

Healthcare-Associated Infections in Minnesota Acute Care Hospitals

2021 ANNUAL REPORT

Healthcare-Associated Infections in Minnesota Acute Care Hospitals 2021 Annual Report

Note: The publishing of this report was delayed due to the COVID-19 pandemic response and its need for shifted responsibilities.

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Introduction

Healthcare-associated infections (HAIs) are infections associated with receiving medical care in a hospital or other health care facility. According to the Centers for Disease Control and Prevention (CDC), there were an estimated 687,000 HAIs in U.S. acute care hospitals in 2015 and approximately 72,000 HAI-associated deaths (CDC, 2018). The widespread use of antibiotics has resulted in an increase in antibiotic-resistant infections, leading to more than 2.8 million illnesses and more than 35,000 deaths each year in the U.S. (CDC, 2019). In hospitals and other health care settings, antibiotic stewardship programs (ASPs) employ coordinated efforts to improve the effective use of antibiotics. Work done in these programs is an important part of broader health care facility efforts to reduce antibiotic resistance.

Minnesota acute care hospitals participating in the Centers for Medicare and Medicaid Services (CMS) Hospital Inpatient Quality Reporting Program and Inpatient Prospective Payment System (PPS) use the National Healthcare Safety Network (NHSN) to report HAIs and other select measures to fulfill reporting requirements. NHSN is a secure, internet-based surveillance system managed by CDC.

The purpose of this report is to summarize statewide HAI data reported by Minnesota acute care PPS hospitals to NHSN and the progress of all Minnesota acute care hospitals towards implementing CDC's antibiotic stewardship core elements as reported through the NHSN annual facility survey.

This report includes five HAIs reported by acute care PPS hospitals:

- Central line-associated bloodstream infections (CLABSI)
- Catheter-associated urinary tract infections (CAUTI)
- Surgical site infections (SSI) following colon surgery and abdominal hysterectomy
- Positive laboratory-identified (LabID) results for methicillin-resistant *Staphylococcus aureus* (MRSA) in the bloodstream
- Positive laboratory-identified (LabID) results for *Clostridioides difficile* infection (CDI) in stool

This report also includes information reported to NHSN by Minnesota hospitals on their implementation of certain antibiotic stewardship program (ASP) components, or ASP core elements.

Key Findings

In 2021, Minnesota acute care hospitals reported significant advancement in institutional antibiotic stewardship, with 94% of all hospitals reporting implementation of all seven antibiotic stewardship program core elements. This is a 65% increase from 2017 (57%).

As compared with predicted rates, Minnesota PPS acute care hospitals reported improvement across most HAI types in 2021. Predicted rates are determined by CDC based on baseline data from 2015.

- **Fewer** central line-associated bloodstream infections (CLABSI) as predicted
- **Fewer** catheter-associated urinary tract infections (CAUTI) than predicted
- **Fewer** hospital-onset cases of methicillin-resistant *Staphylococcus aureus* (MRSA) bacteria in the bloodstream than predicted
- **Fewer** hospital-onset *Clostridioides difficile* infections (CDI) than predicted, as identified through laboratory-identified (LabID) testing of stool (feces)
- **Fewer** number of surgical site infections (SSI) following colon procedures and **similar** number following abdominal hysterectomies as predicted.

Table 1. Minnesota PPS Acute Care Hospital Standardized Infection Ratios (SIR) and Progress Toward Goals for Selected Healthcare-Associated Infections (HAI), 2020 - 2021

| HAI Type | 2020 MN SIR (n=49) | 2021 MN SIR (n=49) | % Change (2020 – 2021) | HHS goal | At or below HHS goal |
|------------|--------------------|--------------------|------------------------|----------|----------------------|
| CLABSI | 0.92 | 0.88 | ↓ 4% | 0.50 | ✗ |
| CAUTI | 0.81 | 0.86 | ↑ 6% | 0.75 | ✗ |
| SSI – HYST | 1.21 | 1.26 | ↑ 4% | 0.70 | ✗ |
| SSI – COLO | 0.72 | 0.68 | ↓ 7% | 0.70 | ★ |
| MRSA | 0.46 | 0.61 | ↑ 33% | 0.50 | ✗ |
| CDI | 0.57 | 0.57 | ↑ 0% | 0.70 | ★ |

No shading indicates the SIR is not statistically different from the 2015 national baseline

Green shading indicates SIR is statistically lower than 2015 national baseline

Red shading indicates SIR is statistically higher than 2015 national baseline

Data downloaded from NHSN on May 17, 2022

Symbol Key

- ↕ Change is not statistically significant
- ↓ Statistically significant decrease in SIR
- ↑ Statistically significant increase in SIR
- ★ State SIR is at or below the HHS goal
- ✗ State SIR is not at or below the HHS goal

Methods

NHSN Data

Hospitals self-report data to NHSN according to the NHSN surveillance protocol developed by CDC. Although efforts are made through education and training to improve the standardization and understanding of NHSN surveillance guidelines, definitions, and criteria, there can be variability in interpretation and application, leading to differences in reporting practices among hospitals.

Minnesota Department of Health (MDH) accesses NHSN data through a data use agreement (DUA) with CDC that was initially established in 2013 and updated in November 2017. The DUA establishes a formal data access and data use relationship between MDH and CDC and stipulates that MDH may only use the data for HAI surveillance and prevention purposes. For more information about MDH NHSN DUA, refer to [National Healthcare Safety Network \(NHSN\) \(https://www.health.state.mn.us/facilities/patientsafety/infectioncontrol/nhsn.html\)](https://www.health.state.mn.us/facilities/patientsafety/infectioncontrol/nhsn.html).

This report covers data that were collected between January and December 2021 and were downloaded from the NHSN secure internet platform on May 17, 2022; any changes made to the data after this date are not reflected in this report.

There might be variation between results published in this report and results published elsewhere. Hospitals have the ability to modify their NHSN data at any time and therefore results might appear to vary if other sources use different data collection periods or downloaded data from NHSN on a different date.

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

Standardized Infection Ratio (SIR)

The standardized infection ratio (SIR) is a summary measure used to track HAIs at a national, state, or local level over time. The SIR accounts for various facility and/or patient-level factors that contribute to HAI risk. The SIR is calculated by dividing the number of observed infections by the number of predicted infections. The number of predicted infections is calculated based on 2015 national HAI aggregate data, using a multivariable regression model and adjusted using factors found to be significant predictors of HAI incidence.

$$\text{SIR} = \frac{\text{Observed Infections}}{\text{Predicted Infections}}$$

- An SIR greater than 1.0 indicates that more infections were observed than predicted
- An SIR less than 1.0 indicates that fewer infections were observed than predicted

For more information about the SIR, refer to [CDC: The NHSN Standard Infection Ratio \(SIR\): A Guide to the SIR \(PDF\) \(https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/nhsn-sir-guide.pdf\)](https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/nhsn-sir-guide.pdf).

Risk Adjustment

The SIRs presented in this report are adjusted for risk factors known to be significantly associated with differences in infection incidence, such as type of patient care location, bed size of the hospital, patient age, and other factors. NHSN incorporates information on many important factors that might put a patient at risk for an HAI, but not all clinical details are collected in this system. Therefore, each patient has a different set of risks that might not be fully accounted for in the calculation of the standardized infection ratio.

U.S. Department of Health and Human Services (HHS) SIR Goals

The U.S. Department of Health and Human Services (HHS) sets national HAI reduction targets through the National Action Plan to Prevent Health Care-Associated Infections: Road Map to Elimination. In October 2016, HHS announced new targets for acute care hospitals using national 2015 NHSN data as the baseline. These targets are in effect for a five-year period during 2015–2020.

