

# Managing Residents with MDROs and *C. auris* in Long-Term Care

---

**Sarah E. Sansom, DO MS**

Assistant Professor, Rush University, Chicago IL

Nebraska Infectious Diseases Society | 8.28.26



# Conflicts of Interest

- No relevant conflicts to declare.
- I receive research funding from CDC and NIH.

# Objectives

- 1 Describe what current MDRO epidemiology means for Nebraska LTCF**
- 2 Identify strategies you can implement now to protect your patients, and assess the research behind them**
- 3 Recognize potential future prevention strategies**

## Two referral calls, same morning

### **A** Resident A: DECLINED

- Hip fracture, needs 3 weeks of rehab
- *C. auris* in a urine culture 2 months ago
- Currently asymptomatic, no device, no wound
- Status known, documented, and communicated

### **B** Resident B: ADMITTED

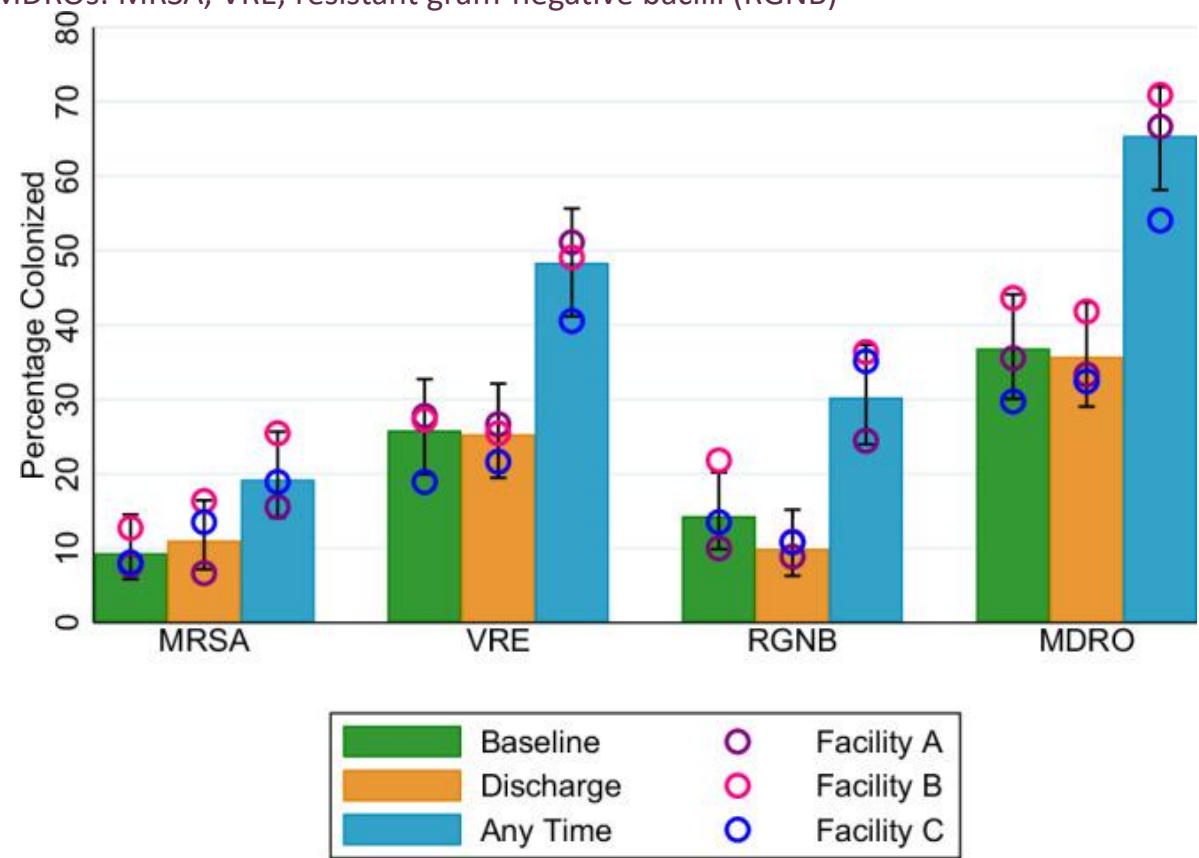
- Routine hospital discharge, no MDRO history
- Never screened for anything
- Tracheostomy, chronic sacral wound and an indwelling Foley
- Status entirely unknown

*Which one is more likely to seed transmission in your facility?*

# Endemic Threats: Multidrug-Resistant Organisms in U.S. Nursing Homes

## Multicenter Prospective Cohort

- 197 residents across 3 US nursing homes; serial body site surveillance cultures (nares, hand, groin) at multiple timepoints
- MDROs: MRSA, VRE, resistant gram-negative bacilli (RGNB)



**36.5%**

MDRO Colonization at Baseline

**65.4%**

Colonized at Any Point During Stay

**>40%**

Acquired new MDRO

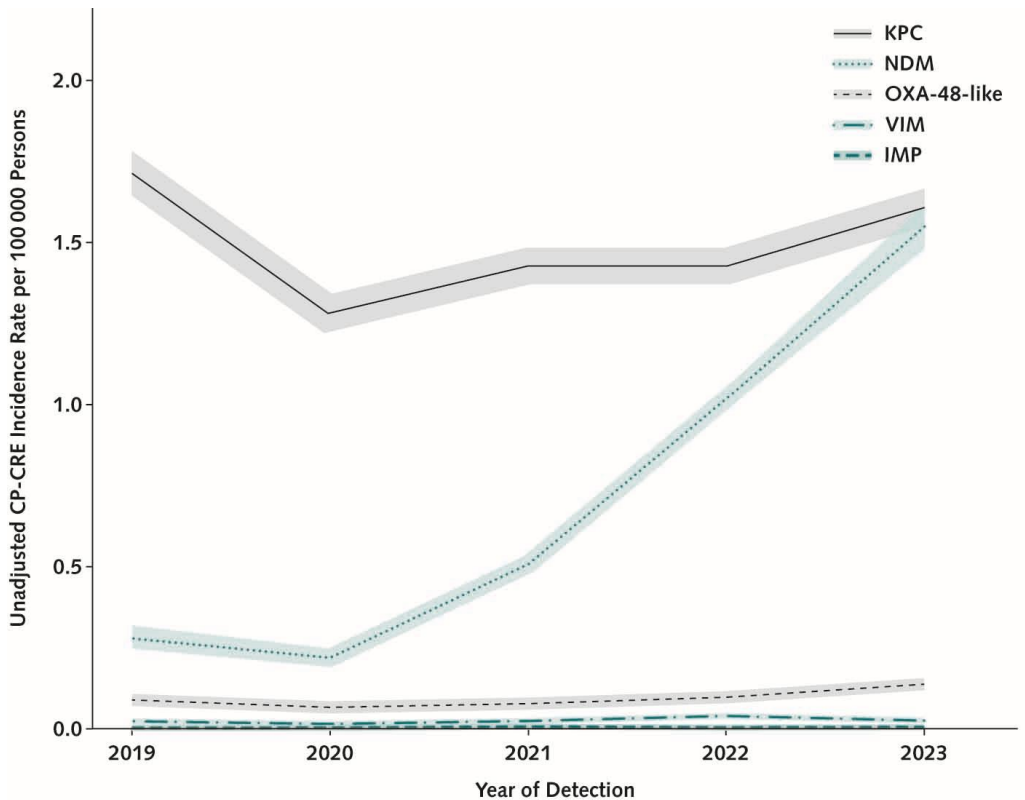
### IMPLICATION

MDRO burden in nursing homes far exceeds baseline screening. Out-of-room activities and shared spaces are key transmission sites.

