Candida Auris Updates

Presented by:

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Virginia Infection Prevention Training Center

Objectives:

- Describe why *C. auris* is listed as an "urgent threat" by the CDC
- List risk factors for *C. auris* acquisition in healthcare settings
- List key steps in outbreak investigation and remediation

Candida auris is a CDC "Urgent Threat":

- 1. It is often **multidrug-resistant**. Some strains are resistant to all three classes of antifungals.
- 2. It is difficult to identify with standard laboratory methods.*
- 3. It has caused outbreaks in healthcare settings.

Transmission of *C. auris* occurs in the same way as MRSA, in that both of these can become part of a patient or providers' "normal flora".

"C. Auris: It is a fungus that acts like a bacteria in healthcare environments."

Unique Characteristics of a Bad Yeast:

- C. Auris can grow at higher temperatures, (42 C), than other yeast
- C. Auris accepts higher salt burdens (skin propensity), than other yeasts
- C. Auris is resistant to drying





Casadevall A, Kontoyiannis DP, Robert V. Environmental Candida auris and the Global Warming Emergence Hypothesis. mBio. 2021 Mar 16;12(2):e00360-21. doi: 10.1128/mBio.00360-21.

Garcia-Bustos V, et al. Climate change, animals, and Candida auris: insights into the ecological niche of a new species from a One Health approach. Clin Microbiol Infect. 2023 Mar 18:S1198-743X(23)00132-5. doi: 10.1016/j.cmi.2023.03. 016.

Virulence Factors:

- Adhesion: C. auris has genes for many adhesions > persistent skin and surface colonization
 - Surface colonization factor 1 (Scf1) previously uncharacterized, critical role at cell surface:
 - Overexpression of this factor along with adhesion Iff4109 enhances skin colonization, biofilm formation, expanse of fungal lesions, and death in animal models
- Filamentation:
 - While rare, some C. auris cells gain ability to form filaments w/in a mammalian host: a non-coding RNA (DINOR) appears to be implicated in this ability > enhanced virulence

Aggregation:

- Models of systemic infection induces aggregation:
- Mutations found in genes related to cell division and budding
- Aggregative cells exhibit enhanced immune resistance

Bing J, et al. Rapid evolution of an adaptive multicellular morphology of Candida auris during systemic infection. Nat Commun. 2024 Mar 16;15(1):2381. doi: 10.1038/s41467-024-46786-8.



Morphology

Phenotype:

(mouse model of

"Aggregative"

Bing J, et al. Rapid evolution of an adaptive multicellular morphology of Candida auris during systemic infection. Nat Commun. 2024 Mar 16;15(1):2381. doi: 10.1038/s41467-024-46786-8.

	CDC Definition	Applicable Organisms in Virginia
Tier 1	 Organisms and resistance mechanisms novel to the U.S., OR Organisms for which no current treatment options exist (pan-resistant) and that have the potential to spread more widely within a region 	• C. auris isolates resistant to all antifungals tested
Tier 2	 MDROs primarily found in healthcare settings but not found regularly in the region; organisms might be found more commonly in other areas in the U.S. 	• C. auris isolates susceptible to at least one antifungal tested
Tier 3	 MDROs that are already established in the U.S. and have been identified before in the region but are not thought to be endemic 	Not applicable for <i>C. auris</i>

https://www.vdh.virginia.gov/content/uploads/sites/174/202 3/01/C-auris-Containment-Strategy.pdf

Risk Factors

Colonized patients can/do go on to develop invasive infections

- <u>Risk factors for invasive infection</u>: extremes of age, uncontrolled diabetes, immunosuppression, ICU stay, antibiotic/antifungal exposures, Medical Devices and procedures: CVC, urinary catheter, trach
- <u>Risk factors for mortality</u> among the infected (estimated around 40%*): renal failure, heart failure, vent dependence, dialysis, CVC (especially if not removed), TPN, concurrent bacteremia

Pandya N, et al. International Multicentre Study of *Candida auris* Infections. J Fungi (Basel). 2021 Oct 19;7(10):878. doi: 10.3390/jof7100878.