The 2020 HHS SIR goals for the HAIs included in this report are as follows:

- CLABSI and MRSA: 0.50
- CAUTI: 0.75
- SSI and CDI: 0.70

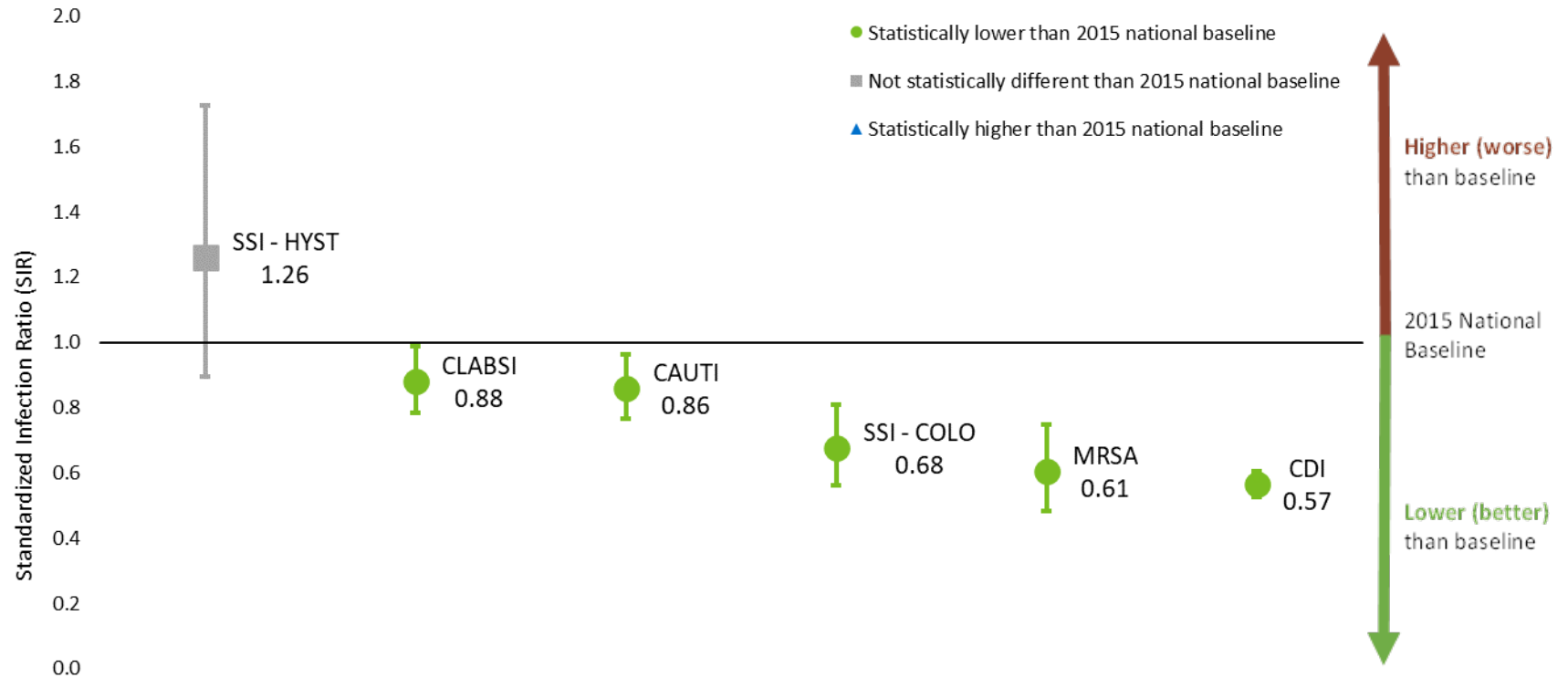
For more information about these targets and the National HAI Action Plan, refer to [HHS: National Targets and Metrics – Health Care-Associated Infections \(https://health.gov/hcq/prevent-hai-measures.asp\)](https://health.gov/hcq/prevent-hai-measures.asp).

Data Quality

All data presented in this report are self-reported by hospitals to NHSN. To ensure complete and accurate data, MDH conducts quarterly data quality reviews of NHSN data for Minnesota acute care PPS hospitals to identify internal inconsistencies and outlier values that could be erroneous. For more information about MDH NHSN data quality reviews, refer to [National Healthcare Safety Network \(NHSN\) \(https://www.health.state.mn.us/facilities/patientsafety/infectioncontrol/nhsn.html\)](https://www.health.state.mn.us/facilities/patientsafety/infectioncontrol/nhsn.html).

Statewide HAI Summary

Figure 1. Minnesota PPS Acute Care Hospital Standardized Infection Ratios (SIR) for Selected Healthcare-Associated Infections (HAI), 2021 (n=49)

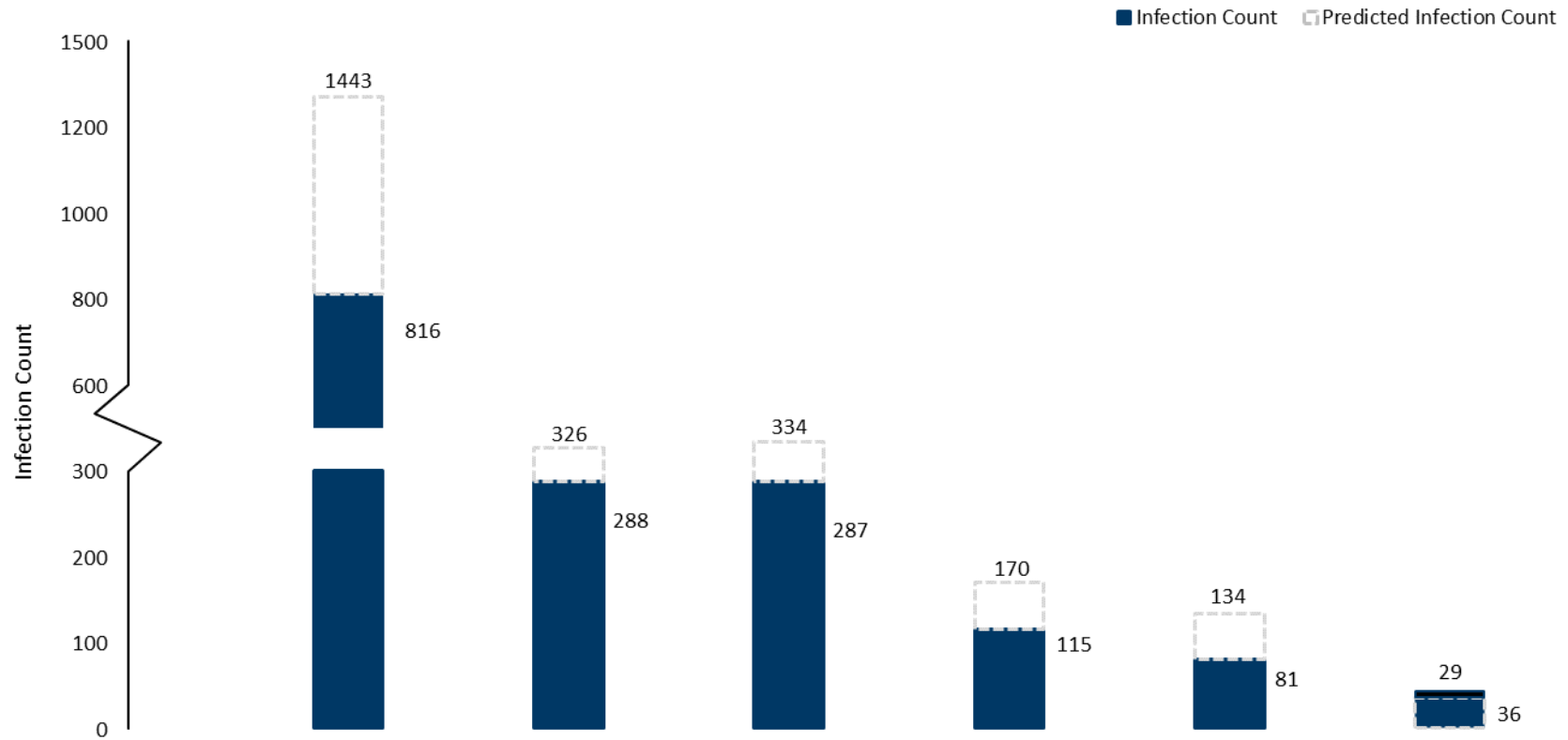


| HAI Type | SSI – HYST | CLABSI | CAUTI | SSI – COLO | MRSA | CDI |
|---------------------------|------------|--------|-------|------------|------|-------|
| Infection Count | 36 | 288 | 287 | 115 | 81 | 816 |
| Predicted Infection Count | 29 | 326 | 334 | 170 | 134 | 1,443 |
| SIR | 1.26 | 0.88 | 0.86 | 0.68 | 0.61 | 0.57 |
| HHS 2020 SIR Goal | 0.70 | 0.50 | 0.75 | 0.70 | 0.50 | 0.70 |

PPS = prospective payment systems; SSI = surgical site infection; HYST = abdominal hysterectomy; COLO = colon surgery; CDI = laboratory-identified *C. difficile*. CAUTI = catheter-associated urinary tract infection; CLABSI = central line-associated bloodstream infection; MRSA = laboratory-identified MRSA bacteremia. HHS = U.S. Department of Health and Human Services; Data downloaded from NHSN on May 17, 2022

