COVID-19 and HAI Updates and Q&A Webinars for Long-Term Care and Congregate Residential Settings

January 5th , 2024

Housekeeping

- All attendees in listen-only mode
- Submit questions via Q&A pod to **All Panelists**
- Slides and recording will be made available later
- For continuing education credit, complete evaluation survey upon end of webinar
  - Must be registered individually to receive credit

IDPH
Illinois Department of Public Health

Agenda

- Upcoming Webinars
- Bulk COVID-19 Rapid Antigen Shipments for LTCFs
- Candida auris: Not Your Grandmother's Yeast
- Open Q & A

Slides and recording will be made available after the session.

IDPH
Illinois Department of Public Health

Upcoming Infection Prevention and Control Q&A

1:00 pm - 2:00 pm

Date	Infection Control Topic	Registration Link
Friday, January 19th	Hot Topics: Bloodborne Pathogen Standard: Biohazard waste management, Hepatitis B	https://illinois.webex.com/weblink/register/r7b1c42d0146e779082e1816279d9ec06
Friday, February 9th	Falls and Antimicrobial Use	https://illinois.webex.com/weblink/register/r1e93656bd36dabb16006c1f7201015cc
Friday, February 23rd	Urinary Tract Infections	https://illinois.webex.com/weblink/register/r59f9d827f42f61e76cdb9d6e00c3a8df

IDPH
Illinois Department of Public Health

Bulk COVID-19 Rapid Antigen Test Distributions for LTCFs

- All Illinois LTCFs are eligible to request a one-time bulk shipment of iHealth COVID-19 Rapid Antigen Tests.
- Tests expire 4/5/2024 (3-month supply).
- Intended to supplement on-site testing through respiratory season.
- Approved quantities will be delivered to your nearest Local Health Department.
- Someone from your LHD will contact you to coordinate pickup or drop off.

Requirements and How to Apply

Test Type	CLIA Requirement	Provider Order Requirement	**Results Reporting Requirement
iHealth COVID-19 Rapid Antigen Test	✓	✓	✓

**Only positive test results need reported to IDPH.

How to Apply:

- Complete the IDPH Shipment Request Form HERE: https://redcap.dph.illinois.gov/surveys/?s=T78A4HAKFTPKWXAA

- Deadline to submit is Friday, January 12th at 5PM CST.

*Any questions regarding the status of your bulk shipment can be directed to the IDPH Antigen Testing inbox at DPH.AntigenTesting@illinois.gov.

LabCorp Pixel Multiplex (COVID + FLU + RSV) Test Availability and Requirements

On Demand Option- No requirements! Simply complete the IDPH Request Form for each patient needing tested. Otherwise, email DPH.AntigenTesting@illinois.gov and ask for a bulk order form to complete and send back.

Link to On Demand Request Form:
https://redcap.dph.illinois.gov/surveys/?s=LME7CY7RXMYL397H

Store on Site Option- Only requires an ordering provider with a valid NPI number. Store test kits on-site for outbreak response.

Link to Store on Site Request Form:
https://redcap.dph.illinois.gov/surveys/?s=8DWNMHNDKADDXM9R

Request Options	CLIA Requirement	Provider Order Requirement	Results Reporting Requirement
On Demand Option			
Store on Site Option		✓	

Candida auris: Not Your Grandmother's Yeast

Deb Patterson Burdsall PhD, RN-BC, CIC, LTC-CIP, FAPIC

No Conflicts

“I collect spores, molds, and fungus.”
– Egon Spengler

- 1984 Colombia Pictures

Candida fungi, Candida albicans, C. auris and other human pathogenic yeasts, 3D illustration *Dr_Microbe, Getty Images/iStockphoto*

No, Not the Last of Us Either!!!

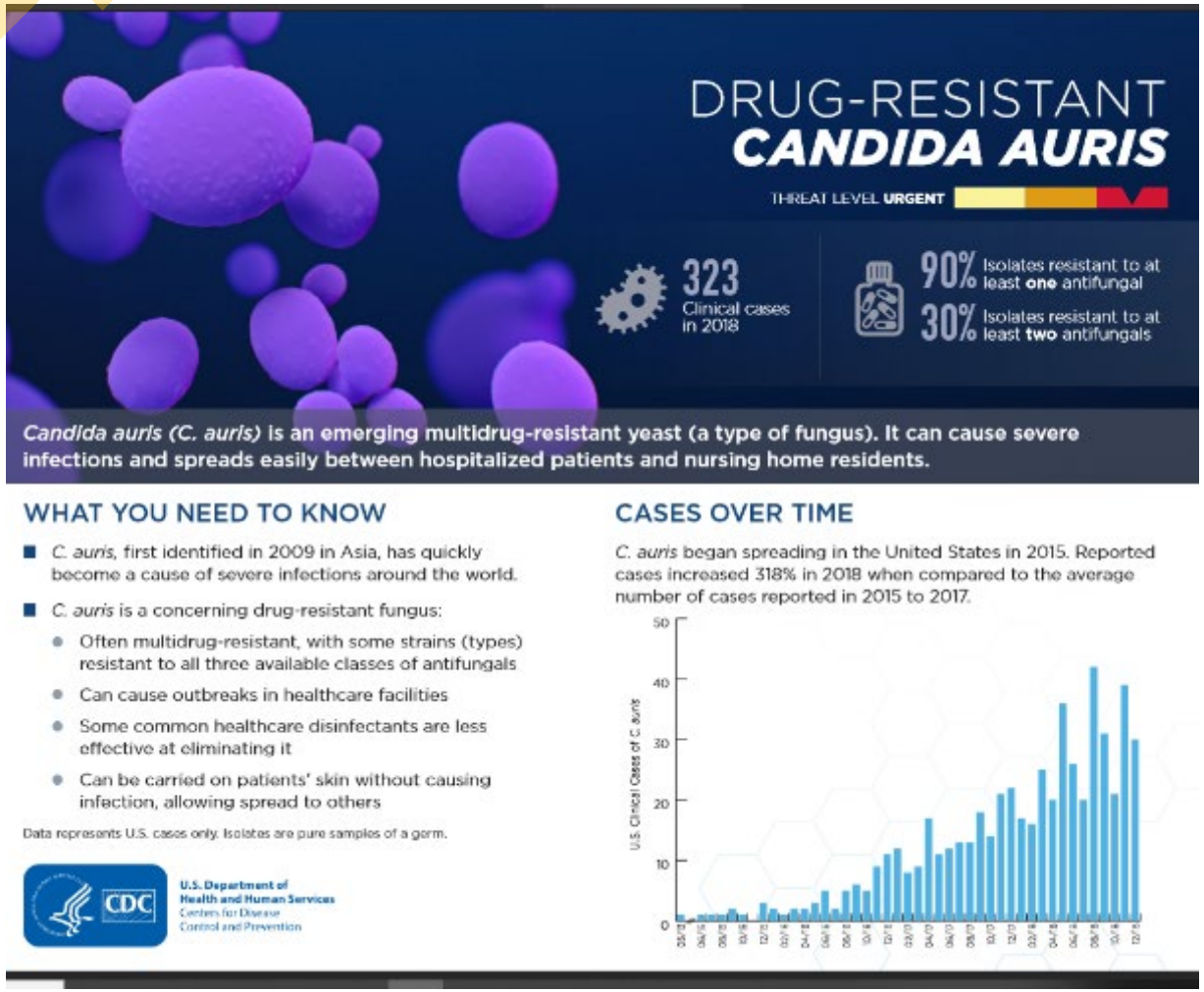
Photo Credit: Kyle Brooks, U.S. National Forest Service

Candida fungi, Candida albicans, C. auris and other human pathogenic yeasts, 3D illustration *Dr_Microbe, Getty Images/iStockphoto*

Candida fungi, Candida albicans, C. auris and other human pathogenic yeasts, 3D illustration Dr_M
Images/iStockphoto

Learning Objectives

- Describe the history of *Candida auris* in the US and Illinois
- Identify the differences between *Candida auris (C. auris*) and other, more commonly found *Candida* species
- Implement a screening process for residents at high risk of *C. auris* infection and colonization



- Often multidrug-resistant
- Some strains are resistant to all three available classes of antifungals
- It is difficult to identify with standard laboratory methods
- Can be misidentified in labs without specific technology. Misidentification may lead to inappropriate management.
- It has caused outbreaks in healthcare settings
- Important to quickly identify *C. auris* so healthcare facilities can take special precautions to stop its spread

https://www.cdc.gov/drugresistance/pdf/threats-report/candida-auris-508.pdf

Infection Prevention and Control for *Candida auris*

Español (Spanish) Print

The primary infection control measures for prevention of *C. auris* transmission in healthcare settings are:

- Adherence to hand hygiene.
- Appropriate use of Transmission-Based Precautions based on setting.
- Cleaning and disinfecting the patient care environment (daily and terminal cleaning) and reusable equipment with recommended products, including focus on shared mobile equipment (e.g., glucometers, blood pressure cuffs).
- Communication about patient's *C. auris* status when patient is transferred.
- Screening contacts of newly identified case patients to identify *C. auris* colonization.
- Laboratory surveillance of clinical specimens to detect additional cases.

In addition to these key points, considerations that are setting-specific are listed below:

Dialysis clinics
Outpatient settings
Home healthcare settings
Home and family members

On this page, the term "patient" refers to both patients of healthcare facilities and residents of nursing homes.

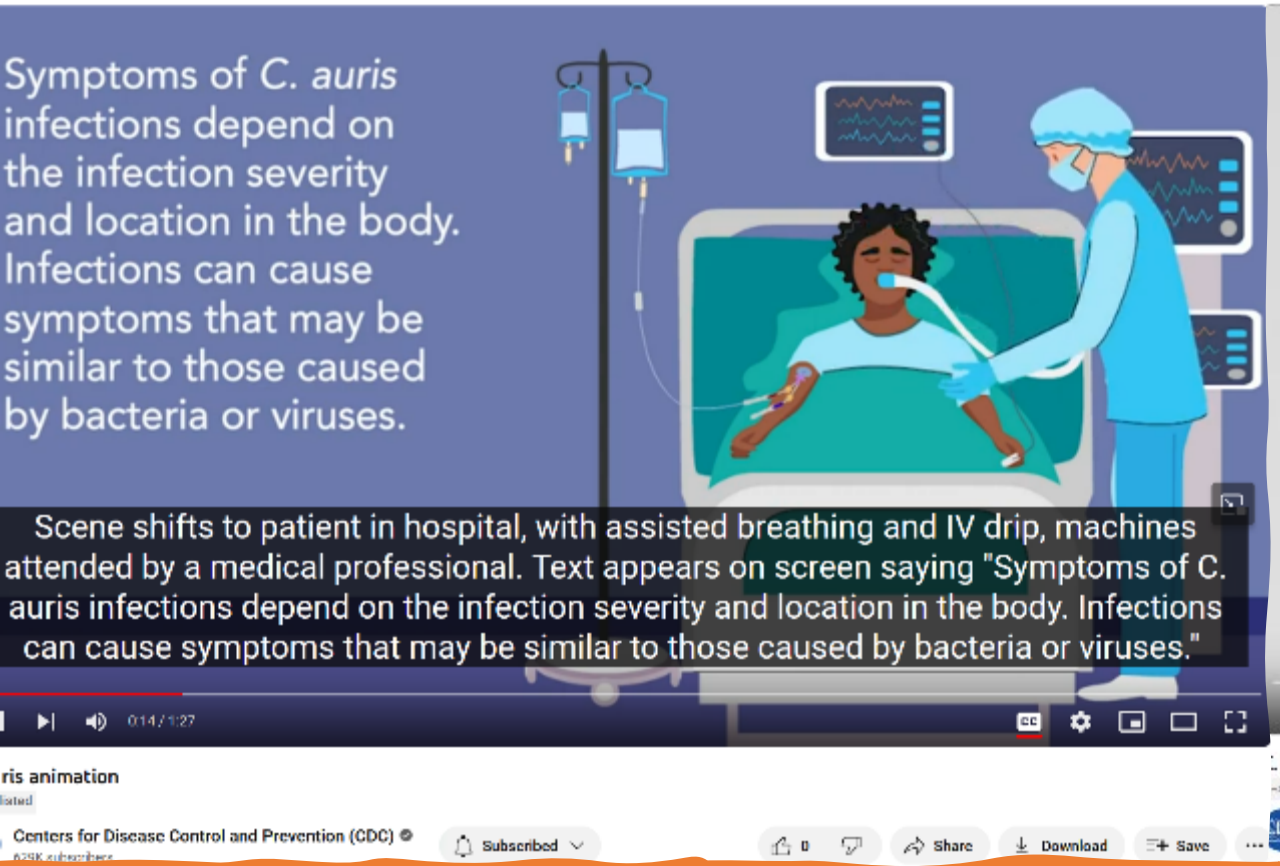
In addition to these key points, setting-specific considerations are listed below:

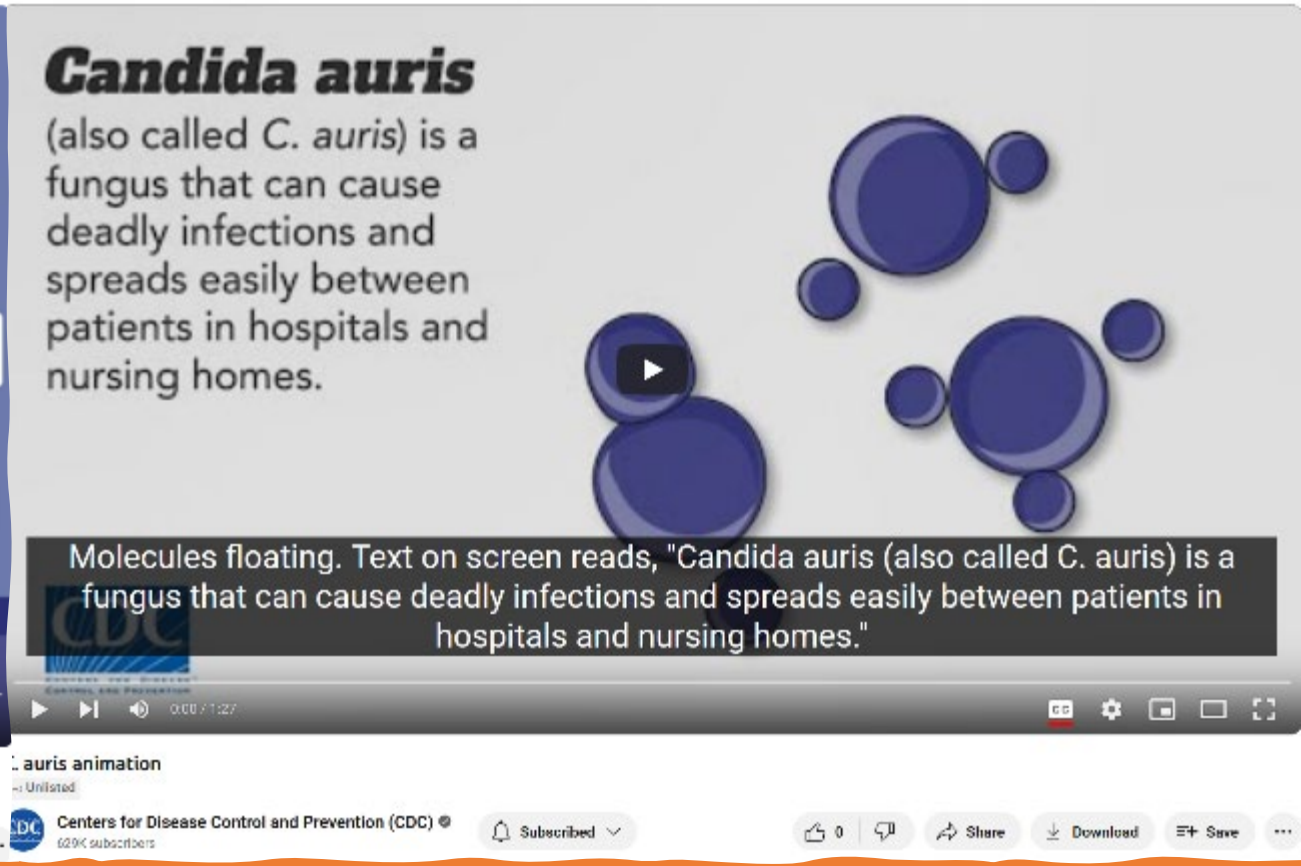
- Dialysis facilities
- Outpatient settings
- Home healthcare settings
- Home and family members

Hand hygiene

When caring for patients with *C. auris*, healthcare personnel should follow standard hand hygiene practices. **Alcohol-based hand sanitizer (ABHS) is the preferred hand hygiene method for *C. auris*** when hands are not visibly soiled. If hands are visibly soiled, wash with soap and water. Wearing gloves is not a substitute for hand hygiene.

