Healthcare-Associated Infections in Utah, 2016

Utah Department of Health

Division of Disease Control and Prevention

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FOREWORD

Healthcare-associated infections (HAIs) continue to be a major, yet often preventable, threat to patient safety. In recent years, many of the most difficult-to-treat HAIs are caused by organisms which are resistant to antibiotics. The Utah Department of Health (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.

The *2016 Annual Healthcare Associated Infections Report* has been developed in collaboration with the Utah Healthcare Infection Prevention Governance Committee, a multi-disciplinary panel of state leaders in patient safety, infectious diseases, and infection control. It provides the most current data on Utah's progress toward the goal of reducing and, ultimately, eliminating HAIs. We hope that providers and patients will find the information presented here to be useful to their understanding of HAIs and identifying practice to prevent these infections within facilities.

We are grateful to the infection prevention practitioners and others at facilities throughout the state that do the work of collecting and reporting these data to the National Healthcare Safety Network. The UDOH analyzes the data from this system to compile this report. The UDOH also regularly conducts validations of a sample of facilities and infection types to monitor data quality and completeness.

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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 2016 showed some significant changes compared to the previous year's data. CAUTIs, colon SSIs, and *C. difficile* infections all showed significant increases in the state of Utah. However, MRSA bacteremia infections decreased significantly from 2015.

Compared to national baseline data, patients in Utah facilities that reported 2016 HAI data to NHSN experienced:

- 18% fewer CLABSI
- 18% more CAUTI
- 28% more surgical site infections within 30 days of colon surgery
- 32% more surgical site infections within 30 days of abdominal hysterectomy
- 7% more *C. difficile* infections
- 38% 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. healthcare 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 *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. 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.

Targeted Assessment for Prevention (TAP) Facility Assessment Tools

In 2016, the Centers for Disease Control and Prevention (CDC) developed TAP Facility Assessment Tools for CAUTI, CLABSI, and *C. difficile* infections. These tools work as gap analysis tools to identify gaps in infection prevention practice in healthcare facilities. Each tool contains the most updated evidence-based practices to help prevent and control each respective type of healthcare associated infection. The UDOH worked with 15 healthcare facilities in 2017 to complete the CAUTI and *C. difficile* infection assessment tools. This effort helped the UDOH to understand the strengths and challenges among Utah short-term and long-term acute care hospitals in implementing best practices, and also helped the facilities to recognize their gaps in prevention practices. These resources were shared with the hospital infection preventionists in order to utilize them in collaboration with other healthcare leaders within their own facility. Many of the facility leaders from participating facilities shared that they found these tools very helpful for the future direction of their programs. The tools allowed facilities to recognize their efforts in following best practices, but also helped them to identify gaps needed to be addressed through additional efforts and resources.

The TAP Facility Assessment Tools address best practices in different topic areas for each type of infection, including:

- General infrastructure, capacity, and processes, including healthcare personnel training, competency assessments, audits, and feedback to staff
- Appropriate use of central venous catheters and indwelling urinary catheters
- Proper insertion and maintenance practices for central venous catheters and indwelling urinary catheters
- Appropriate urine culturing practices
- Antibiotic stewardship for *C. difficile* infection prevention
- Early detection, isolation, and appropriate testing for *C. difficile*
- Contact precautions and hand hygiene
- Environmental cleaning.

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 CMS required acute healthcare facilities to report specific HAI data to the 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 which is 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 included in this report were calculated by NHSN using a new baseline model. NHSN is now using 2015 data to re-set baselines for future calculated SIRs. NHSN will use 2015 data to re-set baselines for future calculated SIRs. This new 2015 baseline will serve as a reference point to compare the progress healthcare facilities are making in preventing infections. When NHSN calculates the SIR for each healthcare facility, a "predicted" number of infections is created based on reported data from previous years (i.e., baseline). This prediction method allows for risk adjustment of reported data for different healthcare facilities, making it possible to compare performance among similar groups of facilities. Infection prevention progress can be measured by comparing the infection data that facilities report to NHSN that is now adjusted according to updated risk-adjustment models. The SIRs calculated by using the 2015 baselines became available for use in January 2017. NHSN users have the ability to analyze all data beginning January 1, 2015, using the new 2015 re-baseline model; however, 2016 is the final year of data that can be used to calculate SIRs using the original baseline model.

What does the SIR mean?

