

# NHSN Group Users Meeting

April 23rd, 2025

# Welcome!

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## The HAI Epidemiology Unit

- Elli Stier – Unit Manager
- Anne Haddad – AMS Coordinator
- Sarmed Rezzo – LTC Epidemiologist
- Susan Catlin – HAI Epidemiologist
- Brooke Heidenga – HAI Epidemiologist
- Shruthi Degala – HAI Epidemiologist
- Niki Mach – MDRO Epidemiologist
- Allison Pall – iEC Surveillance Coordinator (EIP)
- Kyle Muchez – NHSN Epidemiologist

# Agenda

- Review of CLABSI Event Insertion Data
- NHSN 2024 Annual Survey Data – Summary
- NHSN Antimicrobial Use and Resistance (AUR) Update
- Questions & Discussion



# CLABSI: Time Between Insertion & Event

*Healthcare Associated Infections Epidemiology Unit  
Michigan Department of Health and Human Services*

NHSN Group Users Meeting

April 23, 2025

# The Question

## February 2025 Group Users Meeting

How many days are there between device insertion and event?

- A) All devices
- B) Dialysis catheters

Early infection, median of 7 to 10 days, is the most common timeframe across studies, but one study showed a median time of 33 days between insertion and infection.

Ascertaining this information could help narrow down a timeframe for meaningful IPC intervention to assist with CLABSI prevention.

# Methods

Inclusion: events that contribute to SIR (“Clab\_Excl” = N)

Evaluation of data completeness – “Device Insertion Date” variable

Calculate days between insertion and event

- Range, mean, median
- All device types and dialysis catheters alone
  - All eligible events 2016-2024
  - All events linked to MIDB 2016-2022 (race/ethnicity)

Assess data normality – median vs. mean

# Data Completeness – “Device Insertion Date”

Event Type	Year	All Device Types			Dialysis Catheter		
		Insertion Date Populated	Eligible Events	Percent Insertion Date Populated	Insertion Date Populated	Eligible Events	Percent Insertion Date Populated
All Events	2016	187	582	32.1%	35	68	51.5%
	2017	179	551	32.5%	31	57	54.4%
	2018	142	501	28.3%	39	69	56.5%
	2019	101	503	20.1%	29	153	19.0%
	2020	126	630	20.0%	40	238	16.8%
	2021	197	782	25.2%	57	245	23.3%
	2022	162	703	23.0%	49	232	21.1%
	2023	159	603	26.4%	56	216	25.9%
	2024	120	576	20.8%	39	191	20.4%
	<b>TOTAL</b>	<b>1373</b>	<b>5431</b>	<b>25.3%</b>	<b>375</b>	<b>1469</b>	<b>25.5%</b>
Events Linked to MIDB	2016	169	518	32.6%	33	64	51.6%
	2017	166	507	32.7%	28	53	52.8%
	2018	117	472	24.8%	37	65	56.9%
	2019	79	471	16.8%	28	141	19.9%
	2020	101	575	17.6%	40	218	18.3%
	2021	163	739	22.1%	53	234	22.6%
	2022	122	653	18.7%	43	213	20.2%
	<b>TOTAL</b>	<b>917</b>	<b>3935</b>	<b>23.3%</b>	<b>262</b>	<b>988</b>	<b>26.5%</b>

# Insertion to Event

Population	Timeframe	All Device Types			Dialysis Catheter		
		Range	Median	Mean	Range	Median	Mean
All Events	2016-2024	0-1798	9	24.8	0-801	7	20.3
Events Linked to MIDB	2016-2022	0-1798	8	23.9	0-801	8	17.9

# Insertion to Event by Race/Ethnicity

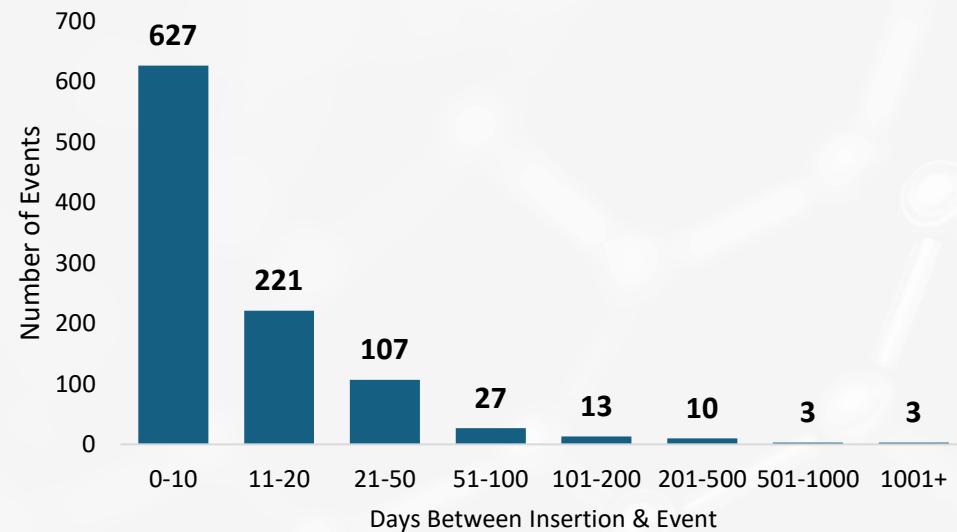
All Device Types	White	Black	Hispanic	Arabic	Asian	Native American
Insertion Date Populated	740	207	22	9	12	3
Insertion to Event: Minimum	0	1	2	2	2	4
Insertion to Event: Maximum	1798	1770	187	122	415	12
Insertion to Event: Median	7	8	11.5	13.5	10	10
Insertion to Event: Mean	22.7	27.2	22.4	25.6	40.5	8.7

Dialysis Catheter	White	Black	Hispanic	Arabic	Asian	Native American
Insertion Date Populated	167	85	3	2	3	1
Insertion to Event: Minimum	0	1	6	11	6	4
Insertion to Event: Maximum	801	172	98	21	10	4
Insertion to Event: Median	6	8	29	16	9	4
Insertion to Event: Mean	19	15.6	44.3	16	8.3	4

