



HAWAII STATE
DEPARTMENT
OF HEALTH



HAI Report 2023

Healthcare-Associated Infections in Hawai'i Hospitals

January 1, 2023 – December 31, 2023

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Executive Summary

Healthcare-associated infections (HAIs) are infections that patients get while in a healthcare setting, either while receiving health care or soon after.¹ The Healthcare-Associated Infections and Antimicrobial (HAI-AR) Resistance Program at the Hawai'i Department of Health (HDOH) monitors HAIs associated with acute care hospitals (ACHs) and critical access hospitals (CAHs) in Hawai'i. There are various types and levels of severity of HAIs, and this report will focus on the following events which are reported to the National healthcare Safety Network: Central Line-Associated Bloodstream Infections (CLABSI), Catheter-Associated Urinary Tract Infections (CAUTI), Surgical Site Infections (SSI) including abdominal hysterectomy infections and colon surgery infections, *Clostridioides difficile* infections (*C. difficile* or CDI), and Methicillin-resistant *Staphylococcus aureus* (MRSA) bacteremia.

The National healthcare Safety Network (NHSN) is nation's most widely used HAI surveillance system that provides healthcare facilities and health departments with data to identify areas for quality improvement, measure progress of prevention efforts, and aid in the prevention of healthcare-associated infections.² From January 1, 2023 – December 31, 2023, acute care hospitals in Hawaii saw the following healthcare-associated events:

- 12% **fewer** CLABSIs than predicted (SIR=0.88; CI: 0.69–1.11)
- 39% **fewer** CAUTIs than predicted† (SIR=0.61; CI: 0.44–0.83)
- 55% **more** colon surgery SSIs than predicted† (SIR=1.55; CI: 1.11–2.10)
- 39% **more** hysterectomy SSIs than predicted (SIR=1.39; CI: 0.51–3.09)
- 42% **fewer** *C. difficile* infections than predicted† (SIR=0.53; CI: 0.45–0.61)
- 32% **fewer** MRSA bacteremia events than predicted† (SIR=0.68; CI: 0.44–1.00)

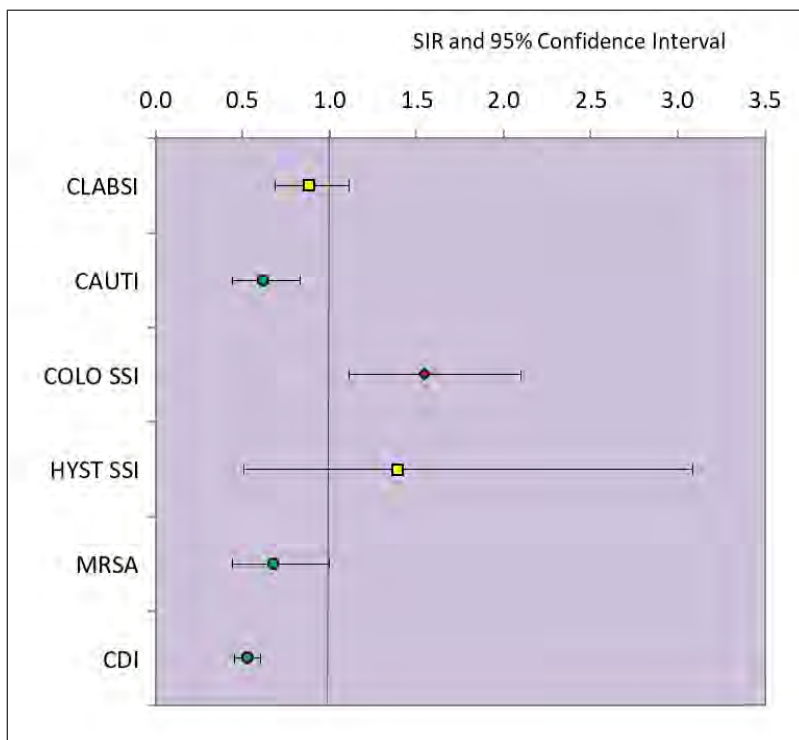


Figure 1: Standardized infection ratio (SIR) of six events reported to NHSN by acute care hospitals.

¹ [About HAIs \(CDC, 2024\)](#)

² [About NHSN \(CDC, 2024\)](#)

† dagger denotes statistical significance.

Hawai'i hospitals had as many CLABSIs and hysterectomy SSIs as predicted, and had significantly fewer CAUTIs, MRSA bacteremia infections, and C. diff infections than predicted. However, there were statistically significantly more colon surgery SSIs than predicted using 2015 national baseline data.

Introduction

Healthcare-associated infections (HAIs) are infections related to receiving treatment in a healthcare setting. For each type of infection affecting a patient in a healthcare setting, specific criteria are used to determine whether the infection is an HAI, or has an onset within the hospital admission, for the purposes of surveillance. For example, if a bloodstream infection develops in a patient on or after the third hospital day (day of admission is day one), the infection is considered an HAI, or hospital onset (HO). Bloodstream infections occurring within the first two hospital days are considered community onset infections; i.e., they were acquired in the community before admission to the hospital.

CDC estimated 1 in 31 hospital patients contracted an HAI in 2022.³ In 2009, CDC estimated the direct cost of HAIs to U.S. hospitals is at least \$28.4 billion (after adjusting to 2007 dollars). HAIs have decreased dramatically in hospitals across the nation, including Hawai'i. New technologies, more teamwork, and a reliance on evidence-based practices have had a considerable impact on safety and quality of care.

The following report includes information about HAIs among patients who received treatment requiring specific types of devices or procedures in Hawai'i's acute care facilities and critical access hospitals in 2023. In 2011, the Hawai'i legislature passed HRS §325-2.5, relating to HAI reporting. Healthcare facilities have granted the Hawai'i Department of Health (HDOH) access to HAI data reported under the Centers for Medicare and Medicaid Services (CMS) rules to the National Healthcare Safety Network (NHSN).

The statute also instructs HDOH to prepare public reports of Hawai'i HAI rates using methodology developed by CDC and CMS. The first Hawai'i HAI report was released in 2013 and contained data for conditions mandated by CMS for the Inpatient Quality Reporting (IQR) program for calendar year 2012, including all CLABSI and CAUTI in intensive care unit (ICU) locations as well as all inpatient surgical site infections (SSIs) after abdominal hysterectomy (HYST) and colon (COLO) surgeries. The following year, the 2013 Hawai'i HAI Report added data on facility-wide methicillin-resistant Staphylococcus aureus (MRSA) bacteremia, CDI infections, and healthcare personnel (HCP) influenza vaccination rates. The 2015 report added CLABSI and CAUTI data for medical and surgical wards (in addition to ICU data) in accordance with IQR reporting requirements. Beginning in 2016, critical access hospitals (CAHs) were required to report influenza vaccination coverage as part of Medicare Beneficiary Quality Improvement Project (MBQIP).

Methods

HDOH utilizes CDC's NHSN system for HAI reporting. NHSN is a free, secure, web-based surveillance system developed by CDC and used by over 22,000 healthcare facilities in the nation. NHSN has data collection modules covering a wide variety of HAIs from many types of healthcare organizations. The data are risk-adjusted and aggregated with standardized numerator and denominator definitions to allow for comparison against a national benchmark. The six CMS-mandated HAIs are presented using a standardized infection ratio (SIR). The SIR is a summary measure which compares the number of infections associated with a facility's number of device days (CLABSI and CAUTI), procedures (SSI), or patient days (CDI and MRSA bacteremia) with national baseline data. The national data include all U.S. hospitals reporting data to CDC's NHSN database.

The SIR accounts for some risk factors which could increase or decrease a patient's risk of infection. This adjustment for differences in risk allows for reasonable comparisons among hospitals, regardless of patient

³ [CDC HAI Progress Report - 2022](#)

characteristics. The findings in this report assume that patients at Hawai'i hospitals are similar to all patients in the NHSN database. **SIRs lower than 1.0 indicate better performance than predicted.**

The SIR is a ratio describing a hospital's actual infection numbers compared with a predicted number calculated using national baseline data. Since the NHSN database does not contain data for every HAI in the United States, there is a level of uncertainty associated with the estimated SIR. This uncertainty is represented by a 95% confidence interval (CI; presented as an error bar). This means we have a high degree of confidence (in this case, 95%) the true SIR lies within this range. CIs provide a simple way to determine statistical significance. If the confidence interval includes the value of 1, then the SIR is not significant (i.e., the number of observed events is not significantly different than the number predicted). If the confidence interval does not include the value of 1, then the SIR is significant.⁴

This report also presents HCP influenza vaccination status in Hawai'i's healthcare facilities. HCP include employees, licensed independent practitioners, adult students/trainees and volunteers. Additionally, there is an optional category that includes other contract personnel: direct care providers and providers of non-direct services such as maintenance, IT, or dietary food staff. The proportion of HCP vaccinated was calculated as the number of workers known to be vaccinated divided by the total number of workers in the facility. In addition to data from acute care hospitals, data are included from several CAHs. These facilities participate in a number of non-IQR CMS reporting programs, it should be noted that these facilities may not be comparable with acute care facilities.

Limitations

This report covers data from January 1, 2023 to December 31, 2023. The datasets were generated and downloaded from NHSN on May 16, 2024; any changes made to the data after this date are not reflected in this report. The 2023 data presented in this report have not been externally validated. External validation is defined as a survey and audit process which would be performed by an outside agency (i.e. HDOH) to assure quality of NHSN surveillance and reporting. A hospital's ability to detect HAI cases varies between hospitals as a result of the different resources available for surveillance, methodology (including laboratory testing methodology), and infection prevention methods implemented. Higher HAI rates may be attributable to superior detection of HAIs rather than an actual higher number of events.

