

18-ID-05

Committee: Infectious Disease**Title: Standardized Case Definition for *Candida auris* clinical and colonization/screening cases and National Notification of *C. auris* case, clinical**

Check this box if this position statement is an update to an existing standardized surveillance case definition.

I. Statement of the Problem

Candida auris is an emerging fungus that presents a serious global health threat. It can cause invasive infections associated with up to 40% in-hospital 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. *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. Making *C. auris* nationally notifiable will help with timely detection of *C. auris*, which is a key step in containing its spread within healthcare facilities and networks. A consensus case definition, which was approved in 2017, allows for standardized public health tracking of *C. auris* cases. This position statement updates the consensus case definition to reflect changes in performance characteristics of laboratory tests used to identify *C. auris*.

II. Background and Justification

Candida auris is an emerging multidrug-resistant yeast that can cause invasive infections and is associated with high mortality. Some strains of *C. auris* are resistant to the three major classes of antifungals, severely limiting treatment options. *C. auris* can spread in healthcare settings and cause outbreaks. *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* persists in the healthcare environment for weeks, and quaternary ammonia-based disinfectants, which are routinely used 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.

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.

Commonly used yeast identification methods often misidentify *C. auris* as other yeasts (especially *Candida haemulonii*) (Appendix 1 contains a list of fungal species commonly reported in place of *C. auris* by different laboratory identification methods). *C. auris* should be suspected when *C. haemulonii* (especially when isolated from an invasive site) or other organisms listed in Appendix 1 are identified by a yeast identification method that cannot accurately identify *C. auris*.

As of April 2018, over 700 patients with *C. auris* infection or colonization have been identified in the United States. Most cases have occurred in New York City, New Jersey, and the Chicago area. *C. auris* has only recently emerged in the United States, with cases primarily occurring after mid-2015. Given the recent emergence and limited geographic extent of cases, there is an opportunity to control the spread of *C. auris* before it becomes more widespread in the United States.

Control requires timely detection of the organism and adherence to recommended infection control practices, which includes proper hand hygiene, contact precautions, thorough environmental disinfection, contact tracing, and public health notification and action to prevent transmission within a healthcare facility and in the region.

Making *C. auris* nationally notifiable will help with timely detection of *C. auris*, which is a key step in containing its spread within healthcare facilities and networks. A standardized case definition will allow for public health tracking of *C. auris* cases.

III. Statement of the desired action(s) to be taken

CSTE recommends the following actions:

1. Utilize standard sources (e.g. reporting*) for case ascertainment for *Candida auris*. Surveillance for *Candida auris* should use the following recommended sources of data to the extent of coverage presented in Table III.

Table III. Recommended sources of data and extent of coverage for ascertainment of cases of *Candida auris*.

Source of data for case ascertainment	Coverage	
	Population-wide	Sentinel sites
Clinician reporting	x	
Laboratory reporting	x	
Reporting by other entities (e.g., hospitals, veterinarians, pharmacies, poison centers), specify: all healthcare facilities	x	
Death certificates		
Hospital discharge or outpatient records		
Extracts from electronic medical records		
Telephone survey		
School-based survey		
Other, specify:		
2018 Template		

*Reporting: process of a healthcare provider or other entity submitting a report (case information) of a condition under public health surveillance to local or state public health. Note: notification is addressed in a Nationally Notifiable Conditions Recommendation Statement and is the process of a local or state public health authority submitting a report (case information) of a condition on the *Nationally Notifiable Conditions List* to CDC.

2. Utilize standardized criteria for case ascertainment and classification (Sections VI and VII and Technical Supplement) for *Candida auris*.
3. Please see accompanying NNC Recommendation Statement for additional Desired Actions to be Taken (page 12).

IV. Goals of Surveillance

To assess the temporal, geographic, and demographic occurrence of *C. auris* in the United States in order to facilitate its prevention and control. Surveillance will also help to identify cases of *C. auris* and provide an opportunity for rapid response to contain its spread.

V. Methods for Surveillance: Surveillance for *Candida auris* should use the recommended sources of data and the extent of coverage listed in Table III.

The primary source of data is the microbiology laboratory. Laboratories should report confirmed or potential *C. auris* cases to State and Local Territorial (STLT) public health agencies and submit potential *C. auris* isolates (or specimens, if culture independent diagnostic tests [CIDT] are used) to regional Antibiotic Resistance Laboratory Network (AR Lab Network) laboratories or CDC via state public health laboratories for further characterization. Clinicians and healthcare facilities that become aware of a confirmed or potential case of *C. auris* should report the case to STLT public health authorities.

