Healthcare-Associated Infections Prevention Program Annual Data Report

2023

Wisconsin Healthcare-Associated Infections Prevention Program

Division of Public Health, Wisconsin Department of Health Services

P-00340 (08/2024)

WISCONSIN DEPARTMENT of HEALTH SERVICES

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About This Report

Healthcare-associated infections (HAIs) are infections that occur while receiving health care. The risk of developing an HAI is higher for patients who undergo surgical procedures or have medical devices such as central lines, urinary catheters, and ventilators. Infections caused by multidrug-resistant organisms (MDROs), such as methicillin-resistant *Staphylococcus aureus* (MRSA), can also be acquired in various health care settings and are considered HAIs.

These infections are a significant burden and can cause serious illness and death, but many are preventable. Wisconsin works to monitor these infections because they are a threat to public health and patient safety.

The purpose of this report is to monitor trends and patterns and to support evaluation of HAI prevention and control efforts among Wisconsin acute care and critical access hospitals. This report includes data on six HAI types:

- Catheter-associated urinary tract infections (CAUTIs)
- Central line-associated blood stream infections (CLABSIs)
- Ventilator-associated events (VAEs)
- Surgical site infections (SSIs)
- MRSA bacteremia (MRSA in the bloodstream)
- *Clostridioides difficile* infections (CDI)

About the Wisconsin HAI Prevention Program

The Wisconsin HAI Prevention Program conducts statewide HAI surveillance and provides technical assistance in a variety of areas for health care and public health partners, including infection prevention and control, MDRO containment, and antimicrobial stewardship.

Additional information on the Wisconsin HAI Prevention Program is available on the DHS website. For questions and comments, please email DHSWIHAIPreventionProgram@dhs.wisconsin.gov.

Methodology

The National Healthcare Safety Network (NHSN) is a national HAI reporting system developed and maintained by the CDC (Centers for Disease Control and Prevention).

The Wisconsin Department of Health Services, Division of Public Health (DPH) collects HAI data reported by hospitals into NHSN and reports aggregate data to monitor trends and to compare Wisconsin HAI occurrence to the national baseline. Hospitals voluntarily

share HAI data reported in NHSN with DPH. Among 143 eligible Wisconsin hospitals, all provided data regarding at least one type of HAI to DPH.

Where possible, annual data are displayed separately for acute care and critical access hospitals. Critical access hospitals are those in rural areas with an official federal billing designation, that have 25 or fewer acute care inpatient beds, are located more than 35 miles from another hospital, maintain an average length of stay of 96 hours or less, and provide emergency care services. The remaining acute care hospitals, including children's hospitals, are grouped separately in this report.

Data for this report were downloaded from NHSN on June 24, 2024. Changes made to the data after this date are not reflected in this report.

Standardized infection ratio

The standardized infection ratio (SIR) is a key outcome measure in NHSN and is the ratio of the number of observed HAIs to the number of predicted infections. The number of predicted infections is based on a national benchmark and a risk adjustment process that accounts for facility- and patient-level characteristics that are known to be associated with each HAI type. The specific factors included in the risk adjustment for each infection type vary, but often include hospital size and teaching status, patient population served by the hospital, and surgical patient characteristics.

The SIR enables "apples to apples" comparisons of HAI data across facilities and hospital unit types, as well as comparisons with state and national data.

- A SIR > 1 indicates that more infections were observed than predicted.
- A SIR < 1 indicates that fewer infections were observed than predicted.
- A SIR = 1 indicates there was no difference from the national baseline.

The current SIR national baseline was established utilizing data reported by hospitals into NHSN in 2015. NHSN is in the process of updating national baseline values based on data submitted by hospitals in 2022. This process is expected to be completed by the end of 2024.

For additional information on the SIR, see NHSN's *A Guide to the SIR*.

Symbols and conventions used in this report

In graphs and tables throughout this report, an asterisk (*) is used to denote a **statistically significant difference** between a SIR value and the 2015 national baseline SIR. **The horizontal black line in the graphs represents the 2015 national baseline.** The number of hospitals or hospital units reporting data for a specific HAI type is noted in graphs and tables (for example, n=58).

In the "Key Takeaways" section, plus and minus signs are used to show whether a SIR value is **higher or lower than the 2015 national baseline**, and whether the difference is statistically significant.

- Lower than national baseline, difference is statistically significant
- Lower than national baseline, difference is not statistically significant
- Higher than national baseline, difference is statistically significant
- Higher than national baseline, difference is not statistically significant

Colored arrows are used in this report to show the **direction of change** in a SIR value from year to year, and whether that change is statistically significant.

- Statistically significant decrease
- Decrease, not statistically significant
- Statistically significant increase
- Increase, not statistically significant

Key Takeaways for 2023

Acute care hospitals

As in recent years, state-level 2023 SIRs for Wisconsin acute care hospitals were significantly **lower** than the 2015 national baseline for **almost all HAI types** included in the report. In 2023 there were:

- Fewer CAUTIs than predicted.
- Fewer CLABSIs than predicted.
- Fewer VAEs than predicted.
- Fewer MRSA bacteremia events than predicted.
- Fewer CDI events than predicted.

In terms of statistically significant changes in state-level SIRs for acute care hospitals from 2022 to 2023, data show that:

- The CAUTI SIR decreased in 2023.
- The Total VAE SIR increased in 2023.

Critical access hospitals

State-level SIRs for Wisconsin critical access hospitals for **CAUTI** and **CDI** were significantly **lower** than the 2015 national baseline in 2023. State-level SIRs for CLABSI and MRSA bacteremia were not significantly different from the national baseline. In 2023, there were:

- Fewer CAUTIs than predicted.
- Fewer CLABSIs than predicted.
- More MRSA bacteremia events than predicted.
- Fewer CDI events than predicted.

VAE data is not shown for critical access hospitals, as few critical access hospitals report on VAE in NHSN.

There were no statistically significant changes in the state-level SIR for critical access hospitals for any HAI type from 2022 to 2023.

Surgical site infections (SSIs)

Wisconsin SSI data is shown for acute care and critical access hospitals combined.

This report includes SSI SIRs calculated using two different NHSN SIR models. The All SSI SIR model includes SSIs occurring at the superficial, deep, and organ/space levels. The Complex Admission/Readmission SIR model only includes SSIs at the deep or organ/space level that are detected during the same hospital admission as the surgical procedure, or upon readmission to the same facility where the procedure was performed. Both models include only SSIs associated with adult, inpatient procedures.

Under the **All SSI model**, the state-level SIR for SSIs associated with abdominal hysterectomy procedures (**HYST**) was significantly **higher** than the 2015 national baseline. State-level SIRs for SSIs following colon surgeries (COLO), hip prosthesis procedures (HPRO) and knee prosthesis procedures (KPRO) were not significantly different from the 2015 baseline. In 2023 there were:

- Fewer COLO SSIs than predicted.
- More HPRO SSIs than predicted.
- More HYST SSIs than predicted.
- More KPRO SSIs than predicted.

Under the **Complex Admission/Readmission model**, the state-level **HPRO** SIR was significantly **lower** than the national baseline. In 2023 there were:

- Fewer COLO SSIs than predicted.
- Fewer HPRO SSIs than predicted.
- More HYST SSIs than predicted.
- More KPRO SSIs than predicted.

In terms of changes from 2022 to 2023, the only statistically significant change for SSIs was an **increase** in the SIR for **all surgical procedure types combined** under the All SSI SIR model. From 2022 to 2023:

- The SIR for all procedure types combined increased under the All SSI SIR model.