The national data used for comparison in these data analyses are the NHSN aggregated data from national HAI data. Data collected in 2015 was used as the new baseline for 2016 and will be used for all subsequent; it is important to note that 2016 and future reports will not be comparable with reports using the earlier baselines (e.g. 2012-2014 data). Also, with the new baseline, facility SIRs have increased and shifted closer to 1.⁵

Additionally, for HCP influenza vaccination, caution should be used in applying these data as an estimate of the overall number of healthcare workers vaccinated in the state. In some instances, a single healthcare worker may be counted in multiple hospitals, and therefore the total number of vaccinated personnel in the state as shown in this table may be inflated.

Instructions for Interpreting Graphs








Since the SIR is an estimate, the graphs included in this report display an associated 95% confidence interval (CI) using an error bar. For hospitals with smaller patient volumes, the error bar will be wider. **The nearer the SIR is to 1.0, the closer the actual number of infections was to the predicted number of infections for a given hospital.** An SIR greater than 1.0 indicates more HAIs were observed than predicted. Conversely, a SIR less than 1.0 indicates fewer HAIs were observed than predicted. An SIR of 0 means the hospital had no infections during the time period.


⁴ [A Guide to the SIR, Based on 2015 National Baseline](#)

⁵ ["Paving the Path Forward: 2015 Rebaseline" \(CDC, 2023\)](#)

The SIR can only be calculated if the number of predicted infections for the hospital is greater than 1.0. When the number of predicted infections is less than 1.0, the number of device days, procedures, or patient days in that facility is too low to calculate a reliable SIR. For this reason, an SIR could not be calculated for every facility in Hawai'i.

There are four possible categories for a hospital's SIR:

- If the error bar on the graph (95% CI) falls completely below the reference line of 1.0, the number of infections was **significantly lower (better)** than what we would predict, based on national data. This is represented by a green checkmark on the table:  or a green circle:  on the SIR graph.
- If the error bar crosses over the reference line of 1.0, the number of infections **was similar (not significantly different)** than predicted, based on national data. This is represented by a yellow equals sign on the table:  or a yellow square:  on the SIR graph.
- If the error bar falls completely above the reference line of 1.0, the number of infections was **significantly higher (worse)** than predicted, based on national data. This is represented by a yield sign on the table:  or a red diamond:  on the SIR graph.
- If the number of **predicted infections is less than 1.0**, then an SIR could not be calculated. This is represented by a white triangle  on the table and will not be included on the SIR graph (indicated by an * by the facility name).

Additionally, facilities achieving zero infections during the specified time period are marked with a green flower  next to the facility name in the table.

Central Line-Associated Bloodstream Infections (CLABSI)

A central line is an intravascular catheter, or tube, that reaches near the heart and is used for infusion, withdrawal of blood, or monitoring.⁶ A central line-associated bloodstream infection (CLABSI) can occur when germs travel into the line and enter the bloodstream, leading an infection which can cause fever, chills, swelling, risk of sepsis and other life-threatening complications. Healthcare workers can help prevent CLABSIs by following evidence-based recommended infection control guidelines⁷ such as proper hand hygiene, skin preparation, sterile barrier precautions, and ensuring the line is properly removed when no longer needed. From 2022 to 2023, the CLABSI SIR in Hawai'i acute care hospitals increased 34% from 0.66 to 0.88.⁸

SIR Table for CLABSI in ICUs & Medical/Surgical Wards

January 1, 2023 – December 31, 2023

Facility Name	Performance Compared to Predicted	Infection Count	Predicted Infections	Central Line Days	SIR	95% Confidence Intervals
Adventist Health Castle		2	2.92	3,645	0.69	0.12, 2.27
Hilo Medical Center		0	3.91	4,958	0.00	0.00, 0.77
Kaiser Permanente Moanalua Medical Center		5	7.18	6,579	0.70	0.26, 1.54
Kapi'olani Medical Center for Women & Children		10	15.75	12,620	0.64	0.32, 1.13
Kuakini Medical Center		0	2.50	3,113	0.00	0.00, 1.20
Maui Memorial Medical Center		5	2.28	3,326	2.19	0.80, 4.86
North Hawai'i Community Hospital		2	0.68	1,130	Too small to calculate	
Pali Momi Medical Center		5	2.94	4,145	1.70	0.62, 3.78
Straub Medical Center		7	6.44	9,292	1.09	0.48, 2.15
The Queen's Medical Center		29	27.61	26,387	1.05	0.72, 1.49
The Queen's Medical Center - Hale Pūlama Mau		0	0.16	213	Too small to calculate	
The Queen's Medical Center - West O'ahu		1	2.27	2,447	0.44	0.02, 2.18
Wahiawā General Hospital		0	0.24	304	Too small to calculate	
Wilcox Medical Center		1	1.24	2,058	0.80	0.04, 3.96
Hawai'i Total - Acute Care Hospitals		67	76.12	80,217	0.88	0.69, 1.11
Kaua'i Veterans Memorial Hospital ‡		0	0.082	302	Too small to calculate	

Note: Reporting in Hawai'i is linked to CMS IQR reporting requirements. Source of national baseline data: 2015 NHSN CLABSI Data. Data last generated: May 16, 2024.
 ‡ CAHs utilize different models to calculate the number of predicted infections, and are therefore separated for CLABSI, CAUTI, CDI & MRSA Bacteremia.

- Legend:
- = Number of infections was **lower (better)** than predicted
 - = Number of infections was **similar (not significantly different)** to predicted
 - = Number of infections was **higher (worse)** than predicted
 - = SIR cannot be calculated due to <1 predicted infection, a comparison to national data is not possible.
 - = Recognizes hospitals with zero infections during the specified time period

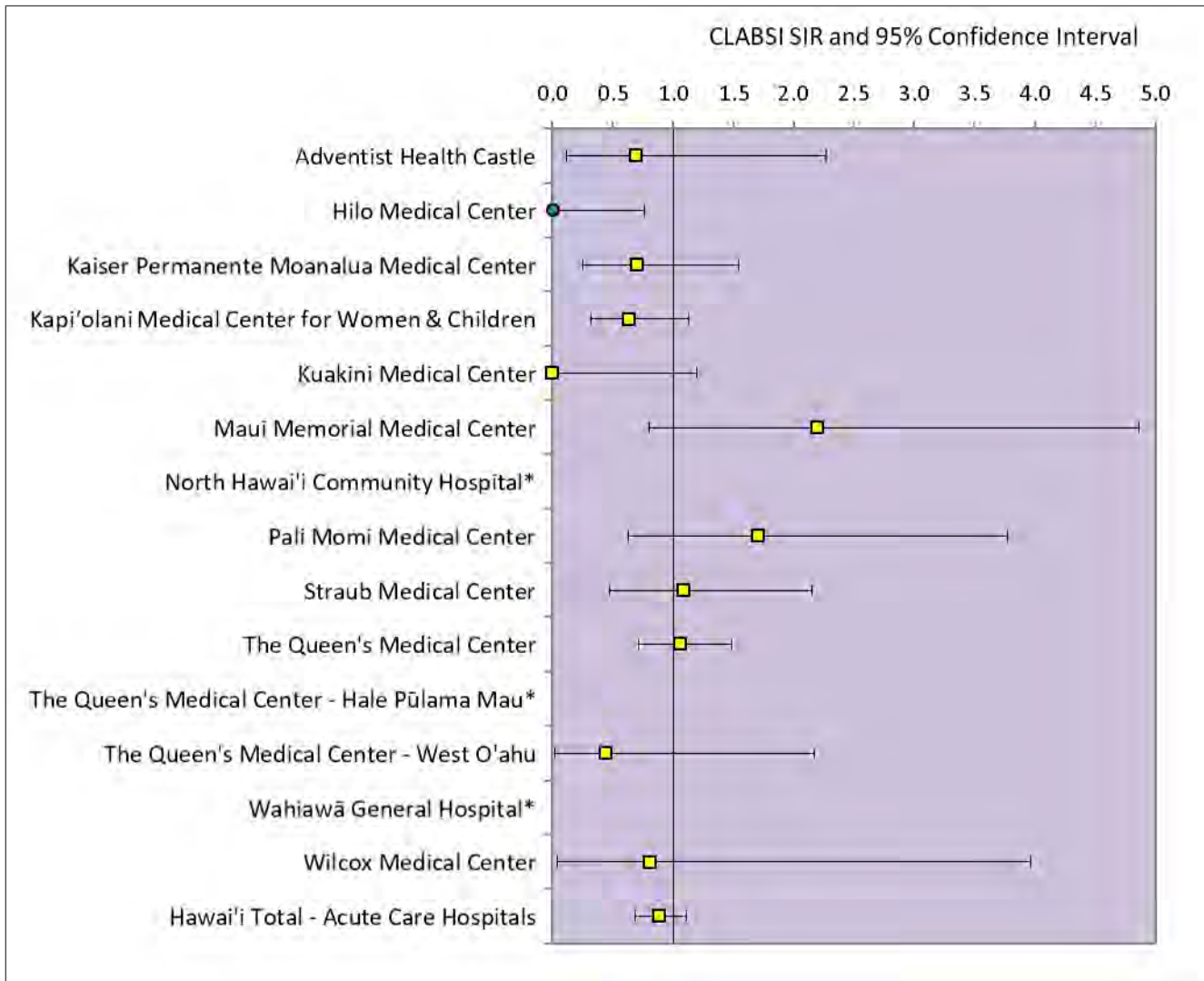
⁶ [Bloodstream Infection Event \(Central Line-Associated Bloodstream Infection and Non-central Line Associated Bloodstream Infection\)](#)

⁷ [Guidelines for the Prevention of Intravascular Catheter-Related Infections, 2011](#)

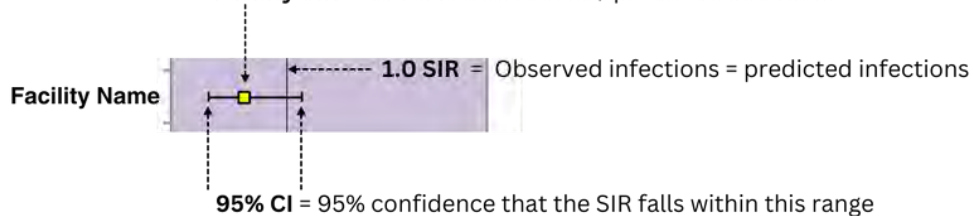
⁸ NHSN Statistics Calculator: Compare Two Standardized Ratios (SIRs)

SIR Graph for CLABSI in ICUs & Medical/Surgical Wards

January 1, 2023 – December 31, 2023



Facility SIR = Observed infections / predicted infections



- = Number of infections was **lower** (better, statistically significant) than predicted
- = Number of infections was **similar** (not significantly different) to predicted
- ◆ = Number of infections was **higher** (worse, statistically significant) than predicted
- * = Facilities with <1 predicted infection have **no SIR** or confidence intervals calculated in NHSN.