# Emerging Threats: NDM Carbapenemase-Producing Enterobacterales

## CDC Surveillance Analysis

- CDC Antimicrobial Resistance Laboratory Network (AR Lab Network), 2019–2023
- Open cohort: 29 US states with mandated submission of all carbapenem-resistant *Klebsiella* spp, *E. coli*, and *Enterobacter* spp; stratified by carbapenemase gene



29 states

Surveillance Cohort

+69%

Overall CP-CRE Increase

+461%

NDM-CRE Rise 2019–2023

### IMPLICATION

NDM-CRE has emerged as a dominant and growing resistance threat, displacing KPC in *E. coli*

# Emerging Threats: *Candidozyma (Candida) auris*



## WHAT YOU NEED TO KNOW

- *C. auris*, first identified in 2009 in Asia, has quickly become a cause of severe infections around the world.
- *C. auris* is a concerning drug-resistant fungus:
  - Often multidrug-resistant, with some strains (types) resistant to all three available classes of antifungals
  - Can cause outbreaks in healthcare facilities
  - Some common healthcare disinfectants are less effective at eliminating it
  - Can be carried on patients' skin without causing infection, allowing spread to others

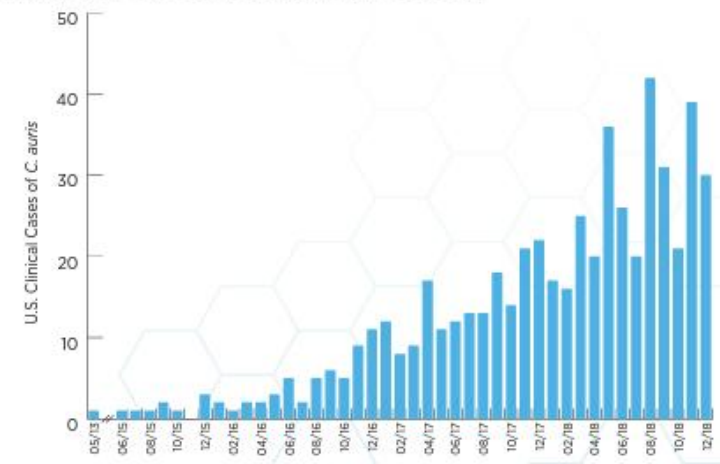
Data represents U.S. cases only. Isolates are pure samples of a germ.

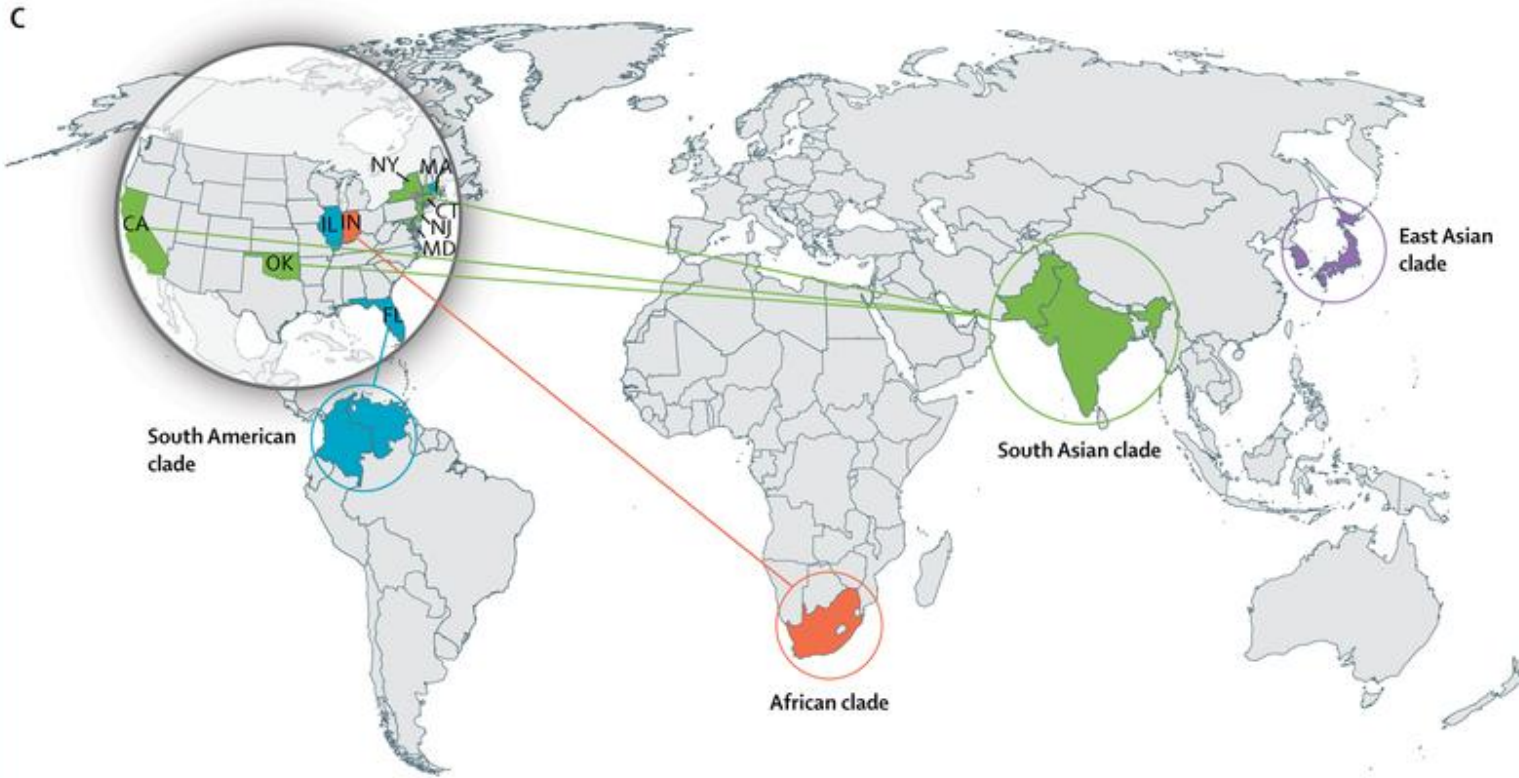
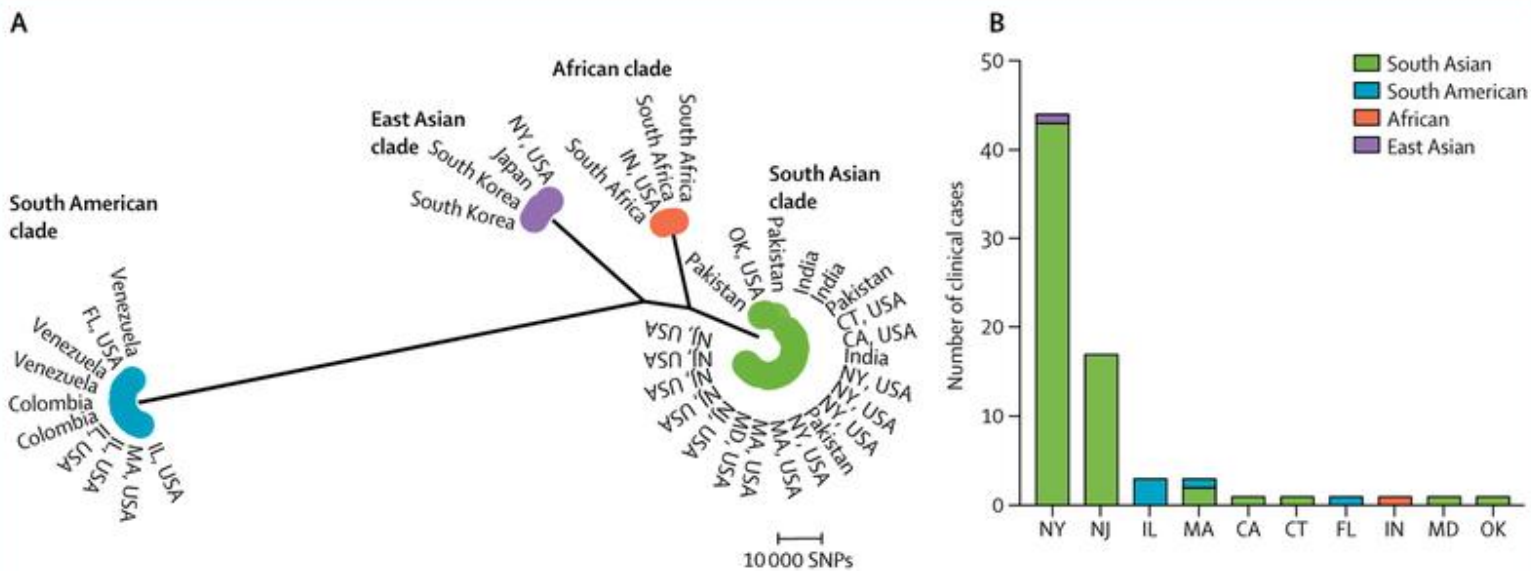


