Wisconsin Department of Health Services

Division of Public Health

P-00340 (03/2023)

Healthcare-Associated Infections Prevention Program—2021 Report

Healthcare-associated infections (HAIs) are infections that occur while receiving health care. Patients undergoing surgical procedures or who have medical devices such as central lines, urinary catheters, and ventilators are at risk of acquiring HAIs. Infections caused by multidrug-resistant organisms, such as methicillin-resistant *Staphylococcus aureus* (MRSA), can also be acquired in various health care settings.

The Wisconsin Department of Health Services, Division of Public Health (DPH) collects HAI data from hospitals on a voluntary basis and publicly reports aggregate data to monitor trends and to compare Wisconsin HAI occurrence to the national baseline. This comparison is made using a standardized infection ratio (SIR), calculated by dividing the number of observed HAIs by the number predicted based on national pooled data. These national data are collected through the Centers for Disease Control and Prevention (CDC) National Healthcare Safety Network (NHSN) and are represented in each graph with a value of 1.00 and a black line. Hospital-specific data are displayed on the Wisconsin Hospital Association CheckPoint® website.

The NHSN system adjusts the SIR for a facility or state to account for risk factors that might cause infection rates to be higher or lower. The specific factors included in the risk adjustment for each infection type varies, but often includes hospital size and teaching status, patient population served by a hospital, and surgical patient characteristics. Lower SIRs indicate better progress toward preventing HAIs.

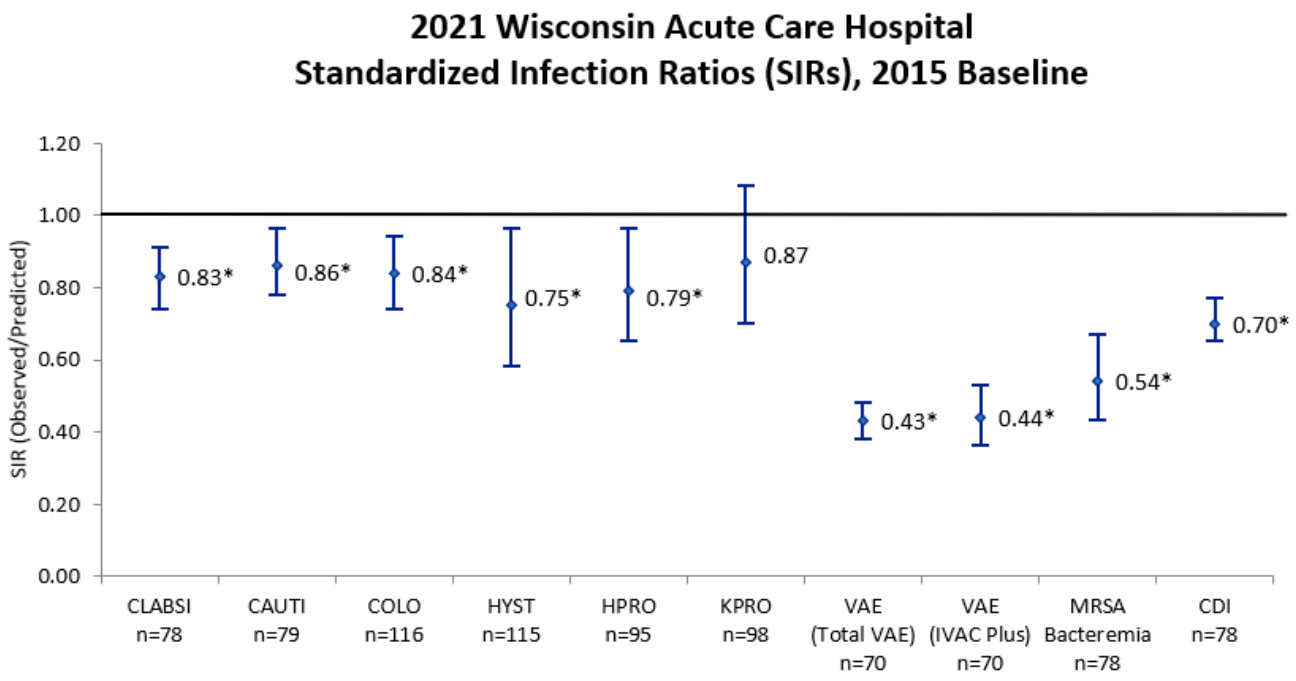
This report includes 2021 data for six HAI types: Central line-associated bloodstream infections (CLABSI), catheter-associated urinary tract infections (CAUTI), ventilator-associated events (VAE), surgical site infections (SSI), MRSA bacteremia (MRSA in the bloodstream), and *Clostridioides difficile* infections infections (CDI). Data were accessed from NHSN during July 2022 to allow sufficient time for complete data collection and reporting for calendar year 2021. Among 143 eligible Wisconsin hospitals, all provided data regarding at least one type of HAI to DPH.

As shown in Figures 1 and 2 below, the SIRs for most HAI types were below the 2015 national baseline in 2021, for both acute care and critical access hospitals in Wisconsin. As additional points of comparison, the graphs on the following pages show the U.S and Wisconsin hospital SIR values for the past five years for each HAI type, where available.

The following pages also include a comparison of 2020 and 2021 Wisconsin HAI data, information about the distribution of individual hospital SIRs in 2021, and location-specific SIRs. Where possible, annual data are displayed separately for critical access and acute care 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 into reports.

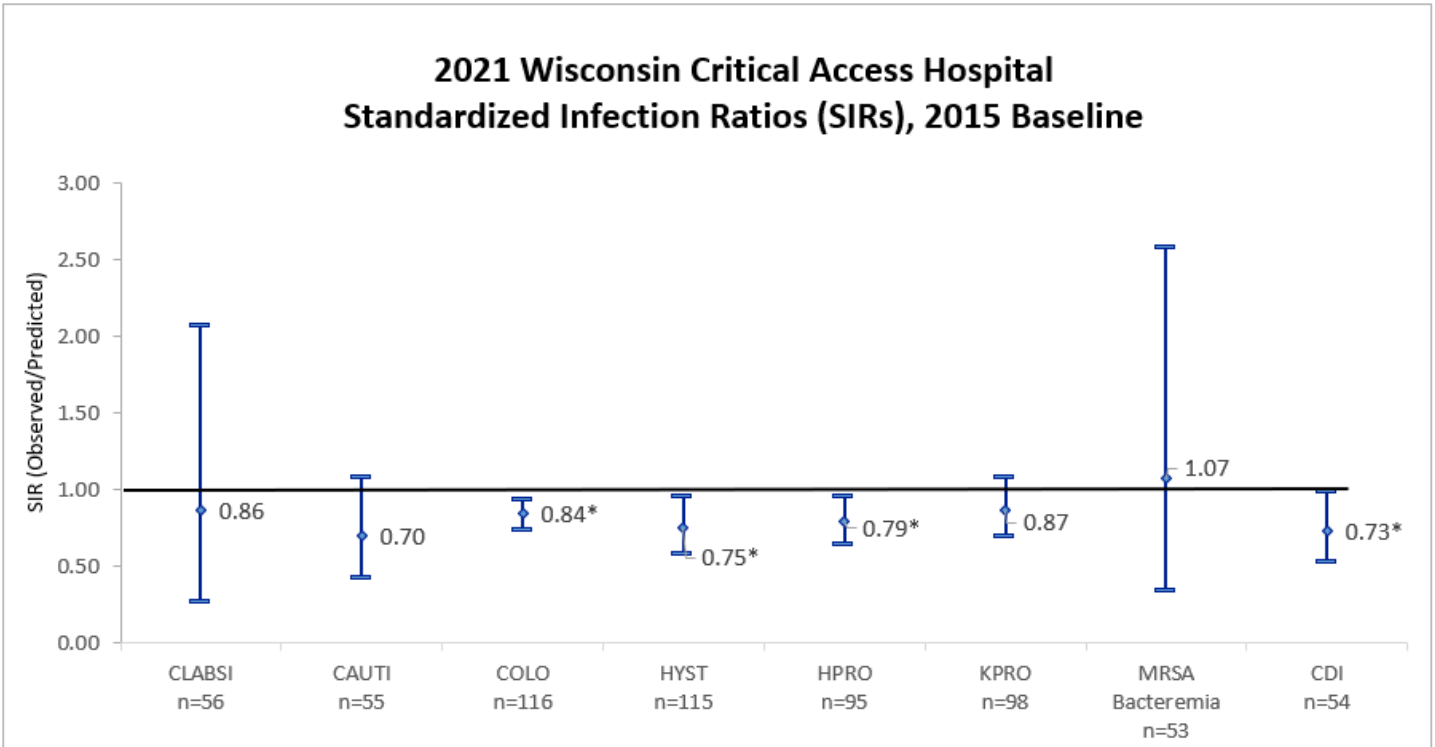
Special note on the 2021 HAI Prevention Program Annual Report: The COVID-19 pandemic continued to impact hospital operations, including HAI prevention efforts, across the country for much of 2021. A paper published by NHSN researchers[1] in September 2021, and an update article[2] published in May 2022, showed a significant increase in national-level SIRs for several HAI types in 2020 and for the first three quarters of 2021, as compared to the same, "pre-pandemic" periods in 2019. The authors noted that for some HAI types, the COVID-19 pandemic appeared to have at least temporarily reversed general trends showing improvements in HAIs at the national level in recent years. Readers of this report are encouraged to consider the potential impact of COVID-19 on Wisconsin HAI data for 2021.