HEALTHCARE-ASSOCIATED INFECTIONS IN MINNESOTA ACUTE CARE HOSPITALS

Figure 2. Minnesota PPS Acute Care Hospitals Predicted and Actual Infection Counts for Selected Healthcare-Associated Infections (HAI), 2021 (n=49)



| HAI Type | CDI | CLABSI | CAUTI | SSI – COLO | MRSA | SSI – HYST |
|---------------------------|-------|--------|-------|------------|------|------------|
| Infection Count | 816 | 288 | 287 | 115 | 81 | 36 |
| Predicted Infection Count | 1,443 | 326 | 334 | 170 | 134 | 29 |
| SIR | 0.57 | 0.88 | 0.86 | 0.68 | 0.61 | 1.21 |
| HHS 2020 SIR Goal | 0.70 | 0.50 | 0.75 | 0.70 | 0.50 | 0.70 |

PPS = prospective payment systems; SSI = surgical site infection; HYST = abdominal hysterectomy; COLO = colon surgery; CDI = laboratory-identified *C. difficile*; CAUTI = catheter-associated urinary tract infection; CLABSI = central line-associated bloodstream infection; MRSA = laboratory-identified MRSA bacteremia; HHS = U.S. Department of Health and Human Services; Data downloaded from NHSN on May 17, 2022

Healthcare-Associated Infection (HAI) Data Submitted to the National Healthcare Safety Network (NHSN) by Minnesota Acute Care PPS Hospitals (n=49), 2020 and 2021

Table 2. Central Line-Associated Bloodstream Infections (CLABSI)

| Unit | 2020 MN SIR | 2021 MN SIR | % Change (2020 – 2021) |
|----------------------|-------------|-------------|------------------------|
| ICU, NICU, and Ward* | 0.92 | 0.88 | ↓ 4% |
| ICU | 1.09 | 1.14 | ↑ 5% |
| NICU | 1.36 | 0.94 | ↓ 31% |
| Ward* | 0.74 | 0.65 | ↓ 12% |

HHS 2020 SIR Goal: 0.50

*Ward locations include adult and pediatric medical, surgical, and medical/surgical wards

Table 4. Surgical Site Infections (SSI)**

| Type | 2020 MN SIR | 2021 MN SIR | % Change (2020 – 2021) |
|------------------------|-------------|-------------|------------------------|
| Colon Surgery | 0.72 | 0.68 | ↓ 7% |
| Abdominal Hysterectomy | 1.21 | 1.26 | ↑ 4% |

HHS 2020 SIR Goal: 0.70

** SSI SIR is risk adjusted using the Complex Admission/Readmission model

SIR = standardized infection ratio

Risk adjustment for SIR based on NHSN 2015 national baseline

Data downloaded from NHSN on May 17, 2022

Table 3. Catheter-Associated Urinary Tract Infections (CAUTI)

| Unit | 2020 MN SIR | 2021 MN SIR | % Change (2020 – 2021) |
|--------------------------|-------------|-------------|------------------------|
| ICU and Ward* | 0.81 | 0.86 | ↑ 6% |
| ICU | 0.76 | 0.89 | ↑ 16% |
| Ward* | 0.87 | 0.83 | ↓ 5% |
| Inpatient Rehabilitation | 1.65 | 0.84 | ↓ 49% |

HHS 2020 SIR Goal: 0.75

*Ward locations include adult and pediatric medical, surgical, and medical/surgical wards

Table 5. Facility-wide Laboratory-Identified (LabID) Events

| Type | 2020 MN SIR | 2021 MN SIR | % Change (2020 – 2021) |
|------------------------|-------------|-------------|------------------------|
| MRSA Bacteremia | 0.46 | 0.61 | ↑ 33% |
| C. difficile Infection | 0.57 | 0.57 | ↑ 0% |

MRSA HHS 2020 SIR Goal: 0.50

CDI HHS 2020 SIR Goal: 0.70

| Key |
|---|
| SIR is not statistically different from national baseline |
| SIR is statistically lower than national baseline |
| SIR is statistically higher than national baseline |
| ↕↕ Change is not statistically significant |
| ↓ Statistically significant decrease in SIR |
| ↑ Statistically significant increase in SIR |

Central Line-Associated Bloodstream Infections (CLABSI)

A **central line** is a tube placed in a large vein to allow access to the bloodstream and administration of intravenous (IV) medications. A **central line-associated bloodstream infection (CLABSI)** can occur when bacteria or other germs travel along a central line and enter the bloodstream. When inserted incorrectly or if the insertion site is not kept clean, a central line can become a pathway for germs to enter the body, potentially resulting in a serious bloodstream infection.

This report includes CLABSI data reported by Minnesota acute care PPS hospitals from units required for CMS reporting, including adult, pediatric, and neonatal intensive care units (ICU), and adult and pediatric medical, surgical, and medical/surgical wards. It does not include CLABSI data that might have been reported voluntarily from other units, such as specialty wards.

Table 6. CLABSI by Location Type, Acute Care PPS Hospitals, 2021

| Location Type | No. Facilities Reporting | Infection Count | Predicted Infection Count | Number Central Line Days | SIR (95% CI) | Facilities with ≥ 1 Predicted Infection | Facilities with ≥ 1 Predicted Infection and SIR Sig. < 1 n (%) | Facilities with ≥ 1 Predicted Infection and SIR Sig. > 1 n (%) |
|----------------------|--------------------------|-----------------|---------------------------|--------------------------|----------------------|--|---|---|
| ICU, NICU, and Ward* | 48 | 288 | 326.4 | 324,320 | 0.88 (0.79, 0.99) | 22 | 4 (18%) | 2 (9%) |
| ICU | 30 | 164 | 144.0 | 109,588 | 1.14 (0.98, 1.32) | 15 | 2 (13%) | 3 (20%) |
| NICU | 11 | 18 | 19.3 | 10,642 | 0.94 (0.57, 1.45) | 3 | 0 (0%) | 0 (0%) |
| Ward* | 48 | 106 | 163.1 | 156,341 | 0.65 (0.54, 0.78) | 20 | 3 (15%) | 0 (0%) |

*Ward locations include adult and pediatric medical, surgical, and medical/surgical wards