Risk Factors for Candidemia:

Table 2 continued							
Variable ^a	Univariable analysis			Multivariable analysis ^b			
	Unadjusted cause- specific HR	95% CI	Р	Adjusted cause- specific HR	95% CI	P	
Invasive mechanical ventilation ^c	0.43	0.05-55.65	0.606				
Continuous renal replacement therapy	2.65	1.18–5.95	0.019	2.23	0.98-5.07	0.056	Briano F, et al. <i>Candida</i> <i>auris</i> Candidemia in Critically III, Colonized
Extracorporeal membrane oxygenation	1.37	0.18-10.20	0.758				Incidence and Risk Factors. Infect Dis
Total parenteral nutrition	0.77	0.35-1.66	0.500				1160.
Site of C. auris colonization							https://doi.org/10.1007/ s40121-022-00625-9
Skin colonization ^c	2.13	0.69–10.60	0.210				
Urinary colonization	2.17	0.97-4.85	0.058				
Respiratory colonization	4.09	1.22-13.67	0.022				
Multisite colonization	9.45	1.28-70.00	0.028	9.67	1.30-71.91	0.027	

Cumulative incidence >250/ at 60 day

Skin-Environment Connection: Role of Cleaning? CHG?



Sansom SE, et al. Rapid Environmental Contamination with Candida auris and Multidrug-Resistant Bacterial Pathogens Near Colonized Patients. Clin Infect Dis. 2023 Dec 6:ciad752. doi: 10.1093/cid/ciad752.

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Colonization Persists Most Frequently in Nares/Hands:

Body Sites	Culture Detection, n (%)					
	C. auris	MRSA	VRE	ESBL	CRE	
Nares	29 (71)	12 (29)	n/a	n/a	n/a	
Axillae	23 (56)	8 (20)	16 (39)	15 (37)	11 (27)	
Inguinal Crease	23 (56)	7 (17)	18 (44)	14 (34)	14 (34)	
Perianal Skin	22 (54)	13 (32)	20 (49)	24 (59)	16 (39)	
Palms/Fingertips	31 (76)	7 (17)	10 (24)	6 (15)	6 (15)	
Any Body Site	41 (100)	21 (51)	25 (61)	28 (68)	17 (41)	

Table 1: Clinical Characteristics Among C. auris-colonized Patients: CHG Bathing:

	SNF Orange Co.	SNF Chicago	ACH Chicago	Overall
	(N=21)	(N=10)	(N=14)	(N=45)
CHG used	20 (100%)	2 (29%)	11 (92%)	33 (85%)

Sansom SE, et al. Rapid Environmental Contamination with Candida auris and Multidrug-Resistant Bacterial Pathogens Near Colonized Patients. Clin Infect Dis. 2023 Dec 6:ciad752. doi: 10.1093/cid/ciad752.

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Re-contamination of the Room (of colonized patients) after Cleaning:



Sansom SE, et al. Rapid Environmental Contamination with Candida auris and Multidrug-Resistant Bacterial Pathogens Near Colonized Patients. Clin Infect Dis. 2023 Dec 6:ciad752. doi: 10.1093/cid/ciad752.

C. Auris in the State of Maryland: LTC (Ventilator-Capable) Facility Link:

- Study by Harris AD et al, using Maryland MDRO Prevention Collaborative
- State-wide, Cross Sectional, PPS Mar-Jun 2023
- 51 HCF in MD: 40 ACF, 11 Vent LTC:
- 482 vented patients ACB: 30.7% positive
 - 59.5% of that 30.7% being MDR ACB
- 470 vented patients C. auris: 6.6% positive



Harris AD, et al. Prevalence of Acinetobacter baumannii and Candida auris in Patients Receiving Mechanical Ventilation. JAMA. 2023 Nov 14;330(18):1769-1772. doi: 10.1001/jama.2023.21083.

Candida in the Sink:

Between A (top) and B (bottom):

- All surfaces cleaned with Hydrogen-peroxide agent on EPA list "active v. C. auris"
- Water run x 30 sec



Clin Infect Dis, Volume 65, Issue 11, 1 December 2017, Pages 1954–1955, https://doi.org/10.1093/cid/cix629

High-Risk Units versus High-Risk Facilities:





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https://www.vdh.virginia.gov/content/uploads/sites/174/2023/01/C-auris-Containment-Strategy.pdf