Figure 1



Notes: SSI data include all hospitals and reflect NHSN's "All SSIs" model. Device-associated, MRSA, and CDI data is for acute care hospitals only.
Black line = 2015 national baseline; n = Number of hospitals reporting. *Statistically significant difference from 2015 baseline (p<.05)
Data accessed July 2022

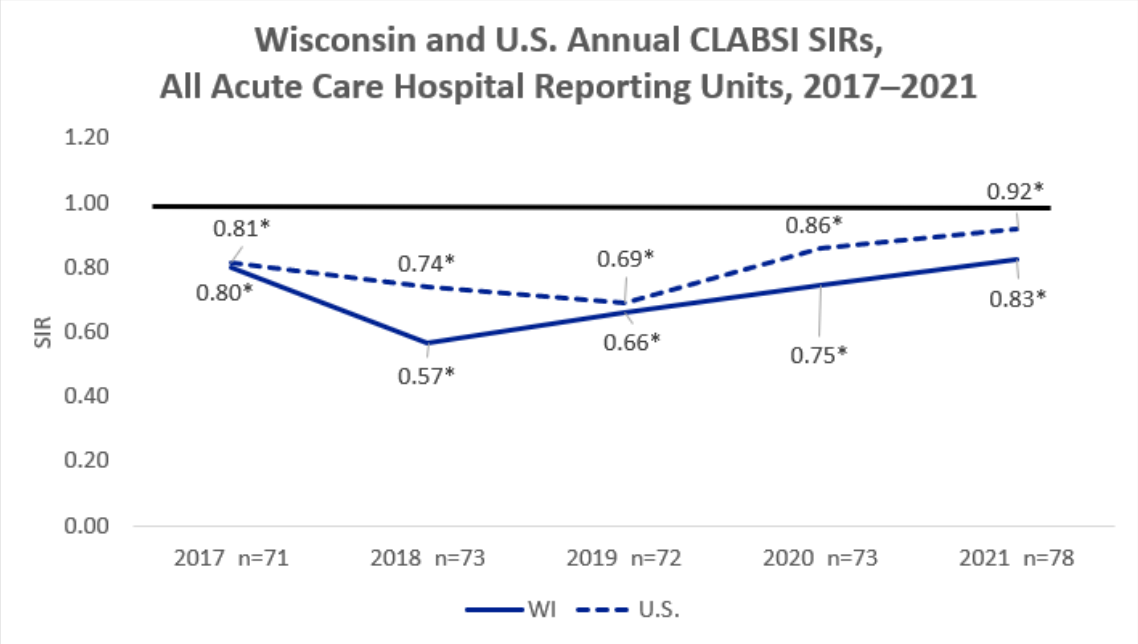
Figure 2

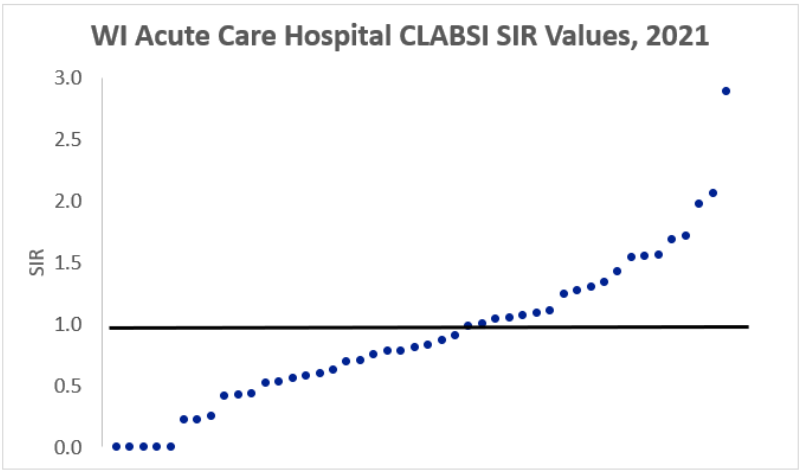


Notes: SSI data include all hospitals and reflect NHSN's "All SSIs" model. Device-associated, MRSA, and CDI data is for critical access hospitals only.
Black line = 2015 national baseline; n = Number of hospitals reporting. *Statistically significant difference from 2015 baseline (p<.05)
Data accessed July 2022

Central Line-Associated Bloodstream Infection (CLABSI): Acute Care Hospitals

At the national level, there was a 7% increase in CLABSIs from 2020 to 2021, with the largest increase (10%) in intensive care units (ICUs). At the same time, acute care hospitals in just over half of U.S. states (n=27) still performed better than the 2015 national baseline for CLABSI in 2021. These data come from the CDC's 2021 National and State Healthcare-Associated Infections Progress Report.[3]





- Dots represent individual hospital SIRs
- Number of hospitals able to calculate a SIR (at least 1 predicted infection): **46**
- Number of hospitals with SIR > 1: **19 (41%)**
- Median SIR value: **0.83**

