***Candida auris***

**Practical Information Resources for Clinical Laboratorians**

The intent of this checklist is to provide practical information and key resources available to confront *C. auris* in a clinical laboratory. It is not comprehensive and each facility must determine the extent to which the information might be used to implement or modify processes for *C. auris* in their laboratory. Communication with local, regional and/or state health departments is also highly recommended.

**Table 1. *C. auris* checklist– practical information resources available**

| √ | Practical Information | Resource |
|---|---|---|
| | Gram stain and culture characteristics<br><br>CDC website and 2 case studies | https://www.cdc.gov/fungal/candida-auris/identification.html<br>https://jidc.org/index.php/journal/article/view/25881537/1294<br>https://www.jcdr.net/articles/PDF/12487/39654_CE[Ra1]_F(SL)_PF1(AGAK)_PFA(AK)_PB(AG_SHU)_PN(SL).pdf |
| | Limitations of phenotypic methods for isolate identification | https://www.cdc.gov/fungal/candida-auris/identification.html |
| | Reliable methods for isolate identification | https://www.cdc.gov/fungal/candida-auris/identification.html |
| | Isolates available for verification of identification methods | https://wwwn.cdc.gov/ARIsolateBank/Panel/AllIsolate (*Candida auris* panel) |
| | Antifungal susceptibility testing of *C. auris*<br>**Note:** there are no FDA cleared commercial methods for *C. auris* | https://www.cdc.gov/fungal/candida-auris/c-auris-antifungal.html |
| | Passive surveillance for *C. auris* in routine diagnostic specimens | See **Table 2** below |
| | Procedure for collection of swabs for colonization screening | https://www.cdc.gov/fungal/candida-auris/c-auris-patient-swab.html |
| | Procedure for testing swabs for colonization screening | https://www.cdc.gov/fungal/candida-auris/c-auris-guidance.html |
| | Identification of high-risk patients that may warrant *C. auris* colonization screening | https://www.cdc.gov/fungal/candida-auris/c-auris-screening.html<br>Note: State or local health departments can provide additional guidance |
| | **SAFETY** -<br>Lab Safety when working with known or suspected *C. auris* isolates<br>Disinfectants EPA approved for *C. auris*;<br>Note: quaternary ammonia only products are NOT effective | https://www.cdc.gov/fungal/candida-auris/c-auris-infection-control.html#disinfection<br>https://www.cdc.gov/fungal/candida-auris/c-auris-lab-safety.html<br>https://www.epa.gov/pesticide-registration/list-p-antimicrobial-products-registered-epa-claims-against-candida-auris |
| | *C. auris* resources available through the Antibiotic Resistance Laboratory Network (AR Lab Network) | https://www.cdc.gov/drugresistance/laboratories/ar-lab-network-testing-details.html |

| | | |
|---|---|---|
| | | https://www.cdc.gov/drugresistance/laboratories.html (check your local or regional AR Lab Network laboratory) and See **Table 3** below |
| | Requirements for public health department reporting of *C. auris* | C. auris is a Nationally Notifiable disease; contact your local public health laboratory as specific requirements often differ from state to state, region to region. For case definitions: https://ndc.services.cdc.gov/conditions/candida-auris/ |
| | *C. auris* cases in the USA | https://www.cdc.gov/fungal/candida-auris/tracking-c-auris.html |
| | CDC *C. auris* support contact information | candidaauris@cdc.gov |

**√** Check when information is obtained

**Table 2. Passive surveillance for *C. auris***

Laboratorians and infection preventionists should work together to devise a streamlined approach for detection and reporting of patients colonized or infected with *C. auris*. This may involve revising laboratory protocols and/or methods to detect C. *auris* in routine diagnostic specimens as part of "passive surveillance", including specimens that may not typically undergo species identification with current protocols. Local epidemiology and resources available will generally guide protocols adopted.

**Species identification of yeast from non-sterile sources – examples of criteria used to choose isolates for species-level identification. This includes 'rule out *C. auris*' as part of passive surveillance.**

| Criteria | Example | | |
|---|---|---|---|
| | **1** | **2** | **3** |
| Which patients? | All Inpatient | High-risk* inpatients | All inpatient |
| Which specimen type? | Urine | Urine | All |
| Which yeast isolates? | Any unless specimen considered contaminated | Any unless specimen considered contaminated | Any previously reported as "yeast" |