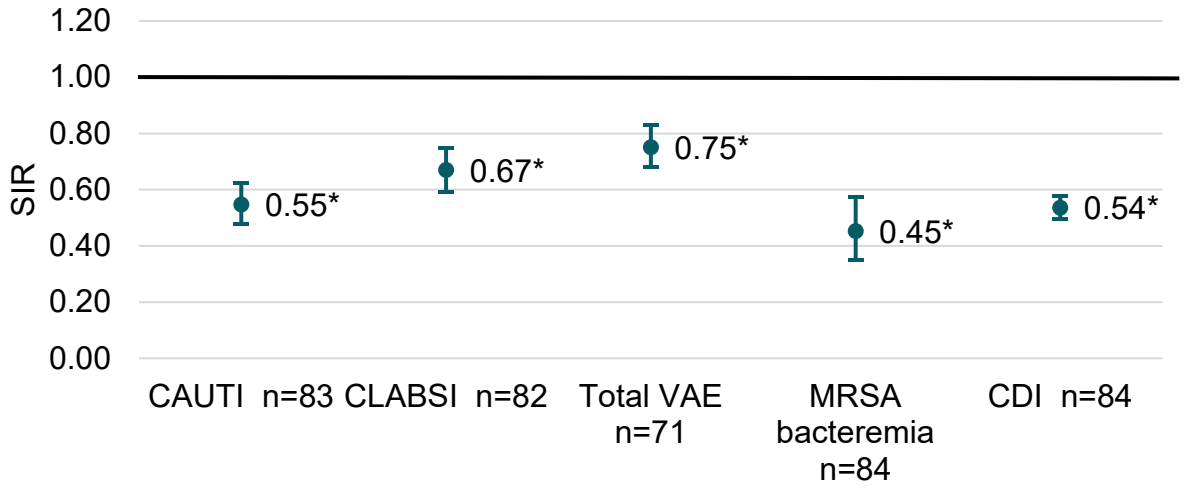
More details about these key takeaways can be found in the "Overview of 2023 SIRs" and "HAI-specific Data" sections of this report.

Overview of 2023 SIRs

Acute care hospitals

In 2023, state-level SIRs for acute care hospitals for **CAUTI**, **CLABSI**, **VAE** (Total VAE), **MRSA bacteremia**, and **CDI** were significantly **lower** than the 2015 national baseline.

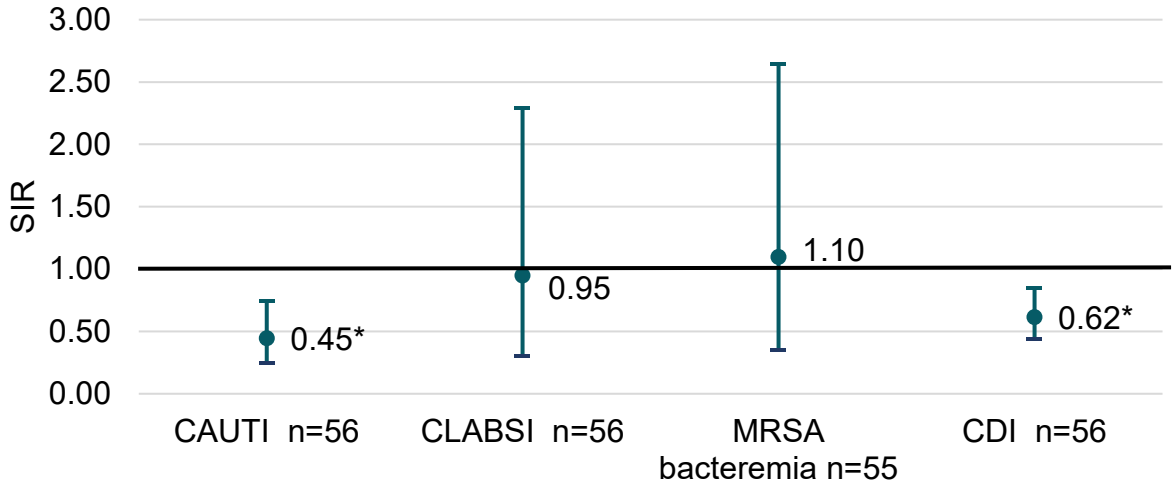
FIGURE 1. State-level SIRs for Wisconsin acute care hospitals by HAI type, 2023.



Critical access hospitals

In 2023, state-level SIRs for critical access hospital for **CAUTI** and **CDI** were significantly **lower** than the 2015 national baseline.

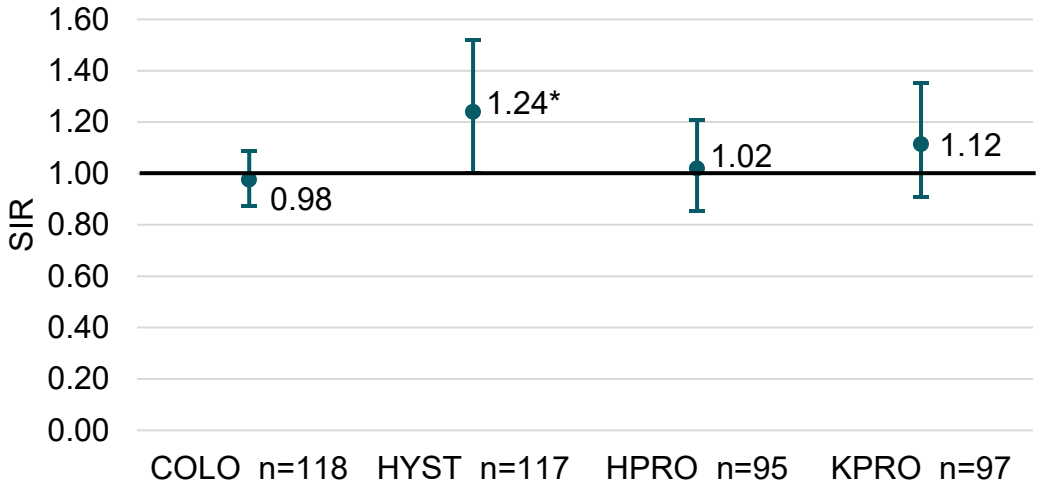
FIGURE 2. State-level SIRs for Wisconsin critical access hospitals by HAI type, 2023.



Surgical site infections

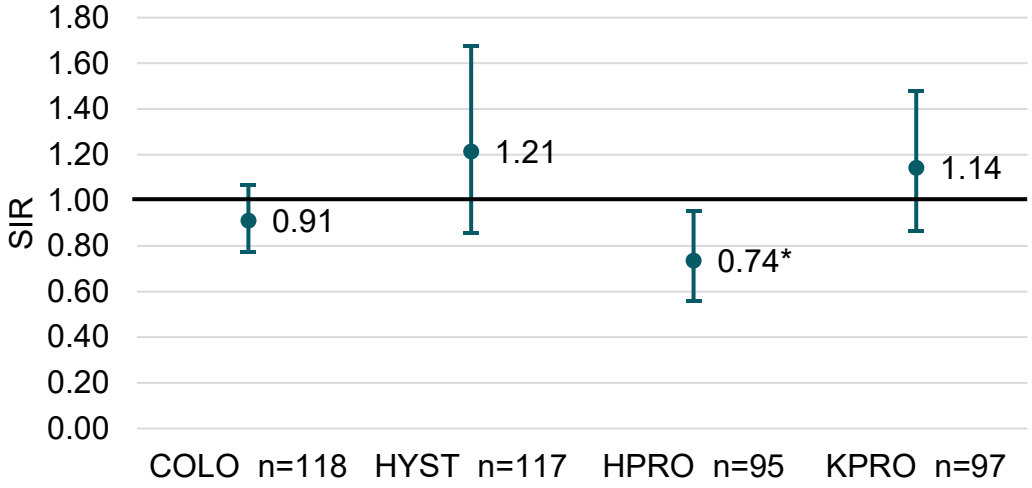
Under the All SSI SIR model, the state-level SIR for **HYST** was significantly **higher** than the 2015 national baseline in 2023. State-level SIRs for COLO, HPRO, and KPRO were not significantly different from the national baseline.

FIGURE 3. SSI SIRs for Wisconsin acute care and critical access hospitals, select procedures, All SSI model, 2023.



Under the Complex Admission/Readmission SIR model, the **HPRO** SIR was significantly **lower** than the national baseline in 2023. State-level SIRs for the other three procedure types were not significantly different from the 2015 baseline.

Figure 4. SSI SIRs for Wisconsin acute care and critical access hospitals, select procedures, Complex Admission/Readmission model, 2023.



HAI-Specific Data

Note to readers: National-level HAI data for 2023 is not yet available; therefore, U.S. SIR values for 2023 are not shown in the figures in this section. An updated version of this report with national-level SIRs for 2023 will be released after the 2023 National and State HAI Progress Report is published by CDC later this year. National data for 2019–2022 come from the 2022 National and State HAI Progress Report and the National and State HAI Report Data Archive webpage.

Catheter-associated urinary tract infection (CAUTI): Acute care hospitals

In Wisconsin, there was a statistically significant **decrease** in the state-level **CAUTI** SIR for acute care hospitals from 2022 to 2023, both when looking at all hospital unit types combined, and when looking just at hospital locations designated in NHSN as critical care units.

FIGURE 5. Wisconsin and U.S. annual CAUTI SIRs, all acute care hospital reporting units, 2019–2023.