https://www.cdc.gov/fungal/candida-auris/c-auris-infection-control.html

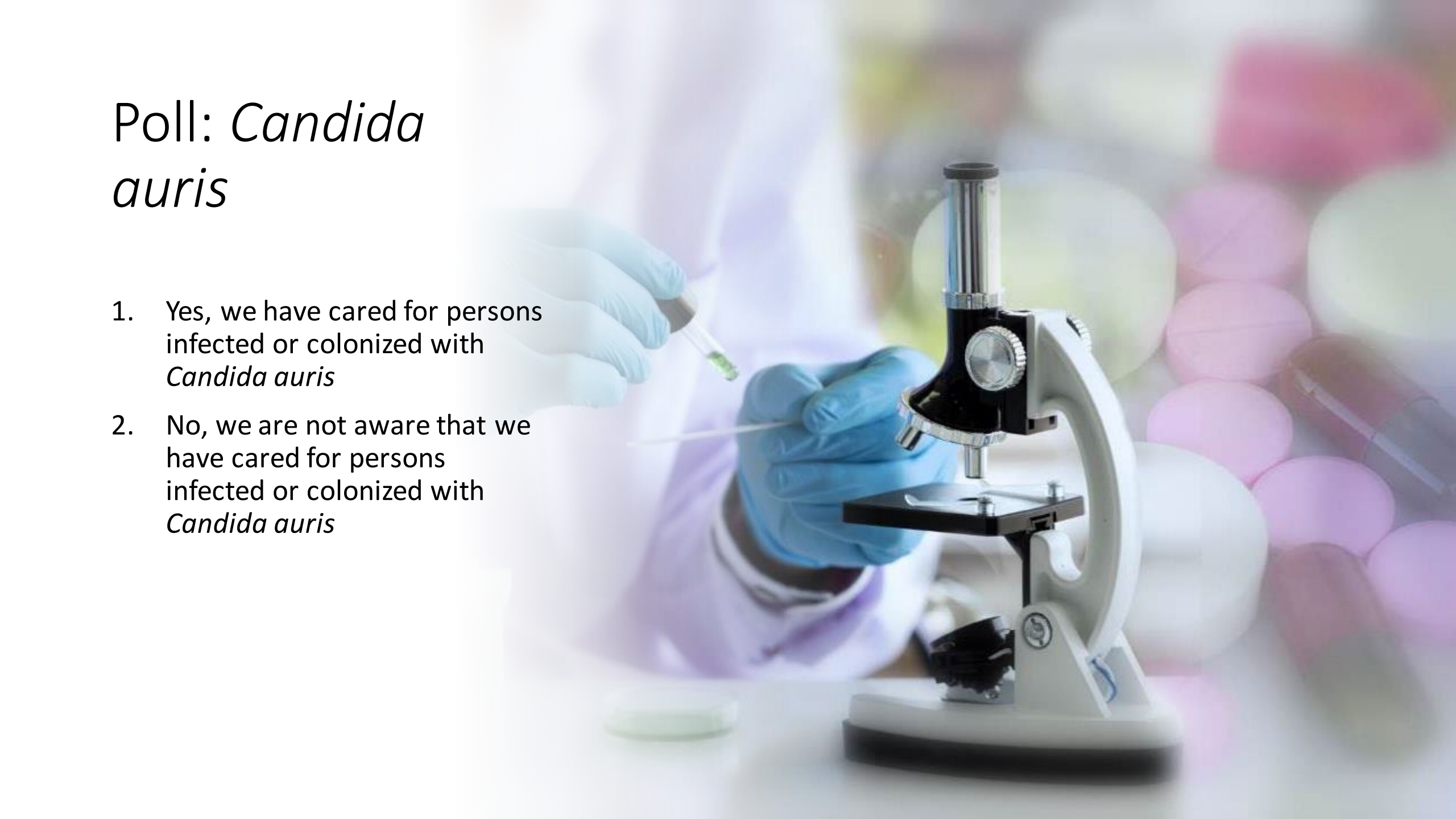




- https://www.youtube.com/watch?v=2AkI5NeD4Ec

Poll: *Candida auris*

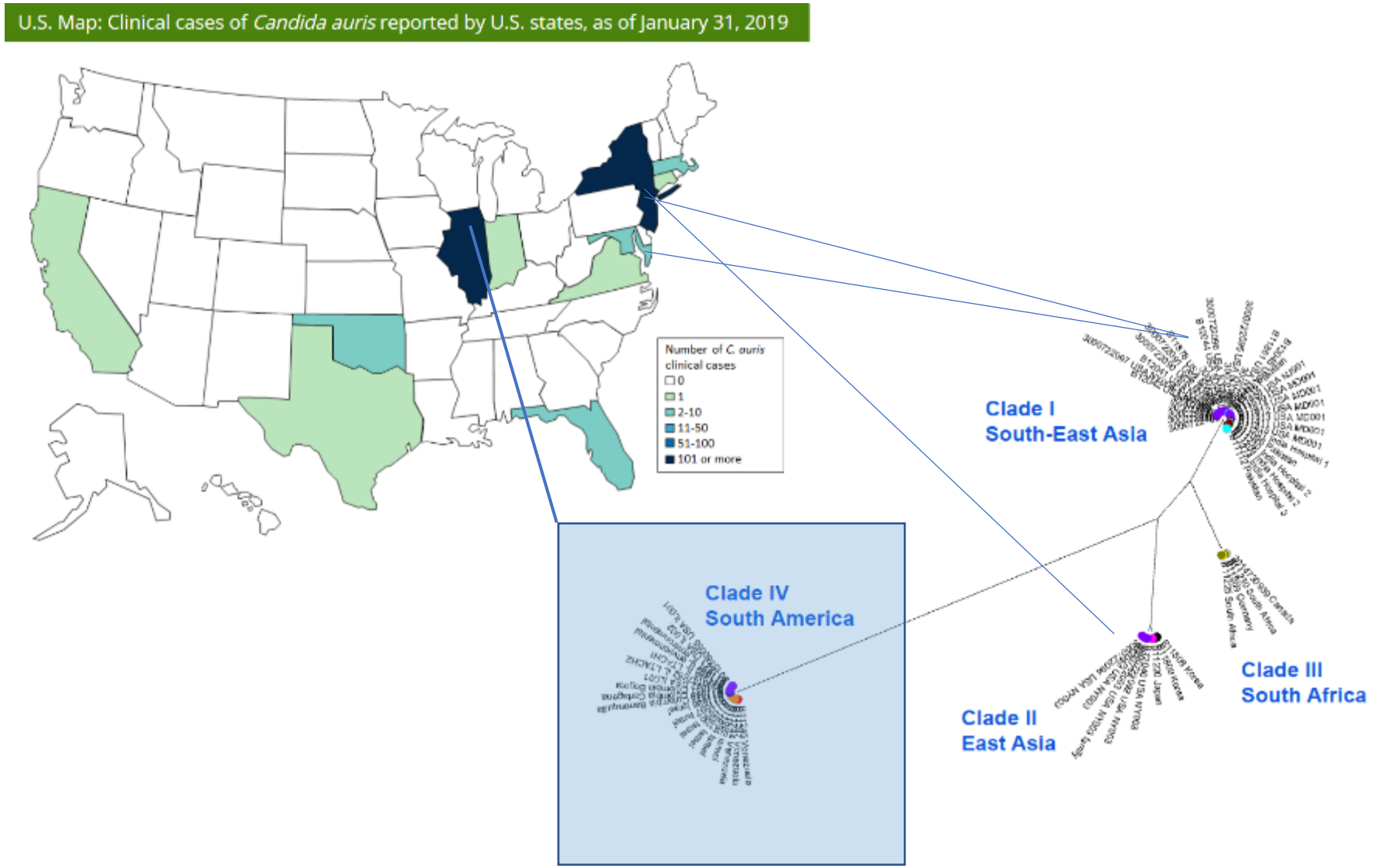
1. Yes, we have cared for persons infected or colonized with *Candida auris*
2. No, we are not aware that we have cared for persons infected or colonized with *Candida auris*

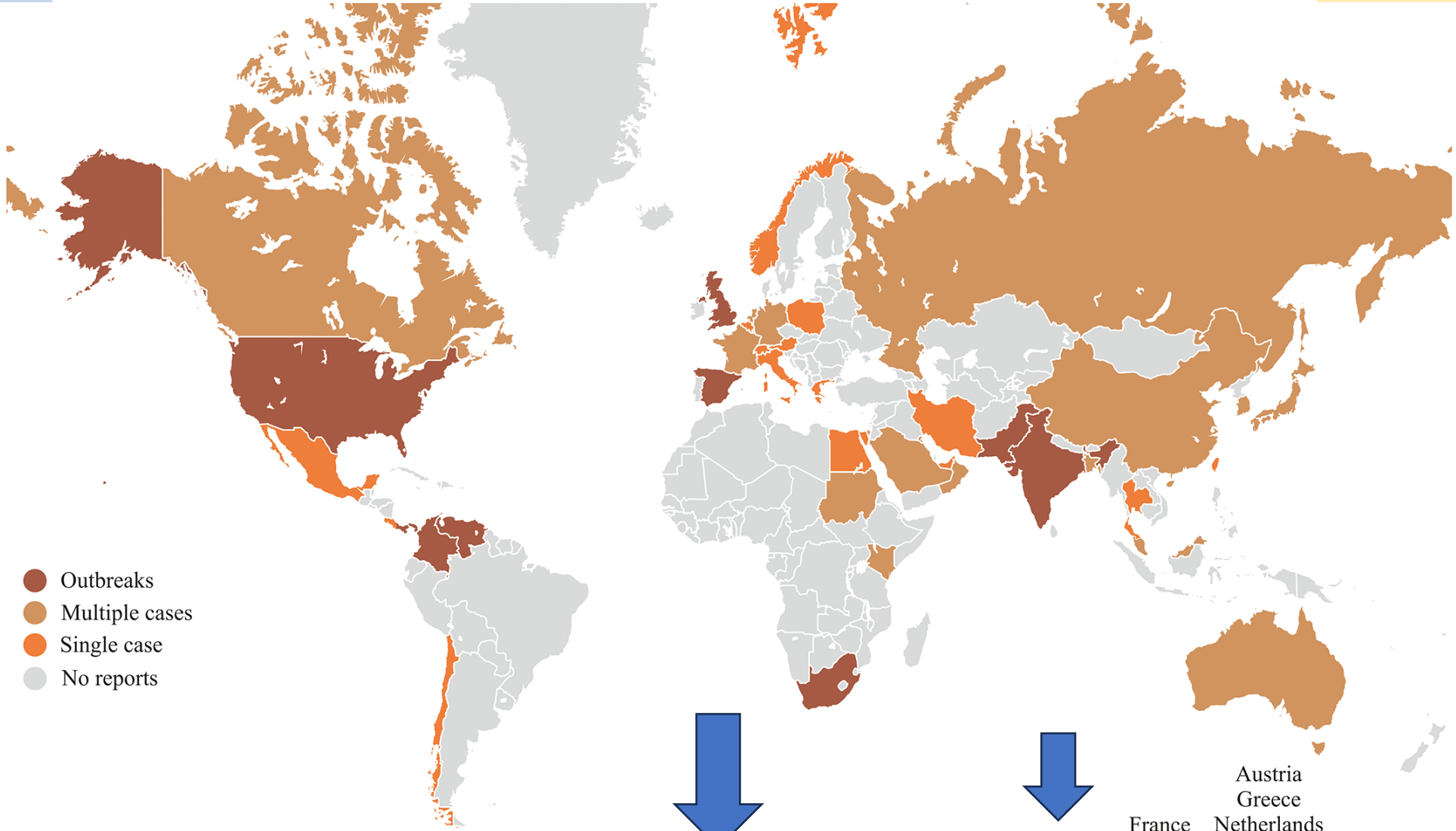


Poll: *Candida auris:* We admit patients and residents from collar states that have multiple cases of *Candida auris* (e.g., Iowa, Indiana, Missouri).

1. Yes
2. No

C. auris Emergence in the US

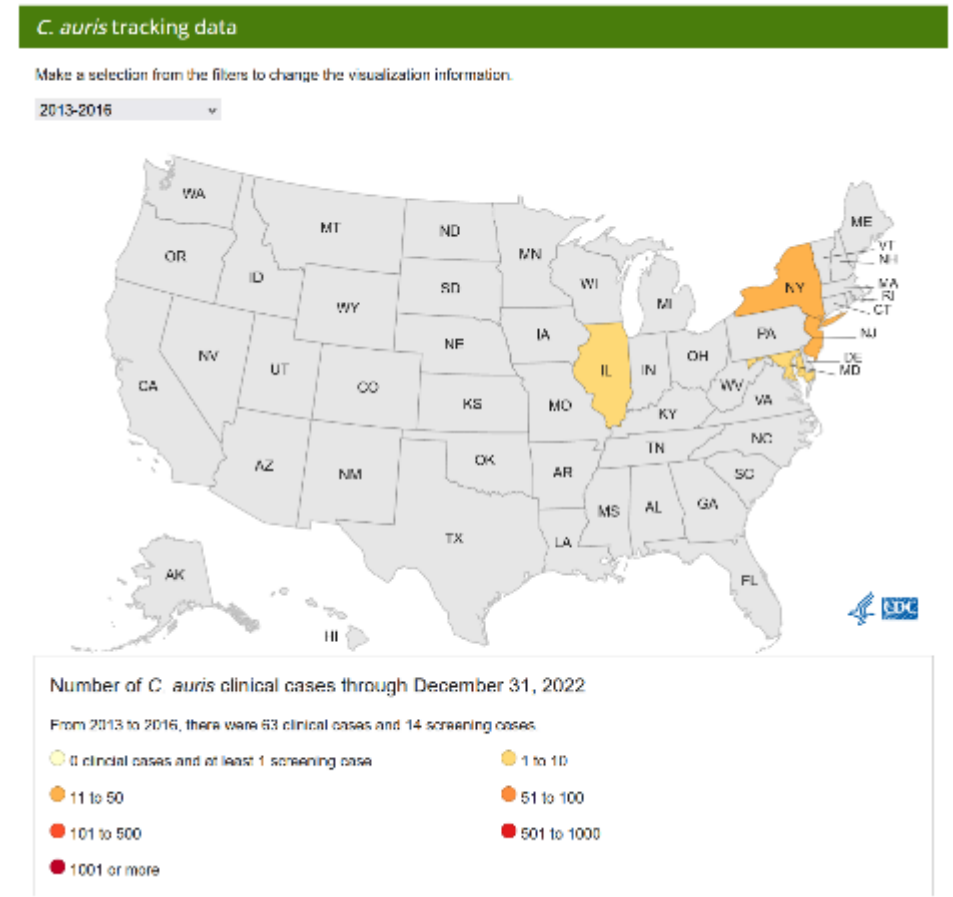




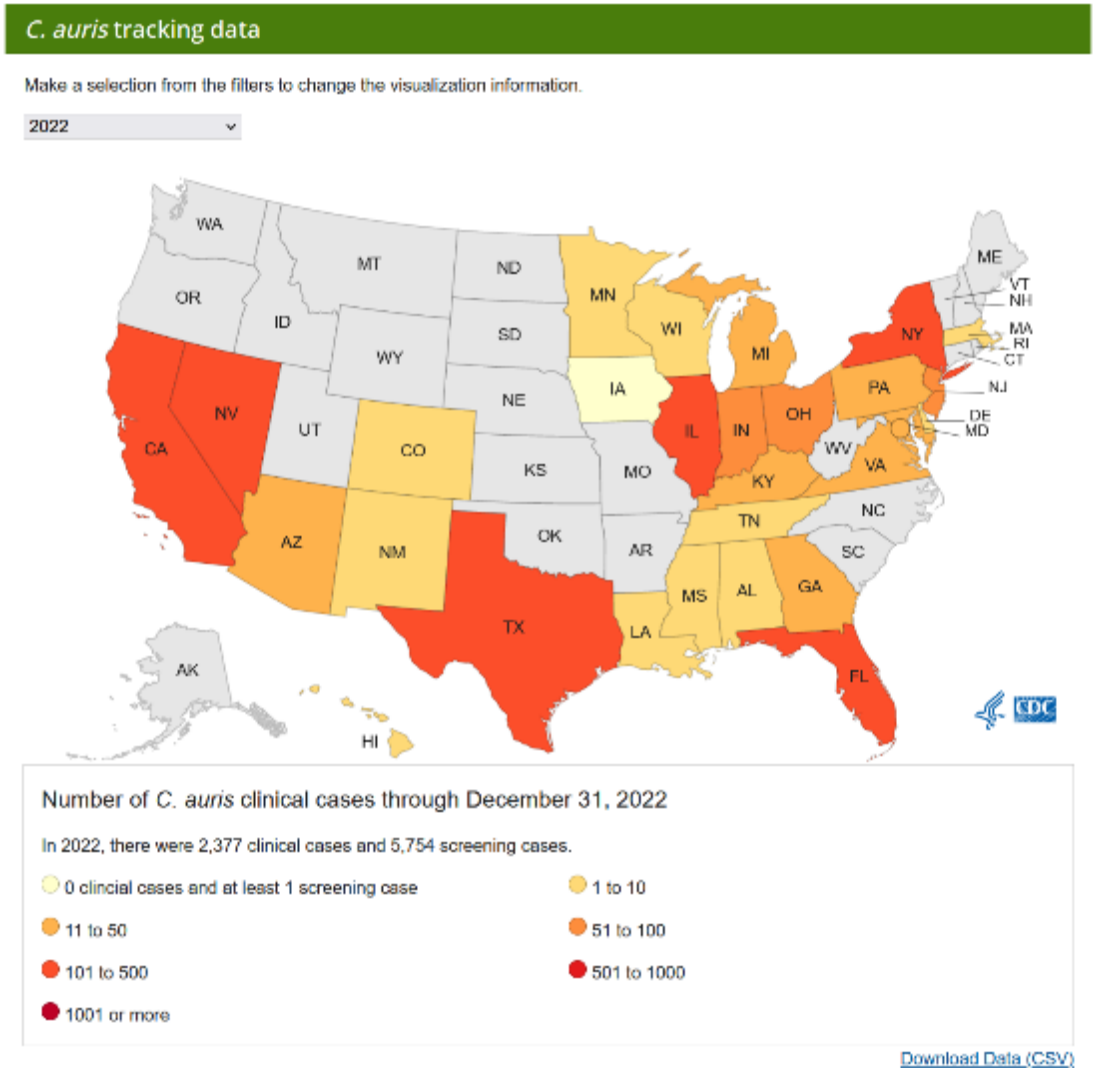
J. Med. Microbiol. 70, 001318 (2021); https://doi.org/10.1099/jmm.0.001318

