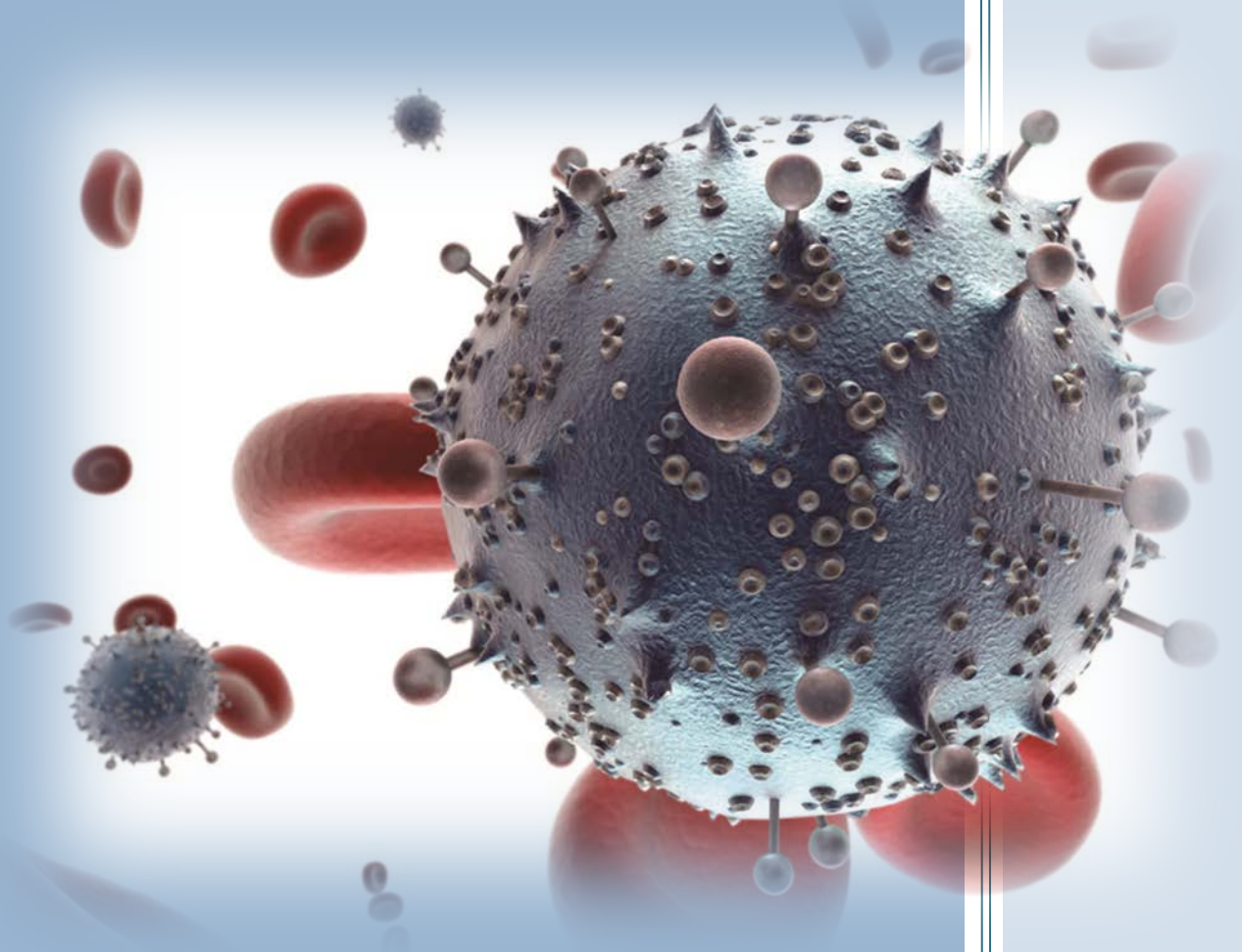
2015

Healthcare-associated Infections in Utah



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Division of Disease Control and Prevention

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Annual Report

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FOREWORD

Healthcare-associated infections (HAIs) are a major, yet often preventable, threat to patient safety. The Utah Department of Health's (UDOH) HAI Prevention Program is committed to helping Utah patients receive the best and safest care. Implementing statewide HAI prevention efforts is an essential part of a comprehensive patient safety program. Publicly releasing of HAI data is an important step in creating transparency for healthcare safety and quality in Utah.

Patients have a right to feel safe and assured that the public health system is working to eliminate infections. We are grateful to all the healthcare professionals and facilities in Utah that work tirelessly to realize this goal. Two of the keys to elimination of HAIs are 1) the accurate collection of data to assess prevention impact, and 2) the dissemination of results to healthcare providers and consumers. Conscientious efforts in data reporting contribute toward meeting HAI prevention efforts and control needs.

The *2015 Annual Healthcare Associated Infections Report* was developed in collaboration with the Utah Healthcare Infection Prevention (UHIP) Governance Committee, a multi-disciplinary panel of state leaders in patient safety, infectious diseases, and infection control. It provides updated data on Utah's progress toward the goal of reducing and, ultimately, eliminating HAIs.

This report allows Utahns to compare HAIs among licensed hospitals in Utah. The data in this report are self-reported to the National Healthcare Safety Network (NHSN) by each facility required to report HAIs by the Centers for Medicare and Medicaid Services (CMS). The UDOH analyzes the data, using appropriate statistical methods, and provides comparison information.

Each year, UDOH regularly conducts selected validations of the data for quality and completeness. However, due to resource limitations, these validations are not comprehensive. Despite these limitations, Utah's results for preventing HAIs are encouraging and; as additional data are collected, more specific results will be possible, allowing for increased HAI surveillance and prevention efforts.

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Executive Summary

Healthcare-associated infections (HAIs) are infections that are acquired while patients are receiving treatment for another condition in a healthcare setting. The Utah Department of Health (UDOH) works with community partners to monitor and prevent these infections because they are an important threat to patient safety. Because of the concerns with these deadly and costly HAIs, Utah state regulation requires the UDOH to collect data on HAIs and report this data to the public on an annual basis. Validation of these data by UDOH is limited. Data also does not reflect variabilities of patient acuity experienced in different facility settings. This report contains the following data:

- All infections for which Centers for Medicare and Medicaid Services (CMS) requires facilities to report to the National Healthcare Safety Network (NHSN):
    - Central line-associated bloodstream infections (CLABSIs)
    - Catheter-associated urinary tract infections (CAUTIs)
    - Surgical site infections (SSIs) – exclusive to colon surgeries and abdominal hysterectomy surgeries
    - *Clostridium difficile* (*C. difficile)* infections, Methicillin Resistant *Staphylococcus aureus* (MRSA) bacteremia infections
    - Dialysis infection events
- Identified facilities, as required by the Utah Health Code, Title 26, Chapter 6, Section 31
- A comparison of data in acute care facilities, long-term acute care facilities, and inpatient rehabilitation facilities to national baseline data.

Numbers of HAIs reported by Utah facilities during 2015 did not significantly change as compared to previous year's data, except for CAUTIs that significantly decreased. Reduced number of reported CAUTI may reflect implementation of prevention strategies by Utah facilities as well as changes in NHSN CAUTI surveillance definitions activated in 2015.

Compared to national baseline data, patients in Utah facilities that reported 2015 HAI data to NHSN experienced:

- 51% fewer CLABSI
- 15% fewer CAUTI
- 9% more surgical site infections within 30 days of colon surgery
- 11% more surgical site infections within 30 days of abdominal hysterectomy
- 22% fewer *C. difficile* infections
- 35% fewer MRSA bacteremia infections.

Introduction

Healthcare-associated infections, or HAIs, are infections that people acquire while they are receiving treatment for another condition in a healthcare setting. HAIs can be acquired anywhere healthcare is delivered, including inpatient acute care hospitals, outpatient settings such as ambulatory surgical centers and end-stage renal disease facilities, and long-term care facilities such as nursing homes and rehabilitation centers. HAIs may be caused by any infectious agent, including bacteria, fungi, and viruses, as well as other less common types of pathogens.

HAIs are a significant cause of morbidity and mortality. On any given day, about 1 in every 25 hospital patients has at least one healthcare-associated infection. Based on the 2014 National and State Healthcare-Associated Infections Progress Report, most infections have decreased compared to the national baseline. Despite progress, more action is needed at every level of public health and healthcare to eliminate infections that commonly threaten hospital patients.[1] These infections cost the U.S. health care system billions of dollars each year and lead to the loss of tens of thousands of lives. In addition, HAIs can have devastating emotional, financial, and medical consequences.[2]

Infections may occur as a result of complications following a surgical procedure, known as a surgical site infection (SSI), or when staff fail to closely follow infection control practices such as hand washing. Patients receiving medical care and taking antibiotics for long periods of time may be more susceptible to HAIs such as *C. difficile* infections. These infections now rival methicillin-resistant *Staphylococcus aureus* (MRSA) as the most common organism to cause HAIs in the United States.

HAIs may also be caused by the use of various types of invasive devices, such as a central line or urinary catheter when patients are ill. The use of such devices can harm patients' natural defenses against germs and the longer these devices are in place, the greater the risk of infection.[3] Types of HAIs associated with devices include central line-associated bloodstream infections (CLABSIs), catheter-associated urinary tract infections (CAUTIs), or infections associated with the usage of ventilators. CLABSIs, CAUTIs, and ventilator-associated pneumonia account for roughly two-thirds of all HAIs.[4]

Patients who undergo dialysis or "hemodialysis" treatment (a treatment for patients with inadequate kidney function) also have an increased risk for an HAI. They are at high risk because this artificial process of getting rid of waste and unwanted water in the body requires frequent use of catheters or insertion of needles to access the bloodstream. Hemodialysis patients also have weakened immune systems, which increase their risk for infection. They also require frequent hospitalizations and surgery where they might acquire an infection.[5]

Another common HAI is caused by the bacteria *C. difficile*. Most *C. difficile* infections are connected with receiving medical care and taking antibiotics for long periods of time.[6]

Half of all hospital patients with *C. difficile* infections have the infection when admitted and may spread it within the facility.[7] The most dangerous source of spread to others is patients with diarrhea.

Methicillin-resistant *Staphylococcus aureus* (MRSA) is a bacterium that is resistant to many antibiotics and common in healthcare facilities. In the community, most MRSA infections are skin infections. In medical facilities, MRSA causes life-threatening bloodstream (or bacteremia) infections, pneumonia, and surgical site infections. MRSA bacteremia infections reported by Utah acute care facilities are included in this report.

Assessement of HAI Prevention Activities in Utah

The Utah Department of Health (UDOH) received funding in 2015 from the Centers for Disease Control and Prevention (CDC) to assist Utah healthcare facilities by evaluating their Infection Prevention Programs and providing expert consultation regarding several topics, including Healthcare-associated Infection (HAI) Prevention, Hand Hygiene, Environmental Cleaning, and Multi-drug Resistant Organisms Management, etc.

Assessments began in early 2016 across the state not only at acute care facilities, but also long-term care facilities, outpatient dialysis facilities, and other outpatient settings. The consultations are conducted by experienced and certified Infection Preventionists. Findings from the facility assessments are confidential and are not associated with regulatory or licensing agencies.

Facility participation in the assessments is voluntary, but has been very well received. Facilities have expressed appreciation for these consultations, as reflected by one Infection Preventionist's evaluation, "The assessment was a big help to our facility to show areas that need to be improved." Furthermore, some participants have already recognized benefit from their assessment, "Our healthcare-associated *Clostridium difficile* infections have decreased since implementing the new processes discussed during our facility's assessment." Funding for the assessments continues through March 2018.

How are Utah HAI data collected?

Identifying HAIs requires an organized approach involving several different types of activity. It is important to determine whether infections are healthcare-associated or already present upon facility admission. Due to the concerns about deadly and costly HAIs, state regulation (Rule 386-705, Epidemiology, Healthcare-Associated Infection) requires the UDOH to collect and report data on HAIs.

Since 2008, acute care hospitals with intensive care units have submitted data directly to the UDOH for the annual HAI report; however, reporting facilities were not identified by name. In 2011, the Centers for Medicare and Medicaid Services (CMS) required acute healthcare facilities to report specific HAI data to the National Healthcare Safety Network (NHSN) for payment reimbursement. In 2012, Utah Health Code Title 26, Chapter 6, Section 31, Public Reporting of Healthcare Associated Infections, was passed requiring the UDOH to: a) access and analyze facility-specific NHSN data required by CMS; b) publish an annual HAI report for the public in which facilities are identified by name; and c) conduct validation activities.

Facilities in Utah submit data about specific healthcare-associated infections (HAIs) to the NHSN, a secure, online tracking system used by hospitals and other healthcare facilities. The Utah data are reported to NHSN by each facility that is required to report HAIs to CMS. More than 17,000 hospitals and other healthcare facilities nationwide report data to NHSN. This information is then used for summarizing HAI data at the national level and for care improvement by facilities, states, regions, quality groups, and national public health agencies, including CDC.

For an HAI to be publicly reported in Utah under Title 26, Chapter 6, Section 31, an HAI must meet CMS's specific reporting measures required for reporting to NHSN. The UDOH works with NHSN and other partners to monitor and prevent these infections because they are a significant threat to patient safety.

Interpreting HAI Data

Calculating Standardized Infection Ratios (SIRs)

The standardized infection ratio (SIR) is a summary statistic developed by NHSN used to track HAI prevention progress over time. Progress is measured at the national, state, local, or facility level.

The SIR compares the *total* number of HAI events in a healthcare facility to the *predicted* number of HAI events, based on "standard population" data. For purposes of this report, the standard population data are HAI data reported nationally by thousands of facilities using NHSN. Facilities with small numbers of patients may not have enough HAI events to reliably compare to the standard population. SIRs for these facilities are not included. SIRs are also not included for dialysis facilities because a national baseline has not yet been established.

SIRs included in this report were calculated by NHSN using established baselines prior to 2015 data. NHSN will use 2015 data to re-set baselines for future calculated SIRs.

What does the SIR mean?

SIR Value	Interpretation
Less than 1	There were fewer infections reported in Utah in 2015 compared to the national baseline data, indicating progress has been made in preventing infections.
Equal to 1	There were about the same number of infections reported in Utah in 2015 compared to the national baseline data, indicating no progress has been made.
More than 1	There were more infections reported in Utah in 2015 compared to the national baseline data, indicating there has been an increase in infections.

A confidence interval (CI) is provided if an SIR was estimated for a given healthcare facility. The CI describes the uncertainty associated with the SIR estimate. Facilities with more device days or that perform more procedures will have narrower CIs, which means there is less doubt associated with the accuracy of their SIRs compared to facilities performing fewer procedures. This is because there is more information about a facility's performance with additional procedures. A 95% CI means that 95 times out of 100, the true value would be expected to fall within the range shown in the table. When 1.0 is not included in the CI, this means that the SIR is "statistically significant." That is, there is sufficient information to conclusively state that the SIR is either more or less than the national baseline.