Containment Strategy Recommendation Summary				
	Tier 1	Tier 2		
Containment Strategy Elements	Pan- resistant <i>C. auris</i> isolates	C. auris		
Healthcare investigation	Always	Always		
Prospective surveillance	Always	Always		
Retrospective lab surveillance	Always	Always		
Onsite Infection Control Assessment with observations of practices	Always	Always		
Screening of healthcare roommates	Always	Always		
Broader screening of healthcare contacts*	Always	Always		
Household contact screening	Sometimes	Rarely		
Environmental sampling	Rarely	Rarely		
Healthcare personnel screening	Rarely	Rarely		

*Screening of close healthcare contacts who require high levels of care (ventilators, central lines, urinary catheters, feeding tubes, or bedbound)

Roles and Responsibilities to Contain Candida auris

https://www.vdh.virginia.gov/content/uploads/sites/174/2023/01/C-auris-Containment-Strategy.pdf https://www.cdc.gov/hai/pdfs/mdro-guides/Health-Response-Contain-MDRO-H.pdf

Outbreak: When NEW C. auris is Identified in Your Facility:

- Notify local health department and work together to collect information and identify next steps*
- Place patient/resident in appropriate room with appropriate PPE use: transmission-based precautions v. enhanced barrier precautions
- Focus on basic infection prevention including HH
- Focus on cleaning with approved disinfectants**
- Educate team/patients/residents/family
 - NOTE: CDC and VDH have resources for this
- Communicate C. auris status on transfer



https://www.vdh.virginia.gov/content/uploads/sites/174/2023/10/C-auris-Facility-Info_Oct2023_508FINAL.pdf

HH Caveats:

- Are ABHS dispensers...
 - Convenient? Unobstructed?
 - Full of product?
- Are hand-washing sinks...
 - Unobstructed?
 - Is there stuff in the splash

zone?



- Are they doing it well?
- Are they doing it frequently, for appropriate indications?
- Is glove usage appropriate?



https://www.vdh.virginia.gov/content/uploads/sites/174/2023/10/C-auris-Facility-Info_Oct2023_508FINAL.pdf

PPE Caveats: TBP and EBP:

- Are PPE supplies readily available at the room/point of care?
- Is signage prominently displayed/ visible?
- Have you designated patient/resident care equipment?

- TBP in acute care are indefinite:
- In a nursing home, a resident may be de-escalated from Contact Precautions to EBP when clinically appropriate (e.g., when a draining wound that is positive for C. auris heals such that it is able to be covered/contained)

Environmental Cleaning Caveats:**

- Make sure EVS and Bedside providers clear on who is cleaning what w/in the rooms or on the unit
 - This should be on paper/documented
- You will need to round with EVS, and confirm practice

• Ugh the WIPES:

- 1. Need to use products on the EPA P-list
- 2. All of front line need to know the **wet** times
- 3. Also need to follow IFUs

Elephant in the Room?





Summary:

- *C. auris* is an urgent threat because it is often multidrug resistant, difficult to treat, and implicated in hospital outbreaks
- Medically vulnerable patients are at higher risk for acquisition and infection with *C. auris*, particularly those with medical devices, ICU level of care:
 - In our experience has been surgical-trauma and transplant populations in particular at highest risk
- Management of an outbreak includes: collaboration with VDH, identification and isolation of colonized/infected patients, focus on HH/PPE use, and environmental cleaning with appropriate disinfectants, education and communication across the healthcare continuum.





Candida auris Notes From the Field

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November 8, 2024





Candida auris (C. auris) as a Public Health Problem

• Nationally, *C. auris* is classified as an **urgent threat** and is increasing.

	Throat	Change in Rates or Number of Infections***				
	Tireat	2020 vs. 2019	2021 vs. 2020	2022 vs. 2021	2022 vs. 2019	
URGENT*	Hospital-onset CRE	Increase	Increase	Stable	Increase	
	Hospital-onset Carbapenem- resistant Acinetobacter	Stable	Stable	Stable	Increase"	
	Clinical Cases of <i>C. auris</i>	Increase	Increase	Increase	Increase	



Reference: https://www.cdc.gov/antimicrobial-resistance/data-research/threats/update-2022.html



