

Department of Public Health

Healthcare-associated Infections/Antimicrobial Resistance
(HAI/AR) Program

Enhanced Barrier Precautions

CDC Guidance to Nursing Homes to
Prevent the Spread of Multidrug-Resistant Organisms

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Speaker Disclosures

- Tiina Peritz has nothing to disclose
- Susy Rettig has nothing to disclose

Housekeeping

- All participants have been muted during the presentation
- Please type any questions in the group chat box
- Time permitting there will be a Q&A session at the end
- This presentation is being recorded and will be posted on our website:

<https://hip.phila.gov/HAIAR/HAIArchive>



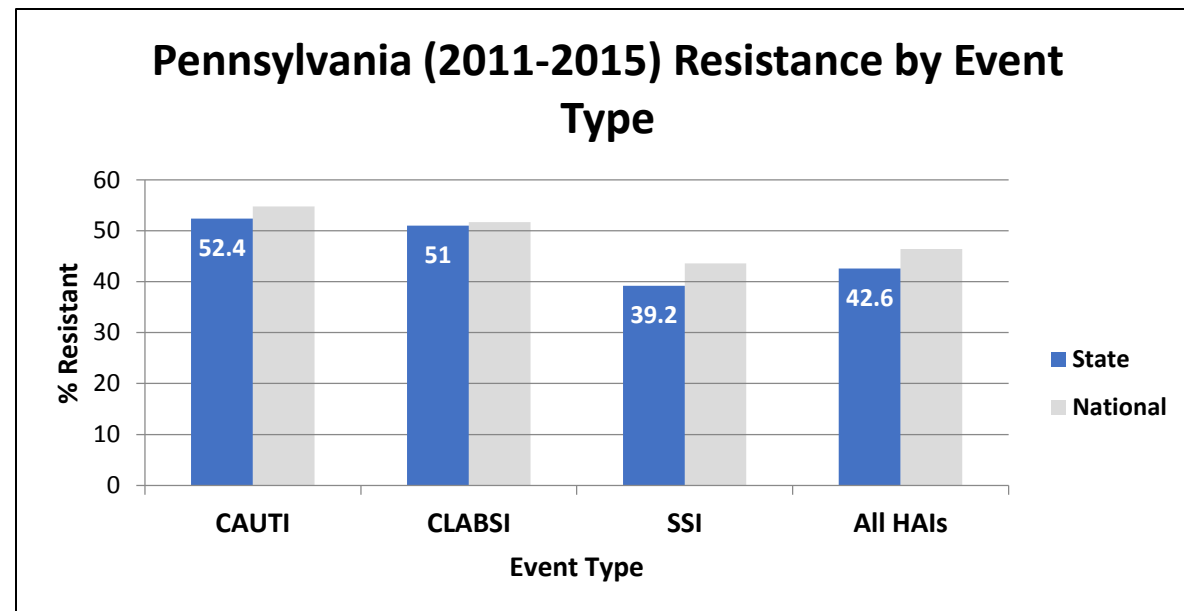
Today's Outline

- Burden of Multidrug-Resistant Organisms (MDROs)
- Enhanced Barrier Precautions Guidance
- Micro Review: Novel and Targeted Organisms
- Frequently Asked Questions:
 - How to read a lab report to determine what bug your resident has
 - Room choice and cohorting

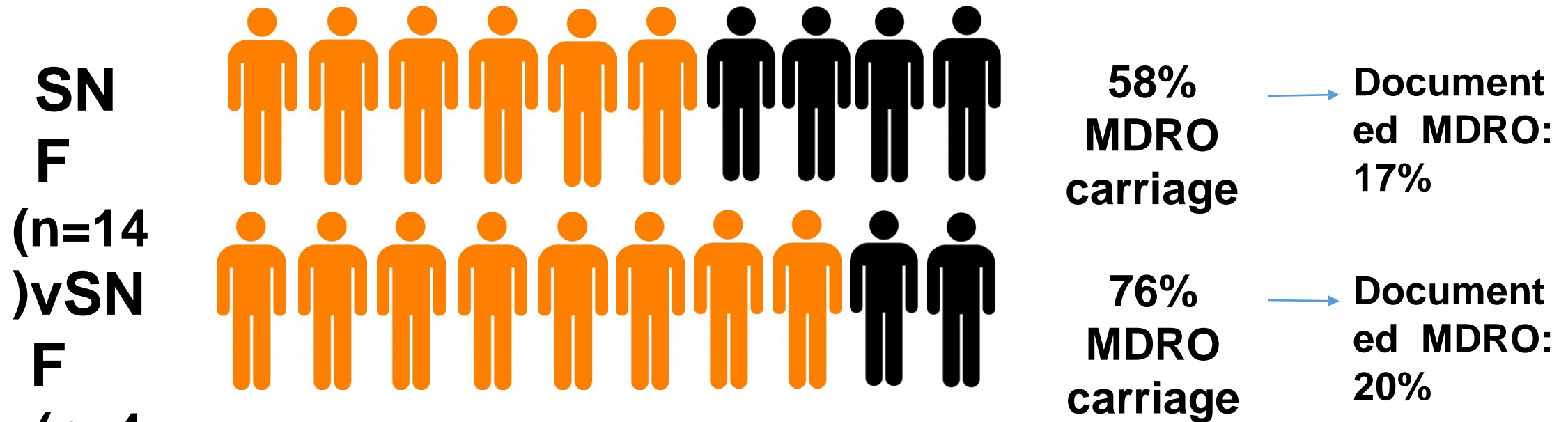
Burden of Antimicrobial Resistance

Every year in the U.S....

- Two million people have an infection due to a multidrug-resistant organism (MDRO)
- 23,000 people DIE of an infection due to a resistant organism



Burden of MDROs in Nursing Homes (Median %)



SNF
F
(n=14)
vSNF
F
(n=4)

- Frequent pathogens: MRSA and ESBL
- Median CRE prevalence: 10% in NHs with vents

Challenges with Detection of MDROs

- Limited capacity to detect transmissible-pathogens, including MDROs
 - Clinical cultures underestimate true prevalence of MDROs
 - No active surveillance for MDROs (among new admissions)
 - Poor communication between healthcare facilities during care transitions
 - Once identified, testing for clearance of MDRO is not feasible or reliable