Actual values calculated for the SIR, along with confidence intervals, are found in Tables 1-12 in the Appendix.

Figures 1-12 summarize the SIR data, taking into account whether the SIR is meaningful statistically, using the following icons. These symbols are used throughout this report to show the comparison of HAIs reported in Utah to national baseline data:

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

Below is an overall summary of 2015 HAI data reported by Utah facilities compared to national baseline data.

- ▼ **Catheter-associated Urinary Tract Infections (CAUTI)**
  - ▼ CAUTI – intensive care settings in acute care facilities
  - ● CAUTI – non-intensive care settings in acute care facilities
  - ● CAUTI – inpatient rehabilitation settings in acute care facilities
  - ▼ CAUTI – long-term acute care facilities
- ▼ **Central Line-associated Blood Stream Infections (CLABSI)**
  - ▼ CLABSI – intensive care settings in acute care facilities
  - ▼ CLABSI – non-intensive care settings in acute care facilities
  - ▼ CLABSI – newborn intensive care settings in acute care facilities
  - ● CLABSI – long-term acute care facilities
- ● **Surgical site infection associated with colon surgery**
- ● **Surgical site infection associated with abdominal hysterectomy**
- ▼ ***Clostridium difficile* (facility onset) in acute care facilities**
- ▼ **Methicillin resistant *Staphylococcus aureus* (MRSA) bacteremia**

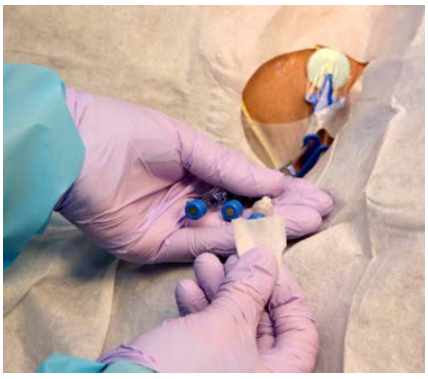
Calculating Rates

When information for estimating a predicted number of events is not available, raw incidence rates are provided. An incidence rate is a summary measure developed by NHSN to track HAIs at the national, state, local, or facility level over time, and describes how frequently HAIs occur within a specific period. This rate is calculated by taking the number of HAI events, dividing it by the total number of device days, and multiplying that by the desired time frame. Because healthcare facilities vary in size and patient mix, incidence rates should not be directly compared to others. A larger facility that treats more severe illnesses will naturally have a higher incidence rate, and consequently, is not indicative of the quality of care relative to other facilities. Overall incidence rates for the state are not given in this report, as NHSN does not provide these and they would not be comparable to other states.

If a hospital has zero infections, what that does that mean?

The total number of infections listed in the data tables represents a count of the number of infections reported by a hospital. If the number of infections is zero (0), this means the hospital saw no infections of this type during the year. It does NOT mean that the hospital failed to report all of their infections. For hospitals that reported zero infections, the size of the hospital and the total number of procedures performed versus the total number of infections that were predicted should be considered.

Central Line-associated Bloodstream Infections (CLABSIs)



A CLABSI is a serious infection that occurs when germs (usually bacteria) enter the bloodstream through an invasive device called a central line catheter. A catheter is a tube placed in a large vein in the neck, chest, or groin that ends at, or close to, the heart to give medication or fluids, collect blood for medical tests, or monitor blood flow.

The risk of CLABSI in ICU patients is high. Reasons include the frequent insertion of multiple catheters, the use of specific types of catheters that are almost exclusively inserted in ICU patients and associated with substantial risk (e.g., pulmonary artery catheters with catheter introducers), and the fact that catheters are frequently placed in emergency circumstances, repeatedly accessed each day, and often needed for extended periods of time. Additionally, CLABSIs increase the length and cost of hospital stays. The non-inflation-adjusted attributable cost of CLABSIs varies from $3,700 to $39,000 per episode.[9]

CLABSI data for 2015 were reported by long-term acute care facilities for all inpatients, and acute care facilities for all admitted to an adult, pediatric, and neonatal intensive care unit, or adult or pediatric medical, surgical, or medical/surgical wards.

In 2015, 48 adult and pediatric ICU-related CLABSIs were reported in Utah acute care facilities and associated with 51,398 central line catheter days. Compared to the national baseline, patients in Utah acute care facilities had 52 percent fewer CLABSIs in 2015 than would have been predicted. Twenty-seven acute care facilities met the criteria for required CLABSI reporting. Of these 27, 13 facilities had infection rates not significantly different from what was expected nationally; of the remaining facilities, two facilities had significantly fewer infections compared to what was expected nationally. Eleven acute care facilities did not have enough central line catheter days to provide an accurate assessment of their performance (Figure 1).

Fifteen newborn ICU-related CLABSIs were reported in Utah acute care facilities and associated with 17,255 central line catheter days. Compared to the national baseline, infants in Utah newborn intensive care areas from acute care facilities (NICUs) had 59 percent fewer CLABSIs in 2015 than would have been predicted. Thirteen NICUs met the criteria for required CLABSI reporting. Of these 13, three NICUs had infection rates not significantly different from what was expected nationally; of the remaining facilities, three facilities had significantly fewer infections compared to what was expected nationally. Seven NICUs did not have enough central line catheter days to provide an accurate assessment of their performance (Figure 2).

Thirteen CLABSIs were reported in Utah long-term acute care facilities (LTAC) and associated with 21,036 central line catheter days. Compared to the national baseline, patients in Utah LTACs had 31 percent fewer CLABSIs in 2015 than would have been predicted. Four LTACs met the criteria for required CLABSI reporting. Of these four, one LTAC had significantly fewer CLABSIs compared to what was expected nationally, and the remaining LTACs had infection rates not significantly different than what was expected nationally (Figure 3).

Twenty-eight CLABSIs were reported in Utah inpatient non-intensive care locations in acute care facilities and associated with 40,634 central line catheter days. Compared to the national baseline, patients had 50 percent fewer CLABSIs in 2015 than would have been predicted. Thirty-seven facilities met the criteria for required CLABSI reporting. Of these 37, three facilities had significantly fewer CLABSIs compared to what was expected nationally; six facilities had infections not significantly different from what was expected nationally. Twenty-eight facilities did not have enough central line catheter days to provide an accurate assessment of their performance. (Figure 4).

Figure 1. Central line-associated bloodstream infections in adult and pediatric intensive care units in acute care facilities, Utah, 2015[+]

Hospital	CLABSIs
State of Utah	▼
Alta View Hospital	--
American Fork Hospital	--
Ashley Regional Medical Center	--
Cache Valley Specialty Hospital	--
Castleview Hospital	--
Davis Hospital and Medical Center	●
Cedar City Hospital	--
Dixie Regional Medical Center	●
Intermountain Medical Center	●
Jordan Valley Hospital	●
Jordan Valley Hospital West Valley Campus	▲
Lakeview Hospital	●
LDS Hospital	●
Logan Regional Hospital	--

Hospital	CLABSIs
State of Utah	▼
McKay Dee Hospital	●
Mountain Point Medical Center	--
Mountain View Hospital	●
Mountain West Medical Center	--
Ogden Regional Medical Center	●
Primary Children's Hospital	●
Riverton Hospital	--
Salt Lake Regional Medical Center	●
St. Mark's Hospital	●
Timpanogos Regional Hospital	●
Uintah Basin Medical Center	--
University Hospital	▼
Utah Valley Hospital	▼

[+]Source: NHSN data

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Figure 2. Central line-associated bloodstream infections in newborn intensive care units in acute care facilities, Utah, 2015[+]

Hospital	CLABSIs
State of Utah	▼
Ashley Regional Medical Center	--
Davis Hospital and Medical Center	--
Dixie Regional Medical Center	--
Intermountain Medical Center	▼
Jordan Valley Hospital	--
Logan Regional Hospital	--
McKay-Dee Hospital	●
Ogden Regional Medical Center	--
Primary Children's Hospital	▼
St. Mark's Hospital	●
Timpanogos Regional Hospital	--
University Hospital	●
Utah Valley Regional Medical Center	▼

[+]Source: NHSN data

Figure 3. Central line-associated bloodstream infections in long-term acute care facilities, Utah, 2015[+]

Hospital	CLABSIs
State of Utah	●
Landmark Hospital	●
Promise Hospital	▼
Specialty Hospital of Utah	●
Utah Valley Specialty Hospital	●

[+]Source: NHSN data

▼ Statistically **FEWER** infections than national baseline
● Not statistically different from national baseline
▲ Statistically **MORE** infections than national baseline
-- Facilities had insufficient data to reliably compare their data to the standard population

Figure 4. Central-line-associated bloodstream infections in inpatient non-intensive care locations in acute care facilities, Utah, 2015[+]

Hospital	CLABSIs
State of Utah	▼
Alta View Hospital	--
American Fork Hospital	●
Ashley Regional Medical Center	--
Bear River Valley Hospital	--
Beaver Valley Hospital	--
Brigham City Community Hospital	--
Cache Valley Specialty Hospital	--
Castleview Hospital	--
Cedar City Hospital	--
Davis Hospital and Medical Center	--
Delta Community Hospital	--
Dixie Regional Medical Center	▼
Fillmore Community Hospital	--
Garfield Memorial Hospital	--
Intermountain Medical Center	●
Jordan Valley Hospital	--
Jordan Valley Hospital West Valley Campus	--
Lakeview Hospital	--
LDS Hospital	●
Logan Regional Hospital	--
Lone Peak Hospital	--
McKay Dee Hospital	--
Mountain Point Medical Center	--
Mountain View Hospital	--
Mountain West Medical Center	--
Ogden Regional Medical Center	●
Orem Community Hospital	--
Park City Hospital	--
Primary Children's Hospital	▼
Riverton Hospital	--
Sanpete Valley Hospital	--
Sevier Valley Hospital	--
St. Mark's Hospital	●
Timpanogos Regional Hospital	--
Uintah Basin Medical Center	--
University Hospital	●
Utah Valley Hospital	▼

[+]Source: NHSN data

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Catheter-associated Urinary Tract Infections (CAUTIs)

A urinary tract infection (UTI) is an infection that can happen anywhere along the urinary tract, including the kidneys, ureters, urinary bladder, and the urethra. A UTI that occurs in a patient or resident with a catheter is known as a catheter-associated UTI (CAUTI).

CAUTI data for 2015 were reported by long-term acute care facilities for all inpatients, and acute care facilities for all admitted to an adult, pediatric and neonatal intensive care unit, or adult or pediatric medical, surgical, or medical/surgical wards. Numbers of CAUTI infections reported by Utah facilities significantly decreased in 2015 as compared to previous years' data. Reduced reported CAUTI incidence may reflect prevention activities implemented by facilities and may be due to changes in CAUTI NHSN surveillance definitions as of 2015.

In 2015, 92 ICU-related CAUTIs were reported in Utah acute care facilities and associated with 60,201 catheter days. Compared to the national baseline, one of Utah's acute care facilities had significantly fewer CAUTIs in 2015 than would have been predicted. Twenty-seven facilities met the criteria for required CAUTI reporting. Of these 27, 15 acute care facilities had CAUTI rates not significantly different from expected national rates; one facility had significantly higher infections compared to what was expected nationally. Ten acute care facilities did not have enough catheter days to provide an accurate assessment of their performance (Figure 5).

Fourteen CAUTIs were reported in Utah inpatient rehabilitation facilities (IRFs) and associated with 4,359 catheter days. Compared to the national baseline, none of Utah's IRFs had significantly fewer CAUTIs in 2015 than would have been predicted. Eleven IRFs met the criteria for required CAUTI reporting. Of these 11, four IRFs had CAUTI rates not significantly different from expected national rates; two IRFs had significantly higher infections compared to what was expected nationally. Five IRFs did not have enough catheter days to provide an accurate assessment of their performance (Figure 6).

Sixteen CAUTIs were reported in Utah long-term acute care facilities (LTACs) and associated with 13,349 catheter days. Compared to the national baseline, none of Utah's LTACs had significantly fewer CAUTIs in 2015 than would have been predicted. Four facilities met the criteria for required CAUTI reporting, and all four LTACs had CAUTI rates not significantly different to what was expected nationally (Figure 7).

Among inpatient non-intensive care locations in acute care facilities, 91 CAUTIs were reported and associated with 61,190 catheter days. Thirty-seven facilities met the criteria for required CAUTI reporting. Compared to the national baseline, none of Utah's facilities had significantly fewer CAUTIs in 2015 than would have been predicted. Of the 37 facilities, 21 facilities had CAUTI infections not significantly different from was expected nationally; one facility had

significantly higher infections compared to what was expected nationally. Fifteen facilities did not have enough catheter days to provide an accurate assessment of their performance (Figure 8).