U.S. Department of  
Health and Human Services  
Centers for Disease  
Control and Prevention

## CASES OVER TIME

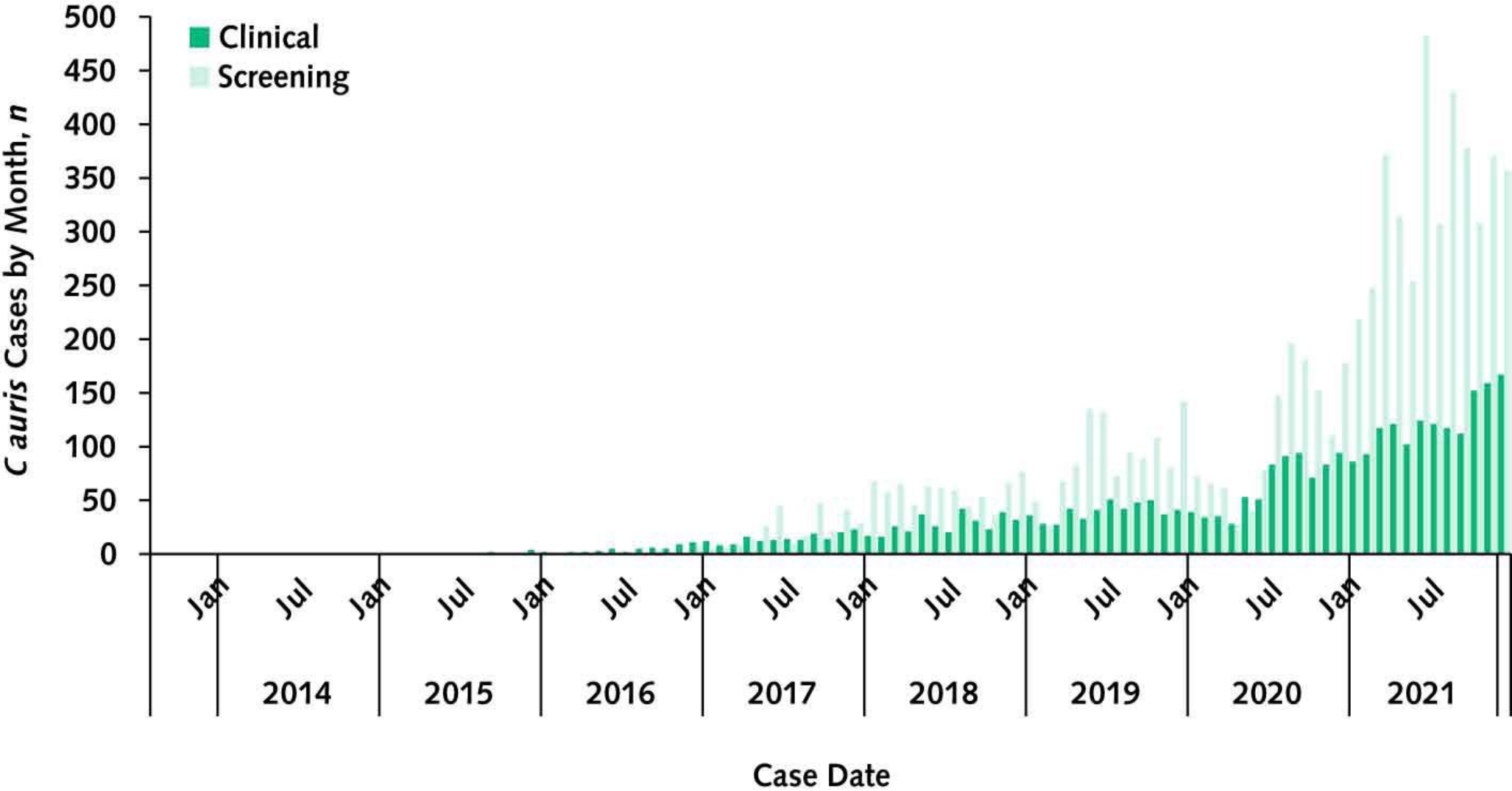
*C. auris* began spreading in the United States in 2015. Reported cases increased 318% in 2018 when compared to the average number of cases reported in 2015 to 2017.





# Epidemiology in the United States

- *C. auris* is a nationally notifiable disease
- Most cases from NY, NJ, IL, FL, CA, TX



# Why is *C. auris* so successful in long term care?

## ● Skin colonization

Lives on skin and mucosa surfaces - so contact during routine care can transmit

## ● Environmental persistence

Survives on room surfaces and shared equipment for long periods

## ● Disinfectant tolerance

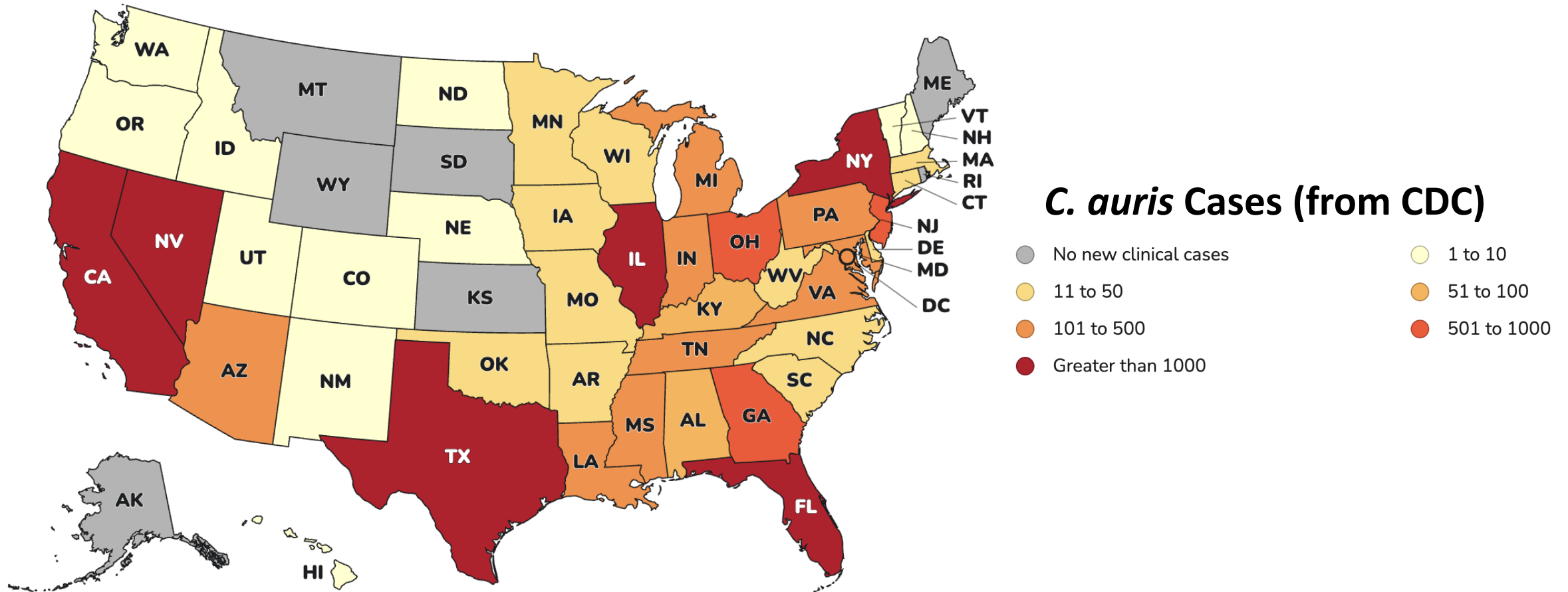
Routine quaternary ammonium products may not kill it - product choice matters

## ● Durable colonization

Persists for years; colonized residents may intermittently test negative

## Where Nebraska Currently Stands

- Compared to other regions, the prevalence of emerging threats remains low



<https://www.cdc.gov/candida-auris/tracking-c-auris/index.html>

Compared to other regions, the prevalence of emerging threats in Nebraska remains low.