MDRO Risk Factors in the Post-acute Care Population

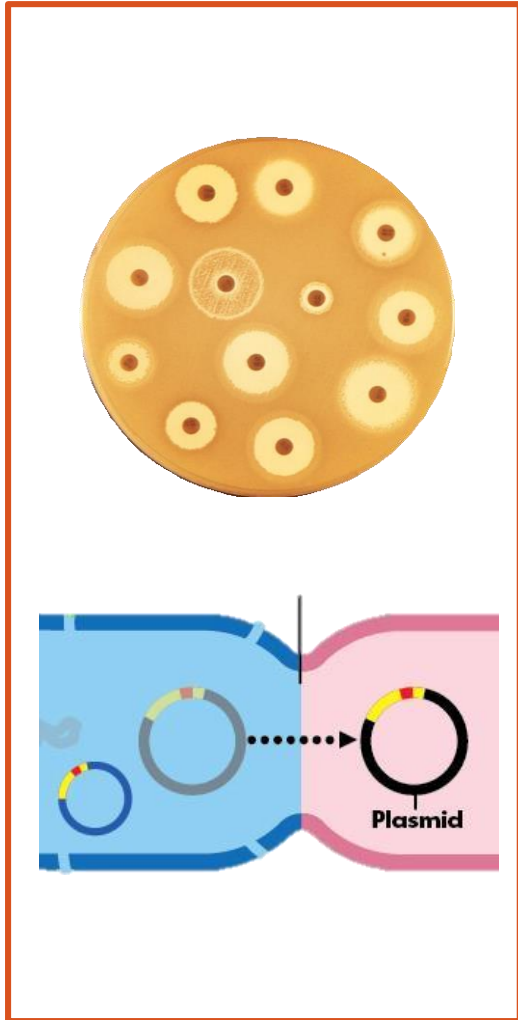
- Indwelling medical devices (e.g., urinary catheter, PEG tube, tracheostomy/vents, central line)
- Presence of wounds or decubitus ulcers
- Antibiotic use in prior 3 months, particularly fluoroquinolones
- Recent hospitalization
- Comorbid medical conditions
- Increased functional dependence



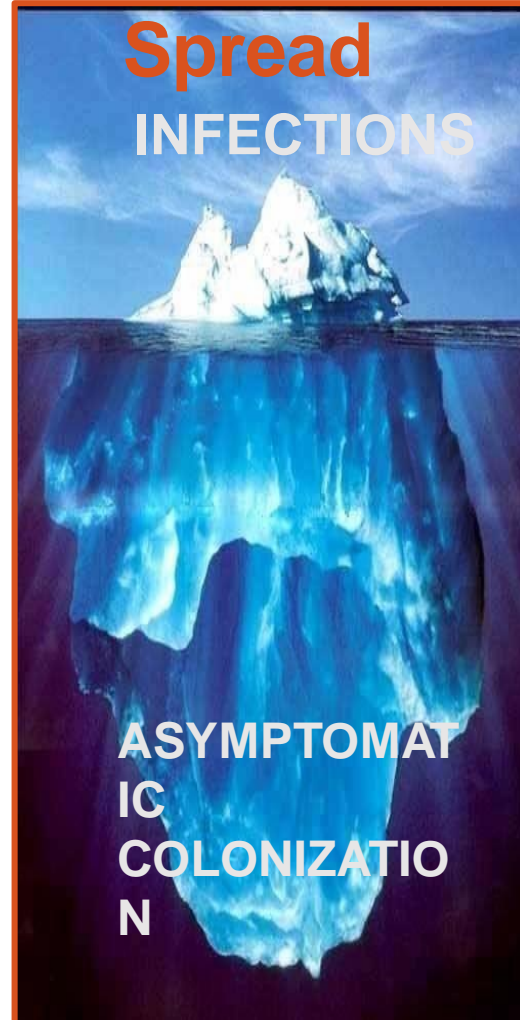
*facilities also increases
opportunities for spread and
these acquisition*

Characteristics of Emerging Antimicrobial Resistance (AR) in Healthcare Settings

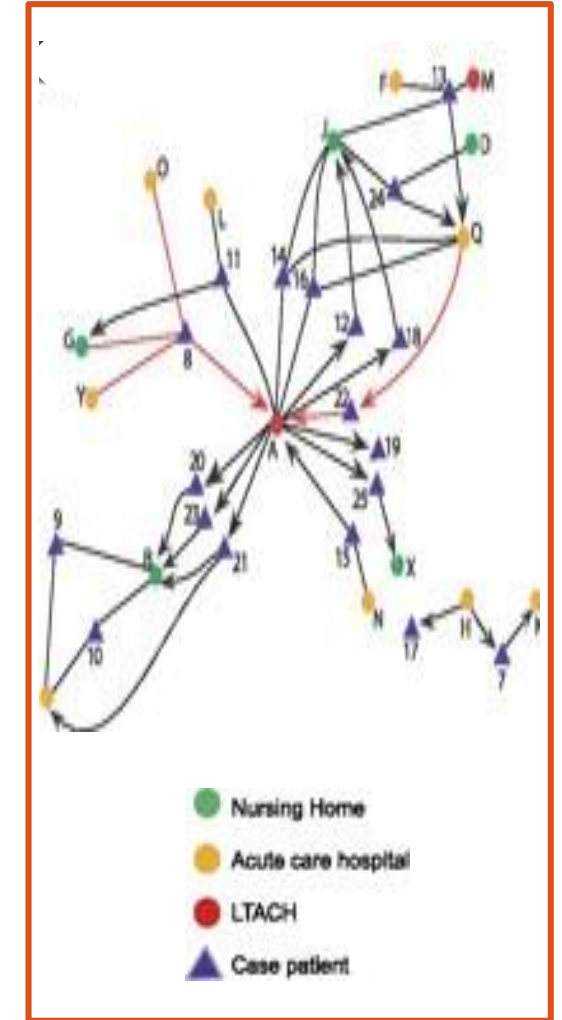
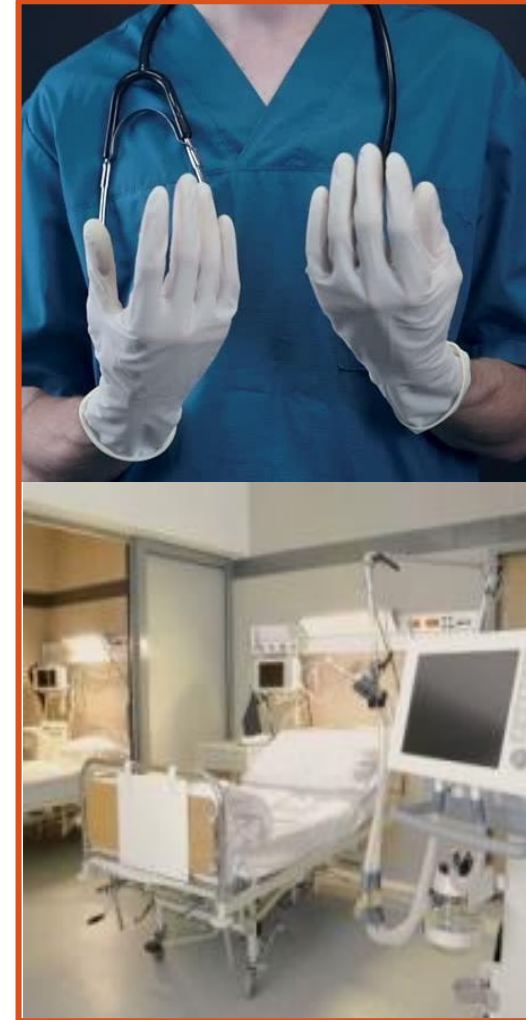
Resistance



