September 2024

IOWA Health and Human Services

Table of Contents

Iowa Department of Health and Human Services
Center for Acute Disease Epidemiology
321 E 12th Street, 5th Floor
Des Moines, IA 50319

Contact Information:
Andrew Hennenfent, DVM, MPH, DACVPM
Healthcare Associated Infections Program Manager
Email: hai-ar@hhs.iowa.govha

Abbreviations

CAD	Cumulative Attributable Difference
CADE	Center for Acute Disease Epidemiology (Department within Iowa HHS)
C. auris	*Candida auris*
CAUTI	Catheter-Associated Urinary Tract Infection
CDC	Centers for Disease Control and Prevention
CDI	*Clostridioides difficile* infection
CLABSI	Central Line-Associated Bloodstream Infection
CMS	Centers for Medicare and Medicaid Services
CP-CREs	Carbapenemase-Producing Carbapenem-Resistant Enterobacterales
CPO	Carbapenemase-Producing Organisms
CRAB	Carbapenem-resistant *Acinetobacter baumanii*
FacWideIn	Facility-wide inpatient
HAIs	Healthcare-Associated Infections
IDSS	Iowa Disease Surveillance System
ICU	Intensive Care Unit
Iowa HHS	Iowa Department of Health and Human Services
MDRO	Multidrug-Resistant Organism
MRSA	Methicillin-Resistant *Staphylococcus aureus*
NHSN	National Healthcare Safety Network

PPS	Prospective Payment System
SIR	Standardized Infection Ratio
TAP	Targeted Assessment for Prevention
U.S. HHS	Federal Department of Health and Human Services
VAE	Ventilator-Associated Events
VISA	Vancomycin-Intermediate *Staphylococcus aureus*
VRSA	Vancomycin-resistant *Staphylococcus aureus* (VRSA)

Executive Summary

The following report includes information about healthcare associated infections (HAIs) among patients that received care in an Iowa healthcare facility in 2021. The data is compared to national benchmarks, as well as HAIs in Iowa in previous years, with particular attention paid to 2019 as the last full year prior to the start of the COVID-19 response.

Overall, Iowa acute care PPS hospitals and voluntary critical access hospitals saw an increase in Catheter Associated Urinary Tract infections (CAUTI), Central Line-Associated Bloodstream Infections (CLABSI), and methicillin-resistant *Staphylococcus aureus* (MRSA) infections than reported in previous years, with a decrease in number of *Clostridioides difficile* infections (CDI). However, there were still fewer CAUTIs, CDIs, and MRSA infections reported than were predicted for Iowa, with only improvements in CAUTIs and CDIs reaching statistical significance.

CDIs had the greatest level of improvement, with a 13.7% decrease in infections, and a 9.8% improvement in the standardized infection ratio (SIR) from 2019. This is also the only SIR that met the goal (0.7 or less) set by U.S. HHS. CLABSIs showed the most notable room for progress, with the highest overall SIR, greatest increase in both infection count and SIR, and an elevated ICU SIR during the fourth quarter.

In addition, in 2021 the Iowa Department of Health and Human Services (Iowa HHS) investigated 25 CPOs, with 19 cases of carbapenem-resistant Enterobacterales (CRE) across 9 different species, and 5 cases of carbapenem-resistant *Acinetobacter baumanii* (CRAB). This is a small decrease from the 27 CPOs reported in 2019.

It should be noted that this report is not comprehensive of all HAIs within Iowa but can be used to monitor progress towards national goals, monitor trends, and identify areas for improvement in infection control practices.

Introduction

Healthcare-associated infections (HAIs) are infections that develop during, or soon after, receiving healthcare services or being in a healthcare setting.[1] People can acquire an HAI anywhere healthcare is given, including both in-patient and outpatient settings. These infections can cause serious illness and death, and many are preventable. In the U.S. hospital setting alone, about 1 in 31 patients has an HAI.[2]

In terms of economic burden, HAIs in U.S. hospitals have direct medical costs of at least $28.4 billion annually, and account for an additional $12.4 billion in costs to society from early deaths and lost productivity.[2, 3] Risk factors that contribute to potentially contracting an HAI include: invasive procedures, illness severity, not following best prevention practices, and overuse or improper use of antimicrobials.

Iowa healthcare facilities self-report HAI data to the Centers for Disease Control and Prevention (CDC) and the Iowa Department of Health and Human Services (Iowa HHS) using a free, web-based software system called the National Healthcare Safety Network (NHSN). Iowa does not have state-specific NHSN reporting requirements. However, acute care hospitals participating in the Centers for Medicare and Medicaid Services (CMS) Hospital Inpatient Quality Reporting Program and Inpatient Prospective Payment System (PPS) are required to report certain data in NHSN.

Quarterly, the Iowa HHS HAI Program analyzes NHSN data for hospital reported CLABSI, CAUTI, and CDIs, and offers technical assistance in the form of a Targeted Assessment for Prevention (TAP) Strategy Tool to those facilities experiencing the highest rates.

Furthermore, per Iowa Code Chapter 139A, in 2021 reporting Vancomycin-intermediate *Staphylococcus aureus* (VISA), Vancomycin-resistant *Staphylococcus aureus* (VRSA), and other multi-drug resistant organisms (MDROs) such as Carbapenemase-Producing Carbapenem-Resistant Enterobacterales (CP-CREs) and *Candida auris* (*C. auris*) was mandated in Iowa; requiring all Iowa healthcare providers and public, private, and hospital laboratories to report cases to Iowa HHS within specified timeframes. Common source epidemics or disease outbreaks of unusual numbers occurring in healthcare facilities are also reportable to Iowa HHS.

The Iowa HAI Program reviews all MDRO reports sent to the Iowa Disease Surveillance System (IDSS) and performs investigations for laboratory confirmed cases. Additionally, the Iowa HAI Program regularly performs infection control assessment and response (ICARs) for healthcare facilities, involving regional HAI Nurse Clinicians traveling to facilities to review policies, observe practices, and ultimately give recommendations for improvement. *See page 31, "Infection Control Assessment and Response (ICAR)" for information on how to schedule an ICAR.*

WHAT IS THE PURPOSE OF THIS REPORT?

The purpose of this report is to publish annual statewide HAI trends to provide healthcare providers, facilities, and associations, as well as local public health agencies, data to make informed decisions when updating their infection prevention and control policies and setting goals for HAI reductions.
Included in this report are two HAIs and the prevalence of two pathogens reported by acute care hospitals to NHSN:

1. Central Line-Associated Bloodstream Infections (CLABSI)
2. Catheter-Associated Urinary Tract Infection (CAUTI)
3. Methicillin-Resistant *Staphylococcus aureus* (MRSA) in blood specimens
4. *Clostridioides difficile* infection (CDI) in stool specimens

However, these measures do not represent all possible HAIs that facilities can report voluntarily into NHSN. These measures were selected by the federal government (CMS) and Iowa HHS because they give a good overview of a healthcare facility's HAI prevention efforts. This report also shares aggregate information on MDRO trends observed from MRSA and CDI positive test results in Iowa reported from any healthcare setting. These trends provide an overview of emerging resistance threats and antibiotic stewardship in Iowa.

REPORT AUDIENCE

The Iowa HHS HAI Program produces this report for healthcare providers, public health officials, and Iowa policy makers. This data can drive patient advocacy, healthcare facility prevention strategies, awareness of the burden of HAIs within the community, and legislative support for HAI prevention and surveillance.

HOW DO I READ THIS REPORT?

This report summarizes HAI reporting in Iowa to present statewide trends. The data in this report can be used by healthcare facilities to compare their own HAI status to a statewide metric as well as national rates and use the information to drive areas for improvement within their own facility.

However, the data used has several limitations. First, included NHSN data is limited to acute care hospitals participating in CMS' PPS program, and thus does not reflect all acute care hospitals in the state. It also does not reflect other healthcare facility types. Additionally, critical access hospitals are exempt from this reporting requirement.