|                                     | Total_Isolates | Ampicillin       | Ampicillin_Sulbactam | Amoxicillin_Clavulanate | Piperacillin_Tazobactam | Cefazolin        | Cefuroxime      | Cefoxitin       | Ceftriaxone      | Ceftazidime      | Cefepime         | Ceftolozane_Tazobactam | Ertapenem        | Meropenem        |
|-------------------------------------|----------------|------------------|----------------------|-------------------------|-------------------------|------------------|-----------------|-----------------|------------------|------------------|------------------|------------------------|------------------|------------------|
| <i>Escherichia coli</i>             | 28,035         | 59.5%<br>(27964) | 58.3%<br>(19662)     | 83.3%<br>(12080)        | 93.4%<br>(20344)        | 86.5%<br>(18489) | 83%<br>(10104)  | 90.4%<br>(8924) | 93.9%<br>(26507) | 99.2%<br>(12302) | 92.7%<br>(18114) | 99.5%<br>(8724)        | 99.9%<br>(14922) | 99.9%<br>(13252) |
| <i>Acinetobacter baumannii</i>      | 53             | R                | 96.2%<br>(52)        | R                       |                         | R                | R               | R               |                  | 85.4%<br>(41)    | 96.9%<br>(32)    |                        | R                | 100%<br>(31)     |
| <i>Citrobacter freundii</i>         | 720            | R                | R                    | R                       | 90.6%<br>(563)          | R                | R               | R               | 79.6%<br>(540)   | 93.5%<br>(431)   | 98.3%<br>(699)   |                        | 97.7%<br>(486)   | 99.2%<br>(476)   |
| <i>Citrobacter koseri</i>           | 558            | R                | 98.5%<br>(264)       | 98.8%<br>(342)          | 99.4%<br>(532)          | 96.2%<br>(397)   | 89.9%<br>(287)  | 96.7%<br>(241)  | 98.9%<br>(524)   | 99.3%<br>(297)   | 99.7%<br>(399)   | 99.3%<br>(151)         | 100%<br>(382)    | 100%<br>(359)    |
| <i>Enterobacter cloacae</i> complex | 1,255          | R                | R                    | R                       | 83.3%<br>(966)          | R                | R               | R               | 69.8%<br>(755)   | 79%<br>(734)     | 95.2%<br>(1241)  |                        | 90.2%<br>(766)   | 99.6%<br>(715)   |
| <i>Haemophilus influenzae</i>       | 76             | 66.7%<br>(75)    |                      | 84.8%<br>(46)           |                         |                  |                 |                 | 100%<br>(62)     |                  |                  |                        |                  | 100%<br>(17)^    |
| <i>Klebsiella aerogenes</i>         | 993            | R                | R                    | R                       | 85.6%<br>(834)          | R                | R               | R               | 79.9%<br>(730)   | 92.1%<br>(572)   | 98.3%<br>(978)   | 100%<br>(25)^          | 97.2%<br>(662)   | 99.7%<br>(504)   |
| <i>Klebsiella oxytoca</i>           | 1,302          | R                | 70.7%<br>(1178)      | 91%<br>(774)            | 92.7%<br>(1067)         | 48.9%<br>(1135)  | 81.7%<br>(612)  | 92%<br>(588)    | 93.1%<br>(1244)  | 97.9%<br>(798)   | 93.4%<br>(978)   | 99.3%<br>(416)         | 99.8%<br>(875)   | 100%<br>(844)    |
| <i>Klebsiella pneumoniae</i>        | 5,824          | R                | 86.4%<br>(5283)      | 93.4%<br>(3104)         | 94.1%<br>(5515)         | 88.6%<br>(4047)  | 86.3%<br>(2452) | 90.6%<br>(2327) | 94.1%<br>(5568)  | 97.3%<br>(3171)  | 92.9%<br>(4093)  | 99.3%<br>(1531)        | 99.7%<br>(3806)  | 99.9%<br>(3543)  |

|                          |        |         |     |                                                                     |
|--------------------------|--------|---------|-----|---------------------------------------------------------------------|
| Percent Susceptible Key: | 100-90 | 89.9-70 | <70 | Not enough data to interpret, <70% of susceptibility data available |
|--------------------------|--------|---------|-----|---------------------------------------------------------------------|

*What can I do now to protect  
patients in my facility?*

# Framing our approach:

## You are not MDRO-free. You are MDRO-unaware.

**50%+**

of LTC residents may be colonized with an MDRO

- From CMS's own guidance

### What this means in your facility:

- Roughly half your census is colonized with something right now
- You have never tested that assumption, because you have never screened

***The resident with a documented MDRO  
is the one person whose status you really know!***

# Tools you have now for safe care:

- 1 Enhanced barrier precautions (EBP)
- 2 Recognize, flag, and communicate
- 3 Cleaning and decolonization
- 4 Antimicrobial stewardship\*

*\*Defer to other speakers to cover this!*

# Enhanced barrier precautions: what triggers them

## 1 Known MDRO status

Infected or colonized with an MDRO, when contact precautions do not otherwise apply.

## 2 Risk of acquisition

Wounds and/or indwelling medical devices, regardless of whether the resident is known to carry an MDRO.

## The conceptual shift

- **Traditional**: which MDRO is this resident carrying?
- **EBP**: who is most likely to acquire an MDRO?

# Enhanced Barrier Precautions to Prevent MDRO Transmission in Nursing Home Ventilator Units

## CDC Surveillance Analysis

- 2 community NHs with chronic ventilator units in Maryland
- 56 residents at baseline, 64 in intervention period
- EBP (gowns + gloves for high-contact care) for chronic wounds, devices, or MDRO
- Monthly swabs for *S. aureus* and CRO; WGS for resident-to-resident transmission

|                                                               |               | Acquisition |       |                                         |
|---------------------------------------------------------------|---------------|-------------|-------|-----------------------------------------|
|                                                               | Resident days | Frequency   | Rate* | Rate Ratio (95% CI);<br><i>p</i> -value |
| Any Organism of interest (MRSA, MSSA, CRAB, CR-PA, and CR-KP) |               |             |       |                                         |
| NH-CVU1                                                       |               |             |       |                                         |
| Baseline                                                      | 996           | 21          | 21.1  | –                                       |
| Intervention                                                  | 1000          | 15          | 15.0  | 0.71<br>(0.34–1.45), <i>p</i> = 0.32    |
| NH-CVU2                                                       |               |             |       |                                         |
| Baseline                                                      | 1124          | 26          | 23.1  | –                                       |
| Intervention                                                  | 1396          | 17          | 12.2  | 0.53<br>(0.27–1.00), <i>p</i> = 0.04    |

94%

Residents who met EBP criteria

39->77% NH1 | 26->72% NH2

Gown Use Pre vs. Post-Intervention

↓25% NH1 | ↓ 67% NH2

MDRO transmission confirmed by WGS

## IMPLICATION

Enhanced Barrier Precautions are feasible and effective in nursing home ventilator units to reduce transmission.

## EBP is not contact precautions – that's the point!

**Room restriction**

**No:** residents are not restricted to their rooms

**Group activities**

**No:** participation is not limited

**Dining room**

**No:** communal dining continues

**Gown and gloves**

**Yes:** during high-contact care activities

**Duration**

For the stay, or until the wound heals / device removed

# Gown and glove for the task, not the doorway

## Gown and gloves REQUIRED

*High-contact resident care activities*

- Bathing and showering
- Dressing
- Toileting and hygiene
- Transfers
- Changing linens
- Device care
- Wound care

## Gown and Gloves NOT required

*Entering the room without high-contact care*

- Answering a call light
- Conversing with a resident
- Handing over medications
- Delivering a meal tray

# Recognize the limits: What EBP does not do

## EBP Limitations:

- Contribution to preventing respiratory virus transmission is unknown
- Does not replace transmission-based precautions when those are indicated
- Doesn't replace hand hygiene
- An essential part of a multi-faceted infection prevention strategy

The infographic is on an orange background. At the top, it features two red octagonal 'STOP' signs flanking the title 'ENHANCED BARRIER PRECAUTIONS' in large, bold, black letters. Below the title, the text 'EVERYONE MUST:' is written in white. The first requirement is illustrated with an icon of a hand being sprayed with blue liquid from a bottle labeled 'ABHR'. The text reads: 'Clean their hands, including before entering and when leaving the room.' The second requirement is for 'PROVIDERS AND STAFF MUST ALSO:'. This section includes two icons: a pair of blue gloves and a blue gown. The text for the gloves reads: 'Wear gloves and a gown for the following High-Contact Resident Care Activities.' followed by a list: 'Dressing', 'Bathing/Showering', 'Transferring', 'Changing Linens', 'Providing Hygiene', 'Changing briefs or assisting with toileting', and 'Device care or use:'. The text for the gown reads: 'central line, urinary catheter, feeding tube, tracheostomy' and 'Wound Care: any skin opening requiring a dressing'. At the bottom, a white text box states: 'Do not wear the same gown and gloves for the care of more than one person.' The bottom right corner features the CDC logo and the text 'U.S. Department of Health and Human Services Centers for Disease Control and Prevention'. On the left side, there is vertical text: 'CDC/309010-0100'.