1996	1997	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
South Korea	Japan	Pakistan	South Africa India	Kenya	China	Venezuela Singapore	Colombia USA UK	Israel Kuwait	Australia Germany	Belgium Norway Spain Russia Oman Panama	France Switzerland Canada Taiwan UAE Egypt Saudi Arabia	Austria Greece Netherlands Poland Chile Bangladesh Malaysia Thailand Iran	Italy Costa Rica Sudan	Mexico

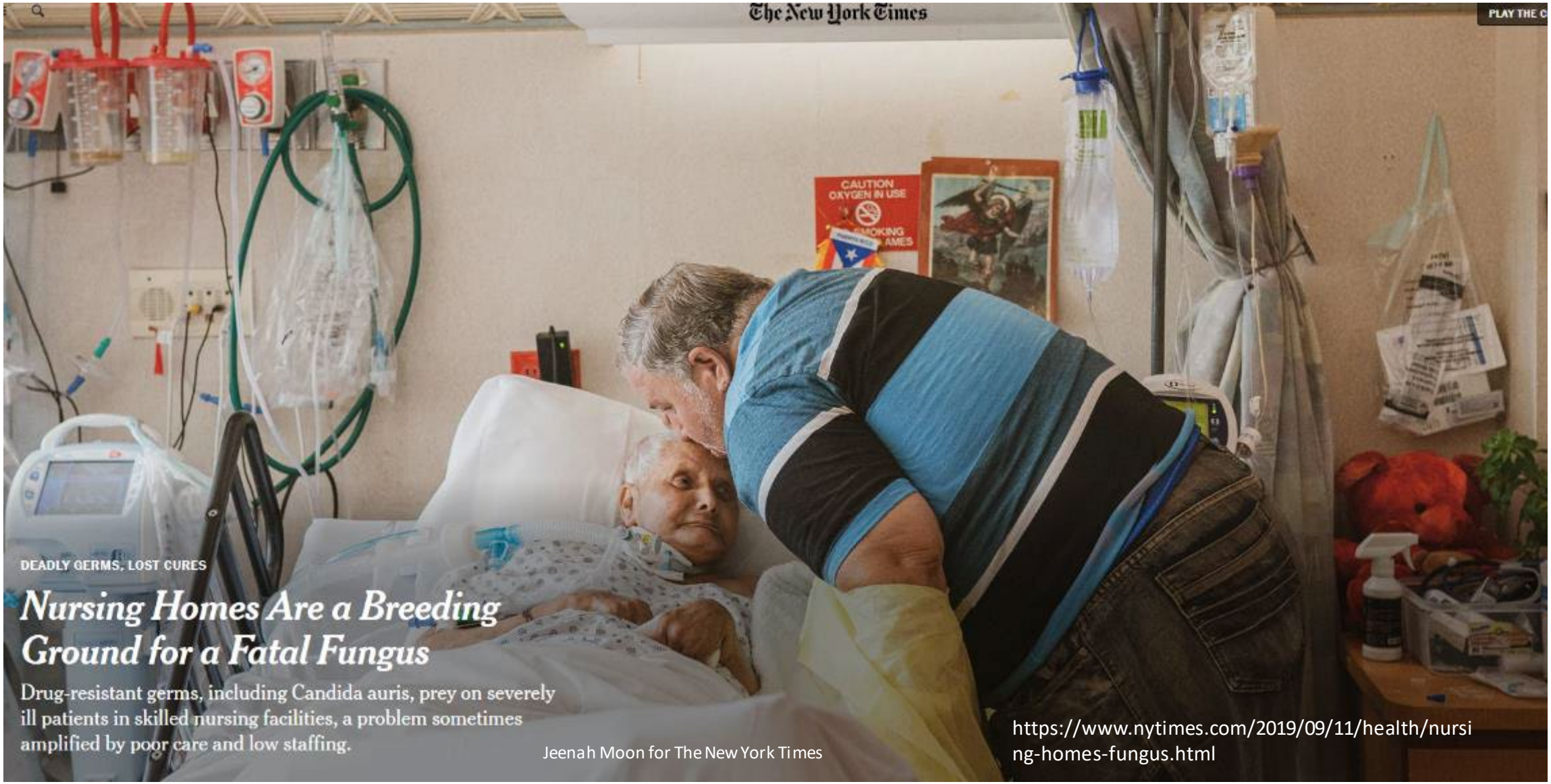
Candida auris detection 2013-2016



Candida auris detection 2013-2022



2019 New York Times



Home | UWSMPH | UW-Madison | Directory | Contact | Careers | Search For:

Wisconsin State Laboratory of Hygiene
UNIVERSITY OF WISCONSIN-MADISON

ABOUT WSLH | WSLH SERVICES | LAB NETWORKS & SURVEILLANCE | RESEARCH SUPPORT CENTER | NEWS & PUBLICATIONS | PAY YOUR BILL

CLINICAL TESTING | WATER & OTHER ENVIRONMENTAL TESTING | OCCUPATIONAL HEALTH & SAFETY SERVICES | FORENSIC TOXICOLOGY | PROFICIENCY TESTING

- **Clinical Testing**
  - Clinical Testing
  - Communicable Disease
    - About Us
    - Contacts
    - Customer Service
    - Forms
    - Rabies
    - Clinical Supplies
    - Testing
    - Wisconsin Clinical Laboratory Network
    - AR Lab Network
    - Ebola Virus Information for Lab Professionals
    - COVID-19
    - Mpox- 2022
  - Newborn Screening (NBS)
  - UW Cytogenetics
  - Cytology Laboratory
  - Biochemical Genetics
  - Clinical Metals

ARLABnetwork

The Wisconsin State Laboratory of Hygiene (WSLH) is proud to be 1 of 7 Regional Lab
the Antibiotic Resistance (AR) Laboratory Network.

The AR Lab Network was established in 2016 to help identify, respond to, and prevent
resistance in the United States. As a Regional Lab, the WSLH performs comprehensive
antimicrobial resistant organisms for the state of Wisconsin, as well as select testing fo
in the Midwest Region of the AR Lab Network: Kentucky, Illinois, Indiana, Michigan, an

CDC's AR Lab Network

Wisconsin Division of Public Health – Carbapenem-Resistant Enterobacteriaceae (CRE

Wisconsin Division of Public Health – Antibiotic Resistance (AR)

Characterizing other genera for detection of targeted carbapenemases special study (A

▲ **Candida auris screening/colonization**

Specimen collection and submission instructions	Collection kits provided by WSLH when testing is approved Transport on ice to be tested within 96 hours after collection
Pre-approval required?	Yes, prior approval needed with state HAI program.
Specimen type	Collect from patient's axilla and/or groin
WSLH Testing Methodology	• PCR • Selective enrichment broth to isolate Candida auris • Species identification using MALDI TOF mass spectrometry
Turnaround Time	2 days for PCR, Up to 10 days for culture
Contact	If you would like to conduct a screening for Candida auris, please contact Wisconsin HAI Program at 608-267-7711 or DHSWIHAIPreventionProgram@dhs.wisconsin.gov

▼ **Carbapenem-Resistant Acinetobacter baumannii – Targeted Surveillance**

▼ **Expanded Drug Testing for Hard-to-Treat Infections**

Instructions for Colonization Swab Collection

Shipping to the WSLH

WSLH Shipping Address:
2601 Agriculture Drive
Madison, WI 53718

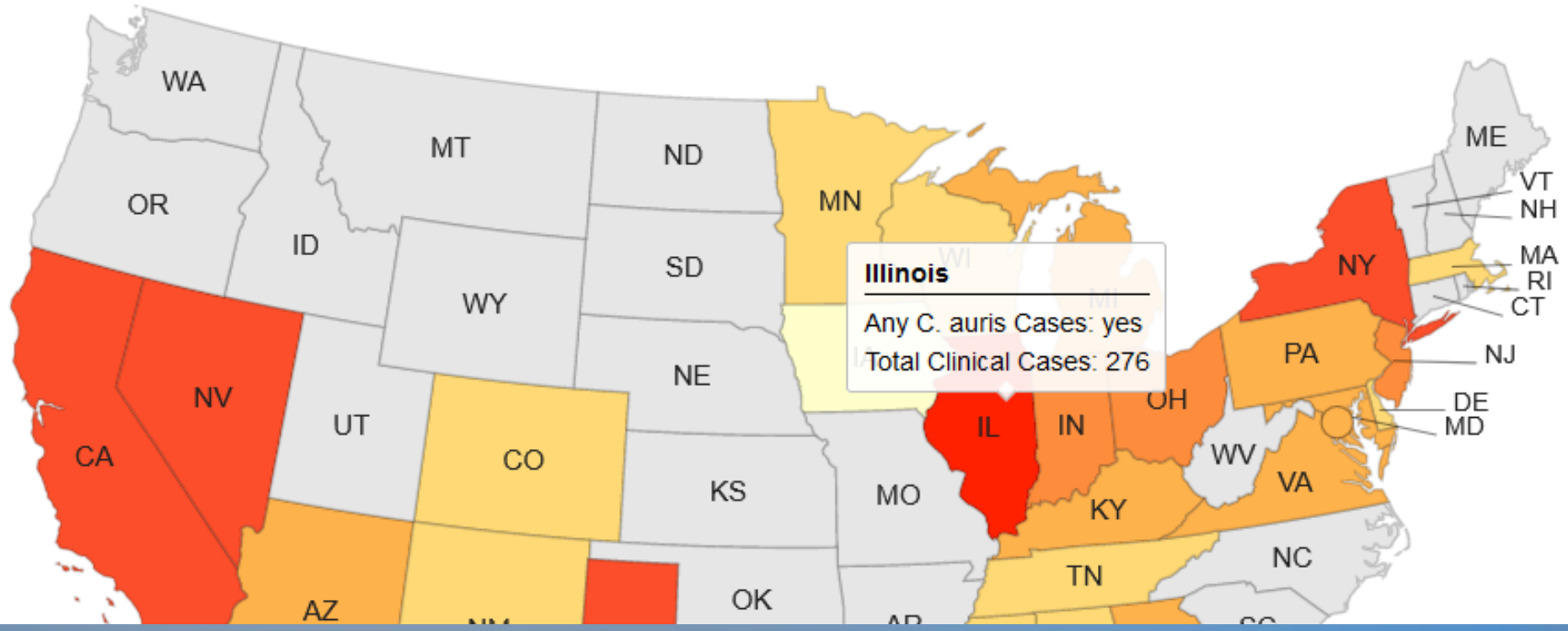
Customer Service Phone Number: 1 800 862 1013

Testing Lab for IDPH *C.auris* samples

C. auris tracking data

Make a selection from the filters to change the visualization information.

Most Recent 12 Months



https://www.cdc.gov/fungal/candida-auris/tracking-c-auris.html

Importance of Screening Cultures

- 1491 Positive Screening Cultures
- 193 (0ver 10%) went to active clinical disease

https://dph.illinois.gov/topics-services/diseases-and-conditions/infectious-diseases/candida-auris.html

Illinois Data

Table 1. Characteristics of 782 clinical case patients with available risk factor data

CHARACTERISTIC	PERCENTAGE OF PATIENTS
Presence of IV device	74%
Wounds	71%
Feeding tube	80%
Urinary Catheter	74%
Tracheostomy	88%
Mechanically ventilated	85%

Additionally, through proactive screening, 1491* individuals were found to have *C. auris* on their skin (colonization identified by culturing *C. auris* from a swab that was rubbed on a patient's skin), but were not ill.

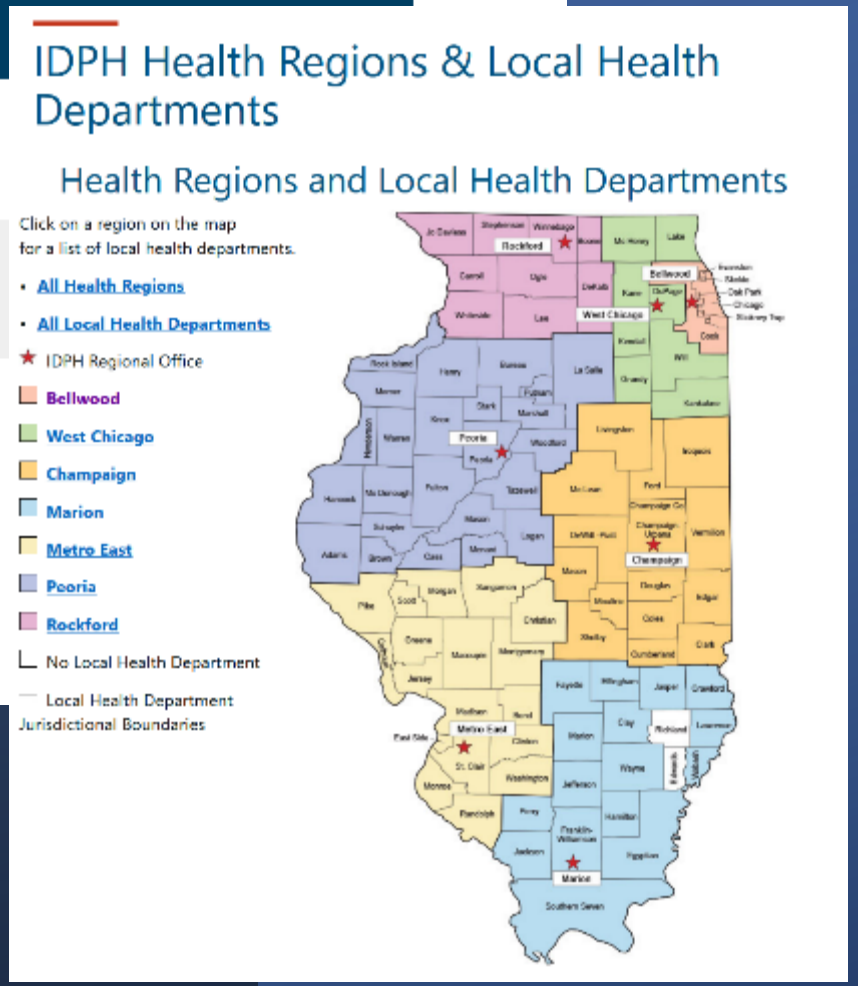
*193 of the 1491 known screening-positive cases have since developed clinical disease and are therefore counted in the clinical cases as well.

https://dph.illinois.gov/topics-services/diseases-and-conditions/infectious-diseases/candida-auris.html

Illinois Data

Between May 24, 2016 and July 31, 2022, 921 confirmed and four probable clinical cases were identified.

LOCATION OF FACILITY WHERE CASE WAS IDENTIFIED	NUMBER OF CLINICAL AND PROBABLE CASES
Chicago	454
Cook County (outside Chicago)	397
Boone, Champaign, DeKalb, DuPage, Kankakee, Lake, Logan, McHenry, Macon, Peoria, Sangamon, Will, & Winnebago counties	70



https://dph.illinois.gov/topics-services/diseases-and-conditions/infectious-diseases/candida-auris.html

SIREN NOTIFICATION

To: Local Health Departments, Hospital Administrators, ED Staff, EMS Staff, Immunization Staff, Infectious Disease Physicians, Labs, Federally Qualified Healthcare Facilities, Long Term Care / Assisted Living Facilities, Home Health Care, Homeless Shelters, and Health Care Coalition Partners

CC: IDPH CD Leads and Staff, IDPH Immunization Leads, IDPH RHOs, IDPH OPR Leads, IDPH ERCs, IDPH Regional EMS Coordinators, IDPH Health Facilities Surveillance Nurses, IDPH Healthcare Associated Infection Team, IDPH Long Term Care Leads, IDPH Deputy Directors, IDPH Section Chiefs, HFS, State Board of Health, IDPH HAI Team, and IDPH HAN Team

From: Illinois Department of Public Health

Date: October 5, 2023

Subject: Candida auris Health Advisory

Table. Illinois *C. auris* case counts by city/county of facility that detected the case, 8/1/2016 – 9/22/2023

City/County of Facility that Detected Case	Number of Clinical Cases	Number of Colonized Cases	Total
Chicago	654	1311	1965
Suburban Cook (excluding Chicago)	638	822	1460
DuPage	51	44	95
Lake	29	43	72
Will	20	36	56
Other Counties*	34	23	57
Total	1426	2279	3705

*Other counties: Boone, Champaign, Coles, DeKalb, Iroquois, Kane, Kankakee, LaSalle, Logan, Macon, McDonough, McHenry, Peoria, Rock Island, Sangamon, St. Clair, and Winnebago

After discussion about cross-jurisdictional *C. auris* cases with State-to-State *C.auris* admissions and transfers

Illinois Department of Public Health
IDPH
Protecting Health, Improving Lives

HEALTH ADVISORY

JB Pritzker, Governor — Sameer Vohra, MD, JD, MA, Director

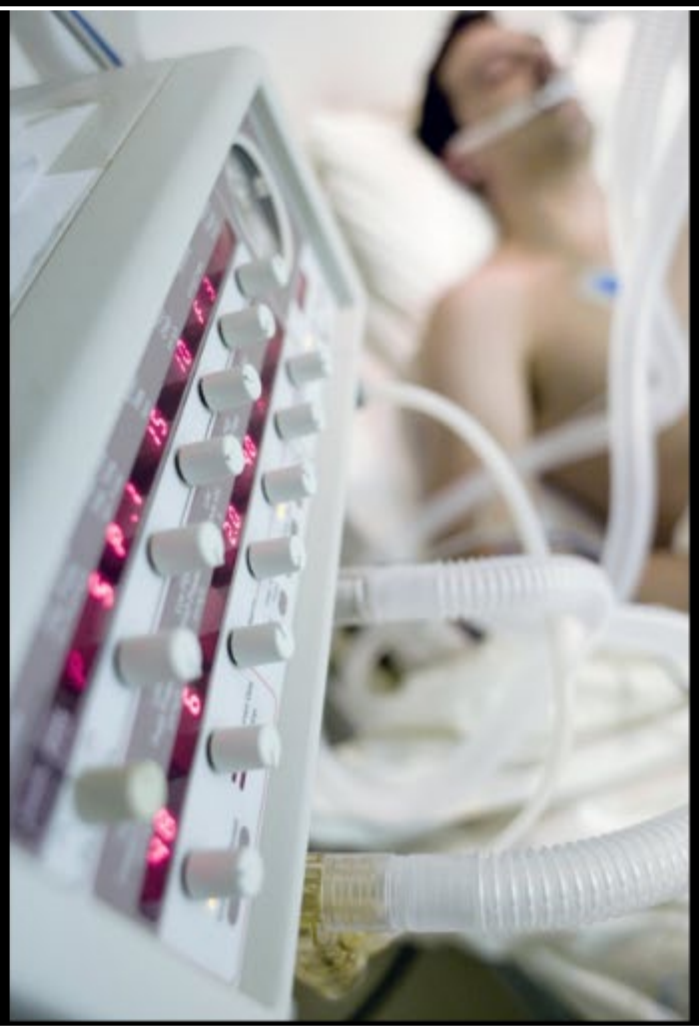
Summary and Action Items

- The Illinois Department of Public Health (IDPH) has seen an increase in *Candida auris* cases detected in counties that previously had low or no prevalence.
- To prevent further spread in these regions, recommendations for facilities on Transmission-Based Precautions, cleaning and disinfecting, inter-facility communication, and use of the Extensively Drug-Resistant Organism (XDRO) registry are described below.