Catheter-Associated Urinary Tract Infections (CAUTI)

An indwelling urinary catheter (IUC) is a drainage tube that is inserted into the bladder through the urethra, left in place, and is connected to a drainage bag.⁹ Indwelling catheters increase a person’s risk of developing a urinary tract infection (UTI). A catheter-associated urinary tract infections (CAUTI) when germs infect the urinary system, which includes the kidneys and bladder. A CAUTI can cause fever, pain, sepsis, secondary bacteremia or bloodstream infection, and life-threatening complications. Healthcare workers can help prevent CAUTI by following evidence-based recommended infection control guidelines, ensuring sterile equipment, maintaining the sterile drainage system and removing catheters promptly.¹⁰ From 2022 to 2023, the CAUTI SIR in Hawai'i ACHs decreased 32% from 0.90 to 0.61.¹¹

SIR Table for CAUTI in ICUs & Medical/Surgical Wards

January 1, 2023 – December 31, 2023

Facility Name	Performance Compared to Predicted	Infection Count	Predicted Infections	Number of Catheter Days	SIR	95% Confidence Intervals
Adventist Health Castle		1	3.81	4,750	0.26	0.01, 1.29
Hilo Medical Center		2	6.84	8,455	0.29	0.05, 0.97
Kaiser Permanente Moanalua Medical Center		7	5.73	4,658	1.22	0.54, 2.42
Kapi'olani Medical Center for Women & Children		0	0.88	891	Too small to calculate	
Kuakini Medical Center		2	2.24	2,870	0.89	0.15, 2.95
Maui Memorial Medical Center		6	3.68	4,397	1.63	0.66, 3.40
North Hawai'i Community Hospital		0	0.46	899	Too small to calculate	
Pali Momi Medical Center		0	1.97	2,816	0.00	0.00, 1.52
Straub Medical Center		4	5.27	7,641	0.76	0.24, 1.83
The Queen's Medical Center		13	29.56	18,276	0.44	0.25, 0.73
The Queen's Medical Center - Hale Pūlama Mau		2	0.26	369	Too small to calculate	
The Queen's Medical Center - West O'ahu		2	2.98	2,898	0.67	0.11, 2.22
Wahiawā General Hospital		0	0.42	586	Too small to calculate	
Wilcox Medical Center		1	1.07	2,097	0.93	0.05, 4.61
Hawai'i Total - Acute Care Hospitals		40	65.16	61,603	0.61	0.44, 0.83
Kau'i Veterans Memorial Hospital		0	0.27	420	Too small to calculate	

Note: Reporting in Hawai'i is linked to CMS IQR reporting requirements. Source of national baseline data: 2015 NHSN CAUTI Data. Data last generated: May 16, 2024. ‡CAHs utilize different models to calculate the number of predicted infections, and are therefore separated for CLABSI, CAUTI, CDI & MRSA Bacteremia.

Legend:

- = Number of infections was **lower (better)** than predicted
- = Number of infections was **similar (not significantly different)** to predicted
- = Number of infections was **higher (worse)** than predicted
- = SIR cannot be calculated due to <1 predicted infection, a comparison to national data is not possible.
- = Recognizes hospitals with zero infections during the specified time period

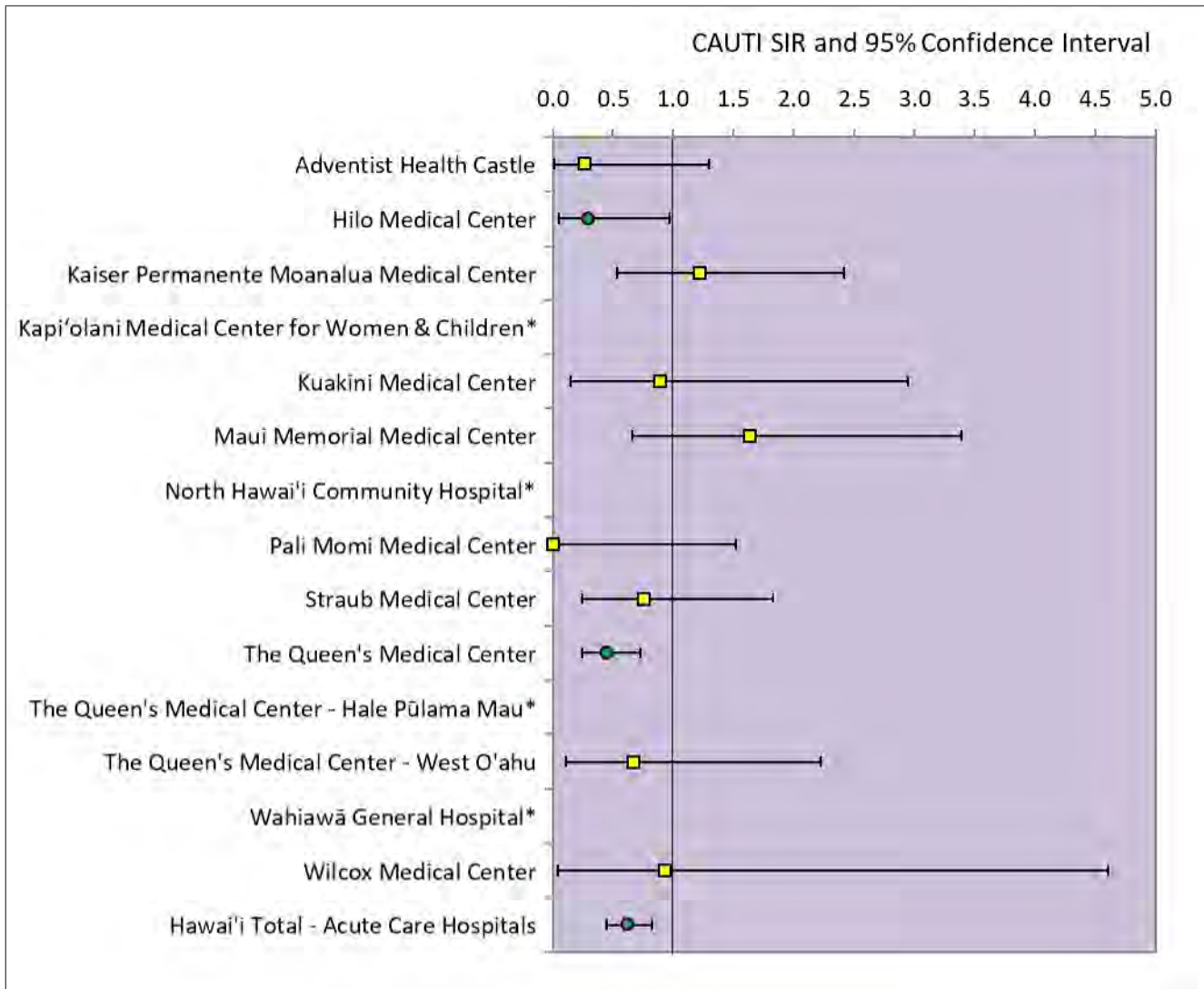
⁹ [Urinary Tract Infection \(Catheter-Associated Urinary Tract Infection \[CAUTI\] and Non-Catheter-Associated Urinary Tract Infection \[UTI\]\) Events](#)

¹⁰ [Clinical Safety: Preventing Catheter-associated Urinary Tract Infections \(CAUTIs\)](#)

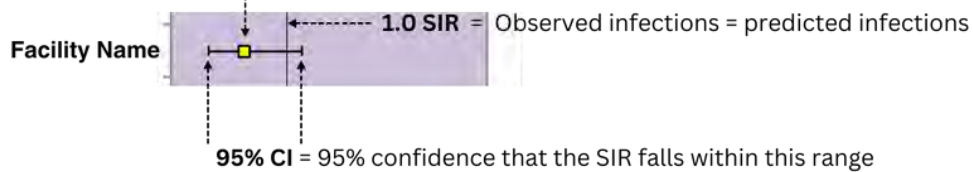
¹¹ NHSN Statistics Calculator: Compare Two Standardized Ratios (SIRs)

SIR Graph for CAUTI in ICUs & Medical/Surgical Wards

January 1, 2023 – December 31, 2023



Facility SIR = Observed infections / predicted infections



- = Number of infections was **lower** (better, statistically significant) than predicted
- = Number of infections was **similar** (not significantly different) to predicted
- ◆ = Number of infections was **higher** (worse, statistically significant) than predicted
- * = Facilities with <1 predicted infection have **no SIR** or confidence intervals calculated in NHSN.

Inpatient Colon Surgery (COLO)—Surgical Site Infection (SSI)

An surgical site infection (SSI) is an infection occurring after surgery in the part of the body where the surgery took place. Colon surgery (COLO) is a surgical procedure that includes incision (cutting), removal, and sometimes the re-joining of any part(s) of the large intestine. Signs and symptoms of a COLO SSI include redness and pain at the incision site, fluid drainage from the site, fever, and more severe signs infection. Healthcare workers should follow the CDC’s guidelines on the prevention of SSIs, and patients can withhold from shaving prior to the surgery, ensuring they understand post-operative wound care, and ensuring anyone in contact with their wound, including themselves, practices proper hand hygiene.¹² From 2022 to 2023, the COLO SSI SIR increased 59% from 0.97 to 1.55.¹³ There were statistically significantly more COLO SSIs than predicted in 2023.