SIR Value	Interpretation
Less than 1	There were fewer infections reported in Utah in 2016 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 2016 compared to the national baseline data.
More than 1	There were more infections reported in Utah in 2016 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 1-13 summarize the SIR data, taking into account whether the SIR is meaningful statistically, using the following icons.[8] 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
- ▲ Statistically **MORE** infections than national baseline
- -- Predicted to have less than one infection for the year, but had one or more infections, as defined by NHSN, in 2016
- ** Predicted to have less than one infection for the year, and did **NOT** have an infection, as defined by NHSN, in 2016
- ▽ **FEWER** infections than national baseline, but not statistically different
- △ **MORE** infections than national baseline, but not statistically different

Below is an overall SIR summary of 2016 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 Standardized Utilization Ratios (SURs)

The standardized utilization ratio (SUR) is a summary statistic developed by NHSN used to track trends in device use over time. This includes use of urinary catheters, central lines, and ventilators. Progress is measured at the national, state, local, or facility level.

The SUR compares the *total* number of device days in a healthcare facility to the *predicted* number of device days, based on "standard utilization" data. For purposes of this report, the standard utilization data are device days data reported nationally by thousands of facilities using NHSN.

What does the SUR mean?

SUR Value	Interpretation
Less than 1	There were fewer devices utilized in Utah in 2016 compared to the national baseline data, indicating progress has been made in reducing device use.
Equal to 1	There were about the same number of devices utilized in Utah in 2016 compared to the national baseline data.
More than 1	There were more devices utilized in Utah in 2016 compared to the national baseline data, indicating there has been an increase in infections device use.

Actual values calculated for the SUR, along with confidence intervals, are found in tables in Appendices A and D. Figures 1-8 summarize the SUR data, taking into account whether the SUR is meaningful statistically, using the following icons.[8] These symbols are used throughout this report to show the comparison of device utilization in Utah to national baseline data:

- Statistically **FEWER** devices utilized than national baseline
- Statistically **MORE** devices utilized than national baseline
- **FEWER** devices utilized than national baseline, but not statistically different
- **MORE** devices utilized than national baseline, but not statistically different

Below is an overall SUR summary of 2016 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

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 the rates would not be comparable to other states.

What does it mean if a hospital reports zero infections?

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. 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** due to: [9]

- Insertion of multiple catheters
- Use of specific catheters associated with substantial risk
- Catheters frequently placed in emergency circumstances
- Catheters accessed repeatedly each day
- Need for catheters for extended periods of time

The non-inflation adjusted cost of CLABSIs varies from

$3,700 to $39,000

per episode

A Look at CLABSIs in Utah in 2016

50 adult and pediatric ICU-related CLABSIs in acute care facilities

▼ 16% fewer CLABSIs in Utah acute care facilities compared to the national baseline

12 newborn ICU-related CLABSIs in acute care facilities

▼ 46% fewer CLABSIs in Utah acute care facilities compared to the national baseline

16 CLABSIs in long-term acute care facilities

▼ 27% fewer CLABSIs in Utah acute care facilities compared to the national baseline

29 non-ICU-related CLABSIs in acute care facilities

▼ 24% fewer CLABSIs in Utah acute care facilities compared to the national baseline

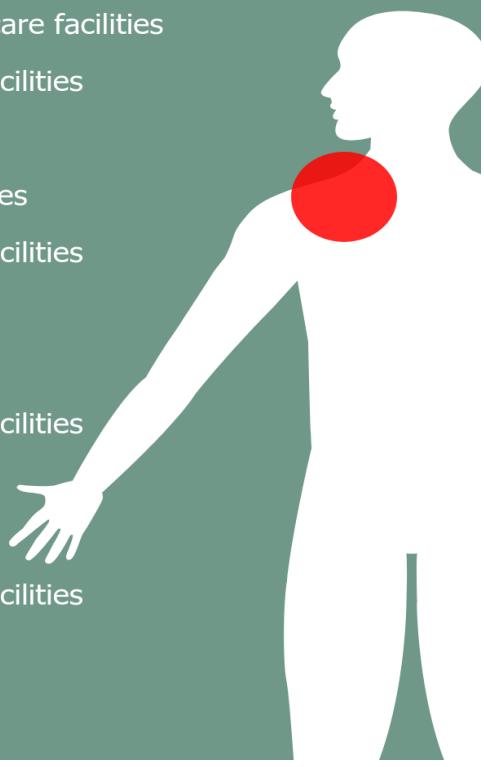


Figure 1. Central line-associated bloodstream infections in adult and pediatric intensive care units in acute care facilities, Utah, 2016+