Background

Candida auris (*C. auris*) is a multidrug resistant fungus that was first identified in Illinois in 2016. It can cause invasive disease and colonize individuals, especially among patients/residents who require complex medical care. *C. auris* is a public health concern due to the resistance of some *C. auris* to all three types of antifungal medicines and its potential to spread and cause outbreaks in health care settings.

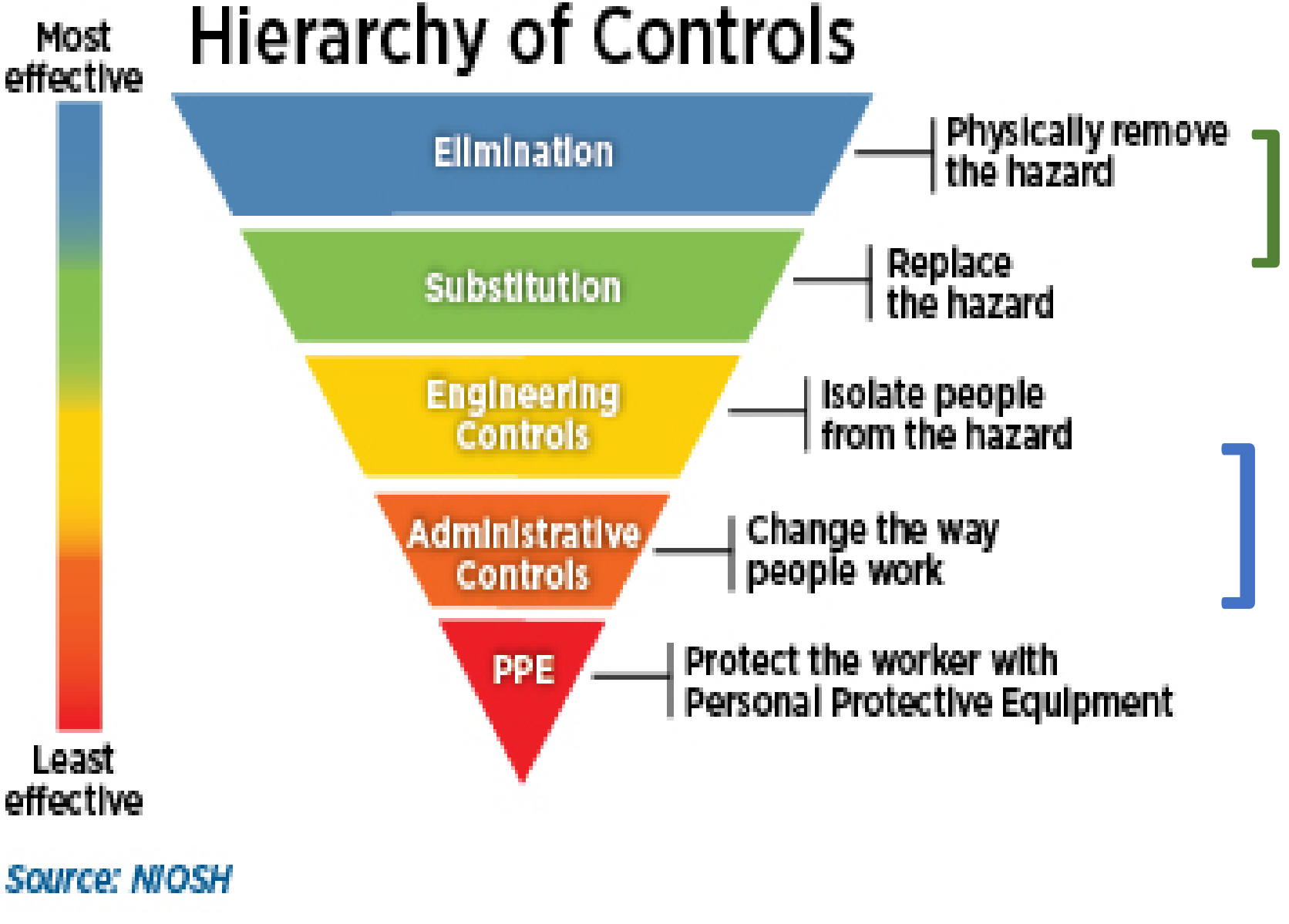
During the COVID-19 response, cases of *C. auris* across the United States increased by 60%. Since the first identification of *C. auris* in metro Chicago, cases have increased in that region and have been detected across the state (Table). To date, 21 counties have identified at least one case of *C. auris*. It is concerning that there have been recent introductions into Boone, Champaign, Coles, DeKalb, Iroquois, Kane, Kankakee, LaSalle, Logan, Macon, McDonough, McHenry, Peoria, Rock Island, Sangamon, St. Clair, and Winnebago counties. Many of these cases were not known at transfer. *C. auris* introduction in Illinois has also been linked to the sharing of patients/residents from surrounding states.



Images: YAY Images

The Real

Hierarchy of Controls

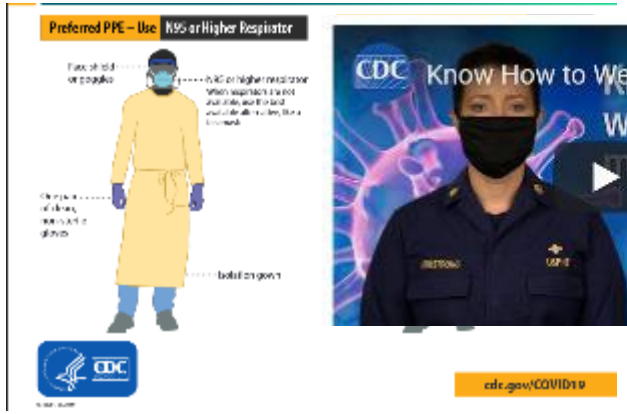


What Needs More Focus in LTC

What We Have Done in LTC

Source: NIOSH

General Vaccine Administration



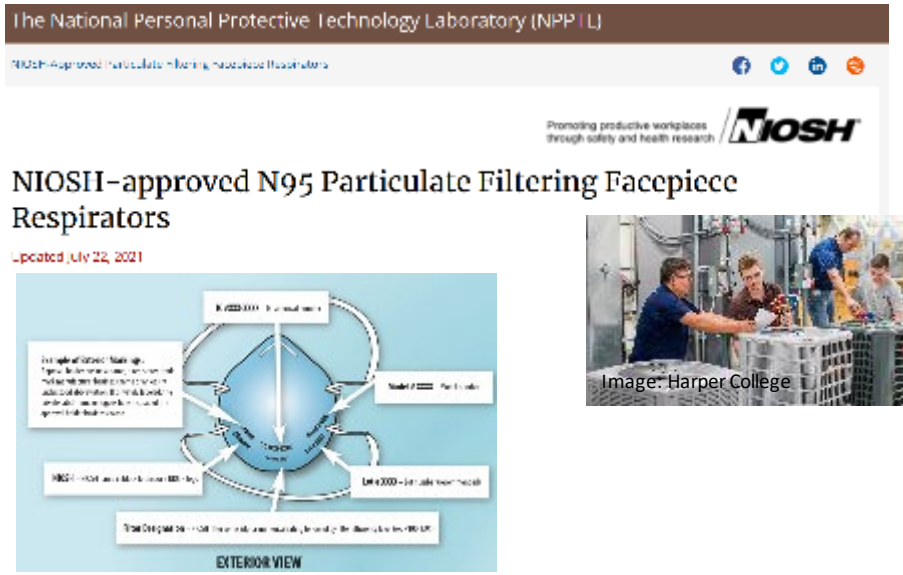
Source Control / PPE

Detection, Isolation/Quarantine

Screening and Surveillance

Hand Hygiene

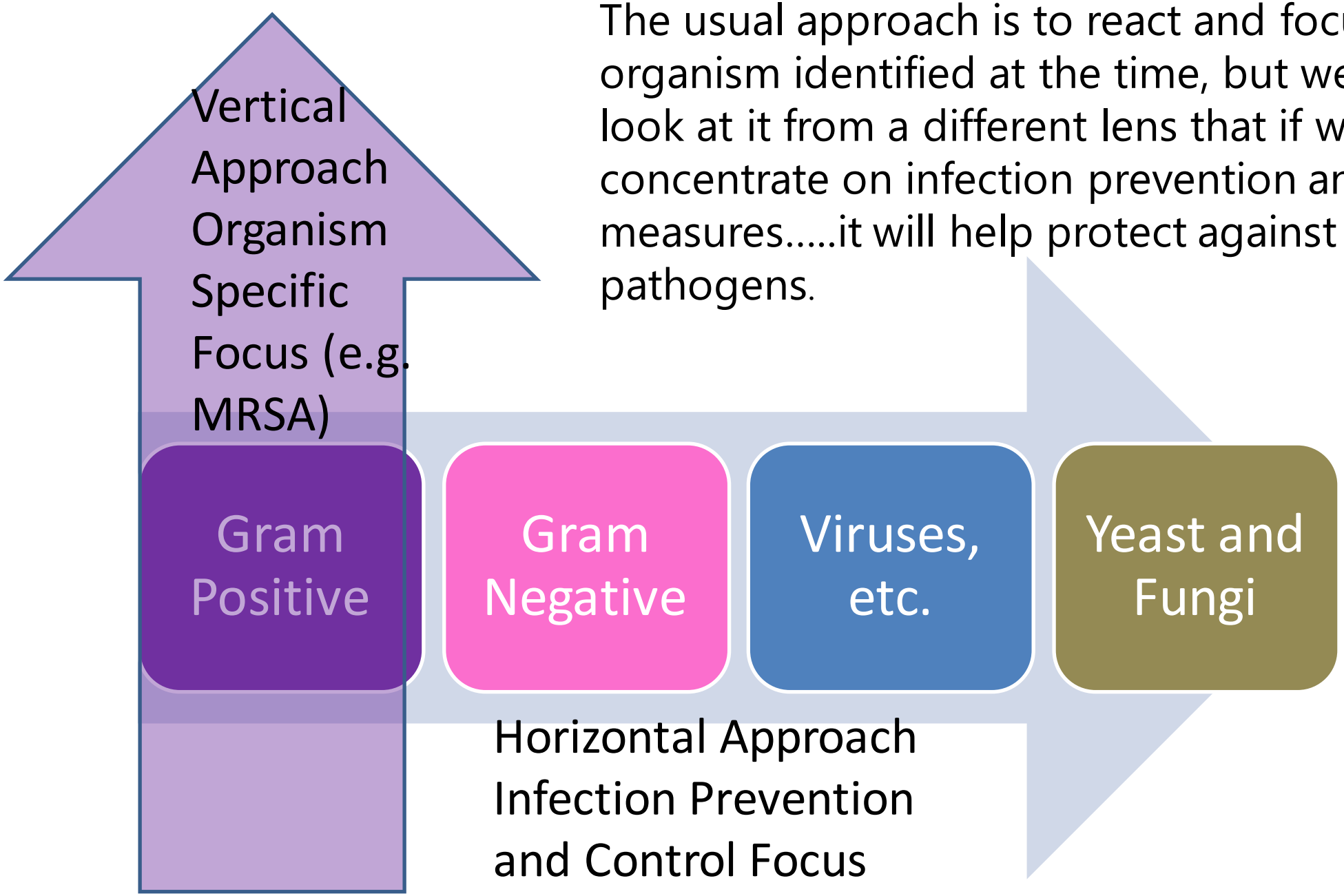
Surface Cleaning / Disinfecting



Respiratory Protection / Ventilation

Core Infection Prevention Practices

The usual approach is to react and focus on the organism identified at the time, but we need to look at it from a different lens that if we concentrate on infection prevention and control measures…..it will help protect against ALL pathogens.



Septimus et al., 2014; Wentzel &Edmond, 2010

Slide: Burdsall

Burdsall High C's of Infection Prevention and Control

Clean Hands and Gloves

Clean Clothes

Clean Equipment and Environment

Contained Drainage

Covered Wounds

Careful Assessment

Current Vaccinations

Careful Use of Antimicrobials

Collaborative Approach

Communication

Point Prevalence Surveys

- Performed to:
  - Identify unrecognized colonization
  - Monitor in-house spread
  - Evaluate efficacy of interventions
- Facility plans with local health department and IDPH
- Realize that just because more Transmission Based Precautions (or Enhanced Barrier Precautions) are being used DOES NOT mean the facility is doing anything wrong. They may be doing everything right.

C. auris Prevalence, March 2017

- *C. auris* positive (1)
- Screened negative for *C. auris* (65)
- Not tested for C. auris (refused or not in room) (3)

PPS # 1

Slide: Chicago Department of Public Health

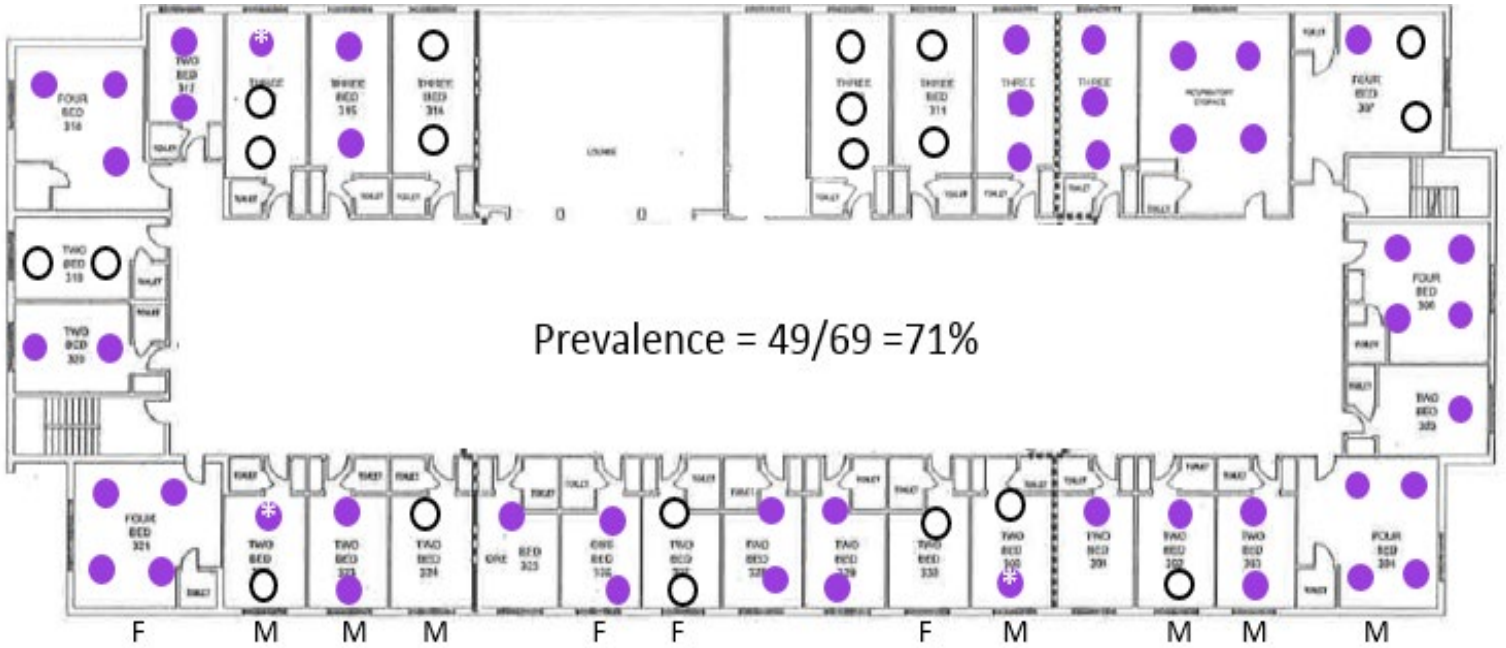
vSNF A Vent-Floor
1/30/18 *C. auris* Prevalence