Figure 5. Catheter-associated urinary tract infections in adult and pediatric intensive care units in acute care facilities, Utah, 2015[+]

Hospital	CAUTIs
State of Utah	▼
Alta View Hospital	--
American Fork Hospital	--
Ashley Regional Medical Center	--
Cache Valley Hospital	--
Castleview Hospital	--
Cedar City Hospital	--
Davis Hospital and Medical Center	●
Dixie Regional Medical Center	●
Intermountain Medical Center	▲
Jordan Valley Hospital	●
Jordan Valley Hospital West Valley Campus	●
Lakeview Hospital	●
LDS Hospital	●
Logan Regional Hospital	●
McKay Dee Hospital	●
Mountain Point Medical Center	--
Mountain View Hospital	●
Mountain West Medical Center	--
Ogden Regional Medical Center	●
Primary Children's Hospital	●
Riverton Hospital	--
Salt Lake Regional Medical Center	●
St. Mark's Hospital	●
Timpanogos Regional Hospital	●
Uintah Basin Medical Center	--
University Hospital	▼
Utah Valley Hospital	●

[+]Source: NHSN data

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Figure 6. Catheter-associated urinary tract infections in in-patient rehabilitation facilities, Utah, 2015[+]

Hospital	CAUTIs
State of Utah	●
Davis Hospital and Medical Center	--
Dixie Regional Medical Center	●
Health South Rehabilitation Hospital of Utah	●
Intermountain Medical Center	▲
Jordan Valley Hospital	--
McKay Dee Hospital	--
Northern Utah Rehabilitation Hospital	●
Salt Lake Regional Medical Center	--
St. Mark's Hospital	--
University Hospital	▲
Utah Valley Hospital	●

[+]Source: NHSN data

Figure 7. Catheter-associated urinary tract infections in long-term acute care facilities, Utah, 2015[+]

Hospital	CAUTIs
State of Utah	▼
Landmark Hospital	●
Promise Hospital	●
Specialty Hospital of Utah	●
Utah Valley Specialty Hospital	●

[+]Source: NHSN data

▼ Statistically **FEWER** infections than national baseline
● Not statistically different from national baseline
▲ Statistically **MORE** infections than national baseline
-- Facilities had insufficient data to reliably compare their data to the standard population

Figure 8. Catheter-associated urinary tract infections in inpatient non-intensive care locations in acute care facilities, Utah, 2015[+]

Hospital	CAUTIs
State of Utah	●
Alta View Hospital	●
American Fork Hospital	●
Ashley Regional Medical Center	--
Bear River Valley Hospital	--
Beaver Valley Hospital	--
Brigham City Community Hospital	--
Cache Valley Specialty Hospital	●
Castleview Hospital	●
Cedar City Hospital	●
Davis Hospital and Medical Center	●
Delta Community Hospital	--
Dixie Regional Medical Center	●
Fillmore Community Hospital	--
Garfield Memorial Hospital	--
Intermountain Medical Center	▲
Jordan Valley Hospital	▼
Jordan Valley Hospital West Valley Campus	●
Lakeview Hospital	●
LDS Hospital	●

Hospital	CAUTIs
State of Utah	●
Logan Regional Hospital	●
Lone Peak Hospital	--
McKay-Dee Hospital	●
Mountain Point Medical Center	--
Mountain View Hospital	●
Mountain West Medical Center	--
Ogden Regional Medical Center	●
Orem Community Hospital	--
Park City Hospital	--
Primary Children's Hospital	--
Riverton Hospital	●
Salt Lake Regional Medical Center	▼
Sanpete Valley Hospital	--
Sevier Valley Hospital	--
St. Mark's Hospital	●
Timpanogos Regional Hospital	●
Uintah Basin Medical Center	●
University Hospital	●
Utah Valley Hospital	●

[+]Source: NHSN data

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Surgical Site Infections (SSIs)

A surgical site infection is an infection that occurs after surgery in the part of the body where the surgery took place. Surgical site infections can sometimes be superficial infections involving the skin only. Other surgical site infections are more serious and can involve tissues under the skin, organs, or implanted material. Surgical site infections are the most common and most costly HAI in the United States (160,000-300,000 SSIs per year).[10] The two SSI types required for reporting in Utah are those following colon surgeries and abdominal hysterectomy surgeries.

Colon Surgeries

Colon surgery is an operation performed on the large intestine. The colon (the large bowel or large intestine) is the tube-like part of the digestive tract that stores stool and pushes it out from the body. Colon surgery is often the main treatment for earlier stage colon cancers. It is also performed to repair damage to the colon or treat diseases such as diverticulitis and inflammatory bowel disease.

Colon surgical data for 2015 were reported only by acute care facilities. NHSN surveillance definitions accommodate for patient risk factors for surgical site infections after associated colon surgery.

In 2015, 123 SSIs associated with colon surgeries were reported in Utah and associated with 2,195 colon surgeries. Compared to the national baseline, one facility had significantly fewer SSIs associated with colon surgeries in 2015 than would have been predicted. Thirty-one facilities met the criteria for required reporting of SSIs associated with colon surgeries. Of these 31, 16 facilities had infection rates not statistically significant from what was expected nationally; two facilities had significantly higher infection rates. Twelve facilities did not have enough data to provide an accurate assessment of their performance (Figure 9).

The selection of healthcare-associated infection validation activities are guided by the Utah Healthcare Infection Prevention Governance Committee (UHIP GC). Because colon surgeries had higher than expected infections in Utah during 2014, colon surgeries performed during 2015 were targeted for validation. Validation activities identified 13 additional colon surgical site infections among the 10 facilities selected for validation. The UDOH Validation Team requested that facilities' infection preventionists enter these newly identified infections in the NHSN database to more accurately reflect number of infections in Utah.

UDOH continues to work with healthcare facilities to implement prevention strategies for reducing surgical site infections associated with colon surgeries by disseminating evidence-based recommended practices. The UDOH HAI Program continues to provide educational opportunities with regard to correctly applying NHSN definitions when performing colon surgical site infection surveillance.

Figure 9. Surgical site infections associated with colon surgeries in acute care facilities, Utah, 2015[+]

Hospital	Colon SSIs
State of Utah	●
Alta View Hospital	●
American Fork Hospital	●
Ashley Regional Medical Center	--
Bear River Valley Hospital	--
Brigham City Community Hospital	--
Cache Valley Specialty Hospital	--
Castleview Hospital	●
Cedar City Hospital	●
Davis Hospital and Medical Center	●
Dixie Regional Medical Center	▼
Intermountain Medical Center	●
Jordan Valley Hospital	▲
Jordan Valley Hospital West Valley Campus	--
Lakeview Hospital	●
LDS Hospital	●
Logan Regional Hospital	●
Lone Peak Hospital	--
McKay-Dee Hospital	▲
Mountain Point Medical Center	--
Mountain View Hospital	--
Mountain West Medical Center	--
Ogden Regional Medical Center	●
Park City Hospital	--
Primary Children's Hospital	●
Riverton Hospital	●
Salt Lake Regional Medical Center	--
Sevier Valley Hospital	--
St. Mark's Hospital	●
Timpanogos Regional Hospital	●
Uintah Basin Medical Center	--
University Hospital	●
Utah Valley Hospital	●

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

[+]Source: NHSN data

Abdominal Hysterectomy Surgeries

An abdominal hysterectomy is a surgical procedure in which the uterus is detached from the body through an abdominal incision. This operation is most commonly used when the uterus is enlarged, the ovaries and fallopian tubes are being removed, or when disease has spread to the pelvic cavity as in endometriosis or cancer. The most common complications following a hysterectomy are fever and infection.

Abdominal hysterectomy surgical data for 2015 were reported only by acute care facilities. NHSN surveillance definitions accommodate for patient risk factors associated with surgical site infection after abdominal hysterectomy.

In 2015, 57 SSIs associated with abdominal hysterectomies were reported in Utah and associated with 2,953 abdominal hysterectomy surgeries. Compared to the national baseline, none of Utah's facilities had significantly fewer SSIs associated with abdominal hysterectomies in 2015 than would have been predicted. Twenty-nine facilities met the criteria for required reporting of SSIs associated with abdominal hysterectomies. Of these 29, nine facilities had infections not statistically significant from what was expected nationally; two facilities had significantly higher infections compared to what was expected nationally. Eighteen facilities did not have enough data to provide an accurate assessment of their performance (Figure 10).

Figure 10. Surgical site infections associated with abdominal hysterectomy surgeries in acute care facilities, Utah, 2015[+]

Hospital	Abdominal hysterectomy SSIs
State of Utah	○
Alta View Hospital	--
American Fork Hospital	--
Ashley Regional Medical Center	--
Brigham City Community Hospital	○
Castleview Hospital	--
Cedar City Hospital	--
Davis Hospital and Medical Center	○
Dixie Regional Medical Center	--
Intermountain Medical Center	▲
Jordan Valley Hospital	--
Jordan Valley Hospital West Valley Campus	--
Lakeview Hospital	--
LDS Hospital	○
Logan Regional Hospital	--
Lone Peak Hospital	--
McKay-Dee Hospital	○
Mountain Point Medical Center	--
Mountain View Hospital	--
Mountain West Medical Center	--
Ogden Regional Medical Center	○
Orem Community Hospital	--
Park City Hospital	--
Primary Children's Hospital	--
Riverton Hospital	○
Salt Lake Regional Medical Center	--
Sevier Valley Medical Center	--
St. Mark's Hospital	○
Timpanogos Regional Hospital	○
Uintah Basin Medical Center	--
University Hospital	▲
Utah Valley Hospital	○

▼ Statistically **FEWER** infections than national baseline

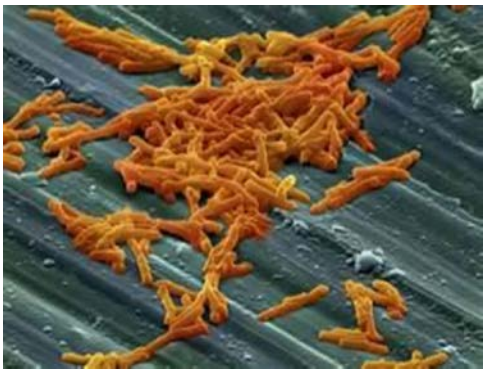
○ Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

[+]Source: NHSN data

Clostridium difficile Infections



Most cases of *C. difficile* infections occur in patients taking antibiotics. The elderly and people with certain medical problems have the greatest chance of acquiring *C. difficile*. *C. difficile* can live outside the human body for a very long time and may be found on things in the environment such as bed linens, bed rails, bathroom fixtures, and medical equipment. *C. difficile* infections can spread from person-to-person on contaminated equipment and on the hands of doctors, nurses, other healthcare providers, and visitors.

C. difficile causes at least 250,000 hospitalizations and 14,000 deaths every year, and was recently categorized by CDC as an urgent threat to patient safety.[7]

In 2015, 526 hospital onset *C. difficile* infections were reported in Utah acute care facilities. Compared to the national baseline, two of the Utah facilities had significantly fewer *C. difficile* infections in 2015 than would have been predicted. Thirty-seven facilities met the criteria for required reporting of *C. difficile* infections. Of these thirty-seven, 29 facilities had infections not statistically significant from what was expected nationally. None of Utah's facilities had significantly higher infections compared to what was expected nationally. Six facilities did not have enough data to provide an accurate assessment of their performance (Figure 11).

Figure 11. *C. difficile* infections in acute care facilities, Utah, 2015[+]

Hospital	*C. difficile*
State of Utah	▼
Alta View Hospital	●
American Fork Hospital	●
Ashley Regional Medical Center	●
Bear River Valley Hospital	--
Beaver Valley Hospital	--
Brigham City Community Hospital	●
Cache Valley Specialty Hospital	--
Castleview Hospital	●
Cedar City Hospital	●
Davis Hospital and Medical Center	●
Dixie Regional Medical Center	●
Garfield Memorial Hospital	--
Intermountain Medical Center	●
Jordan Valley Hospital	●
Jordan Valley Hospital West Valley Campus	●
Lakeview Hospital	●
LDS Hospital	●
Logan Regional Hospital	●
Lone Peak Hospital	●
McKay-Dee Hospital	▼
Mountain Point Medical Center	--
Mountain View Hospital	●
Mountain West Medical Center	●
Ogden Regional Medical Center	●
Orem Community Hospital	●
Park City Hospital	●
Primary Children's Hospital	●
Riverton Hospital	▼
Salt Lake Regional Medical Center	●
Sanpete Valley Hospital	--
Sevier Valley Hospital	●
St. Mark's Hospital	●
The Orthopedic Specialty Hospital	●
Timpanogos Regional Hospital	●
Uintah Basin Medical Center	●
University Hospital	●
Utah Valley Hospital	●

▼ Statistically **FEWER** infections than national baseline

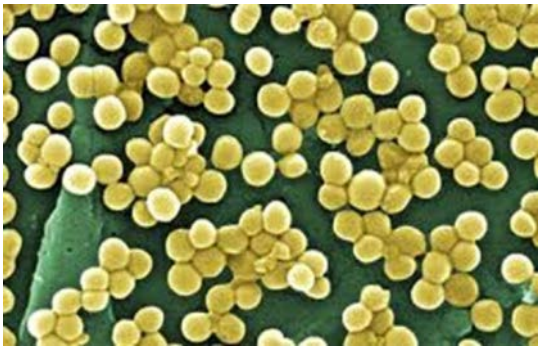
● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

[+]Source: NHSN data

Methicillin-resistant *Staphylococcus aureus* (MRSA) Bacteremia Infections



MRSA is usually spread by direct contact with an infected wound or from contaminated hands, usually those of health care providers. Bacteremia occurs when bacteria enter the bloodstream. This may occur through a wound or infection, or through a surgical procedure or injection. Bacteremia may cause no symptoms and resolve without treatment, or it may produce fever and other symptoms of infection. In some cases, bacteremia leads to septic shock, a potentially life-threatening condition.

Some studies comparing patients with Methicillin-sensitive *Staphylococcus aureus* (MSSA) bacteremia to those with MRSA bacteremia have reported nearly twice the mortality rate, significantly longer hospital stays, and significantly higher median hospital costs for MRSA.[11]

In 2015, 32 MRSA bacteremia infections were reported in Utah. Compared to the national baseline, one of Utah's facilities had significantly fewer MRSA bacteremia infections in 2015 than would have been predicted. Thirty-seven facilities met the criteria for required reporting of MRSA bacteremia infections. Of these 37, eight facilities had infections not statistically significant from what was expected nationally. Twenty-eight facilities did not have enough data to provide an accurate assessment of their performance. (Figure 12).

Figure 12. Methicillin-resistant *Staphylococcus aureus* bacteremia in acute care facilities, Utah, 2015[+]

Hospital	MRSA
State of Utah	▼
Alta View Hospital	--
American Fork Hospital	--
Ashley Regional Medical Center	--
Bear River Valley Hospital	--
Beaver Valley Hospital	--
Brigham City Community Hospital	--
Cache Valley Specialty Hospital	--
Castleview Hospital	--
Cedar City Hospital	--
Davis Hospital and Medical Center	--
Dixie Regional Medical Center	●
Garfield Memorial Hospital	--
Intermountain Medical Center	●
Jordan Valley Hospital	--
Jordan Valley Hospital West Valley Campus	--
Lakeview Hospital	--
LDS Hospital	●
Logan Regional Hospital	--
Lone Peak Hospital	--

Hospital	MRSA
State of Utah	▼
McKay Dee Hospital	●
Mountain Point Medical Center	--
Mountain View Hospital	--
Mountain West Medical Center	--
Ogden Regional Medical Center	●
Orem Community Hospital	--
Park City Hospital	--
Primary Children's Hospital	▼
Riverton Hospital	--
Salt Lake Regional Medical Center	--
Sanpete Valley Hospital	--
Sevier Valley Hospital	--
St. Mark's Hospital	●
The Orthopedic Specialty Hospital	--
Timpanogos Regional Hospital	--
Uintah Basin Medical Center	--
University Hospital	●
Utah Valley Hospital	●

[+]Source: NHSN data

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national rate

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Dialysis Infection Events

The kidneys perform several critical functions. They clean blood, remove excess fluid from the body, and produce hormones needed for other important bodily functions. When the kidneys are unable to perform these functions, they can fail, resulting in the need for hemodialysis, the process of filtering the waste products collected in the blood. Bloodstream and other types of infections are a leading cause of death among hemodialysis patients, second only to vascular disease.

Dialysis facilities are required to report the number of patients requiring initiation of intravenous antimicrobial therapy, the number of patients with laboratory results indicating infection in their bloodstream, and patients with signs and symptoms of vascular access infections (i.e., redness, swelling, and/or pus), as well as an estimated number of patients at risk for these events.

