Candida auris (C. auris)

BASIC EPIDEMIOLOGY

Infectious Agent
Candida auris is an emerging multidrug-resistant yeast that can cause invasive infections and is associated with high mortality. Most strains of *C. auris* are resistant to at least one antifungal drug, one-third are resistant to two antifungal drug classes, and some strains are resistant to all three major classes of antifungal drugs, severely limiting treatment options. *C. auris* can spread in healthcare settings and cause outbreaks.

In the United States, *C. auris* has been predominantly identified among patients with extensive exposure to ventilator units at skilled nursing facilities and long-term acute care hospitals, and those who have received healthcare in countries with extensive *C. auris* transmission. Other risk factors for *C. auris* infection are similar to those for invasive infection with other *Candida* species and include central venous catheter use, and recent broad-spectrum antibiotic or antifungal use.

Transmission
C. auris can colonize patients' skin and other body sites, perhaps indefinitely, and colonization poses a risk both for invasive infection and transmission. *C. auris* can spread readily between patients in healthcare facilities. It has caused numerous healthcare-associated outbreaks that have been difficult to control. In some countries, *C. auris* has emerged as a leading cause of candidemia, accounting for up to 40% of *Candida* isolates in some hospitals; hospital units have been closed temporarily to stop transmission of *C. auris*. Control of *C. auris* requires timely detection and adherence to recommended infection control practices. Yeast identification methods used at many clinical laboratories often misidentify *C. auris* as other yeasts (e.g., *Candida haemulonii*), making detection and thereby control of *C. auris* challenging.

Transmission can occur via direct person-to-person contact or secondary contact with contaminated environmental surfaces, medical devices, or equipment. Additionally, the hands of healthcare workers who frequently touch these objects in patient environments often become vectors of transmission if hand hygiene compliance and/or transmission-based precautions are not adhered to.

Incubation Period
There is no set incubation period for exposure-to-illness onset.

Communicability
The period of communicability is unknown and may be as long as the organism is present in the individual. *C. auris* persists in the healthcare environment for weeks, and certain routinely used disinfectants in healthcare settings are not effective against the organism. Recent investigations have demonstrated that one-third to half of all patients on a given unit, especially in a long-term care setting, can become colonized with *C. auris* within weeks of an index patient entering the facility. Outbreaks of *C. auris* in many parts of the world have been very difficult to control, sometimes requiring closure of hospital units and intensive public health interventions. In some countries with unchecked transmission of *C. auris*, it has become a leading cause of *Candida* infections, signaling a rapid change in the epidemiology of *Candida* infections.

Clinical Illness

Clinical manifestation of *C. auris* infection depends upon the site of infection. Patients with *C. auris* bloodstream infection typically have sepsis and severe illness. Other invasive infections, such as intraabdominal candidiasis can also occur. *C. auris* can also cause wound infections and otitis. *C. auris* has been found in urine and respiratory specimens, though its contribution to clinical disease in these sites is unclear. *C. auris* can also colonize the skin, nose, ears, and other body sites of asymptomatic people.

Severity

Candida auris can cause invasive infections associated with up to 40% in-hospital mortality.

DEFINITIONS

Clinical Case Definition
When found in a clinical culture, *C. auris* can represent an infection or colonization. There is no set clinical case definition for *C. auris* as it can cause many types of symptoms.

Laboratory Confirmation
Candida auris: *Candida auris* from any body site/source that is laboratory confirmed.

- Confirmatory laboratory evidence:
    - Detection of *C. auris* from any body site using either culture or a culture independent diagnostic test (CIDT) (e.g., Polymerase Chain Reaction[PCR]).
- Presumptive laboratory evidence:
    - Detection of *C. haemulonii* from any body site using a yeast identification method that is not able to detect *C. auris*, AND
    - Either the isolate/specimen is not available for further testing, or the isolate/specimen has not yet undergone further testing.

(Note: When additional test results are available, case re-classification may occur, including making this a non-case.)

Epidemiologic Linkage

- Person resided within the same household with another person with confirmatory or presumptive laboratory evidence of *C. auris* infection or colonization.

OR

- Person received care within the same healthcare facility as another person with confirmatory or presumptive laboratory evidence of *C. auris* infection or colonization.

OR

- Person received care in a healthcare facility that commonly shares patients with another facility that had a patient with confirmatory or presumptive laboratory evidence of *C. auris* infection or colonization.