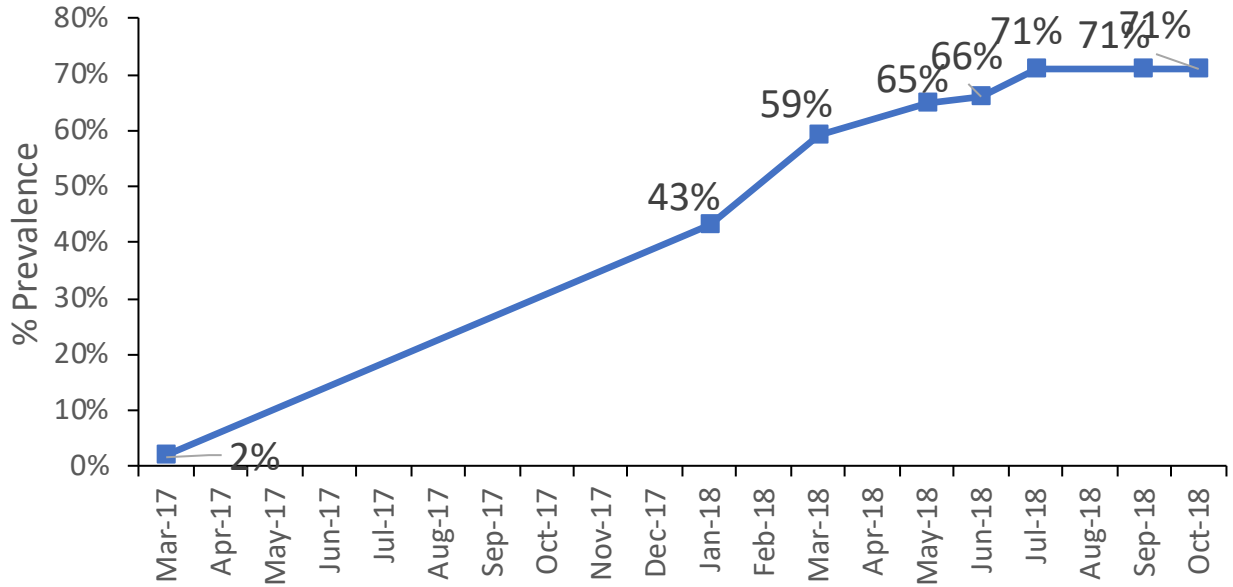
- *C. auris* positive (29)
- Screened negative for *C. auris* (33)
- Not tested for C. auris (refused or not in room) (5)

PPS # 2

Slide: Chicago Department of Public Health

C. auris Prevalence- Mar 2017-Oct 2018



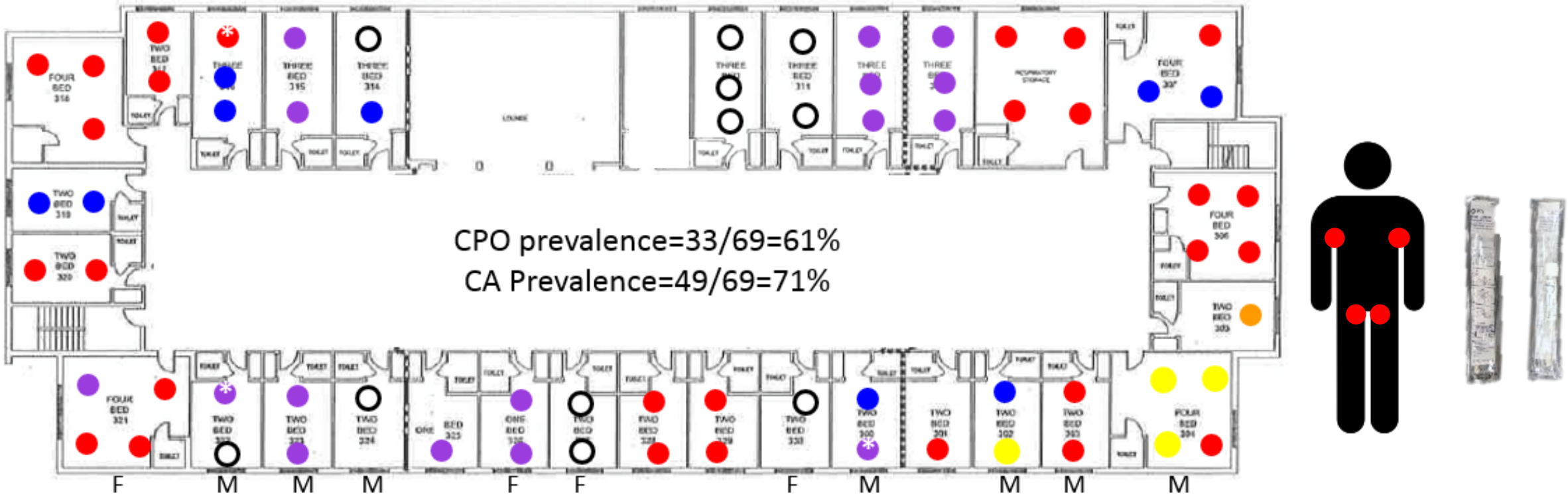


HEALTHY CHICAGO
CHICAGO DEPARTMENT OF PUBLIC HEALTH

Slide: Chicago Department of Public Health

Point Prevalence Surveys

vSNF A Vent-Floor Oct 2018 MDRO Prevalence



Slide: Chicago Department of Public Health

Environmental Science & Technology

pubs.acs.org/est

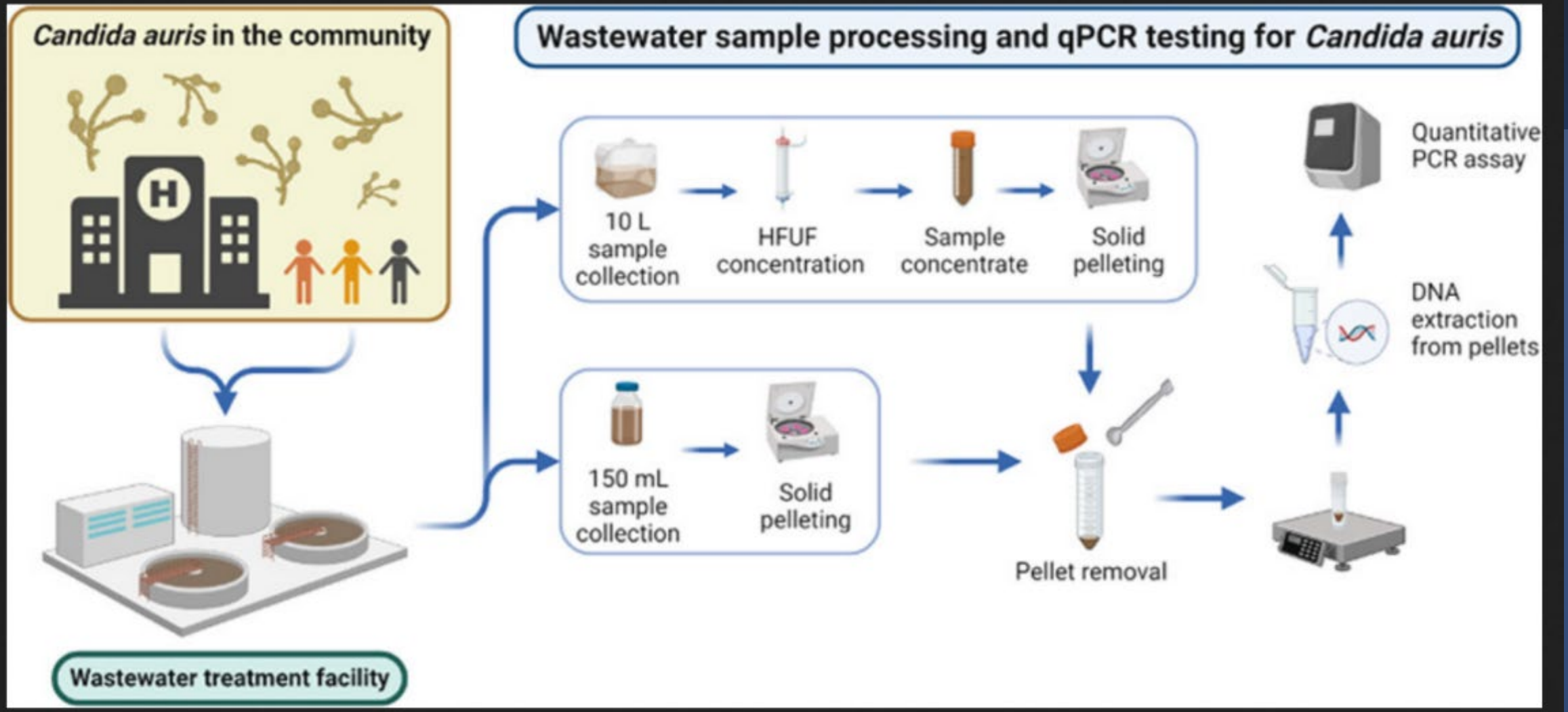
Article

Community-Scale Wastewater Surveillance of *Candida auris* during an Ongoing Outbreak in Southern Nevada

Casey Barber,[⊥] Katherine Crank,[⊥] Katerina Papp, Gabriel K. Innes, Bradley W. Schmitz, Jorge Chavez, Alessandro Rossi, and Daniel Gerrity*

Cite This: *Environ. Sci. Technol.* 2023, 57, 1755−1763

Read Online

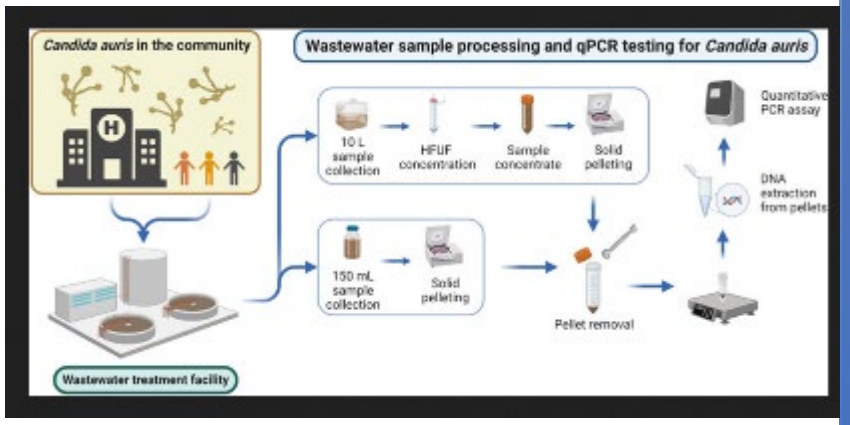

Candida auris in the community
Wastewater sample processing and qPCR testing for *Candida auris*
10 L sample collection
HFUF concentration
Sample concentrate
Solid pelleting
Quantitative PCR assay
DNA extraction from pellets
150 mL sample collection
Solid pelleting
Pellet removal
Wastewater treatment facility

Community-Scale Wastewater Surveillance of *Candida auris* during an Ongoing Outbreak in Southern Nevada

Casey Barber, Katherine Crank, Katerina Papp, Gabriel K. Innes, Bradley W. Schmitz, Jorge Chavez, Alessandro Rossi, and Daniel Gerrity

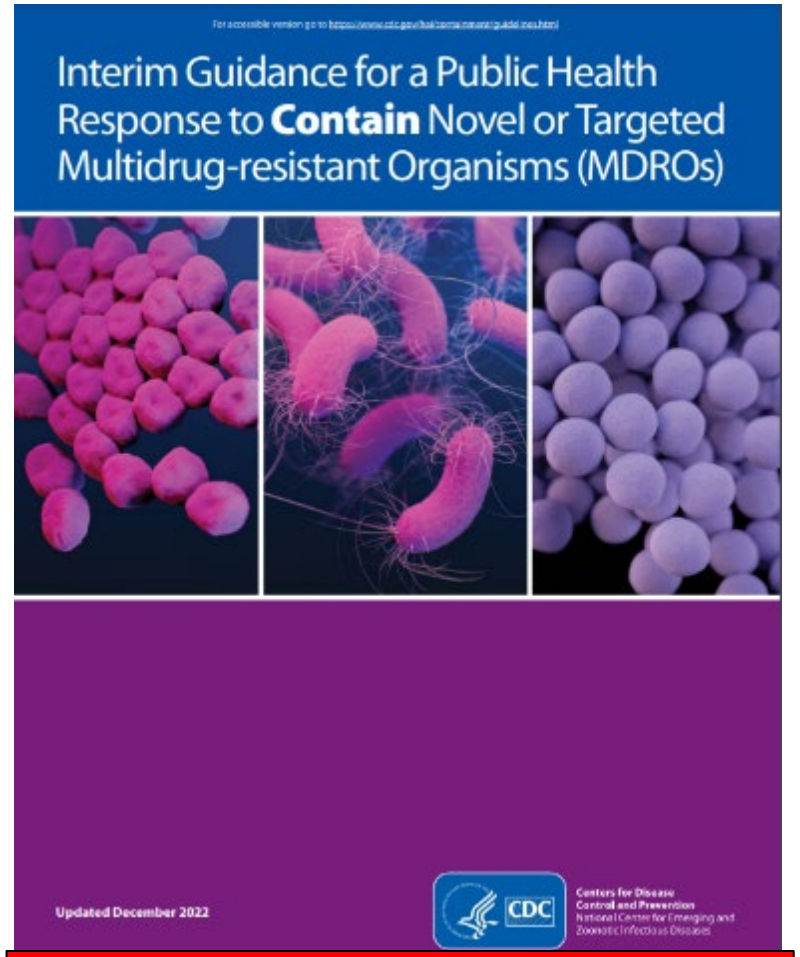
Environmental Science & Technology **2023** *57* (4), 1755-1763

DOI: 10.1021/acs.est.2c07763



- ABSTRACT:
- "Applicability of wastewater surveillance for *C. auris* in a metropolitan area in Southern Nevada
- Reported outbreaks across multiple healthcare facilities
- Influent or primary effluent samples were collected over 10 weeks from seven sewer sheds in Southern Nevada
- **Positive detection was observed in 72 of 91 samples (79%)**
- **Higher detection frequencies in sewer sheds serving healthcare facilities involved in the outbreak (94 vs 20% sample positivity)**
- Wastewater surveillance may assist in tracking the spread of *C. auris* and serve as an early warning tool for public health action
- These findings provide the foundation for future application of wastewater-based epidemiology (WBE) to community- or facility-level surveillance of *C. auris* and other high consequence, healthcare-associated infectious agents."
- https://pubs.acs.org/doi/epdf/10.1021/acs.est.2c07763

CDC MDRO Guidance



Containment – Updated

https://www.cdc.gov/hai/mdro-guides/containment-strategy.html

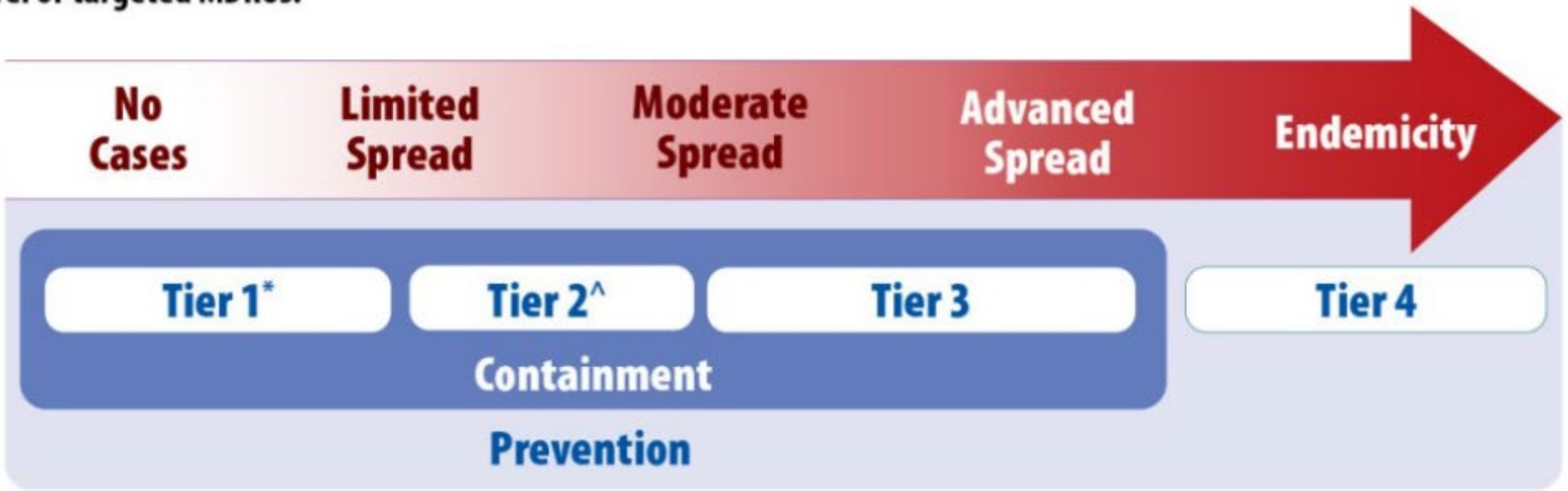
Slide: IDPH

Prevention – New!

https://www.cdc.gov/hai/mdro-guides/prevention-strategy.html

CDC MDRO Containment Tiers & Recommended Strategy

Figure 1. Relationship between epidemic stages, response tiers, containment response, and prevention activities for novel or targeted MDROs.