Hospital	SIR	SUR
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	SIR	SUR
State of Utah	▽	▼
McKay Dee Hospital	▽	▲
Mountain Point Medical Center	**	▼
Mountain View Hospital	**	▲
Mountain West Medical Center	**	▲
Ogden Regional Medical Center	▽	▲
Park City 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 Regional Medical Center	▼	▲

+Source: NHSN data

SIR

▼ Statistically **FEWER** infections than national baseline

▲ Statistically **MORE** infections than national baseline

-- Predicted to have less than one infection for the year, but had one or more infections, as defined by NHSN, in 2016

** Predicted to have less than one infection for the year, and did **NOT** have an infection, as defined by NHSN, in 2016

▽ **FEWER** infections than national baseline, but not statistically different

△ **MORE** infections than national baseline, but not statistically different

SUR

▼ Statistically **FEWER** devices utilized than national baseline

▲ Statistically **MORE** devices utilized than national baseline

▽ **FEWER** devices utilized than national baseline, but not statistically different

△ **MORE** devices utilized than national baseline, but not statistically different

Figure 2. Central line-associated bloodstream infections in newborn intensive care units in acute care facilities, Utah, 2016+

Hospital	SIR	SUR
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	▽	N/A*
St. Mark's Hospital	--	▼
Timpanogos Regional Hospital	**	▲
University Hospital	△	▼
Utah Valley Regional Medical Center	▼	▲

+Source: NHSN data
*Data not available at this time for children's hospitals

SIR

▼ Statistically **FEWER** infections than national baseline

▲ Statistically **MORE** infections than national baseline

-- Predicted to have less than one infection for the year, but had one or more infections, as defined by NHSN, in 2016

** Predicted to have less than one infection for the year, and did **NOT** have an infection, as defined by NHSN, in 2016

▽ **FEWER** infections than national baseline, but not statistically different

△ **MORE** infections than national baseline, but not statistically different

SUR

▼ Statistically **FEWER** devices utilized than national baseline

▲ Statistically **MORE** devices utilized than national baseline

▽ **FEWER** devices utilized than national baseline, but not statistically different

△ **MORE** devices utilized than national baseline, but not statistically different

Figure 3. Central line-associated bloodstream infections in long-term acute care facilities, Utah, 2016+

Hospital	SIR	SUR
State of Utah	▽	▲
Landmark Hospital	▲	▲
Promise Hospital	▼	▲
Specialty Hospital of Utah	△	▲
Utah Valley Specialty Hospital	▽	▲

+Source: NHSN data

SIR

▼ Statistically **FEWER** infections than national baseline

▲ Statistically **MORE** infections than national baseline

-- Predicted to have less than one infection for the year, but had one or more infections, as defined by NHSN, in 2016

** Predicted to have less than one infection for the year, and did **NOT** have an infection, as defined by NHSN, in 2016

▽ **FEWER** infections than national baseline, but not statistically different

△ **MORE** infections than national baseline, but not statistically different

SUR

▼ Statistically **FEWER** devices utilized than national baseline

▲ Statistically **MORE** devices utilized than national baseline

▽ **FEWER** devices utilized than national baseline, but not statistically different

△ **MORE** devices utilized than national baseline, but not statistically different

Figure 4. Central-line-associated bloodstream infections in inpatient non-intensive care locations in acute care facilities, Utah, 2016+

Hospital	SIR	SUR
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	**	▼
Heber Valley Hospital	**	▼
Intermountain Medical Center	▽	▼
Jordan Valley Medical Center	**	▼
Jordan Valley Medical Center West Valley Campus	--	▼
Lakeview Hospital	**	▽
LDS Hospital	▽	△

Hospital	SIR	SUR
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 Medical Center	**	▼
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 Regional Medical Center	▼	▲

+Source: NHSN data

SIR

▼ Statistically **FEWER** infections than national baseline

▲ Statistically **MORE** infections than national baseline

-- Predicted to have less than one infection for the year, but had one or more infections, as defined by NHSN, in 2016

** Predicted to have less than one infection for the year, and did **NOT** have an infection, as defined by NHSN, in 2016