SIR Table for Inpatient Colon Surgery SSI

January 1, 2023 – December 31, 2023

Facility Name	Performance Compared to Predicted	Infection Count	Procedure Count	Predicted Infections	SIR Complex	95% Confidence Intervals
Adventist Health Castle 🌿	△	0	44	0.94	Too small to calculate	
Hilo Medical Center 🌿	▬▬	0	79	1.94	0.00	0.00, 1.55
Kaiser Permanente Moanalua Medical Center	▬▬	7	152	3.37	2.08	0.91, 4.11
Kaua'i Veterans Memorial Hospital 🌿	△	0	0	No procedures.	Too small to calculate	
Kona Community Hospital 🌿	△	0	0	No procedures.	Too small to calculate	
Kuakini Medical Center 🌿	▬▬	0	40	1.05	0.00	0.00, 2.85
Maui Memorial Medical Center	▬▬	1	106	2.25	0.45	0.02, 2.19
North Hawai'i Community Hospital	△	2	27	0.54	Too small to calculate	
Pali Momi Medical Center	▬▬	1	105	2.41	0.42	0.02, 2.05
Straub Medical Center	▬▬	5	99	2.11	2.37	0.87, 5.25
The Queen's Medical Center	▽	17	220	7.95	2.14	1.29, 3.35
The Queen's Medical Center - West O'ahu	▬▬	4	56	1.38	2.90	0.92, 6.99
Wilcox Medical Center	△	1	26	0.64	Too small to calculate	
Hawai'i Total	▽	38	954	24.59	1.55	1.11, 2.10

Note: Reporting in Hawai'i is linked to CMS IQR reporting requirements. Shriners Hospital for Children does not perform this procedure. Kapiolani Medical Center for Women and Children is not mandated to report COLO SSI to NHSN. Report excludes Superficial Incisional Secondary (SIS) and Deep Incisional Secondary (DIS) SSIs. Includes only procedures and associated SSIs that are reported with primary closure technique. Source of national baseline data: 2015 NHSN SSI Data. Data contained in this report were last generated on May 16, 2024.

Legend:

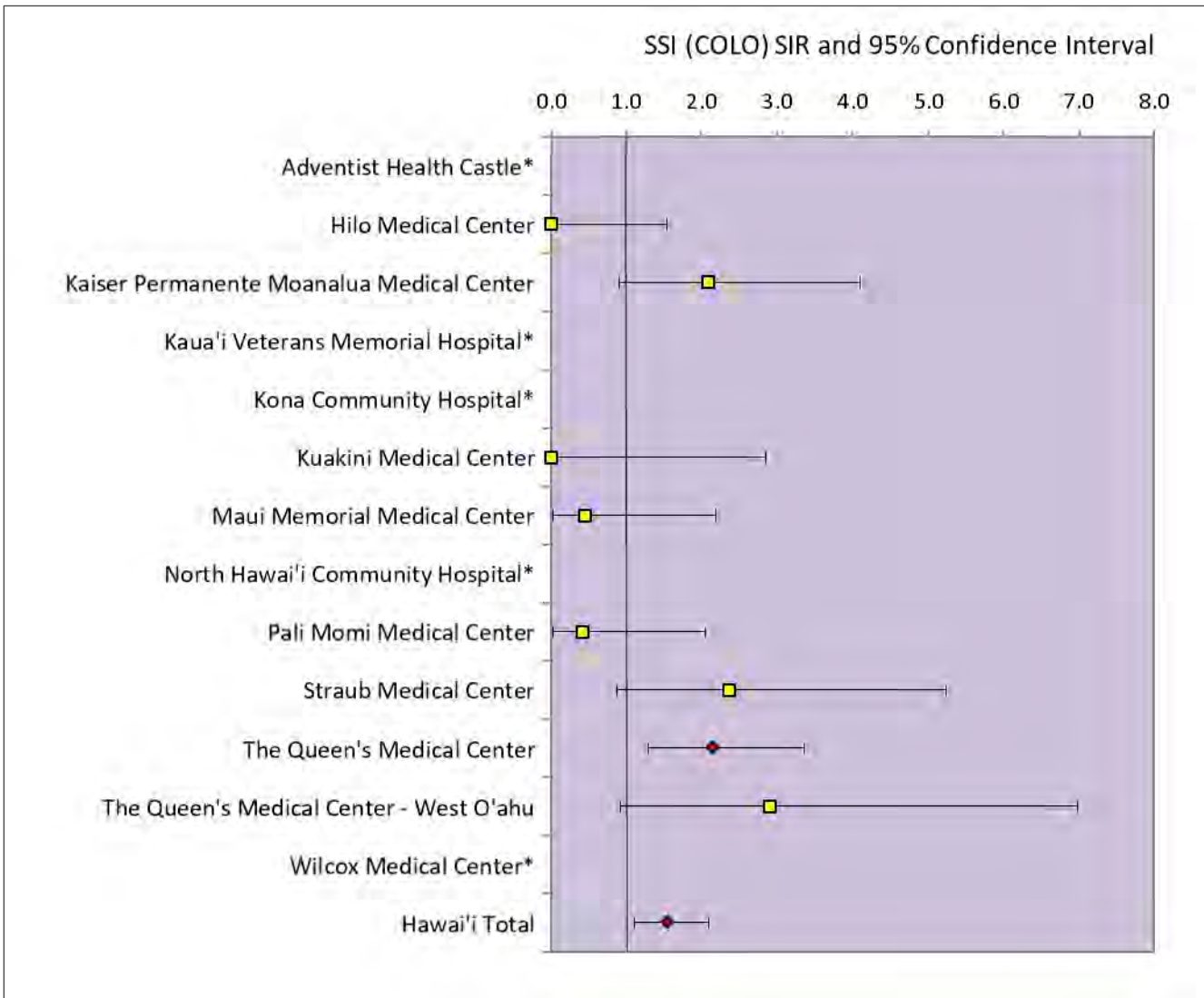
- ✓ = Number of infections was **lower (better)** than predicted
- ▬▬ = Number of infections was **similar (not significantly different)** to predicted
- ▽ = Number of infections was **higher (worse)** than predicted
- △ = SIR cannot be calculated due to <1 predicted infection, a comparison to national data is not possible.
- 🌿 = Recognizes hospitals with zero infections during the specified time period

¹² [Surgical Site Infection Basics, CDC 2024](#)

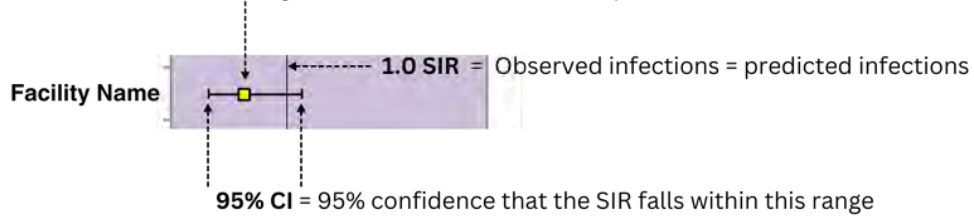
¹³ NHSN Statistics Calculator: Compare Two Standardized Ratios (SIRs)

SIR Graph for Inpatient Colon Surgery SSI

January 1, 2023 – December 31, 2023



Facility SIR = Observed infections / predicted infections



- = Number of infections was **lower** (better, statistically significant) than predicted
- = Number of infections was **similar** (not significantly different) to predicted
- ◆ = Number of infections was **higher** (worse, statistically significant) than predicted
- * = Facilities with <1 predicted infection have **no SIR** or confidence intervals calculated in NHSN.

Inpatient Abdominal Hysterectomy — Surgical Site Infection (SSI)

An abdominal hysterectomy (HYST) is a surgical procedure in which an incision or cut is made in the lower belly followed by removal of the uterus. An SSI occurs if the location of the incision becomes infected, displaying redness or pain, potentially causing fever and other signs of infection. Healthcare workers should follow the CDC’s guidelines on the prevention of SSIs, and patients can withhold from shaving prior to the surgery, ensuring they understand post-operative wound care, and ensuring anyone in contact with their wound, including themselves, practices proper hand hygiene.¹⁴ From 2022 to 2023, HYST SSI SIR increased over 400% (due to a small number of procedures and infections) from 0.25 to 1.39.¹⁵ In 2023, there were not significantly more HYST SSIs than predicted (SIR 1.39; 95% CI [0.51, 3.09]).

SIR Table for Inpatient Abdominal Hysterectomy SSI

January 1, 2023 – December 31, 2023

Facility Name	Performance Compared to Predicted	Infection Count	Procedure Count	Predicted Infections	SIR Complex	95% Confidence Intervals
Adventist Health Castle 🌿	△	0	4	0.03	Too small to calculate	
Hilo Medical Center 🌿	△	0	27	0.18	Too small to calculate	
Kaiser Permanente Moanalua Medical Center	△	3	96	0.75	Too small to calculate	
Kapi’olani Medical Center for Women & Children	△	1	110	0.91	Too small to calculate	
Kaua’i Veterans Memorial Hospital 🌿	△	0	1	0.01	Too small to calculate	
Kona Community Hospital 🌿	△	0	0	No procedures.	Too small to calculate	
Maui Memorial Medical Center 🌿	△	0	16	0.14	Too small to calculate	
North Hawai’i Community Hospital 🌿	△	0	4	0.02	Too small to calculate	
Pali Momi Medical Center 🌿	△	0	38	0.28	Too small to calculate	
Straub Medical Center 🌿	△	0	8	0.07	Too small to calculate	
The Queen’s Medical Center 🌿	▬	0	125	1.01	0.00	0.00, 2.95
The Queen’s Medical Center - West O’ahu 🌿	△	0	0	No procedures.	Too small to calculate	
Wilcox Medical Center	△	1	37	0.19	Too small to calculate	
Hawai’i Total	▬	5	466	3.59	1.39	0.51, 3.09

Note: Reporting in Hawai’i is tied to CMS IQR reporting requirements. Shriners Hospital for Children and Kuakini Medical Center do not perform this procedure. Excludes Superficial Incisional Secondary (SIS) and Deep Incisional Secondary (DIS) SSIs. Includes only procedures and associated SSIs that are reported with primary closure technique. Source of national baseline data: 2015 NHSN SSI Data. Data contained in this report were last generated on May 16, 2024.