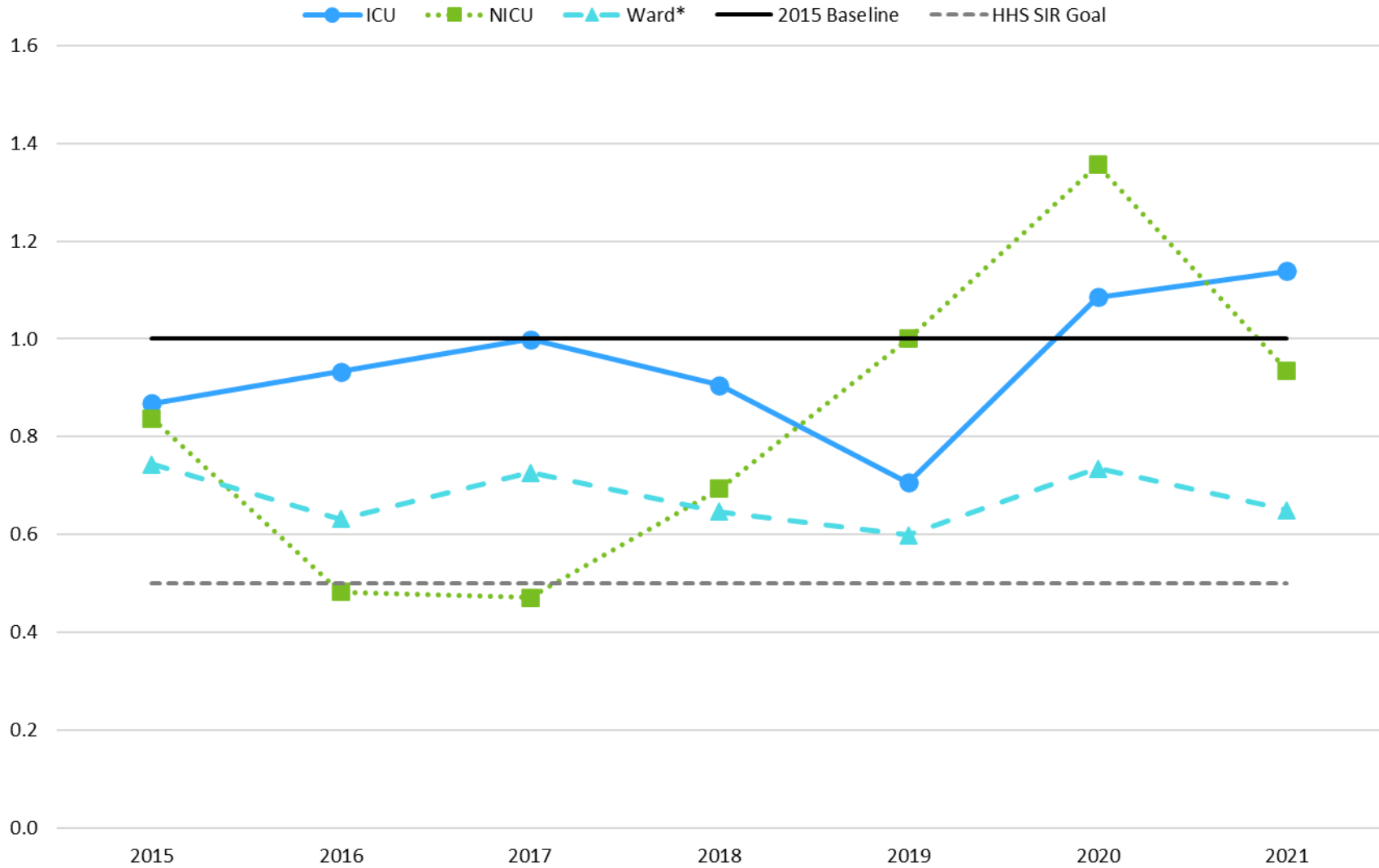
Sig. = statistically significant

Green shading indicates SIR is statistically lower than 2015 national baseline

Red shading indicates SIR is statistically higher than 2015 national baseline

Data downloaded from NHSN on May 17, 2022

Figure 3. CLABSI SIR by Year and Location Type, Acute Care PPS Hospitals, 2015–2021



*Ward locations include adult and pediatric medical, surgical, and medical/surgical wards

Data downloaded from NHSN on May 17, 2022

Catheter-Associated Urinary Tract Infection (CAUTI)

A **urinary catheter** is a tube placed in the bladder to drain urine. A **catheter-associated urinary tract infection (CAUTI)** can occur when bacteria or other germs travel along a urinary catheter, resulting in a bladder or kidney infection.

This report includes CAUTI data reported by Minnesota acute care PPS hospitals from units required for CMS reporting including adult and pediatric intensive care units (ICU), adult and pediatric medical, surgical, and medical/surgical wards, and CMS-certified inpatient rehabilitation wards. It does not include CAUTI data that might have been reported voluntarily from other units, such as specialty wards.

Table 7. CAUTI by Location Type, Acute Care PPS Hospitals, 2021

| Location Type | No. Facilities Reporting | Infection Count | Predicted Infection Count | Number Urinary Catheter Days | SIR (95% CI) | Facilities with ≥ 1 Predicted Infection | Facilities with ≥ 1 Predicted Infection and SIR Sig. <1 n (%) | Facilities with ≥ 1 Predicted Infection and SIR Sig. >1 n (%) |
|----------------|--------------------------|-----------------|---------------------------|------------------------------|----------------------|--|--|--|
| ICU and Ward* | 48 | 287 | 333.6 | 277,973 | 0.86 (0.77, 0.96) | 24 | 3 (13%) | 3 (13%) |
| ICU | 30 | 166 | 187.6 | 134,942 | 0.89 (0.76, 1.03) | 16 | 2 (13%) | 3 (19%) |
| Ward* | 48 | 121 | 146.1 | 143,031 | 0.83 (0.69, 0.99) | 20 | 1 (5%) | 1 (5%) |
| Rehabilitation | 11 | 10 | 11.9 | 4,527 | 0.84 (0.43, 1.50) | 5 | 0 (0%) | 0 (0%) |

*Ward locations include adult and pediatric medical, surgical, and medical/surgical wards

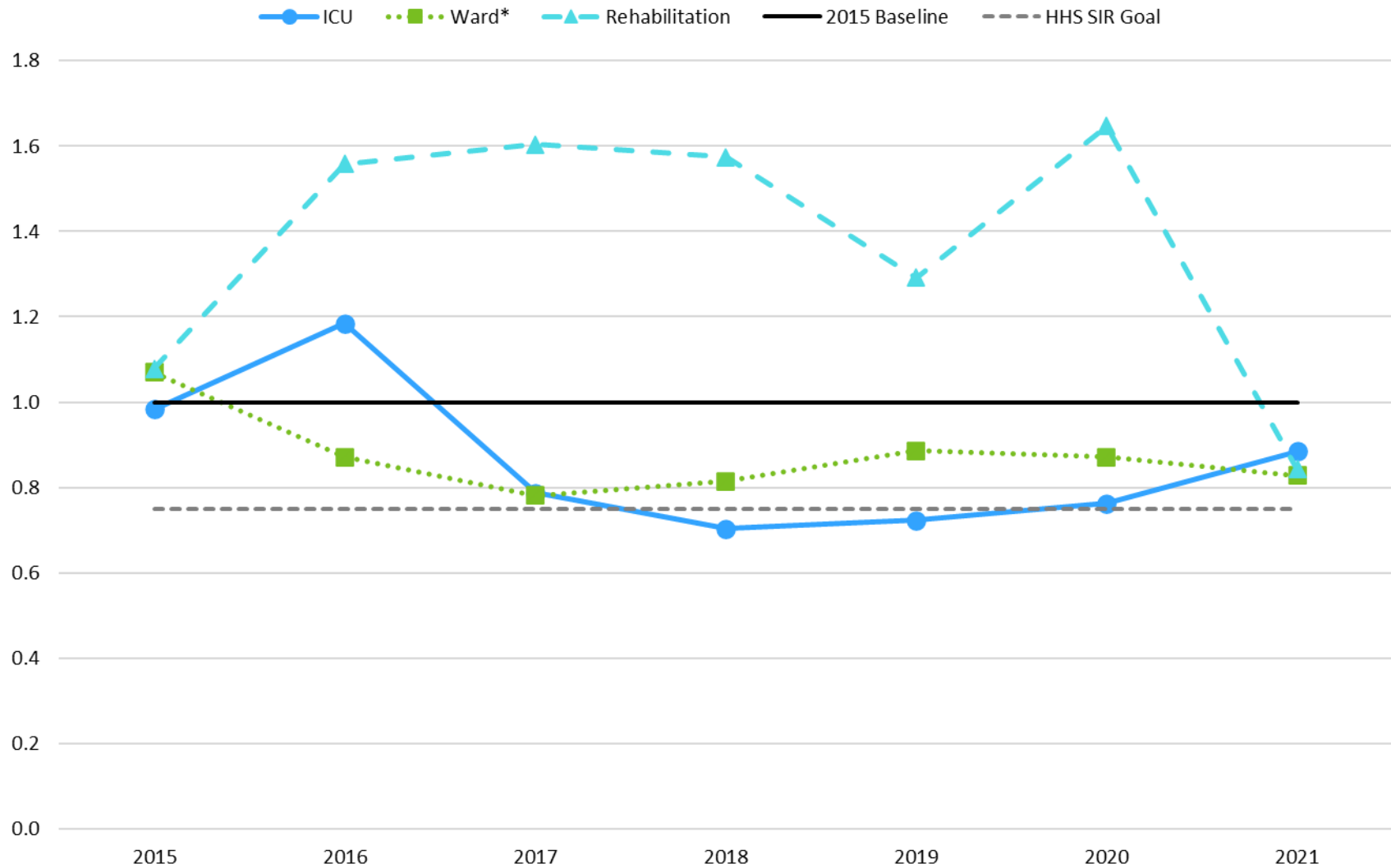
Sig. = statistically significant

Green shading indicates SIR is statistically lower than 2015 national baseline

Red shading indicates SIR is statistically higher than 2015 national baseline

Data downloaded from NHSN on May 15, 2022

Figure 4. CAUTI SIR by Year and Location Type, Acute Care PPS Hospitals, 2015–2021



*Ward locations include adult and pediatric medical, surgical, and medical/surgical wards
Data downloaded from NHSN on May 17, 2022

Surgical Site Infections (SSI)

A **surgical site infection** (SSI) occurs after surgery in the part of the body where the surgery took place. These infections might involve only the skin but could also be more serious if tissue under the skin or internal organs are infected. SSIs sometimes take extended time periods after surgery to develop. Symptoms might include fever, redness or pain around the surgical site, or drainage of fluid from the wound.

This report includes SSIs reported by Minnesota acute care PPS hospitals following surgical procedures required for CMS reporting including colon surgeries (COLO) and abdominal hysterectomies (HYST) from hospitals that perform those procedures. It does not include SSI data that might have been reported voluntarily for other types of surgical procedures. The risk-adjustment model used to calculate SIR is the complex admission/readmission model, which includes procedures in adult patients that stay overnight in the hospital. This model includes more complicated and severe infections involving deep tissue and organ space and excludes superficial infections that involve only the top layers of skin and tissue.