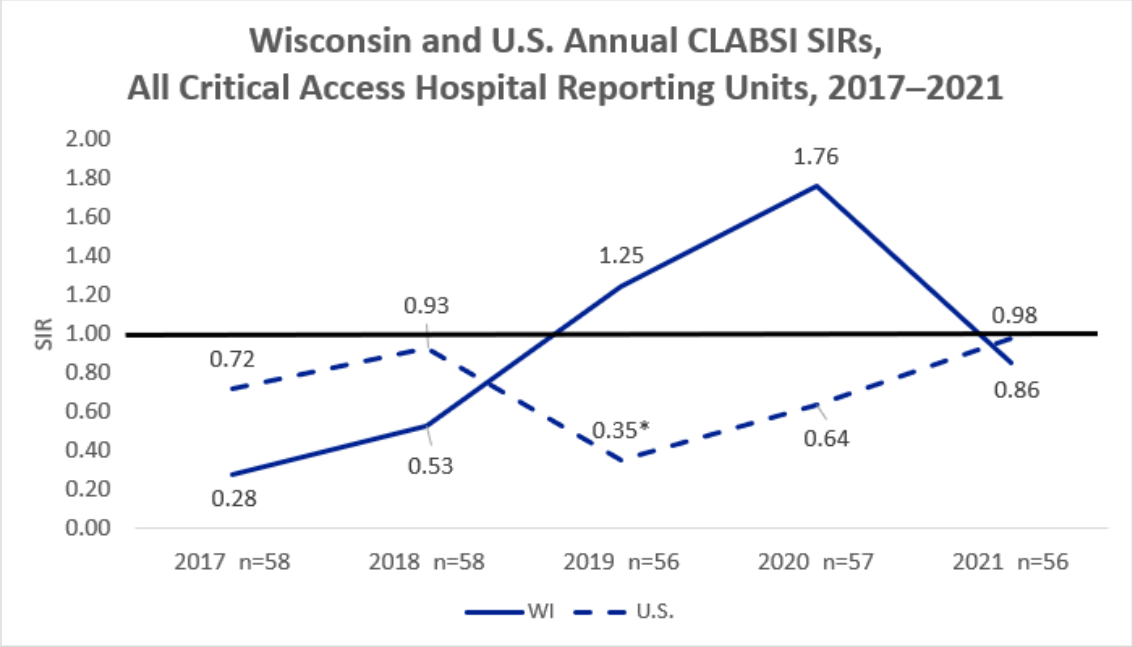
Unit-Level Information					
Unit Type	**Number of Reporting Hospitals (Units)**	**Number of Infections**	**2021 SIR**	**Confidence Interval**	**Percent Change 2020–2021**
All units	78 (515)	353	0.83*	0.74–0.91	11% increase
NICUs	19 (19)	11	0.71	0.37–1.23	48% decrease
ICUs	62 (92)	170	1.16	0.99–1.35	31% increase^
Non-ICUs	78 (404)	172	0.65*	0.56–0.75	2% increase

Black line = 2015 national baseline n = Number of WI reporting hospitals

*Statistically significant difference from 2015 national baseline ^Statistically significant change

CLABSI: Critical Access Hospitals

Among critical access hospitals reporting CLABSI data into NHSN in the U.S., the number of CLABSIs increased from 40 in 2020 to 56 in 2021, a 40% increase.[3,4] As shown below, the CLABSI SIR for critical access hospitals in Wisconsin decreased from 2020 to 2021, though this was not a statistically significant change.



No critical access hospital had sufficient volume to calculate a facility-level CLABSI SIR for 2021.

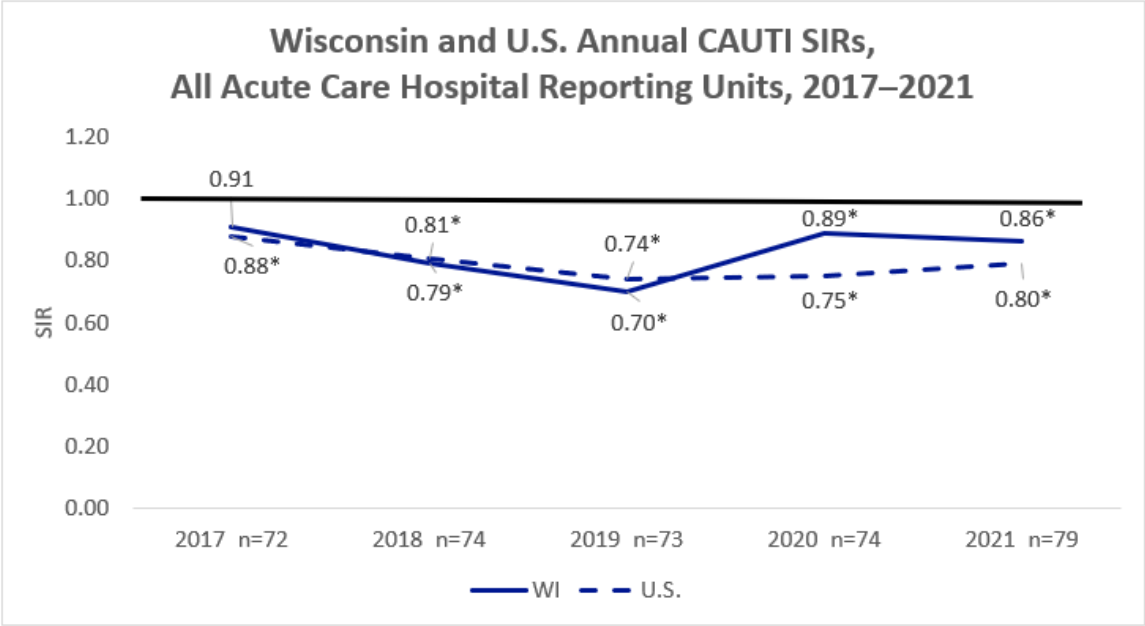
Unit-Level Information					
Unit Type	**Number of Reporting Hospitals (Units)**	**Number of Infections**	**2021 SIR**	**Confidence Interval**	**Percent Change 2020–2021**
All units	56 (71)	4	0.86	0.27–2.07	51% decrease
ICUs	13 (13)	0	Not calculated		
Non-ICUs	56 (58)	4	0.90	0.29–2.17	42% decrease

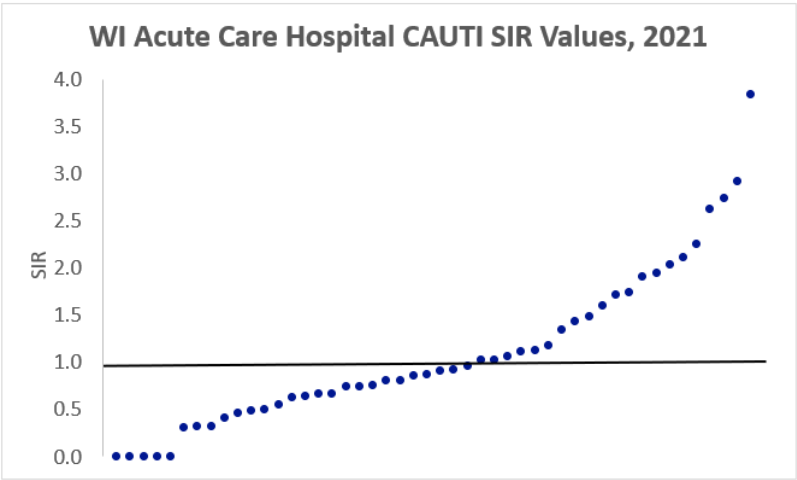
Black line = 2015 national baseline n = Number of WI reporting hospitals

*Statistically significant difference from 2015 national baseline ^Statistically significant change

Catheter-Associated Urinary Tract Infection (CAUTI): Acute Care Hospitals

At the national level, there was a 5% increase in CAUTIs from 2020 to 2021 among acute care hospitals overall, and a 9% increase in acute care hospital ICU units.[3] In Wisconsin, acute care hospitals saw a small but not statistically significant decrease in CAUTIs from 2020 to 2021.