Legend:

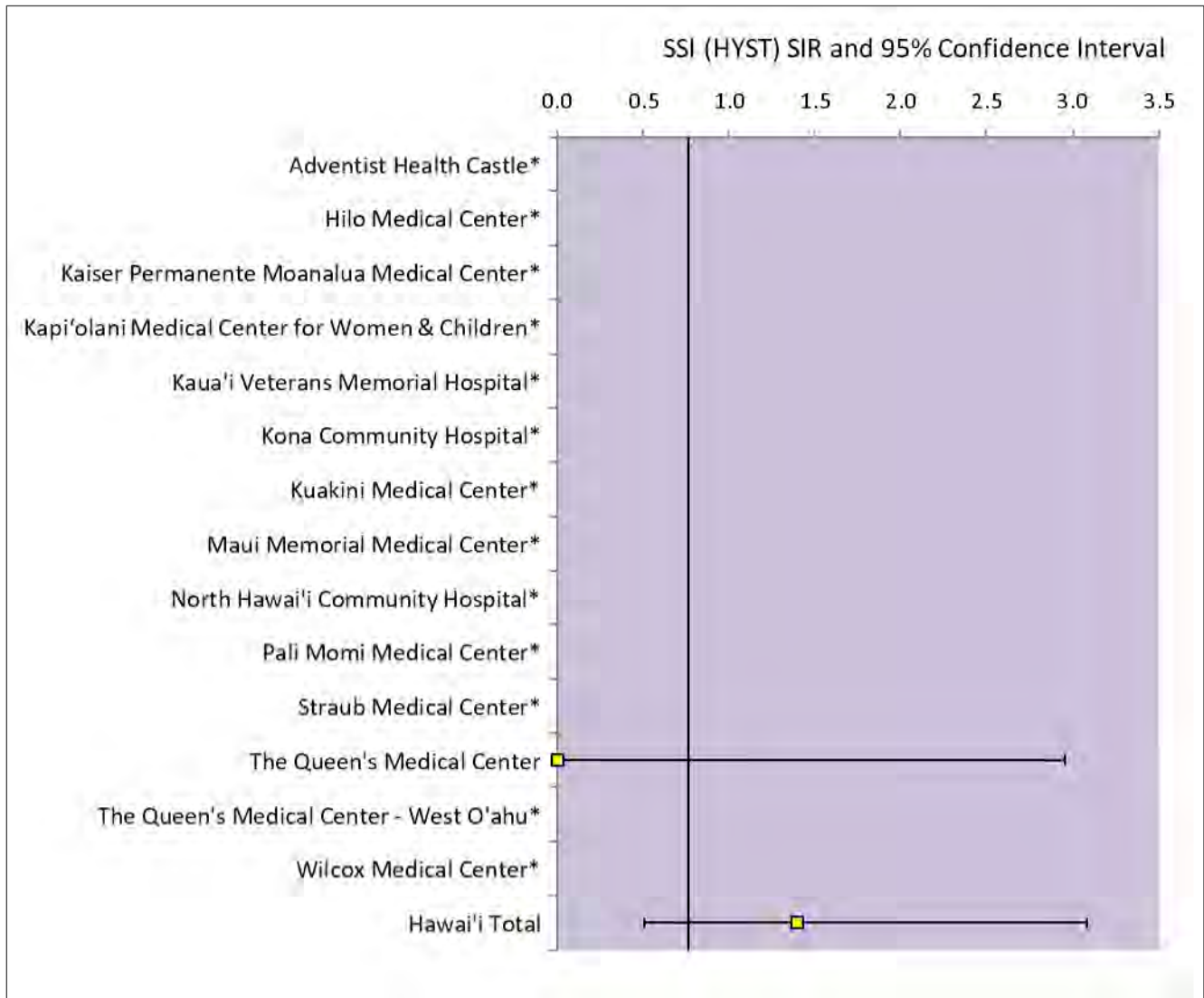
- ✓ = Number of infections was **lower (better)** than predicted
- ▬ = Number of infections was **similar (not significantly different)** to predicted
- ▽ = Number of infections was **higher (worse)** than predicted
- △ = SIR cannot be calculated due to <1 predicted infection, a comparison to national data is not possible.
- 🌿 = Recognizes hospitals with zero infections during the specified time period

¹⁴ [Surgical Site Infection Basics, CDC 2024](#)

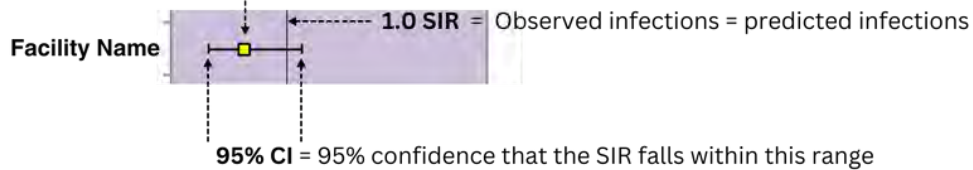
¹⁵ NHSN Statistics Calculator: Compare Two Standardized Ratios (SIRs)

SIR Graph for Inpatient Abdominal Hysterectomy (HYST) SSI

January 1, 2023 – December 31, 2023



Facility SIR = Observed infections / predicted infections



- = Number of infections was **lower** (better, statistically significant) than predicted
- = Number of infections was **similar** (not significantly different) to predicted
- ◆ = Number of infections was **higher** (worse, statistically significant) than predicted
- * = Facilities with <1 predicted infection have **no SIR** or confidence intervals calculated in NHSN.

Inpatient *Clostridioides difficile* Infection (CDI)

Clostridioides difficile (*C. diff*) infection, or CDI, is an illness that occurs when the large intestine becomes overrun by *C. diff* bacteria, usually following exposure to antibiotics. CDI symptoms include abdominal pain, watery diarrhea, dehydration, and fever, and can lead to kidney failure and/or life-threatening damage to the colon. CDI patients should be placed on isolation and contact precautions to prevent transmission. Antibiotics should be used appropriately, and proper hand hygiene must be followed. The CDI SIR decreased 10% from 0.58 in 2022 to 0.53 in 2023.¹⁶

SIR Table for Inpatient *C. difficile* Infections

January 1, 2023 – December 31, 2023

Facility Name	Performance Compared to Predicted	Number of CDI (HO)	Predicted Infections	Number of Patient Days	SIR	95% Confidence Intervals
Adventist Health Castle	✓	2	8.23	26,518	0.24	0.04, 0.80
Hilo Medical Center	▬	21	30.15	55,670	0.70	0.44, 1.05
Kaiser Permanente Moanalua Medical Center	▬	31	31.83	46,753	0.97	0.67, 1.37
Kapi'olani Medical Center for Women & Children	✓	4	14.58	38,681	0.27	0.09, 0.66
Kuakini Medical Center	▬	14	17.37	28,093	0.81	0.46, 1.32
Maui Memorial Medical Center	✓	22	40.94	73,587	0.54	0.35, 0.80
North Hawai'i Community Hospital	▬	3	1.93	7,209	1.56	0.40, 4.24
Pali Momi Medical Center	✓	5	21.25	40,037	0.24	0.09, 0.52
Shriners Hospitals for Children – Honolulu 🌿	△	0	0.14	929	Too small to calculate	
Straub Medical Center	✓	16	33.19	53,210	0.48	0.29, 0.77
The Queen's Medical Center	✓	54	111.17	162,945	0.49	0.37, 0.63
The Queen's Medical Center - Hale Pūlama Mau 🌿	✓	0	3.08	13,658	0.00	0.00, 0.97
The Queen's Medical Center - West O'ahu	✓	10	21.16	38,304	0.47	0.24, 0.84
Wahiawā General Hospital 🌿	✓	0	3.37	7,250	0.00	0.00, 0.89
Wilcox Medical Center 🌿	✓	0	8.28	18,388	0.00	0.00, 0.36
Hawai'i Total - Acute Care Hospitals	✓	182	346.67	611,232	0.53	0.45, 0.61
Kaua'i Veterans Memorial Hospital ‡ 🌿	▬	0	1.08	4,910	0.00	0.00, 2.76

Note: Reporting in Hawai'i is tied to CMS IQR reporting requirements. Only laboratory confirmed inpatient healthcare-onset CDI isolates are presented. Source of national baseline data: 2015 NHSN CDI LabID Data. Data contained in this report were last generated on May 16, 2024.

‡CAHs utilize different models to calculate the number of predicted infections, and are therefore separated for CLABSI, CAUTI, CDI & MRSA.