OR

- Person had an overnight stay in a healthcare facility in the previous one year in a foreign country with documented *C. auris* transmission (https://www.cdc.gov/fungal/candida-auris/tracking-cauris.html).

*Note: the person with confirmatory or presumptive laboratory evidence of C. auris and potentially exposed individuals do not need to be present in a health care facility for any overlapping time period. Any case occurring in a facility with a confirmed or probable case identified in the prior 12 months would be considered epidemiologically linked.

Case Classification
***Candida auris* case, clinical**
Public Health jurisdiction may consider stratifying clinical cases as invasive vs non-invasive.

- **Confirmed:** Person with confirmatory laboratory evidence from a clinical specimen collected for the purpose of diagnosing or treating disease in the normal course of care. This includes specimens from sites reflecting invasive infection (e.g., blood, cerebrospinal fluid) and specimens from non-invasive sites such as wounds, urine, and the respiratory tract, where presence of *C. auris* may simply represent colonization and not true infection.
- **Probable:** Person with presumptive laboratory evidence from a clinical specimen collected for the purpose of diagnosing or treating disease in the normal course of care and evidence of epidemiologic linkage. A clinical specimen includes specimens from sites reflecting invasive infection (e.g., blood, cerebrospinal fluid) and specimens from non-invasive sites

such as wounds, urine, and the respiratory tract, where presence of *C. auris* may simply represent colonization and not true infection.

***Candida auris* case, colonization/screening**

- **Confirmed:** Person with confirmatory laboratory evidence from a swab collected forthe purpose of screening for *C. auris* colonization regardless of site swabbed. Typical colonization/screening specimen sites are skin (e.g., axilla, groin), nares, rectum, orother external body sites. Swabs from wound or draining ear are considered clinical.
- **Probable:** Person with presumptive laboratory evidence from a swab collected for the purpose of screening for *C. auris* colonization regardless of site swabbed. Typical colonization/screening specimen sites are skin (e.g., axilla, groin), nares, rectum, or other external body sites. Swabs from wound or draining ear are considered clinical.

Criteria to distinguish a new case of this disease or condition from reports or notifications which should not be enumerated as a new case for surveillance

- A person with a clinical case should not be counted as a colonization/screening case thereafter (e.g., patient with known infection who later has colonization of skin isnot counted as more than one case).
- A person with a colonization/screening case can be later categorized as a clinical case (e.g., patient with positive screening swab who later develops bloodstream infection would be counted in both categories).

SURVEILLANCE AND CASE INVESTIGATION

Case Investigation

Local and regional health departments will promptly address all reports of *C. auris*.
The jurisdiction where the healthcare facility is located conducts the investigation and ensures control measures are promptly taken. The investigation steps below describe the public health activities to be completed when a suspected or confirmed *C. auris* case is reported. Investigations and control measures are required for infection or colonization with any type of *C. auris*.

Case Investigation Checklist

- ☐ The jurisdiction that conducts the investigation is according to the location where thepatient tested positive for *C. auris*. (E.g.; patient tested positive for *C. auris* and is in hospital in jurisdiction A but the patient resides in jurisdiction B, jurisdiction A would conduct the investigation).
- ☐ Immediately ensure contact precautions have been implemented for anyone with suspected or confirmed *C. auris*.
- ☐ Confirm that the laboratory results meet the case definition.
    - If it is unclear, call a DSHS Regional HAI Epidemiologist for assistance.
- ☐ Ensure additional control measures are in place for cases and/or facilities. (see "specific control measures" section below)
- ☐ Review the medical records. If needed, speak to an Infection Preventionist (IP) atthe healthcare facility to verify demographics, symptoms, and course ofillness.
- ☐ If the patient has been discharged from the reporting healthcare facility and the receiving healthcare facility is known, the investigator ensures that the receiving healthcare facility is informed of the *C. auris* case and ensures control measures are in place.
- ☐ Refer to the *C. auris* Investigation form for additional questions to address.