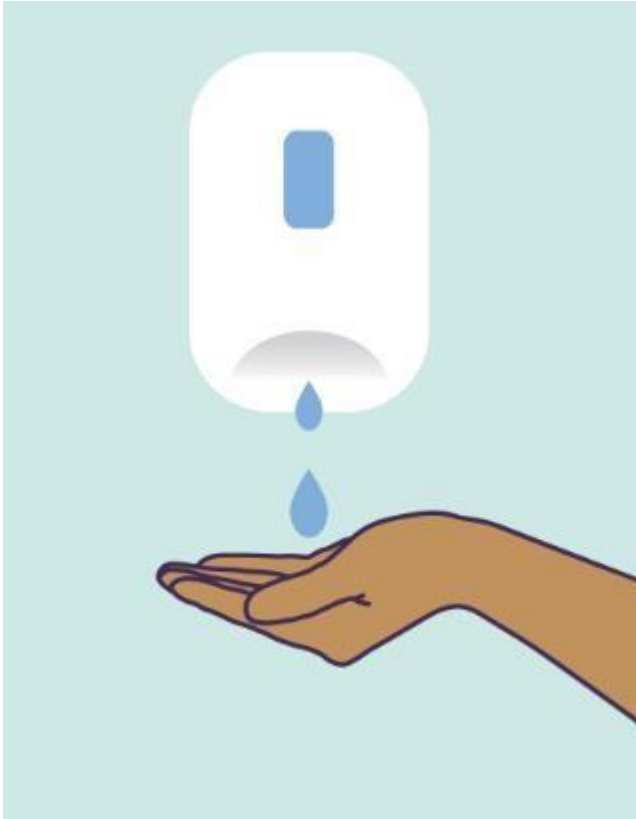
Detection



Transmission



AR Prevention Strategies



Hand Hygiene



**Personal
Protective
Equipment
Precautions**



**Environmental
Cleaning &
Disinfection**

Difficulty in Applying Transmission-Based Precautions for MDROs in Nursing Homes

<p>“Transmission-Based Precautions must be used when resident develops signs and symptoms of a transmissible infection”</p>	<p>Colonization ≠ Infection</p>
<p>“Facility policies must identify type and duration of Transmission-Based Precautions”</p>	<p>Duration of MDRO colonization can be prolonged (>6 months)</p>
<p>“Transmission-Based Precautions should be the least restrictive possible for the resident based on his/her clinical situation and used for the least amount of time”</p>	
<p>“Once the resident is no longer a risk for transmitting the infection... removing Transmission-Based Precautions is required”</p>	<p>Resident remains at risk for transmitting the MDRO even when not actively infected</p>

