Prevention of *Candida auris* and Other Novel Multidrug-resistant Organisms in Healthcare Facilities

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C. auris, COVID-19 Cases in CA through November 30, 2020

- Number of Candida auris Cases
- Number of COVID-19 Cases

Month and Year: January 2017 to November 2020

- The graph shows the number of Candida auris cases and COVID-19 cases in California from January 2017 to November 2020.
- The number of COVID-19 cases spiked significantly in the months of August and September 2020.
Key Messages

• COVID-19-related disruptions and challenges have affected everyone – we understand!
  – Healthcare personnel (HCP) safety concerns, shortages, infection control lapses

• *Candida auris* and other novel multidrug-resistant organisms (MDRO) are **still** public health threats, with recent resurgence of cases and outbreaks

• Strategies to prevent *C. auris* and other MDRO transmission are not new

• Strengthening basic infection prevention and control practices reduces transmission of **both** MDRO and SARS-CoV-2, **and** protects patient and HCP health and safety

• Public health resources are available to support MDRO testing and containment
Candida auris and other novel multidrug-resistant organism prevention in long-term care facilities

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Objectives

1. Describe novel multidrug-resistant organisms (MDROs).
2. Describe *Candida auris* in long-term care settings.
3. Describe recent public health investigation related to *Candida auris*, other novel MDROs and COVID-19 in Los Angeles County (LAC).
4. Describe prevention strategies for *Candida auris* and novel MDROs in long-term care facilities (LTCF).
What are Novel Multidrug-Resistant Organisms (MDROs)?

Resistant to all or most antibiotics tested, making them hard to treat

Are uncommon in a geographic area or the US (e.g., *Candida auris*)

OR

Have special genes that allow them to spread their resistance to other germs (e.g., Carbapenem-resistant bacteria)
Novel multidrug-resistant bacteria pose a special threat.

Carbapenemases are enzymes that make certain antibiotics, like carbapenems, penicillins, and cephalosporins ineffective.

The code for carbapenemases can be shared between strains of bacteria, accelerating their spread.

*Carbapenems are the broadest-spectrum antibiotics used in difficult to treat bacterial infections.
The language used to describe novel MDROs can be confusing, but you just need to know the basics.

You may hear:

CPO = carbapenemase-producing organism

KPC, VIM, NDM, IMP, OXA-48 = carbapenemase enzymes

CRE, CRAB, CRPA = multidrug-resistant bacteria

*Candida auris* = novel multidrug-resistant yeast

[CDC 2019 AR Threats Report](https://www.cdc.gov/drugresistance/biggest-threats.html)

[CDC CRE Technical Information](https://www.cdc.gov/hai/organisms/cre/technical-info.html)
Carbapenem resistance has **spread rapidly** throughout the U.S.

KPC-CRE found in the US spread from 2 states in 2001 to 50 states, DC, and PR by 2017

- States with *Klebsiella pneumoniae* carbapenemase (KPC)-producing Carbapenem-resistant Enterobacterales (CRE) confirmed by CDC

[Tracking CRE in the United States](www.cdc.gov/hai/organisms/cre/trackingcre.html)
Novel MDROs require more aggressive intervention than endemic* MDROs.

We don’t want novel MDROs to become as common as endemic MDROs (e.g., MRSA and VRE)

Endemic and novel MDROs can be prevented using the same infection prevention and control (IPC) principles!

*Endemic = the constant presence of an agent or health condition within a given geographic area or population

MRSA = Methicillin-resistant *Staphylococcus aureus*; VRE = Vancomycin-resistant Enterococci
Transmission and spread of novel MDROs
Novel MDROs can be prevented by core infection prevention practices.

- Hand hygiene
- Cleaning and disinfection
- Transmission-based precautions
- Dedicated medical equipment
Novel MDROs can spread silently if residents/patients are colonized.

**Colonization** means that a person is carrying a germ but does not have symptoms of an infection.

Colonized patients can spread the germs to others.

Colonized patients can develop infections.
Screening for novel MDROs helps identify colonized patients and prevent transmission.

Facility-wide point prevalence surveys as part of investigations

Screening newly admitted or readmitted patients
Gaps in interfacility communication contribute to novel MDRO spread.

Spread of an MDRO Among Many Healthcare Facilities in a Region

Spread is often amplified in high acuity post-acute care facilities

- Long lengths of stay
- High acuity patients
- Less infection control infrastructure than short stay acute care hospitals

LTACH = long-term acute care hospital
Coordinated communication between facilities and health departments is essential to prevent spread.