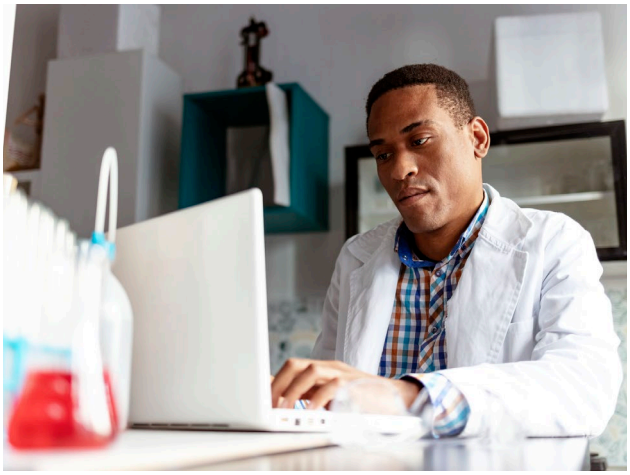
Methods

NHSN DATA

The National Healthcare Safety Network (NHSN) is the CDC's national healthcare-associated infections tracking system. NHSN captures a variety of data that range from HAIs (CLABSIs, CAUTIs, MDRO & CDI events, VAEs, and SSIs), vaccination rates of health care personnel, COVID-19 data, etc. Hospitals are required to enter some data per federal CMS mandates. Facilities can also choose to report in NHSN beyond their CMS requirements, as NHSN serves as a general database that can help facilities store and manage their data, as well as provide some data analysis tools. Acute Care Hospitals self-report data to NHSN according to protocols developed by CDC.[11, 12]

Iowa HHS regularly educates and trains providers to improve the standardization and understanding of NHSN surveillance guidelines, definitions, and criteria. However, due to hospital staff turnover and onboarding practices, there can be variability in interpretation and application, leading to differences in reporting practices among hospitals.

Because Iowa does not have any state-specific mandates requiring the reporting of the HAIs in NHSN, hospitals can choose not to grant Iowa HHS access to view their data, in which case their numbers reported in NHSN will not be reflected in the aggregate data in this report. Additionally, hospitals have the ability to modify their NHSN data at any time, which may result in variation between results published in this report and results published elsewhere if different data collection access or periods were utilized, or data was downloaded from NHSN on different dates.



Per federal CMS mandates, hospitals are required to report data quarterly, with the fourth quarter data due May of the next calendar year. As a result, the annual NHSN data Iowa HHS can access is not available until May of the next calendar year (for example, the 2022 NHSN data Iowa HHS can access will not be available until May 2023).

For more information about NHSN, refer to CDC: National Healthcare Safety Network (NHSN) (https://www.cdc.gov/nhsn/).

DATA COLLECTION

Variables that can be collected in NHSN include, but are not limited to: CLABSI, CAUTI, SSI, VAE, MRSA, CDI, flu vaccination among healthcare personnel, COVID-19 vaccination among healthcare personnel, antimicrobial use, and antibiotic stewardship core element adherence. Reporting data into NHSN allows facilities to collect and use data about HAIs, adherence to clinical practices known to prevent HAIs, the incidence or prevalence of MDROs within their

facility, and trends and coverage of healthcare personnel vaccination. It allows healthcare facilities the opportunity to track progress over time and identify problem areas for improvement.

For this report, data reported to the Patient Safety component of NHSN by acute care hospitals for the variables CLABSI, CAUTI, and MDRO & CDI events for the year 2021 were analyzed. For each of the reported HAIs and events, the following information is included: infection count, predicted infection, national SIR, group SIR, SIR p-value, SIR 95% confidence interval, and group CAD.

SIR

Progress in reducing HAIs, as assessed by NHSN data, is tracked using a Standardized Infection Ratio (SIR). The SIR compares the number of HAIs observed to the predicted number of infections. The predicted number is a risk-adjusted estimate calculated using multivariable regression models generated from nationally aggregated data during a baseline time period.[10] This adjusts for various facility and/or patient-level risk factors that contribute to HAI risk within each facility. Risk factors that have been found to be significantly associated with differences in infection incidence depending on the type of procedure, patient care location, bed size of the hospital, patient age, and other factors.
The predicted number of infections for Iowa is then compared to the number of actual infections during the year as reported by Iowa facilities into NHSN, and a SIR is calculated based on whether there were more or less infections than predicted (the lower the infection count compared to the predicted infections, the lower the SIR and vice versa).

$$\frac{\text{\# of HAIs observed}}{\text{\# of HAIs predicted}} = \text{SIR}$$

How to interpret the SIR:

- A SIR **greater than 1.0** indicates that the state of Iowa had **more** infections than predicted, based on the 2015 national aggregate data.
- A SIR **less than 1.0** indicates that the state of Iowa had **fewer** infections than predicted, based on the 2015 national aggregate data.
- A SIR **equal to 1.0** indicates that the **same** number of HAIs were observed as predicted, based on the 2015 national aggregate data.[6]

Iowa HHS advises acute care hospitals with an SIR greater than 1.0 to closely examine their efforts to reduce HAIs.

How to interpret the SIR 95% Confidence Interval:

- If the Confidence Interval **does not include 1** in its range, then the SIR is significantly different than 1.0 (the national baseline), meaning the number of infections is significantly different than the number of predicted infections. Example: 95% CI= (0.62, 0.93).

- If the Confidence Interval **does include 1** in its range, then the SIR is not significantly different than 1.0, and the number of infections is not significantly different than the number of observed infections. Example: 95% CI= (0.78, 1.24).[6]

The Cumulative Attributable Difference (CAD) is another metric calculated in NHSN, and if the CAD is positive, it represents the number of infections that needed to be prevented in order to reach the target SIR. If a CAD is negative, then that means that Iowa and facilities prevented more HAIs than what was required in order to meet the target SIR.

U.S. HHS REDUCTION GOALS

In October 2016, The U.S. Department of Health and Human Services (U.S. HHS) released targets for the national acute care hospital metrics for the National Action Plan to Prevent Health Care-Associated Infections: Road Map to Elimination (HAI Action Plan).

Progress: National Acute Care Hospital HAIs

Measure (and data source)	Progress made 2016 (from 2015 baseline)	Progress made 2019 (from 2015 baseline)	2020 Target (from 2015 baseline)
CLABSI (NHSN)[1]	11% reduction	31% reduction	50% reduction
CAUTI (NHSN)[1]	7% reduction	26% reduction	25% reduction
Invasive MRSA (NHSN/EIP)[1, 2]	8% reduction	5% increase[4]	50% reduction
Hospital-onset MRSA (NHSN)[1]	6% reduction	18% reduction	50% reduction
Hospital-onset CDI (NHSN)[1]	8% reduction	42% reduction	30% reduction
SSI (NHSN)[1]	6% reduction	7% reduction	30% reduction
***Clostridioides difficile*-related hospitalizations (HCUP)**[3]	4% reduction	29% reduction	30% reduction

The targets are based on 2015 baseline data and were used to create target reduction goals for a 5-year period from 2015-2020. U.S. HHS is currently working on updating the plan with updated data, but no release date has been announced as of the writing of this report. For this report, when it is mentioned whether or not an HAI has met the target SIR or target reduction goal, this is referring to the 2020 Target as seen in the table above. The targeted SIRs are calculated from reduction percents (1.0 - Reduction % goal), and are listed as follows:

- CLABSI target SIR: 0.5
- CAUTI target SIR: 0.75
- MRSA target SIR: 0.5
- CDI target SIR: 0.7

When an Iowa Group SIR has reached (or is lower than) the national target SIR, that means that Iowa reached the national 2020 target reduction goals for that HAI.

MDRO data

The majority of MDRO investigations are initiated when electronic laboratory reporting (ELR) data is transmitted to Iowa HHS. When electronic laboratory reports are received for microbiological testing, it is first determined if the organism is a carbapenemase producer. If the organism is a carbapenemase producer, a HAI Nurse Clinician contacts both the provider and patient during the course of the investigation to determine if there was potential transmission within a healthcare facility.
All reports of *C. auris* transmitted to Iowa HHS are investigated using a similar method.

DATA COLLECTION

In most instances, ELR data connections directly transmit potential carbapenemase producing organism test results to the Iowa Disease Surveillance System (IDSS). Those results are then screened for the organism's ability to produce the enzyme carbapenemase. For surveillance purposes, those results showing the ability to produce the enzyme are classified as a case. Those without the ability to produce the enzyme are classified as not a case.
C. auris case counts from other U.S. states were obtained from the CDC *Candida auris* map tracking site, with an option to download the data of clinical case counts per state by year.[13]