Difficulty in restricting movement/moving residents

Need: Clarification about how/when to use PPE and room restriction

Lack of Private rooms

Need: Clarification about managing prolonged carriage of MDROs

“Home-like” environment

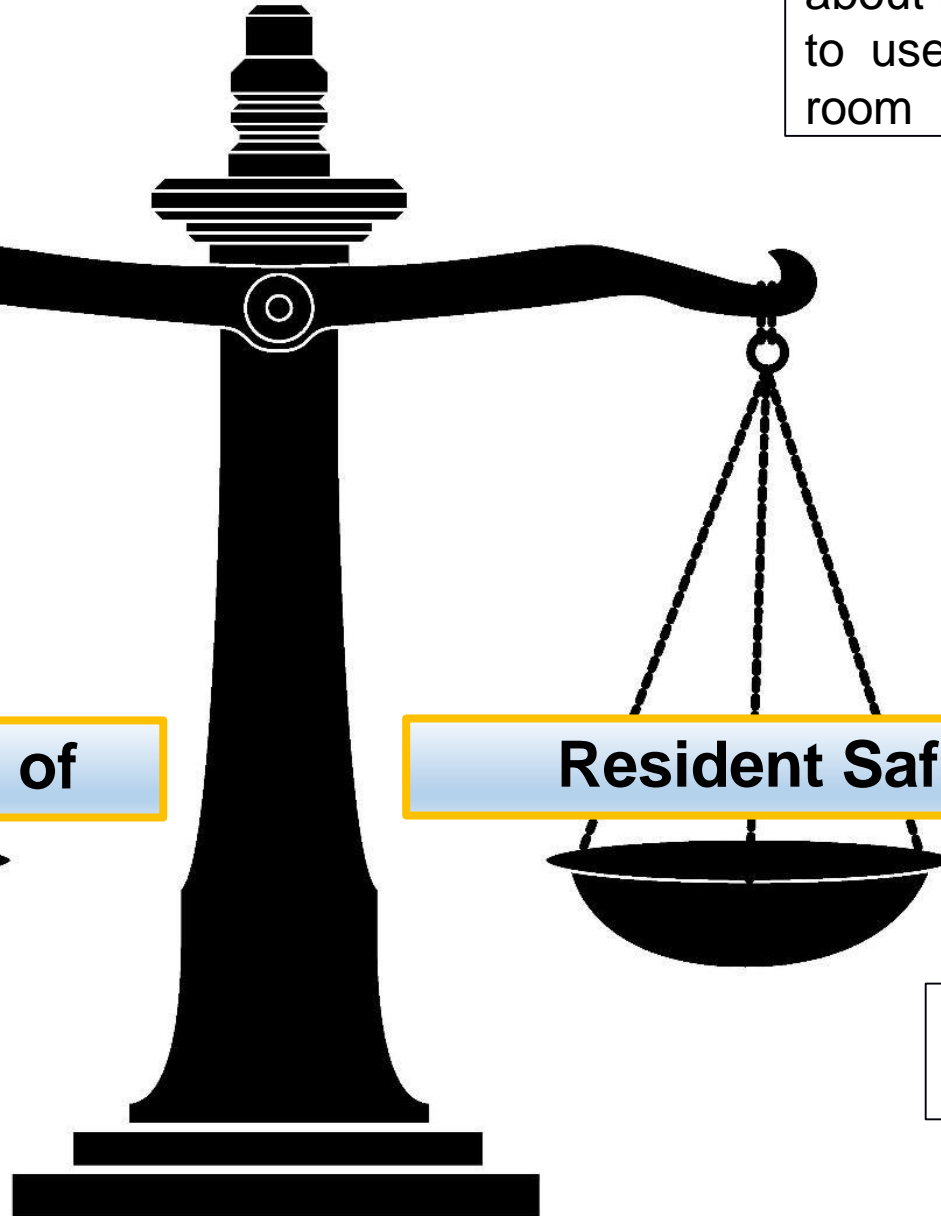
Resident Quality of Life

Resident Safety

Psychosocial well-being

Preventing spread of MDROs

Minimize stigmatization



Enhanced Barrier Precautions (EBP): Guidance for facilities during AR Containment Responses

The screenshot shows the CDC website interface. At the top left is the CDC logo and the text 'Centers for Disease Control and Prevention CDC 24/7: Saving Lives, Protecting People™'. At the top right is a search bar and a link to 'A-Z Index'. Below this is a green header bar with the text 'Healthcare-associated Infections'. Underneath is a breadcrumb trail: 'CDC > Healthcare-associated Infections (HAI) > Containment Strategy'. On the right side of the breadcrumb trail are social media icons for Facebook, Twitter, Email, and RSS. The main content area has a left sidebar with a home icon and the text 'Healthcare-associated Infections (HAI)'. Below this are several menu items: 'HAI Data +', 'Types of Infections +', 'Diseases and Organisms +', 'Preventing HAIs +', 'Containment Strategy -', 'What Can Be Done', 'Guidelines', 'Case Studies', and 'PPE in Nursing Homes'. The main content area features the title 'Implementation of Personal Protective Equipment (PPE) in Nursing Homes to Prevent Spread of Multidrug-resistant Organisms (MDROs)'. Below the title is a grey box containing the text 'Print version: [Implementation of PPE in Nursing Homes to Prevent Spread of MDROs](#) [PDF - 4 pages]'. Below this is a paragraph of text: 'Implementation of Contact Precautions, as described in the CDC [Guideline for Isolation Precautions](#), is perceived to create challenges for nursing homes trying to balance the use of PPE and room restriction to prevent MDRO transmission with residents' quality of life. Thus, current practice in many nursing homes is to implement Contact Precautions only when residents are infected with an MDRO and on treatment.' To the right of the main text is a 'Table of Contents' section titled 'On This Page' with links to 'Description of Existing Precautions', 'Description of New Precautions', 'Summary of PPE Use and Room Restriction', 'Implementation', and 'References'.

<https://www.cdc.gov/hai/containment/PPE-Nursing-Homes.html>¹¹

Why was the guidance needed for Containment?

Focusing only on residents with active infection fails to address the continued risk of transmission from residents with MDRO colonization, which can persist for long periods of time (e.g., months), and result in the silent spread of MDROs.

With the need for an effective response to the detection of serious antibiotic resistance threats, there is growing evidence that current implementation of Contact Precautions in nursing homes is not adequate for prevention of MDRO transmission.

This document is intended to provide guidance for PPE use and room restriction in nursing homes for preventing transmission of novel or targeted MDROs, including as part of a public health [containment response](#). This guidance introduces a new approach called Enhanced Barrier Precautions, which falls between Standard and Contact Precautions, and requires gown and glove use for certain residents during specific high-contact resident care activities [2,3] that have been found to increase risk for MDRO transmission.

As of July 2019, Novel or Targeted MDROs are defined as:

- Pan-resistant organisms,
- Carbapenemase-producing enterobacteriaceae,
- Carbapenemase-producing *Pseudomonas* spp.,
- Carbapenemase-producing *Acinetobacter baumannii*, and
- *Candida auris*

Contact Precautions

Precautions	Applies to:	PPE used for these situations:	Required PPE
<p>Contact Precautions</p>	<p><i>All residents infected or colonized with a novel or targeted multidrug-resistant in specific situations:</i></p> <ul style="list-style-type: none"> • Presence of acute diarrhea, draining wounds or other sites of secretions or excretions that are unable to be covered or contained • On units or in facilities where ongoing transmission is documented or suspected <p><i>For infections (e.g., C. difficile, norovirus, scabies) and other conditions where Contact Precautions is recommended</i></p> <p>See Appendix A – Type and Duration of Precautions Recommended for Selected Infections and Conditions of the CDC Guideline for Isolation Precautions</p>	<p>Any room entry</p>	<p>Gloves and gown</p> <ul style="list-style-type: none"> • Don before room entry, doff before room exit; change before caring for another resident • Face protection may also be needed if performing activity with risk of splash or spray <p><i>Note: Includes consideration for single room or cohorting; and restriction of movement and participation in group activities within the facility</i></p>