*as determined with input from infection preventionists

**Table 3. Ways in which CLIA-certified AR Lab Network laboratories can assist clinical laboratories with *C. auris*.**

| Local Clinical Laboratory | | AR Lab Network Support |
|---|---|---|
| **Scenario** | **Questions/Observations** | |
| Wants to ensure current yeast identification methods can identify *C. auris*. | Where can I find guidance? | CDC provides guidance https://www.cdc.gov/fungal/candida-auris/identification.html |

| | | |
|---|---|---|
| MALDI-TOF needs to be verified for identification of *C. auris*. | Where can isolates be obtained for verification? | FDA AR Isolate bank and CDC provide isolates free of charge. https://wwwn.cdc.gov/ARIsolateBank/ (*Candida auris* panel). |
| The lab's first *C. auris* isolate is identified. | How can I confirm identification is accurate, as a supplemental QA check? | Confirm identification of *C. auris* by MALDI-TOF.<br><br>Note: AR Lab Network can accept isolates for confirmation/rule-out *C. auris* |
| The clinician wants antifungal susceptibility testing results on a *C. auris* isolate. | Where can antifungal susceptibility testing be performed since our laboratory cannot do this? | Performs antifungal susceptibility testing (on *Candida* spp. other than *C. albicans*).<br><br>Information about antifungal testing can be found here https://www.cdc.gov/fungal/candida-auris/c-auris-antifungal.html<br><br>Note: Contact your AR Lab Network laboratory to determine which labs can accept and report isolates for *C. auris* antifungal susceptibility testing. |
| The Infection Preventionist approaches the lab about screening a patient for *C. auris* that is being transferred from a LTCF in which several *C. auris* patients were identified. | What screening approaches are appropriate?<br>Where can screening specimens be tested? | Performs screening of axilla/groin swabs or nares/axilla/groin to identify patients colonized with *C. auris*.<br><br>(Local public health department will determine if AR Lab Network can accommodate the request based on circumstances surrounding the case). |

**References:**


Information for Laboratorians and Health Professionals: https://www.cdc.gov/fungal/candida-auris/health-professionals.html

A CDC message to laboratory staff: https://www.cdc.gov/fungal/candida-auris/fact-sheets/fact-sheet-lab-staff.html

Arensman, K. et al. 2020. Clinical outcomes of patients treated for *Candida auris* infections in a multisite health system, Illinois, USA. Emerg Infect Dis. 26:876-880. https://dx.doi.org/10.3201/eid2605.191588.

Arora P, Singh P, Wang Y, Yadav A, Pawar K, Singh A, Padmavati G, Xu J, Chowdhary A. 2021. Environmental isolation of *Candida auris* from the coastal wetlands of Andaman Islands, India. mBio 12:e03181-20. https://doi.org/10.1128/mBio.03181-20.

de Almeida JN Jr., Francisco EC, Hagen F, Brandão IB, Pereira FM, Presta Dias PH, de Miranda Costa MM, de Souza Jordão RT, de Groot T, Colombo AL. Emergence of *Candida auris* in Brazil in a COVID-19 Intensive Care Unit. *Journal of Fungi*. 2021; 7(3):220. https://doi.org/10.3390/jof7030220

Du H, Bing J, Hu T, Ennis CL, Nobile CJ, et al. (2020) *Candida auris*: Epidemiology, biology, antifungal resistance, and virulence. PLOS Pathogens 16(10): e1008921. https://doi.org/10.1371/journal.ppat.1008921

Hata DJ, Humphries R, Lockhart SR; College of American Pathologists Microbiology Committee. *Candida auris*: An Emerging Yeast Pathogen Posing Distinct Challenges for Laboratory Diagnostics, Treatment, and Infection Prevention. Arch Pathol Lab Med. 2020 Jan;144(1):107-114. doi: 10.5858/arpa.2018-0508-RA. Epub 2019 Jun 6. PMID: 31169997.

Jeffrey-Smith, A. et al. 2018. *Candida auris*: a review of the literature. Clin Microbiol Rev. 31:e00029-17. https://doi.org/10.1128/CMR.00029-17.

Kordalewska M and Perlin DS (2019) Identification of Drug Resistant *Candida auris.* Front. Microbiol. 10:1918. doi: 10.3389/fmicb.2019.01918

Lockhart SR, Berkow EL, Chow N, Welsh RM. *Candida auris* for the clinical microbiology laboratory: Not your grandfather's *Candida* species. Clin Microbiol Newsl. 2017 July 1; 39(13): 99–103. doi:10.1016/j.clinmicnews.2017.06.003.

Spivak ES, Hanson KE. 2018. *Candida auris*: an emerging fungal pathogen. J Clin Microbiol 56:e01588-17. https://doi.org/10.1128/JCM.01588-17.

Villaneuva-Lozano H, et al. Outbreak of *Candida auris* infection in a COVID-19 hospital in Mexico. Clin Micro and Infect 2021; 27: 813-816.

Zhu Y, O'Brien B, Leach L, Clarke A, et al. Laboratory analysis of an outbreak of *Candida auris* in New York from 2016 to 2018: Impact and Lessons Learned. J Clin Microbiol. 2020; 25;58(4):e01503-19. https://journals.asm.org/doi/10.1128/JCM.01503-19