- The *C. auris* Investigation Form is available on the DSHS Website: http://www.dshs.state.tx.us/idcu/investigation/

- All probable and confirmed cases of *C. auris* require the investigation form to be completed.
- As required by TAC, all isolates identified as *Candida auris* must be submitted to the DSHS Laboratory.
  - Any yeast isolate identified as *C. haemulonii* or any yeast isolate that had identification attempted without successful identification can be sent to DSHS Laboratory.
- A paper copy of the investigation form and laboratory report is NOT required to be sent to DSHS EAIDU unless specifically asked.
- Enter all case investigations and submit a notification in NBS within 30 days of the initial report.
  - The jurisdiction that conducted the investigation enters the case in NBS.
  - The jurisdiction is entered as the jurisdiction who conducted the investigation and not the jurisdiction of residency.
  - Once the case is reviewed and approved by DSHS central office, the central office will update the jurisdiction to the jurisdiction of residency for aggregate reporting purposes.

NOTE: if a case is multi-jurisdictional, it is the responsibility of the investigator to notify other jurisdictions of the case.

Prevention and Control Measures

Control Measures for Cases

Ideally, the facility is performing control measures for the case and the investigator is communicating directly with the facility, most likely with the IP or the responsible representative over infection prevention. The investigator may also speak with the patient directly if applicable. The investigator ensures the below control measures are addressed but not all specific control measures might be necessary for all case investigations.

Specific Control Measures

- Conduct an infection control assessment by reviewing the items in this section and in the Texas Antibiotic Resistance Lab Network Response Plan
- Facilities are responsible for ensuring that healthcare personnel are vigilant with hand hygiene practices and ensure that:
  - Hand hygiene sinks are accessible and free from clutter/supplies;
  - Alcohol-based hand sanitizers are accessible and well stocked.
- Ensure the patient is on contact precautions/contact isolation. Contact precautions include but are not limited to:
  - Performing hand hygiene before entry into the patient room;
  - Donning (putting on) gown and gloves either before or upon immediate entry into the patient's room; (note some facilities might require more PPE)
  - Doffing (removing) gown, gloves and any other personal protective equipment (PPE) before exiting or immediately upon exiting the patient's room. Hand hygiene should be performed after removal of PPE.
  - Hand hygiene should be performed before exiting or immediately upon exiting the patient's room.
  - No recommendation currently exists for when to discontinue contact precautions. A facility should consult with an infectious disease physician, the IP, or the other provider that initiated the precautions. The facility may also call a DSHS regional HAI Epidemiologist for assistance.

- Ensure the facility is performing disinfection of reusable equipment before and after each use.
- Recommend single patient rooms if available.
    - If single rooms are not feasible, recommend cohorting like patients (ex: a patient with *C. auris* and another patient with *C. auris*)
- Recommend staff cohorting if possible.
- Recommend reducing the use of invasive medical devices for patients on the unit where the case was cared for, as invasive devices increase patient's risk of infection.
- Increase the frequency of cleaning of high touch areas.
- Provide education on *C. auris* as needed, with specific emphasis on contact precaution and the above control measures.
    - If additional help is needed regarding providing education, contact your DSHS Regional HAI Epidemiologist. (Education could be provided to: anyone at the facility, family members, and the patient.)
- Colonization screening
    - Roommates of positive cases should be screened for *C. auris* colonization. Contact a DSHS Regional HAI Epidemiologist for colonization screening resources
    - Implementation of broader colonization screening may be necessary, depending on the results of the infection control assessment. See DSHS *C. auris* screening recommendations and CDC Screening for *Candida auris* Colonization webpage for guidance: https://www.cdc.gov/fungal/candida-auris/c-auris-screening.html. Contact a DSHS Regional HAI Epidemiologist for colonization screening resources.
    - Conduct retrospective laboratory surveillance. Identify clinical laboratories that performed cultures from healthcare settings where the index patient received care. Review three months of lab results to identify any additional *C. auris* isolates or *Candida* isolates not speciated. If available, these retrospective isolates should be sent to DSHS Laboratory for testing.
    - Conduct prospective surveillance to detect if there is ongoing transmission by monitoring laboratory cultures for *C. auris* isolates or *Candida* isolates not speciated at these facilities for three months after the collection date of the last positive specimen. Request submission of isolates to DSHS Laboratory.

Treatment

Each case will have a unique treatment option. It is recommended that the reporting facility collaborate with a clinical pharmacist, an infectious disease physician, and/or an antibiotic stewardship resource for an individualized treatment plan.

Exclusions

Students (K-12) and daycare age children with *C. auris* wound infection need to be excluded from attendance until drainage from wounds or skin and soft tissue infections is contained and maintained in a clean dry bandage; restrict from situations that could result in the infected area becoming exposed, wet, soiled, or otherwise compromised. No other exclusions apply.