Making Health Care Safer Infographics
(www.cdc.gov/vitalsigns/stop-spread/infographic.html)
Containment of novel MDROs is cyclical and requires early and aggressive response.
COVID-19 presents new prevention challenges for novel MDROs.

- Staffing shortages
- PPE shortages
- ABHS shortages
- Disinfectant shortages

Increased patient/resident volume and transfers

Increased infection prevention program burden

HCP safety

PPE = personal protective equipment; ABHS = alcohol-based hand sanitizer; HCP = healthcare personnel
Candida auris
Candida auris is an emerging multidrug-resistant yeast (a type of fungus) that can cause severe infections.
Clinical cases of *Candida auris* have continued to increase since its first detection in the United States.
Candida auris affects the sickest of the sick.

- Multiple healthcare stays
- Tracheostomies
- Ventilator-dependent
- Colonized with other MDROs
- Recently received antibiotics and antifungals
vSNFs and LTACHs are disproportionately affected when compared with traditional skilled nursing facilities (SNFs).

Data from investigation in Illinois and New York, unpublished

vSNF = skilled nursing facilities with ventilator units; LTACH = long-term acute care hospitals
Patients with *Candida auris* are often colonized indefinitely.

Persist for many months

Currently, no decolonization strategies

Primarily on skin
  - Nares
  - Armpit
  - Groin
Of patients colonized with *Candida auris* 5-10% develop bloodstream infections.

Mortality is $>45\%$ within the first 30 days
Misconception: Healthcare personnel (HCP) can become easily colonized when caring for patients with *Candida auris*.

HCP are at minimal risk of colonization.

An investigation in a facility with a *Candida auris* outbreak found that out of ~700 HPC caring for patients with *Candida auris*, none were colonized.
Candida auris persists in the environment for a long time.
Candida auris can also contaminate medical equipment.
From a single introduction, *Candida auris* can spread rapidly.

\[ \text{vSNF A Ventilator/Trach Floor} \]
\[ \text{March 2017} \quad C. \text{ auris} \quad \text{PPS Results} \]

C. *auris* colonization prevalence = 1.5% (1/69)

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

vSNF = skilled nursing facility with ventilator units; PPS = point-prevalence survey  
Slide courtesy of Chicago Department of Public Health.
From a single introduction, *Candida auris* can spread rapidly, cont.

vSNF = skilled nursing facility with ventilator units; PPS = point-prevalence survey  Slide courtesy of Chicago Department of Public Health.
Novel MDROs travel together.

vSNF = skilled nursing facility with ventilator units; PPS = point-prevalence survey; CPO = carbapenemase-producing organism

Slide courtesy of Chicago Department of Public Health.
Investigation *Candida auris* and COVID-19 in Los Angeles County (LAC): Investigation
Responding to increased detection of *Candida auris* in long-term care facilities.
LAC and CDC's coordinated public health response had **three objectives**.

1. **Assess infection prevention and control (IPC) program, infrastructure, and practices** in LTACH and vSNF facilities with recent or ongoing novel MDRO outbreaks or at risk of future outbreaks **to identify factors contributing to MDRO transmission**.

2. **Identify IPC changes in response to the COVID-19 pandemic** that could contribute to re-emergence of novel MDROs, including how facilities were implementing surge capacity strategies.

3. **Use findings to inform additional education and recommendations.**

vSNF = skilled nursing facility with ventilator units; LTACH = long-term acute care hospital
Assessment of IPC practices included questionnaire and direct observations.

- IPC program staffing
- MDRO detection, management, and prevention
- Facility staffing
- Hand hygiene
- Cleaning and disinfection
- PPE supply and usage

PPE = personal protective equipment

Facility layout
PPE use
Hand hygiene
Environmental cleaning
We visited 12 facilities: 4 LTACHs and 8 vSNF, 5 facilities had *Candida auris* and 2 had CPO.

- Staffing, hand hygiene, cleaning and disinfectant, and PPE shortages were common.

- No significant differences in practices were found between facilities with *Candida auris* or CPO and those without.

**LTACH** = long-term acute care hospital; **vSNF** = skilled nursing facility with ventilator units; **CPO** = carbapenemase-producing organism
We identified **several strengths** in our IPC assessment.

All facilities had infection prevention programs.

ABHS was generally available but not as much as would be ideal.

Most facilities stocked disinfectants effective against *Candida auris*.