- Dots represent individual hospital SIRs
- Number of hospitals able to calculate a SIR (at least 1 predicted infection): **48**
- Number of hospitals with SIR > 1: **21 (44%)**
- Median SIR value: **0.90**

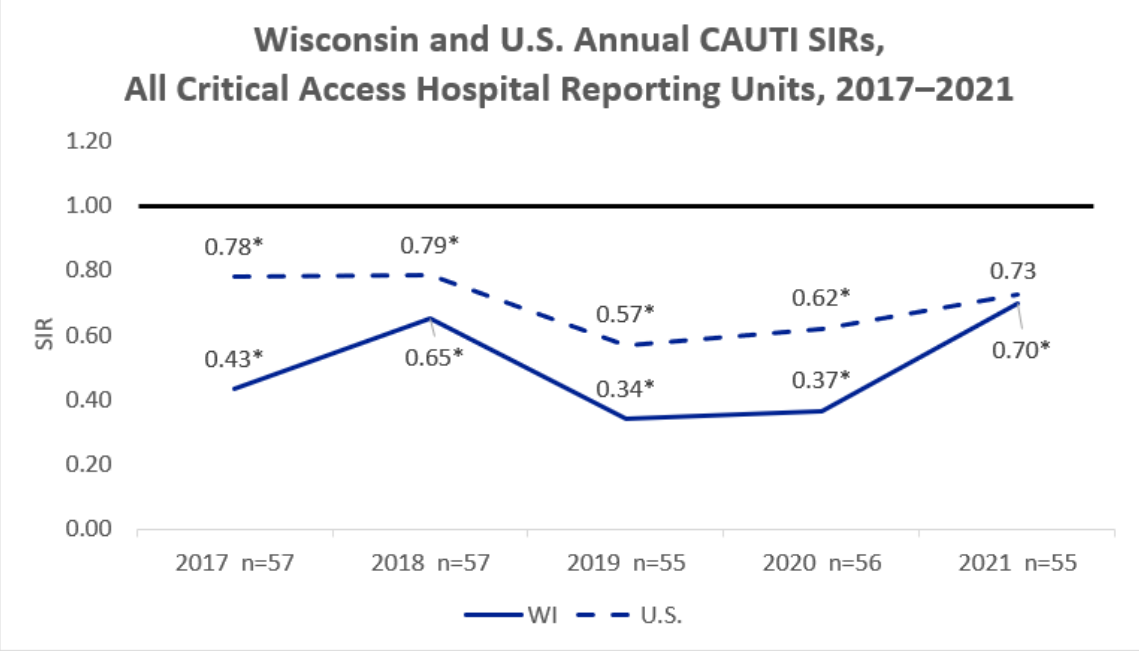
Unit-Level Information					
Unit Type	**Number of Reporting Hospitals (Units)**	**Number of Infections**	**2021SIR**	**Confidence Interval**	**Percent Change 2020–2021**
All units	79 (508)	374	0.86*	0.78–0.96	3% decrease
ICUs	63 (95)	210	1.06	0.92–1.21	12% increase
Non-ICUs	79 (413)	164	0.70*	0.60–0.81	16% decrease

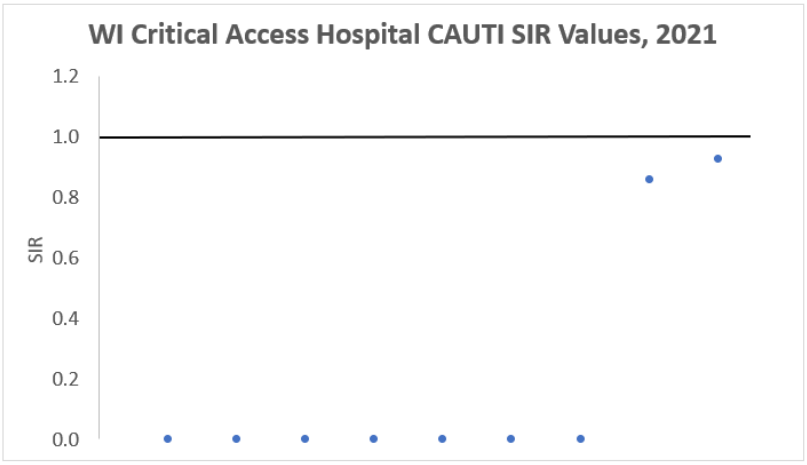
Black line = 2015 national baseline n = Number of WI reporting hospitals

*Statistically significant difference from 2015 national baseline ^Statistically significant change

CAUTI: Critical Access Hospitals

At the national level, the number of CAUTIs reported by critical access hospitals increased from 186 in 2020 to 267 in 2021, a 44% increase.[3,4] Wisconsin critical access hospitals saw an increase in CAUTIs from 2020 to 2021, but the increase was not statistically significant.





- Dots represent individual hospital SIRs
- Number of hospitals able to calculate a SIR (at least 1 predicted infection): **9**
- Number of hospitals with SIR > 1: **0**
- Median SIR value: **0**

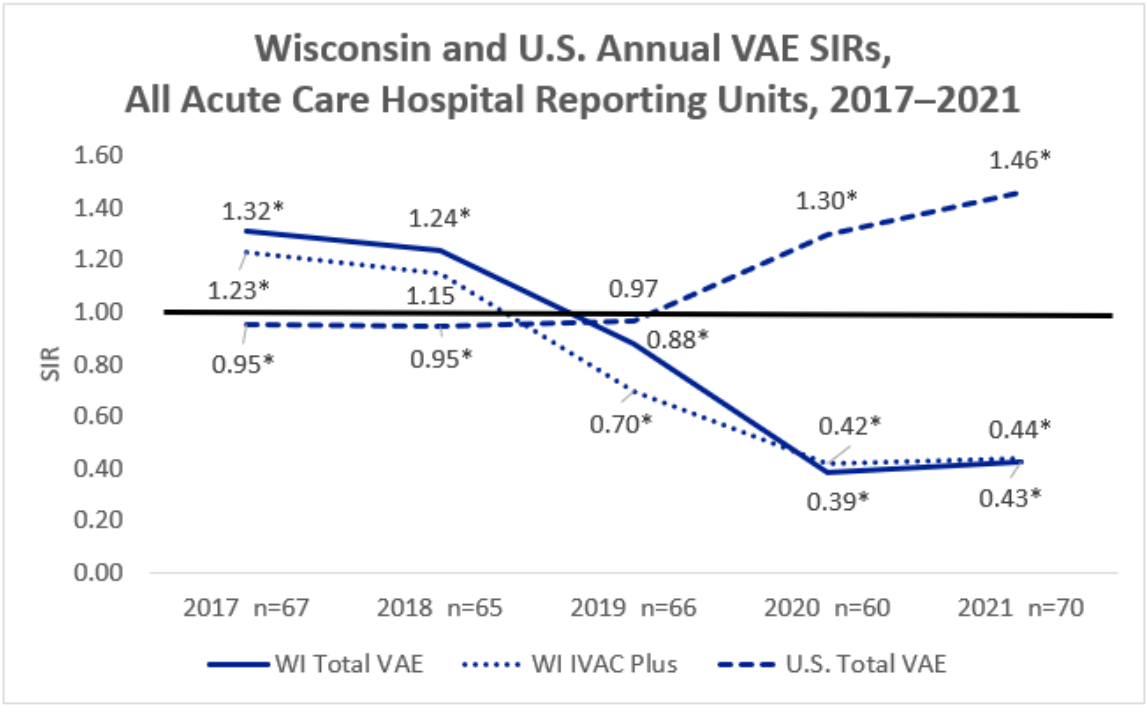
Unit-Level Information					
Unit Type	**Number of Reporting Hospitals (Units)**	**Number of Infections**	**2021 SIR**	**Confidence**	**Percent Change 2020–2021**
All units	55 (88)	18	0.70	0.43–1.08	91% increase
ICUs	13 (13)	2	0.98	0.15–3.01	38% increase
Non-ICUs	55 (75)	16	0.68	0.40–1.08	96% increase