VI. Criteria for case ascertainment

A. Narrative: A description of suggested criteria for case ascertainment of a specific condition.

Clinical criteria

None

Laboratory criteria

Report any patient or laboratory finding to public health authorities that meets either of the following criteria:

- Detection of *C. auris* in a specimen using either culture or a culture independent diagnostic test (CIDT) (e.g., Polymerase Chain Reaction [PCR])
- Detection of an organism that commonly represents a *C. auris* misidentification (see Appendix 1 for details by method) in a specimen by culture

Epidemiologic linkage criteria

None

Submit confirmed and potential *C. auris* isolates/specimens to an AR Lab Network laboratory or CDC via state public health laboratories for further characterization. Isolates/specimens may be from clinical specimens (i.e., collected for the purposes of diagnosing or treating disease in the normal course of care) or screening specimens (i.e., collected for the detection of colonization and not for the purpose of diagnosing or treating disease).

B. Disease-specific data elements to be included in the initial report

None

VII. Case Definition for Case Classification**A. Narrative: Description of criteria to determine how a case should be classified.**

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.

Clinical Criteria

None

Laboratory Criteria*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* (Appendix 1), 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-c-auris.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 Classifications

Candida auris case, clinical

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 and evidence of epidemiologic linkage.

Suspect:

Person with presumptive laboratory evidence and no evidence of epidemiologic linkage.

Public Health jurisdiction may consider stratifying clinical cases as invasive vs non-invasive.

Candida auris case, colonization/screening

Confirmed:

Person with confirmatory 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.

Probable:

Person with presumptive laboratory evidence from a swab collected for the purpose of screening for *C. auris* colonization.

B. 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 is not 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).

VIII. Period of Surveillance

Ongoing

IX. Data

CSTE recommends the following case statuses be included in the CDC Print Criteria:

- Confirmed (clinical, by jurisdiction, colonization/screening U.S.-wide)
- Probable (clinical, by jurisdiction, colonization/screening U.S.-wide)
- Suspect
- Unknown

X. Revision History

Position Statement ID	Section of Document	Revision Description
17-ID-03	II. Background and Justification	Updated with new information about transmissibility of <i>C. auris</i> and case counts in the U.S.
17-ID-03	III. Statement of desired actions to be taken	Table III, removed the following sources of data: death certificates, hospital discharge or outpatient records, extracts from, electronic medical records. For coverage continue population-wide, removed sentinel sites.
17-ID-03	VII. Case definition, laboratory criteria	<p>Revised to reflect updates in laboratory test performance characteristics, include CIDT in addition to culture, refer to Appendix 1 instead of text within position statement for details of misidentifications.</p> <p>Changed label from supportive to presumptive laboratory criteria.</p> <p>Added under presumptive lab criteria that the isolate/specimen has not yet undergone further testing.</p> <p>Added clarifying note: When additional test results are available, case re-classification may occur, including making this a non-case.</p>
17-ID-03	VII. Case definition, epidemiologic linkage criteria	Added epidemiologic linkage to patients with presumptive laboratory evidence (in addition to confirmatory); clarify that no overlapping time-period is required, add time-frame (12 months) for epidemiological linkage, add overnight stay in healthcare facility overseas in previous one year in foreign country with documented <i>C. auris</i> transmission.
17-ID-03	VII. Case classification	<p>Changed “screening” to “colonization/screening”</p> <p>Added probable colonization/screening case classification.</p> <p>Clarified that swabs from wounds or draining ears are considered clinical.</p>
17-ID-03	IX. Data	Added CDC Print Criteria
17-ID-03	XI. References	Added/updated references
17-ID-03	Nationally Notifiable condition recommendation Statement	<p>Recommends adding <i>Candida auris</i> (clinical) to the Nationally Notifiable Condition List as routinely notifiable (only clinical).</p> <p>Statement on message mapping guide: CSTE recommends that a working group be established that includes CSTE and CDC members.</p>
17-ID-03	Appendix 1	Added appendix 1 that describes <i>C. auris</i> identification methods including common misidentifications