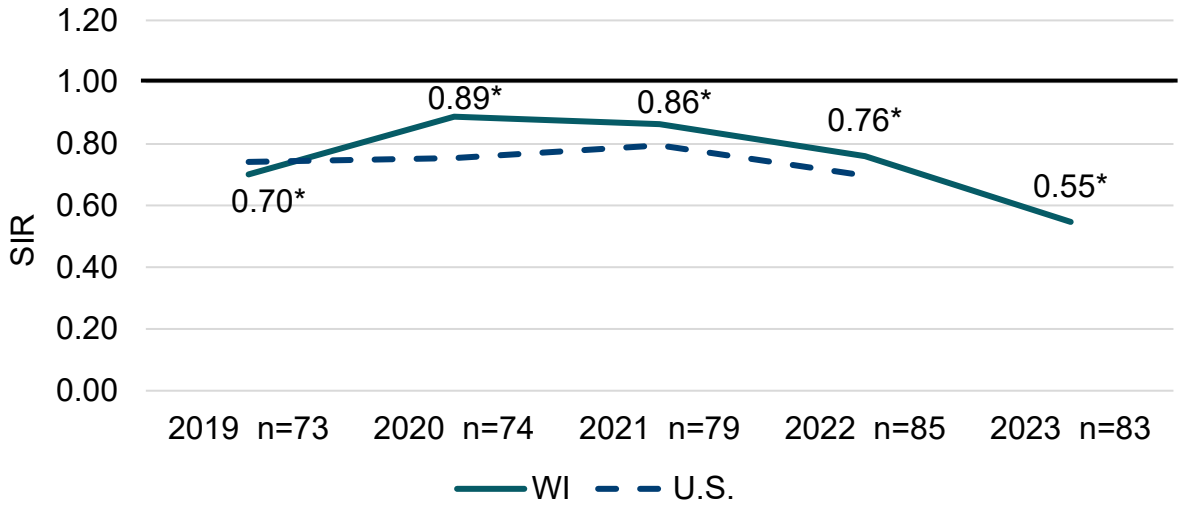


Figure 6 shows facility-level CAUTI SIRs for 2023. NHSN will only calculate a SIR value if the number of predicted infections for that time period is 1 or more; therefore facility-level SIRs are not available for all hospitals.

Of the 83 Wisconsin acute care hospitals reporting CAUTI data in 2023, 49 (59%) were able to calculate a facility-level CAUTI SIR for 2023. Among facilities able to calculate a SIR, the median SIR value was 0.58.

FIGURE 6. Wisconsin acute care hospital CAUTI SIR values, 2023.

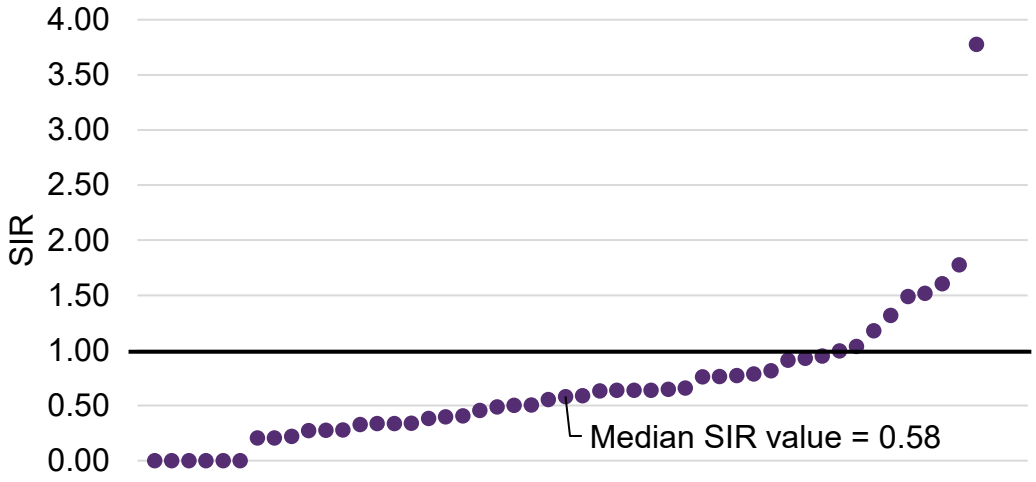


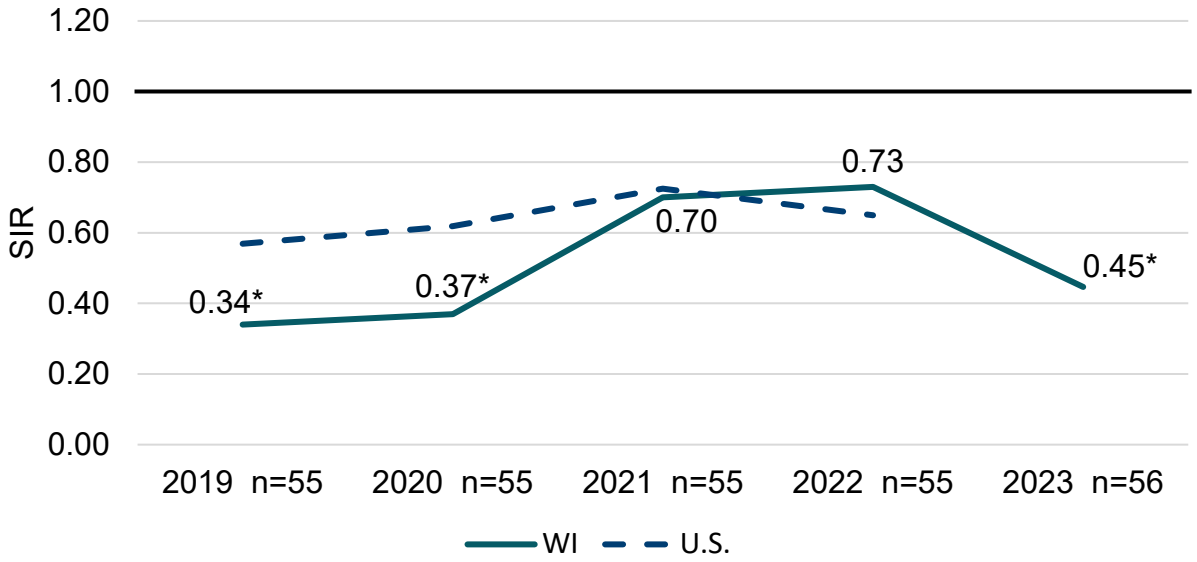
TABLE 1. Unit-level CAUTI information for acute care hospitals.

Unit type	Number of reporting hospitals (units)	Infection count	2023 SIR	95% confidence interval	Percent change 2022–2023
All units	83 (491)	220	0.55*	0.48, 0.62	⬇ 28% decrease
ICU	63 (92)	66	0.38*	0.30, 0.49	⬇ 51% decrease
Non-ICU	83 (399)	154	0.70*	0.57, 0.78	⇩ 10% decrease

CAUTI: Critical access hospitals

The state-level **CAUTI** SIR for critical access hospitals decreased in 2023 and is now significantly **below** the 2015 national baseline. Wisconsin critical access hospitals reported 20 CAUTI events in 2022 and 13 CAUTI events in 2023.

FIGURE 7. Wisconsin and U.S. annual CAUTI SIRs, all critical access hospital reporting units, 2019–2023.



Five Wisconsin critical access hospitals (9%) were able to calculate a facility-level SIR for CAUTI for 2023. The SIR value was 0 for each of these hospitals.