Black line = 2015 national baseline n = Number of WI reporting hospitals

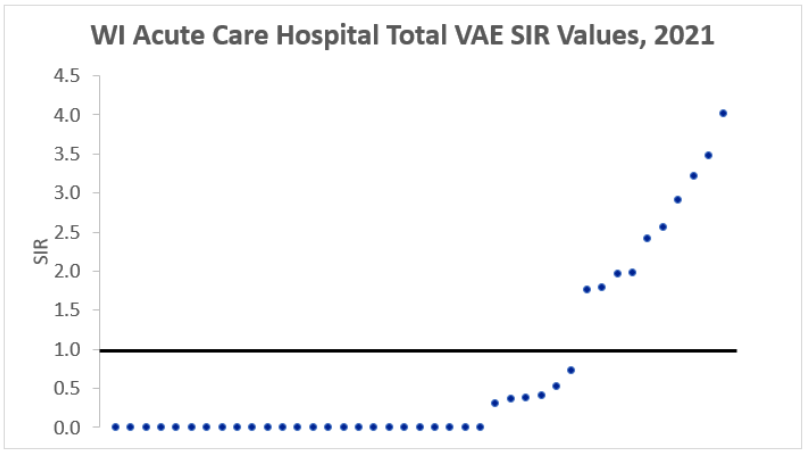
*Statistically significant difference from 2015 national baseline ^Statistically significant change

Ventilator-Associated Event (VAE): Acute Care Hospitals

Surveillance for ventilator-associated events includes both infections and other conditions that may or may not represent true infections. The "Total VAE" measure includes all ventilator-associated events. "IVAC Plus" includes all ventilator-associated events except for ventilator-associated conditions. Data shown is for acute care hospitals only.



Note: U.S. comparison data for IVAC Plus is not available.



- Dots represent individual hospital SIRs
- Number of hospitals able to calculate a SIR (at least 1 predicted infection): **41**
- Number of hospitals with SIR > 1: **10 (24%)**
- Median SIR value: **0**

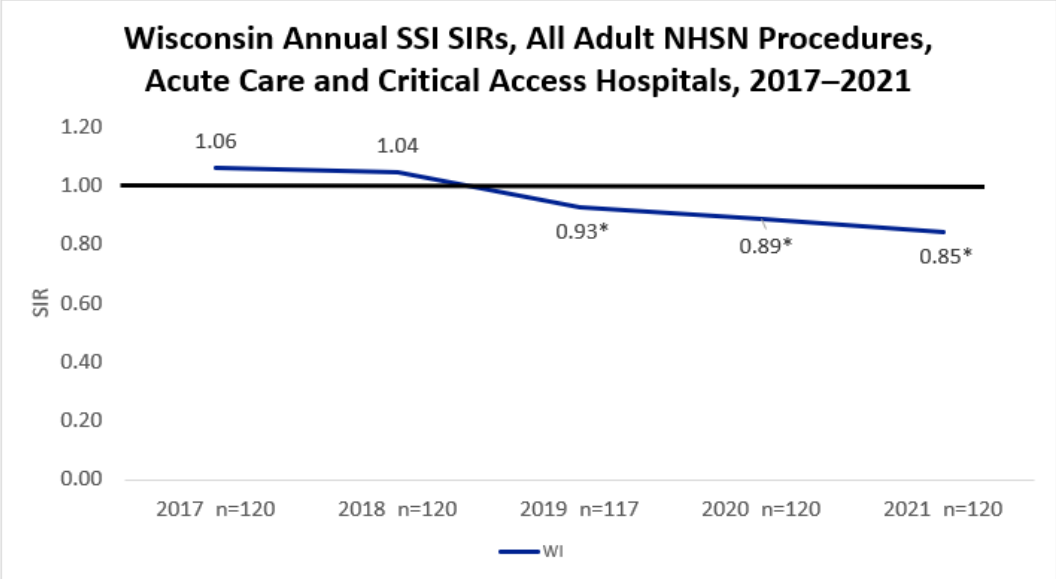
Information on Total VAE and IVAC Plus					
	Number of Reporting Hospitals (Units)	**Number of Infections**	**2021 SIR**	**Confidence Interval**	**Percent Change 2020–2021**
Total VAE	70 (399)	251	0.43*	0.38-0.48	11% increase
IVAC Plus	70 (399)	93	0.44*	0.36-0.53	4% increase

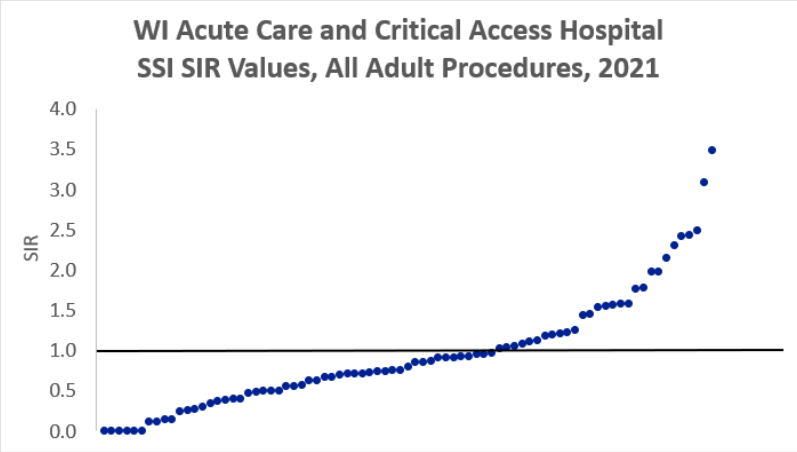
Black line = 2015 national baseline n = Number of WI reporting hospitals

*Statistically significant difference from 2015 national baseline ^Statistically significant change

Surgical Site Infection (SSI): 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 here are data for adult, inpatient procedures in acute care and critical access hospitals, including SSIs occurring at all levels. See the NHSN SIR guide for details on the different SSI models.





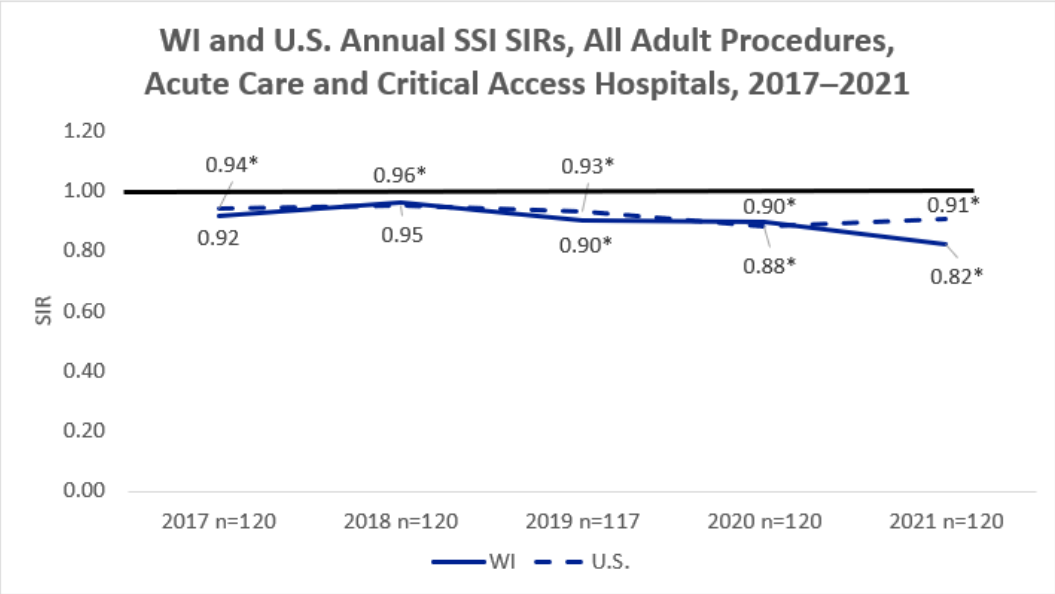
Note: U.S. comparison data for the "All SSI" model is not available.