▽ **FEWER** infections than national baseline, but not statistically different

△ **MORE** infections than national baseline, but not statistically different

SUR

▼ Statistically FEWER devices utilized than national baseline

▲ Statistically MORE devices utilized than national baseline

▽ FEWER devices utilized than national baseline, but not statistically different

△ MORE devices utilized than national baseline, but not statistically different

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 in 2016 were reported by:

Long-term acute care facilities for all inpatients	Acute care facilities for all admitted to an adult, pediatric, or neonatal intensive care unit	Acute care facilities for all admitted to an adult or pediatric medical, surgical, or medical/surgical wards

According to the Centers for Disease Control and Prevention (CDC),

75%

of UTIs acquired in hospitals are associated with urinary catheters.

Between

15-25%

of hospital patients receive a urinary catheter at some point in their stay

A Look at CAUTIs in Utah in 2016

102 ICU-related CAUTIs in acute care facilities

▲ 31% more CAUTIs in Utah acute care facilities compared to the national baseline

11 CAUTIs in inpatient rehabilitation facilities (IRFs)

▲ 241% more CAUTIs in Utah IRFs compared to the national baseline

15 CAUTIs in long-term acute care (LTAC) facilities

▼ 35% fewer CAUTIs in Utah LTAC facilities compared to the national baseline

69 CAUTIs in inpatient non-intensive care locations in acute care facilities

▲ 23% more CAUTIs in Utah acute care facilities compared to the national baseline

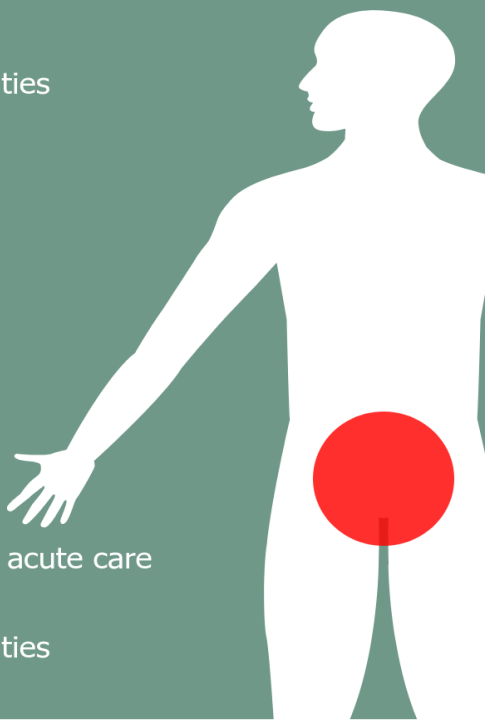


Figure 5. Catheter-associated urinary tract infections in adult and pediatric intensive care units in acute care facilities, Utah, 2016+

Hospital	SIR	SUR
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	**	▼

Hospital	SIR	SUR
State of Utah	▲	▼
McKay Dee Hospital	▽	▲
Mountain Point Medical Center	**	▼
Mountain View Hospital	**	▲
Mountain West Medical Center	**	△
Ogden Regional Medical Center	△	▲
Park City 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 Regional Medical Center	▽	▲

+Source: NHSN data

SIR

▼ Statistically **FEWER** infections than national baseline

▲ Statistically **MORE** infections than national baseline

-- Predicted to have less than one infection for the year, but had one or more infections, as defined by NHSN, in 2016

** Predicted to have less than one infection for the year, and did **NOT** have an infection, as defined by NHSN, in 2016

▽ **FEWER** infections than national baseline, but not statistically different

△ **MORE** infections than national baseline, but not statistically different

SUR

▼ Statistically **FEWER** devices utilized than national baseline

▲ Statistically **MORE** devices utilized than national baseline

▽ **FEWER** devices utilized than national baseline, but not statistically different

△ **MORE** devices utilized than national baseline, but not statistically different

Figure 6. Catheter-associated urinary tract infections in in-patient rehabilitation facilities, Utah, 2016+

Hospital	SIR	SUR
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

SIR

▼ Statistically **FEWER** infections than national baseline

▲ Statistically **MORE** infections than national baseline

-- Predicted to have less than one infection for the year, but had one or more infections, as defined by NHSN, in 2016

** Predicted to have less than one infection for the year, and did **NOT** have an infection, as defined by NHSN, in 2016