C. auris in Virginia: Cases by Year



Source: VDH Candida auris Data Dashboard



C. auris in Virginia: Case Demographics, January 2018 – July 2024



Source: VDH Candida auris Data Dashboard



C. auris in Virginia: Total Clinical Cases, January 2018 - July 2024



Source: VDH Candida auris Data Dashboard



C. auris Outbreak Investigations in Virginia by Region and by Facility, January 2023 - June 2024



Source: Virginia Outbreak Surveillance System





C. auris Infection Prevention and Control Strategies: Perspectives From a VDH Regional Infection Preventionist



Point Prevalence Surveys (PPS)

- Facility leadership agrees to the PPS as proposed by VDH
- State public health lab (DCLS) capacity is verified for a testing date
- Facility needs to obtain informed patient or guardian consent prior to specimen collection
- Patients should be kept on transmission-based precautions until test results are communicated to the facility from VDH



Notes from the Field: Admissions

- Knowledge gap by admission coordinators on recognizing *C. auris* and its need for precautions
 - Admission screening is often performed by non-clinical staff
 - Clinical staff review of the record may take place hours to days after admission, particularly weekends
 - Admission screening might not clarify which isolation precautions the patient needs
 - "Candida aka just yeast" vs C. auris
- Lack of solid transfer communication from facility to facility or that a culture might be pending



Notes from the Field: Isolation

- Patient/resident room signage
 - Acute care: Contact Precautions
 - Nursing homes: Enhanced Barrier Precautions (EBP)
- Storage of isolation supplies
 - Over the door soft or hard units ("caddies")
 - Metal or plastic drawer carts outside the patient/resident's room
 - One or two carts for a hallway or unit





Notes from the Field: Issues with Isolation Carts

- Visibly soiled; unclear process who cleans and how often
- Not kept stocked with needed supplies
 - Need a clear process on who stocks and how often
- Lack of supply drawer standardization to make it easier for staff to get
 needed supplies consistently
- Unnecessary supplies (e.g., shoe covers and hair bonnets) leading to clutter
- Unnecessary or inappropriate items stored on top of isolation carts (e.g., dietary trays, non-isolation cleaning supplies, food or drink)



Enhanced Barrier Precautions? What's This?

ENHANCED BARRIER PRECAUTIONS (EBP)

WHY EBP IS IMPORTANT

Keep residents, staff, and visitors safe by adding a layer of protection during resident care activities that have a higher risk of spreading dangerous germs.

WHEN TO USE EBP



- Resident has ever tested positive for a multidrug-resistant organism (MDRO). Do not use EBP and use Contact Precautions if:
- * The resident has a draining wound, diarrhea, or secretions/excretions that cannot be contained OR
- Congoing MDRO transmission is documented or suspected on the unit or in the facility
- Resident does not have a history of an MDRO but has one or both of the following:
 - * A wound that requires a dressing. Wound drainage is contained in the dressing.
 - An indwelling device (central line, urinary catheter, feeding tube, trach, or ventilator)



Recommended by public health authorities

HOW TO APPLY EBP



- Place residents appropriately 🔆 No private room required * Residents are not restricted to their room
- - Place EBP sign on resident's door



- Perform hand hygiene upon entering and exiting room
- - Wear gown and gloves during high-contact resident care activities

High-contact resident care activities include:

- Dressing, bathing/showering, transferring,



changing linens, providing hygiene, changing briefs or assisting with toileting, device care or use, wound care



Use EBP for the entire length of resident's stay in the facility (or until wounds heal / device removed)

Last Updated 12/2023



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Notes From the Field: Isolation and EBP

- General lack of understanding in nursing homes of EBP is and how to implement it
 - If in an outbreak, Contact Precautions must be used for the duration of the outbreak
- Not all nursing homes have fully implemented or started at all!
- Recent CMS memo (<u>QSO-24-08-NH</u>) outlines requirements for nursing homes, effective April 1, 2024



Notes From the Field: Personal Protective Equipment (PPE)

Opportunities for improvement:

- Gloves worn in the hallways
- Hand hygiene not performed when gloves and/or other PPE removed
- Incorrect doffing practices leading to cross contamination
- Not changing PPE between patients/residents



Notes From the Field: Hand Hygiene

- Alcohol-based hand sanitizer (ABHS) units
 - Enough in the facility?
 - Located where needed?
 - Any units empty or not working?
 - Product out of date
- Use of over-the-counter hand soaps and ABHS
- Handwashing sinks
 - Access should not be blocked
 - Make sure sinks have adequate soap and paper towel supplies
 - Separate clean and dirty handwashing sinks