XI. References

1. Lockhart SR, Etienne KA, Vallabhaneni S, et al. Simultaneous emergence of multidrug-resistant *Candida auris* on 3 continents confirmed by whole-genome sequencing and epidemiological analyses. *Clin Infect Dis*. 2017;64(2):134-140.
2. Okinda N, Kagotho E, Castanheira M, Njuguna A, Omuse G, Makau P. Candidemia at a referral hospital in sub-Saharan Africa: emergence of *Candida auris* as a major pathogen. Paper presented at: European Conference On Clinical Microbiology And Infectious Diseases 2014.
3. Schelenz S, Hagen F, Rhodes JL, et al. First hospital outbreak of the globally emerging *Candida auris* in a European hospital. *Antimicrob Resist Infect Control*. 2016;5:35.
4. Mizusawa M, Miller H, Green R, et al. Can multidrug-resistant *Candida auris* be reliably identified in clinical microbiology laboratories? *J Clin Microbiol*. 2017;55(2):638-640.
5. Welsh RM, Bentz ML, Shams A, et al. Survival, persistence, and isolation of the emerging multidrug-resistant pathogenic yeast *Candida auris* on a plastic healthcare surface. *J Clin Microbiol*. 2017.
6. Cadnum JL, Shaikh AA, Piedrahita CT, et al. Effectiveness of disinfectants against *Candida auris* and other *Candida* species. *Infect Control Hosp Epidemiol*. 2017:1-4.
7. Britz E, Govender NP. Global emergence of a multi-drug resistant fungal pathogen, *Candida auris*. *Southern African Journal of Infectious Diseases*. 2016;31(3):3-4.
8. Chakrabarti A, Sood P, Rudramurthy SM, et al. Incidence, characteristics and outcome of ICU-acquired candidemia in India. *Intensive Care Med*. 2015;41(2):285-295.

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Nationally Notifiable Conditions (NNC) Recommendation Statement

Position Statement Title: Standardized Case Definition for *Candida auris*

Disease/Condition: *Candida auris* case, clinical

This statement recommends the addition of a disease/condition to the *Nationally Notifiable Conditions List*.

This NNC Recommendation Statement recommends the following:

1. Utilize standardized criteria for case ascertainment and classification (based on Sections VI and VII and Technical Supplement of accompanying position statement) for *Candida auris* and add *Candida auris* to the *Nationally Notifiable Condition List*
 - Immediately notifiable, extremely urgent (within 4 hours)
 - Immediately notifiable, urgent (within 24 hours)
 - Routinely notifiable, only clinical
 - No longer notifiable
2. CSTE recommends that all States and Territories enact laws (statute or rule/regulation as appropriate) to make this disease or condition reportable in their jurisdiction. Jurisdictions (e.g. States and Territories) conducting surveillance (according to these methods) should submit case notifications* to CDC.
3. Expectations for Message Mapping Guide (MMG) development for a newly notifiable condition: NNDSS is transitioning to HL7-based messages for case notifications; the specifications for these messages are presented in MMGs. When CSTE recommends that a new condition be made nationally notifiable, CDC must obtain OMB PRA approval prior to accepting case notifications for the new condition. Under anticipated timelines, notification using the Generic V2 MMG would support transmission of the basic demographic and epidemiologic information common to all cases and could begin with the new MMWR year following the CSTE annual conference. Input from CDC programs and CSTE would prioritize development of a disease-specific MMG for the new condition among other conditions waiting for MMGs. CSTE recommends that a working group be established that includes CSTE and CDC members to develop a message mapping guide.
4. CDC should publish data on clinical cases of *Candida auris* as appropriate (see Section IX of corresponding position statement).
5. CSTE recommends that all jurisdictions (e.g. States or Territories) with legal authority to conduct public health surveillance follow the recommended methods as outlined here and in the accompanying standardized surveillance position statement.

*Notification: process of a local or state public health authority submitting a report (case information) of a condition on the *Nationally Notifiable Conditions List* TO CDC.

Technical Supplement

Table VI. Table of criteria to determine whether a case should be reported to public health authorities.

Criterion	<i>C. auris</i>
<i>Clinical Evidence</i>	
None	
<i>Laboratory Evidence</i>	
Detection of <i>C. auris</i> in a specimen using either culture or a culture independent diagnostic test (e.g., PCR)	S
Detection of an organism that commonly represents a <i>C. auris</i> misidentification (see Appendix 1 for details) in a specimen by culture	S
<i>Epidemiological Evidence</i>	
None	

Notes:

S = This criterion alone is SUFFICIENT to report a case. N = All "N" criteria in the same column are NECESSARY to report a case

O = At least one of these "O" (ONE OR MORE) criteria in **each category** (categories=clinical evidence, laboratory evidence, and epidemiological evidence) **in the same column**—in conjunction with all "N" criteria in the same column—is required to report a case.

* A requisition or order for any of the "S" laboratory tests is sufficient to meet the reporting criteria.