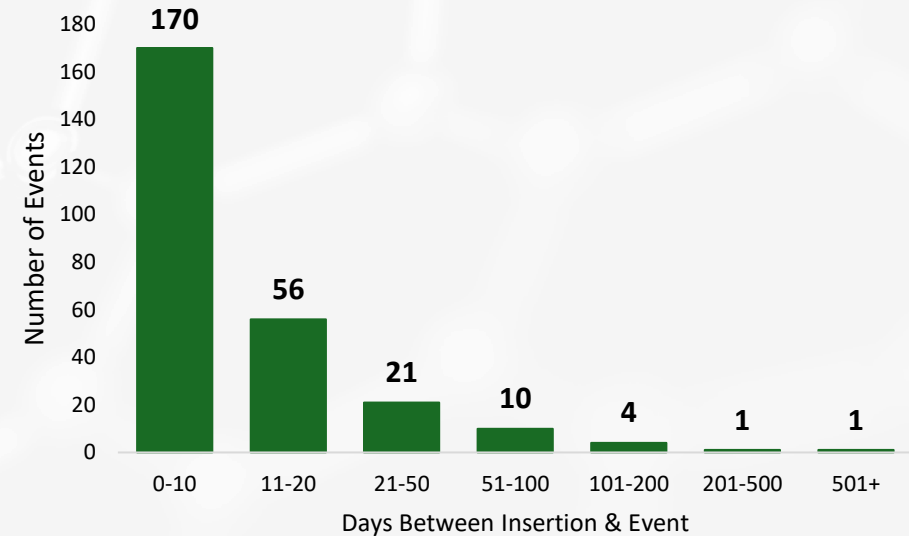
# Intervention to Event Distribution

Linked Events 2016-2022:  
Distribution of Days Between Insertion and Event

All Device Types



Dialysis Catheters



## Non-normal distributions:

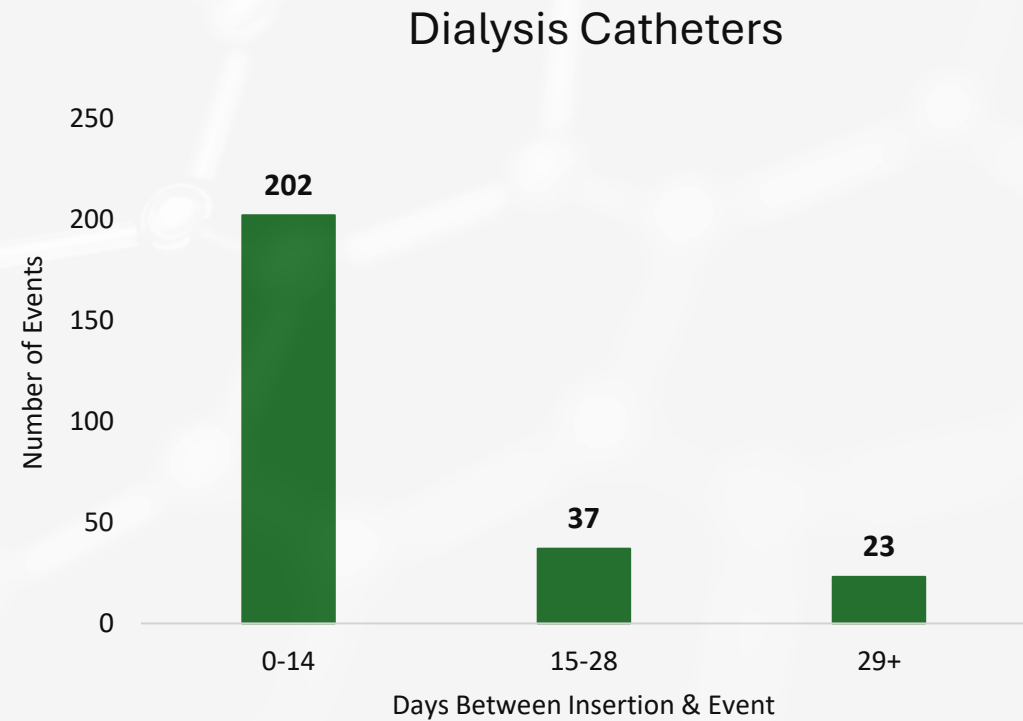
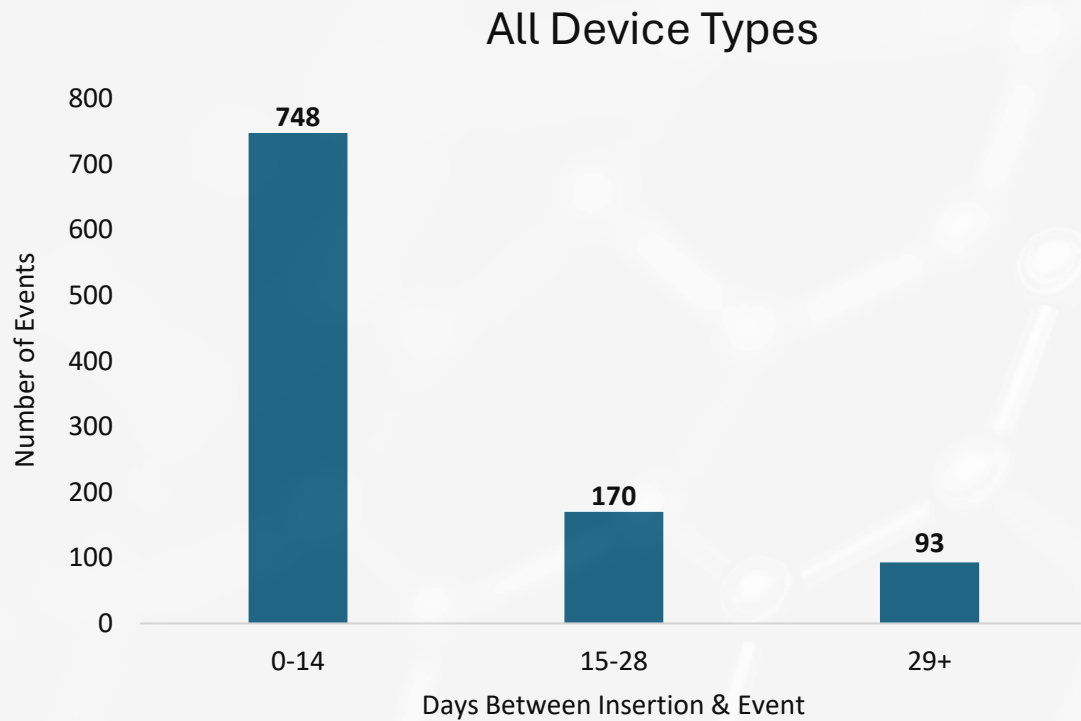
Histograms show right skew due to outliers.  
Shapiro-Wilk tests:  $p < .05$ .

## Median vs. Mean:

Use mean if no outliers and data are normally distributed.  
Use median if data are skewed with outliers.

# Intervention Timeframe

Linked Events 2016-2022:  
Distribution of Days Between Insertion and Event



# Summary

- Device insertion date is populated for approximately 25% of all events.
- Data for time between insertion date and event are not normally distributed (outliers); therefore, median is the appropriate value to use.
- Median insertion to event for **all device types** is **8-9 days**.
  - Below median: White patients (7 days)
  - At median: Black patients (9 days)
  - Above median: Asian, Native American, Hispanic, Arabic patients (10-13.5 days)
- Median insertion to event for **dialysis catheters** is **7-8 days**.
  - Below median: White and Native American patients (4-6 days)
  - At median: Black patients (8 days)
  - Above median: Asian, Hispanic, Arabic patients (9-29 days)
- Recommended interval for IPC monitoring is **0 to 14 days**.

# 2024 Annual NHSN Survey

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APRIL 23<sup>RD</sup>, 2025

# Survey Background

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100 FACILITIES COMPLETED  
2024 ANNUAL DATA AND  
SUBMITTED IN MARCH 2025



SECTIONS OF THE SURVEY ARE  
SPECIFIC TO THE NHSN'S  
PATIENT SAFETY COMPONENT



INFECTION CONTROL  
PRACTICES SECTION: Q24–  
Q34A

# Survey Background

**Table 1. Facility Characteristics of the Michigan NHSN Group<sup>1</sup>**

<b>Region</b>	<b>Number</b>
1	9
2N	16
2S	18
3	16
5	9
6	17
7	7
8	8
<b>Medical School Affiliation</b>	<b>Number</b>
Teaching <sup>2</sup>	87
Non-Teaching	13
<b>Bed Size</b>	<b>Number</b>
≤100	47
101-200	13
201-500	31
≥501	9

<sup>1</sup>Number of hospitals who completed the 2024 Annual Hospital Survey-Patient Safety Component.

<sup>2</sup>Teaching includes major, graduate, and undergraduate affiliation with medical schools as indicated on their facility survey.