Organism or resistant mechanism that have

*Never (or very rarely) been identified **in the United States** and for which experience is extremely limited are Tier 1.

^Never (or very rarely) been identified **in a public health jurisdiction but are more common in other parts of the U.S.** are Tier 2.

Slide: IDPH

https://www.cdc.gov/hai/mdro-guides/containment-strategy.html

CDC MDRO Prevention Guidance:
Section I. Preparing to Implement an MDRO Prevention Plan
Illinois has their own Illinois Plan in development

1. Determine the focus MDROs
2. Risk stratify healthcare facilities within a jurisdiction
3. Decide where to begin MDRO Prevention Plan implementation
4. Evaluate jurisdictional clinical laboratory surveillance
5. Define process and outcome measures

https://www.cdc.gov/hai/mdro-guides/prevention-strategy.html

Slide: IDPH

Inter-Facility Infection Control Transfer Form for States Establishing HAI Prevention Collaboratives

Available from: https://www.cdc.gov/hai/prevent/prevention_tools.html

This example Inter-facility Infection Control patient transfer form can assist in fostering communication during transitions of care. This concept and draft was developed by the Utah Healthcare-associated Infection (HAI) working group and shared with Centers for Disease Control and Prevention (CDC) and state partners courtesy of the Utah State Department of Health.

This tool can be modified and adapted by facilities and other quality improvement groups engaged in patient safety activities.

Interfacility Communication

Photo: NIH

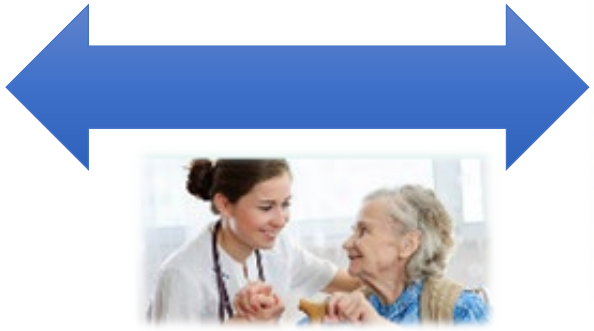


Photo: CDC

Photo: CDC

https://www.cdc.gov/hai/pdfs/toolkits/Interfacility-IC-Transfer-Form-508.pdf

ENHANCED BARRIER PRECAUTIONS

STOP STOP

EVERYONE MUST:

Clean their hands, including before entering and when leaving the room.

PROVIDERS AND STAFF MUST ALSO:

Wear gloves and a gown for the following High-Contact Resident Care Activities.

- Dressing
- Bathing/Showering
- Transferring
- Changing Linens
- Providing Hygiene
- Changing briefs or assisting with toileting
- Device care or use:
  - central line, urinary catheter, feeding tube, tracheostomy
- Wound Care: any skin opening requiring a dressing

Do not wear the same gown and gloves for the care of more than one person.

CDC

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

CONTACT PRECAUTIONS

STOP STOP

EVERYONE MUST:

Clean their hands, including before entering and when leaving the room.

PROVIDERS AND STAFF MUST ALSO:

Put on gloves before room entry.
Discard gloves before room exit.

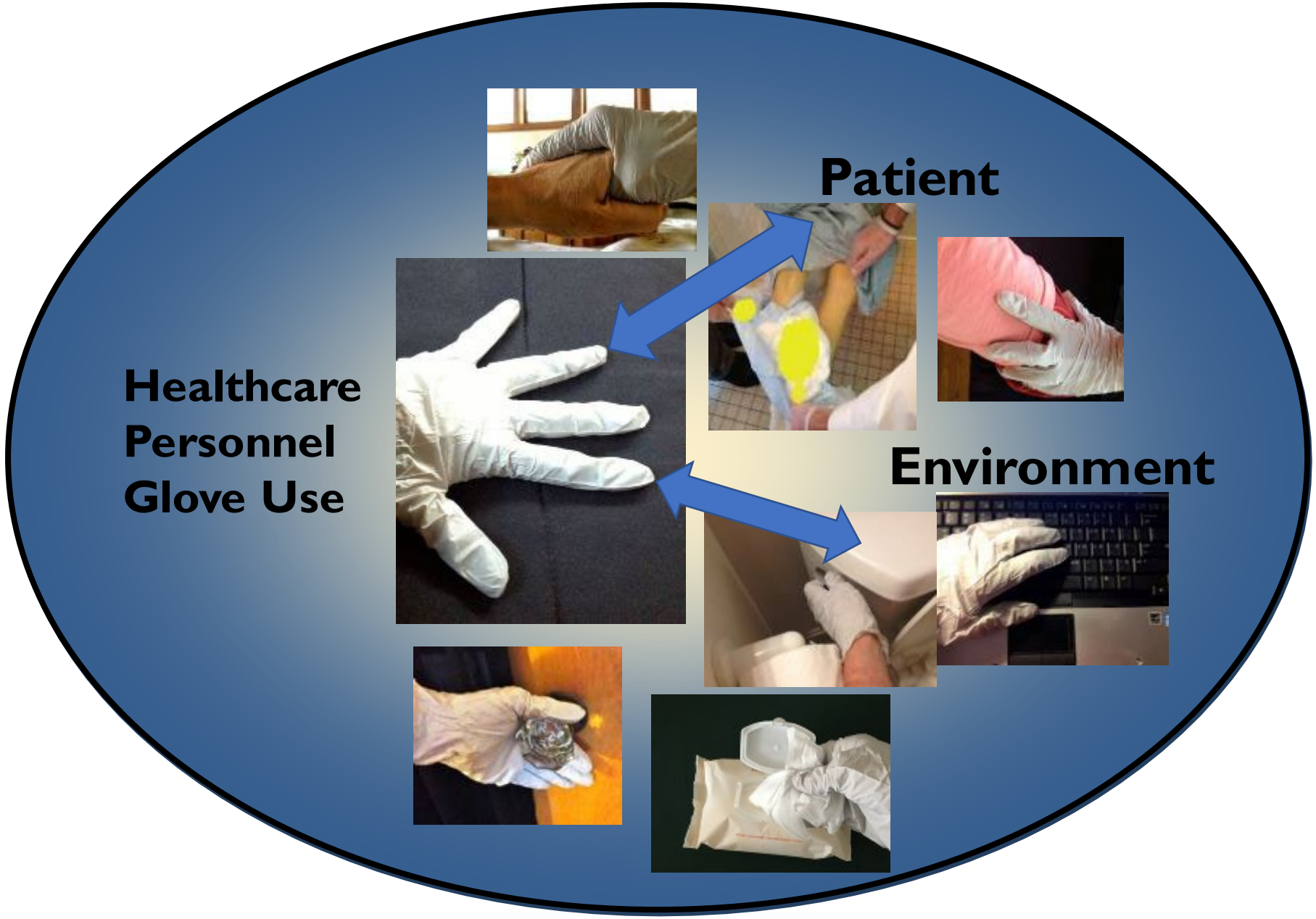
Put on gown before room entry.
Discard gown before room exit.

Do not wear the same gown and gloves for the care of more than one person.

Use dedicated or disposable equipment.
Clean and disinfect reusable equipment before use on another person.

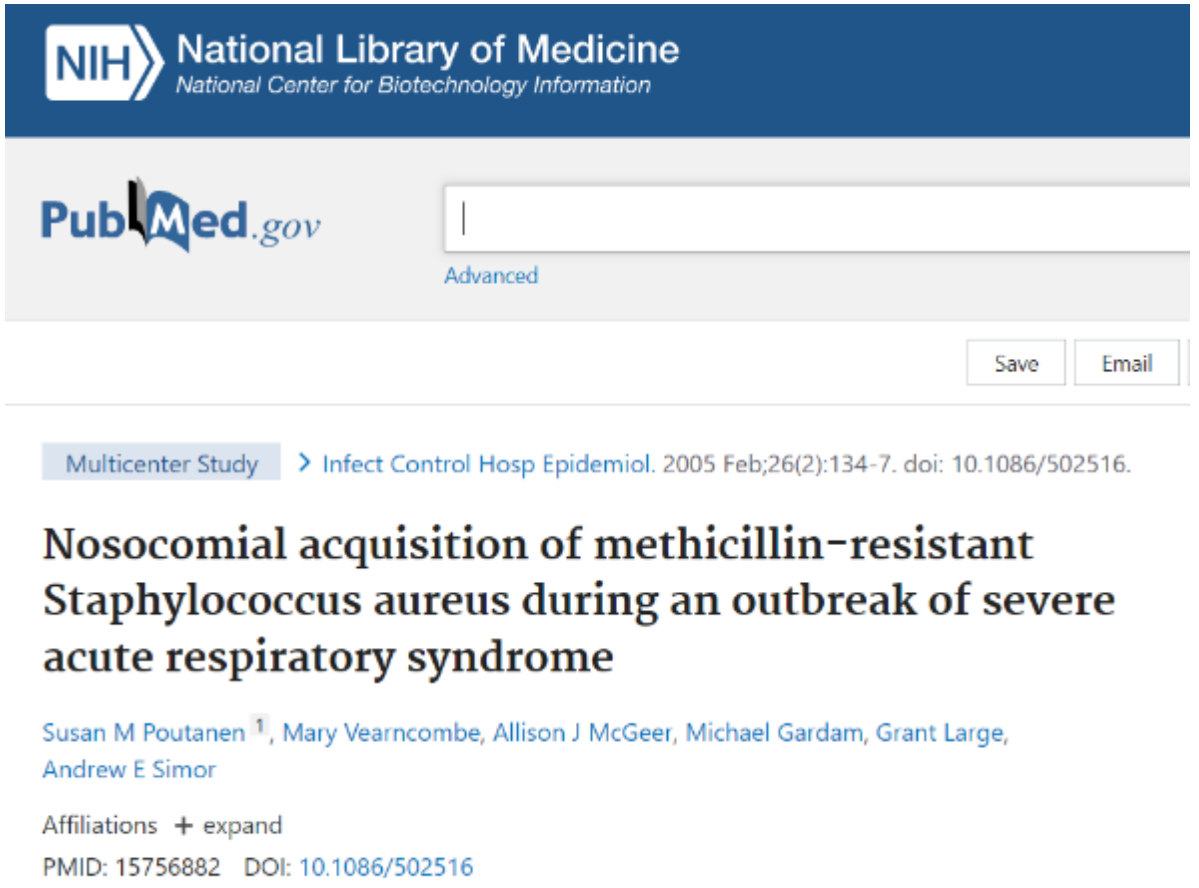
CDC

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

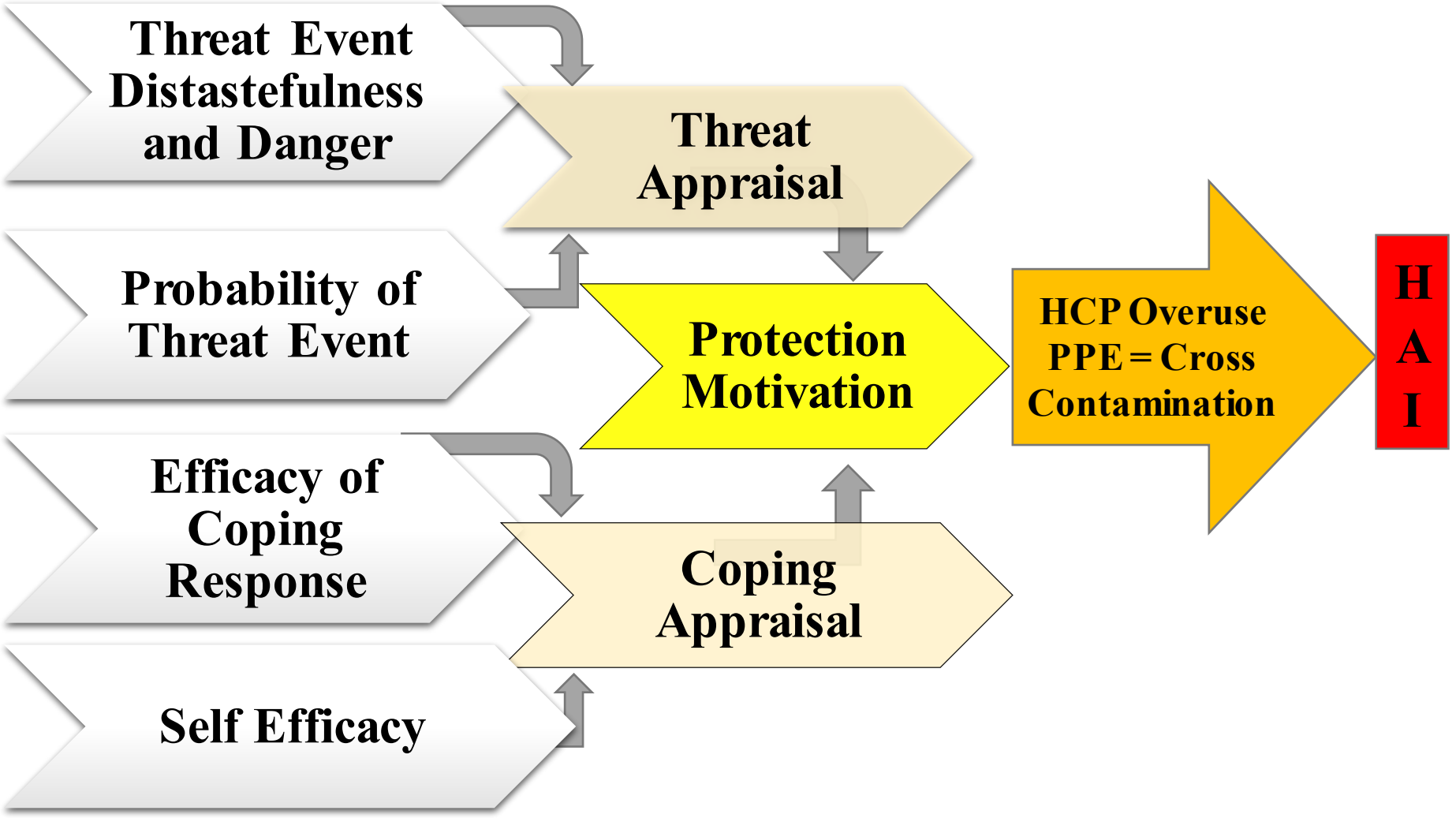

Patient
Healthcare
Personnel
Glove Use
Environment

Lessons Learned from Toronto SARS outbreak in 2005

- ***Conclusions: Inappropriate reuse of gloves and gowns*** *and failure to wash hands between patients may have contributed to transmission of MRSA during the SARS outbreak.*
- *Attention should be paid to training healthcare workers regarding the appropriate use of precautions as a means to protect themselves and patients.*



Protection Motivation Theory for Healthcare Personnel



HCP= Healthcare personnel, HAI= Healthcare associated infection, Adopted from Munro, Lewin, Swart & Volmink (2007). Protection Motivation Theory

Two Indicators of Inappropriate CNA Glove Use in 74 Patient Care Events

227 Failed or Misplaced Glove Changes

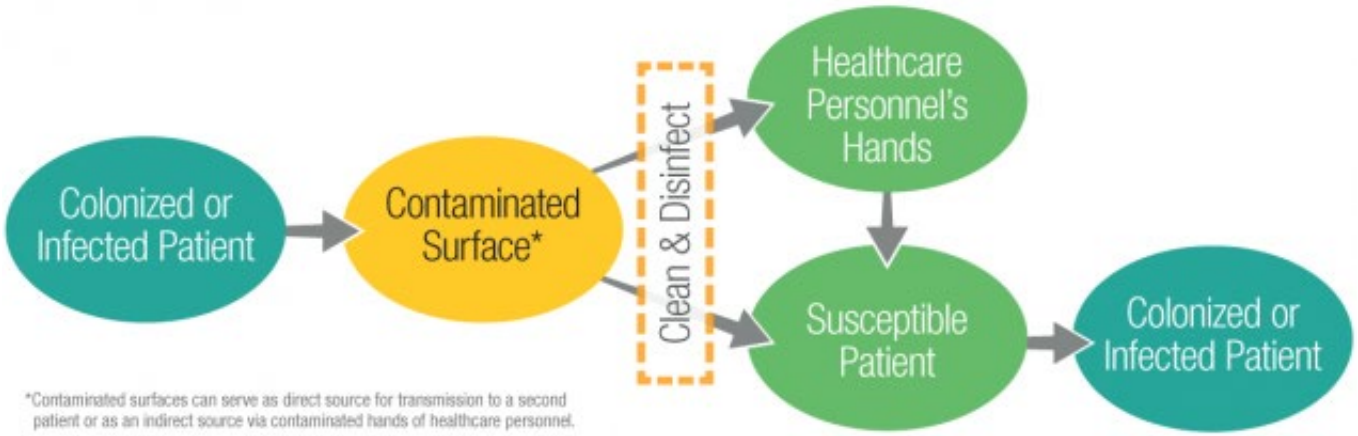
782 Contaminated Touch Points

Burdsall et al., 2017 https://pubmed.ncbi.nlm.nih.gov/28863810/

Why is *Candida auris* such a threat?