Results

NHSN

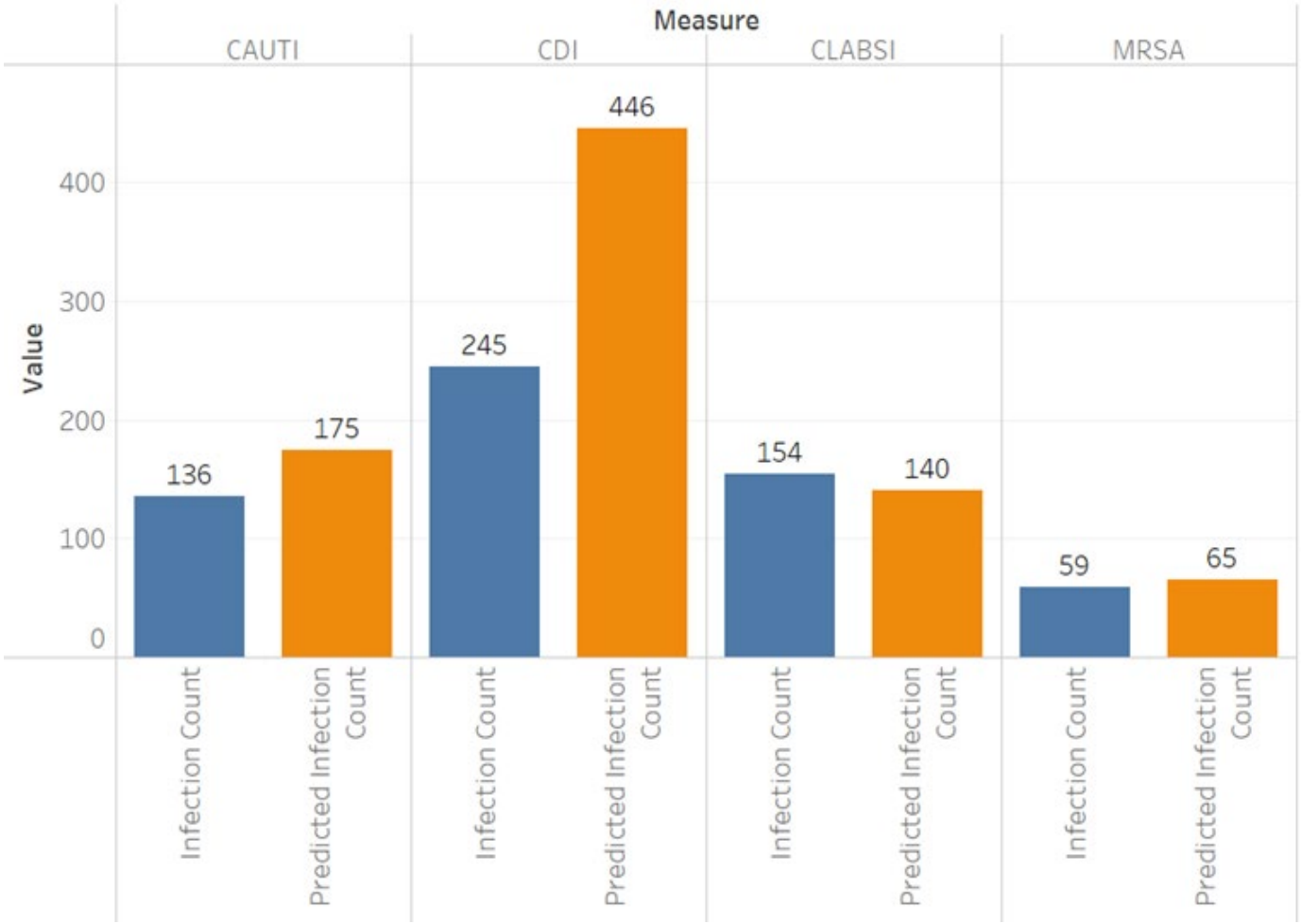
There are 109 hospitals have given Iowa HHS access to their data in NHSN, which comprises the aggregated data reflected in this report. Data downloaded from NSHN on March 2, 2023.

STATEWIDE 2021 HAI SUMMARY

	CAUTI	CDI	CLABSI	MRSA
Infection Count	136	245	145	59
Predicted Infection	175	445	129	65
Iowa Group CAD	4.60	-66.64	80.23	26.02
U.S. HHS 2020 target SIR	0.75	0.70	0.50	0.5
Iowa Group SIR	0.80	0.55	1.1	0.90
SIR p-value	0.002	0	0.25	0.39
SIR 95% Confidence Interval	(0.65, 0.91)	(0.48, 0.62)	(0.93, 1.28)	(0.68, 1.14)

Table 1. 2021 overall TAP Data

Infection Count Compared to Predicted Infection Count of HAIs in Iowa, 2021

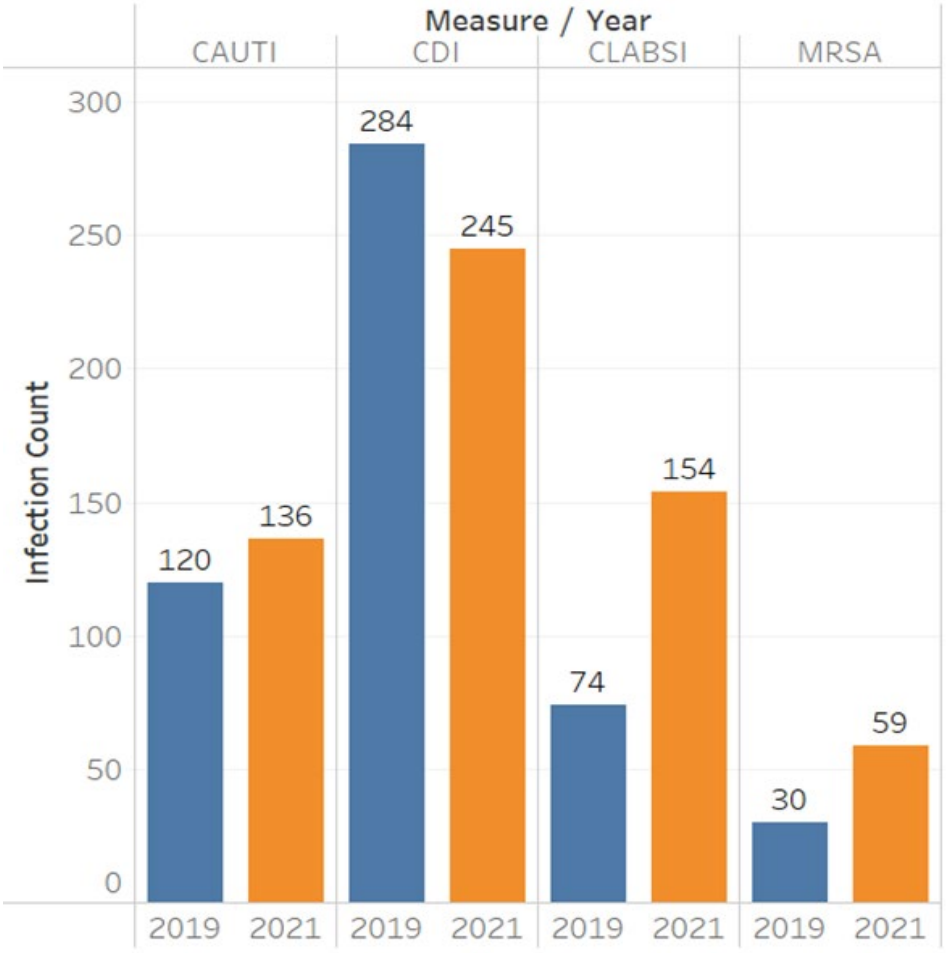


Standardized Infection Ratios (SIRs) and 95% Confidence Intervals by HAIs and Statistical Significance, 2021

HAI	2019 SIR	2021 SIR	% Change	2019 Infection Count	2021 Infection Count	% Change
CAUTI	0.80	0.80	0% change	120	133	10.8% increase
CDI	0.61	0.55	9.8% decrease	284	245	13.7% decrease
CLABSI	0.60	1.1	83.3% increase	74	140	89.1% increase
MRSA	0.51	0.90	76.4% increase	30	59	96.6% increase

Table 2. Change in SIR and Infection Count by HAI in Iowa, 2019 vs. 2021

Comparison of HAI Infection Counts 2019 Compared to 2021 (Pre and Post COVID-19)



CAUTI

An indwelling urinary catheter is a drainage tube placed in the bladder through the urethra to drain urine. A catheter-associated urinary tract infection (CAUTI) can occur when germs travel along a urinary catheter, resulting in an infection in any part of the urinary system, including urethra, bladder, ureters, and kidney. UTIs are the fifth most frequent type of healthcare-associated infection reported in the U.S. Complications associated with a CAUTI cause discomfort to the patient, prolonged hospital stays, and increased cost and mortality.