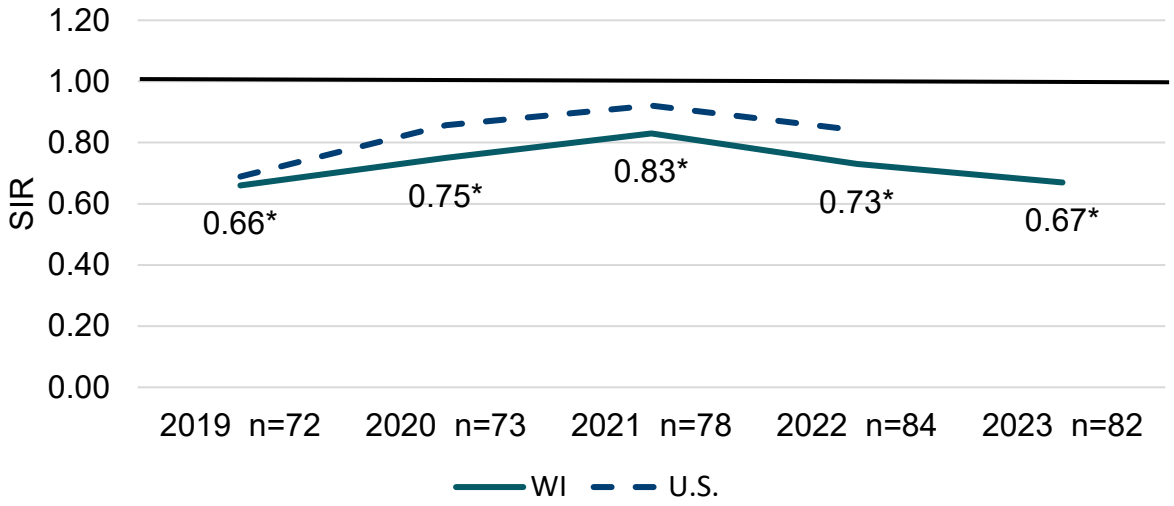
TABLE 2. Unit-level CAUTI information for critical access hospitals.

Unit type	Number of reporting hospitals (units)	Infection count	2023 SIR	95% confidence interval	Percent change 2022–2023
All units	56 (85)	13	0.45*	0.25, 0.75	⇩ 44% decrease
ICU	12 (12)	0	0.00*	--	--
Non-ICU	56 (73)	13	0.47*	0.26, 0.78	⇩ 33% decrease

Central line-associated bloodstream infection (CLABSI): Acute care hospitals

The state-level CLABSI SIR for acute care hospitals decreased for the second year in a row, though neither the change from 2021 to 2022 nor the change 2022 to 2023 was statistically significant. The state-level **CLABSI** SIR for acute care hospitals has been significantly **below** the 2015 national baseline since 2016.

FIGURE 8. Wisconsin and U.S. annual CLABSI SIRs, all acute care hospital reporting units, 2019–2023.



Of the 82 acute care hospitals reporting CLABSI data for 203, 47 (57%) were able to calculate a facility-level CLABSI SIR. Among these facilities, the median SIR value was 0.57.

FIGURE 9. Wisconsin acute care hospital CLABSI SIR values, 2023.

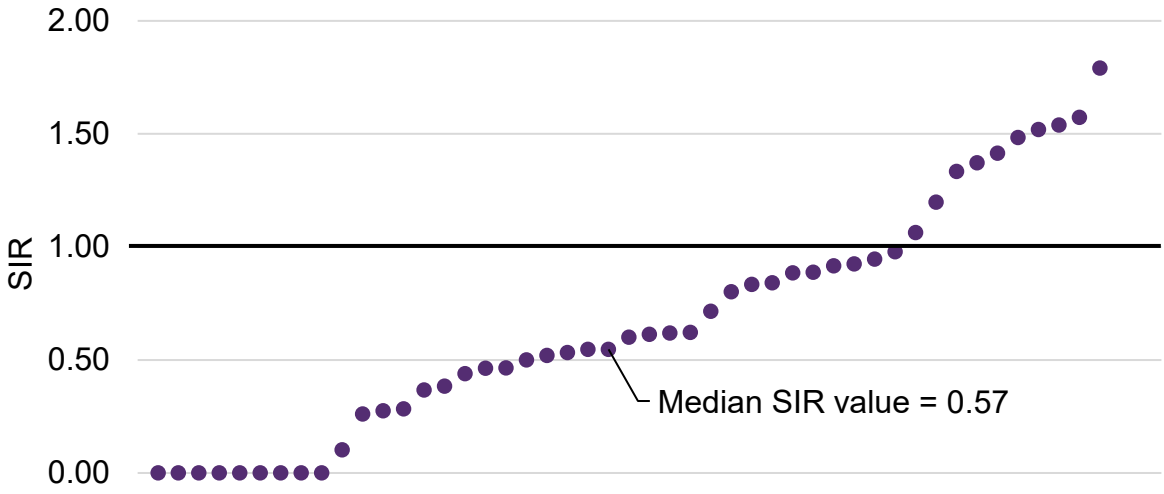


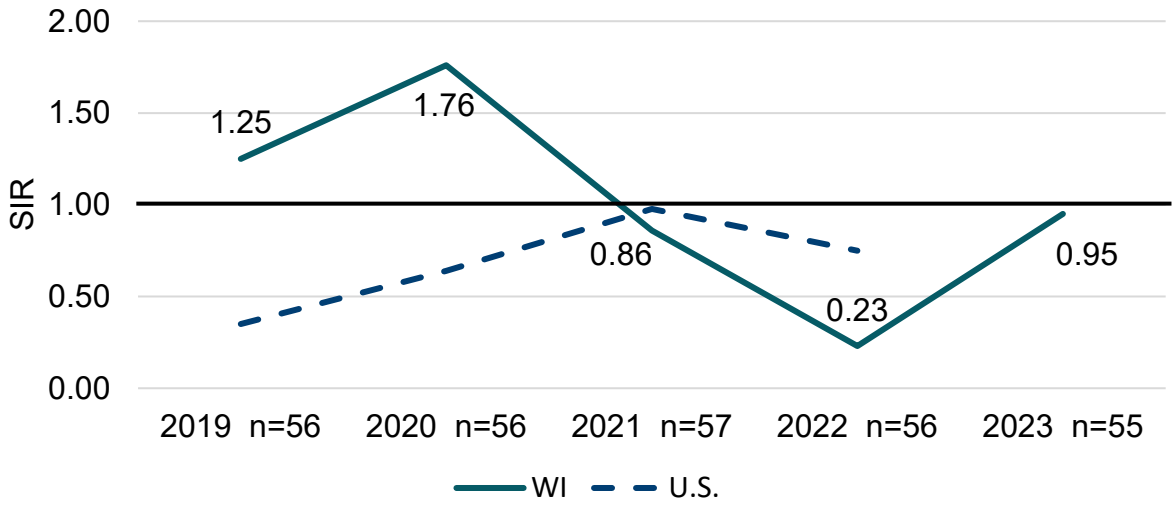
TABLE 3. Unit-level CLABSI information for acute care hospitals.

Unit type	Number of reporting hospitals (units)	Infection count	2023 SIR	95% confidence interval	Percent change 2022–2023
All units	82 (498)	272	0.67*	0.59, 0.75	⇩ 8% decrease
NICU	17 (17)	10	0.68	0.33, 1.15	⇩ 40% decrease
ICU	62 (89)	88	0.70*	0.56, 0.85	⇩ 8% decrease
Non-ICU	82 (392)	174	0.66*	0.57, 0.76	⇩ 6% decrease

CLABSI: Critical access hospitals

The state-level CLABSI SIR for critical access hospitals increased from 2022 to 2023, but this was the difference between one reported infection in 2022 and four reported infections in 2023 and was not a statistically significant change.

FIGURE 10. Wisconsin and U.S. annual CLABSI SIRs, all Wisconsin critical access hospital reporting units, 2019–2023.



No Wisconsin critical access hospital was able to calculate a facility-level CLABSI SIR for 2023.

TABLE 4. Unit-level CLABSI information for critical access hospitals.

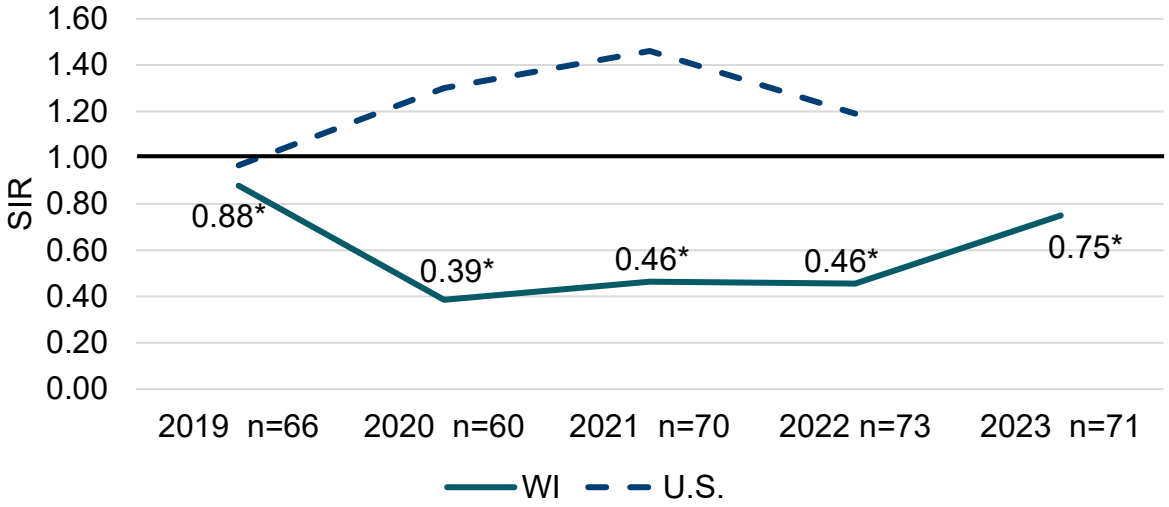
Unit type	Number of reporting hospitals (units)	Infection count	2023 SIR	95% confidence interval	Percent change 2022–2023
All units	56 (84)	4	0.95	0.30, 2.29	⇧ 321% increase
ICU	12 (12)	0	--	--	--
Non-ICU	56 (72)	4	0.97	0.31, 2.34	⇧ 316% increase