**Table 8. SSIs Following Colon Surgery (COLO) and Abdominal Hysterectomy (HYST),
Acute Care PPS Hospitals, 2021**

| Procedure Type | No. Facilities Reporting | Infection Count | Predicted Infection Count | Number of Procedures | SIR (95% CI) | Facilities with ≥ 1 Predicted Infection | Facilities with ≥ 1 Predicted Infection and SIR Sig. <1 n (%) | Facilities with ≥ 1 Predicted Infection and SIR Sig. >1 n (%) |
|----------------|--------------------------|-----------------|---------------------------|----------------------|----------------------|--|--|--|
| COLO | 49 | 115 | 170.0 | 5,604 | 0.68 (0.56, 0.81) | 21 | 3 (14%) | 0 (0%) |
| HYST | 49 | 36 | 28.6 | 3,449 | 1.26 (0.90, 1.73) | 11 | 0 (0%) | 1 (9%) |

Complex Admission/Readmission SIR model, adult only

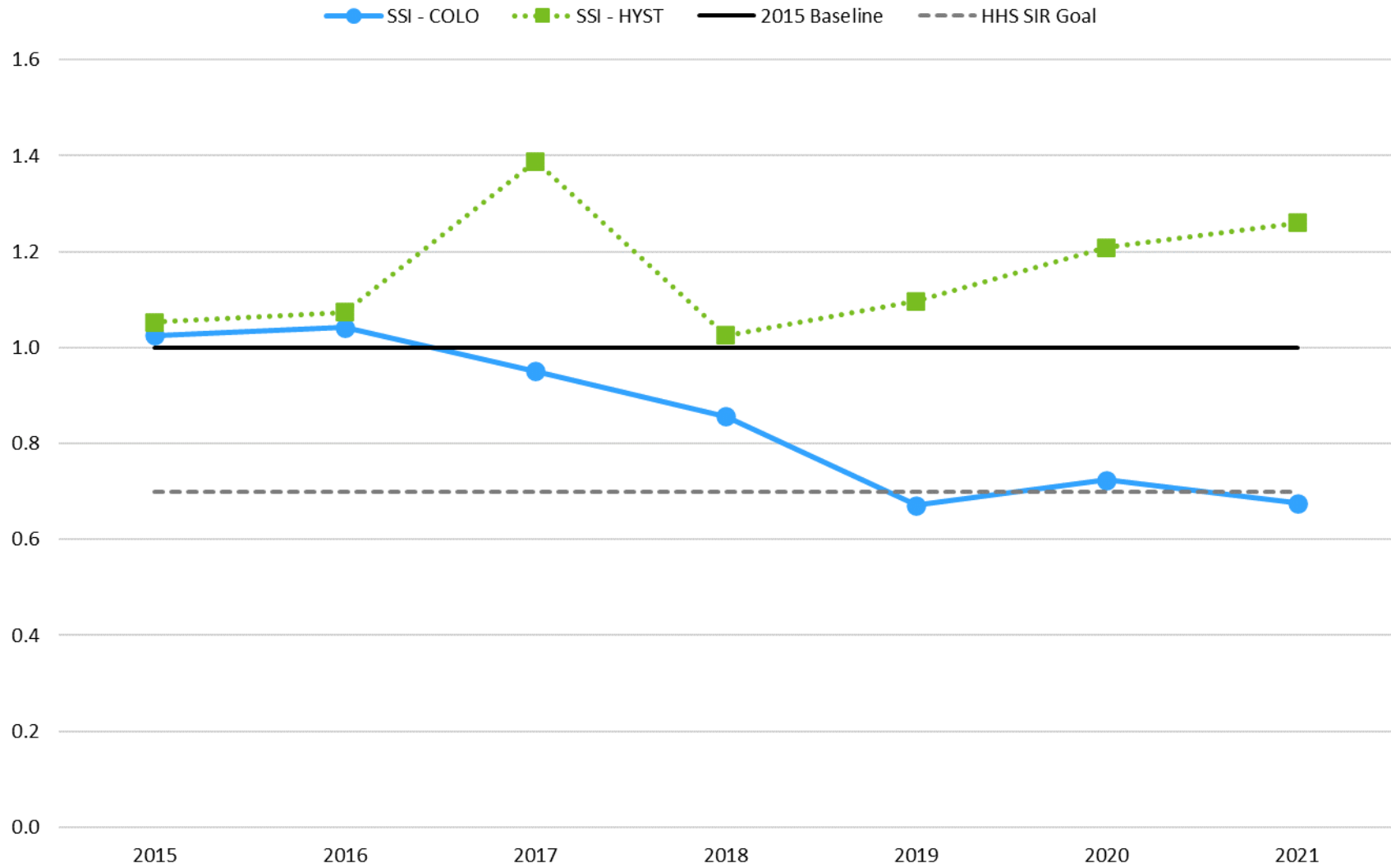
Sig. = statistically significant

Green shading indicates SIR is statistically lower than 2015 national baseline

Red shading indicates SIR is statistically higher than 2015 national baseline

Data downloaded from NHSN on May 17, 2022

Figure 5. SSI Complex Admission/Readmission SIR by Year and Procedure Type, Acute Care PPS Hospitals, 2015–2021



Data downloaded from NHSN on May 17, 2022

Methicillin-Resistant *Staphylococcus aureus* (MRSA) Bacteremia Laboratory-Identified Events (LabID)

Methicillin-resistant *Staphylococcus aureus* (MRSA) infections are caused by bacteria that are resistant to certain types of drugs. MRSA can cause skin or wound infections. Sometimes, MRSA can infect the blood and cause serious illness and even death.

MRSA LabID events rely on laboratory data only and do not require patients to be ill to have a positive result. Sometimes patients will have multiple lab tests during their treatment that are positive for a MRSA infection. The first positive test that identifies a MRSA infection is called the incident infection, which means that the patient did not have another positive test result for MRSA within the last 56 days.

This report only displays incident MRSA bloodstream infections identified on or after the fourth day of hospitalization (health care facility-onset) in inpatient locations reported by Minnesota acute care PPS hospitals.

Table 9. Health Care Facility-Onset MRSA Bacteremia LabID Events, Acute Care PPS Hospitals, 2021

| No. Facilities Reporting | Infection Count | Predicted Infection Count | Number of Patient Days | SIR (95% CI) | Facilities with ≥ 1 Predicted Infection | Facilities with ≥ 1 Predicted Infection and SIR Sig. < 1 n (%) | Facilities with ≥ 1 Predicted Infection and SIR Sig. > 1 n (%) |
|--------------------------|-----------------|---------------------------|------------------------|----------------------|--|---|---|
| 49 | 81 | 133.9 | 2,301,726 | 0.61 (0.48, 0.75) | 20 | 3 (15%) | 0 (0%) |

Health care facility-onset events include incident events collected on or after hospital day four