Table VII. Classification Table: Criteria for defining a case of *Candida auris*

	Clinical Cases			Colonization/Screening Cases	
	Clinical Suspect	Clinical Probable	Clinical Confirmed	Colonization/Screening Probable	Colonization/Screening Confirmed
Clinical Evidence					
None					
Laboratory evidence					
Detection of <i>C. auris</i> from any body site using either culture or culture independent diagnostic test (e.g., PCR)			N		N
Detection of <i>C. haemulonii</i> from any body site using a yeast identification method not able to detect <i>C. auris</i> (Appendix 1)	N	N		N	
Clinical specimen was obtained during the normal course of care	N	N	N		
Specimen from a swab was obtained for the purpose of colonization screening				N	N
Isolate/specimen is not available for further testing or has not yet undergone further testing	N	N		N	
Epidemiologic evidence					
Resided within the same household with another person with confirmatory or presumptive laboratory evidence of <i>C. auris</i> infection or colonization		O			
Received care in the same healthcare facility as another person who had confirmatory or presumptive laboratory evidence of <i>C. auris</i> infection or colonization within the prior 12 months		O			
Received care in a healthcare facility that commonly shares patients with another facility that had a patient with confirmatory or presumptive laboratory evidence of <i>C. auris</i> infection or colonization within the prior 12 months		O			
Stayed overnight in a healthcare facility in the previous one year in a foreign country with documented <i>C. auris</i> transmission		O			
Absence of epidemiologic link to a confirmed case	N				
Criteria to distinguish a new case:					
For clinical cases, count patient once regardless of if a new event occurs	N	N	N		
For colonization/screening cases, count patient only once regardless of the interval between testing (assumes patient is always colonized)				N	N
A person with a colonization/screening case can later have a separate clinical case	N	N	N	N	N
A patient with a clinical case should not be counted as having a colonization/screening case thereafter	N	N	N	N	N

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Notes:

N = All "N" criteria in the same column are NECESSARY to classify a case. A number following an "N" indicates that this criterion is only required for a specific disease/condition subtype (see below). If the absence of a criterion (i.e., criterion NOT present) is required for the case to meet the classification criteria, list the absence of criterion as a necessary component.

O = At least one of these "O" (ONE OR MORE) criteria in **each category** (categories=clinical evidence, laboratory evidence, and epidemiologic evidence) **in the same column**—in conjunction with all "N" criteria in the same column—is required to classify a case. A number following an "O" indicates that this criterion is only required for a specific disease/condition subtype.

Appendix 1

Identification of *Candida auris* (as of August 20, 2018). This appendix will be updated as new information about *C. auris* identification becomes available.

Some yeast identification methods are unable to differentiate *C. auris* from other yeast species. *C. auris* can be misidentified as a number of different organisms when using traditional biochemical methods for yeast identification such as VITEK 2 YST, API 20C, BD Phoenix yeast identification system, and MicroScan.

The most common misidentification of *C. auris* is *Candida haemulonii*. *C. haemulonii* have been less commonly observed to cause invasive infections. Therefore, *C. auris* should be suspected when *C. haemulonii* is identified on culture of blood or other normally sterile site unless the method used can reliably detect *C. auris*. *Candida* isolates from the urine and respiratory tract ultimately confirmed as *C. auris* have been initially identified as *C. haemulonii*; less data are available about the ability of *C. haemulonii* to grow in urine or the respiratory tract, although true *C. haemulonii* infections in general appear to be rare in the United States.

The table below summarizes common misidentifications based on the yeast identification method used. If any of the species listed below are identified using the specified identification method, or if species identity cannot be determined by any method, further characterization using appropriate methodology should be sought.

Common misidentifications for <i>C. auris</i> by yeast identification method	
Identification Method	Organism <i>C. auris</i> can be misidentified as
Bruker MALDI Biotyper (FDA database)	No misidentifications of <i>Candida auris</i> . Bruker MALDI-TOF is able to accurately identify <i>C. auris</i>
bioMérieux VITEK MS (IVD/RUO database)	<i>Candida haemulonii</i>
VITEK 2 YST (Ver. 8.01 or older)	<i>Candida haemulonii</i> <i>Candida duobushaemulonii</i>
API 20C	<i>Rhodotorula glutinis</i> (characteristic red color not present) <i>Candida sake</i>
BD Phoenix yeast identification system	<i>Candida haemulonii</i> <i>Candida catenulata</i>
MicroScan	<i>Candida famata</i> <i>Candida guilliermondii</i> * <i>Candida lusitanae</i> * <i>Candida parapsilosis</i> *
RapID YEAST PLUS	<i>Candida parapsilosis</i> *

**C. guilliermondii*, *C. lusitanae*, and *C. parapsilosis* generally make hyphae or pseudohyphae on cornmeal agar. If hyphae or pseudohyphae are not present on cornmeal agar, this should raise suspicion for *C. auris* as *C. auris*

typically does not make hyphae or pseudohyphae. However, some *C. auris* isolates have formed hyphae or pseudohyphae. Therefore, it would be prudent to consider any *C. guilliermondii*, *C. lusitanae*, and *C. parapsilosis* isolates identified on MicroScan and any *C. parapsilosis* isolates identified on RapID YEAST PLUS as possible *C. auris* isolates and further identification should be sought.

How to identify *C. auris*

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*.