All organisms are not equal

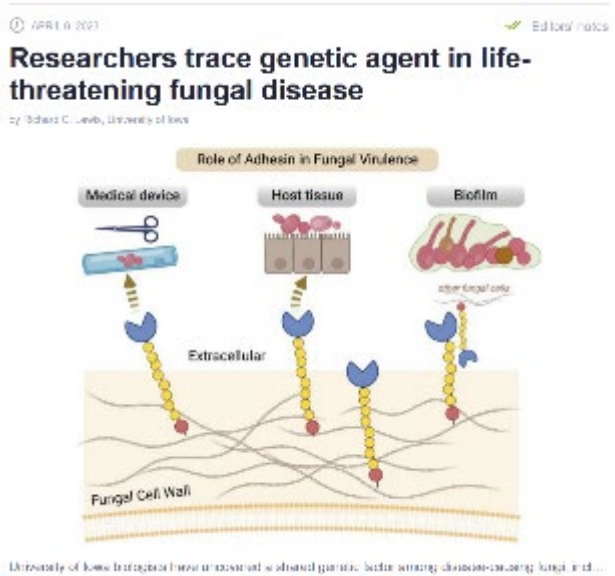
Candida fungi, Candida albicans, C. auris and other human pathogenic yeasts, 3D illustration *Dr_Microbe, Getty Images/iStockphoto*



https://www.cdc.gov/hai/prevent/environment/surfaces.html

What is an adhesin?

- Adhesins are outer-surface components of cell walls
- Proteins that act like glue
- Allow bacteria and fungi to stick to surfaces and form biofilms



https://now.uiowa.edu/news/2023/04/researchers-trace-genetic-agent-life-threatening-fungal-disease

EC
Journals.ASM.org

MINIREVIEW

Adhesins in Human Fungal Pathogens: Glue with Plenty of Stick

Piet W. J. de Groot,[a] Oliver Bader,[b] Albert D. de Boer,[a] Michael Weig,[b] Neeraj Chauhan[c,d]

Regional Center for Biomedical Research, Albacete Science and Technology Park, University of Castilla—La Mancha, Albacete, Spain[a]; Institute for Medical Microbiology and German National Reference Center for Systemic Mycoses, University Medical Center Göttingen, Göttingen, Germany[b]; Public Health Research Institute[c] and Department of Microbiology and Molecular Genetics,[d] New Jersey Medical School, University of Medicine and Dentistry of New Jersey, Newark, New Jersey, USA

- *"Understanding the pathogenesis of an infectious disease is critical for developing new methods to prevent infection and diagnose or cure disease.*
- *Adherence of microorganisms to host tissue is a prerequisite for tissue invasion and infection.*
- *Fungal cell wall adhesins involved in adherence to host tissue or abiotic medical devices are critical for colonization leading to invasion and damage of host tissue.*
- *Here, with a main focus on pathogenic Candida species, we summarize recent progress made in the field of adhesins in human fungal pathogens and underscore the importance of these proteins in establishment of fungal diseases."*

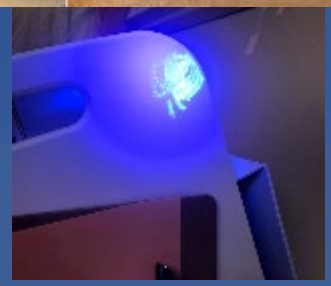
https://journals.asm.org/doi/pdf/10.1128/ec.00364-12

Abiotic factors

Non-living physical and chemical elements

Examples include water, air, soil, sunlight, minerals.

More important examples: plastic, indwelling devices in healthcare



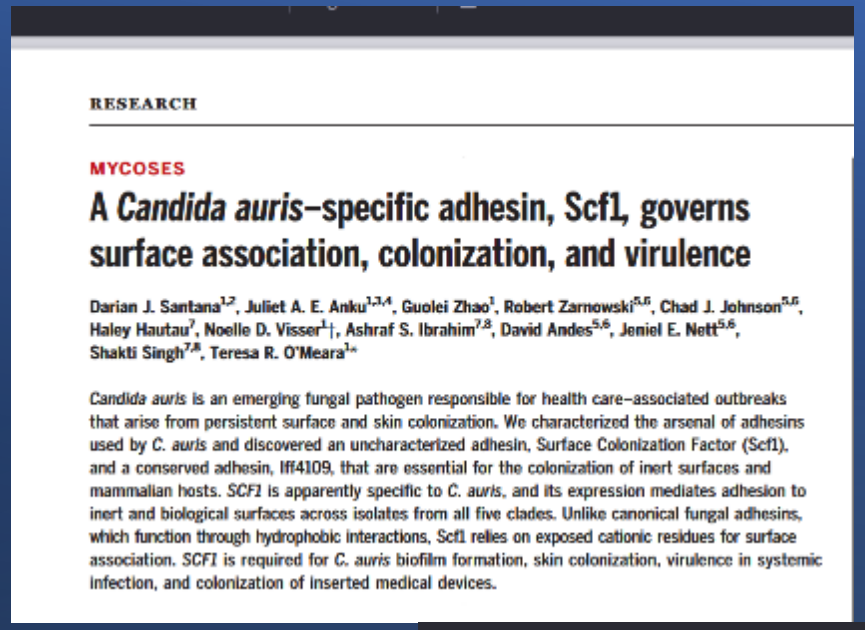
Biotic factors

Living elements

Once-living organisms in the ecosystem

Examples include humans, animals, plants, bacteria, fungi

https://www.diffen.com/difference/Abiotic_vs_Biotic



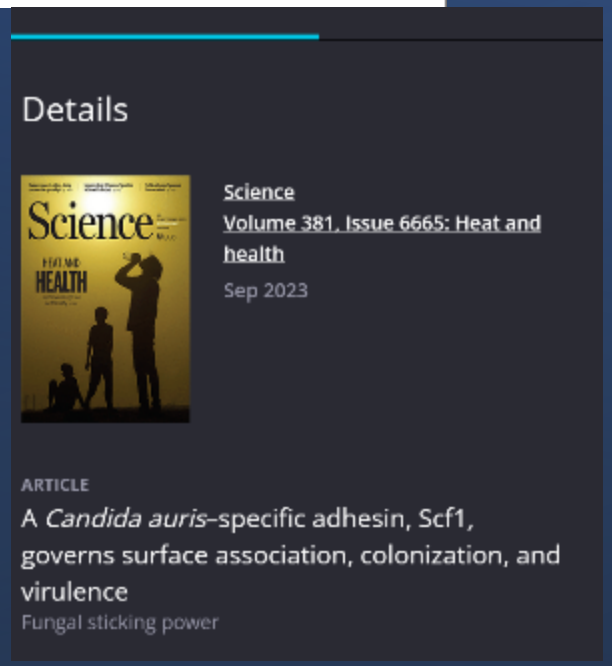
RESEARCH

MYCOSES

A *Candida auris*–specific adhesin, Scf1, governs surface association, colonization, and virulence

Darian J. Santana[1,2], Juliet A. E. Anku[1,3,4], Guolei Zhao[1], Robert Zarnowski[5,6], Chad J. Johnson[5,6], Haley Hautau[7], Noelle D. Visser[1]†, Ashraf S. Ibrahim[7,8], David Andes[5,6], Jeniel E. Nett[5,6], Shakti Singh[7,8], Teresa R. O'Meara[1]*

Candida auris is an emerging fungal pathogen responsible for health care–associated outbreaks that arise from persistent surface and skin colonization. We characterized the arsenal of adhesins used by *C. auris* and discovered an uncharacterized adhesin, Surface Colonization Factor (Scf1), and a conserved adhesin, Iff4109, that are essential for the colonization of inert surfaces and mammalian hosts. *SCF1* is apparently specific to *C. auris*, and its expression mediates adhesion to inert and biological surfaces across isolates from all five clades. Unlike canonical fungal adhesins, which function through hydrophobic interactions, Scf1 relies on exposed cationic residues for surface association. *SCF1* is required for *C. auris* biofilm formation, skin colonization, virulence in systemic infection, and colonization of inserted medical devices.



Candida auris SPECIFIC Adhesin*

- Surface Colonization Factor: Scf1*
- Conserved adhesin Iff4109 (similar to other *Candida* adhesins)
- Adheres to plastic
- Adheres to indwelling devices
- Adheres to skin
- Contribute to infection
- Contribute to long term colonization of abiotic and biotic surfaces
- Sticky, sticky, sticky

https://www.science.org/doi/epdf/10.1126/science.adf8972

Environmental Services and Related Areas

- **Environmental Cleaning and Disinfecting**
- **Maintenance and Building**
- **Plant Operations**

Environmental Services and Related Areas

https://www.cdc.gov/hai/prevent/environment/surfaces.html

What does CMS say?

- *§483.10(i) Safe Environment.*
- *"The resident has a right to a safe, clean, comfortable and homelike environment, including but not limited to receiving treatment and supports for daily living safely…. Sanitary includes, but is not limited to, preventing the spread of disease-causing organisms by keeping resident care equipment clean and properly stored. Resident care equipment includes, but is not limited to, equipment used in the completion of the activities of daily living."*

State Operations Manual Appendix PP ***§483.10 p 62-63***

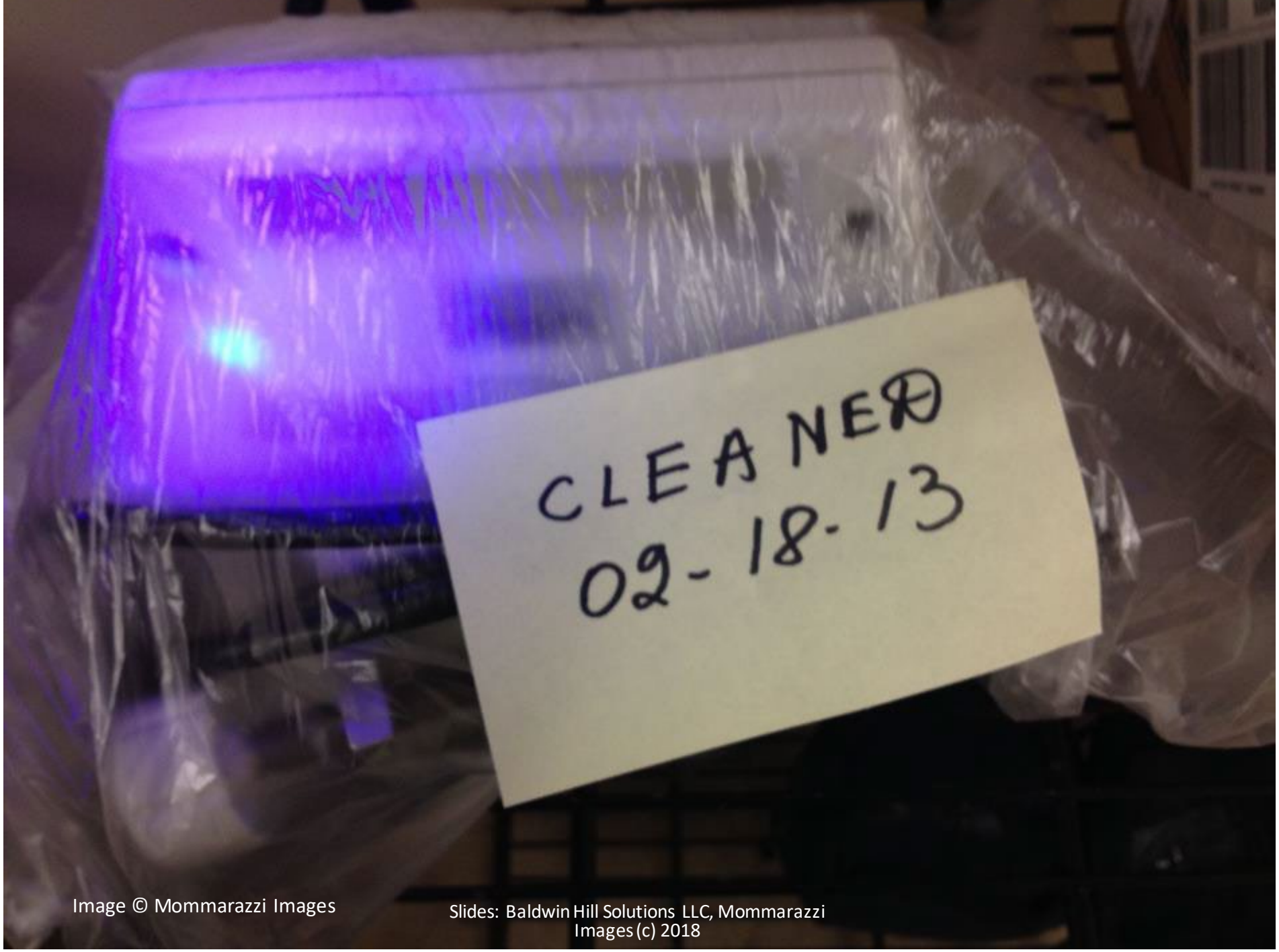
Environmental Cleaning and Disinfecting

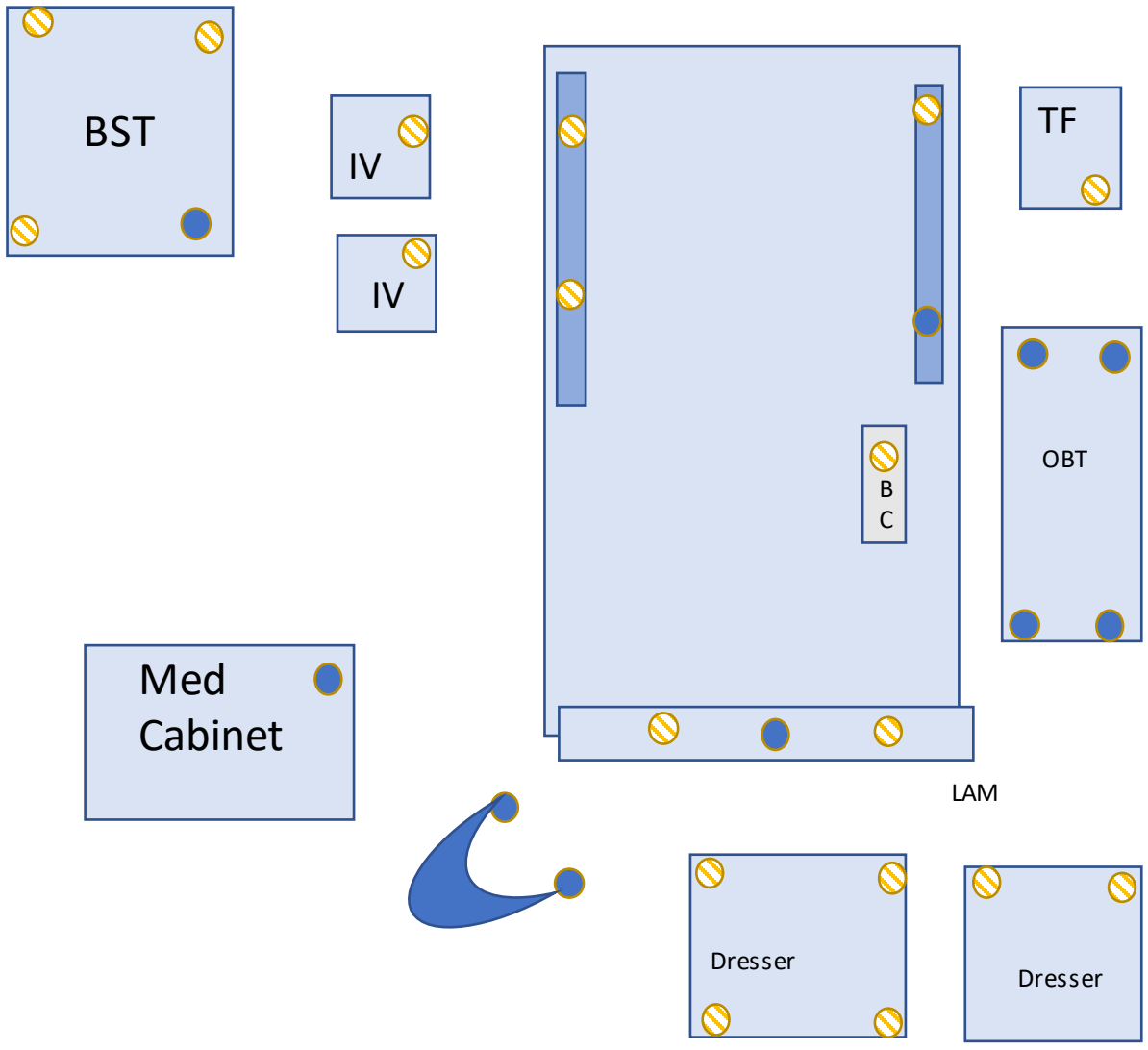
- Images: YAY Images, Mommarazzi Images © 2018

Equipment and Environment Not Cleaned

"Housekeeping's Job"

"Nursing's Job"





Missed

Wiped

18 Missed
28 Marked Areas
64.3% Missed

10 Wiped
28 Marked Areas
35.7% Wiped

Tools available at Hektoen.org: https://www.hektoen.org/initiatives-2/infection-control/

Example Room marked with fluorescent laundry detergent to monitor how many surfaces were wiped during cleaning/disinfecting

EPA List N Agents may not be what you are looking for with *C. diff*, *Candida auris,* or Norovirus

Candida fungi. Candida albicans, C. auris and other human pathogenic yeasts. 3D illustration Dr_Microbe. Getty Images/iStockphoto

EPA United States Environmental Protection Agency

Environmental Topics | Laws & Regulations | Report a Violation | About EPA

Pesticide Registration

CONTACT US

List P: Antimicrobial Products Registered with EPA for Claims Against Candida Auris

On this page:

- Products on List P
- How to use List P products effectively
- How to check if a product is on List P
- Additional Resources

Products on List P

The following products are registered for use with Candida auris (C. auris). EPA has reviewed laboratory testing data demonstrating that these products kill C. auris.