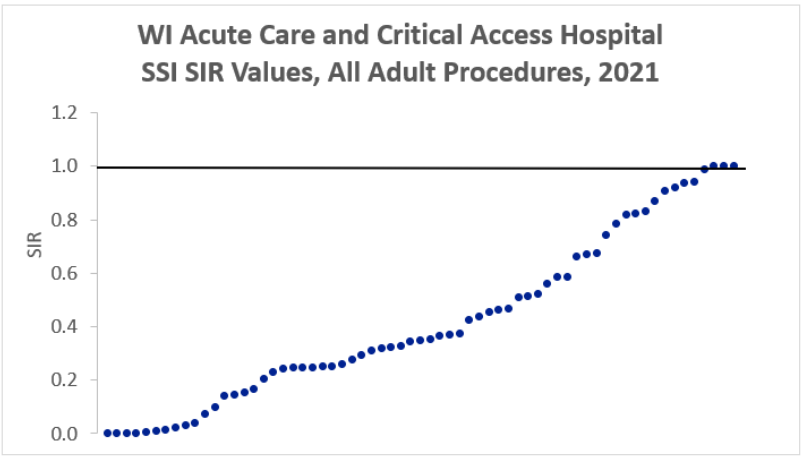
- Dots represent individual hospital SIRs
- Number of hospitals able to calculate a SIR (at least 1 predicted infection): **81**
- Number of hospitals with SIR > 1: **29 (36%)**
- Median SIR value: **0.80**

Procedure-Specific Information (Includes superficial, deep, and organ/space infections)					
	Number of Reporting Hospitals (Procedures)	**Number of Infections**	**2021 SIR (All SSI Model)**	**Confidence Interval**	**Percent Change 2020–2021**
All procedures combined	120 (64,653)	864	0.85*	0.79–0.90	5% decrease
Colon procedures (COLO)	116 (5,828)	252	0.84*	0.74–0.94	23% increase^
Hip replacement (HPRO)	95 (11,703)	97	0.79*	0.65–0.96	8% decrease
Abdominal hyster-ectomy (HYST)	115 (4,501)	58	0.75*	0.56–0.96	31% decrease^
Knee replacement (KPRO)	98 (15,096)	79	0.87	0.70–1.08	5% decrease

Surgical Site Infection: All Hospitals (Complex Admission/Readmission SSI Model)

This page includes SSI data for adult, inpatient procedures in both acute care and critical access hospitals, and only includes infections at the deep or organ/space level detected during the same hospital admission as the surgical procedure, or upon readmission to the same facility where the procedure was performed. For details on the different NHSN SSI models, see the NHSN SIR Guide.



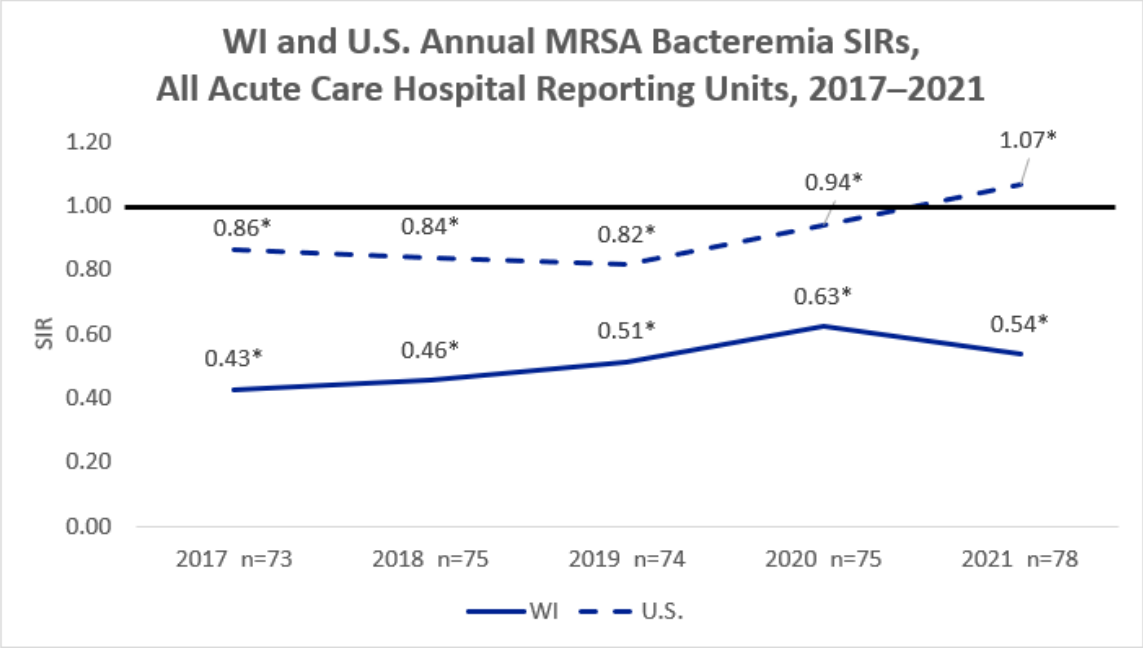


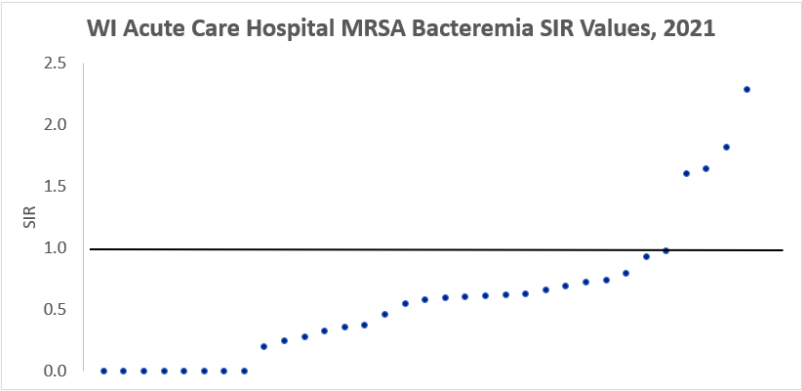
- Dots represent individual hospital SIRs
- Number of hospitals able to calculate a SIR (at least 1 predicted infection): **65**
- Number of hospitals with SIR > 1: **3 (5%)**
- Median SIR value: **0.35**

Procedure-Specific Information (Includes only deep and organ/space infections)					
	Number of Reporting Hospitals (Procedures)	**Number of Infections**	**2021 SIR (Complex A/R Model)**	**Confidence Interval**	**Percent Change 2020–2021**
All procedures combined	120 (64,653)	417	0.82*	0.81–0.99	8% decrease
Colon procedures (COLO)	116 (5,828)	132	0.90	0.74–1.06	20% increase
Hip replacement (HPRO)	95 (11,703)	35	0.50*	0.35–0.69	32% decrease
Abdominal hyster-ectomy (HYST)	115 (4,501)	26	0.85	0.57–1.23	11% decrease
Knee replacement (KPRO)	98 (15,096)	38	0.76	0.56–1.07	8% decrease

Methicillin-resistant *Staphylococcus aureus* (MRSA) Bacteremia: Acute Care Hospitals

Patients treated with antibiotics or who have devices such as central lines, urinary catheters, or ventilators are at high risk of acquiring HAIs caused by MRSA and other multidrug-resistant organisms. This measure includes laboratory-identified MRSA in the bloodstream occurring more than three days after a hospital admission. At the national level, there was a 14% increase in the MRSA bacteremia SIR between 2020 and 2021.[3] The MRSA bacteremia SIR for Wisconsin acute care hospitals decreased slightly in 2021, but this was not a statistically significant change.