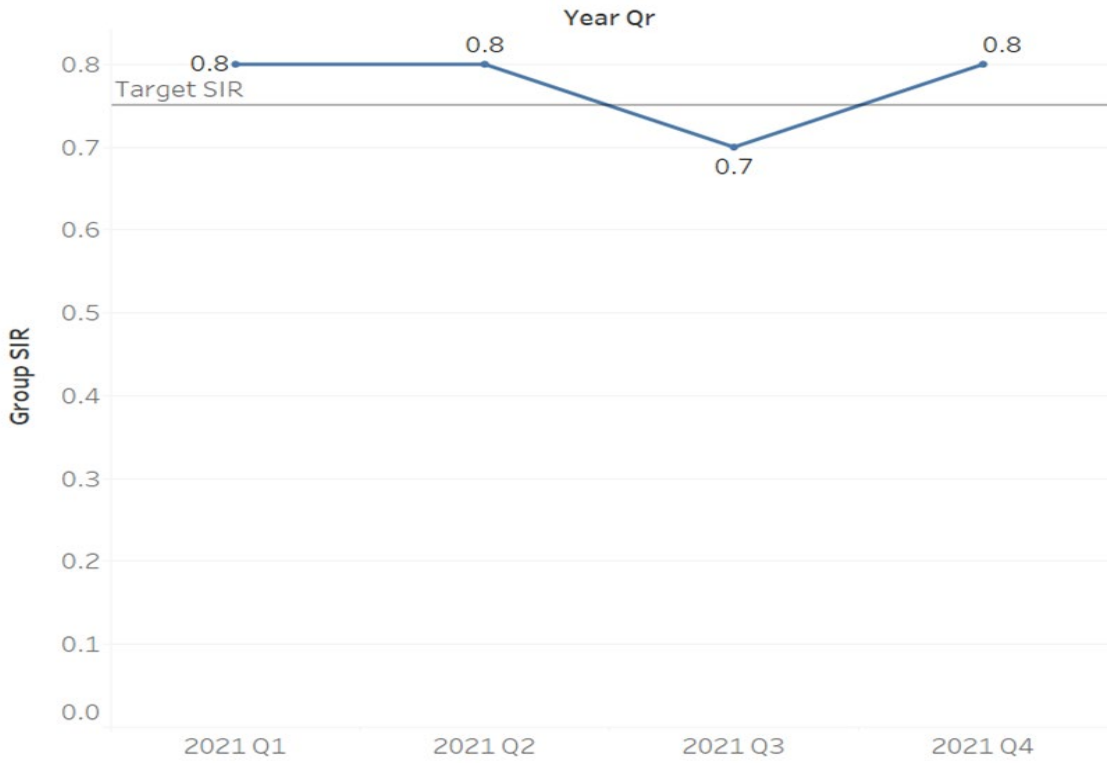
The most important risk factor for developing a CAUTI is prolonged use of the indwelling urinary catheter. Therefore, catheters should only be used for appropriate indications and should be removed as soon as they are no longer medically needed.

CAUTI data was received from NHSN and contains Iowa acute care PPS hospital and critical access hospital data, as required by CMS (*NOTE: critical access hospitals are exempt from mandatory reporting of this data, thus the data does not reflect all critical access hospitals in Iowa, only those that voluntarily reported and granted Iowa HHS viewing access*). Units required to report this data into NHSN include Adult Intensive Care Units (ICUs) and Pediatric ICUs, as well as Adult and Pediatric Medical, Surgical & Medical/Surgical Wards. [12]

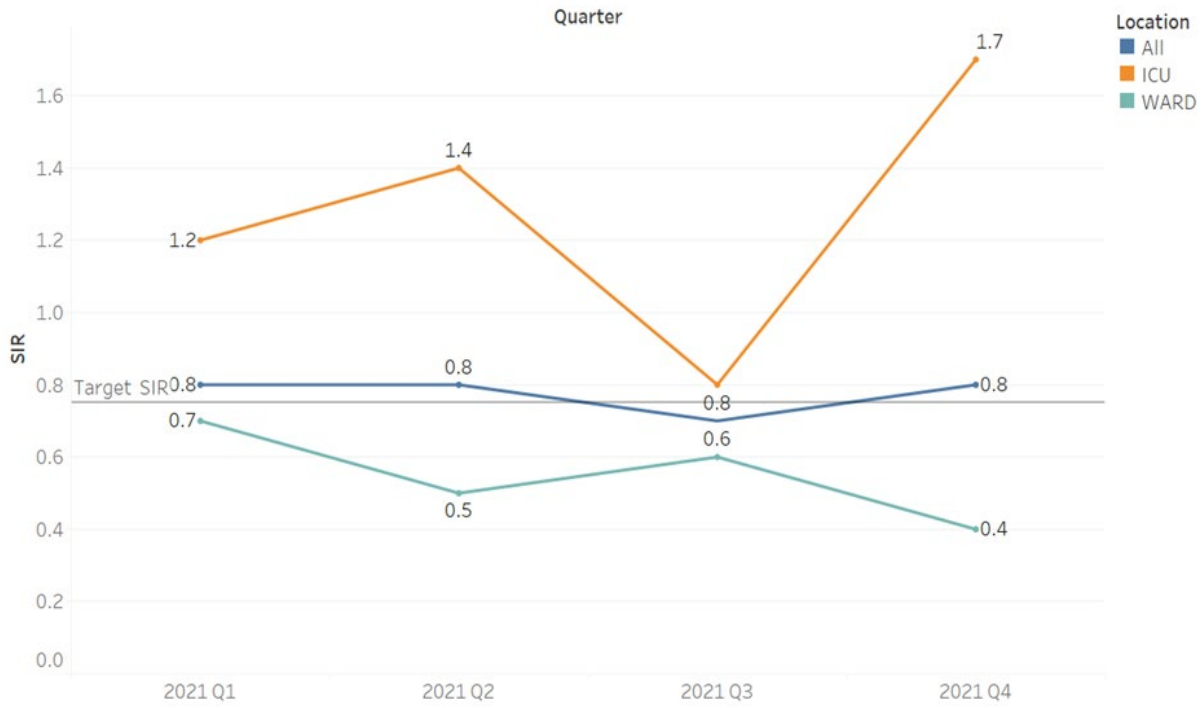
Location Type	No. Facilities Reporting	Infection Count	Predicted Infection Count	Number of Catheter Days	SIR (95% CI)
All Locations	92	136	175	166,440	0.8 (0.65, 0.91)
ICU	34	68	-	-	1.3
WARD*	181	68	-	-	0.6

*Ward includes adult and pediatric medical, surgical, and medical/surgical wards

Iowa 2021 CAUTI Group SIR by Quarter



Iowa 2021 CAUTI Group SIR by Location



CDI

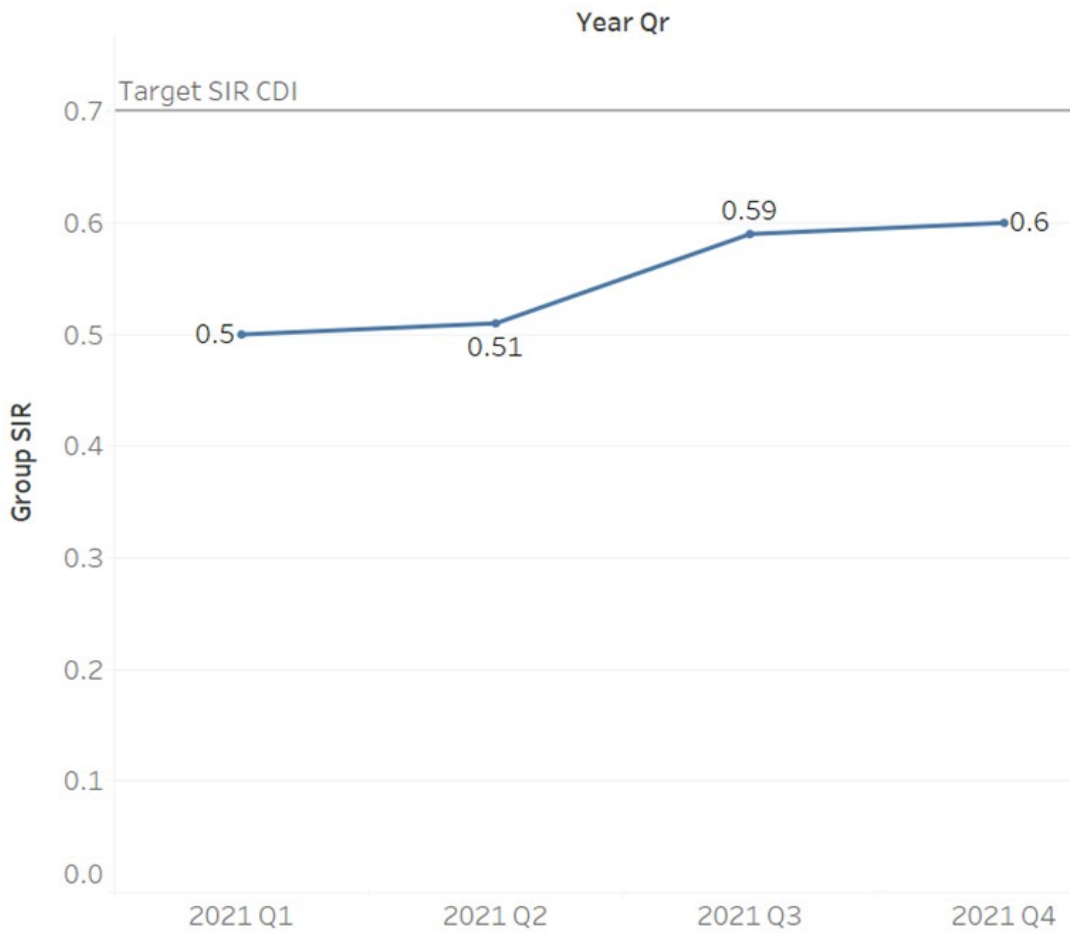
Clostridioides difficile (CDI) is a type of bacteria that causes severe diarrhea and can be deadly. CDI usually occurs in people who have recently taken antibiotics and have been under medical care. Other risk factors include a recent stay in a hospital or nursing home, weakened immune system, being at least 65 years old, and having a previous infection.