**STOP**

**ENHANCED BARRIER PRECAUTIONS**

**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.



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

CDC/309010-0100

# Recognize, Flag, and Capture

1

## **Ask the right question at admission**

“Has this resident ever tested positive?”

Colonization is durable; a negative today does not undo a positive last year.

2

## **Flag the chart so the MDRO identifier persists**

The flag needs to survive discharge, hospitalization, and readmission.

3

## **Capture exposure and risk, not just known status**

Was the resident in a facility during an outbreak? Roomed with a known case?

That is actionable information - consider screening.

# Send (and receive) the information!

- Notify receiving facility of MDRO status and recommended precautions.
- This runs both directions: you are a sender as often as a receiver!
- Put a real MDRO field on the transfer form, and check that someone fills it in.
- A receiving facility that is told can prepare. Surprises can end badly.

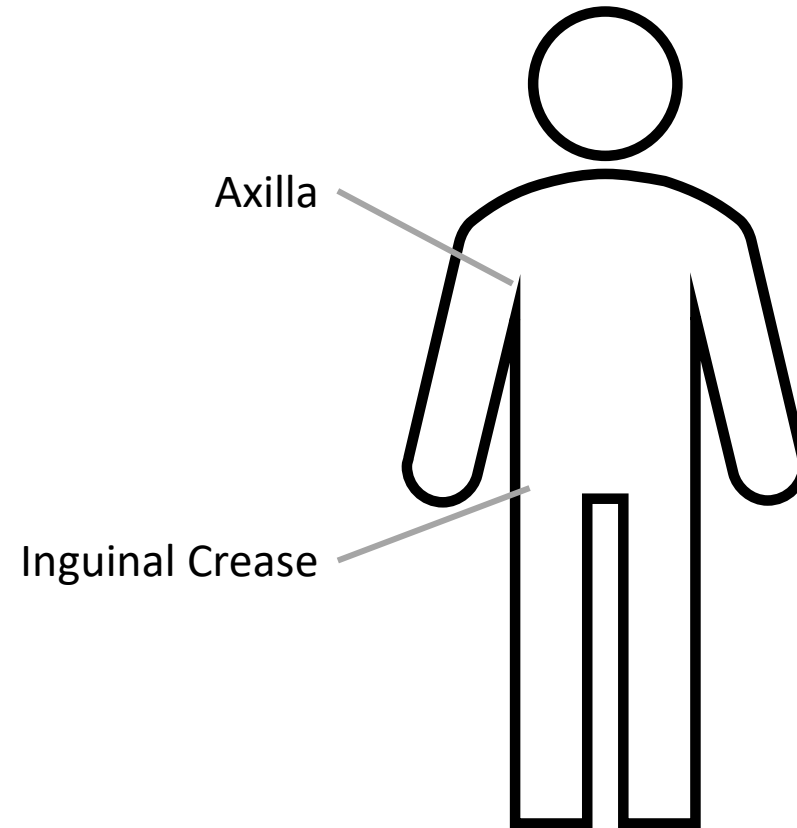


## *C. auris* Screening is a Key Prevention Strategy

- Screening for *C. auris*, paired with implementation of effective control strategies, is a key strategy to prevent spread in healthcare facilities.
  - 2025. *Screening for Candida auris Colonization*. Centers for Disease Control and Prevention [Online.]
- Implementing a screening program for *C. auris* is based on multiple factors, including local epidemiology, laboratory capacity, and ongoing prevention activities within the facility or region.
  - Keighley et al. *Curr fungal infect rep* 2021; Ong et al. *Int Med J* 2019.

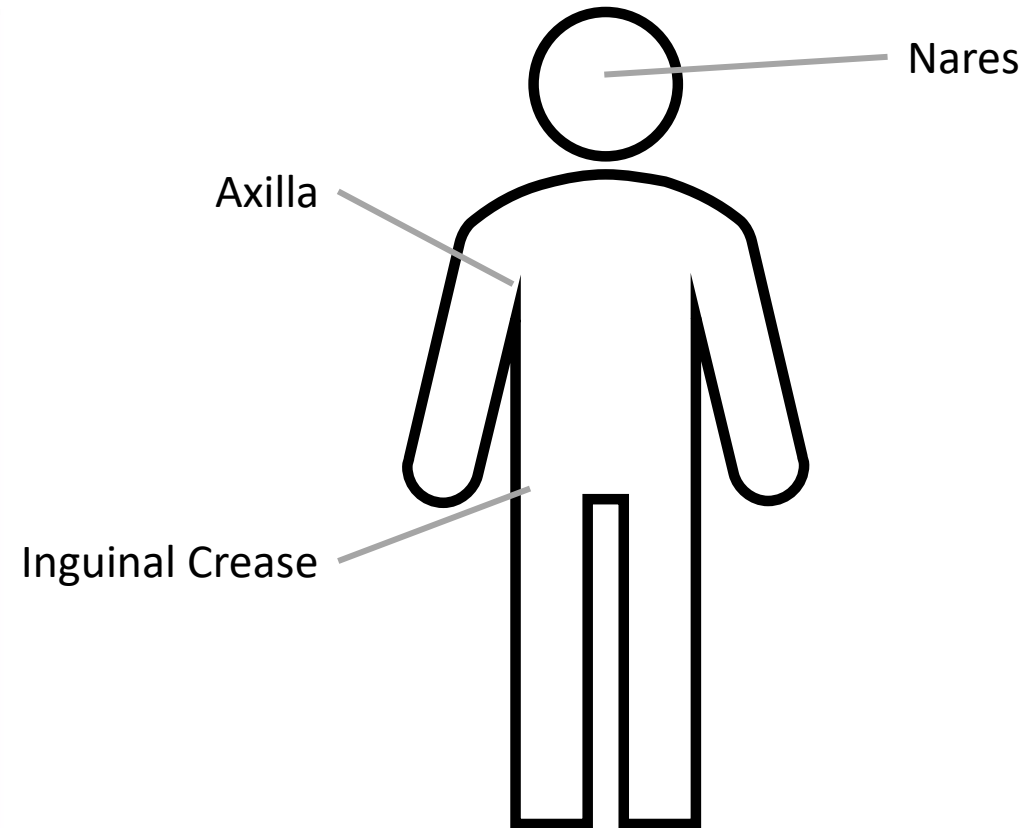
# *C. auris* Screening is a Key Prevention Strategy

- The standard approach involves collection of a composite skin swab of patients' bilateral axillae and inguinal creases
  - 2025. Screening for Candida auris Colonization. Centers for Disease Control and Prevention;
  - 2021. Epidemiological Alert: Candida auris outbreaks in health care services in the context of the COVID-19 pandemic. Pan American Health Organization, World Health Organization.
  - 2025, posting date. Candida auris Infection Prevention and Control in Canadian Healthcare Settings Government of Canada.