In 2015, 37 outpatient dialysis facilities in Utah met the criteria for required reporting. There are currently insufficient data to establish a national comparison. When there is sufficient information that can be deemed reliable, it will be contained in future reports.

Data Quality Validation

Background

The Utah Department of Health (UDOH) is required under Utah Title 26-6-31, Public Reporting of Healthcare Associated Infections, to validate reported data. Due to the continued higher number of surgical site infections after colon surgeries (COLO SSI) performed in Utah hospitals as compared to national baseline data, the Utah Healthcare Infection Prevention Governance Committee (UHIP GC) recommended validation of these reported infections.

The focus of these validation activities completed from May 16, 2016 through June 30, 2016 was to determine how NHSN COLO SSI surveillance definitions were interpreted and applied to data collection. The validations were performed by UDOH HAI Prevention Program staff in ten facilities throughout Utah. Four Utah facilities were chosen among those reporting higher than expected numbers of COLO SSI. The remaining six facilities selected for validation had significant differences between the number of actual COLO SSI reported in 2015 versus the expected number of COLO SSI calculated by the National Healthcare Safety Network (NHSN) based on the facility's colon surgical procedure volumes and case severity.

Validation activities are intended to compare reported information with audit findings and outcomes to enhance accuracy and completeness of COLO SSI reporting. A standardized validation method, as guided by NHSN, was chosen to serve as a test of proficiency in surveillance methods and accuracy in case findings.

Procedure

A full day on-site medical record audit was conducted at targeted facilities. An interview with infection prevention and control staff preceded the audit to determine surveillance methodology, including numerator (surgical site infection) and denominator (colon surgical procedures) collection methodology. In each facility, a sample size of up to 20 NHSN reported COLO SSI cases were reviewed. Additionally, 40 charts of patients who had a colon surgical procedure were reviewed to determine if any reportable infections were missed. A standardized audit tool developed by the CDC was used. Results of the validation findings were reviewed with the facility to provide immediate onsite education to improve HAI surveillance and reporting. Facilities were expected to correct data in NHSN based on validation findings.

Validation Key Findings

The accuracy and completeness of HAI surveillance and reporting can be calculated. These findings include sensitivity, specificity, and positive predictive value (PPV). Sensitivity answers the question, "How likely are patients with an infection accurately identified as having an infection?" Specificity answers the question, "How likely are patients without an infection

accurately identified as not having an infection?" The PPV is the proportion of HAIs reported that met the surveillance criteria accurately.

UDOH auditors reviewed 375 total colon surgical procedures from the ten facilities selected for validation. From these colon surgical procedures, auditors identified meeting 2015 NHSN criteria. From the 375 procedures reviewed, UDOH auditors identified 95 COLO SSI. Infection preventionists in these ten facilities had identified seventy-four of these infections prior to validation activities. UDOH auditors discovered that two of the reported infections did not meet NHSN COLO SSI surveillance definition. The positive predictive value reveals that the surveillance performed in these ten facilities identified COLO SSI meeting the NHSN surveillance criteria 97% of the time.

The UDOH auditors identified 23 additional COLO SSI than had been previously reported. The calculated sensitivity reveals that routine surveillance performed by these ten validated facilities identified 76% of the COLO SSI occurring. The calculated specificity reveals surveillance accurately "ruled out" COLO SSI 99% of the time.

Patients may experience superficial surgical site infections that only involve the skin and subcutaneous tissue of the surgical incision. Twenty-six superficial COLO SSI were identified during validation activities. Seven deep incisional COLO SSI (infections extending into the deep muscle layers) were identified; and 54 COLO SSI involving the organ space were identified.

It should be noted that results from these ten facilities may not be generalized to all facilities in the state. Also, because the audit sample was targeted and unweighted, aggregate findings are not necessarily indicative of NHSN data quality throughout the state.

Conclusions

Validation results indicate that numbers of COLO SSI are higher than initially indicated by reported surveillance data prior to validation activities. Some of the validated facilities' infection preventionists were not aware of prevention strategies used by their facility to decrease COLO SSI risk. Further work toward COLO SSI prevention is needed in Utah.

NHSN surgical site infections are not always dependent upon a positive microbiological culture; surveillance definitions also include signs and symptoms of a surgical site infection experienced by the patient. Most of the additional COLO SSIs identified by the UDOH auditors did not have a positive microbiological culture. Facilities with surveillance methodology dependent on a positive culture trigger missed some of these COLO SSI identified by the UDOH auditors during validation activities. All of the validated facilities use the International Statistical Classification of Diseases and Related Health Problems (ICD) to identify colon surgical procedures. Facilities used ICD Version 9 codes until the medical classification list was updated to ICD Version 10 in October 2015. UDOH auditors discovered nine procedures that did not meet colon surgical procedure criteria during validation activities. These findings were attributed to difficulties

encountered by facilities during the ICD update. Five of the ten validated facilities also review exploratory abdominal surgical procedures to determine if any of these procedures involved surgery to the large bowel and should be included in the COLO procedure list reported to NHSN.

Validation results demonstrate the need for a robust validation program to improve accuracy in all HAI reporting. It is important to determine whether infections are healthcare-associated or already present upon facility admission in order to implement appropriate infection prevention measures. Accurate HAI data supports facilities' efforts to implement effective infection prevention strategies.