▽ **FEWER** infections than national baseline, but not statistically different

△ **MORE** infections than national baseline, but not statistically different

SUR

▼ Statistically **FEWER** devices utilized than national baseline

▲ Statistically **MORE** devices utilized than national baseline

▽ **FEWER** devices utilized than national baseline, but not statistically different

△ **MORE** devices utilized than national baseline, but not statistically different

Figure 7. Catheter-associated urinary tract infections in long-term acute care facilities, Utah, 2016+

Hospital	SIR	SUR
State of Utah	▽	▲
Landmark Hospital	▽	▲
Promise Hospital	▼	▽
Specialty Hospital of Utah	△	▼
Utah Valley Specialty Hospital	△	▲

+Source: NHSN data

SIR

▼ Statistically **FEWER** infections than national baseline

▲ Statistically **MORE** infections than national baseline

-- Predicted to have less than one infection for the year, but had one or more infections, as defined by NHSN, in 2016

** Predicted to have less than one infection for the year, and did **NOT** have an infection, as defined by NHSN, in 2016

▽ **FEWER** infections than national baseline, but not statistically different

△ **MORE** infections than national baseline, but not statistically different

SUR

▼ Statistically **FEWER** devices utilized than national baseline

▲ Statistically **MORE** devices utilized than national baseline

▽ **FEWER** devices utilized than national baseline, but not statistically different

△ **MORE** devices utilized than national baseline, but not statistically different

Figure 8. Catheter-associated urinary tract infections in inpatient non-intensive care locations in acute care facilities, Utah, 2016+

Hospital	SIR	SUR
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	**	▼
Heber Valley Hospital	**	▲
Intermountain Medical Center	▲	▼
Jordan Valley Medical Center	△	▲
Jordan Valley Medical Center West Valley Campus	**	▲
Lakeview Hospital	**	▲
LDS Hospital	△	▼

Hospital	SIR	SUR
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 Medical Center	**	▼
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

SIR

▼ Statistically **FEWER** infections than national baseline

▲ Statistically **MORE** infections than national baseline

-- Predicted to have less than one infection for the year, but had one or more infections, as defined by NHSN, in 2016

** Predicted to have less than one infection for the year, and did **NOT** have an infection, as defined by NHSN, in 2016

▽ **FEWER** infections than national baseline, but not statistically different

△ **MORE** infections than national baseline, but not statistically different

SUR

▼ Statistically FEWER devices utilized than national baseline

▲ Statistically MORE devices utilized than national baseline

▽ FEWER devices utilized than national baseline, but not statistically different

△ MORE devices utilized than national baseline, but not statistically different

Surgical Site Infections (SSIs)

A surgical site infection is an infection that occurs after surgery in 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, which accounts for **31%** of all HAIs in hospitalized patients. [10]

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 performed for treatment of colon cancer, to repair colon damage, or treat diseases such as diverticulitis and inflammatory bowel disease.

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.

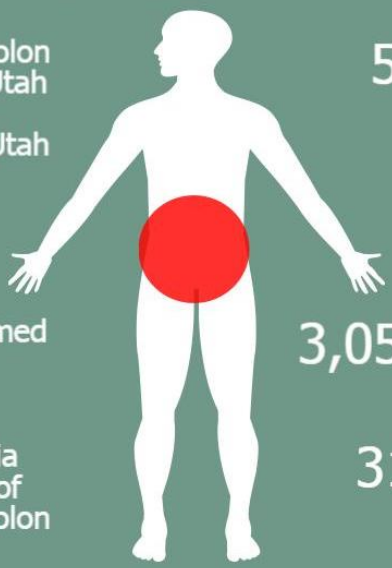
A Look at SSIs in Utah in 2016

138 SSIs associated with colon surgeries reported in Utah

▲ 28% more SSIs in Utah acute care facilities compared to the national baseline

2,230 colon surgeries performed

32 facilities met the criteria for required reporting of SSIs associated with colon surgeries



51 SSIs associated with abdominal hysterectomies reported in Utah

▲ 33% more SSIs in Utah acute care facilities compared to the national baseline

3,054 abdominal hysterectomy surgeries performed

31 facilities met the criteria for required reporting of SSIs associated with colon surgeries

NHSN surveillance definitions accommodate for patient risk factors for surgical site infections after associated colon surgery and abdominal hysterectomy.