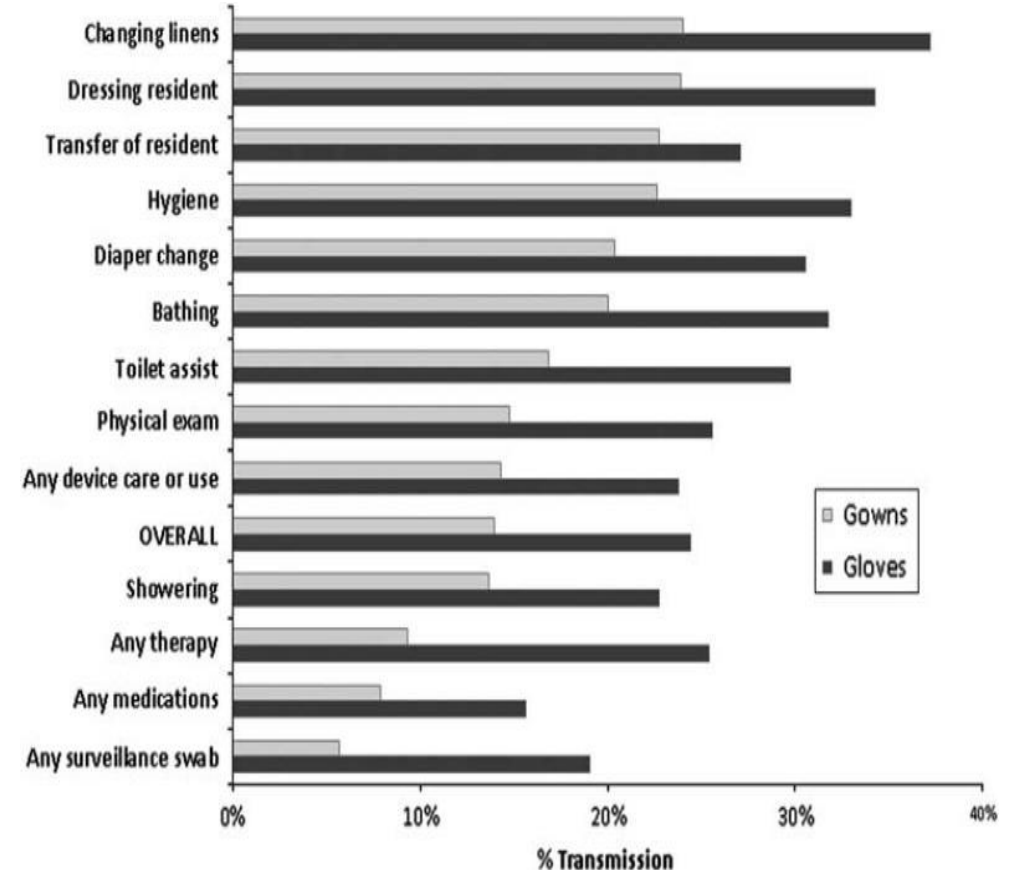
Enhanced Barrier Precautions

“*Enhanced Barrier Precautions* expand the use of PPE beyond situations in which exposure to blood and body fluids is anticipated and refer to the use of gown and gloves during high-contact resident care activities that provide opportunities for transfer of MDROs to staff hands and clothing”

Precautions	Applies to:	PPE used for these situations:	Required PPE
<p>Enhanced Barrier Precautions</p>	<p>All residents with any of the following:</p> <ul style="list-style-type: none"> • Infection or colonization with a novel or targeted MDRO when Contact Precautions do not apply • Wounds and/or indwelling medical devices (e.g., central line, urinary catheter, feeding tube, tracheostomy/ventilator) regardless of MDRO colonization status <p>Facilities may consider applying Enhanced Barrier Precautions to residents infected or colonized with other epidemiologically-important MDROs based on facility policy.</p>	<p>During high-contact resident care activities:</p> <ul style="list-style-type: none"> • Dressing • Bathing/showering • Transferring • Providing hygiene • Changing linens • Changing briefs or assisting with toileting • Device care or use: central line, urinary catheter, feeding tube, tracheostomy/ ventilator • Wound care: any skin opening requiring a dressing 	<ul style="list-style-type: none"> • Gloves and gown prior to the high- contact care activity • Change PPE before caring for another resident • Face protection may also be needed if performing activity with risk of splash or spray <p>Note: Does not require single-room or restrictions of movement/participation within facility</p>

MDRO contamination of NH caregiver hands and clothes during common activities

- Evaluated different interactions between staff and MDRO colonized residents
- Used cultures of gloves/gowns to mimic transmission to hands and clothing
- Assisting with linen change, transfer and personal hygiene had highest likelihood of contamination
- Transmission was increased:
 - Multiple activities are bundled together
 - During care of residents with chronic wounds



Enhanced Barrier Precautions (EBP): Frequently Asked Questions

Frequently Asked Questions (FAQs) about Enhanced Barrier Precautions in Nursing Homes

These FAQs were created to address questions about Enhanced Barrier Precautions as defined in the CDC guidance "[Implementation of Personal Protective Equipment \(PPE\) in Nursing Homes to Prevent Spread of Novel or Targeted Multidrug-resistant Organisms \(MDROs\)](#)"

Definition and scope of Enhanced Barrier Precautions

1. Do Enhanced Barrier Precautions replace/supersede the recommendations in the CDC Guideline for Isolation Precautions (2007) and the Guideline for the Management of Multidrug-Resistant Organisms (MDRO) in Healthcare Settings (2006)?

No. This supplemental guidance is intended to clarify expectations for personal protective equipment (PPE) use and room restriction in nursing homes for preventing transmission of [novel or targeted MDROs](#), including as part of a public health [Containment Response](#). The [CRE Toolkit](#) and CDC website addressing infection control recommendations for [Candida auris](#) are being updated to reflect this new guidance for nursing homes. Future updates are anticipated to address application of Enhanced Barrier Precautions outside of a Containment Response. However, facilities may choose to apply Enhanced Barrier Precautions for residents infected or colonized with, or at-risk for acquiring other epidemiologically-important MDROs.

2. Are Enhanced Barrier Precautions recommended for healthcare settings other than nursing homes, such as long-term acute care hospitals (LTACHs)?

On This Page

[Definition and scope of Enhanced Barrier Precautions](#)

[Application and duration of Enhanced Barrier Precautions](#)

[Implementation of Enhanced Barrier Precautions](#)

[References](#)

<https://www.cdc.gov/hai/containment/PPE-Nursing-Homes.html>

Planning for Implementing Enhanced Barrier Precautions – Lessons Learned

- Develop facility-specific materials*
 - Written policy and procedure
 - Signage (or use CDC's)
 - Educational materials
 - Line list
- Educate in advance:
 - Staff: nursing, rehab, dietary, EVS, contractors, physicians
 - Residents and family
- Inform the state survey office local branch*
- Develop implementation plan for facility*
 - Start with one unit (highest risk)
 - Enough time for implementation
- Plan for increased need of PPE, isolation carts



Implementing Enhanced Barrier Precautions

- Post clear signage outside of the resident room indicating the type of Precautions and required PPE
 - For Enhanced Barrier Precautions, signage should clearly indicate the high-contact resident care activities
- Make PPE including gowns and gloves available immediately outside of resident room
- Ensure access to alcohol-based hand rub in every resident room (ideally both inside and outside of room)
- Position a trash can inside resident room and near exit for discarding PPE
- Incorporate periodic monitoring and assessment of adherence to determine need for additional training



Increasing Availability of Alcohol-based Hand Rub*

DEPARTMENT OF HEALTH & HUMAN SERVICES
Centers for Medicare & Medicaid Services
7500 Security Boulevard, Mail Stop C2-21-16
Baltimore, Maryland 21244-1850



Center for Clinical Standards and Quality/Quality, Safety & Oversight Group

Ref: QSO-20-03-NH

DATE: November 22, 2019

TO: State Survey Agency Directors

FROM: Director
Quality, Safety & Oversight Group

SUBJECT: Updates and Initiatives to Ensure Safety and Quality in Nursing Homes

Actions to Improve Infection Prevention and Control

In light of recent reports of healthcare-associated infections in nursing homes, such as adenovirus and *Candida auris*, facilities are reminded of their responsibility for an effective infection prevention and control program to mitigate the onset and spread of infections. Basic practices include:

- Appropriate hand hygiene. As a reminder, alcohol-based handrub (ABHR) should be used instead of soap and water in all clinical situations except when hands are visibly soiled (e.g., blood, body fluids), or after caring for a resident with known or suspected *C. difficile* or norovirus infection during an outbreak; in these circumstances, soap and water should be used. Facilities should ensure adequate access to ABHR since a main reason for inadequate hand hygiene adherence results from poor access;
- Appropriate use of personal protective equipment (PPE). Facilities need to ensure sufficient access and use of PPE, such as gowns and gloves in resident care areas/near the entrance to resident rooms, and appropriate education about the importance of PPE;

Increasing Availability of Alcohol-based Hand Rub*



The purpose of this communication is to promote use of alcohol-based hand rubs (ABHR) by addressing misconceptions regarding the safety, use and efficacy of ABHR in long-term care facilities (LTCF). The memo represents a joint effort by the Bureau of Quality Assurance, Division of Nursing Care Facilities and Division of Safety Inspection, and the Bureau of Epidemiology.

USE AND EFFICACY:

Did you know that health care providers might need to clean their hands as many as 100 times per 12-hour shift? Fewer than half of health care providers properly implement World Health Organization's (WHO) My 5 Moments for Hand Hygiene guidance (<http://www.who.int/infection-prevention/campaigns/clean-hands/5moments/en/>).

Research has shown that ABHR is the most effective method for hand hygiene in health care settings and that it is also the least drying and least likely to lead to skin breakdown in health care workers. Therefore, ABHR is the preferred method for routine hand hygiene in health care settings, including LTCF.

AVAILABILITY IN LTCFs:

It is important to ensure that the ABHR dispensers are widely available and easily accessible at the points of care. Make ABHR available to staff where and when they need it!

- Place ABHR dispensers at the entrance to each patient room. Ideally, dispensers should be in a place that is easily accessible to health care workers. In multi-resident rooms, consider placing dispensers in a location that can also be easily accessed when caring for multiple residents, as well as at the entrance to the rooms.
- In secured units, place ABHR dispensers near the nurses' station. Provide individual-sized containers of ABHR for staff to carry in an otherwise empty pocket or clipped onto their person. Using these is a skill; promote a culture of hand hygiene in your locked units. Train staff on how to properly use individual-sized containers and document demonstrated competency.

SAFETY:

- **Fire hazard:** LTCFs must follow Life Safety Code regarding location and installation of ABHR dispensers (<https://www.federalregister.gov/documents/2016/05/04/2016-10043/medicare-and-medicaid-programs-fire-safety-requirements-for-certain-health-care-facilities>). If you are having difficulty determining where to install ABHR dispensers in your facility per the requirements of the Life Safety Code, you may contact your local Division of Safety Inspection Field Office (http://www.health.pa.gov/facilities/Licensees/Building%20Safety/Pages/Contact-Us.aspx#_WXndc6PD-4).
- **Slip and fall hazard:** ABHR dispensers should have a tray or other mechanism to stop excess product from going on the floor. Dispensers must be kept in good working order. Don't leave ABHR bottles on hand rails.
- **Ingestion hazard:** ABHR dispensers should only dispense the amount of product required for proper use and should not dispense more than once per activation. See "Commonly Asked Questions" for more information.

August 14, 2017

Potential Benefits of EBP

- Increased awareness of and adherence to standard precautions
 - Staff thinking of high-risk activities
 - Availability of PPE on the units
- Decreased stigma of being on precautions
 - Both MDRO and high-risk patients
 - Frame it as a patient safety issue in patient and family education
 - Key to introduce in advance to all stakeholders
- Precautions without risk of social isolation
- Easier escalation during outbreak or containment response
- Fewer outbreaks (hopefully!)