C. difficile infection can spread from person-to-person on contaminated equipment and on the hands of healthcare providers and visitors. Since the spore-forming bacteria can persist in the environment and resist some methods of cleaning and disinfection, *C. difficile* poses an infection prevention challenge in healthcare settings.

CDI data was received from NHSN and contains Iowa acute care PPS hospital and critical access hospital data, as required by CMS (NOTE: *critical access hospitals are exempt from mandatory reporting of this data, thus the data does not reflect all critical access hospitals in Iowa, only those that voluntarily reported and granted Iowa HHS viewing access*).

Location Type	No. Facilities Reporting	Infection Count	Predicted Infection Count	Number of Patient Days	SIR (95% CI)
All Locations	91	245	446	983,538	0.55 (0.48, 0.62)

Iowa 2021 CDI Group SIR by Quarter



CLABSI

A central line is a long, flexible tube (catheter) placed in a large vein in a person's neck, chest, upper arm, or leg, with a tip that ends near the heart. A central line allows bloodstream access and administration of intravenous (IV) medications, nutrients, or fluids; access for laboratory testing, or to monitor pressure inside the heart. Central lines are also often used for treatments of kidney disease (dialysis) or cancer (chemotherapy) and can be left in place even after discharge from the hospital.

Central line-associated bloodstream infections (CLABSI) can occur when germs travel along a central line and enter the bloodstream. Central lines are typically kept in place longer than a regular intravenous (IV) catheter. A central line can become a pathway for germs to enter the body, potentially resulting in a serious bloodstream infection. CLABSIs typically cause prolonged hospitalization, increased costs and risk of mortality. CLABSIs may be prevented through proper central line insertion practices (CLIP) and careful management following insertion.

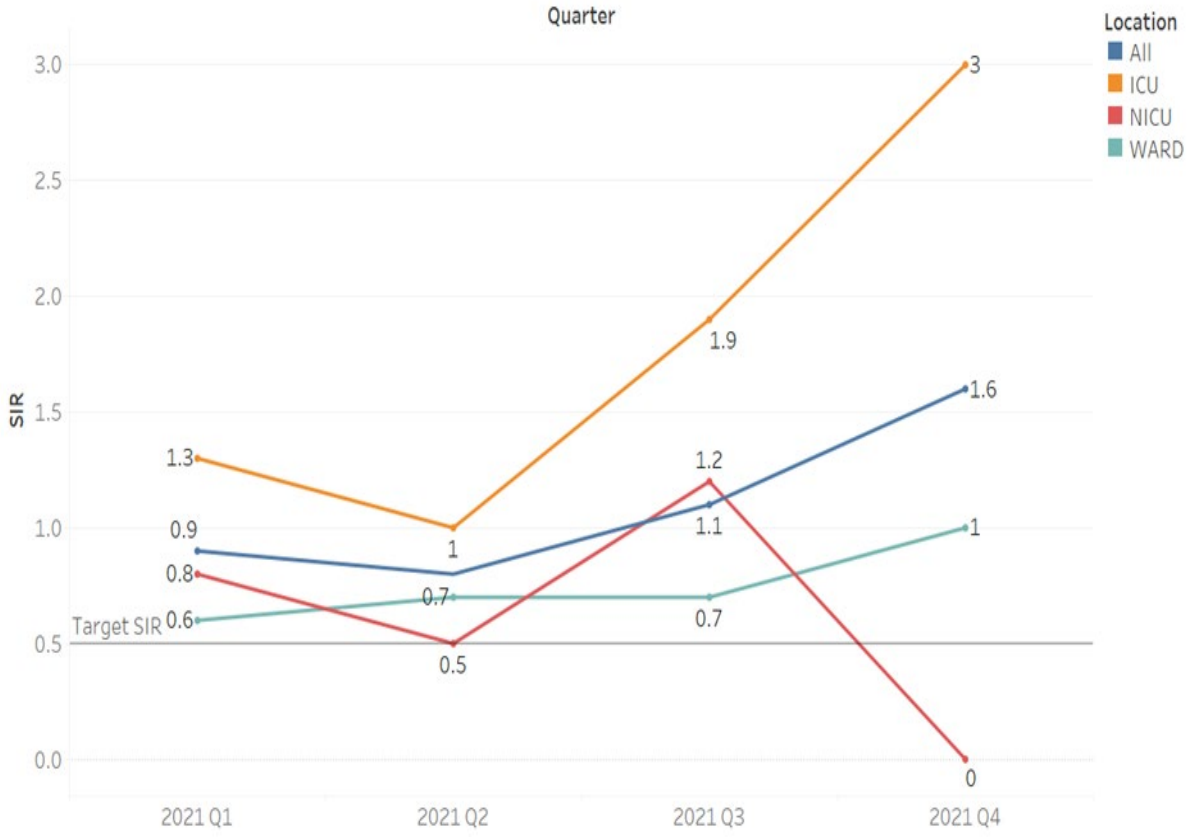
CLABSI data was received from NHSN and contains Iowa acute care PPS hospital and critical access hospital data, as required by CMS (*NOTE: critical access hospitals are exempt from mandatory reporting of this data, thus the data does not reflect all critical access hospitals in Iowa, only those that voluntarily reported and granted Iowa HHS viewing access*). Units required to report this data into NHSN include Adult Intensive Care Units (ICUs), Pediatric ICUs, and Neonatal ICUs, as well as Adult and Pediatric Medical, Surgical & Medical/Surgical Wards.[12]

Location Type	No. Facilities Reporting	Infection Count	Predicted Infection Count	Number Central Line Days	SIR (95% CI)
All Locations	88	154	140	153,395	1.1 (0.93, 1.28)
ICU	39	89	-	-	1.7
NICU	10	4	-	-	0.6
WARD*	196	61	-	-	0.7

*Ward includes adult and pediatric medical, surgical, and medical/surgical wards

Iowa 2021 CLABSI Group SIR by Quarter

Iowa 2021 CLABSI Group SIR by Location



MRSA

Staphylococcus aureus are bacteria commonly found on the skin. Although these bacteria are generally harmless, they can cause infections ranging from pimples or boils to serious infections of internal organs. Methicillin-resistant *Staphylococcus aureus* (MRSA) is a strain of Staph that has become resistant to certain antibiotics, such as methicillin. MRSA can spread within the community or in a healthcare setting, such as a hospital or long-term care facility. MRSA can cause skin or wound infections. Sometimes, MRSA can infect the blood and cause serious illness and even death.

MRSA data was received from NHSN and contains Iowa acute care PPS hospital and critical access hospital inpatient data, as required by CMS (*NOTE: critical access hospitals are exempt from mandatory reporting of this data, thus the data does not reflect all critical access hospitals in Iowa, only those that voluntarily reported and granted Iowa HHS viewing access*). Additionally, this data only reflects blood cultures that are positive for MRSA and does not reflect all MRSA infection from other sources/sites.