# *C. auris* Screening is a Key Prevention Strategy

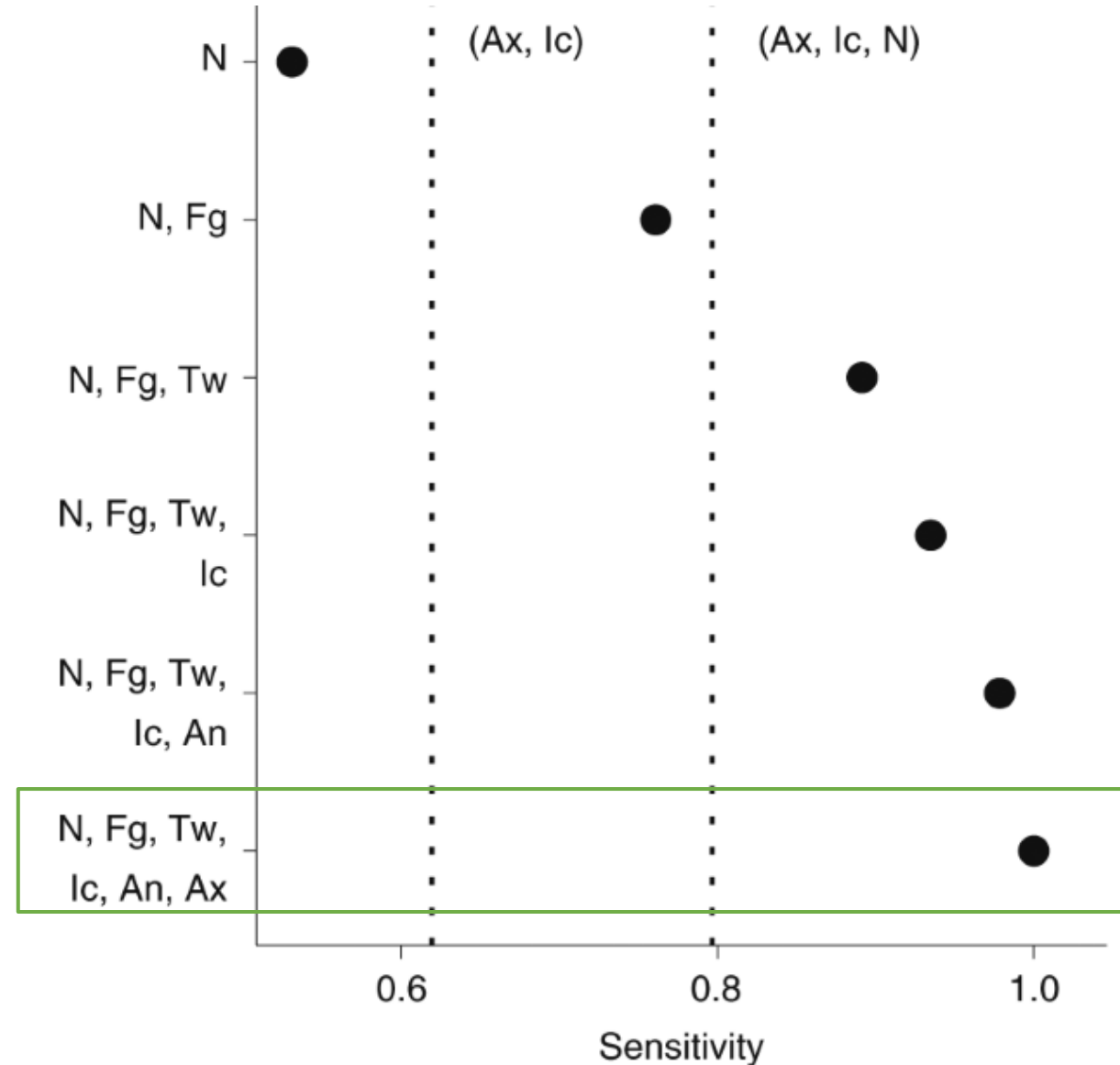
- Anterior nares is the next most reported approach
- Estimated to detect an additional 12-20% of *C. auris* carriers
- When colonized, the anterior nares has higher burden of *C. auris* than the axilla and inguinal crease
  - Adams et al. EID 2018
  - Sansom and Gussin et al. CID 2024
  - Proctor et al Nat Med 2021
  - Zhu et al JCM 2020
  - Rowlands et al. J Infect Control 2023



**Sample More = Find More *C. auris***

# *C. auris* Screening is a Key Prevention Strategy

- May need to screen at least 6 body sites to detect everyone!
  - Proctor DM et al. Nat Med. 2021



# The right product and focus on shared equipment

## Product selection

- Routine quaternary ammonium products may not be effective against *C. auris*
- Use an **EPA List P** registered product where *C. auris* is a concern
- Confirm contact time

<https://www.epa.gov/pesticide-registration/epas-registered-antimicrobial-products-effective-against-candida-auris-list>

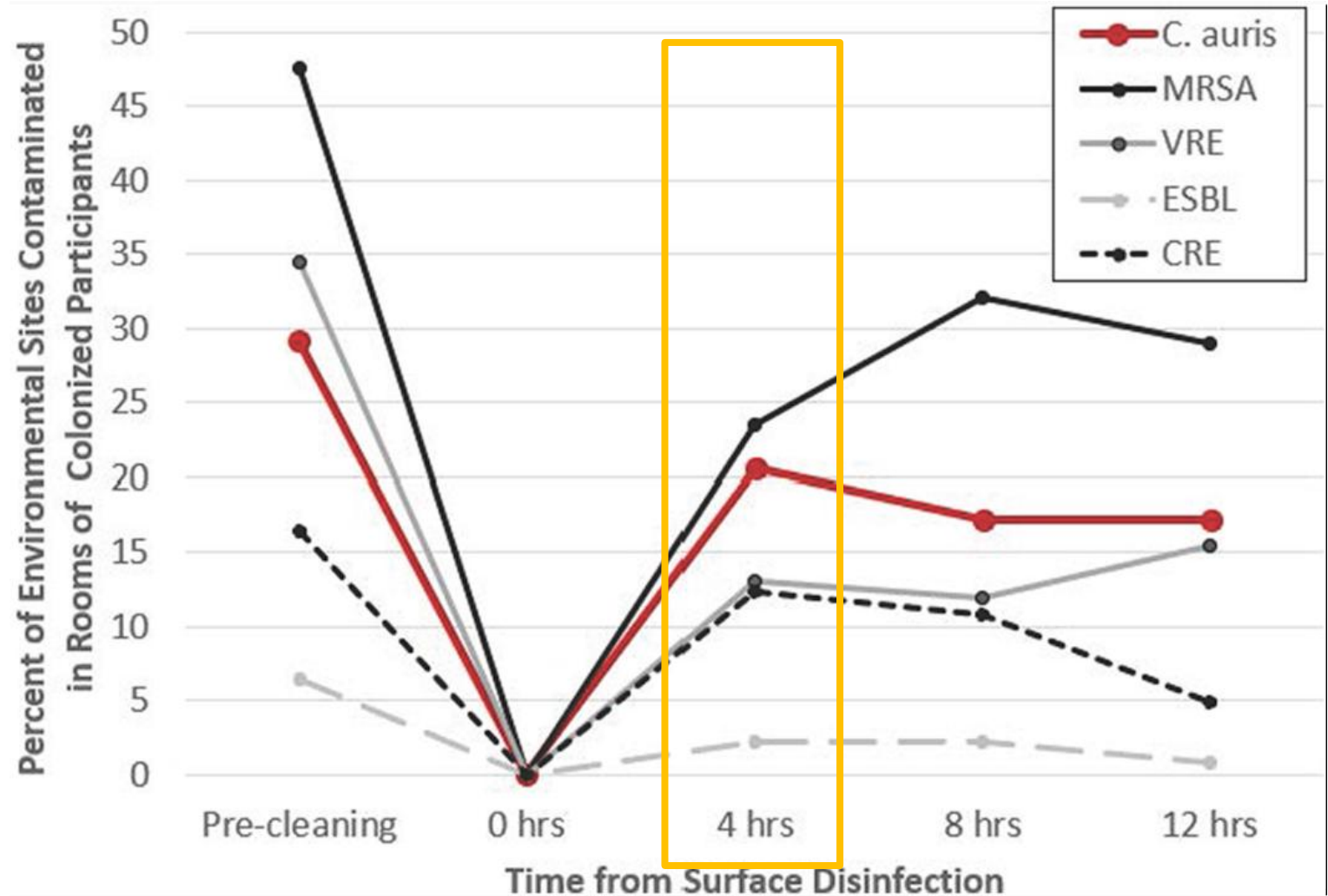
## Target shared equipment

- Blood pressure cuffs, thermometers, glucometers, pulse oximeters
- Mechanical lifts and lift slings
- Therapy equipment
- Shared wheelchairs
- Dedicate single-resident equipment where you can; disposable where you cannot

# Risk Factors for Contamination of Healthcare Environment

- Environmental contamination is thought to play a key role in *C. auris* transmission.
- It occurs rapidly following disinfection and is associated with burden of *C. auris* skin colonization.