# Why Infection Control Practices Matter

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Prevent transmission of MDROs and emerging pathogens

Foundation for outbreak prevention and containment

This survey allows us to benchmark and share what facilities are doing well in this domain

# HAI Prevention Practices (Q73)

Table 1. General HAI Prevention Practices <sup>1</sup>						
HAI Prevention	CAUTI	CLABSI	CDI LabID Events	MRSA Bacteremia LabID Events	COLO SSIs	HYST SSIs
Facility has prevention checklist/bundle	90 (90.0%)	94 (94.0%)	62 (62.0%)	48 (48.0%)	61 (61.0%)	56 (56.0%)
Facility monitors adherence to prevention checklist/bundle:						
Weekly	32 (35.6%)	37 (39.4%)	17 (27.4%)	10 (20.8%)	5 (8.2%)	6 (10.7%)
Monthly	20 (22.2%)	20 (21.3%)	9 (14.5%)	10 (20.8%)	25 (41.0%)	22 (39.3%)
Quarterly	5 (5.6%)	4 (4.3%)	4 (6.5%)	3 (6.3%)	5 (8.2%)	5 (8.9%)
Yearly	4 (4.4%)	3 (3.2%)				
PRN	21 (23.3%)	21 (22.3%)	29 (46.8%)	23 (47.9%)	22 (36.1%)	20 (35.7%)
Other	5 (5.6%)	5 (5.3%)		1 (2.1%)	2 (3.3%)	2 (3.6%)
Not regularly monitored/measured	3 (3.3%)	4 (4.3%)	3 (4.8%)	1 (2.1%)	2 (3.3%)	1 (1.8%)

<sup>1</sup>Facilities who utilize a checklist or bundle for prevention of HAIs.

# Consistent Use of MDRO Contact Precautions (Q25-28)

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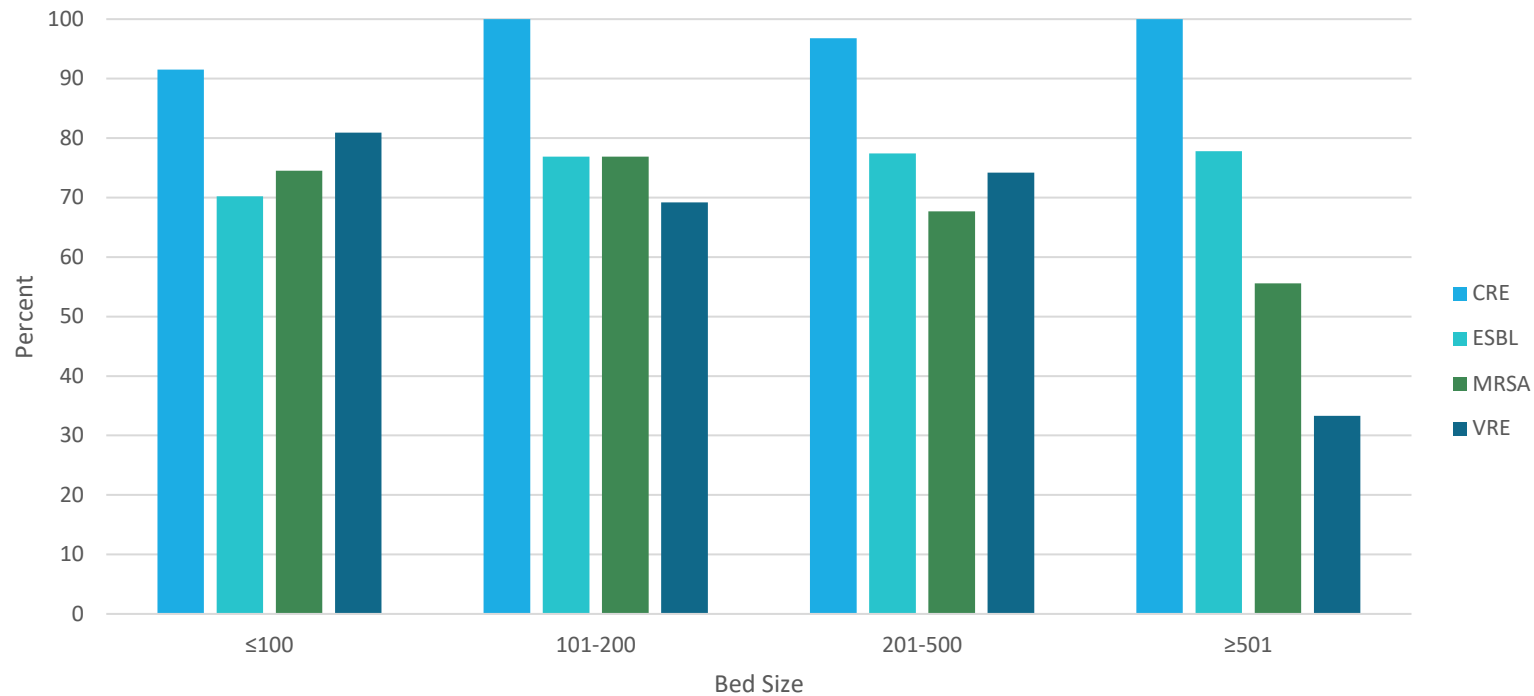
<b>Table 2. Contact Precautions for Multidrug-Resistant Organisms (MDRO)</b>	
<b>Routine Contact Precautions for Infected or Colonized Patients<sup>1</sup>:</b>	<b>N (%)</b>
MRSA <sup>a</sup>	71 (71.0%)
VRE <sup>b</sup>	73 (73.0%)
CRE <sup>c</sup>	95 (95.0%)
ESBL <sup>d</sup>	74 (74.0%)

<sup>1</sup>Facilities who have a policy that patients infected or colonized with the following pathogens are routinely placed in contact precautions while at the facility:

- <sup>a</sup>Methicillin-resistant *Staphylococcus aureus* (MRSA)
- <sup>b</sup>Vancomycin-resistant Enterococci (VRE)
- <sup>c</sup>Carbapenem-resistant Enterobacterales (CRE): regardless of confirmatory testing
- <sup>d</sup>Extended-Spectrum Beta-Lactamase (ESBL): Suspected or confirmed ESBL-producing or extended spectrum cephalosporin resistant *Enterobacterales*

# Consistent Use of MDRO Contact Precautions (Q25-28)

Figure 1. Percent of Facilities with Routine Contact Precautions for Multidrug-Resistant Organisms (MDRO) by Bed Size



# MDRO Screening Practices (Q29-32)

<b>Table 3. Screening for Multidrug-Resistant Organisms (MDROs)</b>	
<b>Routine Screening Testing<sup>1</sup>:</b>	<b>N (%)</b>
MRSA <sup>a</sup>	54 (54.0%)
CRE <sup>b</sup>	16 (16.0%)
C. auris <sup>c</sup>	43 (43.0%)
<b>Routine Lab Method for Testing<sup>2</sup></b>	<b>N (%)</b>
C. auris	43
PCR	16 (37.2%)
Culture-Based	27 (62.8%)
Other	2 (4.7%)