Ventilator-associated event (VAE): Acute care hospitals

Surveillance for VAEs includes both infections and other conditions that may or may not represent true infections. The “Total VAE” measure includes all VAEs. Data shown is for acute care hospitals only.

There was a statistically significant **increase** in the **Total VAE** SIR for Wisconsin acute care hospitals from 2022 to 2023, but the SIR remains significantly **below** the 2015 national baseline.

FIGURE 11. Wisconsin and U.S. annual Total VAE SIRs, all acute care hospital reporting units, 2019–2023.



Of the 71 acute care hospitals that reported VAE data, 42 (59%) were able to calculate a facility-level Total VAE SIR for 2023. The median SIR among these hospitals was 0.

FIGURE 12. Wisconsin acute care hospital Total VAE SIR values, 2023.

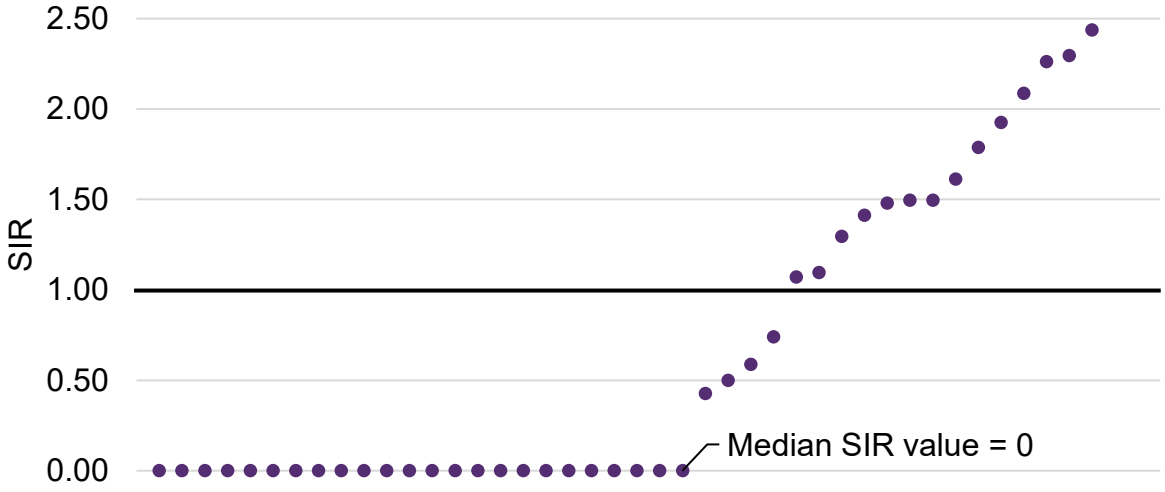


TABLE 5. Unit-level Total VAE information for acute care hospitals.

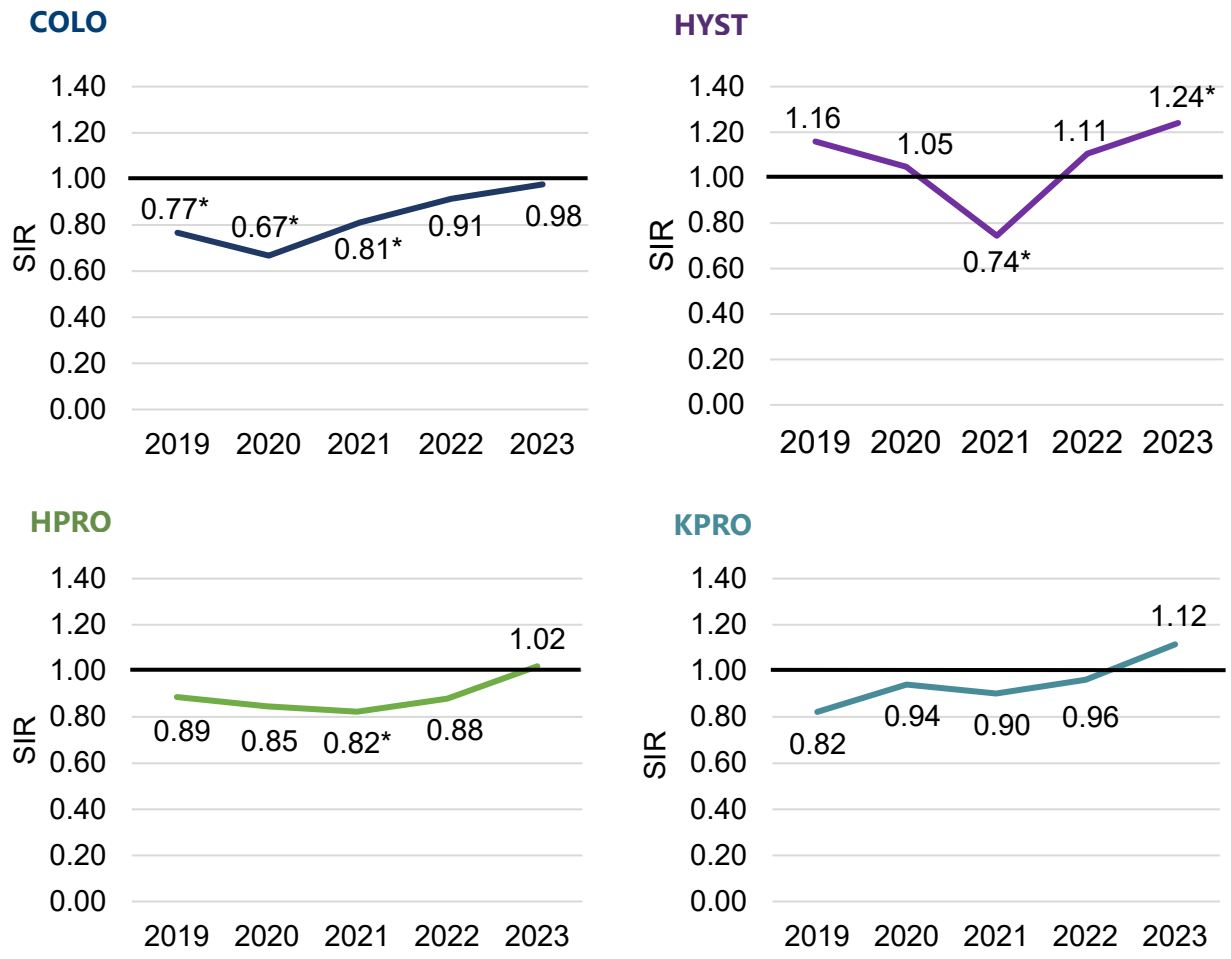
Unit type	Number of reporting hospitals (units)	Infection count	2023 SIR	95% confidence interval	Percent change 2022–2023
All units	71 (411)	392	0.75*	0.68, 0.83	↑ 64% increase
ICU	71 (82)	351	0.74*	0.66, 0.82	↑ 57% increase
Non-ICU	71 (329)	41	0.92	0.67, 1.24	↑ 176% increase

SSIs: All hospitals (All SSI SIR model)

SSIs are classified by the type of procedure with which they are associated, as well as the depth of the infection, and can involve tissues under the skin, organs, or implanted material. Shown in this section are data for adult, inpatient procedures in acute care and critical access hospitals using the All SSI model, which includes SSIs occurring at the superficial, deep and organ/space levels. See the NHSN SIR guide for details on the different SSI SIR models.