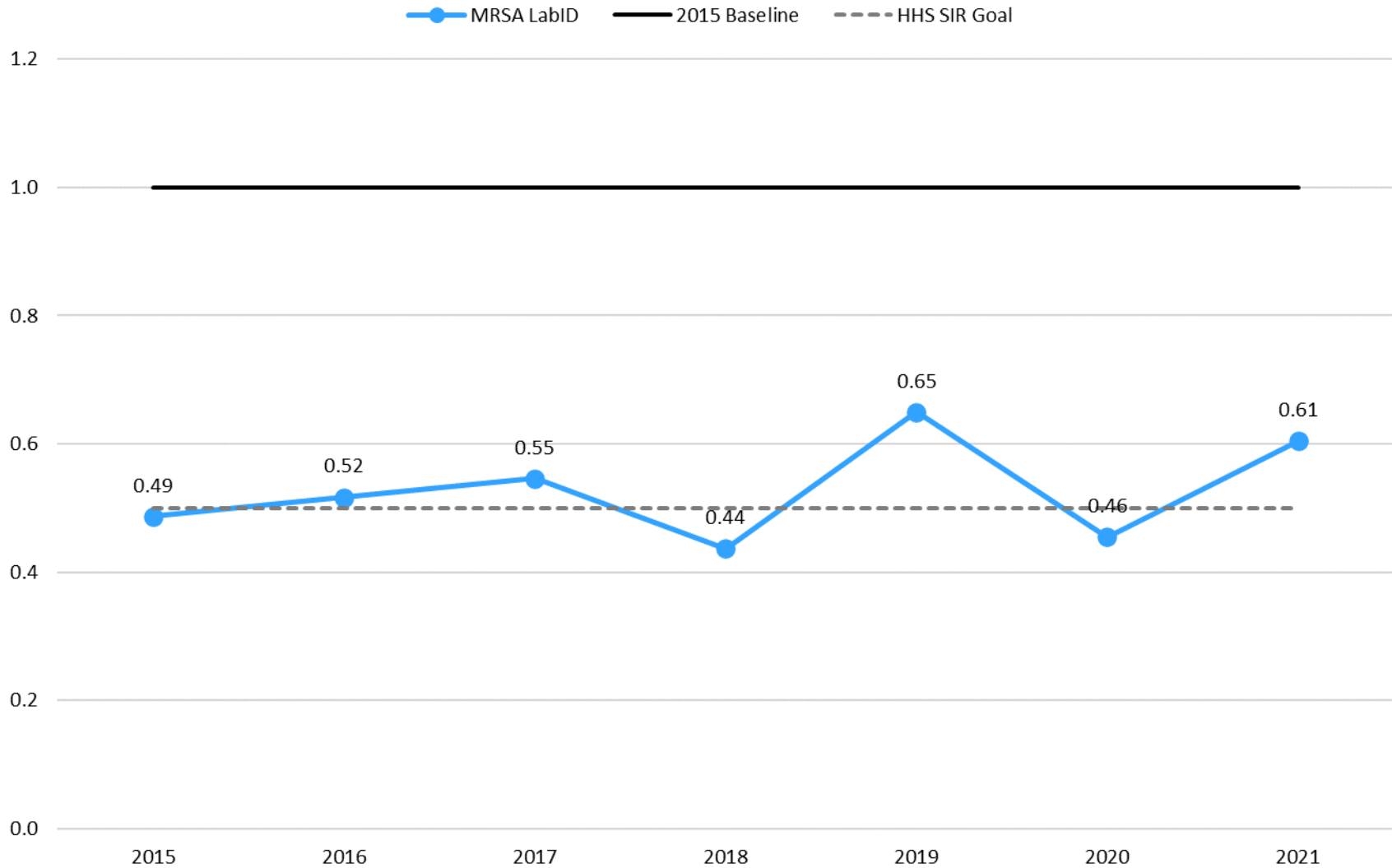
Sig. = statistically significant

Green shading indicates SIR is statistically lower than 2015 national baseline

Red shading indicates SIR is statistically higher than 2015 national baseline

Data downloaded from NHSN on May 17, 2022

Figure 6. Health Care Facility-Onset MRSA LabID Event SIR by Year, Acute Care PPS Hospitals, 2015–2021



Data downloaded from NHSN on May 17, 2022

Health care facility-onset events include incident events collected on or after hospital day four

***Clostridioides difficile* Infection (CDI) Laboratory-Identified (LabID) Events**

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.

CDI LabID events rely on laboratory data only and do not require patients to be ill to have a positive result. Sometimes patients will have multiple lab tests during their treatment that are positive for CDI. The first positive test that identifies CDI is called the incident infection, which means that the patient did not have another positive test result for CDI within the last 56 days.

This report only displays incident CDI identified on or after the fourth day of hospitalization (health care facility-onset) in inpatient locations reported by Minnesota acute care PPS hospitals.

Table 10. Health Care Facility-Onset CDI Infection LabID Events, Acute Care PPS Hospitals, 2021

| No. Facilities Reporting | Infection Count | Predicted Infection Count | Number of Patient Days | SIR (95% CI) | Facilities with ≥ 1 Predicted Infection | Facilities with ≥ 1 Predicted Infection and SIR Sig. < 1 n (%) | Facilities with ≥ 1 Predicted Infection and SIR Sig. > 1 n (%) |
|--------------------------|-----------------|---------------------------|------------------------|-----------------------------|--|---|---|
| 49 | 816 | 1,442.8 | 2,123,505 | 0.57 (0.53, 0.61) | 47 | 22 (47%) | 0 (0%) |

Health care facility-onset events include incident events collected on or after hospital day four

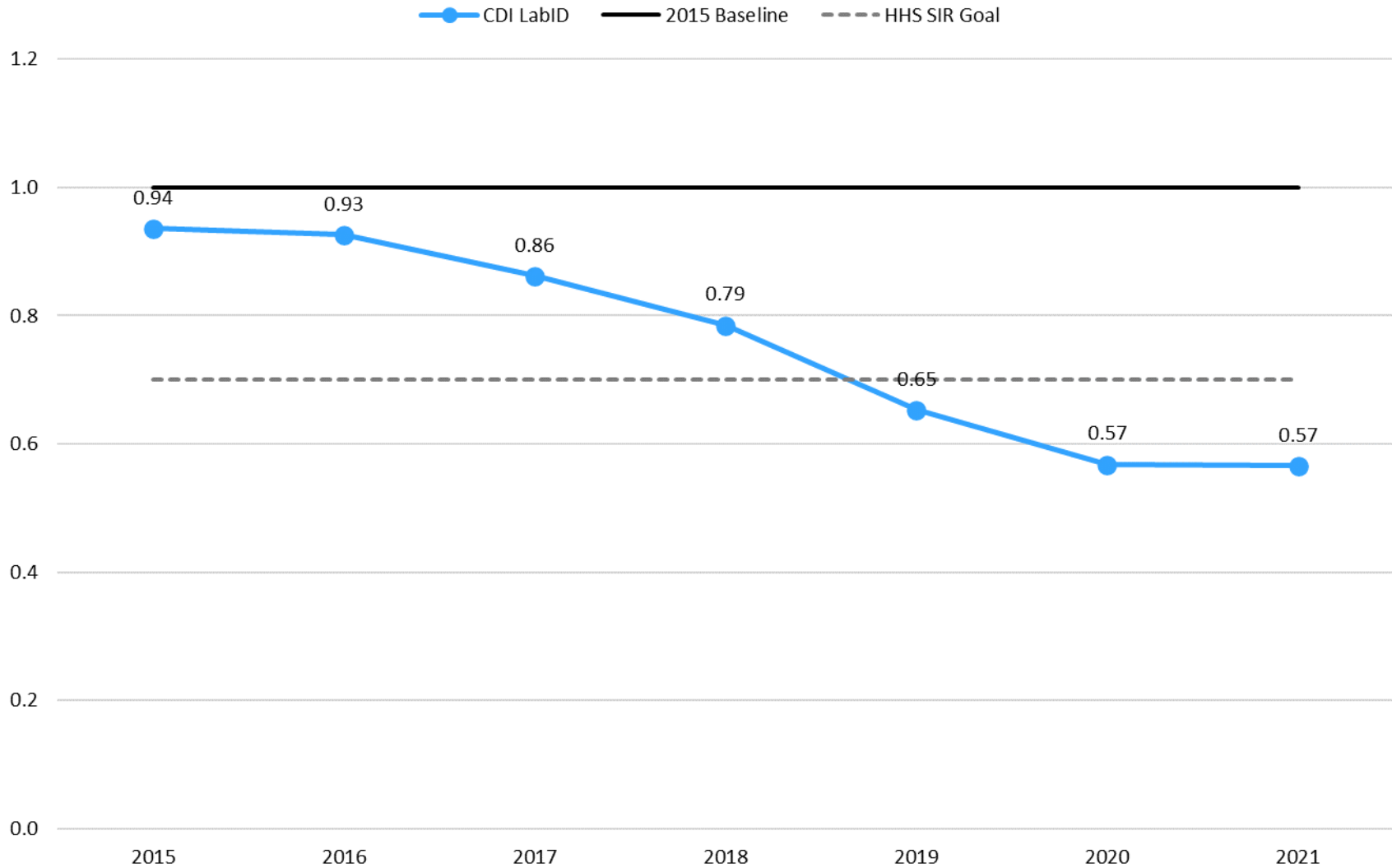
Sig. = statistically significant

Green shading indicates SIR is statistically lower than 2015 national baseline

Red shading indicates SIR is statistically higher than 2015 national baseline

Data downloaded from NHSN on May 17, 2022

Figure 7. Health Care Facility-Onset CDI LabID SIR by Year, Acute Care PPS Hospitals, 2015–2021



Data downloaded from NHSN on May 17, 2022

Health care facility-onset events include incident events collected on or after hospital day four

Antibiotic Stewardship Program Core Elements

Hospital antibiotic stewardship programs (ASPs) have been shown to improve prescribing and treatment practices and to reduce negative impacts of antibiotic use. In 2014, CDC recommended that all acute care hospitals implement an ASP. That same year, CDC published guidance titled, *The Core Elements of Hospital Antibiotic Stewardship Programs* (CDC, 2014). Recognizing that hospitals differ in terms of organizational structure, care provided, and available resources, the core elements are intended to provide flexible guidance to implement the most essential components of an ASP. With this guidance, CDC highlights leadership commitment and a multidisciplinary approach to antibiotic stewardship and regards an ASP that incorporates all seven core elements as a comprehensive program.