**ABHS** = alcohol-based hand sanitizer
We identified common **IPC gaps** that may contribute to *C. auris* spread.

- Preference of soap and water over ABHS
- Missed HH opportunities when entering and exiting resident rooms
- ABHS not available outside and immediately inside resident rooms
- Inadequate measurement and mixing when self-preparing bleach
- Missed high touch surface cleaning and disinfection
- Infrequent cleaning of mobile medical equipment

ABHS = alcohol-based hand sanitizer; HH = hand hygiene
We identified **common IPC gaps** that may contribute to *C. auris* spread, cont.

- Double gowning and double gloving
- Using gowns with back untied
- Re-use of disposable gowns
- Not changing PPE between patients in the same room
- Confusing or contradictory transmission-based precautions signage

- Cohorting patients by organism, site of infection, and infection type (i.e., colonization or active) resulting in frequent/unnecessary patient movement

PPE = personal protective equipment
Preventing MDRO Spread Within Your Facility
Hand hygiene
**Misconception:** Hand hygiene with soap and water is superior at killing organisms on hands than ABHS.

ABHS is better than handwashing at killing bacteria.

ABHS is less damaging to the skin than soap and water.

**ABHS is preferred method of hand hygiene for most clinical situations.**

ABHS = alcohol-based hand sanitizer

Remember the 5 key moments for hand hygiene.

1. **Before** touching a patient
2. **Before** clean/aseptic procedures
3. **After** body fluid exposure/risk
4. **After** touching a patient
5. **After** touching patient surroundings
**Misconception:** HCP should perform handwashing with soap and water after ~3 resident contacts to reduce transmission of organisms.

Indications for handwashing with soap and water:

- When hands are visibly soiled
- After caring for a person with known or suspected infectious diarrhea
- After known or suspected exposure to spores (for example in *Clostridioides difficile* outbreaks)
After glove doffing and moving from dirty to clean when caring for a patient are two frequently missed opportunities for hand hygiene.

Gloves are not a substitute for hand hygiene.
Make it easy to perform hand hygiene for staff and others.

• Provide immediate access to ABHS at every point of care
  • Inside and outside of resident rooms (ideally at each bed space)
  • Common areas
  • Staff workstations
  • Therapy rooms

• Have a plan for restocking supplies
  • Avoid “topping off” ABHS or soap dispensers to avoid environmental contamination
Develop a **training, auditing, and feedback system**.

- Create a culture of safety
- Competency-based training
  - Caught red-handed
  - Fluorescent gel hand washing exercise
- Develop an auditing and feedback program
  - “Secret shopper”
  - Record data
  - Provide feedback

[CDC Hand Hygiene: Education, Monitoring and Feedback slides](https://www.cdc.gov/infectioncontrol/pdf/strive/HH102-508.pdf)
Cleaning and disinfection
Cleaning and disinfection are separate and complementary processes.

Cleaning is the removal of foreign material (e.g., soil, and organic material) from objects.

Disinfection is the thermal or chemical destruction of pathogenic and other types of organisms.

Thorough cleaning is required before disinfection (unless a product is specifically labeled as a combined cleaner and disinfectant) because inorganic and organic materials interfere with the effectiveness of disinfectants.
Contact/Wet Time is the amount of **time that a disinfectant must remain on a surface to be effective.**

Consider **labeling products** with contact times to ensure all staff use disinfectants appropriately.
Focus cleaning high-touch areas frequently.
Make sure shared medical equipment is cleaned and disinfected after each patient.
**Misconception**: All hospital-grade disinfectants effective against SARS-CoV-2 are also effective against *Candida auris*.

- Most quaternary ammonium chloride ("Quats") compounds are not effective against *Candida auris*.

- All disinfectants approved for *Candida auris* are effective against SARS-CoV-2 and other novel MDROs.
There are **several options** when choosing a product effective against *Candida auris*.

- **First choice**: Products with EPA-registered claims against *Candida auris*
  
  [Antimicrobial Products Registered with EPA for Claims Against *C. auris*](https://www.epa.gov/pesticide-registration/selected-epa-registered-disinfectants#candida-auris)

- **Second choice**: Products tested by CDC effective against *Candida auris*
  
  [C. auris Infection Prevention and Control](https://www.cdc.gov/fungal/candida-auris/c-auris-infection-control.html)

- **Third choice**: Products in EPA’s List K effective against *Clostridioides difficile* spores
  
  [List K: EPA’s Registered Antimicrobial Products Effective against *Clostridium difficile* Spores](https://www.epa.gov/pesticide-registration/list-k-epas-registered-antimicrobial-products-effective-against-clostridium)
When using self-prepared bleach pay attention to type, dilution, and storage.