Figure 13 shows procedure-specific SSI SIRs for COLO, HYST, HPRO, and KPRO over time. In 2023, the **HYST** SIR was significantly **higher** than the national baseline. Procedure-specific SIRs for all four procedure types increased from 2022 to 2023, but none of the increases were statistically significant.

FIGURE 13. SSI SIRs for COLO, HYST, HPRO, and KPRO, Wisconsin acute care and critical access hospitals, All SSI SIR model, 2019–2023.



As shown in Table 6, when looking at **all reported surgical procedure types combined**, there was a statistically significant **increase** in the SIR from 2022 to 2023.

TABLE 6. All procedure and procedure-specific information (All SSI model).

	Number of reporting hospitals (procedures)	Infection count	2023 SIR	95% confidence interval	Percent change 2022–2023
All procedures combined	121 (65,598)	1,146	1.08*	1.02, 1.15	↑ 17% increase
COLO	118 (6,354)	320	0.98	0.87, 1.09	⇧ 7% increase
HYST	117 (3,627)	89	1.24*	1.00, 1.52	⇧ 12% increase
HPRO	95 (11,071)	128	1.02	0.86, 1.21	⇧ 16% increase
KPRO	97 (13,943)	98	1.12	0.91, 1.35	⇧ 16% increase

SSI: All hospitals (Complex Admission/Readmission SSI SIR model)

SSI data in this section is for adult, inpatient procedures in both acute care and critical access hospitals, and includes only infections occurring at the deep or organ/space level that are detected during the same hospital admission as the surgical procedure, or upon readmission to the same facility where the procedure was performed. See the NHSN SIR guide for details on the different SSI SIR models.

Under the Complex Admission/Readmission SSI SIR model, the **HPRO** SIR was significantly **lower** than the national baseline in 2023. SSI SIRs for COLO, HYST, and KPRO were not significantly different from the national baseline in 2023. SSI SIRs for these three procedure types all increased in 2023, but the changes were not statistically significant.

FIGURE 14. SSI SIRs for COLO, HYST, HPRO, and KPRO, Wisconsin acute care and critical access hospitals, Complex Admission/Readmission SIR model, 2019–2023.

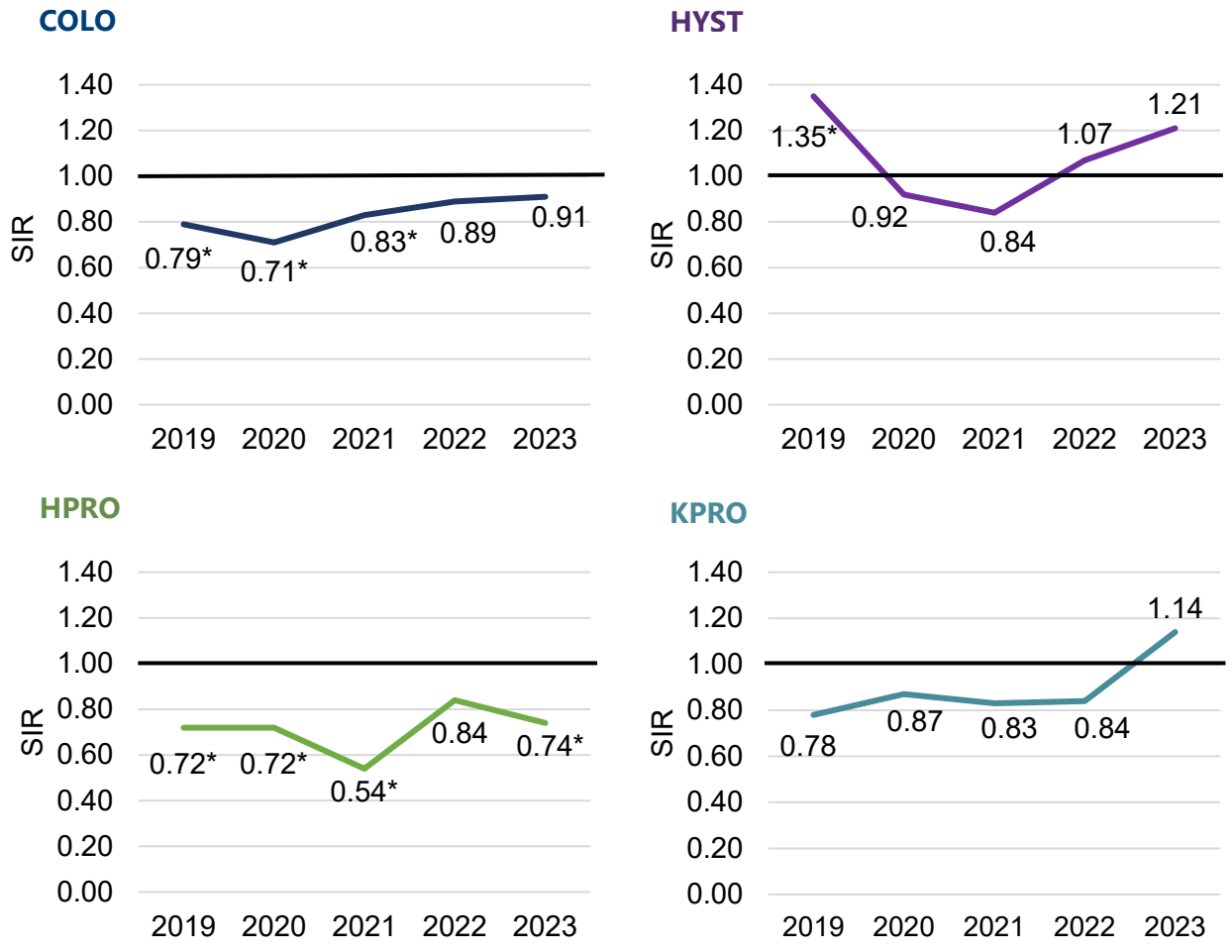


TABLE 7. All procedure and procedure-specific information (Complex Admission/Readmission SSI SIR model).

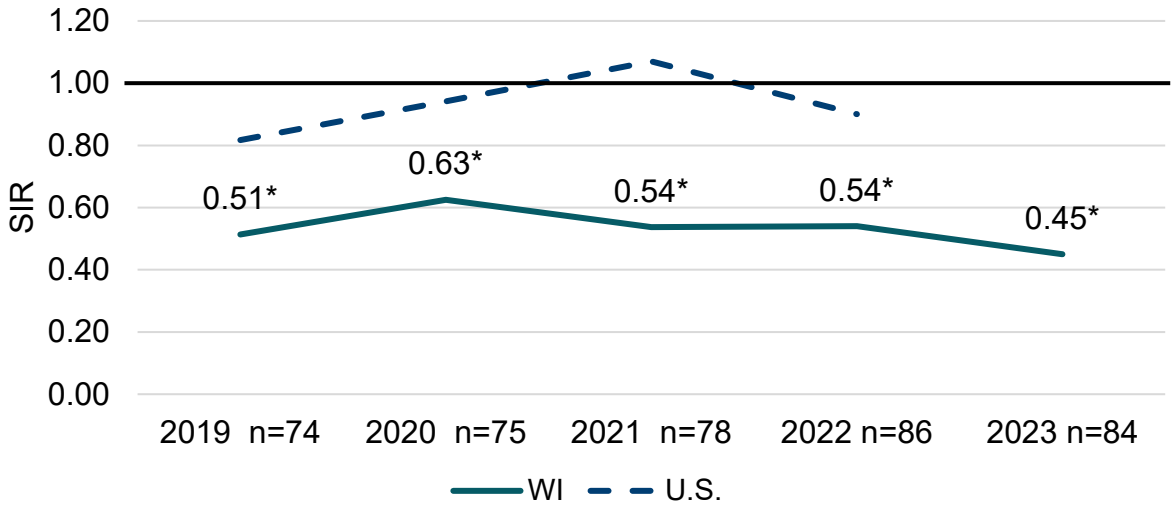
	Number of reporting hospitals (procedures)	Infection count	2023 SIR	95% confidence interval	Percent change 2022–2023
All procedures combined	121 (65,598)	508	0.97	0.88, 1.05	⇧ 4% increase
COLO	118 (6,354)	151	0.91	0.77, 1.07	⇧ 2% increase
HYST	117 (3,627)	34	1.21	0.85, 1.68	⇧ 13% increase
HPRO	95 (11,071)	54	0.74*	0.56, 0.95	⇩ 12% decrease
KPRO	97 (13,943)	54	1.14	0.87, 1.48	⇧ 36% increase

MRSA bacteremia: Acute care hospitals

Patients who are treated with antibiotics or have devices such as urinary catheters are at increased risk of acquiring HAIs caused by MRSA and other MDROs. This measure includes laboratory-identified MRSA bloodstream infections occurring more than three days after a hospital admission (healthcare-onset).