For several years, the NHSN annual hospital survey has included questions intended to assess a hospital's adoption of the ASP core elements. In 2021, some of these questions were updated to better reflect antibiotic stewardship practice. However, some of these changes have influenced our ability to assess progress over time. The survey questions included for each core element, and the answers required to judge whether the program includes or "meets" that core element, as well as notable changes in 2021, are listed in Table 11 below.

Table 11. NHSN Hospital Survey Questions and Scoring to Assess Adoption of Core Elements

| Core Element | 2020 Survey | 2021 Changes |
|--------------|---|--|
| Leadership | <p>Wording change to "formal statement of support for AS". Removed salary support question.</p> <p>Added:</p> <ul style="list-style-type: none"> ▪ Demonstrated leadership support through staff communication, training opportunities, or allocating IT resources for AS. ▪ Facility has committee responsible for AS. | <p>Added:</p> <ul style="list-style-type: none"> ▪ Leadership presents information on stewardship activities and outcomes to facility leadership and/or board at least annually. ▪ Leadership ensures support from key departments and groups. ▪ Facility leadership has demonstrated a commitment to antibiotic stewardship efforts by: <ul style="list-style-type: none"> - Providing stewardship program leader(s) dedicated time for AS interventions - Having a senior executive that serves to help ensure the program has needed resources and support - Discussing resource needs with facility leadership and/or board at least annually |

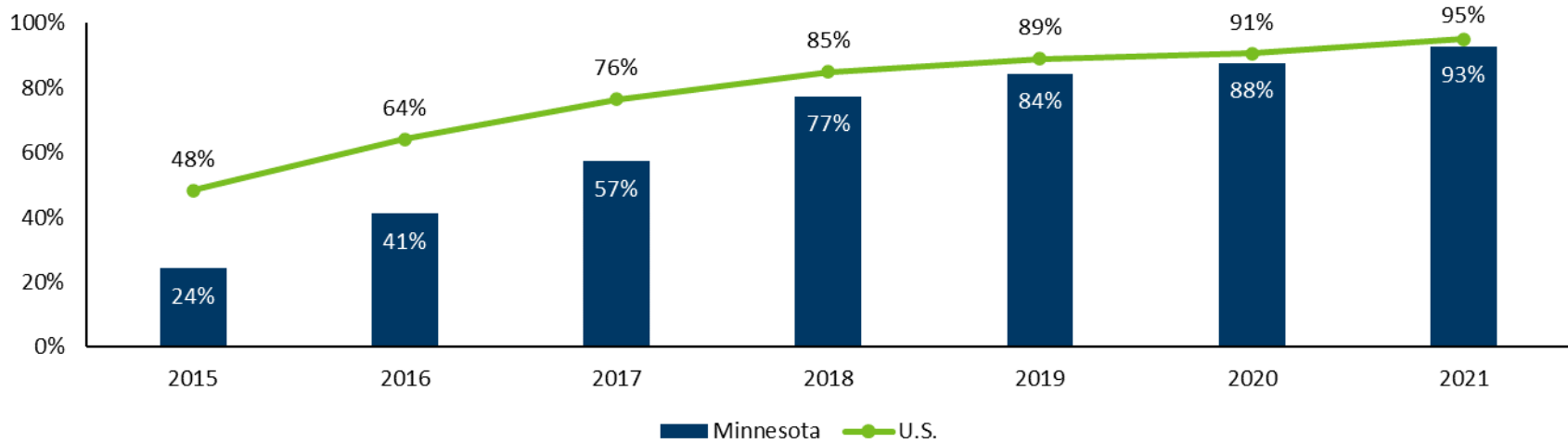
HEALTHCARE-ASSOCIATED INFECTIONS IN MINNESOTA ACUTE CARE HOSPITALS

| Core Element | 2020 Survey | 2021 Changes |
|---------------------|---|--|
| Accountability | A leader is responsible for AS outcomes. | Clarified language to include responsibility for antibiotic stewardship “program management and outcomes”. |
| Pharmacy Expertise* | At least one pharmacist is responsible for improving antibiotic use. | No change. |
| Action | <p>Wording change to “policy or formal procedure”.</p> <p>Wording change of some antibiotics require approval to specify prior authorization.</p> <p>Added:</p> <ul style="list-style-type: none"> ▪ Policy to document duration of antibiotic orders. ▪ Active AS intervention for select diagnoses. | <p>Wording change to facility-specific treatment recommendations, based on national guidelines and local pathogen susceptibilities, to assist with antibiotic selection for common clinical conditions.</p> <p>Added:</p> <ul style="list-style-type: none"> ▪ ‘Pharmacy-based’ interventions for IV to oral antibiotics without physician’s order (e.g., hospital-approved protocol) and alerts to providers about duplicative antibiotic spectra. ▪ ‘Nursing-based’ interventions (tracking duration of therapy and collaborating with treating team). |
| Tracking | <p>Wording change to “policy or formal procedure”.</p> <p>Added:</p> <ul style="list-style-type: none"> ▪ Facility or regional antibiotic resistance patterns are monitored. | <p>Added:</p> <ul style="list-style-type: none"> ▪ Adherence to facility’s treatment recommendations for antibiotic selection for common clinical conditions is monitored. ▪ Monitoring of preauthorization and prospective audit and preauthorization interventions. |
| Reporting | <p>Wording change to “policy or formal procedure”.</p> <p>Added:</p> <ul style="list-style-type: none"> ▪ Antibiotic use and stewardship updates provided to facility leadership. ▪ Outcomes for AS interventions provided to staff. | <p>Wording change for education provided to staff to include information on antibiotic use, antibiotic resistance, and stewardship efforts.</p> <p>Added:</p> <ul style="list-style-type: none"> ▪ Facility distributes antibiogram to prescribers. |
| Education | Specifies staff types and frequency of education. | <p>Wording change to further clarify type of education: “...optimal prescribing, adverse reactions from antibiotics, and antibiotic resistance”</p> <p>Added:</p> <ul style="list-style-type: none"> ▪ Patient education on important side effects. |

HEALTHCARE-ASSOCIATED INFECTIONS IN MINNESOTA ACUTE CARE HOSPITALS

The following section details survey results from Minnesota hospitals and, where available, national results. Results from all participating acute care hospitals are included in this section, including critical access hospitals (CAH), and specialty hospitals that voluntarily report these data to NHSN. In reviewing results comparing Minnesota and U.S. hospitals, it is important to note that the proportion of Minnesota NHSN hospitals classified as CAHs is greater than the proportion of CAHs nationwide. In 2020, CAHs accounted for 57% of 122 Minnesota hospitals reporting to NHSN compared with 25% of 4,527 nationwide.

Figure 8. Proportion of Hospitals Meeting All Seven Antibiotic Stewardship Program Core Elements by Year and Location



Number of Minnesota hospitals reporting (n) = 128 in 2015; 124 in 2016; 131 in 2017; 128 in 2018; 127 in 2019; 122 in 2020; 121 in 2021

Figure 9. Proportion of Minnesota Hospitals Meeting Antibiotic Stewardship Program Core Elements by Year

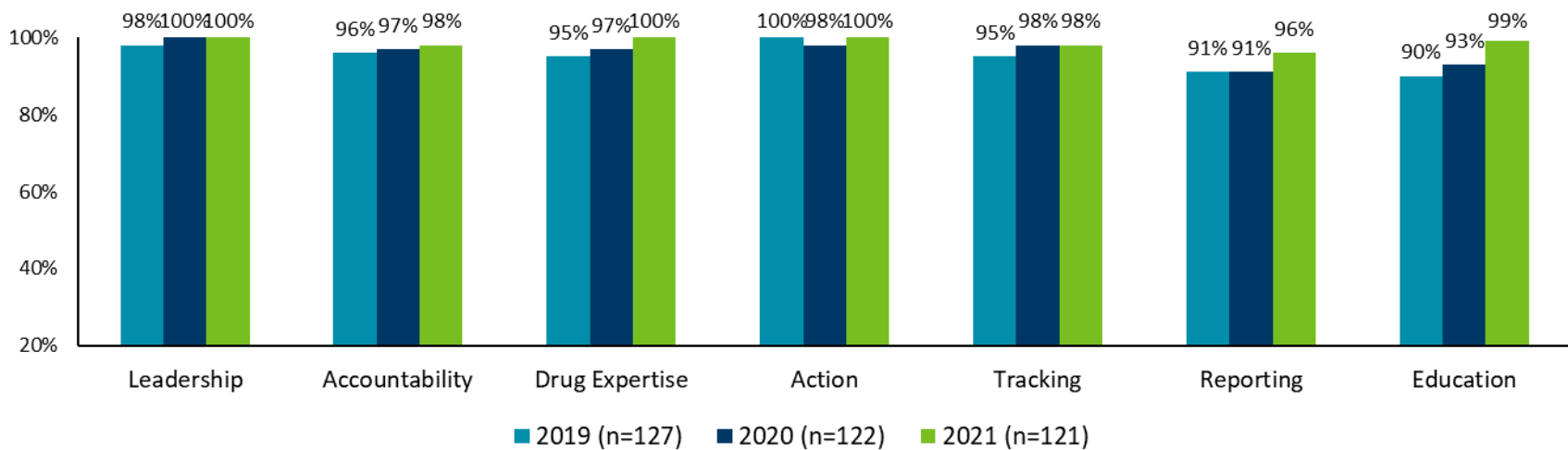


Figure 10. Proportion of Minnesota Hospitals Meeting All Seven Antibiotic Stewardship Program Core Elements by Year and Hospital Type