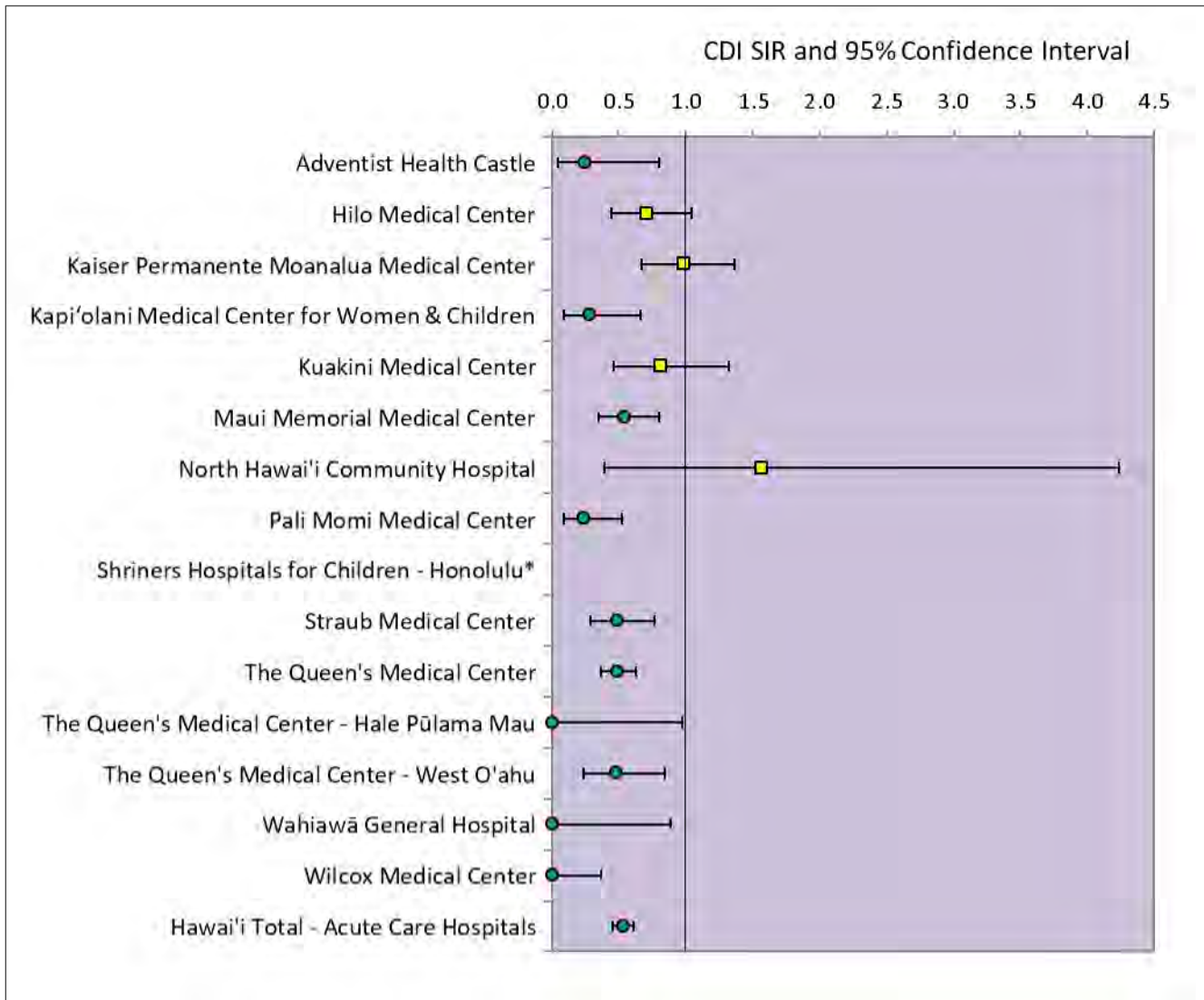
Legend:

- ✓ = Number of infections was **lower (better)** than predicted
- ▬ = Number of infections was **similar (not significantly different)** to predicted
- ▽ = Number of infections was **higher (worse)** than predicted
- △ = SIR cannot be calculated due to <1 predicted infection, a comparison to national data is not possible.
- 🌿 = Recognizes hospitals with zero infections during the specified time period

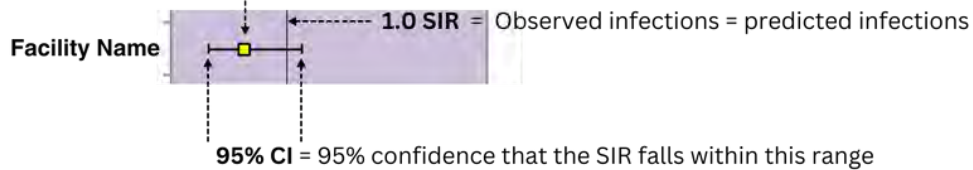
¹⁶ NHSN Statistics Calculator: Compare Two Standardized Ratios (SIRs)

SIR Graph for Inpatient *C. difficile* Infections

January 1, 2023 – December 31, 2023



Facility SIR = Observed infections / predicted infections



- = Number of infections was **lower** (better, statistically significant) than predicted
- = Number of infections was **similar** (not significantly different) to predicted
- ◆ = Number of infections was **higher** (worse, statistically significant) than predicted
- * = Facilities with <1 predicted infection have **no SIR** or confidence intervals calculated in NHSN.

Methicillin-Resistant *Staphylococcus aureus* (MRSA) Bacteremia

Staphylococcus aureus is a common bacterium found on the skin. Among people in healthcare settings, an antibiotic resistant type of this bacterium can cause serious infections such as skin or wound infections, pneumonia, or infections of the blood (bacteremia). MRSA bacteremia can be reduced using the same strategies used to reduce device and procedure related healthcare-associated infections. decolonization and pathogen reduction strategies may be implemented for patients at high risk. The MRSA SIR in Hawai'i increased by 10% from 0.61 in 2022 to 0.68 in 2023.

SIR Table for Inpatient MRSA Bacteremia Infections

January 1, 2023 – December 31, 2023

Facility Name	Performance Compared to Predicted	Infection Count	Predicted Infections	Number of Patient Days	SIR	95% Confidence Intervals
Adventist Health Castle	==	1	1.19	27,830	0.84	0.04, 4.13
Hilo Medical Center	==	4	2.51	57,277	1.59	0.51, 3.84
Kaiser Permanente Moanalua Medical Center 🌿	✓	0	3.60	53,271	0.00	0.00, 0.83
Kapi'olani Medical Center for Women & Children	==	1	2.07	72,085	0.48	0.02, 2.38
Kuakini Medical Center	==	2	1.43	28,093	1.40	0.23, 4.61
Maui Memorial Medical Center	==	5	2.90	76,249	1.73	0.63, 3.83
North Hawai'i Community Hospital 🌿	△	0	0.14	7,887	Too small to calculate	
Pali Momi Medical Center	==	2	2.13	40,037	0.94	0.16, 3.11
Shriners Hospitals for Children - Honolulu 🌿	△	0	0.02	929	Too small to calculate	
Straub Medical Center	==	0	2.94	53,210	0.00	0.00, 1.02
The Queen's Medical Center	==	8	11.57	165,535	0.69	0.32, 1.31
The Queen's Medical Center - Hale Pūlama Mau 🌿	△	0	0.41	13,658	Too small to calculate	
The Queen's Medical Center - West O'ahu 🌿	==	0	2.08	38,304	0.00	0.00, 1.44
Wahiawā General Hospital 🌿	△	0	0.27	7,250	Too small to calculate	
Wilcox Medical Center 🌿	△	0	0.78	19,141	Too small to calculate	
Hawai'i Total - Acute Care Hospitals	✓	23	34.05	660,756	0.68	0.44, 1.00
Kaua'i Veterans Memorial Hospital ‡ 🌿	△	0	0.11	5,339	Too small to calculate	
Samuel Mahelona Memorial Hospital ‡ 🌿	△	0	0.003	122	Too small to calculate	

Note: Reporting in Hawai'i is tied to CMS IQR reporting requirements. Source of national baseline data: 2015 NHSN MRSA Blood LabID Data. Only laboratory confirmed inpatient healthcare-onset MRSA Bacteremia isolates are presented. Data were last generated on May 16, 2024.

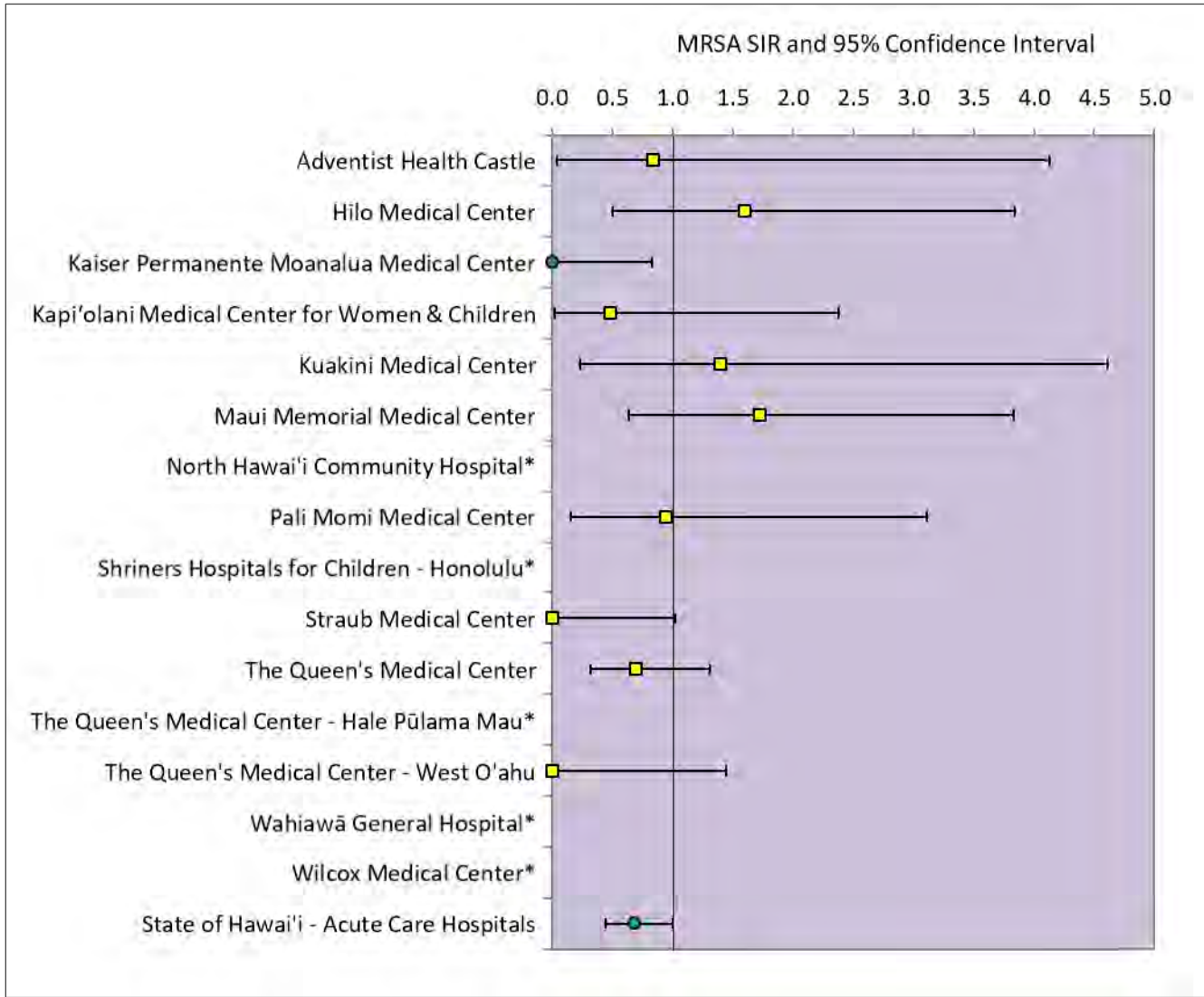
‡ CAHs utilize different models to calculate the number of predicted infections, and are therefore separated for CLABSI, CAUTI, CDI & MRSA.