The MRSA bacteremia SIR for Wisconsin acute care hospitals decreased from 2022 to 2023 but this was not a statistically significant change. The state-level **MRSA bacteremia** SIR for acute care hospitals has been significantly **below** the 2015 national baseline since 2016.

FIGURE 15. Wisconsin and U.S. annual MRSA bacteremia SIRs, all acute care hospital reporting units, 2019–2023.



Thirty-three Wisconsin acute care hospitals (39%) were able to calculate a facility-level MRSA bacteremia SIR for 2023. Among these facilities, the median SIR value was 0.45.

FIGURE 16. Wisconsin acute care hospital MRSA bacteremia SIR values, 2023.

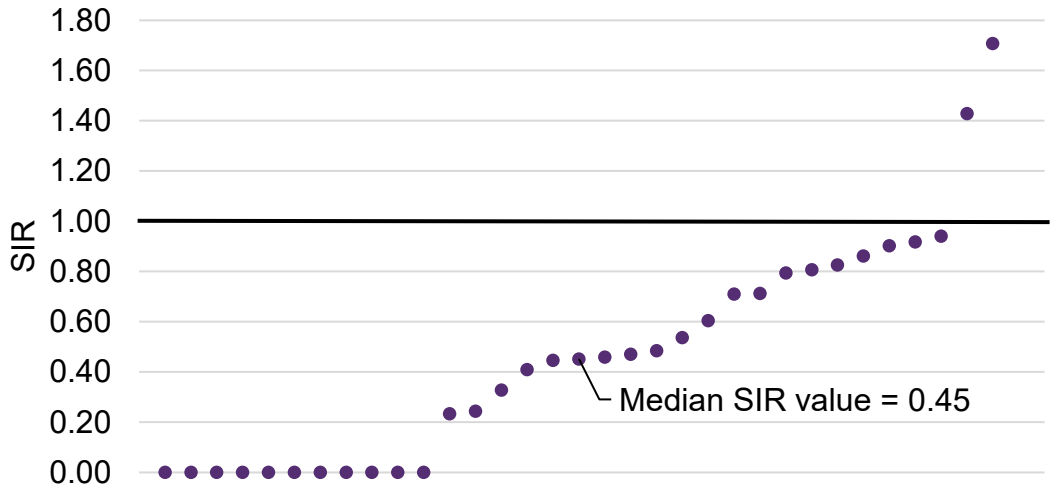


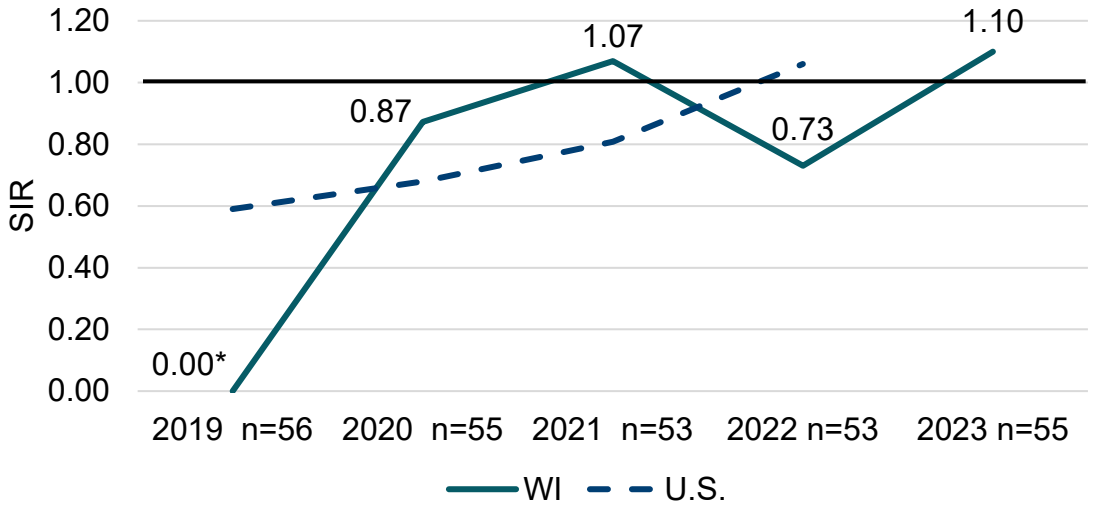
TABLE 8. Unit-level MRSA bacteremia information for acute care hospitals.

Unit type	Number of reporting hospitals	Infection count	2023 SIR	95% confidence interval	Percent change 2022–2023
All units	84	64	0.45*	0.35, 0.57	⇩ 17% decrease

MRSA bacteremia: Critical access hospitals

The state-level MRSA bacteremia SIR for critical access hospitals increased from 2022 to 2023, but this was the difference between three MRSA bacteremia LabID events reported in 2022 and four events reported in 2023 and was not a statistically significant change.

FIGURE 17. Wisconsin and U.S. annual MRSA bacteremia SIRs, all critical access hospital reporting units, 2019–2023.



No Wisconsin critical access hospital was able to calculate a facility-level MRSA bacteremia SIR for 2023.

TABLE 9. Unit-level MRSA bacteremia information for critical access hospitals.

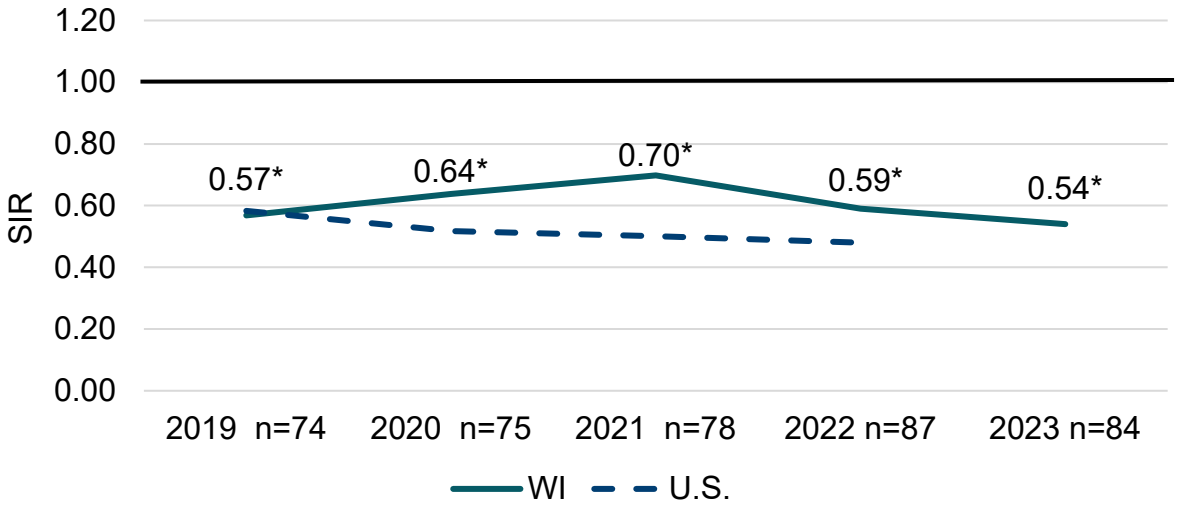
Unit type	Number of reporting hospitals	Infection count	2023 SIR	95% confidence interval	Percent change 2022–2023
All units	55	4	1.10	0.35, 2.65	⇧ 40% increase

C. difficile infections (CDI): Acute care hospitals

People at highest risk of CDI include older hospital patients or nursing home residents receiving prolonged antibiotic therapy. The CDI measure includes laboratory-identified CDIs occurring more than three days after a hospital admission (hospital-onset).

The state-level CDI SIR for acute care hospitals decreased for the second year in a row in 2023. After a statistically significant decrease from 2021 to 2022, the decrease from 2022 to 2023 approached statistical significance but was not a significant change.

FIGURE 18. Wisconsin and U.S. annual CDI SIRs, all acute care hospital reporting units, 2019–2023.



Seventy-one acute care hospitals (85%) could calculate a facility-level CDI SIR for 2023. Among these facilities, the median SIR value was 0.53.

FIGURE 19. Wisconsin acute care hospital CDI SIR values, 2023.