Location Type	No. Facilities Reporting	Infection Count	Predicted Infection Count	Number of Patient Days	SIR (95% CI)
All Locations	83	59	65	1,044,946	0.9 (0.68, 1.14)

Iowa 2021 MRSA Group SIR by Quarter

MDROs

Carbapenemase Producing Organisms

CRE

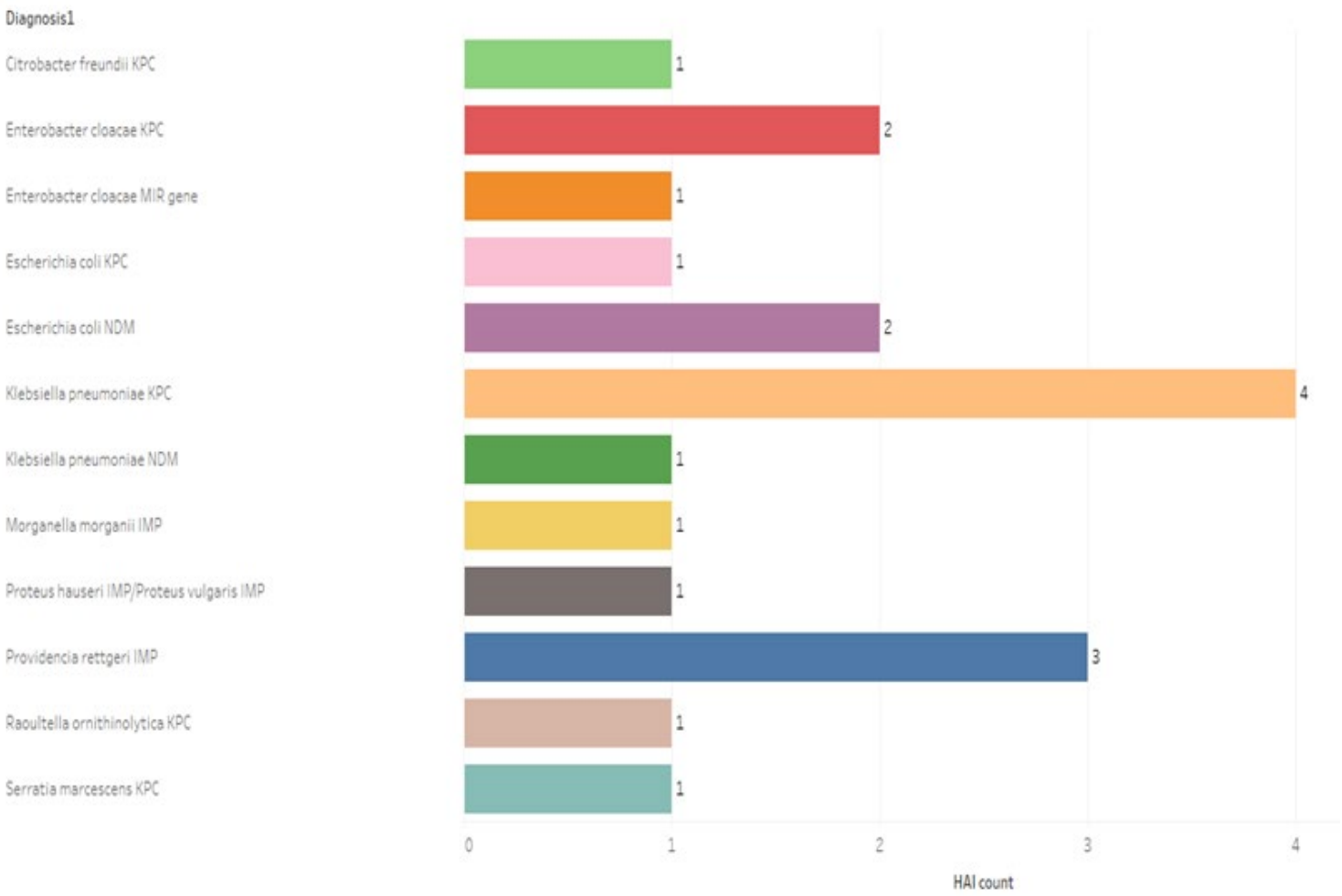
Carbapenemases are β-lactamases with enzymatic capabilities that can render some antibiotics ineffective. Mobile genetic elements carrying carbapenemase genes can be easily shared between bacteria.

Enterobacterales are commensals (often found in the gastrointestinal system) that commonly cause infections in healthcare settings. Examples of Enterobacterales include *Escherichia coli* (*E. coli*) and *Klebsiella pneumoniae*.

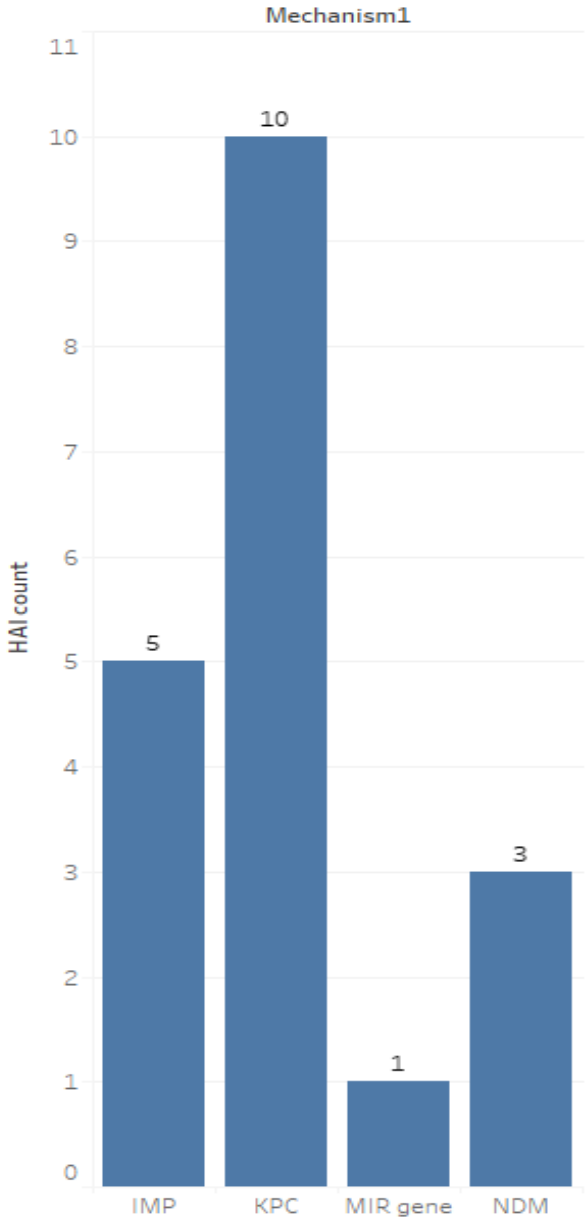
Five carbapenemases, referred to as the "Big Five," account for the vast majority of CPOs worldwide. The "Big Five" is composed of: class A KPC carbapenemase; metallo-β-lactamases of IMP, VIM and NDM groups; and class D OXA-48-like carbapenemases. The *bla*KPC gene is most prevalent worldwide among the "Big Five."

In 2021, Iowa had 19 confirmed cases of CRE investigated by the HAI Program of Iowa HHS. This included 9 different species of Enterobacterales and 4 different Carbapenemase mechanisms.

Confirmed CRE Cases Investigated by the Iowa HHS-HAI Team (2021)



Confirmed CRE Cases Investigated by the Iowa HHS-HAI Team (2021)

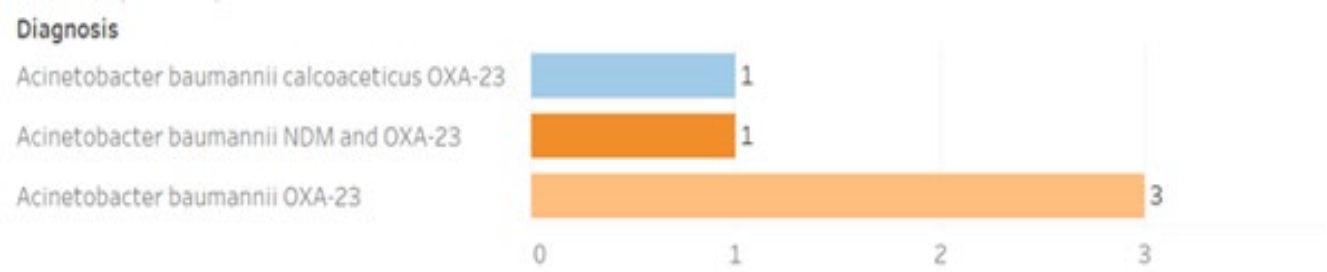


CRAB

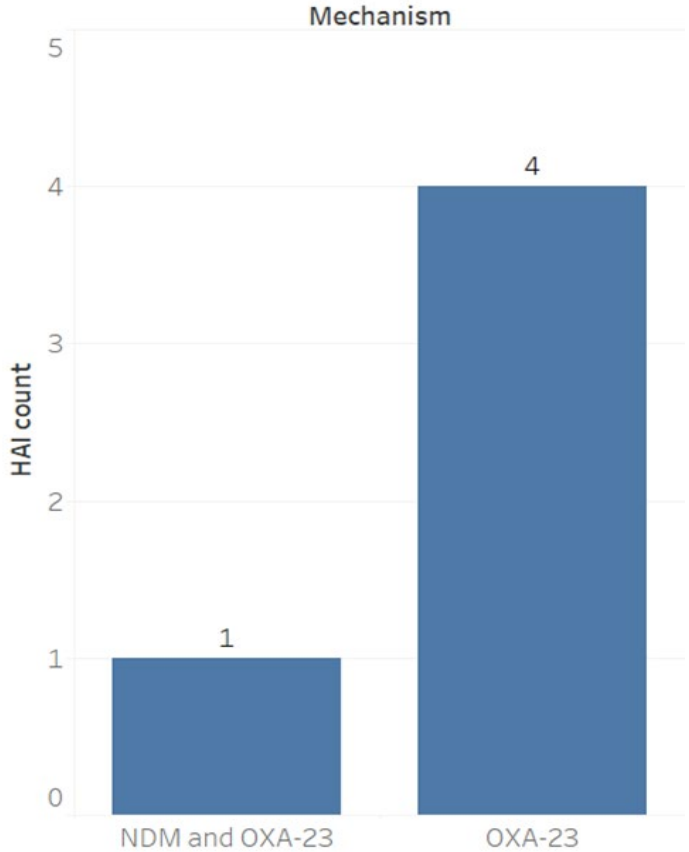
Acinetobacter is a type of bacteria commonly found in the environment, such as soil and water. While there are many *Acinetobacter* species, *Acinetobacter baumannii* is more likely to cause infections in people.