- Dots represent individual hospital SIRs
- Number of hospitals able to calculate a SIR (at least 1 predicted infection): **33**
- Number of hospitals with SIR > 1: **4 (12%)**
- Median SIR value: **0.58**

Unit Type	Number of Reporting Hospitals	Number of Infections**	2021 SIR	Confidence Interval	Percent Change 2020–2021
All units	78	79	0.54*	0.43–0.67	14% decrease

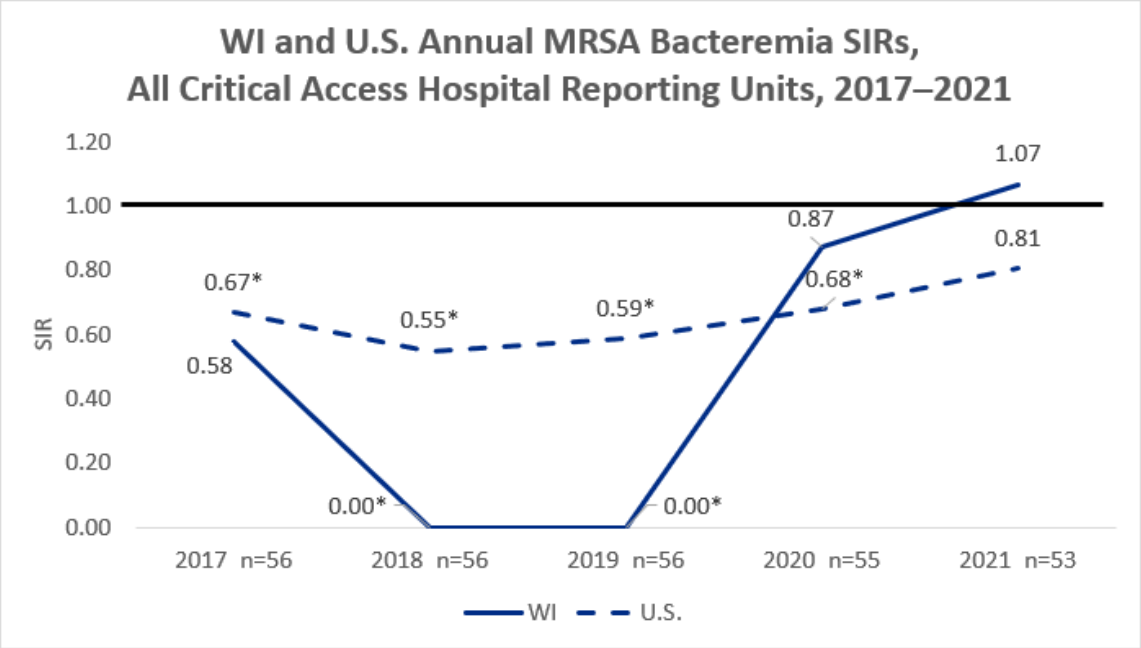
**Includes healthcare-onset (>3 days after admission), laboratory-identified MRSA bacteremia infections

Black line = 2015 national baseline n = Number of WI reporting hospitals

*Statistically significant difference from 2015 national baseline ^Statistically significant change

MRSA Bacteremia: Critical Access Hospitals

At the national level, the number of hospital-onset MRSA bacteremia events reported by critical access hospitals increased from 28 in 2020 to 43 in 2021, a 54% increase.[3,4] As shown in the graph below, the MRSA bacteremia SIR for critical access hospitals in Wisconsin increased from 2020 to 2021, but this was not a statistically significant increase.



No critical access hospital had sufficient volume to calculate a facility-level MRSA bacteremia SIR for 2021.

Unit Type	Number of Reporting Hospitals	Number of Infections**	2021 SIR	Confidence Interval	Percent Change 2020–2021
All units combined	53	4	1.07	0.34–2.58	23% increase

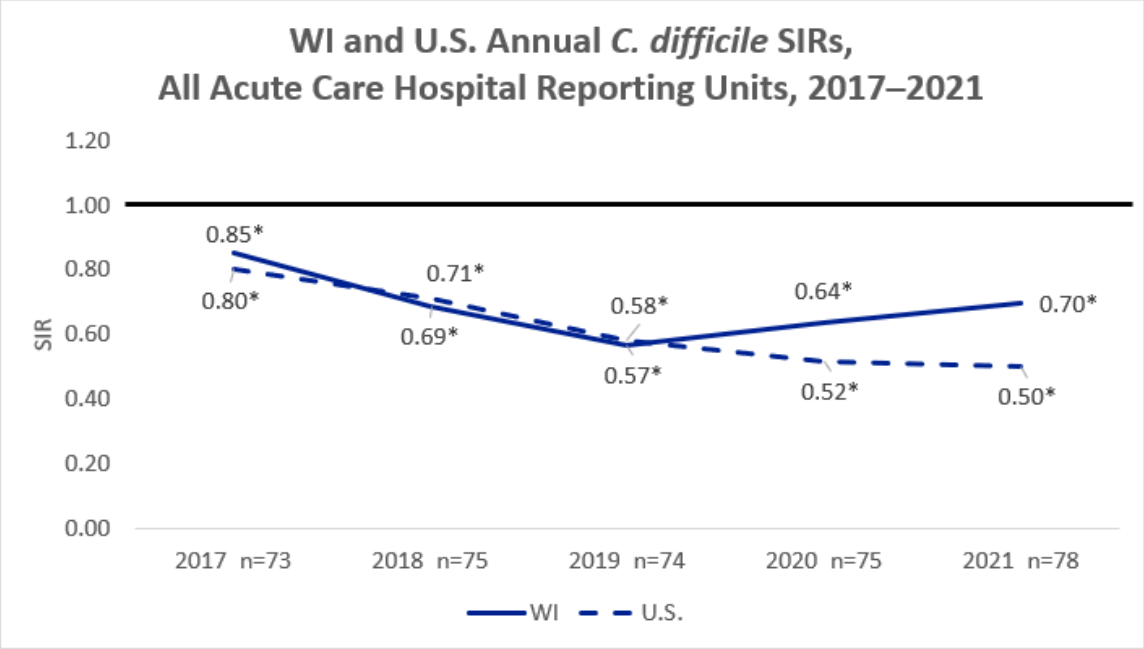
**Includes healthcare-onset (>3 days after admission), laboratory-identified MRSA bacteremia infections

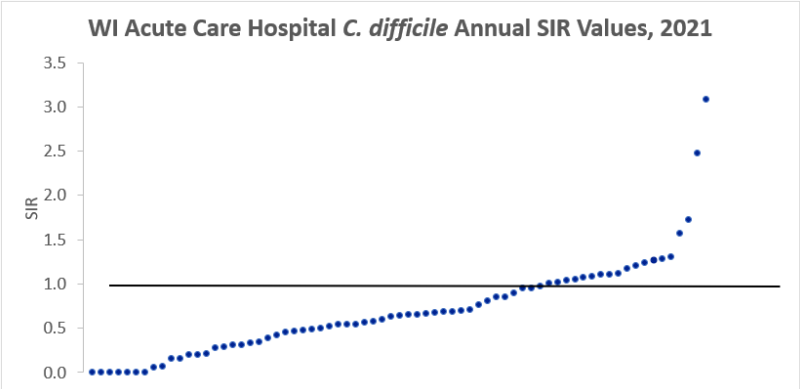
Black line = 2015 national baseline n = Number of WI reporting hospitals

*Statistically significant difference from 2015 national baseline ^Statistically significant change

Clostridioides difficile (C. difficile) Infection: Acute Care Hospitals

Persons at highest risk of *C. difficile* infection include older hospital patients or nursing home residents receiving prolonged antibiotic therapy. The measure shown here includes laboratory-identified *C. difficile* occurring more than three days after a hospital admission. As shown in the table, the *C. difficile* SIR for acute care hospital patients in Wisconsin increased from 2020 to 2021, but this was not a statistically significant change. At the national level, the *C. difficile* SIR for acute care hospitals decreased by 3% from 2020 to 2021, and this was a statistically significant change.[3]