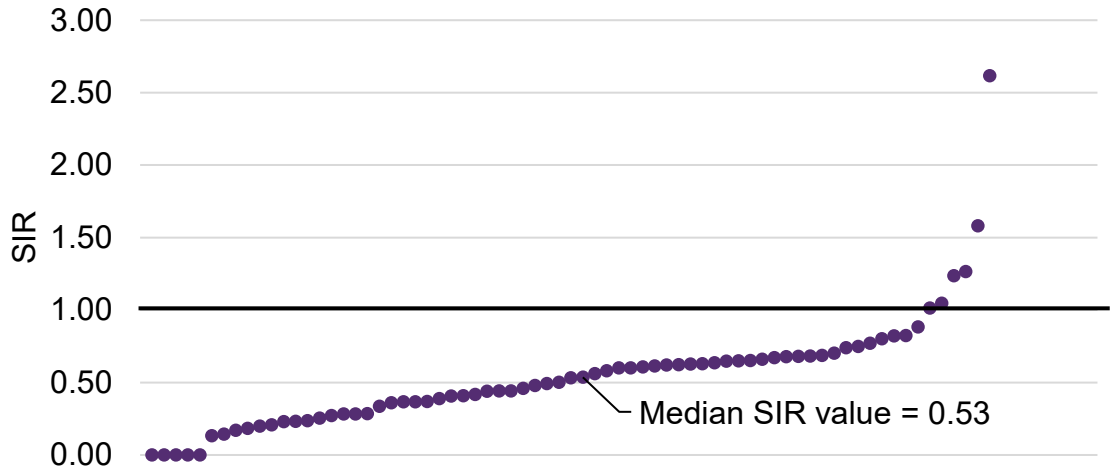


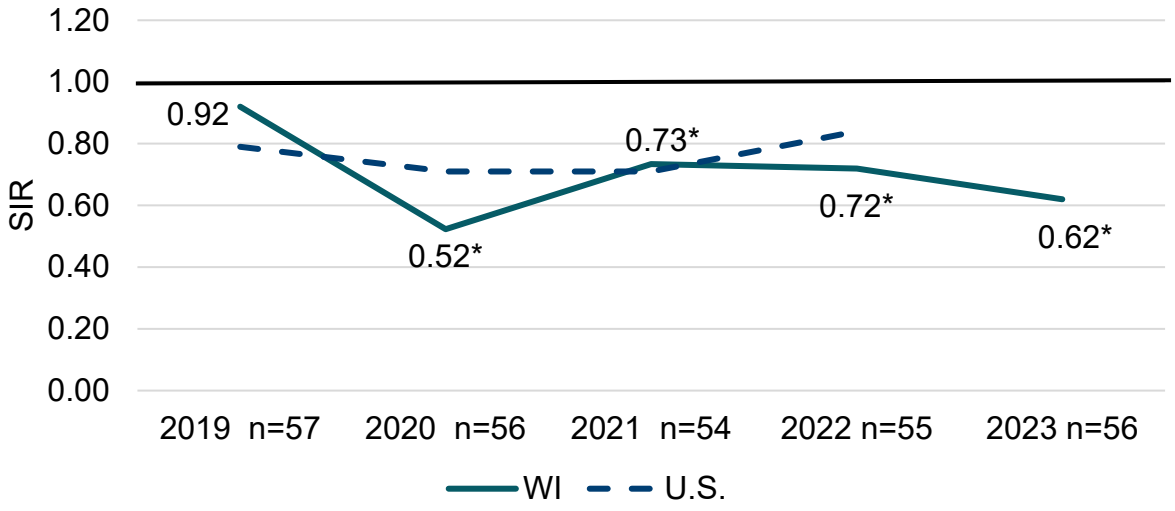
TABLE 10. Unit-level CDI information for acute care hospitals.

Unit type	Number of reporting hospitals	Infection count	2023 SIR	95% confidence interval	Percent change 2022–2023
All units	84	652	0.54*	0.50, 0.58	⇩ 9% decrease

CDI: Critical access hospitals

The state-level CDI SIR for Wisconsin critical access hospitals decreased in 2023, but this was not a statistically significant change. The state-level **CDI** SIR has been significantly **below** the 2015 national baseline since 2020.

FIGURE 20. Wisconsin and U.S. annual CDI SIRs, all critical access hospital reporting units, 2019–2023.



Twenty-six critical access hospitals in Wisconsin were able to calculate a facility-level CDI SIR for 2023. Among these facilities, the median CDI SIR value was 0.60.

FIGURE 21. Wisconsin critical access hospital CDI SIR values, 2023.

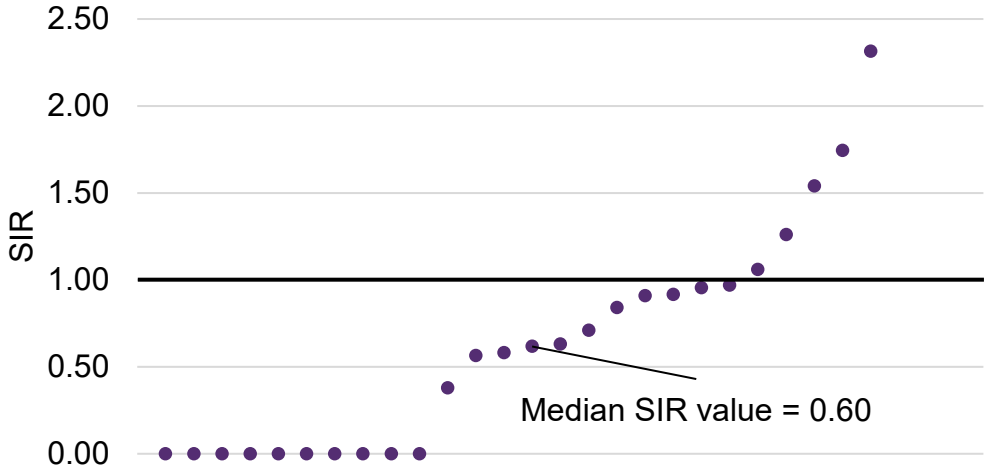


TABLE 11. Unit-level CDI information for critical access hospitals.

Unit type	Number of reporting hospitals	Infection count	2023 SIR	95% confidence interval	Percent change 2022–2023
All units	56	35	0.62*	0.44, 0.85	⇩ 14% decrease

Summary and Next Steps

In 2023, state-level SIRs for Wisconsin acute care hospitals continued to be significantly lower than the national baseline for almost all HAI types discussed in this report. State-level SIRs for Wisconsin critical access hospitals for two HAI types, CDI and CAUTI, were also significantly lower than the national baseline. With a few exceptions, state-level SIRs for SSIs for acute care and critical access hospitals combined were not significantly different from the 2015 baseline.

While it's good news that many of Wisconsin's state-level SIRs continued to be below the 2015 national baseline in 2023, the same pattern has also been seen in many other states in recent years. For example, the 2022 National and State HAI Progress Report[1] notes that in terms of state-level SIRs for acute care hospitals in 2022:

- 50 states performed better than the national baseline on at least two HAI types.
- 41 states performed better than the national baseline on at least three HAI types.
- 23 states performed better than the national baseline on at least four HAI types.

NHSN recognizes the need to reset the national SIR baselines and is currently in the process of updating the national baselines for all the HAI types discussed in the report. The updated SIR baselines will utilize data submitted to NHSN by hospitals in 2022 and reflect updated risk adjustment models. The SIR rebaseline process will be completed by the end of 2024, and we expect the Wisconsin 2024 HAI Annual Data Report to include data utilizing the updated baseline.

While SIR data calculated under the new baseline will not be directly comparable to SIRs calculated under the previous baseline, the updated baseline will provide a much more current benchmark against which facilities, health systems, and states can assess and track their progress in preventing HAIs.

Additional Information

For more information on the specific HAI types discussed in this report, visit the following CDC webpages.

- CAUTI
- CLABSI
- VAE
- SSI
- MRSA bacteremia
- CDI

References

1. Centers for Disease Control and Prevention. National and State Healthcare-Associated Infections Progress Report. Available at: https://www.cdc.gov/healthcare-associated-infections/php/data/progress-report.html. Accessed June 24, 2024.

2. Centers for Disease Control and Prevention. National and State Healthcare-Associated Infections Data Archive. Available at: https://www.cdc.gov/healthcare-associated-infections/php/data/#cdc_listing_res2-archived-reports-and-data. Accessed June 24, 2024.