infected patients in private rooms or cohorting in the setting of semi-private rooms.
- Performance of thorough daily cleaning.
- Terminal room disinfection with an agent that is effective against *Clostridium difficile*.
- Non-sporicidal hydrogen peroxide and chlorine-based disinfectants are effective against *C. auris*.
- Quaternary ammonium products have relatively poor activity and should not be used.
- Iodine-based skin cleansers and chlorhexidine (depending on the formulation) also have demonstrated effective *C. auris* killing.
- Contact tracing and screening to identify other potential patients who may have been exposed, and screening those for asymptomatic colonization should be performed.
- Pulsed-xenon ultraviolet light technology on *C. auris* are being tested in laboratory settings. Findings suggest a 99.6% reduction on *C. auris* after a 10-minute cycle at a 2-m distance vs. a 99.4% reduction after a 5-minute cycle at a 1-m distance.
- Hydrogen peroxide vaporization technology has been used in outbreak management.
- Unit closures and deep cleaning have been necessary to control outbreaks.
- One to one staffing and dedicated patient care equipment (such as thermometers or stethoscopes) have been shown to control outbreaks.

## SUGGESTED PRACTICE IN UNDER-RESOURCED SETTINGS

- Adherence to good hand hygiene combined with standard and contact precautions.

- Adequate hand hygiene should be performed with soap and water, alcohol-based hand cleansers, or chlorhexidine hand rub use.
- Housing of infected patients in private rooms or patient cohorting (see below) in semi-private or open ward settings.
- Terminal room disinfection with an agent that is effective against *Clostridium difficile*.
- Non-sporicidal hydrogen peroxide and chlorine-based disinfectants are effective against *C. auris*
- Quaternary ammonium products have relatively poor activity and should not be used
- When single rooms are not available, facilities may choose to cohort patients with *C. auris* together in the same room.
  - Maintain separation of at least 3 feet between beds.
  - Use privacy curtains to limit direct contact.
  - Clean and disinfect as if each bed area were a different room
  - Clean and disinfect environmental surfaces on a more frequent schedule.
  - Have healthcare personnel change personal protective equipment (if worn), including gloves, and perform hand hygiene before and after interaction with each roommate.

## SUMMARY

Since being identified in 2009, *Candida auris* has now been isolated on five continents and has become the first human pathogenic fungus to be subject to international health alerts because of its propensity to colonize the skin, persist in the hospital environment, cause nosocomial outbreaks, and cause severe disease.

*Candida* bloodstream infections are the third to fourth most common cause of healthcare-associated bloodstream infections. Clinical *C. auris* isolates have been recovered from a variety of specimen types, including normally sterile body fluids, respiratory sections, urine, bile, tissues, wounds, and mucocutaneous swabs. BSI is the most commonly observed invasive infection, with in-hospital mortality rates reported on the order of 30 to 60%.

Misidentifications of *C. auris* as other candida species by commercial biochemical methods have been widely reported, and may play a role in its dissemination in healthcare settings. Skin or mucosal colonization of affected patients appears to be common, and the organism has been recovered from a variety of high-touch patient contact points, such as mattresses, furniture, sinks, and medical equipment. Healthy individuals can be carriers of *C. auris*, and can transmit infection to another person, spread from the patient or their environment to the hands of health care workers seems highly plausible, but colonization of healthcare workers is rare (<1% during outbreaks). Patients who have undergone recent surgery, with chronic disease, and/or with recent use of a broad-spectrum antibiotic or antifungal are at a heightened risk of mortality; patients who

recently had an organ transplant, are on immunosuppressant medication, have diabetes, have a history of receiving antibiotics, had indwelling devices such as catheters, and prolonged hospital or nursing home stays have the highest risk for acquiring *C. auris* infection.

Treatment is indicated only if clinical disease is present or if the organism is isolated from a sterile site. Echinocandins are used as first-line therapy for *C. auris*, pending antifungal susceptibility test results, unless the patient is an infant less than 2 months of age, in which case amphotericin B deoxycholate is recommended.

In order to prevent and control the spread of *Candida auris* adherence to good hand hygiene combined with standard and contact precautions should be implemented and maintained. Hand hygiene should be performed with soap and water, alcohol-based hand cleansers, or chlorhexidine hand rubs. When possible, housing of infected patients in private rooms or cohorting in the setting of semi-private rooms, should be implemented. Performance of thorough daily cleaning as well as terminal room disinfection with an agent that is effective against *Clostridium difficile*, such as non-sporicidal hydrogen peroxide and chlorine-based disinfectants is recommended. Quaternary ammonium products have relatively poor activity and should not be used. When single rooms are not available, facilities may choose to cohort patients with *C. auris* together in the same room, maintaining a separation of at least 3 feet between beds and using privacy curtains to limit direct contact. Cleaning and disinfection should be performed as if each bed area were a different room, and should be scheduled on a more frequent schedule, healthcare personnel should change personal protective equipment, and perform hand hygiene before and after interaction with each roommate. One to one staffing and dedicated patient care equipment (such as thermometers or stethoscopes), hydrogen peroxide vaporization technology, and unit closures and deep cleaning have been necessary to control outbreaks.

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