Micro Review: Novel and Targeted Organisms

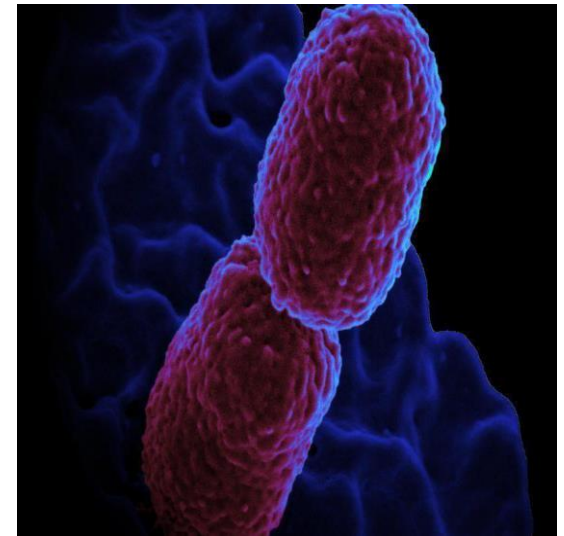


MDROs and Their Approximate Appearance In USA

- MRSA- 1961
- VRE – 1986
- ESBL – 1988
- CRE – 1996
- CP-CRE - 2001

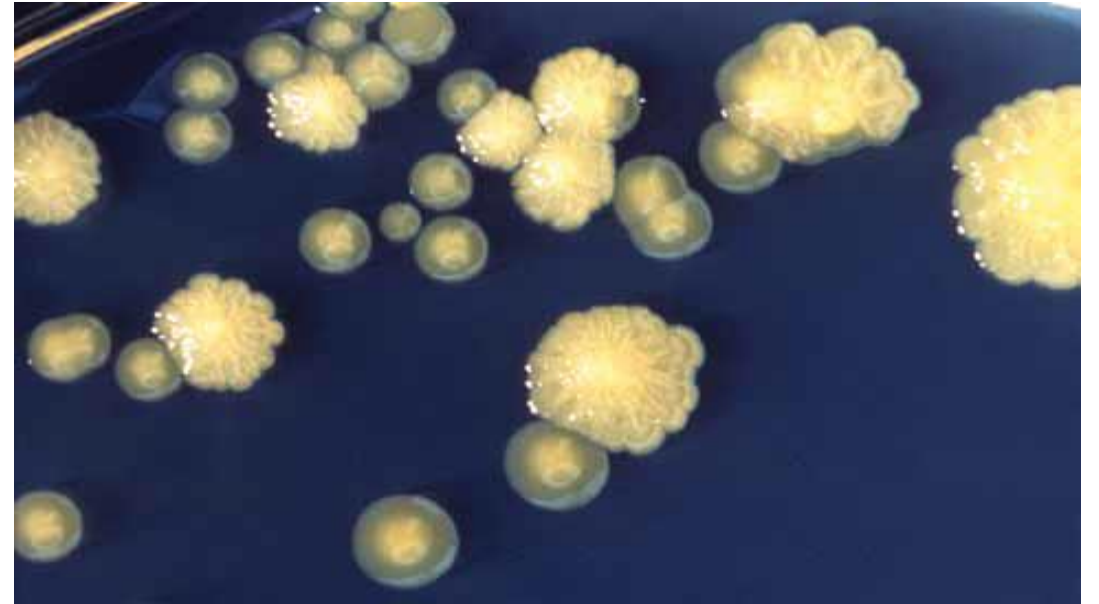
Enterobacteriaceae

- Large family of gram-negative bacteria found in the gut
- Includes more than 100 species
- Found in water or soil
- Most cause extra-intestinal infections



Enterobacteriaceae Examples

- *Klebsiella*
- *E. coli*
- *Enterobacter*
- *Citrobacter*
- *Serratia*
- *Salmonella, Shigella*
- *Proteus, Providencia, Morganella*



Carbapenem Antibiotics

- Usually used to treat serious and drug-resistant infections
 - Meropenem
 - Doripenem
 - Imipenem
 - Ertapenem



Carbapenem Resistant Enterobacteriaceae

- One way that Enterobacteriaceae and other bacteria are resistant to carbapenems is by producing **carbapenemases**
 - enzymes that inactivates carbapenem antibiotics
- **CP-CRE** = Carbapenemase producing carbapenem resistant Enterobacteriaceae
- Infection is difficult to treat due to limited antibiotic options
- Contact or enhanced barrier precautions are recommended

Other Carbapenem Resistant Bacteria

- Other bacteria beside Enterobacteriaceae can be carbapenem resistant and produce carbapenemase
 - *Pseudomonas aeruginosa* and *putida*
 - ❖ Carbapenem resistant *P. aeruginosa* (CRPA)
 - *Acinetobacter baumannii* and other species
 - ❖ Carbapenem resistant *A. baumannii* (CRAB)

Proteus, Providencia, Morganella

- Intrinsic resistance to imipenem
- Precautions are not needed unless also resistant to one or more of these carbapenems
 - Meropenem
 - Doripenem
 - Ertapenem

Lab tests to Identify CRE

- Susceptibility testing to the 4 carbapenem antibiotics
- Susceptible → STOP
- Resistant → test for carbapenamase production
 - Modified Hodge, mCIM, Carba NP
 - Negative → STOP
 - Positive → Identify resistance mechanism (PCR)

Carbapenemase Production Resistance Mechanisms

- *Klebsiella pneumoniae* Carbapenemase [KPC]
- New Delhi metallo- β -lactamase [NDM]
- Oxacillinase [OXA]
- Verona integron-encoded metallo- β -lactamase [VIM]
- Imipenemase [IMP]

No Case

SUSCEPTIBILITY RESULTS

Antibiotic	Enterobacter cloacae MIC Dilutn	MIC Interp
Amikacin	≤16	Susceptible
Ampicillin	>16	Resistant
Ampicillin/Sulbactam	>16/8	Resistant
Aztreonam	>16	Resistant
Cefazolin	>16	Resistant
Cefepime	>16	Resistant
Ciprofloxacin	≤1	Susceptible
Ertapenem	1	Intermediate
Gentamicin	≤4	Susceptible
Imipenem	≤1	Susceptible
Levofloxacin	≤2	Susceptible
Meropenem	≤1	Susceptible
Nitrofurantoin	64	Intermediate
Piperacillin/Tazobactam	64	Intermediate
Tetracycline	≤4	Susceptible
Tigecycline	≤2	Susceptible
Tobramycin	≤4	Susceptible
Trimethoprim/Sulfa	≤2/38	Susceptible

URINE CULTURE WITH MIC

* SOURCE: URINE-CYSTO

STATUS: FINAL

COMPLETED CULTURE RESULTS

ESCHERICHIA COLI - GREATER THAN 100,000 ORGANISMS PER ML

SUSCEPTIBILITY RESULTS:

S = Susceptibility I = Intermediate R = Resistant
Minimum Inhibitory Concentration (MIC) expressed in ug/mL

ORGANISM(S):	ECOLI
AMIKACIN	*S <=2
AMPICILLIN	*R >=32
AUGMENTIN	*R >=32
CARBENICILLIN	*R >=512
CEFOTAXIME	S <=4
CEFTAZIDIME	*S <=8
CEFTIOFUR	*S <=1
CEFTRIAZONE	S <=8
CEPHALOTHIN	*R >=32
CHLORAMPHENICOL	*S 4
CIPROFLOXACIN	*R >=4
DOXYCYCLINE	R >=16
ENROFLOXACIN	*R >=2
GENTAMICIN	*R >=16
IMIPENEM	S <=4
NITROFURANTOIN	*S <=32
OFLOXACIN	R >=8
PIPERACILLIN	*R >=256
TETRACYCLINE	*R >=16
TICARCILLEN	*R >=256
TOBRAMYCIN	*S 2
TRIBRISSEN	*R >=320

NAME :
H# :
ACCT :

*** PATIENT DISCHARGED ***
LOC :
DR. :

AGE :

SEX :

T12224380 COLL: 09/28/2010 16:14 REC: 09/28/2010 16:44 PHYS:

URINE CULTURE

SETUP: UNKNOWN

SPECIMEN DESCRIPTION
SPECIAL REQUEST
CULTURE

URINE
NONE
LIGHT GROWTH ESCHERICHIA COLI
MODERATE GROWTH YEAST
HEAVY GROWTH PSEUDOMONAS AERUGINOSA
FINAL 09/28/2010

REPORT STATUS

SUSCEPTIBILITY

ORGANISM
METHOD
AMPICILLIN
AMIKACIN
CEFTAZIDIME
CEFUROXIME
CIPROFLOXACIN
GENTAMICIN
IMIPENEM
NITROFURANTOIN
TOBRAMYCIN
TRIMETH-SULFA
MEROPENEM
AZTREONAM
PIPERACILLIN/TAZOBACTAM
CEFPODOXIME
AMPICILLIN/SULBACTAM
CEFEPIME
TETRACYCLINE
CEFAZOLIN
CEFTRIAZONE
PIPERACILLIN
ERTAPENEM