MANAGING SPECIAL SITUATIONS

Outbreaks
If an outbreak is suspected, immediately notify a DSHS Regional HAI Epidemiologist. The DSHS regional HAI Epidemiologist will notify central office and work with central office as needed.

Outbreak Definition
At this time there are no defined criteria for an outbreak. If your health department believes they have detected an outbreak, it is recommended to speak with the DSHS regional HAI Epidemiologist.

REPORTING AND DATA ENTRY REQUIREMENTS

Provider, School and Child-care Facilities, and General Public Reporting Requirements
Cases of *Candida auris (C. auris)* should be reported ***within 1 working day*** to the local or regional health department. If the jurisdiction is unclear, call a DSHS Regional HAI Epidemiologist or Emerging and Acute Infectious Disease Unit (EAIDU) at 512-776-7676 for assistance.

Local and Regional Reporting and Follow-up Responsibilities
Local and regional health departments should:

- Promptly investigate all reported cases.
- Ensure control measures are in place and provide education to prevent further spread of disease (see specific control measures section located in this document).
- Enter the case into NBS when the first occurrence is reported and create the NBS notification to DSHS on all cases of *C. auris*. Complete additional case information and enter the remaining information within 30 days of initial report.
    - Please refer to the NBS Data Entry Guide for specific details on how to properly complete an NBS investigation, how to data enter a laboratory report and submit a NBS notification.

When a cluster or an outbreak is investigated, local and regional health departments should:

- Report suspected outbreaks within 24 hours of identification to a DSHS Regional HAI Epidemiologist.
    - Fax the investigation form and all other supporting documents to the DSHS Regional HAI Epidemiologist.
- If labeling a case as part of an outbreak, the outbreak must be named in NEDSS. Outbreak names must be requested through the NEDSS (NBS) office. The staff can be reached by phone (512) 458-7111 ext. 7729 or email nedss@dshs.state.tx.us

DISEASE REPORTING

Purpose of Reporting and Surveillance

- To prevent transmission of infections with *C. auris* in healthcare facilities and the community, by decreasing the likelihood of transmission through the investigationprocess.
- To improve the detection, monitoring and epidemiological characterization of *C. auris* in Texas.
- To develop, implement and evaluate strategies to prevent the emergence, transmission and persistence of *C. auris*.
- To conduct and support epidemiological studies to identify outbreaks and potential sources of ongoing transmission in various populations.
- To identify further trends related to continued antibiotic resistance and the development of MDROs in Texas.

Requested Reporting

- Report *Candida auris* to your local health jurisdiction ***within 1working day.***

Local Health Jurisdiction Investigation Responsibilities

- Local health departments may request assistance with the investigation of *C. auris*by contacting both the DSHS Lead Epidemiologist and the DSHS Regional HAI Epidemiologist for the health service region (HSR).
- Because of the potential for transmission of *C. auris* to vulnerable patients in healthcare settings, public health action is imperative in controlling further transmission by: instituting control measures, identifying and screening close contacts of cases that could transmit in healthcare settings, if indicated, and ensuring that the facility IP has been notified and that appropriate infection control measures are in place.

LABORATORY PROCEDURES

As required by the Texas Administrative Code (TAC), all *Candida auris* isolates must be submitted to the DSHS laboratory.

Diagnostic devices based on matrix-assisted laser desorption/ionization time-of-flight (MALDI-TOF) can differentiate C. auris from other Candida species, but not all the reference databases included in MALDI-TOF devices allow for detection. Currently, accurate identification of C. auris can be performed using the Bruker Biotyper brand MALDI-TOF using the updated Bruker FDA-approved MALDI Biotyper CA System library (Version Claim 4) or their "research use only" libraries (Versions 2014 [5627] and more recent) and VITEK (MALDI-TOF) MS RUO (with Saramis Ver 4.14 database and Saccharomycetaceae update). VITEK 2 with software version 8.01 is also able to accurately detect C. auris, though misidentifications may still be possible. Molecular methods based on sequencing the D1-D2 region of the 28s rDNA or the Internal Transcribed Region (ITS) of rDNA also can identify C. auris.

If you are suspecting a possible outbreak situation and need molecular testing, prior approval from a DSHS HAI Epidemiologist is required.

REVISION HISTORY

December 2021

- Section reviewed