Notes From the Field: Disinfection Products

EPA's Registered Antimicrobial Products Effective Against Candida auris [List P]

On this page:

- <u>Disinfectant Products for Claims Against Candida auris</u>
- Products on EPA's Registered Antimicrobial Products Effective Against Candida auris [List P]
- How to Use Products on this List Effectively
- How to Check if a Product is on EPA's Registered Antimicrobial Products Effective Against Candida auris [List P]
- <u>Additional Information</u>



Notes from the Field: Environmental Services (EVS)

Ensure staff know:

- How to read cleaning disinfectant chemical labels
- How to determine what organisms a product "kills"
- Is the product appropriate for use in healthcare settings? (healthcare-grade vs. over the counter)
- What are the indications for the product? Where can it be used (e.g., which surfaces)?
- What is the product's contact/wet/kill time? How is it kept wet that long?



<u>CDC Project Firstline:</u> <u>How to Read a</u> <u>Disinfectant Label</u>



Notes From the Field: EVS Training

- Are there contractor policies on where and how often to clean? Has the facility infection preventionist (IP) reviewed them?
- What education do contracted staff receive on hire?
 - What makes the trainer qualified?
 - Is competency validated?
- Is training provided to EVS staff in their native language(s)?



Notes From the Field: EVS Auditing and Feedback

- Are cleaning checklists used?
 - Occupied patient/resident room, terminal cleaning on discharge
 - Clinical areas (e.g., rehab gym)
 - General facility cleaning (e.g., common areas, handrails in hallways)
- How is cleaning and disinfection effectiveness evaluated?
 - Method visual inspection? Bioluminescent marker? ATP?
 - How often?
- Are audit results reported to IP or Quality committees?
- Are audit results provided to EVS staff in their native language(s)?



Notes From the Field: EVS Carts...Oh My!

Lack of understanding and enforcement of what is on an EVS cart:

- Food and drink
- Personal items (e.g., purses, makeup, jacket)
- Is there a clean section for clean items (e.g., microfiber cloths)?
- Is there a dirty section for used supplies?
- Unmarked filled spray bottles what's really in them?
- How long is the chemical in the spray bottle stable once mixed? Should it be emptied at the end of the day? Should it be washed and allowed to dry daily if reusing?





Notes From the Field: Cleaning and Disinfection

Ensure staff know:

- Standardization of cleaning steps and which products are used for each task and surface
- If using bucket method
 - How often do cloth or rags need to be changed?
 - What is the chemical dilution?
- Mops
 - How many rooms before the mop is changed?
 - Microfiber or string?
 - If mops heads are washed on site, are they washed separate from resident/patient linen?



Image: Canva



Notes From the Field: The Good News

- C. auris screening on admission
- Good communication and collaboration between healthcare facilities and VDH
- Increased communication about cases on transfer from one facility to another
 - CDC Interfacility Transfer form
 - <u>Emergency Department Care Coordination system</u>: Alerts for patients with *C. auris* or carbapenemase-producing organisms



Additional Resources: CDC

- Antimicrobial Resistance Threats in the United States, 2021-2022
- <u>C. auris webpage for Healthcare Professionals</u>
- <u>CDC Project Firstline: How to Read a Disinfectant Label</u>
- Enhanced Barrier Precautions website
- Environmental Services Observation Tool
- Infection Control Guidance: Candida auris
- Interfacility Transfer Form



Additional Resources: VDH

<u>C. auris website</u>

- <u>Candida auris Data Dashboard</u>
- <u>*C. auris* Education Booklet for Healthcare Facilities</u>
- Cleaning, Disinfection, and Sterilization website
 - Environmental Cleaning and Disinfection Responsibilities Chart
- Emergency Department Care Coordination System
- Enhanced Barrier Precautions Poster
- Learn more about VDH's free, non-regulatory infection prevention assessments



Additional Resources: Other Organizations

- California: Project Firstline EVS Toolkit
- Virginia Infection Prevention and Control Training Alliance (VIPTA)
 - Search the education and training resource library for resources related to *C. auris*



Stay Up to Date with the VDH HAI/AR Program

HAI & AR NAVIGATOR

News from the Virginia Department of Health Healthcare-Associated Infections & Antimicrobial Resistance Program



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Thank you

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Contact Us: hai@vdh.virginia.gov