A. baumannii can cause infections in the blood, urinary tract, and lungs (pneumonia), or in wounds in other parts of the body. *A. baumannii* can also "colonize" or live in a patient without causing infections or symptoms. Resistance mechanisms found in Carbapenem-Resistant *Acinetobacter baumannii* (CRAB) include *bla*OXA-23, *bla*OXA-24/40, and *bla*OXA-58. While *A. baumannii* can be a carbapenemase producing organism, it is not part of the CRE class, and was not reportable in Iowa during 2021 unless as part of a detected outbreak. Five cases of *A. baumannii* were investigated in 2021. All had a resistance mechanism of OXA-23, with one of the cases also having an NDM resistance mechanism.

Confirmed Acinetobacter baumanii Cases Investigated by the Iowa HHS-HAI Team (2021)



Number of Acinetobacter baumanii (CRAB) Associated Mechanisms in Iowa (2021)



Candida auris

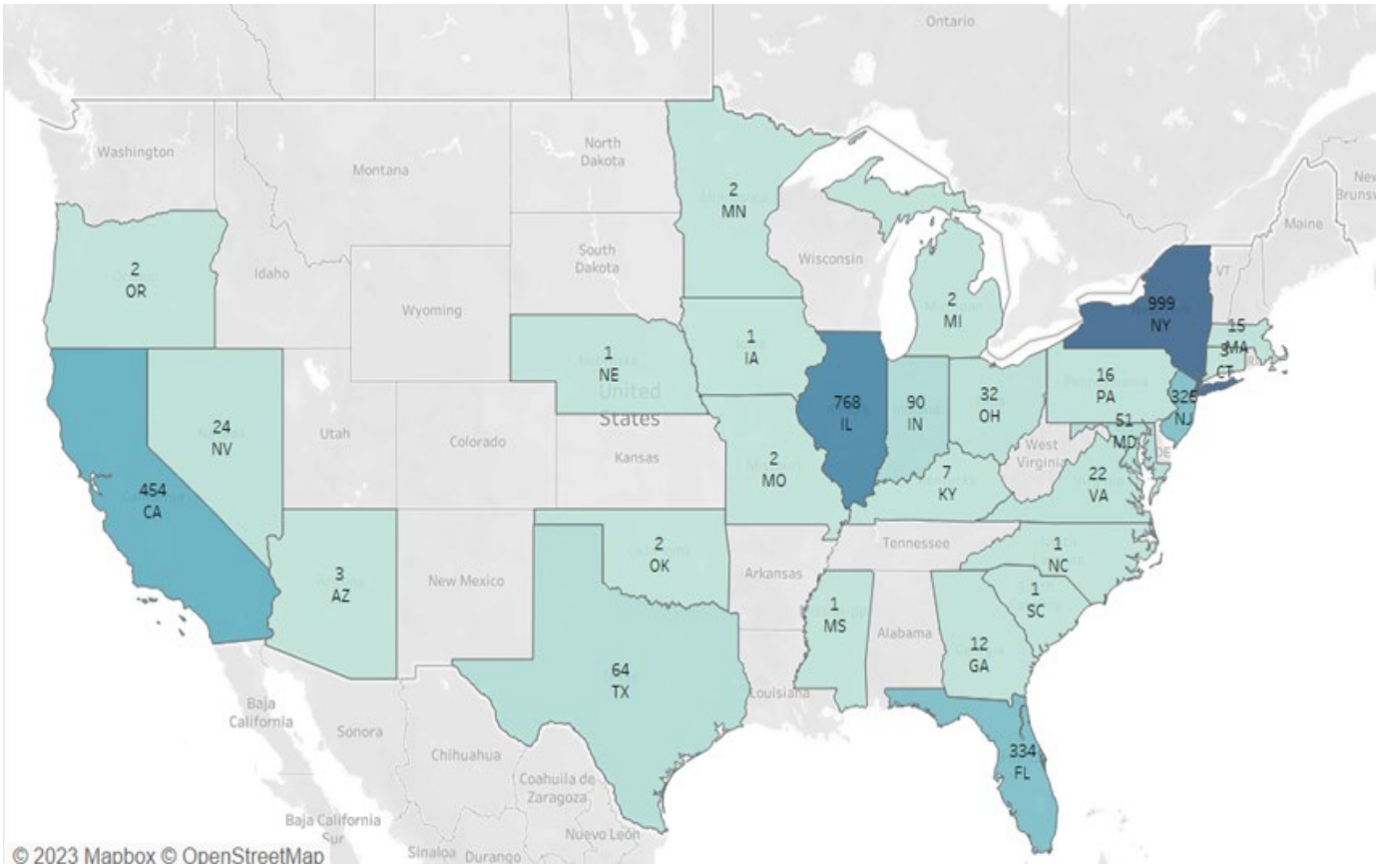
Candida auris is a species of fungus that grows as yeast and one of the few *Candida* species which cause candidiasis in humans. *C. auris* is a serious global health threat. Healthcare facilities in several countries, including the U.S., have reported *C. auris* causing severe illness in hospitalized patients. In some patients, *C. auris* can enter the bloodstream and spread throughout the body, causing serious invasive infections.

C. auris often does not respond to commonly used antifungal drugs, making infections difficult to treat. Patients who have been hospitalized in a healthcare facility for an extended period of time, have a central venous catheter, or other lines/tubes entering their body, or have previously received antibiotics or antifungal medications, appear to be at highest risk of infection and/or colonization with this yeast.

C. auris in Iowa

As of 2021, there was 1 *C. auris* case detected in Iowa. This case was a clinical detection in a patient originating from the Chicago area and was diagnosed in Iowa from a urine culture in 2020. The case had links to healthcare treatment from the Chicago area, which has reported hundreds of *C. auris* cases.

U.S. Map of Clinical C.auris Cases by State (2013-2021)



Vancomycin-intermediate *Staphylococcus aureus* (VISA) and Vancomycin-resistant *Staphylococcus aureus* (VRSA)

Vancomycin-intermediate *S. aureus* (VISA) and Vancomycin-resistant *S. aureus* (VRSA) are staphylococcal bacteria that are less susceptible (VISA) or fully resistant (VRSA) to the antibiotic vancomycin. Vancomycin is an important antimicrobial agent for treating infections caused by *S. aureus* strains that are resistant to oxacillin (MRSA) and other antimicrobial agents. The reduced susceptibility of VISA and VRSA strains to vancomycin leaves clinicians with relatively few therapeutic options for treating these infections.

In the U.S., VISA and VRSA are extremely rare, with only 16 cases of VRSA ever detected nationwide through 2021. Persons at higher risk for VISA/VRSA infection are those with underlying health conditions (such as diabetes or kidney disease), history of infections with MRSA, recent hospitalizations, tubes going into the body (such as a catheter), and recent history of receiving vancomycin or other antibiotics.

Discussion

VISA and VRSA in Iowa

As of 2021, there was 1 VISA case detected in Iowa in 2019. No cases of VISA were detected in 2021 and a VRSA case has never been reported in Iowa.
Discussion

IOWA HAI TRENDS

This report represents the first official healthcare associated infections (HAI) annual report for the state of Iowa. Because of the substantial impact the COVID-19 response had on the U.S. healthcare sector, including in Iowa, a comparison with 2019 Iowa-data is included. The inclusion of the 2019 Iowa-data allows for a comparison of rates from before and after the U.S. COVID-19 response started. Future annual reports for Iowa will include 2019 Iowa data as a comparison, as well as the previous calendar year to the respective report.

The area of greatest concern highlighted in this report is the number of central line-associated bloodstream infections (CLABSIs) noted. In 2021, Iowa saw a dramatic increase in the number of CLABSIs when compared to 2019 data. The 2021 Iowa standardized infection ratio (SIR) also showed more CLABSIs in Iowa than predicted for the year, with the ICU SIR approximately three times higher than the 2021 target SIR during the fourth quarter. However, the group SIR for CLABSI was not statistically significant and the fourth quarter increase in the ICU SIR occurred during a nationwide increase in COVID-19 hospitalizations. With the negative health outcomes and preventable nature of CLABSIs this is an actionable or notable trend, and all healthcare facilities should closely monitor and work to decrease their rate of infection.