C. auris is a fungus that can cause severe infections and spreads easily between patients. C. auris infections tend to occur in health care settings and can be resistant to antifungal drugs.

Prior to these products being registered, there were no antimicrobial pesticides registered specifically for use against C. auris.

How to Use List P Products Effectively

A product's effectiveness can change depending on how you use it. Disinfectants may have different directions for different pathogens. Follow the label directions for C. auris, including the contact time.

https://www.epa.gov/pesticide-registration/list-p-antimicrobial-products-registered-epa-claims-against-candida-auris

Ideal Disinfectant

Rutala and Weber, 2014

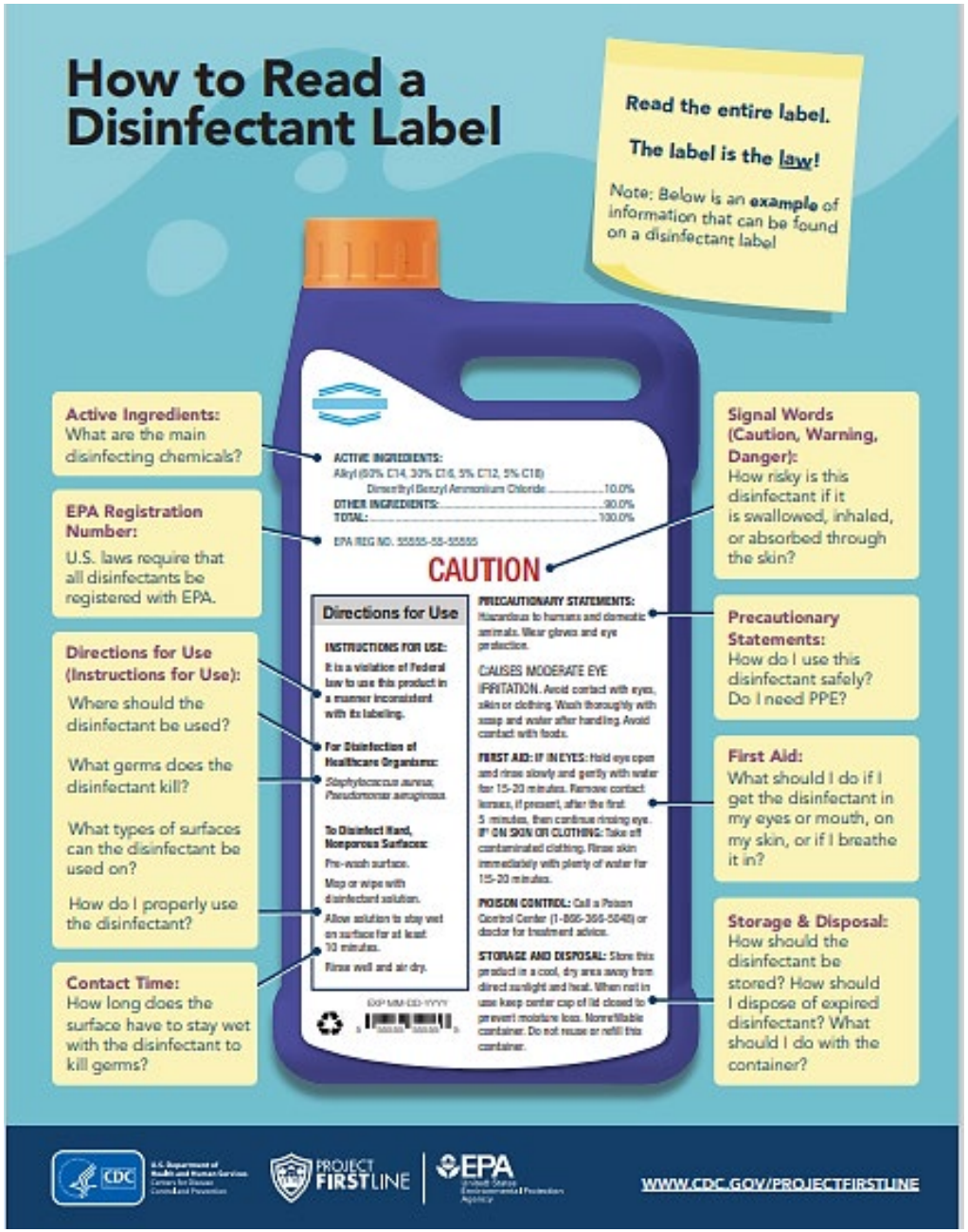
- Nontoxic and non-irritating
- Low toxicity rating
- Not damage surfaces
- Easy to use
- Acceptable odor
- Economical
- One step cleaner / disinfectant

Navigating the EPA Website

- There are a couple of ways to navigate to the information needed to determine if a disinfectant is EPA registered.
- The main EPA page can be found here: https://www.epa.gov/pesticide-registration/selected-epa-registered-disinfectants
  - Consider bookmarking the site for easy access in the future.
- This page provides all the lists by organism claim.

- List A: EPA's Registered Antimicrobial Products as Sterilizers
- List B: EPA Registered Tuberculocide Products Effective Against *Mycobacterium tuberculosis*
- List C: EPA's Registered Antimicrobial Products Effective Against Human HIV-1 Virus
- List D: EPA's Registered Antimicrobial Products Effective Against Human HIV-1 and Hepatitis B Virus
- List E: EPA's Registered Antimicrobial Products Effective Against *Mycobacterium tuberculosis* Human HIV-1 and Hepatitis B Virus
- List F: EPA's Registered Antimicrobial Products Effective Against Hepatitis C Virus
- List G: EPA's Registered Antimicrobial Products Effective Against Norovirus
- List H: EPA's Registered Antimicrobial Products Effective Against Methicillian Resistant Staphyloccus aureus (MRSA) and/or Vancomycin Resistant Enterococcus faecalis or faecium (VRE)
- List J: EPA's Registered Antimicrobial Products for Medical Waste Treatment
- List K: EPA's Registered Antimicrobial Products Effective Against Clostridium Difficile Spores
- List L: EPA's Registered Antimicrobial Products That Meet the CDC Criteria for Use Against the Ebola Virus
- List M: Registered Antimicrobial Products with Label Claims for Avian Influenza
- List N: Disinfectants for Use Against SARS-CoV-2
- List O: Disinfectants for Use Against Rabbit Hemorrhagic Disease Virus (RHDV2)
- List P: Antimicrobial Products Registered with EPA for Claims Against Candida Auris

Slide courtesy of Mary Alice Lavin



How to Read a Product Label

CDC Project Firstline Infographic

[How to Read a Disinfectant Label (cdc.gov)]

Infection Control & Hospital Epidemiology (2023), 1–5
doi:10.1017/ice.2023.157

SHEA

Concise Communication

Efficacy of 23 commonly used liquid disinfectants against *Candida auris* isolates from the 4 major clades

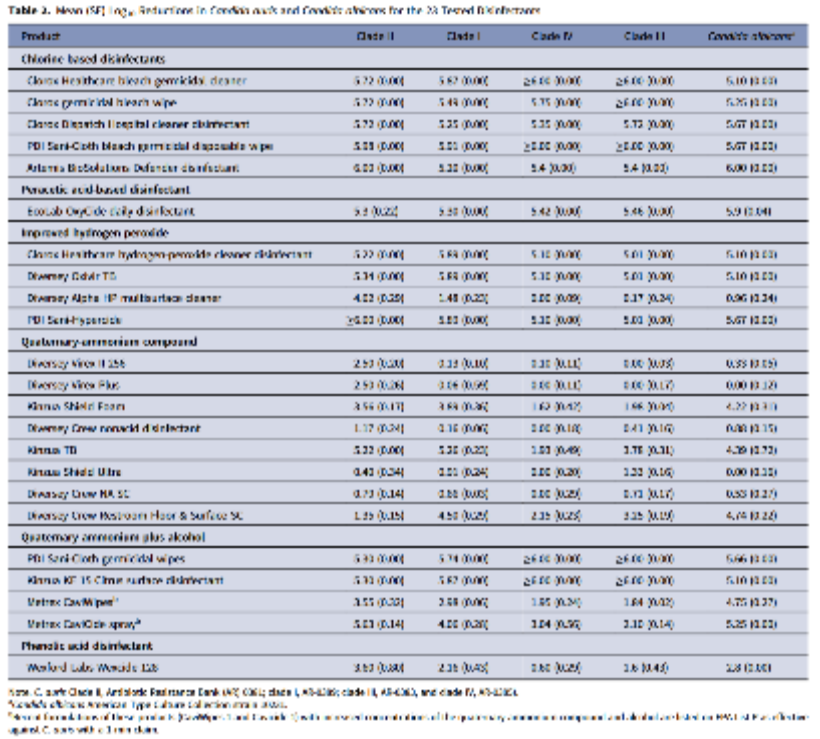
Muhammed F. Haq MD[1], Basya S. Pearlmutter BS[1], Jennifer L. Cadnum BS[1] and Curtis J. Donskey MD[2,3]

[1]Research Service, Louis Stokes Cleveland VA Medical Center, Cleveland Ohio, [2]Geriatric Research, Education, and Clinical Center, Louis Stokes Cleveland VA Medical Center, Cleveland, Ohio and [3]Case Western Reserve University School of Medicine, Cleveland, Ohio

Abstract

We tested the effectiveness of 23 disinfectants used in healthcare facilities against isolates from the 4 major clades of *Candida auris*. Sporicidal disinfectants were consistently effective, whereas quaternary-ammonium disinfectants had limited activity. Quaternary-ammonium–alcohol and hydrogen-peroxide–based disinfectants varied in effectiveness against *C. auris*.

(Received 19 May 2023; accepted 18 June 2023)



- Take Home Messages
  --Make sure there are List P disinfectants available, and they are being used correctly.
  --Just because it says “disinfectant” does not mean it kills *C. auris*

https://www.cambridge.org/core/journals/infection-control-and-hospital-epidemiology/article/abs/efficacy-of-23-commonly-used-liquid-disinfectants-against-candida-auris-isolates-from-the-4-major-clades/097DCF0B6150A61CE055F38B0E65E8E4

Mycoses. 2019 May; 62(5): 408–412.
Published online 2019 Mar 12. doi: 10.1111/myc.12903
PMCID: PMC6850319
PMID: 30748018

Killing of *Candida auris* by UV-C: Importance of exposure time and distance

Theun de Groot,[1] Anuradha Chowdhary,[2] Jacques F. Meis,[1,3,4] and Andreas Voss[✉1,3,4]

UV-C Disinfection: *C. auris* is more resistant

- "A maximal effect of *C. auris* killing was found after 30 minutes of UV-C exposure at 2 m. With half the time or twice the distance, the efficacy strongly diminished to ~10 and ~50 fold, respectively. At suboptimal exposure times and distances, the *C. auris* strains from Japan/Korea were more sensitive to UV-C killing than *C. auris* strains originating from Venezuela, Spain and India.

Conclusions

- Altogether, UV-C exposure times and distance are the most critical parameters to kill *C. auris*, while strain variations of *C. auris* also determine UV-C efficacy. Future studies should aim to determine the effect and place of UV-C on surface decontamination in hospital setting."

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6850319/

Take Home Messages

- *Candida auris* sticks to surfaces with the help of adhesins
- We don’t need to help it by not cleaning / disinfecting!
- First rule of cleaning and disinfection? Start with a clean surface
- A lick and a promise is not going to do it with *Candida auris*
- Make sure the disinfectants you are using are applied to all surfaces
- Make sure you are using a disinfectant that is effective against *Candida auris*
- Monitor cleaning and disinfecting!!

Summary

- *Candida auris* is an established threat in Illinois
- Monitor hand hygiene, environmental cleaning, and PPE use!
- Facilities likely will need more than one disinfectant product to meet all cleaning and disinfection needs
- Ready-to-use products are the most convenient
- In general, utilize the product that kills the largest number of organisms or has the greatest kill claim data
- Always follow the instructions for use for cleaner / disinfectants and when using UV-C which requires closer and longer times
- If more than one contact time is listed, use the longest contact time: You don't know! *C. auris* and *C. diff* spores might be lurking!
- Shorter contact times are easier to use. Manufacturers are coming up with shorter contact times!

QUESTIONS?

- THANK YOU FOR STILL BEING HERE
- THANK YOU FOR ALL YOU DO!!!

Thank you!!!!

Dburdsall@hektoen.org

Selected References

- Ahmad S, Alfouzan W. *Candida auris*: Epidemiology, Diagnosis, Pathogenesis, Antifungal Susceptibility, and Infection Control Measures to Combat the Spread of Infections in Healthcare Facilities. Microorganisms. 2021 Apr 11;9(4):807. doi: 10.3390/microorganisms9040807. PMID: 33920482; PMCID: PMC8069182. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8069182/
- Centers for Disease Control and Prevention (CDC). Tracking *Candida auris* *https://www.cdc.gov/fungal/candida-auris/tracking-c-auris.html*
- Centers for Disease Control and Prevention (CDC). Reduce Risks from Surfaces. https://www.cdc.gov/hai/prevent/environment/surfaces.html
- de Groot PW, Bader O, de Boer AD, Weig M, Chauhan N. Adhesins in human fungal pathogens: glue with plenty of stick. Eukaryot Cell. 2013 Apr;12(4):470-81. doi: 10.1128/EC.00364-12. Epub 2013 Feb 8. PMID: 23397570; PMCID: PMC3623432. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3623432/
- Du H, Bing J, Hu T, Ennis CL, Nobile CJ, Huang G. Candida auris: Epidemiology, biology, antifungal resistance, and virulence. PLoS Pathog. 2020 Oct 22;16(10):e1008921. doi: 10.1371/journal.ppat.1008921. PMID: 33091071; PMCID: PMC7581363. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7581363/
- Egger NB, Kainz K, Schulze A, Bauer MA, Madeo F, Carmona-Gutierrez D. The rise of *Candida auris*: from unique traits to co-infection potential. Microb Cell. 2022 Aug 1;9(8):141-144. doi: 10.15698/mic2022.08.782. PMID: 35974811; PMCID: PMC9344200. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9344200/#B14
- Environmental Protection Agency. *List P: Antimicrobial Products Registered with EPA for Claims Against Candida Auris. https://www.epa.gov/pesticide-registration/list-p-antimicrobial-products-registered-epa-claims-against-candida-auris#products*
- Garcia-Bustos, V., Cabanero-Navalon, M. D., Ruiz-Saurí, A., Ruiz-Gaitán, A. C., Salavert, M., Tormo, M. Á., & Pemán, J. (2021). What do we know about Candida auris? State of the art, knowledge gaps, and future directions. *Microorganisms*, *9*(10), 2177. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8538163/pdf/microorganisms-09-02177.pdf
- Haq, M. F., Pearlmutter, B. S., Cadnum, J. L., & Donskey, C. J. (2023). Efficacy of 23 commonly used liquid disinfectants against Candida auris isolates from the 4 major clades. *Infection Control & Hospital Epidemiology*, 1-5. https://www.cambridge.org/core/journals/infection-control-and-hospital-epidemiology/article/abs/efficacy-of-23-commonly-used-liquid-disinfectants-against-candida-auris-isolates-from-the-4-major-clades/097DCF0B6150A61CE055F38B0E65E8E4
- Illinois Department of Public Health, Candida auris Frequently Asked Questions (2023) https://dph.illinois.gov/topics-services/diseases-and-conditions/infectious-diseases/candida-auris/candida-auris-faq.html
- Lewis, R., April 2023. Researchers trace genetic agent in life-threatening fungal disease. Iowa Now accessed October 1, 2023 at https://now.uiowa.edu/news/2023/04/researchers-trace-genetic-agent-life-threatening-fungal-disease
- Richtel, M., Jacobs, A., 2019 *Nursing Homes Are a Breeding Ground for a Fatal Fungus.* New York Times, September 13, 2019. https://www.nytimes.com/2019/09/11/health/nursing-homes-fungus.html
- Rossato L, Colombo AL. *Candida auris:* What Have We Learned About Its Mechanisms of Pathogenicity? Front Microbiol. 2018 Dec 12;9:3081. doi: 10.3389/fmicb.2018.03081. PMID: 30631313; PMCID: PMC6315175. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6315175/
- Santana, D. J., Anku, J. A., Zhao, G., Zarnowski, R., Johnson, C. J., Hautau, H., ... & O'Meara, T. R. (2023). A Candida auris–specific adhesin, Scf1, governs surface association, colonization, and virulence. *Science*, *381*(6665), 1461-1467. https://www.science.org/doi/epdf/10.1126/science.adf8972
- Vila T, Sultan AS, Montelongo-Jauregui D, Jabra-Rizk MA. Candida auris: a fungus with identity crisis. Pathog Dis. 2020 Jun 1;78(4):ftaa034. doi: 10.1093/femspd/ftaa034. PMID: 32643757; PMCID: PMC7371155. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7371155/
- Wisconsin Department of Health Services. *Candida auris. https://www.dhs.wisconsin.gov/disease/candida-auris.htm*

Open Q&A

Submit questions via Q&A pod to **All Panelists**

Please do not resubmit a single question multiple times

Slides and recording will be made available after the session.

Reminders

- For continuing education credit, please fill out the evaluation survey upon end of webinar

- SIREN Registration
  - To receive situational awareness from IDPH, please use this link to guide you to the correct registration instructions for your public health related classification: http://www.dph.illinois.gov/siren

- Telligen Resources:
  - Project Firstline Trainings: https://www.telligenqiconnect.com/infectionpreventionandcontrol/
  - Contact Telligen: **nursinghome@telligen.com**