Always follow manufacturers’ instructions for proper use of disinfecting (or detergent) products including proper protective equipment needed.

Use germicidal bleach intended for healthcare settings and not generic household bleach.

Surfaces need to be cleaned before applying bleach or else it will be inactivated.

OSHA NIOSH Info Sheet: Protecting Workers Who Use Cleaning Chemicals (PDF) (www.osha.gov/Publications/OSHA3512.pdf)
When using self-prepared bleach pay attention to type, dilution, and storage, cont.

5.25-6.15% sodium hypochlorite solution

- 1 part bleach, 9 parts water dilution (1:10) required to kill *Clostridioides difficile* and *Candida auris*
- Accurately measured and well mixed
- Make your bleach solution *daily* if possible and stored in an opaque container, as bleach is light-sensitive

Section Navigation Rationale and Considerations for Chlorine Use in Infection Control for Non-U.S. General Healthcare Settings
(www.cdc.gov/vhf/ebola/clinicians/non-us-healthcare-settings/chlorine-use.html)
Effective strategies to improve cleaning and disinfection include:

1. **Assign** clear disinfection responsibilities
2. Develop an **audit and feedback** program
3. Make disinfectants **available to all staff**
4. **Train staff** on proper cleaning, disinfection, and product use.

[Appendices to the Conceptual Program Model for Environmental Evaluation](http://www.cdc.gov/hai/toolkits/appendices-evaluating-environmental-cleaning.html)
Strongly consider using disinfectants effective against *Candida auris* even if there have been no cases identified in your facility!
Transmission-based precautions
Gowns and gloves are recommended to care for residents colonized/infected with \textit{C. auris} and other novel MDROs.
Complicated signage can lead to improper PPE use.

**Isolation**

*In addition to standard precautions*

Use the color code system to determine what type of isolation is needed

Blue = sputum
Yellow = urine
Red = blood
Green = skin
Brown = stool

Wear all PPE: gown, gloves, and mask

Difficult to read due to small font and color contrast

Unnecessary level of detail – color coding for site of colonization/infection

Does not mention need for dedicated medical equipment
PPE use signage should be **consistent**.

Avoid placing too many signs together which may have conflicting information.
Signs should clearly communicate the **level of precautions**, PPE needed, and any **other special considerations** and be immediately outside patient’s room.

[Image of CDC transmission-based precautions poster]

**CDC Transmission-based precautions** (www.cdc.gov/infectioncontrol/basics/transmission-based-precautions.html)
Proper donning and doffing will **minimize the risk for disease transmission.**

Misconception: If a resident/patient who was previously known to be colonized with Candida auris tests negative for colonization contact precautions can be removed.

• Colonization with C. auris can last for prolonged periods of time and is not always detected.

• Routine rescreening of individuals is not recommended.

• Decisions to discontinue Contact Precautions should be made in consultation with health department.
Patient placement and cohorting considerations
Private rooms are preferred and prioritize patients with uncontained secretions or excretions.
If cohorting, prioritize pathogens and keep it simple:

1. COVID-19

2. *Candida auris* and/or other MDRO status
   - Remember that *C auris* persists in the environment, rooms require thorough environmental cleaning after any patient movement
   - Beds at least 3 feet apart
   - Each resident and surrounding environment should be treated as separate areas

Colonization vs active infection and the anatomic site of positive specimen should not be considered when making cohorting decisions.
Remember that novel MDROs *travel* together and patients may have multiple organisms.

PPE should be removed, and hand hygiene performed **before providing care to another resident**, even in the same room to avoid cross-contamination.

Slide courtesy of Chicago Department of Public Health.
COVID-19 strategies for optimizing PPE supplies
Surge capacity strategies are a framework to approach a decreased supply of PPE during the COVID-19 response.

Published by CDC in February after the first few cases were reported in the United States and CDC started becoming aware of impending PPE shortages.

CDC developed the burn rate calculator to help facilities optimize the use of PPE during the COVID-19 response.

Surge capacity strategies should be implemented sequentially.

Surge capacity refers to the ability to manage a sudden increase in patient volume that would severely challenge or exceed the present capacity of a facility.