Healthcare-associated Infections by Hospitals Reporting to NHSN

Alta View Hospital

Location: Salt Lake County

CAUTI

Intensive care	--
Inpatient non-intensive care	●

CLABSI

Intensive care	--
Inpatient non-intensive care	--

C. difficile infection

Hospital onset	●

MRSA bacteremia --

SSI

Abdominal hysterectomy	--
Colon surgery	●

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

American Fork Hospital

Location: Utah County

CAUTI

Intensive care	--
Inpatient non-intensive care	●

CLABSI

Intensive care	--
Inpatient non-intensive care	●

C. difficile infection

Hospital onset	●

MRSA bacteremia --

SSI

Abdominal hysterectomy	--
Colon surgery	●

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

Ashley Regional Medical Center

Location: Uintah County

CAUTI

Intensive care	--
Inpatient non-intensive care	--

CLABSI

Intensive care	--
Newborn intensive care	--
Inpatient non-intensive care	--

C. difficile infection

Hospital onset	●

MRSA bacteremia --

SSI

Abdominal hysterectomy	--
Colon surgery	--

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

Bear River Valley Hospital

Location: Box Elder County

CAUTI

Inpatient non-intensive care	--

CLABSI

Inpatient non-intensive care	--

C. difficile infection

Hospital onset	--

MRSA bacteremia --

SSI

Abdominal hysterectomy	--
Colon surgery	--

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

Beaver Valley Hospital

Location: Beaver County

CAUTI

Inpatient non-intensive care	--

CLABSI

Inpatient non-intensive care	--

C. difficile infection

Hospital onset	--

MRSA bacteremia --

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

Brigham City Community Hospital

Location: Box Elder County

CAUTI

Inpatient non-intensive care	--

CLABSI

Inpatient non-intensive care	--

C. difficile infection

Hospital onset	●

MRSA bacteremia --

SSI

Abdominal hysterectomy	●
Colon surgery	--

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

Cache Valley Hospital

Location: Cache County

CAUTI

Intensive care	●
Inpatient non-intensive care	●

CLABSI

Intensive care	--
Inpatient non-intensive care	--

C. difficile infection

Hospital onset	--

MRSA bacteremia --

SSI

Abdominal hysterectomy	▲
Colon surgery	--

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

Castleview Hospital

Location: Carbon County

CAUTI

Intensive care	--
Inpatient non-intensive care	●

CLABSI

Intensive care	--
Inpatient non-intensive care	--

C. difficile infection

Hospital onset	●

MRSA bacteremia --

SSI

Abdominal hysterectomy	--
Colon surgery	●

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

Cedar City Hospital

Location: Iron County

CAUTI

Intensive care	●
Inpatient non-intensive care	●

CLABSI

Intensive care	●
Inpatient non-intensive care	--

C. difficile infection

Hospital onset	●

MRSA bacteremia --

SSI

Abdominal hysterectomy	--
Colon surgery	●

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

Davis Hospital and Medical Center

Location: Davis County

CAUTI

Intensive care	●
Inpatient rehabilitation	--
Inpatient non-intensive care	●

CLABSI

Intensive care	●
Newborn intensive care	--
Inpatient non-intensive care	--

C. difficile infection

Hospital onset	●

MRSA bacteremia --

SSI

Abdominal hysterectomy	●
Colon surgery	●

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

Delta Community Hospital

Location: Millard County

CAUTI

Inpatient non-intensive care	--

CLABSI

Inpatient non-intensive care	--

C. difficile infection

Hospital onset	--

MRSA bacteremia --

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

Dixie Regional Medical Center

Location: Washington County

CAUTI

Intensive care	●
Inpatient rehabilitation	●
Inpatient non-intensive care	●

CLABSI

Intensive care	▼
Newborn intensive care	--
Inpatient non-intensive care	▼

C. difficile infection

Hospital onset	●

MRSA bacteremia ●

SSI

Abdominal hysterectomy	--
Colon surgery	▼

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

Fillmore Community Hospital

Location: Millard County

CAUTI

Inpatient non-intensive care	--

CLABSI

Inpatient non-intensive care	--

C. difficile infection

Hospital onset	--

MRSA bacteremia --

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

Garfield Memorial Hospital

Location: Garfield County

CAUTI

Inpatient non-intensive care	--

CLABSI

Inpatient non-intensive care	--

C. difficile infection

Hospital onset	--

MRSA bacteremia --

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

HealthSouth Rehabilitation Hospital of Utah

Location: Salt Lake County

CAUTI

Inpatient rehabilitation ●

CLABSI

Inpatient rehabilitation --

C. difficile infection

Hospital onset --

MRSA bacteremia --

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

Intermountain Medical Center

Location: Salt Lake County

CAUTI

Intensive care	▲
Inpatient rehabilitation	▲
Inpatient non-intensive care	▲

CLABSI

Intensive care	▼
Newborn intensive care	▼
Inpatient non-intensive care	●

C. difficile infection

Hospital onset	●

MRSA bacteremia ●

SSI

Abdominal hysterectomy	▲
Colon surgery	●

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

Jordan Valley Medical Center

Location: Salt Lake County

CAUTI

Intensive care	●
Inpatient rehabilitation	--
Inpatient non-intensive care	●

CLABSI

Intensive care	●
Newborn intensive care	--
Inpatient non-intensive care	--

C. difficile infection

Hospital onset	●

MRSA bacteremia --

SSI

Abdominal hysterectomy	--
Colon surgery	▲

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

Jordan Valley Medical Center West Valley Campus

Location: Salt Lake County

CAUTI

Intensive care	●
Inpatient non-intensive care	●

CLABSI

Intensive care	▲
Inpatient non-intensive care	--

C. difficile infection

Hospital onset	●

MRSA bacteremia --

SSI

Abdominal hysterectomy	--
Colon surgery	--

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

Lakeview Hospital

Location: Davis County

CAUTI

Intensive care	●
Inpatient non-intensive care	●

CLABSI

Intensive care	●
Inpatient non-intensive care	--

C. difficile infection

Hospital onset	●

MRSA bacteremia --

SSI

Abdominal hysterectomy	--
Colon surgery	●

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

Landmark Hospital

Location: Salt Lake County

CAUTI

CLABSI

C. difficile infection

Hospital onset --

MRSA bacteremia --

 Statistically **FEWER** infections than national baseline

 Not statistically different from national baseline

 Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

LDS Hospital

Location: Salt Lake County

CAUTI

- Intensive care
- Inpatient non-intensive care

CLABSI

- Intensive care
- Inpatient non-intensive care

C. difficile infection

- Hospital onset

MRSA bacteremia

SSI

- Abdominal hysterectomy
- Colon surgery

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

Logan Regional Hospital

Location: Cache County

CAUTI

Intensive care	●
Inpatient non-intensive care	●

CLABSI

Intensive care	●
Newborn intensive care	--
Inpatient non-intensive care	--

C. difficile infection

Hospital onset	●

MRSA bacteremia --

SSI

Abdominal hysterectomy	--
Colon surgery	●

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

Lone Peak Hospital

Location: Salt Lake County

CAUTI

Intensive care	--
Inpatient non-intensive care	--

CLABSI

Intensive care	--
Inpatient non-intensive care	--

C. difficile infection

Hospital onset	●

MRSA bacteremia --

SSI

Abdominal hysterectomy	--
Colon surgery	--

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

McKay Dee Hospital

Location: Weber County

CAUTI

Intensive care	●
Inpatient rehabilitation	--
Inpatient non-intensive care	●

CLABSI

Intensive care	●
Newborn intensive care	●
Inpatient non-intensive care	--

C. difficile infection

Hospital onset	▼

MRSA bacteremia ●

SSI

Abdominal hysterectomy	●
Colon surgery	▲

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

Mountain Point Medical Center

Location: Utah County

CAUTI

Intensive care	--
Inpatient non-intensive care	--

CLABSI

Intensive care	--
Inpatient non-intensive care	--

C. difficile infection

Hospital onset	--

MRSA bacteremia --

SSI

Abdominal hysterectomy	--
Colon surgery	--

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

Mountain View Hospital

Location: Utah County

CAUTI

Intensive care	●
Inpatient non-intensive care	●

CLABSI

Intensive care	●
Inpatient non-intensive care	--

C. difficile infection

Hospital onset	●

MRSA bacteremia --

SSI

Abdominal hysterectomy	--
Colon surgery	--

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

Mountain West Medical Center

Location: Tooele County

CAUTI

Intensive care	--
Inpatient non-intensive care	--

CLABSI

Intensive care	--
Inpatient non-intensive care	--

C. difficile infection

Hospital onset	●

MRSA bacteremia --

SSI

Abdominal hysterectomy	--
Colon surgery	--

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

Northern Utah Rehabilitation Hospital

Location: Weber County

CAUTI

Inpatient rehabilitation 

CLABSI

Inpatient rehabilitation --

C. difficile infection

Hospital onset --

MRSA bacteremia --

 Statistically **FEWER** infections than national baseline

 Not statistically different from national baseline

 Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

Ogden Regional Medical Center

Location: Weber County

CAUTI

Intensive care	●
Inpatient non-intensive care	●

CLABSI

Intensive care	●
Newborn intensive care	--
Inpatient non-intensive care	●

C. difficile infection

Hospital onset	●

MRSA bacteremia ●

SSI

Abdominal hysterectomy	●
Colon surgery	●

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

Orem Community Hospital

Location: Utah County

CAUTI

Inpatient non-intensive care	--

CLABSI

Inpatient non-intensive care	--

C. difficile infection

Hospital onset	●

MRSA bacteremia --

SSI

Abdominal hysterectomy	--

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

Park City Hospital

Location: Summit County

CAUTI

Inpatient non-intensive care	--

CLABSI

Inpatient non-intensive care	--

C. difficile infection

Hospital onset	●

MRSA bacteremia --

SSI

Abdominal hysterectomy	--
Colon surgery	--

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

Primary Children's Hospital

Location: Salt Lake County

CAUTI

Intensive care	●
Inpatient non-intensive care	--

CLABSI

Intensive care	▼
Newborn intensive care	▼
Inpatient non-intensive care	▼

C. difficile infection

Hospital onset	●

MRSA bacteremia ▼

SSI

Colon surgery	●

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

Promise Hospital

Location: Salt Lake County

CAUTI

CLABSI

C. difficile infection

Hospital onset --

MRSA bacteremia --

 Statistically **FEWER** infections than national baseline

 Not statistically different from national baseline

 Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

Riverton Hospital

Location: Salt Lake County

CAUTI

Intensive care	●
Inpatient non-intensive care	●

CLABSI

Intensive care	--
Inpatient non-intensive care	--

C. difficile infection

Hospital onset	▼

MRSA bacteremia --

SSI

Abdominal hysterectomy	●
Colon surgery	●

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

Salt Lake Regional Medical Center

Location: Salt Lake County

CAUTI

Intensive care	●
Inpatient rehabilitation	--

CLABSI

Intensive care	●

C. difficile infection

Hospital onset	●

MRSA bacteremia --

SSI

Abdominal hysterectomy	--
Colon surgery	--

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

Sanpete Valley Hospital

Location: Sanpete County

CAUTI

Inpatient non-intensive care --

CLABSI

Inpatient non-intensive care --

C. difficile infection

Hospital onset --

MRSA bacteremia --

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

Sevier Valley Hospital

Location: Sevier County

CAUTI

Inpatient non-intensive care	--

CLABSI

Inpatient non-intensive care	--

C. difficile infection

Hospital onset	○

MRSA bacteremia --

SSI

Abdominal hysterectomy	--
Colon surgery	--

▼ Statistically **FEWER** infections than national baseline

○ Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

Specialty Hospital of Utah

Location: Davis County

CAUTI

CLABSI

C. difficile infection

Hospital onset --

MRSA bacteremia --

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

St. Mark's Hospital

Location: Salt Lake County

CAUTI

Intensive care	●
Inpatient rehabilitation	--
Inpatient non-intensive care	●

CLABSI

Intensive care	●
Newborn intensive care	●
Inpatient non-intensive care	●

C. difficile infection

Hospital onset	●

MRSA bacteremia ●

SSI

Abdominal hysterectomy	●
Colon surgery	●

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

The Orthopedic Specialty Hospital

Location: Salt Lake County

C. difficile infection

Hospital onset 

MRSA bacteremia --

 Statistically **FEWER** infections than national baseline

 Not statistically different from national baseline

 Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

Timpanogos Regional Hospital

Location: Utah County

CAUTI

Intensive care	●
Inpatient non-intensive care	●

CLABSI

Intensive care	●
Newborn intensive care	--
Inpatient non-intensive care	--

C. difficile infection

Hospital onset	●

MRSA bacteremia --

SSI

Abdominal hysterectomy	●
Colon surgery	●

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

Uintah Basin Medical Center

Location: Duchesne County

CAUTI

Intensive care	--
Inpatient non-intensive care	●

CLABSI

Intensive care	--
Inpatient non-intensive care	--

C. difficile infection

Hospital onset	●

MRSA bacteremia --

SSI

Abdominal hysterectomy	--
Colon surgery	--

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

University Hospital

Location: Salt Lake County

CAUTI

Intensive care	●
Inpatient rehabilitation	▲
Inpatient non-intensive care	●

CLABSI

Intensive care	▼
Newborn intensive care	●
Inpatient non-intensive care	●

C. difficile infection

Hospital onset	●

MRSA bacteremia ●

SSI

Abdominal hysterectomy	▲
Colon surgery	●

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

Utah Valley Hospital

Location: Utah County

CAUTI

- Intensive care
- Inpatient rehabilitation
- Inpatient non-intensive care

CLABSI

- Intensive care
- Newborn intensive care
- Inpatient non-intensive care

C. difficile infection

- Hospital onset

MRSA bacteremia

SSI

- Abdominal hysterectomy
- Colon surgery

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

Utah Valley Specialty Hospital

Location: Utah County

CAUTI

CLABSI

C. difficile infection

Hospital onset --

MRSA bacteremia --

▼ Statistically **FEWER** infections than national baseline

● Not statistically different from national baseline

▲ Statistically **MORE** infections than national baseline

-- Facilities had insufficient data to reliably compare their data to the standard population

Source: NHSN

Appendix A

Understanding CLABSI and CAUTI Standardized Infection Ratio Data in Acute Care Facilities with Intensive Care Units

The device infection event tables depict specific device-associated infections (central line-associated bloodstream infections [CLABSI] or catheter-associated urinary tract infections [CAUTI]) reported by acute care facilities within their intensive care units.

To understand the HAI report, it is important to know the meaning of each of the data elements in the table. Below is an example of a fictitious hospital's data. Each column is numbered and provides an explanation of each data element and its result.

Table A. Device infection events in acute care facilities with intensive care units, Utah, 2015

	Number of HAI device days[1]	Number of HAI device events[2]	Predicted number of HAI device events[3]	Standardized Infection Ratio[4]	95% Confidence Interval[5]
State of Utah	#	#	#	#	#
Facility A	5,817	8	13	.62	0.26-1.21
	1	2	3	4	5	6

1. Acute care facilities (hospitals) with intensive care units (ICU) are listed here by name (Facility A).
2. For each reporting facility listed, patients in ICUs with central line catheters/urinary catheters (devices) are identified every day. A device count is performed at the same time each day. Each patient with one or more central line catheters at the time the count is performed is counted as having one device day. Each patient with a urinary catheter at the time the count is performed is counted as having one device day. For example, a patient with one or more central line catheters and one urinary catheter would be counted as having one central line day and one urinary catheter day. The number of device days in this column (5,817) represents the total number of specific device days for all patients who were in Facility A's intensive care unit(s) during the year.
3. When a patient develops an HAI device-associated infection while having a device in place or within one day after removal of the device, the infection is considered a device-associated HAI if it meets the criteria set forth by NHSN. The number of HAI events in this column (8) represents the total number of specific HAIs identified in patients in Facility A's intensive care units during the year.
4. The predicted number of HAI device events is adjusted to allow facilities to be more fairly compared. Risk adjustments account for differences in patient populations in terms of severity of illness and other factors that may affect the risk of developing an HAI. A facility that uses many devices on very sick patients would be predicted to have a higher device infection rate than a facility that uses fewer devices and has healthier patients. The predicted number of HAI device events for Facility A, based on comparison to a national HAI benchmark of similar hospitals, is calculated as 13.

5. The standardized infection ratio (SIR) is a summary measure developed by NHSN to track HAIs at the national, state, local, or facility level over time. The SIR compares the *total* number of HAI device events for Facility A (8) to the *predicted* number of HAI device events (13), based on "standard population" data. For purposes of this report, the standard population is HAI data reported nationally by thousands of facilities using NHSN. The SIR for Facility A, based on comparison to a national HAI benchmark of facilities that are similar to Facility A, is calculated as 0.62. Facilities with a predicted number of HAI events less than one do not have enough device day data to reliably compare their data to the standard population. Consequently, SIRs are not provided for health care facilities with a predicted number less than one.
6. A confidence interval (CI) will be provided if a SIR was estimated for a given healthcare facility. A CI describes the uncertainty associated with the SIR estimate. Facilities with more device days will have a narrower CI, which means there is less doubt associated with the accuracy of the SIR compared to facilities with fewer device days. This is because there is more information about a facility's performance with additional device days. A 95% CI means that 95 times out of 100, the true value would be expected to fall within the range shown.

Table 1. Central line-associated bloodstream infections in adult and pediatric intensive care units in acute care facilities, Utah, 2015+

	Number of central line days[1]	Number of CLABSI events[2]	Predicted number of CLABSI events[3]	Standardized Infection Ratio[4]	95% Confidence Interval[5]
State of Utah	**51,398**	**48**	**100.46**	**0.48**	**0.36 - 0.63**
Alta View Hospital	120	0	0.23	N/A±	N/A±
American Fork Hospital	627	0	0.94	0.00	0 - 1.45
Ashley Regional Medical Center	67	0	0.10	N/A±	N/A±
Cache Valley Hospital	4	0	0.006	N/A±	N/A±
Castleview Hospital	20	0	0.03	N/A±	N/A±
Cedar City Hospital	227	0	0.4313	N/A±	N/A±
Davis Hospital & Medical Center	1,021	0	1.5315	0.00	0.00, 1.956
Dixie Regional Medical Center	3,290	2	4.94	0.41	0.07 - 1.34
Intermountain Medical Center	9,205	10	16.53	0.605	0.307, 1.078
Jordan Valley Hospital	784	2	1.18	1.70	0.29 - 5.62
Jordan Valley Hospital West Valley Campus	861	5	1.29	3.87	1.42 - 8.58
Lakeview Hospital	713	0	1.35	0.00	0.00 - 2.21
LDS Hospital	1,032	3	1.55	1.94	0.49 - 5.27
Logan Regional Hospital	434	1	0.82	N/A±	N/A±
McKay Dee Hospital	2,357	1	3.54	0.28	0.01 - 1.40
Mountain Point Medical Center	81	0	0.12	N/A±	N/A±
Mountain View Hospital	760	0	1.14	0.00	0.00 - 2.63
Mountain West Medical Center	75	0	0.14	N/A±	N/A±
Ogden Regional Medical Center	1,764	2	2.65	0.76	0.13 - 2.50
Primary Children's Hospital	4,040	7	12.80	0.55	0.24 - 1.08
Riverton Hospital	103	0	0.15	N/A±	N/A±
Salt Lake Regional Medical Center	2,208	2	3.31	0.60	0.10 - 1.99
St. Mark's Hospital	2,079	4	3.12	1.28	0.41 - 3.09
Timpanogos Regional Hospital	941	2	1.80	1.11	0.19 - 3.68
Uintah Basin Medical Center	77	0	0.12	N/A±	N/A±
University Hospital§	11,545	7	30.34	0.23	0.10 - 0.46
Utah Valley Hospital	6,963	0	10.31	0.00	0.00 - 0.29

+Source: NHSN data.

See footnotes on page 82.

Table 2. Central line-associated bloodstream infections in inpatient non-intensive care locations in acute care facilities, Utah, 2015+

	Number of central line days[1]	Number of CLABSI events[2]	Predicted number of CLABSI events[3]	Standardized Infection Ratio[4]	95% Confidence Interval[5]
State of Utah	**40,634**	**28**	**56.08**	**0.50**	**0.34 - 0.71**
Alta View Hospital	204	0	0.24	N/A±	N/A±
American Fork Hospital	939	0	1.13	0.00	0.00 - 2.66
Ashley Regional Medical Center	83	1	0.10	N/A±	N/A±
Bear River Valley Hospital	10	0	0.01	N/A±	N/A±
Beaver Valley Hospital	16	0	0.02	N/A±	N/A±
Brigham City Community Hospital	48	0	0.06	N/A±	N/A±
Cache Valley Hospital	116	0	0.16	N/A±	N/A±
Castleview Hospital	230	0	0.28	N/A±	N/A±
Cedar City Hospital	575	1	0.69	N/A±	N/A±
Davis Hospital & Medical Center	417	0	0.61	N/A±	N/A±
Delta Community Hospital	29	0	0.03	N/A±	N/A±
Dixie Regional Medical Center	4,443	0	6.10	0.00	0.00 -0.49
Fillmore Community Hospital	32	0	0.04	N/A±	N/A±
Garfield Memorial Hospital	56	0	0.07	N/A±	N/A±
Intermountain Medical Center	9,570	9	12.95	0.70	0.34 - 1.28
Jordan Valley Hospital	439	0	0.53		
Jordan Valley Hospital West Valley Campus	365	0	0.44	N/A±	N/A±
Lakeview Hospital	418	0	0.50		
LDS Hospital	1,829	3	2.66	1.13	0.29 -3.07
Logan Regional Hospital	570	0	0.84	N/A±	N/A±
Lone Peak Hospital	30	0	0.04	N/A±	N/A±
McKay Dee Hospital	435	0	0.65	N/A±	N/A±
Mountain Point Medical Center	10	0	0.01	N/A±	N/A±
Mountain View Hospital	373	0	0.45	N/A±	N/A±
Mountain West Medical Center	73	0	0.09	N/A±	N/A±
Ogden Regional Medical Center	1,739	3	2.53	1.18	0.30 - 3.22
Orem Community Hospital	5	0	0.01	N/A±	N/A±
Park City Hospital	129	1	0.15	N/A±	N/A±
Primary Children's Hospital	2,162	0	3.89	0.00	0.00 - 0.77
Riverton Hospital	399	0	0.48	N/A±	N/A±
Sanpete Valley Hospital	81	0	0.10	N/A±	N/A±
Sevier Valley Hospital	167	0	0.20	N/A±	N/A±
St. Mark's Hospital	865	1	1.04	0.96	0.05 - 4.75
Timpanogos Regional Hospital	540	0	0.80	N/A±	N/A±
Uintah Basin Medical Center	206	0	0.25	N/A±	N/A±
University Hospital§	8,891	9	12.1973	0.74	0.36 - 1.35
Utah Valley Hospital	4,140	0	5.7618	0.00	0.00 - 0.52

+Source: NHSN data.

See footnotes on page 82.

Table 3. Central line-associated bloodstream infections in newborn intensive care units in acute care facilities, Utah, 2015[+]

	Number of central line days[1]	Number of CLABSI events[2]	Predicted number of CLABSI events[3]	Standardized Infection Ratio[4]	95% Confidence Interval[5]
State of Utah	**17,255**	**15**	**36.68**	**0.41**	**0.24 - 0.66**
Ashley Regional Medical Center	3	0	0.01	N/A±	N/A±
Davis Hospital & Medical Center	122	0	0.24	N/A±	N/A±
Dixie Regional Medical Center	427	0	0.81	N/A±	N/A±
Intermountain Medical Center	2,053	0	4.96	0.00	0 - 0.61
Jordan Valley Hospital	572	1	0.81	N/A±	N/A±
Logan Regional Hospital	194	0	0.25	N/A±	N/A±
McKay Dee Hospital	707	0	1.66	0.00	0 - 1.81
Ogden Regional Medical Center	196	0	0.41	N/A±	N/A±
Primary Children's Hospital	6,749	7	14.20	0.49	0.22 - 0.98
St. Mark's Hospital	679	3	1.39	2.16	0.55 - 5.88
Timpanogos Regional Hospital	662	1	0.96	N/A±	N/A±
University Hospital[§]	1,954	3	4.52	0.66	0.17 - 1.81
Utah Valley Hospital	2,937	0	6.47	0.00	0 - 0.46

[+]Source: NHSN data.