- Sexton et al. Clin Infect Dis 2021
- Sansom and Gussin et al. Clin Infect Dis 2024

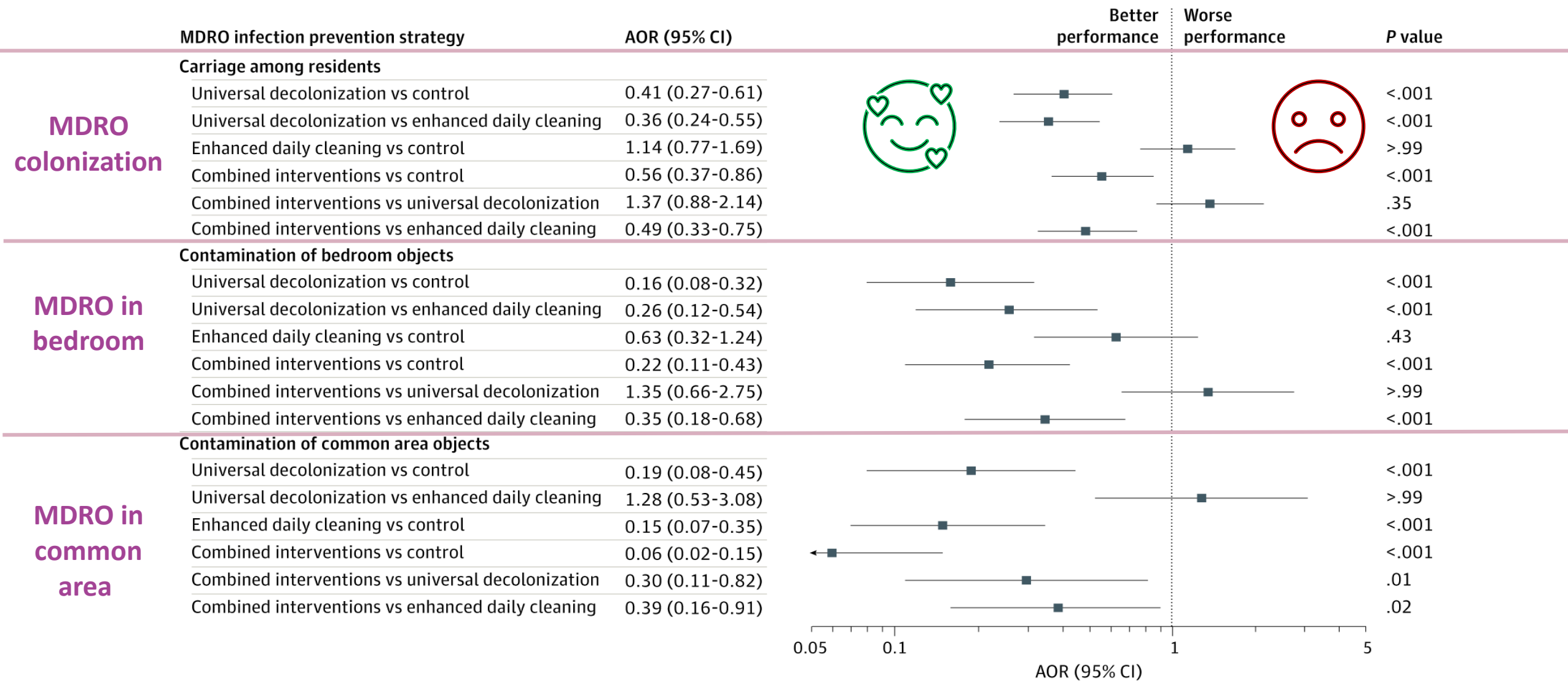


Sansom and Gussin, et al. CID 2024.

## STRATEGY 3 • CLEANING AND DECOLONIZATION

# What does the evidence say to prioritize?

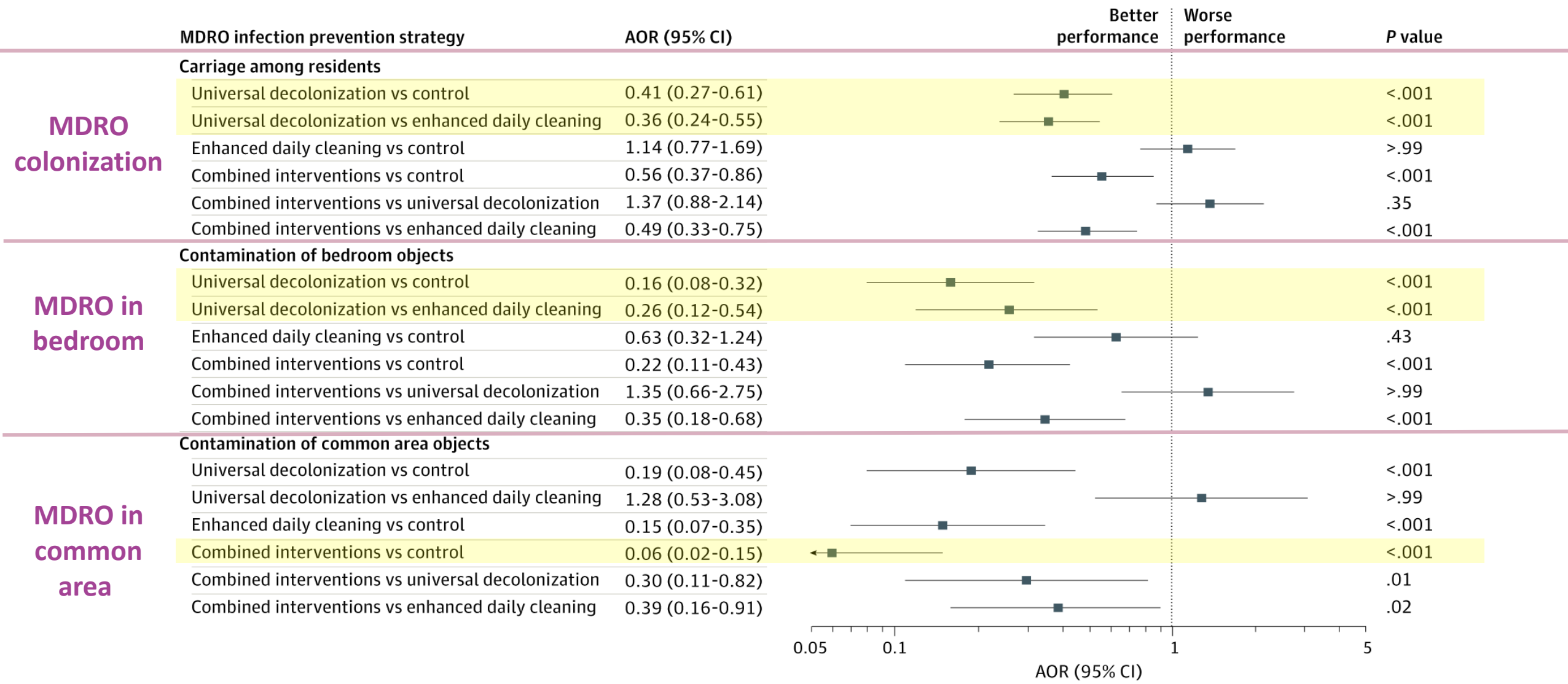
Gussin GM, Singh RD, Kleinman K, et al. Decolonization vs Enhanced Cleaning for Multidrug-Resistant Organism Reduction in Nursing Homes. JAMA Netw Open. 2026;9(8):e2626940. doi:10.1001/jamanetworkopen.2026.26940