- Dots represent individual hospital SIRs
- Number of hospitals able to calculate a SIR (at least 1 predicted infection): **71**
- Number of hospitals with SIR > 1: **19 (27%)**
- Median SIR value: **0.64**

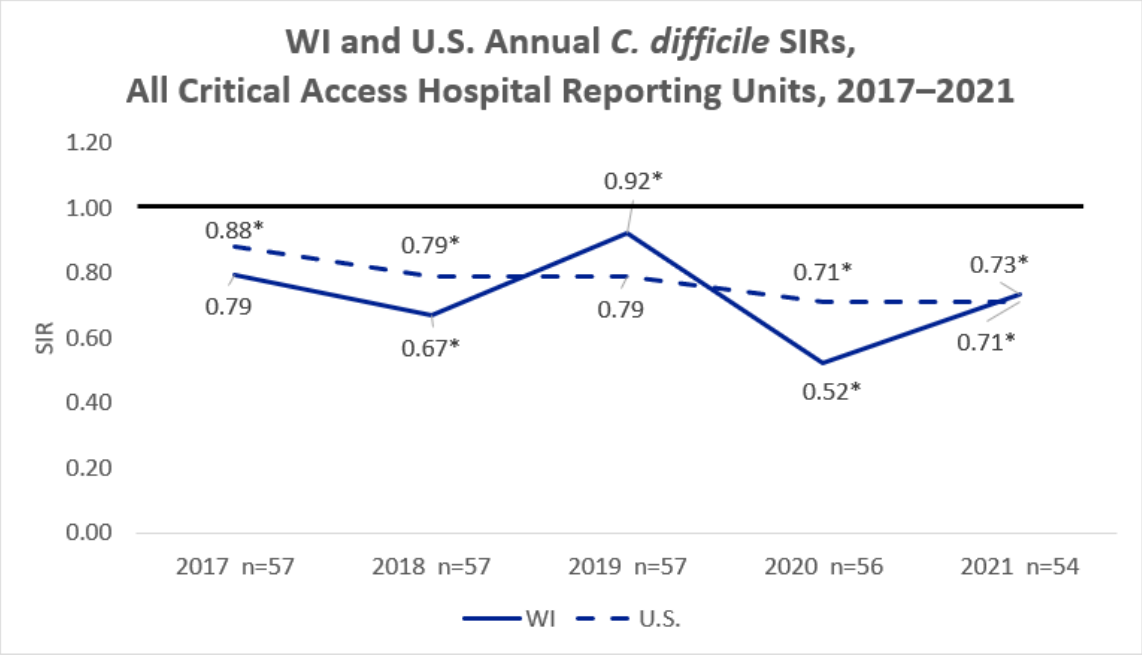
Unit Type	Number of Reporting Hospitals	Number of Infections**	2021 SIR	Confidence Interval	Percent Change 2020–2021
All units combined	78	860	0.70*	0.65–0.77	9% increase

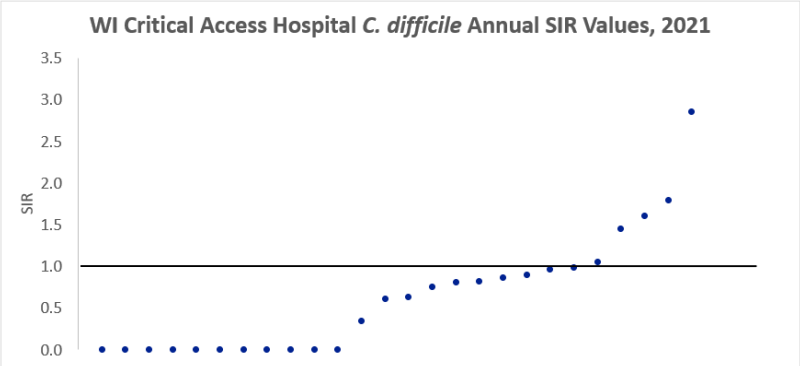
**Includes healthcare-onset (>3 days after admission), laboratory-identified *C. difficile* infections

Black line = 2015 national baseline n = Number of WI reporting hospitals
*Statistically significant difference from 2015 national baseline ^Statistically significant change

C. difficile Infection: Critical Access Hospitals

At the national level, the *C. difficile* SIR for critical access hospitals was essentially the same in 2020 and 2021.[3,4] As shown below, the *C. difficile* SIR for Wisconsin critical access hospitals increased from 2020 to 2021, but this was not a statistically significant change.





- Dots represent individual hospital SIRs
- Number of hospitals able to calculate a SIR (at least 1 predicted infection): **26**
- Number of hospitals with SIR > 1: **5 (20%)**
- Median SIR value: **0.63**

Unit Type	Number of Reporting Hospitals	Number of Infections**	2021 SIR	Confidence Interval	Percent Change 2020–2021
All units combined	54	41	0.73*	0.53–0.99	40% increase

**Includes healthcare-onset (>3 days after admission), laboratory-identified *C. difficile* infections

Black line = 2015 national baseline n = Number of WI reporting hospitals

*Statistically significant difference from 2015 national baseline ^Statistically significant change

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1. Weiner-Lastinger, L., Pattabiraman, V., Konnor, R., Patel, P., Wong, E., Xu, S., Smith, B., Edwards, J., Dudeck, M. (2021). The impact of coronavirus disease 2019 (COVID-19) on healthcare-associated infections in 2020: A summary of data reported to the National Healthcare Safety Network. *Infection Control & Hospital Epidemiology*, 1-14. doi:10.1017/ice.2021.362. Available at: https://www.cambridge.org/core/journals/infection-control-and-hospital-epidemiology/article/impact-of-coronavirus-disease-2019-covid19-on-healthcareassociated-infections-in-2020-a-summary-of-data-reported-to-the-national-healthcare-safety-network/8197F323F4840D233A0C62F4726287E1. Accessed December 29, 2021.
2. Lastinger, L., Alvarez, C., Kofman, A., Konnor, R., Kuhar, D., Nkwata, A., Patel, P., Pattabiraman, V., Xu, S., and Dudeck, M. (2022). Continued increases in the incidence of healthcare-associated infection (HAI) during the second year of the coronavirus disease 2019 (COVID-19) pandemic. *Infection Control & Hospital Epidemiology,* 1-5. doi:10.1017/ice.2022.116. Available at: https://www.cambridge.org/core/journals/infection-control-and-hospital-epidemiology/article/continued-increases-in-the-incidence-of-healthcareassociated-infection-hai-during-the-second-year-of-the-coronavirus-disease-2019-covid19-pandemic/6521FF7F27B97AD5B21BA4B8EA9888A4. Accessed July 14, 2022.
3. Centers for Disease Control and Prevention. 2021 National and State Healthcare-Associated Infections Progress Report. Available at: https://www.cdc.gov/hai/data/portal/progress-report.html. Accessed November 10, 2022.
4. Centers for Disease Control and Prevention. 2020 National and State Healthcare-Associated Infections Progress Report. Available at: https://www.cdc.gov/hai/data/archive/archive.html. Accessed December 29, 2021.

ADDITIONAL INFORMATION

For more information on the specific HAI types discussed in this report, visit the below webpages:

- Central Line-Associated Bloodstream Infection (CLABSI)
- Catheter-Associated Urinary Tract Infection (CAUTI)
- Surgical Site Infection (SSI)
- Ventilator-Associated Event (VAE)
- Methicillin-Resistant *Staphylococcus aureus* (MRSA) Bacteremia
- *Clostridioides difficile (C. difficile*) Infection