See footnotes on page 82.

Table 4. Catheter-associated urinary tract infections in adult and pediatric intensive care units in acute care facilities, Utah, 2015[+]

	Number of catheter days[1]	Number of CAUTI events[2]	Predicted number of CAUTI events[3]	Standardized Infection Ratio[4]	95% Confidence Interval
State of Utah	**60,201**	**92**	**115.33**	**0.80**	**0.65 - 0.97**
Alta View Hospital	256	0	0.51	N/A±	N/A±
American Fork Hospital	596	0	0.77	N/A±	N/A±
Ashley Regional Medical Center	186	0	0.24	N/A±	N/A±
Cache Valley Hospital	1	0	0.00	N/A±	N/A±
Castleview Hospital	126	0	0.16	N/A±	N/A±
Cedar City Hospital	378	0	0.76	N/A±	N/A±
Davis Hospital & Medical Center	1,499	1	1.95	0.51	0.03 - 2.53
Dixie Regional Medical Center	3,969	4	4.76	0.84	0.27 – 2.02
Intermountain Medical Center	10,864	44	25.64	1.72	1.26 - 2.28
Jordan Valley Hospital	1,323	0	1.59	0.00	0.00 - 1.89
Jordan Valley Hospital West Valley Campus	1,402	1	1.82	0.55	0.03 - 2.71
Lakeview Hospital	867	0	1.73	0.00	0.00 - 1.73
LDS Hospital	1,407	1	1.69	0.59	0.03 - 2.92
Logan Regional Hospital	807	1	1.61	0.62	0.03 - 3.06
McKay Dee Hospital	3,045	2	3.65	0.55	0.09 - 1.81
Mountain Point Medical Center	171	0	0.22	N/A±	N/A±
Mountain View Hospital	899	1	1.17	0.86	0.04 - 4.22
Mountain West Medical Center	185	0	0.37	N/A±	N/A±
Ogden Regional Medical Center	2,196	1	2.85	0.35	0.02 - 1.73
Primary Children's Hospital	1,775	6	4.90	1.23	0.50 - 2.55
Riverton Hospital	197	0	0.26	N/A±	N/A±
Salt Lake Regional Medical Center	2,149	0	2.58	0.00	0.00 - 1.16
St. Mark's Hospital	3,551	2	4.26	0.47	0.08 - 1.55
Timpanogos Regional Hospital	1,176	0	2.35	0.00	0.00 - 1.27
Uintah Basin Medical Center	185	0	0.24	N/A±	N/A±
University Hospital[§]	12,940	22	38.84	0.57	0.36 - 0.84
Utah Valley Hospital	8,051	6	10.39	0.58	0.23 - 1.20

[+]Source: NHSN data

See footnotes on page 83.

Table 5. Catheter-associated urinary tract infections in inpatient non-intensive care locations in acute care facilities, Utah, 2015+

	Number of catheter days[1]	Number of CAUTI events[2]	Predicted number of CAUTI events[3]	Standardized Infection Ratio[4]	95% Confidence Interval
State of Utah	**61,190**	**91**	**102.83**	**0.89**	**0.72 - 1.09**
Alta View Hospital	1,225	1	1.96	0.51	0.03 - 2.52
American Fork Hospital	1,314	0	2.07	0.00	0.00 - 1.45
Ashley Regional Medical Center	366	3	0.59	N/A±	N/A±
Bear River Valley Hospital	90	0	0.14	N/A±	N/A±
Beaver Valley Hospital	162	0	0.26	N/A±	N/A±
Brigham City Community Hospital	604	0	0.88	N/A±	N/A±
Cache Valley Hospital	667	1	1.19	0.84	0.04 - 4.14
Castleview Hospital	1,184	1	1.89	0.53	0.03 - 2.60
Cedar City Hospital	809	1	1.29	0.77	0.04 - 3.81
Davis Hospital & Medical Center	1,330	1	2.46	0.41	0.02 - 2.01
Delta Community Hospital	130	1	0.21	N/A±	N/A±
Dixie Regional Medical Center	5,450	4	9.56	0.42	0.13 - 1.01
Fillmore Community Hospital	89	0	0.14	N/A±	N/A±
Garfield Memorial Hospital	125	0	0.20	N/A±	N/A±
Intermountain Medical Center	11,567	39	20.25	1.93	1.39 - 2.61
Jordan Valley Hospital	1,496	0	2.39	0.00	0.00 - 1.25
Jordan Valley Hospital West Valley Campus	1,541	1	2.43	0.41	0.02 - 2.03
Lakeview Hospital	1,454	2	2.21	0.90	0.15 - 2.99
LDS Hospital	2,125	3	3.91	0.77	0.20 - 2.09
Logan Regional Hospital	1,742	2	3.20	0.63	0.11 - 2.07
Lone Peak Hospital	524	0	0.63	N/A±	N/A±
McKay Dee Hospital	1,262	1	2.35	0.43	0.02 - 2.10
Mountain Point Medical Center	14	0	0.02	N/A±	N/A±
Mountain View Hospital	1,647	0	2.43	0.00	0.00 - 1.24
Mountain West Medical Center	436	0	0.60	N/A±	N/A±
Ogden Regional Medical Center	4,139	5	6.43	0.61	0.29 - 1.72
Orem Community Hospital	88	0	0.14	N/A±	N/A±
Park City Hospital	319	0	0.51	N/A±	N/A±
Primary Children's Hospital	151	0	0.21	N/A±	N/A±
Riverton Hospital	757	1	1.21	0.83	0.04 - 4.07
Sanpete Valley Hospital	88	1	0.14	N/A±	N/A±
Sevier Valley Hospital	452	0	0.72	N/A±	N/A±
St. Mark's Hospital	5,319	4	8.51	0.47	0.15 - 1.13
Timpanogos Regional Hospital	970	0	1.79	0.00	0.00 - 1.67
Uintah Basin Medical Center	639	0	1.02	0.00	0.00 - 2.93
University Hospital§	6,709	13	11.69	1.11	0.62 - 1.85
Utah Valley Hospital	4,206	6	7.18	0.70	0.34 - 1.74

+Source: NHSN data.

See footnotes on page 83.

Footnotes

Table 1. Central line-associated bloodstream infections in adult and pediatric intensive care units in acute care facilities, Utah, 2015

[§]Includes Huntsman Cancer Institute.
[‡]SIR estimates are not reliable when the predicted number is less than one. Consequently, SIRs are not provided for health care facilities with a predicted number less than one.

[1]Number of central line days: The total number of days that a patient has a central line.
[2]Number of CLABSI events: The total number of central line-associated bloodstream infections reported per year.
[3]Predicted number of central line-associated bloodstream infection events: The number of central line-associated bloodstream infection events anticipated to occur based on historical data of comparable ICUs.
[4]Standardized Infection Ratio: Compares the total number of central line-associated bloodstream infection events in a hospital's ICU to a national benchmark. Rates are adjusted based on the type and size of a hospital or ICU.
[5]Confidence interval: A 95% confidence interval means that if the sampling of rates was repeated over more periods of time, 95 times out of 100, the true value would be expected to fall within the range shown.

Table 2. Central line-associated bloodstream infections in inpatient non-intensive care locations in acute care facilities, Utah, 2015

[§]Includes Huntsman Cancer Institute.
[‡]SIR estimates are not reliable when the predicted number is less than one. Consequently, SIRs are not provided for health care facilities with a predicted number less than one.

[1]Number of central line days: The total number of days that a patient has a central line.
[2]Number of CLABSI events: The total number of central line-associated bloodstream infections reported per year.
[3]Predicted number of central line-associated bloodstream infection events: The number of central line-associated bloodstream infection events anticipated to occur based on historical data of comparable ICUs.
[4]Standardized Infection Ratio: Compares the total number of central line-associated bloodstream infection events in a hospital's ICU to a national benchmark. Rates are adjusted based on the type and size of a hospital or ICU.
[5]Confidence interval: A 95% confidence interval means that if the sampling of rates was repeated over more periods of time, 95 times out of 100, the true value would be expected to fall within the range shown.

Table 3. Central line-associated bloodstream infections in newborn intensive care units in acute care facilities, Utah, 2015

[§]Includes Huntsman Cancer Institute
[‡]SIR estimates are not reliable when the predicted number is less than one. Consequently, SIRs are not provided for health care facilities with a predicted number less than one.

[1]Number of central line days: The total number of days that a patient has a central line.
[2]Number of central line-associated bloodstream infection events: The total number of central line-associated bloodstream infections reported per year.
[3]Predicted number of central line-associated bloodstream infection events: The number of central line-associated bloodstream infection events anticipated to occur based on historical data of comparable ICUs.
[4]Standardized Infection Ratio: Compares the total number of central line-associated bloodstream infection events in a hospital's ICU to a national benchmark. Rates are adjusted based on the type and size of a hospital or ICU.
[5]Confidence interval: A 95% confidence interval means that if the sampling of rates was repeated over more periods of time, 95 times out of 100, the true value would be expected to fall within the range shown.

Footnotes

Table 4. Catheter-associated urinary tract infections in adult and pediatric intensive care units in acute care facilities, Utah, 2015

[§]Includes Huntsman Cancer Institute.
[‡]SIR estimates are not reliable when the predicted number is less than one. Consequently, SIRs are not provided for health care facilities with a predicted number less than one.

[1]Number of catheter days: The total number of days that a patient has a urinary catheter.
[2]Number of CAUTI events: The total number of catheter-associated urinary tract infections reported per year.
[3]Predicted number of CAUTI events: The number of catheter-associated urinary tract infections anticipated to occur based on historical data of comparable ICUs.
[4]Standardized Infection Ratio: Compares the total number of catheter-associated urinary tract infections in a hospital's ICU to a national benchmark. Rates are adjusted based on the type and size of a hospital or ICU.
[5]Confidence interval: A 95% confidence interval means that if the sampling of rates was repeated over more periods of time, 95 times out of 100, the true value would be expected to fall within the range shown.

Table 5. Catheter-associated urinary tract infections in inpatient non-intensive care locations in acute care facilities, Utah, 2015

[§]Includes Huntsman Cancer Institute.
[‡]SIR estimates are not reliable when the predicted number is less than one. Consequently, SIRs are not provided for health care facilities with a predicted number less than one.

[1]Number of catheter days: The total number of days that a patient has a urinary catheter.
[2]Number of CAUTI events: The total number of catheter-associated urinary tract infections reported per year.
[3]Predicted number of CAUTI events: The number of catheter-associated urinary tract infections anticipated to occur based on historical data of comparable ICUs.
[4]Standardized Infection Ratio: Compares the total number of catheter-associated urinary tract infections in a hospital's ICU to a national benchmark. Rates are adjusted based on the type and size of a hospital or ICU.
[5]Confidence interval: A 95% confidence interval means that if the sampling of rates was repeated over more periods of time, 95 times out of 100, the true value would be expected to fall within the range shown.

Appendix B

Understanding Surgical Site Infection (SSI) Data in Acute Care Facilities

SSI events depict infections associated with specific surgical procedures, colon, and abdominal hysterectomy surgeries, reported by acute care facilities.

In order to understand the HAI report, it is important to know what each of the table's data elements mean. Below is an example of a fictitious hospital's data. Each column is numbered and provides an explanation of each data element and its result.

Table B. Surgical site infection events in acute care facilities, Utah, 2015

	Number of surgical procedures	Number of SSI events	Predicted number of SSI events	Standardized Infection Ratio	95% Confidence Interval
State of Utah	#	#	#	#	#
Facility B	5,817	8	13	.62	0.26-1.21
	1	2	3	4	5	6

1. Only acute care facilities (hospitals) performing colon and abdominal hysterectomy surgical procedures are listed here by name (Facility B).
2. For each reporting facility listed, the number listed (5,817) is the total number of colon/abdominal hysterectomy surgical procedures performed.
3. The number of SSI events in this column (8) represents the total number of colon/abdominal hysterectomy surgical site infections (SSIs) identified in patients who met the criteria set by NHSN who were in Facility B during the reporting period.
4. The predicted number of SSI events is adjusted to allow facilities to be more fairly compared. Risk adjustments account for differences in patient populations in terms of severity of illness and other factors that may affect the risk of developing an HAI. A facility that performs many procedures on very sick patients would be predicted to have a higher SSI rate than a hospital that performs fewer procedures and has healthier patients. The predicted number of SSI events for Facility B, based on comparison to a national HAI benchmark of similar facilities, is calculated as 13.
5. The standardized infection ratio (SIR) is a summary measure developed by NHSN to track HAIs at the national, state, local, or facility level over time. The SIR compares the *total* number of SSI events for Facility B (8) to the *predicted* number of SSI events (13) based on "standard population" data. For purposes of this report, the standard population is HAI data reported nationally by thousands of facilities using NHSN. The SIR for Facility B, based on comparison to a national HAI benchmark of facilities that are similar to Facility B, is calculated as 0.62. Facilities with a predicted number of HAI events less than one do not have enough data to reliably compare their data to the standard population. Consequently, SIRs are not provided for healthcare facilities with a predicted number less than one.

6. A confidence interval (CI) will be provided if a SIR was estimated for a given facility. A CI describes the uncertainty associated with the SIR estimate. Facilities performing more procedures will have a narrower CI, which means there is less doubt associated with the accuracy of the SIR compared to facilities performing fewer procedures. This is because there is more information about a facility's performance with additional procedures. A 95% CI means that 95 times out of 100, the true value would be expected to fall within the range shown.