## STRATEGY 3 • CLEANING AND DECOLONIZATION

# What does the evidence say to prioritize?

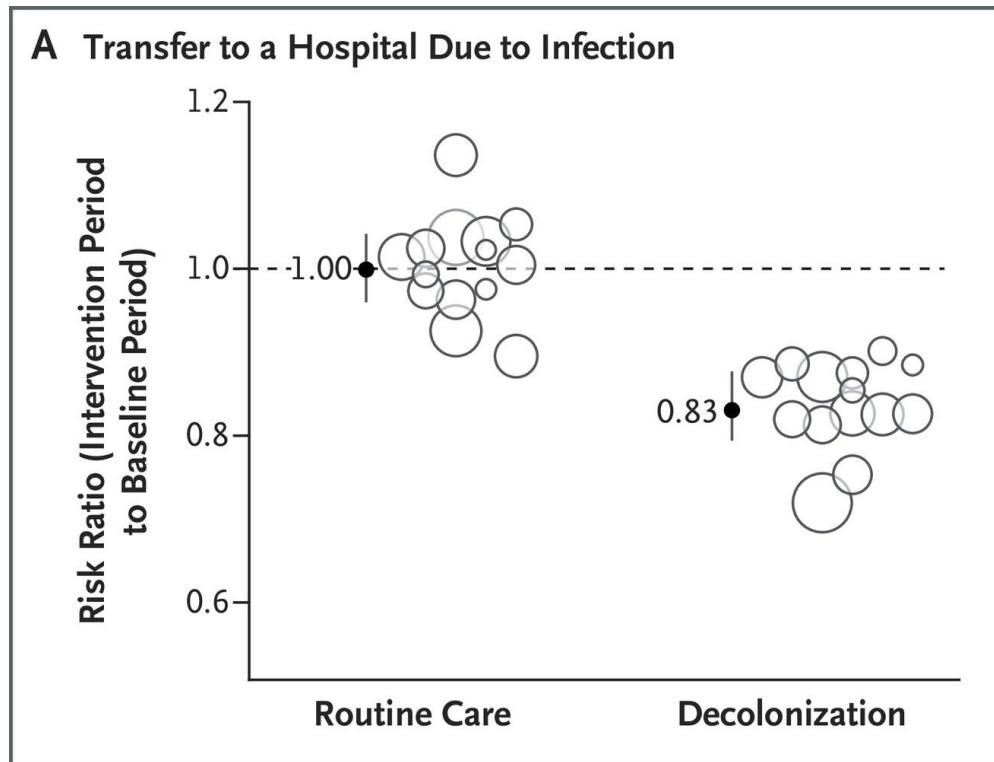
Gussin GM, Singh RD, Kleinman K, et al. Decolonization vs Enhanced Cleaning for Multidrug-Resistant Organism Reduction in Nursing Homes. JAMA Netw Open. 2026;9(8):e2626940. doi:10.1001/jamanetworkopen.2026.26940



# Decolonization prevents infection and hospitalization

## Randomized Controlled Trial

- Enrolled almost 29,000 patients in 28 California nursing homes. MRSA, VRE, ESBL, CRE.
- Chlorhexidine bathing in place of routine soap
- Nasal povidone-iodine twice daily on admission, then every other week
- Universal decolonization = everyone gets the treatment (not just targeted to known carrier)



**↓16.6%**

Difference in risk ratio for hospital transfers due to infection, routine care (RR 1.00) vs decolonization group (RR 0.83)

**RR 0.70**

Risk ratio for colonization with any MDRO in the routine care (48.3% → 47.2%) vs decolonization group (48.9% → 32.0%)

## IMPLICATION

Universal decolonization reduced the risk of transfer to a hospital due to infection

## Back to those two referral calls...

**A**

### Resident A: DECLINED

- Known status, documented and communicated
- No wound, no device
- You could have written the precaution plan before they arrived

**B**

### Resident B: ADMITTED

- Unknown status, never screened
- Chronic wound and indwelling device: two EBP triggers
- No flag, no communication, no plan

**You were never choosing between a risky admission and a safe one.**  
*You were choosing between a risk you could see and one you could not.*

# The future of infection prevention in LTC?

**1 Health Data Interoperability**

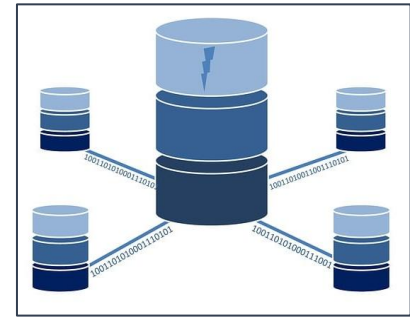
**2 Artificial Intelligence Integration**

**3 Long-acting disinfectants**

**4 Decolonization for emerging threats**

**5 More LTC-focused research!**

# Address inter-facility MDR0 transmission by sharing data



## What is Health Data Integration?

- Merges multiple healthcare data sources into a single place, giving providers access to the most recent and relevant data
- Interoperability: healthcare systems to communicate seamlessly
- Many potential data sources: EHR, public health, state or national databases

## Current Obstacles

- Use of different EHR platforms limits interoperability
- Huge data volumes and complexity
- Lack of data standardization
- Data privacy and security
- Implementation and maintenance cost

# Streamline surveillance with AI tools



## How Can AI Help?

- Surveillance is labor-intensive and time consuming
- AI offers a transformative solution: real time analysis of large datasets to identify patterns and predict risk factors that are otherwise difficult to detect

## Potential Applications

- Detect infections earlier = faster treatment and prevents spread
- Predict who is likely to develop infection = apply targeted preventive measures
- Predict who is likely to have MDROs = pre-emptive isolation and screening

# The promise of residual disinfection



## What are long-acting disinfectants?

- Continuously kills or stops the growth of bacteria and viruses on surfaces
- EPA regulated
- Residual Disinfectants: which kill 99.9% of bacteria for 24 hours
- Supplemental Residual Coating: inhibit growth or provide supplemental killing over weeks or months

## Special Considerations

- Must be used along with routine daily cleaning
- Most 24-hour residual products are effective against vegetative bacteria (like MRSA or VRE) and enveloped viruses, but NOT against bacterial spores like C. difficile or non-enveloped viruses like Norovirus

<https://www.epa.gov/pesticide-registration/list-n-appendix-supplemental-residual-antimicrobial-products-coronavirus>

# Innovations in Decolonization



## ***C. auris* decolonization pipeline**

*Target = skin and nose*

- Intranasal povidone iodine + CHG bathing
- Repurposed and systemic antifungals (i.e., Ibrexafungerp)

## **CRE decolonization pipeline**

*Target = gut*

- Fecal microbiota transplant to restore colonization resistance
- Selective digestive decolonization with non-absorbable antibiotics

<https://clinicaltrials.gov/>  
<https://reporter.nih.gov/>

# LTC-Focused Research is Gaining Momentum



*"As long as the nursing home setting continues to be the place of care for ... the most vulnerable among our population, a coordinated approach to clinical trials research is required to answer the most important clinical questions..."*



**Nursing Home Public Health  
Response Network (NH-PHRN)**



# Thank you

*Questions?*

Sarah E. Sansom DO MS · [Sarah\\_E\\_Sansom@Rush.edu](mailto:Sarah_E_Sansom@Rush.edu)



## APPENDIX

# Anticipated questions

## “Do we have to put them in a private room?”

- No. Single-patient rooms are not required in nursing homes for residents on EBP.
- Prioritize the single rooms you do have for residents with uncontained secretions or excretions, acute diarrhea, or draining wounds.
- Cohorting is permitted and you may cohort based on one high-concern MDRO without regard to co-colonizing organisms.
- In shared rooms: at least three feet between beds, privacy curtains, and clean each bed area as though it were a separate room.

## “How long does EBP stay in place?”

- For MDRO-based indications: the duration of the stay, and on all future readmissions, regardless of subsequent test results.
- For wound or device indications: until the wound resolves or the device is discontinued.
- Do not discontinue based on a negative screen. Colonization with novel and targeted MDROs may persist indefinitely, with intermittent negatives.
- This is why the chart flag has to survive readmission; the indication outlives any single admission record.

## **“What about residents with dementia who wander?”**

- EBP does not restrict residents to their rooms, so wandering is not itself a contraindication to admission.
- The exposure risk from a wandering resident is via hands and shared surfaces, so the mitigations are hand hygiene support, frequent high-touch surface cleaning, and dedicated equipment.
- If the resident has uncontained secretions, drainage, or acute diarrhea then curtail wandering as much as possible.
- Assist with resident hand hygiene before meals and activities. This is low-cost and rarely done systematically.

## “What does screening cost, and who pays for it?”

- Colonization screening and mechanism testing are sometimes available through the CDC AR Lab Network, generally at no cost to the facility.
- Routine admission screening of every resident is not the recommendation. Screening is typically triggered by public health response, epidemiologic linkage, or a point prevalence survey.
- CDC prefers broad screening via point prevalence survey over targeted screening when transmission is suspected, because targeted approaches miss colonized residents.
- Re-screening known carriers for clearance is not recommended. Save your money and your effort!