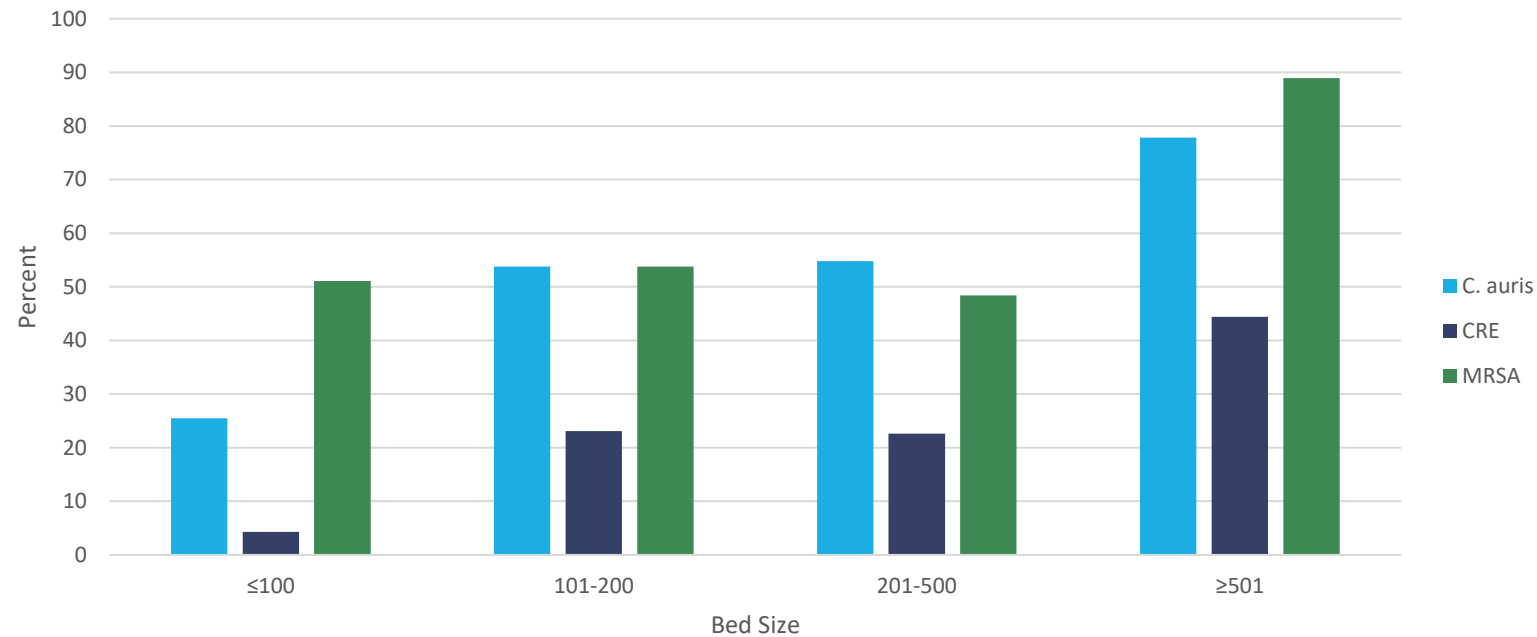
<sup>1</sup>Facilities who routinely perform routine screening testing on patients (culture or non-culture methods), including screening performed by public health laboratories and commercial laboratories:

- <sup>a</sup>Methicillin-resistant *Staphylococcus aureus* (MRSA)
- <sup>b</sup>Carbapenem-resistant Enterobacterales (CRE)
- <sup>c</sup>*Candida auris* (C. auris)

<sup>2</sup>Facilities responding 'yes' to Routine Screening testing for MDROs indicated the lab method routinely used for testing of screening swabs from their facility

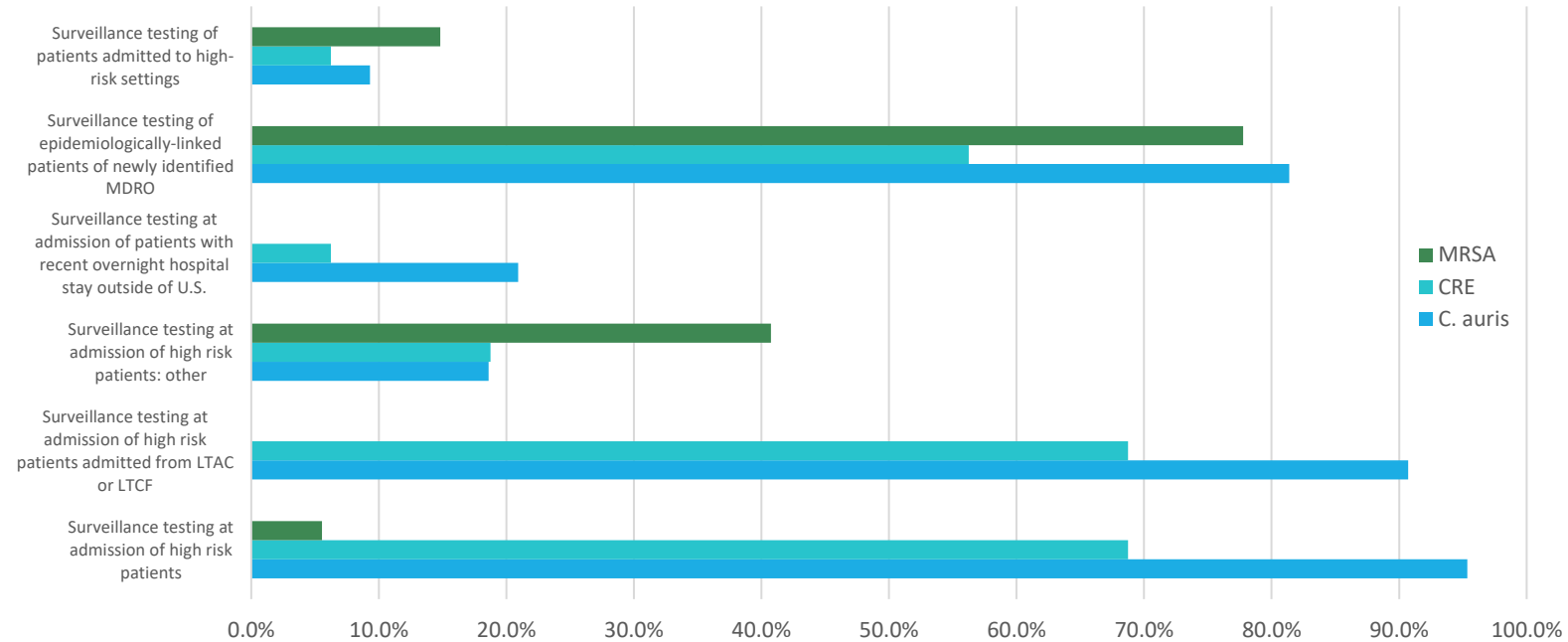
# MDRO Screening Practices (Q29-32)

Figure 2. Percent of Facilities with Routine Screening for Multidrug-Resistant Organisms (MDRO) by Bed Size



# MDRO Screening Practices (Q29-32)

Figure 3. MDRO Routine Surveillance of Patient Groups



# MDRO Prevention Practices (Q33-34)

**Table 5. Prevention Practices for Multidrug-Resistant Organisms (MDRO) and Healthcare-Associated Infections (HAI)**

Routine chlorhexidine bathing <sup>1</sup> :	Number	Percent
Routine bathing policy for any adult patient	90	90.0% (n=100)
ICU patients	73	81.1% (n=90)
All ICU patients	50	68.5% (n=73)
ICU patients with central venous or midline catheters	23	31.5% (n=73)
Non-ICU patients	74	82.2% (n=90)
All Non-ICU patients	3	4.1% (n=74)
Non-ICU patients with central venous or midline catheters	71	95.9% (n=74)
Preoperative bathing for non-ICU patients undergoing surgery	73	81.1% (n=90)

<sup>1</sup>Facilities with a policy to routinely use chlorhexidine bathing for any adult patients to prevent infection or transmission of MDROs.