Table 6. Surgical site infections associated with colon surgeries in acute care facilities, Utah, 2015[+]

	Number of colon surgeries[1]	Number of colon events[2]	Predicted number of colon events[3]	Standardized Infection Ratio[4]	95% Confidence Interval[5]
State of Utah	**2,192**	**119**	**112.93**	**1.05**	**0.80 – 1.16**
Alta View Hospital	36	2	1.84	1.09	0.18 - 3.59
American Fork Hospital	36	1	1.72	0.58	0.03 - 2.88
Ashley Regional Medical Center	9	0	0.46	N/A±	N/A±
Bear River Valley Hospital	6	0	0.26	N/A±	N/A±
Brigham City Community Hospital	13	0	0.85	N/A±	N/A±
Cache Valley Hospital	3	0	0.20	N/A±	N/A±
Castleview Hospital	23	1	1.62	0.62	0.03 - 3.05
Cedar City Hospital	38	1	2.01	0.50	0.03 - 2.45
Davis Hospital and Medical Center	55	4	2.36	1.69	0.02 - 2.09
Dixie Regional Medical Center	171	3	9.61	0.31	0.08 - 0.85
Intermountain Medical Center	282	22	12.89	1.71	0.68 - 1.88
Jordan Valley Hospital	57	8	1.97	4.07	1.89 - 7.73
Jordan Valley Hospital West Valley Campus	27	0	0.87	N/A±	N/A±
Lakeview Hospital	30	2	1.42	1.40	0.24 - 4.64
LDS Hospital	176	8	8.50	0.94	0.44 - 1.79
Logan Regional Medical Center	40	0	1.97	0.00	0 - 1.52
Lone Peak Hospital	11	0	0.56	N/A±	N/A±
McKay Dee Hospital	163	13	7.19	1.81	1.01 - 3.01
Mountain View Hospital	19	2	0.98	N/A±	N/A±
Mountain West Medical Center	2	0	0.05	N/A±	N/A±
Ogden Regional Medical Center	73	4	4.13	0.97	0.42 - 2.56
Park City Medical Center	14	1	0.88	N/A±	N/A±
Primary Children's Hospital	93	6	4.64	1.29	0.52 – 2.69
Riverton Hospital	48	3	2.71	1.11	0.28 – 3.02
Salt Lake Regional Medical Center	19	0	0.93	N/A±	N/A±
Sevier Valley Hospital	12	1	0.60	N/A±	N/A±
St. Mark's Hospital	199	7	9.54	0.73	0.32 - 1.45
Timpanogos Regional Hospital	25	0	1.43	0.00	0 - 2.09
Uintah Basin Medical Center	1	0	0.07	N/A±	N/A±
University Hospital[§]	338	25	21.97	1.14	0.75 - 1.66
Utah Valley Hospital	173	5	8.70	0.57	0.21 - 1.27

[+]Source: NHSN data.

See footnotes on page 88.

Table 7. Surgical site infections associated with abdominal hysterectomy surgeries in acute care facilities, Utah, 2015+

	Number of abdominal hyst[1]	Number of abdominal hyst events[2]	Predicted number of abdominal hyst events[3]	Standardized Infection Ratio[4]	95% Confidence Interval[5]
State of Utah	**2,953**	**57**	**51.55**	**1.11**	**0.85 - 1.42**
Alta View Hospital	36	1	0.81	N/A±	N/A±
American Fork Hospital	88	1	0.94	N/A±	N/A±
Ashley Regional Medical Center	60	0	0.69	N/A±	N/A±
Brigham City Community Hospital	30	0	1.18	0.00	2.54
Castleview Hospital	7	0	0.07	N/A±	N/A±
Cedar City Hospital	39	1	0.65	N/A±	N/A±
Davis Hospital & Medical Center	205	1	3.26	0.31	0.02 - 1.51
Dixie Regional Medical Center	34	0	0.49	N/A±	N/A±
Intermountain Medical Center	306	12	5.79	2.07	1.12 - 3.52
Jordan Valley Hospital	33	2	0.67	N/A±	N/A±
Jordan Valley Hospital West Valley Campus	7	0	0.15	N/A±	N/A±
Lakeview Hospital	7	0	0.07	N/A±	N/A±
LDS Hospital	214	7	3.87	1.81	0.79 - 3.58
Logan Regional Hospital	47	0	0.66	N/A±	N/A±
Lone Peak Hospital	15	0	0.24	N/A±	N/A±
McKay Dee Hospital	157	0	2.33	0.00	0 - 1.29
Mountain View Hospital	35	0	0.69	N/A±	N/A±
Mountain West Medical Center	23	0	0.30	N/A±	N/A±
Ogden Regional Medical Center	176	1	3.79	0.26	0.01 - 1.30
Orem Community Hospital	23	0	0.28	N/A±	N/A±
Park City Medical Center	27	0	0.27	N/A±	N/A±
Riverton Hospital	221	4	2.92	1.37	0.44 - 3.31
Salt Lake Regional Medical Center	33	1	0.56	N/A±	N/A±
Sevier Valley Hospital	8	0	0.19	N/A±	N/A±
St. Mark's Hospital	291	2	5.30	0.38	0.06 - 1.25
Timpanogos Regional Medical Center	125	2	2.19	0.91	0.15 - 3.02
Uintah Basin Medical Center	45	4	0.89	N/A±	N/A±
University Health care Hospitals and Clinics§	309	16	5.99	2.67	1.58 - 4.25
Utah Valley Regional Medical Center	352	2	6.30	0.32	0.05 - 1.05

+Source: NHSN data.

See footnotes on page 88.

Footnotes

Table 6. Surgical site infections associated with colon surgeries in acute care facilities, Utah, 2015

[§]Includes Huntsman Cancer Institute.
[‡]SIR estimates are not reliable when the expected number is less than one. Consequently, SIRs are not provided for health care facilities with a predicted number less than one.
*Not required to report to CMS.

[1]Number of colon surgeries: The total number of colon surgeries reported per year.
[2]Number of colon events: The total number of SSI infections associated with colon surgeries reported per year.
[3]Predicted number of colon events: The number of SSI infections associated with colon surgeries anticipated to occur based on historical data of comparable acute care facilities.
[4]Standardized Infection Ratio: Compares the total number of colon surgeries in a hospital's ICU to a national benchmark. Rates are adjusted based on the type and size of a hospital or ICU.
[5]Confidence interval: A 95% confidence interval means that if the sampling of rates was repeated over more periods of time, 95 times out of 100, the true value would be expected to fall within the range shown.

Table 7. Surgical site infections associated with abdominal hysterectomy surgeries in acute care facilities, Utah, 2015

[§]Includes Huntsman Cancer Institute.
[‡]SIR estimates are not reliable when the predicted number is less than one. Consequently, SIRs are not provided for health care facilities with a predicted number less than one.
*Not required to report to CMS.

[1]Number of abdominal hysterectomies: The total number of abdominal hysterectomies reported per year.
[2]Number of abdominal hyst events: The total number of SSI infections associated with abdominal hysterectomies reported per year.
[3]Predicted number of abdominal hyst events: The number of abdominal hysterectomies anticipated to occur based on historical data of comparable acute care facilities.
[4]Standardized Infection Ratio: Compares the total number of abdominal hysterectomies in a hospital's ICU to a national benchmark. Rates are adjusted based on the type and size of a hospital or ICU.
[5]Confidence interval: A 95% confidence interval means that if the sampling of rates was repeated over more periods of time, 95 times out of 100, the true value would be expected to fall within the range shown.

Appendix C

Understanding *C. difficile* and MRSA Bacteremia Data in Acute Care Facilities

The tables depict *Clostridium difficile* infections (CDI) and Methicillin-resistant *Staphylococcus aureus* (MRSA) bacteremia infections reported by acute care facilities.

In order to understand the HAI report, it is important to know what each of the table's data elements mean. Below is an example of a fictitious hospital's data. Each column is numbered and provides an explanation of each data element and its result.

Table C. Bacterial infection events in acute care facilities, Utah, 2015

	Number of patient days	Number of infections	Predicted number of infections	Standardized Infection Ratio	95% Confidence Interval
State of Utah	#	#	#	#	#
Facility C	5,817	8	13	.62	0.26-1.21
	1	2	3	4	5	6

1. Acute care facilities are listed here by name (Facility C).
2. For each reporting facility listed, the number listed (5,817) is the total number of days patients have stayed at that facility.
3. When a patient develops a CDI or MRSA bacteremia infection, the infection is considered an HAI if it meets the criteria set forth by NHSN. The number of HAI events in this column (8) represents the total number of specific HAIs identified in patients in Facility C during the year.
4. The predicted number of infections is adjusted to allow facilities to be more fairly compared. Risk adjustments account for differences in patient populations in terms of severity of illness and other factors that may affect the risk of developing an HAI. A facility that generally has more severely ill patients would be predicted to have a higher rate than a facility that has healthier patients. The predicted number of infections for Facility C, based on comparison to a national HAI benchmark of similar facilities, is calculated as 13.
5. The standardized infection ratio (SIR) is a summary measure developed by NHSN to track HAIs at the national, state, local, or facility level over time. The SIR compares the *total* number of infections for Facility C (8) to the *predicted* number of infections (13), based on "standard population" data. For purposes of this report, the standard population is HAI data reported nationally by thousands of facilities using NHSN. The SIR for Facility C, based on comparison to a national HAI benchmark of facilities that are similar to Facility C, is calculated as 0.62. Facilities with a predicted number of HAI events less than one do not have enough data to reliably compare their data to the standard population. Consequently, SIRs are not provided for healthcare facilities with a predicted number less than one.

6. A confidence interval (CI) will be provided if a SIR was estimated for a given facility. A CI describes the uncertainty associated with the SIR estimate. Facilities performing with more patient days will have a narrower CI, which means there is less doubt associated with the accuracy of the SIR compared to facilities performing fewer procedures. This is because there is more information about a facility's performance with additional patient days. A 95% CI means that 95 times out of 100, the true value would be expected to fall within the range shown.

Table 8. *C. difficile* infections in acute care facilities, Utah, 2015[+]

	Number of patient days[1]	Number of hospital onset *C. diff* events[2]	Predicted number of hospital onset *C. diff* events[3]	Standardized Infection Ratio[4]	95% Confidence Interval[5]
State of Utah	**773,758**	**526**	**596.53**	**0.88**	**0.81 - 0.96**
Alta View Hospital	9,269	7	5.70	1.23	0.54 - 2.43
American Fork Hospital	15,144	7	8.86	0.79	0.35 - 1.56
Ashley Regional Medical Center	4,012	0	2.38	0.00	0 - 1.26
Bear River Valley Hospital	818	1	0.37	N/A±	N/A±
Beaver Valley Hospital	1,069	0	0.43	N/A±	N/A±
Brigham City Community Hospital	2,748	1	1.20	0.83	0.04 - 4.11
Cache Valley Hospital	2,102	1	0.84	N/A±	N/A±
Castleview Hospital	2,198	3	1.26	2.39	0.61 - 6.49
Cedar City Hospital	70,696	46	56.06	0.82	0.61 - 1.09
Davis Hospital & Medical Center	18,272	6	10.72	0.56	0.23 - 1.16
Dixie Regional Medical Center	52,592	32	33.65	0.95	0.66 - 1.33
Garfield Memorial Hospital	1,061	1	0.64	N/A±	N/A±
Intermountain Medical Center	106,225	97	99.58	0.97	0.79 - 1.18
Jordan Valley Hospital	18,833	16	12.86	1.24	0.74 - 1.98
Jordan Valley Hospital West Valley Campus	10,773	10	6.64	1.51	0.76 - 2.68
Lakeview Hospital	12,189	10	8.20	1.22	0.62 - 2.18
LDS Hospital	32,927	33	27.33	1.21	0.85 - 1.68
Logan Regional Hospital	17,710	8	11.23	0.71	0.33 - 1.35
Lone Peak Hospital	2,964	0	1.75	0.00	0 - 1.76
McKay Dee Hospital	57,004	24	46.24	0.52	0.34 - 0.76
Mountain Point Medical Center	757	1	0.56	N/A±	N/A±
Mountain View Hospital	7,758	4	4.01	1.00	0.32 - 2.41
Mountain West Medical Center	4,288	3	2.44	1.23	0.31 - 3.34
Ogden Regional Medical Center	26,780	24	15.69	1.53	1.00 - 2.24
Orem Community Hospital	2,595	0	1.42	0.00	0 - 2.12
Park City Hospital	4,447	1	2.45	0.41	0.02 - 2.01
Primary Children's Hospital	54,123	34	46.98	0.72	0.51 - 1.00
Riverton Hospital	13,753	1	8.09	0.12	0.01 - 0.61
Salt Lake Regional Medical Center	16,032	8	7.17	1.12	0.52 - 2.12
Sanpete Valley Hospital	1,840	0	0.85	N/A±	N/A±
Sevier Valley Hospital	2,306	0	1.17	0.00	0 - 2.55
St. Mark's Hospital	47,450	40	41.66	0.96	0.70 - 1.30
The Orthopedic Specialty Hospital	5,147	0	2.85	0.00	0 - 1.05
Timpanogos Regional Medical Center	12,676	5	8.30	0.60	0.22 - 1.34
Uintah Basin Medical Center	7,375	1	4.42	0.23	0.01 - 1.12
University Hospital[§]	120,072	98	107.78	0.91	0.74 - 1.10
Utah Valley Hospital	70,696	46	56.06	0.82	0.61 – 1.08

[+]Source: NHSN data

See footnotes on page 93.

Table 9. Methicillin-resistant *Staphylococcus aureus bacteremia* in acute care facilities, Utah, 2015[+]

	Number of patient days[1]	Number of MRSA bacteremia events[2]	Predicted number of MRSA bacteremia events[3]	Standardized Infection Ratio[4]	95% Confidence Interval[5]
State of Utah	**936,370**	**32**	**49.49**	**0.65**	**0.45 - 0.90**
Alta View Hospital	12,253	0	0.44	N/A±	N/A±
American Fork Hospital	22,443	1	0.80	N/A±	N/A±
Ashley Regional Medical Center	4,962	0	0.18	N/A±	N/A±
Bear River Valley Hospital	1,012	0	0.04	N/A±	N/A±
Beaver Valley Hospital	1,133	0	0.04	N/A±	N/A±
Brigham City Community Hospital	2,748	0	0.10	N/A±	N/A±
Cache Valley Hospital	2,124	0	0.08	N/A±	N/A±
Castleview Hospital	2,522	0	0.17	N/A±	N/A±
Cedar City Hospital	9,428	0	0.36	N/A±	N/A±
Davis Hospital & Medical Center	23,023	1	0.91	N/A±	N/A±
Dixie Regional Medical Center	59,880	5	2.40	2.09	0.76 - 4.62
Garfield Memorial Hospital	1,098	0	0.04	N/A±	N/A±
Intermountain Medical Center	129,423	5	10.62	0.47	0.17 - 1.04
Jordan Valley Hospital	24,998	0	1.00	N/A±	N/A±
Jordan Valley Hospital West Valley Campus	11,981	0	0.72	N/A±	N/A±
Lakeview Hospital	13,311	0	0.48	N/A±	N/A±
LDS Hospital	37,141	4	1.59	2.52	0.80 - 6.09
Logan Regional Hospital	23,824	0	0.88	N/A±	N/A±
Lone Peak Hospital	3,631	0	0.13	N/A±	N/A±
McKay Dee Hospital	71,145	0	2.55	0.00	0 - 1.18
Mountain Point Medical Center	1,522	0	0.05	N/A±	N/A±
Mountain View Hospital	8,965	0	0.32	N/A±	N/A±
Mountain West Medical Center	4,288	0	0.23	N/A±	N/A±
Ogden Regional Medical Center	29,970	0	1.09	0.00	0 - 2.74
Orem Community Hospital	5,119	0	0.18	N/A±	N/A±
Park City Hospital	4,994	0	0.18	N/A±	N/A±
Primary Children's Hospital	66,861	0	3.78	0.00	0 - 0.79
Riverton Hospital	18,692	0	0.67	N/A±	N/A±
Salt Lake Regional Medical Center	16,912	0	0.61	N/A±	N/A±
Sanpete Valley Hospital	2,149	0	0.08	N/A±	N/A±
Sevier Valley Hospital	2,615	0	0.09	N/A±	N/A±
St. Mark's Hospital	55,060	3	2.30	1.31	0.33 - 3.55
The Orthopedic Specialty Hospital	5,147	0	0.18	N/A±	N/A±
Timpanogos Regional Medical Center	15,491	0	0.57	N/A±	N/A±
Uintah Basin Medical Center	7,375	0	0.35	N/A±	N/A±
University Hospital[§]	139,962	11	11.69	0.94	0.50 - 1.64
Utah Valley Hospital	93,168	2	3.60	0.56	0.09 - 1.84

[+]Source: NHSN data
See footnotes on page 93.