Optimizing the Supply of PPE in Healthcare Facilities
## Strategies for Optimizing the Supply of Gowns

<table>
<thead>
<tr>
<th>Conventional</th>
<th>Contingency</th>
<th>Crisis</th>
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</thead>
<tbody>
<tr>
<td>Use isolation gown alternatives that offer equivalent or higher protection.</td>
<td>Consider the use of coveralls.</td>
<td>Extended use of isolation gowns.</td>
</tr>
<tr>
<td>Polyester or polyester-cotton fabrics can be safely laundered after each use and reused</td>
<td>Use of gowns beyond the manufacturer-designated shelf life for training.</td>
<td>Prioritize gowns:</td>
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<tr>
<td></td>
<td></td>
<td>• Splashed and sprays anticipated, including aerosol generating procedures</td>
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<tr>
<td></td>
<td></td>
<td>• High-contact activities:</td>
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<tr>
<td></td>
<td></td>
<td>• Dressing, bathing/showering, providing hygiene, assisting with toileting</td>
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<tr>
<td></td>
<td></td>
<td>• Transferring, changing linens</td>
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<tr>
<td></td>
<td></td>
<td>• Device care, wound care</td>
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<tr>
<td>Use gowns or coveralls conforming to international standards.</td>
<td></td>
<td>Consider using gown alternatives:</td>
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<tr>
<td></td>
<td></td>
<td>• Disposable laboratory coats</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Reusable (washable) patient gowns</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Reusable (washable) laboratory coats</td>
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<tr>
<td></td>
<td></td>
<td>• Disposable aprons</td>
</tr>
</tbody>
</table>
Extended use and Re-use of Gowns are different strategies.

**Extended use**
- Wearing *the same gown to see multiple patients without removing.*
- Patients housed in the *same location* and known to be infected with COVID-19.
- No additional known co-infectious diagnoses *transmitted by contact* (e.g., *Candida auris*)

**Reuse**
- Wearing the *same gown for multiple patient encounters* but removing after each encounter.
- Disposable gowns *should not be re-used*.
- Higher risk of HCW self-contamination.
- Not recommended
Communication between facilities is essential to prevent spread.

Communicate MDRO status at:
- Admission
- Discharge
- Transfer within facility

Communicate with your local public health department about MDROs and possible outbreaks.
Summary
Take home messages:

- We understand COVID-19-related disruptions, safety concerns, and other challenges have affected everyone.
- *C. auris* and other MDRO are still public health threats, with recent resurgence of cases and outbreaks.
- Strategies to prevent *C. auris* and other MDRO transmission are not new.
- Strengthening basic infection prevention and control practices reduces transmission of both MDRO and SARS-CoV-2, and protects patient and HCP health and safety.
- Public health resources are available to support MDRO testing and containment.

Courtesy of Tisha Mitsunaga, CDPH
Most important things to remember when you get off this call:

Check your disinfectants! *C. auris* persists in the environment for a long time and requires **thorough cleaning and disinfection** with specific disinfectants – don’t forget to **clean shared medical equipment**

Assess ABHS availability in your facility and take steps to increase access where needed – use pocket sanitizers if needed

Review surge capacity strategies – make plans for how to implement these strategies **in advance** anticipating any shortages – remember to implement sequentially
Acknowledgements

• LAC Department of Public Health
• California Department of Public Health
• All facilities and their staff who shared their experience

Icons obtained from the Noun Project
Images obtained from Getty images
Questions
Resources

• Candida auris
  • Candida auris (www.cdc.gov/fungal/candida-aurant/index.html)
  • C. auris Infection Prevention and Control (www.cdc.gov/fungal/candida-aurant/c-aurant-infection-control.html)
  • Environmental Control of Candida auris with Antimicrobial Pesticides (www.epa.gov/pesticides/environmental-control-candida-aurant-antimicrobial-pesticides)
• Interim Containment Guidance for Novel or Targeted MDROs (www.cdc.gov/hai/outbreaks/mdro/index.html)
• Hand Hygiene (www.cdc.gov/infectioncontrol/guidelines/hand-hygiene/index.html)
• Environmental Cleaning and Disinfection (www.cdc.gov/infectioncontrol/guidelines/environmental/index.html)
• Risk Assessment with Appropriate use of PPE (www.cdc.gov/hai/prevent/ppe.html)
• Guideline for Isolation Precautions (www.cdc.gov/infectioncontrol/guidelines/isolation/index.html)
• Reprocessing of Reusable Medical Equipment (www.cdc.gov/hicpac/recommendations/flexible-endoscope-reprocessing.html)
C. auris Coordinated Response in Los Angeles County

- Los Angeles County Department of Public Health
- California Department of Public Health
- Centers for Disease Control and Prevention (CDC)
  - Division of Healthcare Quality Promotion
  - Mycotic Diseases Branch
- National Institute for Occupational Safety and Health (NIOSH)