# MDRO Prevention Practices (Q33-34)

**Table 5. Prevention Practices for Multidrug- Resistant Organisms (MDRO) and Healthcare-Associated Infections (HAI)**

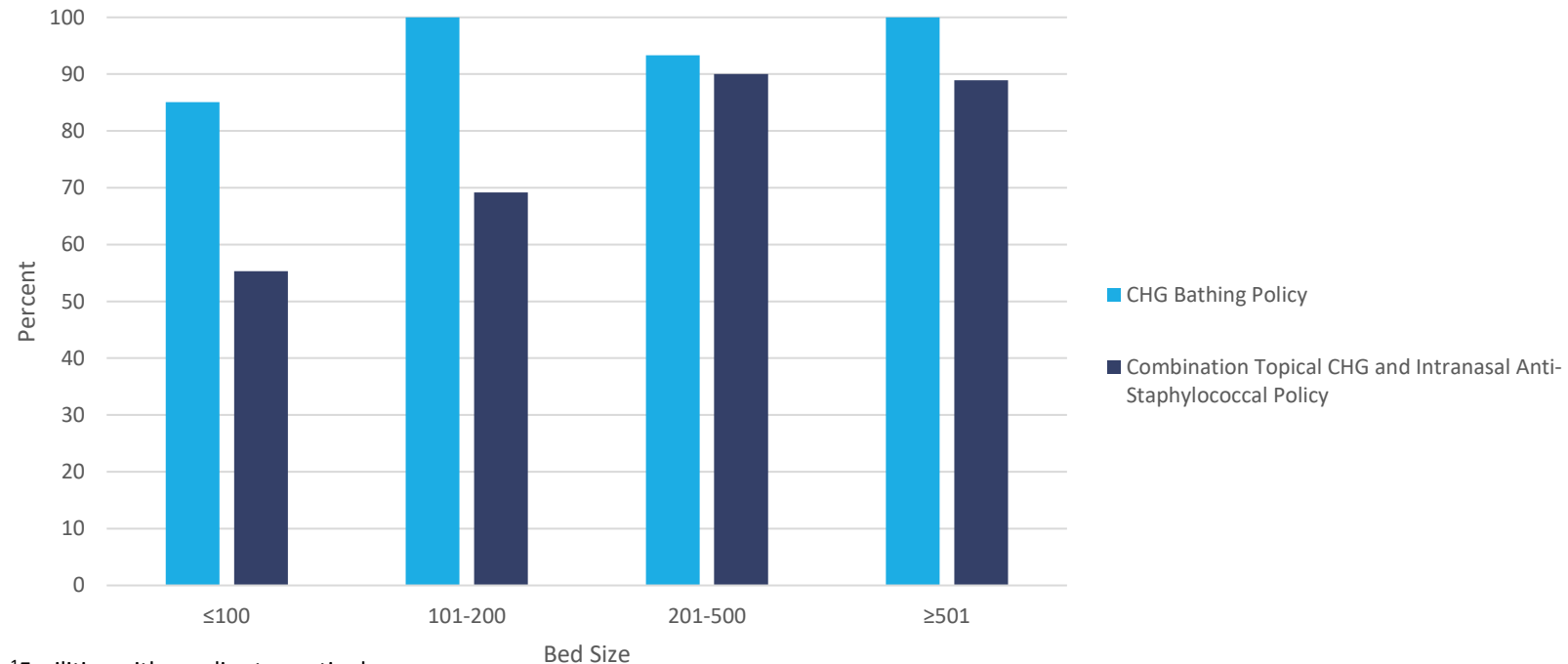
Routine combination prevention <sup>2</sup>	Number	Percent
Routine combination of topical chlorhexidine and intranasal anti-staphylococcal agent for any adult patient	70	70.0% (n=100)
All ICU patients	17	24.3% (n=70)
ICU patients with MRSA <sup>3</sup>	3	17.6% (n=17)
Non-ICU patients	15	21.4% (n=70)
Non-ICU patients with MRSA <sup>3</sup>	8	53.3% (n=15)
Preoperative for patients undergoing surgery	67	95.7% (n=70)

<sup>2</sup>Facilities with a policy to routinely use a combination of topical chlorhexidine and intranasal anti-staphylococcal agent (mupirocin, iodophor, or alcohol based intranasal agent) for any adult patients to prevent HAI or transmission of resistant pathogens

<sup>3</sup>Colonized or infected with MRSA

# MDRO Prevention Practices (Q33-34)

Figure 4. Percent of Facilities with Routine CHG Bathing and Use Policies<sup>1</sup> by Bed Size



<sup>1</sup>Facilities with a policy to routinely use:

- Combination of topical chlorhexidine and intranasal anti-staphylococcal agent (mupirocin, iodophor, or alcohol based intranasal agent) for any adult patients to prevent HAI or transmission of resistant pathogens.
- Facilities with a policy to routinely use chlorhexidine bathing for any adult patients to prevent infection or transmission of MDROs.

# Takeaways

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## CHG and contact precautions are widely adopted

- Most facilities report implementation of contact precautions for MRSA and CRE
- Decolonization strategies such as chlorhexidine bathing are used in about half of hospitals
- CHG use in pre-op and non-ICU patients is inconsistent

## Importance of continuing to adopt screening practices

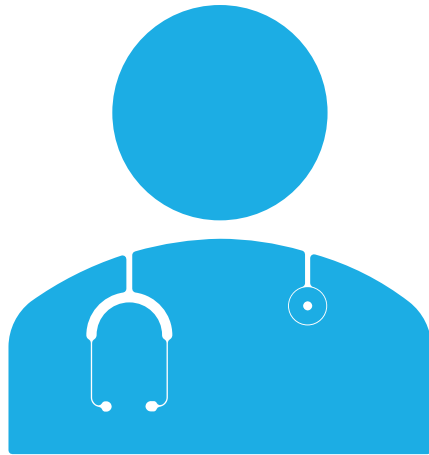
- Screening for CRE and *C. auris* remain low

These data can help facilities in reviewing their current IPC practices and guide decisions on where resources could be used or invested in

HAI prevention efforts for CLABSI and CAUTI are widely adopted and actively monitored

# Thank you

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# Additional Info

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Survey responses from Michigan hospitals were analyzed across three key domains: facility microbiology laboratory practices, infection prevention and control, and antibiotic stewardship. Responses were cleaned and categorized as Yes (Y), No (N), or Missing. Stratified analysis was performed by Region, Teaching Status, and Bed Size Category. Conditional logic was applied to ensure follow-up questions were only considered when applicable.

<https://www.cdc.gov/nhsn/>

# Statewide Summary – Key ICP Practices

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CRE Contact Precautions: 95%

CHG Bathing in ICU: 73%

CHG Bathing (Non-ICU): 74%

CHG Bathing Pre-op: 73%

CHG + Mupirocin Use: 70%

MRSA Contact Precautions: 71%

MRSA Screening: 54%

C. auris Screening: 43%

CRE Screening: 16%



NHSN AUR MODULE  
UPDATE

**NHSN USERS GROUP**

**4 / 23 / 25**

# AUR MODULE

## **Antimicrobial Use (AU)**

- Risk-adjusted inter- and intra-facility antimicrobial use benchmarking
- Evaluate antimicrobial use trends over time at the facility and national levels
- Days of therapy (antimicrobial days) reported over days present
- 95 antimicrobials stratified by route of administration

## **Antimicrobial Resistance (AR)**

- Awareness and benchmarking to aid in clinical decision making and prioritize prevention efforts
- Regional and national assessment of antimicrobial resistant organisms of public health importance, including ecologic and infection burden assessment
- Isolate-level reports containing specimen and patient data, and antimicrobial susceptibility results



# AUR STANDARDIZED METRICS

- Standardized Antimicrobial Administration Ratio (**SAAR**)
  - Analyze and report antimicrobial use data in summary form
  - $SAAR = \text{Observed Antimicrobial Use} / \text{Predicted Antimicrobial Use}$
- Standardized Resistant Infection Ratio (**SRIR**)
  - Compare rates of hospital-onset (HO) drug-resistant infection events to a national benchmark
  - $SRIR = \# \text{ Observed Resistant Infections} / \# \text{ Predicted Resistant Infections}$
- Pathogen-specific Standardized Infection Ratio (**pSIR**)
  - Compare rates of HO culture-positive infections of specific pathogen to a national benchmark
  - $pSIR = \# \text{ Observed Infections of Specific Pathogens} / \# \text{ Predicted Infections of Specific Pathogens}$