Footnotes

Table 8. *C. difficile* infections in acute care facilities, Utah, 2015

[§]Includes Huntsman Cancer Institute.
[I]SIR estimates are not reliable when the predicted number is less than one. Consequently, SIRs are not provided for health care facilities with a predicted number less than one.

[1]Number of patient days: The total number of days that patients stay at a facility per year. Patient days data for *C.difficile* infections excludes newborn nursery patient days data.
[2]Number of *C. diff* events: The total number of *C diff* infections reported per year.
[3]Predicted number of *C. diff* events: The number of *C. diff* infections anticipated to occur based on historical data of comparable ICUs.
[4]Standardized Infection Ratio: Compares the total number of *C. diff* infections in a facility to a national benchmark. Rates are adjusted based on the type and size of the facility.
[5]Confidence interval: A 95% confidence interval means that if the sampling of rates was repeated over more periods of time, 95 times out of 100, the true value would be expected to fall within the range shown.

Table 9. Methicillin-resistant *Staphylococcus aureus bacteremia* in acute care facilities, Utah, 2015

[§]Includes Huntsman Cancer Institute.
[I]SIR estimates are not reliable when the predicted number is less than one. Consequently, SIRs are not provided for health care facilities with a predicted number less than one.
[1]Number of patient days: The total number of days that patients stay at a facility per year.
[2]Number of MRSA events: The total number of MRSA bacteremia infections reported per year.
[3]Predicted number of MRSA events: The amount of MRSA bacteremia infections anticipated to occur based on historical data of comparable facilities.
[4]Standardized Infection Ratio: Compares the total number of MRSA bacteremia in a facility to a national benchmark. Rates are adjusted based on the type and size of the facility.
[5]Confidence interval: A 95% confidence interval means that if the sampling of rates was repeated over more periods of time, 95 times out of 100, the true value would be expected to fall within the range shown.

Appendix D

Understanding CLABSI and CAUTI Rates in Long-term Acute Care Facilities with Intensive Care Units and Wards or Inpatient Rehabilitation Facilities

The device infection event tables depict specific device-associated infections (central line-associated bloodstream infections [CLABSI], catheter-associated urinary tract infections [CAUTI]), reported by long-term acute care facilities with intensive care units and inpatient rehabilitation facilities.

To understand the HAI report, it is important to know what each of the data elements in the table mean. Below is an example of fictitious data from a long-term acute care facility (LTAC) or inpatient rehabilitation facility (IRF). Each column is numbered and provides an explanation of each data element and its result.

Table D. Device infection events in long-term acute care facilities with intensive care units and wards or inpatient rehabilitation facilities, Utah, 2015

	Number of HAI device days	Number of HAI device events	Incidence rate per 1,000 device days	Confidence interval for HAI rate
State of Utah	#	#	#	#
Facility D	5,817	8	1.36	0.64-2.56
1	2	3	4	5

1. Long-term acute care facilities or inpatient rehabilitation facilities are listed here by name (Facility D).
2. For each reporting facility listed, patients with central line catheters/urinary catheters (devices) are identified every day. A device count is performed at the same time each day. Each patient with one or more central line catheters at the time the count is performed is counted as having one device day. Each patient with a urinary catheter at the time the count is performed is counted as having one device day. For example, a patient with one or more central line catheters and one urinary catheter would be counted as having one central line day and one urinary catheter day. The number of device days in this column (5,817) represents the total number of device days for patients with that specific device who were in Facility D during the year.
3. When a patient develops an HAI device-associated infection while having a device in place or within one day after removal of the device, the infection is considered a device-associated HAI if it meets the criteria set forth by NHSN. The number of HAI events (8) represents the total number of specific HAIs identified in patients in Facility D during the year.
4. An incidence rate is a summary measure developed by NHSN to track HAIs at the national, state, local, or facility level over time, and describes how frequently HAIs occur within a specific period.

This rate is calculated by taking the number of device events (8), dividing it by the total number of device days (5,817), and multiplying that by the desired time frame (1,000 device days). A result of 1.36 communicates that 1.36 HAI events are occurring every 1,000 device days at Facility D.

5. A confidence interval (CI) describes the uncertainty associated with the incidence rate estimate. Facilities with more device days or more HAI events will have a narrower CI, which means there is less doubt associated with the accuracy of that rate compared to facilities with fewer device days or events. This is because there is more information about a facility's performance with additional device days. A 95% CI means that 95 times out of 100, the true value would be expected to fall within the range shown in the table.

Table 10. Central-line associated bloodstream infections in long-term acute care facilities with intensive care units and wards, Utah, 2015+

	Number of central line days[1]	Number of CLABSI events[2]	Predicted number of CLABSI events[3]	Standardized Infection Ratio[4]	95% Confidence Interval[5]
State of Utah	**21,036**	**13**	**18.93**	**0.69**	**0.38 - 1.15**
Landmark Hospital	6,701	7	6.03	1.16	0.51 - 2.30
Promise Hospital	5,242	0	4.72	0.00	0 - 0.64
Specialty Hospital of Utah	1,793	1	1.61	0.62	0.03 - 3.06
Utah Valley Specialty Hospital	7,300	5	6.57	0.76	0.28 - 1.69

+Source: NHSN data.

[1]Number of central line days: The total number of days that a patient has a central line.
[2]Number of CLABSI events: The total number of central line-associated bloodstream infections reported per year.
[3]Predicted number of CLABSI events: The number of central line-associated bloodstream infection events anticipated to occur based on historical data of comparable long-term acute care facilities.
[4]Standardized Infection Ratio: Compares the total number of CLABSI events in long-term acute care facilities to a national benchmark.
[5]Confidence interval: A 95% confidence interval means that if the sampling of rates was repeated over more periods of time, 95 times out of 100, the true value would be expected to fall within the range shown.

Table 11. Catheter-associated urinary tract infections in long-term acute care facilities with intensive care units and wards, Utah, 2015+

	Number of catheter days[1]	Number of CAUTI events[2]	Predicted number of CAUTI events[3]	Standardized Infection Ratio[4]	95% Confidence Interval[5]
State of Utah	**13,349**	**16**	**26.70**	**0.61**	**0.36 - 0.95**
Landmark Hospital	4,037	7	8.07	0.87	0.38 - 1.71
Promise Hospital	2,883	3	5.77	0.52	0.13 - 1.41
Specialty Hospital of Utah	1,220	1	2.44	0.41	0.02 - 2.02
Utah Valley Specialty Hospital	5,209	5	10.42	0.48	0.18 - 1.06

+Source: NHSN data.

[1]Number of catheter days: The total number of days that a patient has a urinary catheter.
[2]Number of CAUTI events: The total number of catheter-associated urinary tract infections reported per year.
[3]Predicted number of CAUTI events: The number of catheter-associated urinary tract infections anticipated to occur based on historical data of comparable long-term acute care facilities.
[4]Standardized Infection Ratio: Compares the total number of catheter-associated urinary tract infections in long-term acute care facilities to a national benchmark.
[5]Confidence interval: A 95% confidence interval means that if the sampling of rates was repeated over more periods of time, 95 times out of 100, the true value would be expected to fall within the range shown.

Table 12. Catheter-associated urinary tract infections in inpatient rehabilitation facilities, Utah, 2015+

	Number of catheter days[1]	Number of CAUTI events[2]	Predicted number of CAUTI events[3]	Standardized Infection Ratio[4]	95% Confidence Interval[5]
State of Utah	**4,359**	**14**	**10.98**	**1.28**	**0.73 - 2.09**
Davis Hospital and Medical Center	43	0	0.11	N/A±	N/A±
Dixie Regional Medical Center	580	2	1.51	1.33	0.22 - 4.38
Health South Rehabilitation Hospital of Utah	1,102	0	2.31	0.00	0 - 1.30
Intermountain Medical Center	398	4	1.03	3.87	1.23 - 9.32
Jordan Valley Hospital	309	1	0.80	N/A±	N/A±
McKay Dee Hospital	213	0	0.55	N/A±	N/A±
Northern Utah Rehabilitation Hospital	391	1	1.21	0.83	0.04 - 4.07
Salt Lake Regional Medical Center	146	0	0.38	N/A±	N/A±
St. Mark's Hospital	223	0	0.58	N/A±	N/A±
University Hospital§	471	5	1.22	4.08	1.50 - 9.05
Utah Valley Hospital	483	1	1.26	0.80	0.04 - 3.93

+Source: NHSN data.

§Includes Huntsman Cancer Institute
ISIR estimates are not reliable when the predicted number is less than one. Consequently, SIRs are not provided for healthcare facilities with a predicted number less than one.

[1]Number of catheter days: The total number of days that a patient has a urinary catheter.
[2]Number of CAUTI events: The total number of catheter-associated urinary tract infections reported per year.
[3]Predicted number of CAUTI events: The number of catheter-associated urinary tract infections anticipated to occur based on historical data of comparable inpatient rehabilitation facilities.
[4]Standardized Infection Ratio: Compares the total number of catheter-associated urinary tract infections in inpatient rehabilitation facilities to a national benchmark.
[5]Confidence interval: A 95% confidence interval means that if the sampling of rates was repeated over more periods of time, 95 times out of 100, the true value would be expected to fall within the range shown.

Appendix E

Definitions

1. **Abdominal hysterectomy -** An abdominal hysterectomy is a surgical procedure in which the uterus is removed through an incision in the lower abdomen.

2. **Acute care facility -** A hospital that provides inpatient medical care and other related services for surgery, acute medical conditions, or injuries (usually for a short-term illness or condition).

3. **Catheter-associated urinary tract infection (CAUTI) -** Infection involving any part of the urinary system, including urethra, bladder, ureters, and kidney that are caused by the insertion of a urinary catheter.

4. **Central line** - A catheter (tube) placed in a large vein in the neck, chest, or groin that ends at, or close to, the heart to give medication or fluids, collect blood for medical tests, or monitor blood flow.

5. **Central line days (CLDs)** - Refers to the number of patients with a central line in place. Central line days are calculated by recording the number of patients who have a central line for each day of the month at the same time each day for a specific care location. At the end of the month, the sum of all days is recorded. For purposes of this report, the total is recorded as the sum of all days in a year. Patients having more than one central line in place at a given time are counted as having only one central line day.

6. **Central line-associated bloodstream infection (CLABSI)** - A serious infection that occurs when germs (usually bacteria) that are not related to another infection enter the bloodstream through the central line catheter.

7. **Centers for Medicare and Medicaid Services (CMS)** - A federal agency within the United States Department of Health and Human Services that administers Medicare, Medicaid, the State Children's Health Insurance Program, and sets health insurance portability standards.

8. **Clostridium difficile** - *Clostridium difficile* is a germ that causes diarrhea. It is spread from person-to-person on contaminated equipment and on the hands of health care personnel and visitors. Most cases occur in patients taking antibiotics for long periods of time and in the elderly with certain medical problems.

9. **Colon surgery -** Colon surgery is an operation performed on the large intestine, rectum, anus, and/or the perianal area.

10. **Confidence interval (CI)** - A statistical measure of the precision of a rate estimate. It is a plus-or-minus range around the infection rate reported. A 95% confidence interval means that if the sampling of rates was repeated over more periods of time, 95 times out of 100, the true value would be expected to fall within the range shown.

11. **Dialysis** - Kidney dialysis is a life-support treatment that uses a special machine to filter harmful wastes, salt, and excess fluid from the blood. This restores the blood to a normal, healthy balance. Dialysis replaces many of the kidney's important functions. Hemodialysis is when the blood is filtered using a dialyzer and dialysis machine.

12. **Dialysis facility -** An outpatient facility where a medical procedure (dialysis) is administered to people with end-stage kidney disease.

13. **Healthcare-associated infection (HAI)** - An infection that develops in a person who is cared for in any setting where healthcare is delivered (i.e., acute care hospital, skilled nursing facility, dialysis center, etc.) that was not developing or present at the time of admission to that healthcare setting.

14. **Inpatient rehabilitation facilities (IRFs)** - IRFs are freestanding rehabilitation hospitals and rehabilitation units in acute care hospitals. They provide an intensive rehabilitation program and patients who are admitted must be able to tolerate three hours of intense rehabilitation services per day.

15. **Intensive Care Unit (ICU)** - An area in the hospital where severely ill patients are closely monitored and receive advanced life support.

16. **Long-term acute care facility -** A facility that provides a range of institutional healthcare programs and services, such as comprehensive rehabilitation, respiratory therapy, head trauma treatment, and pain management, outside the acute care hospital.

17. **MRSA bacteremia -** An infection in the blood that is caused by the bacteria *Staphylococcus aureus* and is resistant to methicillin antibiotics.

18. **National rate** - The national rate is determined by the NHSN as similar facilities and specific infection events are compared nationwide.

19. **National Healthcare Safety Network (NHSN)** - The nation's most widely used healthcare-associated infection (HAI) tracking system. NHSN provides facilities, states, regions, and the nation with data needed to identify problem areas, measure progress of prevention efforts, and ultimately eliminate HAIs. The system is supported by the U.S. Centers for Disease Control and Prevention.

20. **Standardized infection ratio (SIR)** - A statistic used to calculate, track, and interpret the number of new HAIs. The SIR is determined by comparing the actual number of HAIs to the predicted number of HAIs for a specific group of patients admitted to a specific patient care unit.

21. **Standard population** - The population against which each of its essential classes or groups can be compared. For purposes of this report, the standard population is the national HAI data reported by the thousands of United States facilities that use the NHSN system.

22. Surgical site infection (SSI) - A surgical site infection is an infection that occurs after surgery in the part of the body where the surgery took place. Many SSIs involve the skin only. Other SSIs are more serious and involve deep tissue or organs and usually result in prolonged or re-hospitalization.

23. Utah Healthcare Infection Prevention Governance Committee (UHIP GC) - A multi-disciplinary panel of state leaders in patient safety, infectious diseases, and infection control. Membership is comprised of a broad base of care delivery groups across the state and organized under and staffed by the Utah Department of Health.

24. Urinary catheter - A flexible tube that is inserted through the urethra and into the bladder to drain urine from the bladder into a bag or container.

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