Legend:

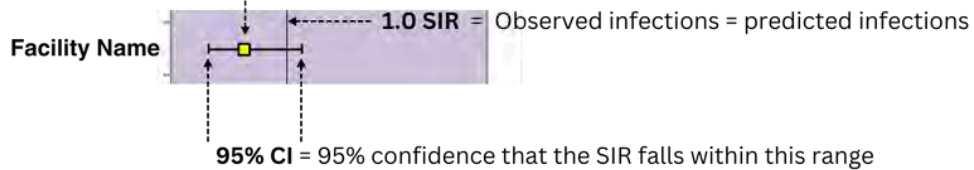
- ✓ = Number of infections was **lower (better)** than predicted
- == = Number of infections was **similar (not significantly different)** to predicted
- △ = Number of infections was **higher (worse)** than predicted
- △ = SIR cannot be calculated due to <1 predicted infection, a comparison to national data is not possible.
- 🌿 = Recognizes hospitals with zero infections during the specified time period

SIR Graph for Inpatient MRSA Infections

January 1, 2023 – December 31, 2023



Facility SIR = Observed infections / predicted infections



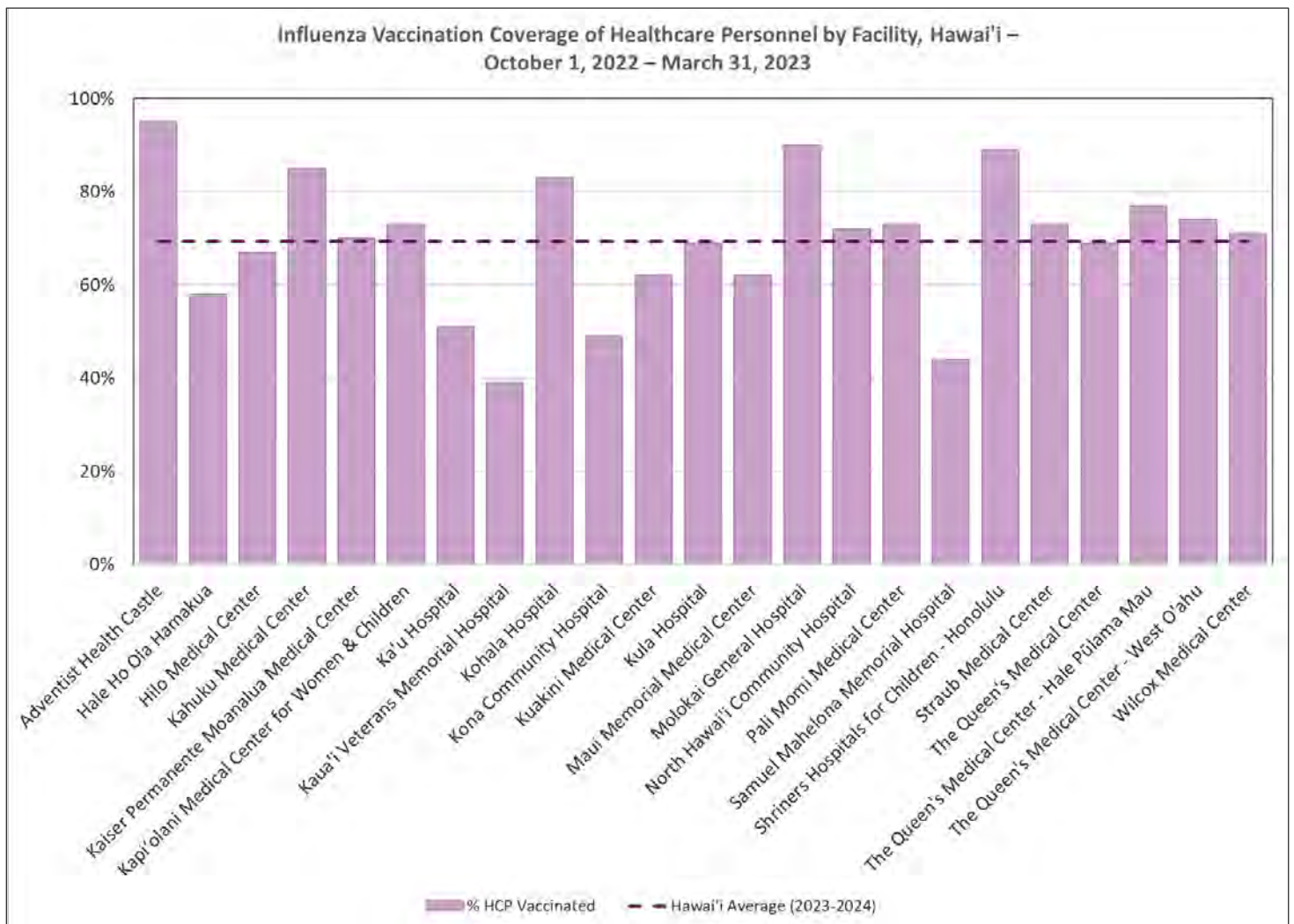
- = Number of infections was **lower** (better, statistically significant) than predicted
- = Number of infections was **similar** (not significantly different) to predicted
- ◆ = Number of infections was **higher** (worse, statistically significant) than predicted
- * = Facilities with <1 predicted infection have **no SIR** or confidence intervals calculated in NHSN.

Influenza Vaccination of Healthcare Personnel

Influenza, also known as the flu, is a contagious viral respiratory illness. Though it can be mild, serious outcomes of influenza infection can result in hospitalization or death. Kūpuna, young children, and people with certain health conditions are at higher risk for serious flu complications. Annual vaccination is the most important measure to prevent severe seasonal influenza infection and transmission. Facilities promote and administer seasonal influenza vaccination. High HCP and patient vaccination rates are critical steps in preventing healthcare transmission of influenza.

Healthcare Personnel (HCP) include employees, licensed independent practitioners, adult students/trainees and volunteers. The national average for last flu season, the 2022/23 season, was 75.9%.^{17,18} when the Hawai'i average was 69%. This year the Hawai'i HCP influenza vaccination average among HCP remains at 69%, just below the new Health People 2030 goal. The Healthy People 2030 goal pertaining to influenza vaccination is to, "Increase the proportion of people who get the flu vaccine every year — IID-09"¹⁹ with a target of 70%, but it is not specific to HCP.

Influenza Vaccination Coverage of Healthcare Personnel by Facility (Graph)



¹⁷ [Influenza Vaccination Coverage Among Health Care Personnel](#) — United States, 2022–23 Influenza Season.

¹⁸ HCP include employees, licensed independent practitioners, adult students/trainees and volunteers.

¹⁹ Healthy People 2030 — [IID-09](#)

Influenza Vaccination Coverage of Healthcare Personnel by Facility (Table)

Facility Name	Vaccinated at Facility	Vaccinated Elsewhere	Total Vaccinated	No. of workers	No. of declinations	No. of Contraindications	Percent of workers vaccinated
Adventist Health Castle	868	562	1,430	1,505	49	25	95%
Hale Ho'ola Hamakua	72	8	80	137	53	0	58%
Hilo Medical Center	826	178	1,004	1,488	356	31	67%
Kahuku Medical Center	141	46	187	220	32	1	85%
Kaiser Permanente Moanalua Medical Center	1,470	190	1,660	2,373	260	9	70%
Kapi'olani Medical Center for Women & Children	1,178	936	2,114	2,906	116	11	73%
Ka'u Hospital	32	3	35	69	33	1	51%
Kaua'i Veterans Memorial Hospital	93	17	110	285	1	0	39%
Kohala Hospital	49	28	77	93	16	0	83%
Kona Community Hospital	288	173	461	949	182	30	49%
Kuakini Medical Center	360	347	707	1,137	10	2	62%
Kula Hospital	10	1	11	16	3	0	69%
Maui Memorial Medical Center	705	174	879	1,419	289	0	62%
Moloka'i General Hospital	109	0	109	121	12	0	90%
North Hawai'i Community Hospital	301	147	448	621	159	0	72%
Pali Momi Medical Center	767	911	1,678	2,314	159	3	73%
Samuel Mahelona Memorial Hospital	48	0	48	110	4	0	44%
Shriners Hospitals for Children - Honolulu	133	115	248	280	7	1	89%
Straub Medical Center	1,248	679	1,927	2,624	131	8	73%
The Queen's Medical Center	540	5,713	6,253	9,086	1,029	44	69%
The Queen's Medical Center - Hale Pūlama Mau	5	92	97	126	16	0	77%
The Queen's Medical Center - West O'ahu	72	1,464	1,536	2,065	282	16	74%
Wilcox Medical Center	429	268	697	975	151	7	71%
Total	9,744	12,052	21,796	30,919	3,350	189	69%

Data contained in this table was last generated on May 16, 2024.