# WHY PARTICIPATE?

- 1.Required by CMS for Promoting Interoperability Program (as of Jan 2024)
- 2.Supports antimicrobial stewardship efforts and intervention planning
- 3.Provides benchmarking to compare usage across units and nationally
- 4.Helps combat antimicrobial resistance through better tracking
- 5.Demonstrates quality, transparency, and readiness for accreditation
- 6.Enhances patient safety by reducing unnecessary antibiotic exposure



# WHO IS REPORTING

**2024**

Total Participating

**AU**

98

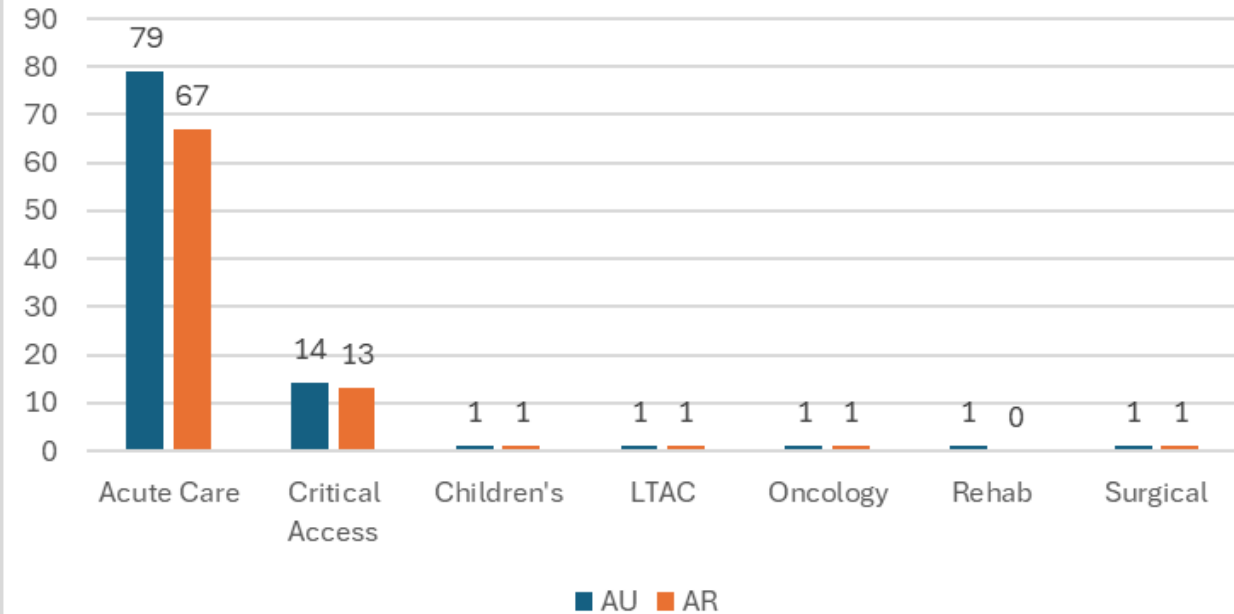
**AR**

84

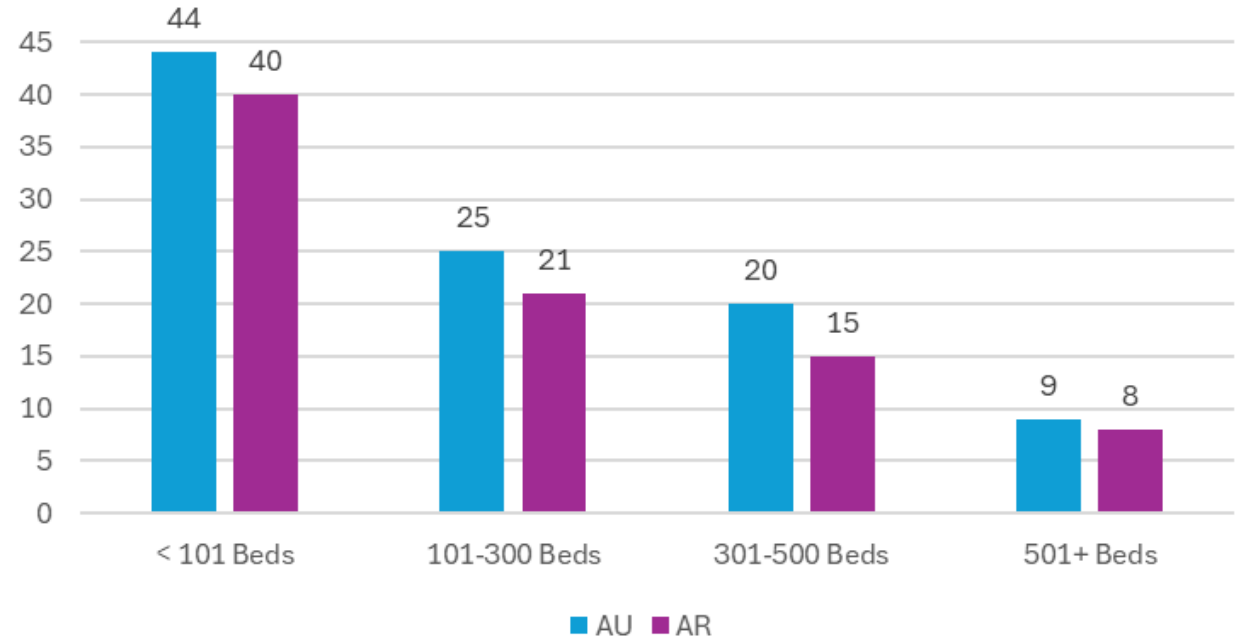
**AU + AR**

83

Type of Hospital



Hospital Bed Size