LIGHT GROWTH ESCHERICHIA COLI
MIC (MCG/ML)
2 RESISTANT
6 SUSCEPTIBLE
8 RESISTANT
10 RESISTANT
12 RESISTANT
14 RESISTANT
16 RESISTANT
18 SUSCEPTIBLE
20 RESISTANT
22 RESISTANT
24 RESISTANT
4 RESISTANT
6 SUSCEPTIBLE
8 RESISTANT
10 INTERMEDIATE
12 RESISTANT
14 RESISTANT
16 RESISTANT
18 RESISTANT
20 INTERMEDIATE
22

PCR: KPC+ CRE

Specimen information		
Accession #: [REDACTED]	Source: Urine catheter	
Internal #:	Description: K. pneumoniae	
External #: [REDACTED]	Collection Date: 02/06/2020	Time:
Event #:	Receipt Date: 02/18/2020	
Agent Suspected: Carbapenamase	Test Condition: CRE	

Test Results		
Test	Method	Result
PANEL: Carbapenemase PCR		
K. pneumoniae carbapenemase	PCR	Detected
New Delhi metallo-β-lactamase	PCR	Not Detected
Oxacillinase-48 like	PCR	Not Detected
Verona integron metallo-β-lactamase	PCR	Not Detected

The Pennsylvania Department of Health Bureau of Laboratories validated this test exclusively for epidemiological and public health surveillance purposes. Its results are not intended to be used for clinical diagnostic purposes or patient management.

The presence or absence of gene targets associated with resistance to various classes of antimicrobial drugs does not assure that the isolate is resistant or sensitive to these antibiotics.

Tested by: William Eckroth	Test Date: 02/20/2020	Released by: Sameera Sayeed	Release Date: 02/20/2020
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Susceptibility Results

MIC (Ordered: 09/16/2019 11:)

Tested Interpretation

* Ampicillin	R
* Amox-clav	R
* Piper Tazo	R
* Cefazolin	R
* Ceftazidime	R
* Ceftriaxone	R
* Cefepime	R
* Meropenem	R
Amikacin	Sus
* Gentamicin	I
* Tobramycin	R
* Levofloxacin	R
Tetracycline	Sus
* Nitrofurant	R
* Trimethoprim-sulfamethoxazole	R

PANEL: Carbapenemase PCR

* Ceftriaxone	R	K. pneumoniae carbapenemase	PCR	Not Detected
* Cefepime	R	New Delhi metallo- β -lactamase	PCR	Detected
* Meropenem	R	Mobilized colistin resistance gene 1	PCR	Not Detected
Amikacin	Sus	Mobilized colistin resistance gene 2	PCR	Not Detected
* Gentamicin	I	Oxacillinase-48 like	PCR	Not Detected
* Tobramycin	R	Verona integron metallo- β -lactamase	PCR	Not Detected

* Drug susceptibility results reported

AST: CRAB, PDRO

Antimicrobial Susceptibility Testing

mCIM

CIM - Test not done

Drugs

		<u>MIC(mcg/ml)</u>
Amikacin -	Resistant	>32.00
Aztreonam -	No interpretation	>16.00
Cefepime -	Intermediate	16.00
Cefotaxime -	Resistant	>32.00
Ceftazidime -	Resistant	>16.00
Ciprofloxacin -	Resistant	>2.00
Colistin -	Intermediate	2.00
Doripenem -	Resistant	>2.00
Doxycycline -	Resistant	>16.00
Ertapenem -	No interpretation	>4.00
Gentamicin -	Resistant	>8.00
Imipenem -	Resistant	>8.00
Levofloxacin -	Resistant	8.00
Meropenem -	Resistant	>8.00
Minocycline -	Intermediate	8.00
Piperacillin/Tazobactam -	Resistant	>64.00
Polymyxin B -	Intermediate	2.00
Ticarcillin clavulanate -	Resistant	>128.00
Tigecycline -	No interpretation	0.50
Tobramycin -	Resistant	>8.00
Trimethoprim/Sulfamethoxazole	Resistant	>4.00

PCR: OXA-23+ (for PDR CRAB case on previous slide)

<u>Test Name</u>	<u>Results</u>	<u>Date Reported</u>
CRE Real-Time PCR		01/31/2020
KPC	KPC gene NOT DETECTED.	
		01/31/2020
NDM	NDM gene NOT DETECTED.	
		01/31/2020
OXA-48	OXA-48 gene NOT DETECTED.	
		01/31/2020
IMP	IMP gene NOT DETECTED.	
		01/31/2020
VIM	VIM gene NOT DETECTED.	
		01/31/2020
OXA-23	OXA-23 gene DETECTED.	
		01/31/2020
OXA-24-40	OXA-24-40 gene NOT DETECTED.	
		01/31/2020
OXA-58	OXA-58 gene NOT DETECTED.	

Line listing

Facility Name:

Organism: Carbapenem resistant

Demographics

Resident name

Floor #

Room #

Admit date

DOB

Age

Sex

CLASSIFICATION

Infection Type

Body Site

Transmission-Based Precautions: Contact or EBP

- Carbapenem susceptible → No precautions
- Carbapenemase-producing Organism → EBP
- Carbapenemase-producing Organism + uncontained secretions or excretions → Contact Precautions

Infection Vs. Colonization

- Infection
 - Organism is in the body and causing disease
 - Typically associated with symptoms.
- Colonization
 - Organism is in/on body but isn't causing disease
 - Not associated with symptoms
 - Can eventually go on to cause infection
- Both are transmissible, both can cause outbreaks and require infection control interventions and precautions

Cohorting

- Cohort CP-CRE patients together if they have the same resistance mechanism
- KPC with KPC, even if one patient has *E. coli* and the other has *K. pneumoniae*
- If resistance mechanism is not known:
 - Public health can perform testing
 - Cohort with low risk roommate
 - Implement transmission-based precautions
- Not optimal to cohort a CRE patient with a CRAB patient
- Call us if you are not sure

Philadelphia Reporting Requirement

- Health Advisory New Drug-Resistant Organism Reporting Requirements in Philadelphia April 25, 2018
 - Philadelphia Board of Health requires reporting of infection or colonization with:
 - *Candida auris*
 - Carbapenem resistant Enterobacteriaceae (CRE)
 - Pan-drug resistant Organisms (PDRO)
- Voluntary reporting encouraged for Carbapenem resistant *Acinetobacter baumannii* and *Pseudomonas* spp.

QUESTIONS



LTCF IPC Focus Group: <https://forms.gle/rQojDpw6drcPaQNJ9>

Email us: HAI.PDPH@phila.gov

Thank you!

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