MDRO TRENDS

Compared to the number of CPOs reported in 2019 (27), Iowa did not see a substantial change in 2021 (25). However, it should be noted that a decreased number of CPOs were reported in 2020 (18) compared to 2019. This decrease may be due to decreased MDRO reporting in 2021 due to the overwhelming burden COVID-19 put on facilities' staff and resources.

The most frequent CRE diagnosed in Iowa in 2021 was *Klebsiella pneumoniae* at 5 confirmed cases: 4 with the KPC resistance mechanism and 1 with the NDM resistance mechanism. KPC was the most frequent resistance mechanism identified overall (10 [53%] of all confirmed CRE cases) in Iowa during 2021. This matches the national trend of KPC identification in the U.S., with the KPC mechanism the most frequently reported carbapenemase nationally in 2021.[9]

The 5 cases of *Acinetobacter baumanii* made up 20% of the 25 CPO cases in 2021. While this is a low amount, *Acinetobacter baumanii* was not a reportable diagnosis in Iowa during 2021 unless associated with an outbreak, thus the number of actual 2021 cases in Iowa could have been higher. Additionally, 2021 was the first year an *Acinetobacter baumanii* case was reported to Iowa HHS.

While no cases of *C. auris* were reported in Iowa during 2021, it remains a concern with Iowa's close proximity to the Chicago metropolitan area that experiences a high number of cases annually.

FACILITY IMPROVEMENT STRATEGIES

One way for a hospital to lower their CLABSI, CAUTI, or CDI rate is to undergo the voluntary Targeted Assessment for Prevention (TAP) strategy with Iowa HHS. Every quarter Iowa HHS sends a TAP report to hospitals with high rates noted in NHSN, and once annually to all hospitals in Iowa. When these reports are issued, as well as anytime throughout the year, the receiving facility can request a full in-depth assessment. The assessment consists of sending facility staff a survey to assess their knowledge of the hospital's infection control and prevention procedures and protocols. Iowa HHS then analyzes the survey data to identify the strengths and weaknesses of the infection prevention and control policies and protocols, giving infection prevention and control personnel at the hospital an idea of staff awareness/compliance with policies, educational needs, policy gaps, and opportunities for improvement. Therefore, allowing for focused facility-level interventions.

Another resource available to all types of Iowa healthcare facilities is the free Infection Control and Assessment Response (ICAR) process with Iowa HHS. During this process, a regional HAI Nurse Clinician visits a facility to review infection prevention and control policies and protocols as well as conduct observations including but not limited to hand hygiene, PPE use, environmental services, etc. After the assessment, the HAI Nurse Clinician creates a comprehensive report of their observations as well as recommendations on how to improve the facility's infection control program and practices.

With MDROs on the rise in the U.S., all Iowa healthcare facilities should consider conducting colonization screenings on new admissions to their facility that received overnight healthcare during the previous 12 months in a geographic area with high MDRO prevalence (including *C. auris*). Additionally, with the ease in which MDROs (including *C. auris*) can transmit within a healthcare facility, when a case is diagnosed within a facility, a risk assessment for transmission should be performed and a Point Prevalence Screening (PPS) considered if any risks were identified as outlined in the CDC containment strategy.

Lastly, all healthcare providers and facilities in Iowa should stay up to date on current infection prevention and control recommendations. To assist with staying up-to-date Iowa HHS offers monthly open office hours sessions for the long-term care setting and a separate session for the hospital setting. Iowa HHS also publishes a weekly Epi Update to keep partners informed of developing public health issues in Iowa.

LIMITATIONS

One limitation to this report is the amount of data available in NHSN for Iowa HHS to review and analyze. Iowa does not have any state-specific NHSN reporting requirements whereas some states do. This means data submitted to NHSN in Iowa is contingent on CMS mandates and facilities in Iowa must give Iowa HHS permission to view the data entered (confer rights). If a facility has not given Iowa HHS permission to view their data, it was not included in this report's analysis.

In 2021, both CRE and *C. auris* were reportable conditions in Iowa. However, the CRE reporting order was limited to the *Enterobacterales* order of bacteria. Therefore, not all Carbapenemase producing organisms were reportable (such as *Acinetobacter baumanii*). This likely contributed to the low numbers of CPOs outside of the *Enterobacterales* order of bacteria in 2021. As of January 2023, Iowa updated the CRE reporting order to CPOs, making Carbapenemase Resistant *Acinetobacter baumanii* and other CPOs outside of *Enterobacterales* order reportable to Iowa HHS.

Available Resources

TAP Assessments: These assessments were created by the CDC for Acute Care Hospitals to help reduce CLABSI, CAUTI, and CDI rates, with a separate assessment for each. A survey is sent to staff at the hospital with questions on their knowledge of policies and procedures related to that HAI (i.e. maintenance and cleaning of central lines, catheters, etc.). The data is collected by the Iowa HHS HAI Program and aggregated into a report with areas of strength and weaknesses, and recommendations for improvement. There is no TAP Assessment for MRSA or SSIs at this time. To schedule a TAP Assessment, hospitals can contact the Iowa HHS-HAI team at hai-ar@hhs.iowa.gov. More information on the CDC TAP Strategy is available at https://www.cdc.gov/healthcare-associated-infections/php/toolkit/tap-strategy.html.

Infection Control Assessment and Response (ICAR): The ICAR is an assessment where an Iowa HHS Nurse Clinician visits a facility, observes the staff's infection prevention and control practices, and creates a report of recommendations based on their observations. These assessments are completely non-punitive and are not reported to anyone outside of the facility. The purpose is solely to provide technical assistance in helping facilities improve their infection prevention program. All healthcare facility types can participate. Facilities can email the HAI team at hai-ar@hhs.iowa.gov to request an ICAR.

HAI Open Office Hours: The Iowa HHS-HAI Program hosts a 30-minute open office hour session for Infection Preventionists in Hospitals and a separate one for Long-Term Care settings each month. During the sessions, relevant healthcare and infection prevention related topics and updates from both Iowa HHS and the CDC are reviewed. Time is also available for attendees to ask questions. Please email the HAI team at hai-ar@hhs.iowa.gov for registration information.

CDC Candida auris Tracking Map: The CDC maintains a map of the US with case counts of clinical cases of C. auris: https://www.cdc.gov/candida-auris/tracking-c-auris/.

Selected EPA registered disinfectants: The EPA maintains multiple lists of disinfectants that are registered by the EPA and effective against specific pathogens. It is important that healthcare facilities have cleaning supplies on hand that are effective against various MDROs/CPOs should they have any positive diagnoses in their facility. The EPA has lists A-Q, with each list containing products specific to a particular pathogen. Refer to the EPA webpage to find disinfectants that are effective against CPOs: https://www.epa.gov/pesticide-registration/selected-epa-registered-disinfectants.

EPI Update: Every Friday a weekly newsletter is released by the Iowa HHS Center for Acute Disease Epidemiology (CADE). The update contains articles on a variety of current healthcare and public health topics and is an easy way to stay up to date with information from Iowa HHS. To register for the update, visit the Epi Update webpage: https://hhs.iowa.gov/public-health/center-acute-disease-epidemiology

References

1. https://www.hhs.gov/oidp/topics/health-care-associated-infections/index.html#:~:text=Healthcare%2Dassociated%20infections%20(HAIs),and%20long%2Dterm%20care%20facilities
2. https://www.cdc.gov/policy/polaris/healthtopics/hai/index.html#:~:text=HAIs%20in%20U.S.%20hospitals%20have,early%20deaths%20and%20lost%20productivity
3. https://stacks.cdc.gov/view/cdc/11550https://www.hhs.gov/oidp/topics/health-care-associated-infections/targets-metrics/index.html#:~:text=These%20measures%20address%20the%20following,units%20and%20ward%2Dlocated%20patients
4. https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/nhsn-sir-guide.pdf
5. https://www.cdc.gov/nhsn/ps-analysis-resources/keys-to-success.html
6. https://www.epa.gov/pesticide-registration/selected-epa-registered-disinfectants
7. https://www.cdc.gov/project-firstline/media/pdfs/howtoreadalabel-infographic-508.pdf
8. https://arpsp.cdc.gov/profile/arln/crehttps://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/nhsn-sir-guide.pdf
9. https://www.cdc.gov/nhsn/cms/ach.html (CMS reporting resources for acute care hospitals)
10. https://www.cdc.gov/nhsn/pdfs/cms/cms-reporting-requirements.pdf (CMS reporting requirements chart by healthcare facility type)
11. https://www.cdc.gov/candida-auris/tracking-c-auris/