# AUR PROJECTS

- AU reports
  - Individual
  - Statewide
- SHEA Poster
- AR exploration

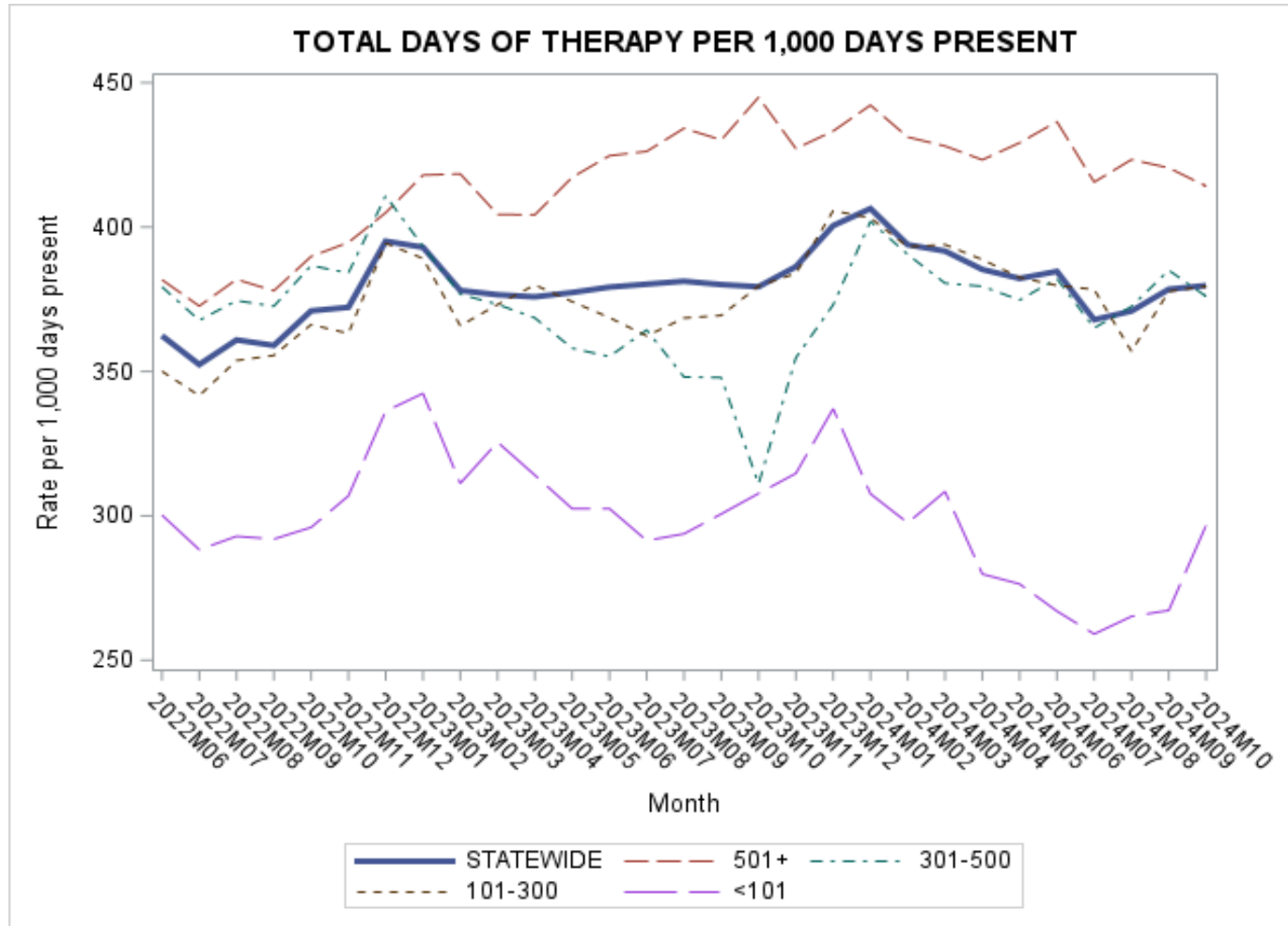


# AU FACILITY REPORTS

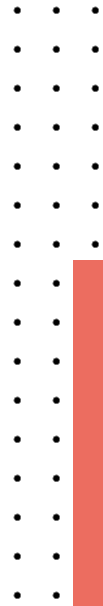
- Data comparing individual facility to others of the same size and overall trends
  - SAARs
  - Total antimicrobial usage
  - Individual antibiotic class usage
- Sent to NHSN facility administrators quarterly
  - Will be adding AUR contacts!



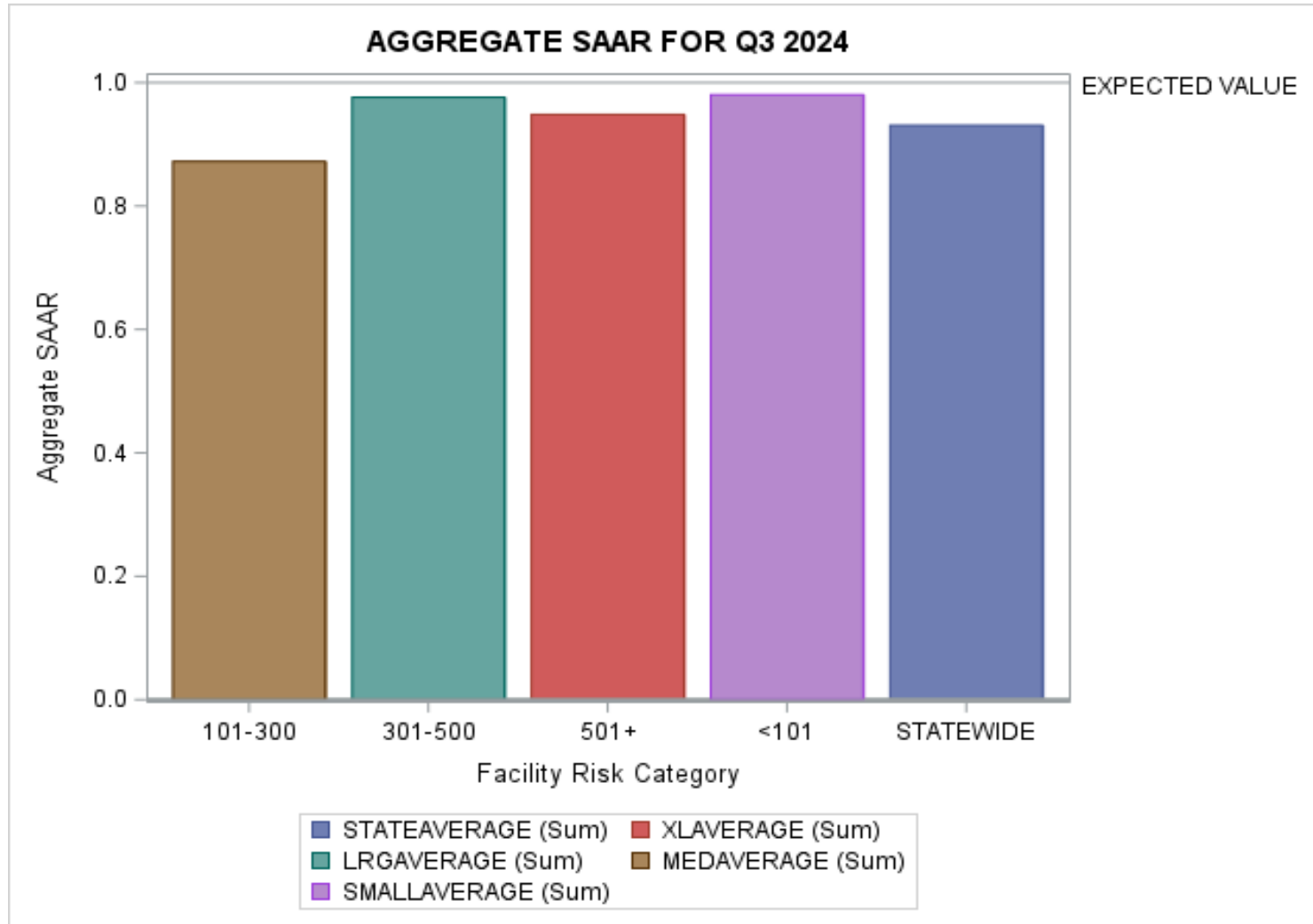
# AU STATEWIDE REPORT



- Available on [www.Michigan.gov/AMSinfo](http://www.Michigan.gov/AMSinfo)



# AU STATEWIDE REPORT



- Available on [www.Michigan.gov/AMSinfo](http://www.Michigan.gov/AMSinfo)