Discussion

Healthcare-associated infections remain a public health priority in Hawai'i hospitals. In 2023, there were 355 HAIs reported into the National Healthcare Safety Network and shared with DOH via our Data Use Agreement. These infections included 67 CLABSIs, 40 CAUTIs, 38 COLO SSIs, 5 HYST SSIs, 182 CDIs, and 23 MRSA bacteremia infections. Key takeaways from Hawai'i hospitals in 2023, demonstrated in the table below, include:

- There were significantly fewer CAUTIs, CDIs, MRSA infections than predicted.
- There were significantly more COLO SSIs than predicted.
- There were as many CLABSIs and HYST SSIs as predicted.

Table: Infections and SIRs with 95% Confidence Intervals, 2022-2023

Event	2022				2023				Difference in Observed HAIs	2022 to 2023 State SIR**
	Observed	Predicted	SIR	95% CI	Observed	Predicted	SIR	95% CI		
CLABSI	54	81.98	0.66	0.50, 0.85	67	76.12	0.88	0.69, 1.11	+13	34% increase
CAUTI	65	72.10	0.90	0.70, 1.14	40	65.16	0.61	0.44, 0.83	-25	32% decrease
COLO	24	24.71	0.97	0.64, 1.42	38	24.59	1.55	1.11, 2.10	+14	59% increase
HYST	1	4.03	0.25	0.01, 1.23	5	3.59	1.39	0.51, 3.09	+4	462% increase
CDI	206	353.36	0.58	0.51, 0.67	182	346.67	0.53	0.45, 0.61	-24	10% decrease
MRSA	23	37.46	0.61	0.40, 0.91	23	34.05	0.68	0.44, 1.00	+0	10% increase

Note: CLABSI and CAUTI includes acute care ICUs & medical/surgical wards.

** Calculated using the NHSN Statistics Calculator: Compare Two Standardized Ratios (SIRs).

Healthy People 2030 prioritizes the prevention and treatment of two HAIs: CDI and MRSA. The Healthy People 2030 goal for CDI is to “reduce C. diff infections that people get in the hospital” (HAI-01).²⁰ The target is a SIR of 0.70, which Hawai'i achieved in 2023 with statistical significance (SIR: 0.53; 95% CI [0.45, 0.61]). The Healthy People 2030 goal for MRSA is to “reduce MRSA bloodstream infections that people get in the hospital” (HAI-02).²¹ The target SIR is 0.50. Hawai'i has not yet achieved this goal and will continue to make strides toward it in the future.

Efforts to date by the healthcare community have resulted in the prevention of hundreds of HAIs in 2023. This results in improved patient outcomes, decreased re-hospitalization and long-term rehabilitation, and increased direct healthcare savings. HDOH, working with stakeholders, will continue to monitor trends and promote prevention strategies with a goal of elimination of HAIs as a public health concern.

²⁰ [Healthy People 2030 - HAI-01](#)

²¹ [Healthy People 2030 - HAI-02](#)

Acknowledgements

We would like to acknowledge the Vermont Program for Quality in Health Care for developing the original format and selected content used as a template for this document. Additionally, we incorporated language and guidance from the [HAI Data Analysis and Presentation Standardization Toolkit](#) developed by the Council of State and Territorial Epidemiologists. We greatly appreciate the staff at the Division of Healthcare Quality Promotion at CDC for their technical assistance. We would like to thank the infection prevention, quality, and information technology staff at Hawai'i hospitals for collaborating to provide data presented in this report. We would also like to thank the members of the Hawai'i HAI Advisory Committee for contributing guidance toward the completion of this report. The Hawai'i Department of Health will be working to reconvene the HAI Advisory Committee in 2024.

For questions about this report, please contact:

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Website: <http://health.Hawaii.gov/docd/dib/healthcare-associated-infections-hais/>

Appendix 1 – Acute Care Hospital Summary Table (2023) – SIRs

Facility Name	CLABSI	CAUTI	COLO	HYST	CDI	MRSA
Adventist Health Castle	0.69	0.26	Too small to calculate	Too small to calculate	0.24	0.84
Hilo Medical Center	0.00	0.29	0.00	Too small to calculate	0.70	1.59
Kaiser Permanente Moanalua Medical Center	0.70	1.22	2.08	Too small to calculate	0.97	0.00
Kapi'olani Medical Center for Women & Children	0.64	Too small to calculate	**	Too small to calculate	0.27	0.48
Kona Community Hospital	**	**	Too small to calculate	Too small to calculate	**	**
Kuakini Medical Center	0.00	0.89	0.00	Too small to calculate	0.81	1.40
Maui Memorial Medical Center	2.19	1.63	0.45	Too small to calculate	0.54	1.73
North Hawai'i Community Hospital	Too small to calculate	Too small to calculate	Too small to calculate	Too small to calculate	1.56	Too small to calculate
Pali Momi Medical Center	1.70	0.00	0.42	Too small to calculate	0.24	0.94
Shriners Hospitals for Children - Honolulu*	**	**	**	**	Too small to calculate	Too small to calculate
Straub Medical Center	1.09	0.76	2.37	Too small to calculate	0.48	0.00
The Queen's Medical Center	1.05	0.44	2.14	0.00	0.49	0.69
The Queen's Medical Center - Hale Pūlama Mau	Too small to calculate	Too small to calculate	**	**	0.00	Too small to calculate
The Queen's Medical Center - West O'ahu	0.44	0.67	2.90	Too small to calculate	0.47	0.00
Wahiawā General Hospital	Too small to calculate	Too small to calculate	**	**	0.00	Too small to calculate
Wilcox Medical Center	0.80	0.93	Too small to calculate	Too small to calculate	0.00	Too small to calculate
Hawai'i Total - Acute Care Hospitals	0.88	0.61	1.55	1.39	0.53	0.68

Data contained in this table was last generated on May 16, 2024.

Appendix 2 – Acronyms:

CAUTI	Catheter associated urinary tract infections
CDC	Centers for Disease Control and Prevention
CDI	<i>Clostridioides difficile</i> infection
CI	Confidence interval
CLABSI	Central line-associated bloodstream infections
CMS	Centers for Medicare and Medicaid Services
COLO	Colon surgeries
HAIs	Healthcare-associated infections
HCP	Healthcare personnel
HDOH	Hawai'i Department of Health
HYST	Abdominal hysterectomy
ICU	Intensive care unit (also known as critical care unit)
IQR	Inpatient quality reporting
MBQIP	Medicare Beneficiary Quality Improvement Project
MRSA	Methicillin-resistant <i>Staphylococcus aureus</i>
NHSN	National Healthcare Safety Network
NICU	Neonatal intensive (critical) care unit
SIR	Standardized infection ratio: $SIR = \frac{\text{Observed HAIs}}{\text{Expected HAIs}}$
SSI	Surgical site infections
TJC	The Joint Commission

Appendix 3 – CLABSIs and CAUTIs in Acute Care ICUs

CLABSIs in Acute Care ICUs

Facility Name	Infection Count	Number of Predicted Infections	Number of Central Line Days	SIR	SIR 95% Confidence Intervals
Adventist Health Castle	2	1.19	1,362	1.68	0.281, 5.545
Hilo Medical Center	0	1.18	1,349	0.00	, 2.538
Kaiser Permanente Moanalua Medical Center	1	3.97	3,284	0.25	0.013, 1.243
Kapi'olani Medical Center for Women & Children	6	14.15	11,203	0.42	0.172, 0.882
Kuakini Medical Center	0	1.09	1,241	0.00	, 2.759
Maui Memorial Medical Center	3	0.84	1,110	Too small to calculate.	
North Hawai'i Community Hospital	1	0.17	253	Too small to calculate.	
Pali Momi Medical Center	3	1.74	2,314	1.72	0.438, 4.683
Straub Medical Center	3	2.86	3,795	1.05	0.267, 2.855
The Queen's Medical Center	14	13.84	12,261	1.01	0.576, 1.658
The Queen's Medical Center - West O'ahu	0	1.44	1,472	0.00	, 2.077
Wahiawā General Hospital	0	0.06	70	Too small to calculate.	
Wilcox Medical Center	1	0.38	562	Too small to calculate.	
Hawai'i Total – Acute Care Hospitals	34	42.89	40,276	0.79	0.558, 1.095
Kaua'i Veterans Memorial Hospital	0	0.02	79	Too small to calculate.	

CAUTIs in Acute Care ICUs

Facility Name	Infection Count	Number of Predicted Infections	Number of Catheter Days	SIR	SIR 95% Confidence Intervals
Adventist Health Castle	1	1.16	1,391	0.86	0.043, 4.252
Hilo Medical Center	0	2.40	2,876	0.00	, 1.249
Kaiser Permanente Moanalua Medical Center	3	2.65	2,003	1.13	0.288, 3.079
Kapi'olani Medical Center for Women & Children	0	0.63	568	Too small to calculate.	
Kuakini Medical Center	0	0.95	1,142	Too small to calculate.	
Maui Memorial Medical Center	4	1.48	1,651	2.71	0.859, 6.524
North Hawai'i Community Hospital	0	0.14	258	Too small to calculate.	
Pali Momi Medical Center	0	1.26	1,721	0.00	, 2.381
Straub Medical Center	0	2.60	3,552	0.00	, 1.153
The Queen's Medical Center	8	19.99	10,109	0.40	0.186, 0.760
The Queen's Medical Center - West O'ahu	1	2.10	1,977	0.48	0.024, 2.346
Wahiawā General Hospital	0	0.05	63	Too small to calculate.	
Wilcox Medical Center	0	0.40	729	Too small to calculate.	
Hawai'i Total – Acute Care Hospitals	17	35.81	28,040	0.48	0.286, 0.745
Kaua'i Veterans Memorial Hospital	0	0.112	171	Too small to calculate.	