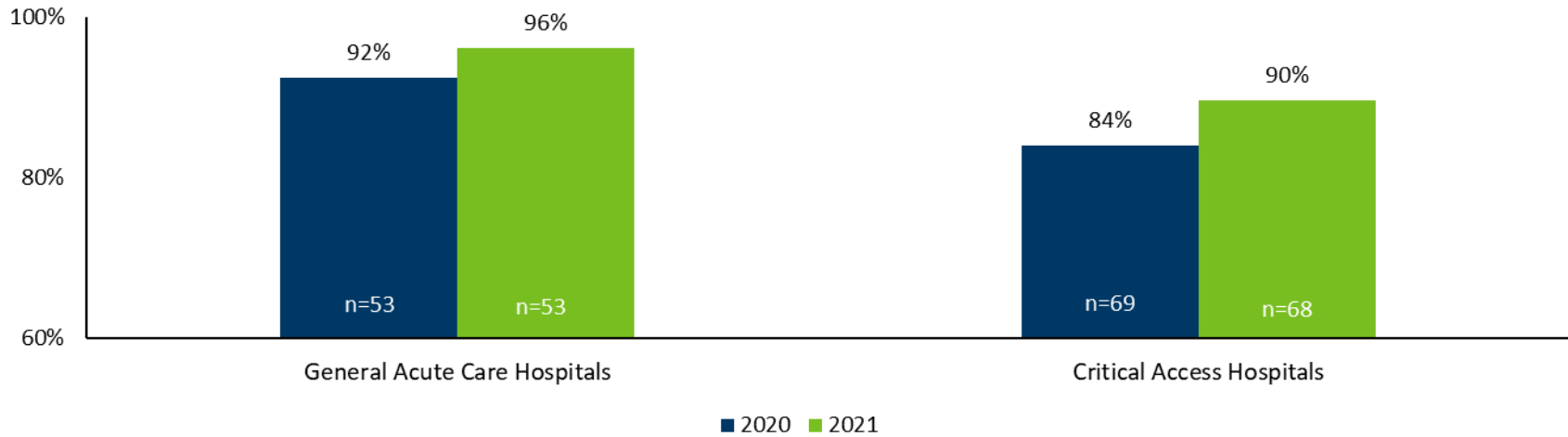


Figure 11. Proportion of Minnesota Hospitals Meeting All Seven Antibiotic Stewardship Program Core Elements by Year and Teaching Status

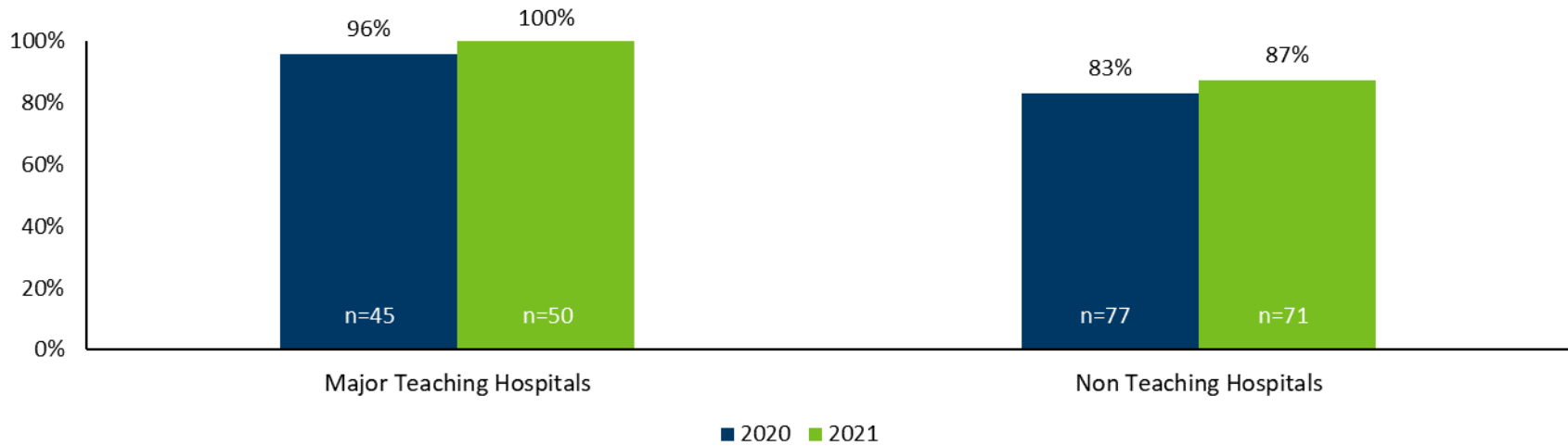
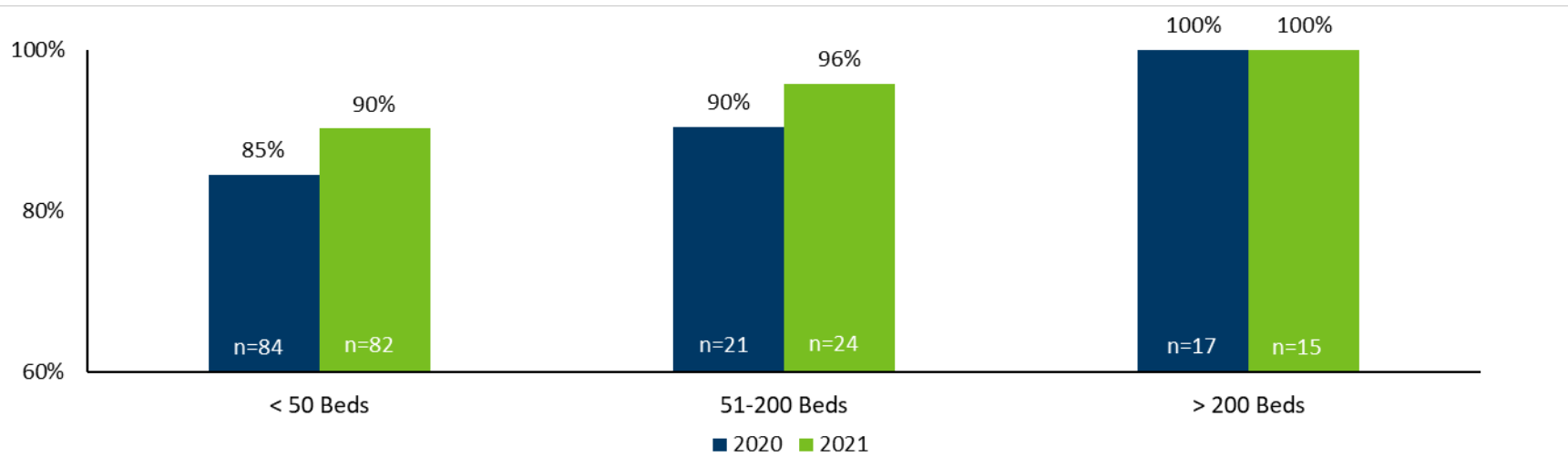


Figure 12. Proportion of Minnesota Hospitals Meeting All Seven Antibiotic Stewardship Program Core Elements by Year and Hospital Bed Number



References

- CDC. (2014). *The Core Elements of Hospital Antibiotic Stewardship Programs*. Atlanta, GA: US Department of Health and Human Services, CDC. Retrieved from CDC website: <https://www.cdc.gov/antibiotic-use/healthcare/pdfs/core-elements.pdf>
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