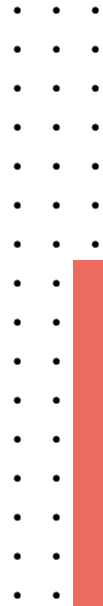
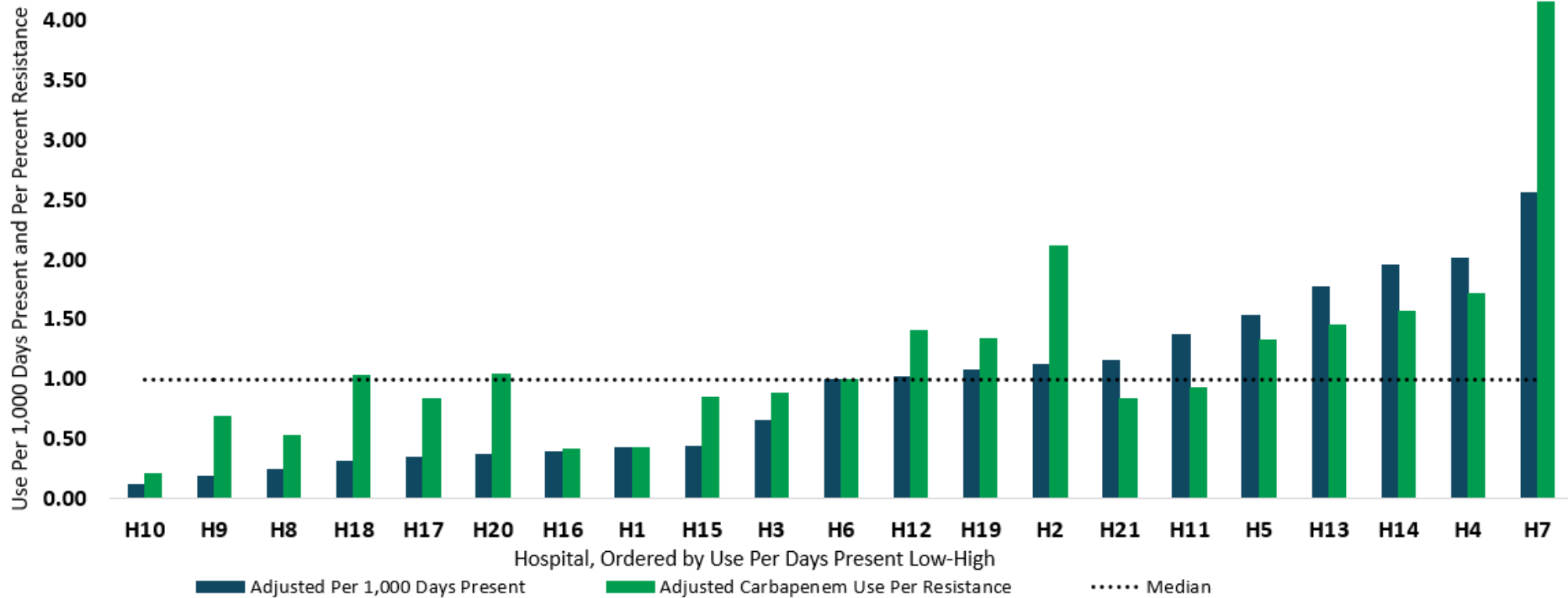


# AU + AR ANALYSIS

- Accepted as a poster at SHEA Spring!
- Analysis of AU data paired with AR to develop a measure of appropriateness of carbapenem use compared to resistance burden.
  - 21 Michigan hospitals
  - Compared our measure to the SAAR to identify hospitals with potential overuse or underuse of carbapenems compared to their resistance burden.
- Currently only for 3 phenotypes and 3 drugs.
  - Phenotypes: ESC *E. coli*, ESC *Klebsiella* spp., *P. aeruginosa*
  - Agents: Ertapenem, Imipenem, Meropenem



# AU + AR ANALYSIS OUTCOME



# AR CONTINUING ANALYSIS

- Digging into the AR data trends to identify action areas.
- A very complex topic!
- Engaging partners from across the state to guide analysis.
- Developed a Tableau dashboard that shows resistance at the statewide, region, bed size, and blinded individual facility levels.
  - 5 phenotypes - ESC *E. coli*, ESC *Klebsiella* spp., MRSA, VRE Faecalis, VRE Faecium



# Antimicrobial Resistance by Onset Type

Select Phenotype

ESCKlebsiella

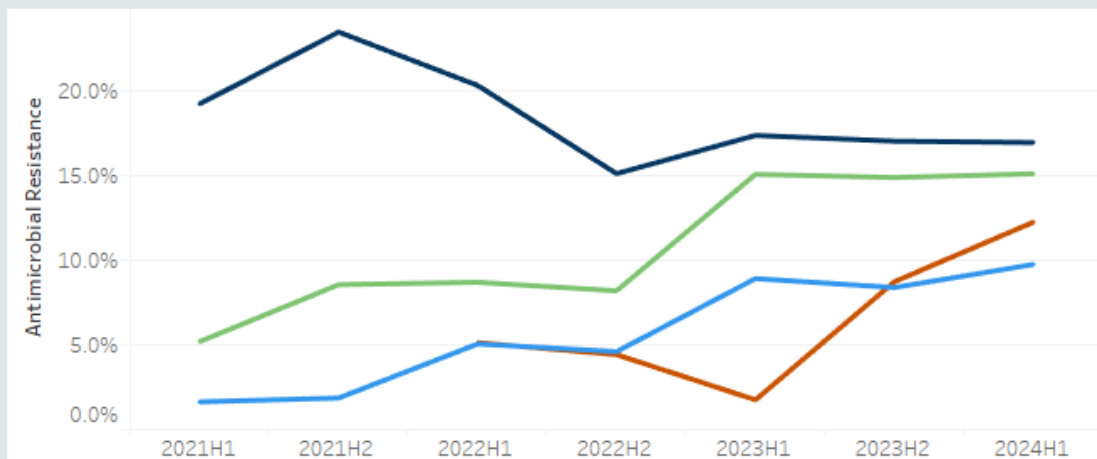
Select Facility Identifier

[Redacted]

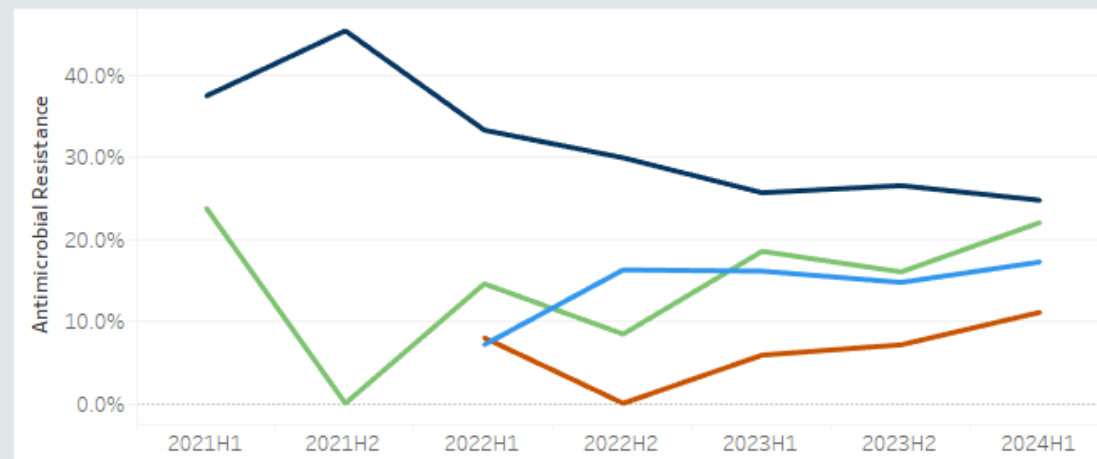
Specimen YrHalf

(Multiple values)

## Community Onset



## Hospital Onset



Measure Names

- Statewide
- Region
- Bed Size
- Facility

MI

- Region 6
- 101-300

Onset	Specimen YrHalf	State: Resistant	State: Tested	State: AR	Region: Resistant	Region: Tested	Region: AR	Bed Size: Resistant	Bed Size: Tested	Bed Size: AR	Facility: Resistant	Facility: Tested	Facility: AR
CO	2023H1	525	3,023	17.4%	60	673	8.9%	99	657	15.1%	2	114	1.8%
	2023H2	724	4,252	17.0%	68	811	8.4%	150	1,008	14.9%	11	126	8.7%
HO	2023H1	120	467	25.7%	10	62	16.1%	23	124	18.5%	1	17	5.9%
	2023H2	136	512	26.6%	9	61	14.8%	21	131	16.0%	1	14	7.1%



Questions?

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# Next Meeting

June 25th, 2025