Figure 9. Surgical site infections associated with colon surgeries in acute care facilities, Utah, 2016+

Hospital	SIR
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	▼

+Source: NHSN data

▼ Statistically **FEWER** infections than national baseline

▲ Statistically **MORE** infections than national baseline

-- Predicted to have less than one infection for the year, but had one or more infections, as defined by NHSN, in 2016

** Predicted to have less than one infection for the year, and did **NOT** have an infection, as defined by NHSN, in 2016

▽ **FEWER** infections than national baseline, but not statistically different

△ **MORE** infections than national baseline, but not statistically different

Figure 10. Surgical site infections associated with abdominal hysterectomy surgeries in acute care facilities, Utah, 2016[+]

Hospital	SIR
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	**
Heber Valley Hospital	**
Intermountain Medical Center	▽
Jordan Valley Medical Center	--
Jordan Valley Medical Center 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 Medical Center	**
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	△

[+]Source: NHSN data

▼ Statistically **FEWER** infections than national baseline

▲ Statistically **MORE** infections than national baseline

-- Predicted to have less than one infection for the year, but had one or more infections, as defined by NHSN, in 2016

** Predicted to have less than one infection for the year, and did **NOT** have an infection, as defined by NHSN, in 2016

▽ **FEWER** infections than national baseline, but not statistically different

△ **MORE** infections than national baseline, but not statistically different

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

15,000

deaths every year. [7]

The Centers for Disease Control and Prevention (CDC) has classified *C. difficile* as an

urgent drug-related threat

to patients in the United States

HAZARD LEVEL
URGENT

A Look at *C. difficile* in Utah in 2016

603 hospital-onset *C. difficile* infections were reported in acute care facilities

7% more *C. difficile* infections in Utah acute care facilities compared to the national baseline

45 facilities met the criteria for reporting of *C. difficile* infections

2 of Utah's facilities had significantly fewer infections compared to what was expected nationally

4 of Utah's facilities had significantly higher infections compared to what was expected nationally

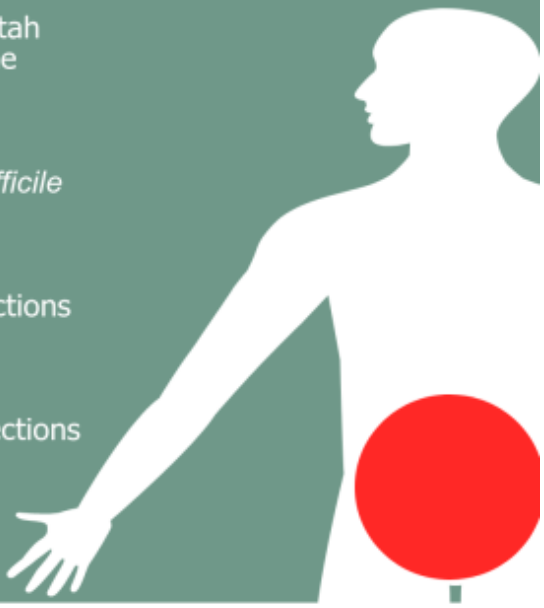


Figure 11. *C. difficile* infections in acute care facilities, Utah, 2016[+]

Hospital	SIR
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	**
HealthSouth Rehabilitation Hospital of Utah	▽
Heber Valley Hospital	**
Intermountain Medical Center	▲
Jordan Valley Medical Center	▲
Jordan Valley Medical Center West Valley Campus	▲
Lakeview Hospital	▲
Landmark Hospital	▲
LDS Hospital	▲
Logan Regional Hospital	▽
Lone Peak Hospital	▲
McKay Dee Hospital	▽

Hospital	SIR
State of Utah	▲
Mountain Point Medical Center	▽
Mountain View Hospital	▽
Mountain West Medical Center	▲
Northern Utah Rehabilitation Hospital	▽
Ogden Regional Medical Center	▲
Orem Community Hospital	**
Park City Medical Center	▽
Primary Children's Hospital	▲
Promise Hospital of Salt Lake	▼
Riverton Hospital	▽
Salt Lake Regional Medical Center	▲
Sanpete Valley Hospital	--
Sevier Valley Hospital	**
Shriners	**
South Davis Community Hospital	▽
St. Mark's Hospital	▲
The Orthopedic Specialty Hospital	**
Timpanogos Regional Hospital	▽
Uintah Basin Medical Center	▽
University Hospital	▲
Utah Valley Hospital	▽
Utah Valley Specialty Hospital	▲

[+]Source: NHSN data

▼ Statistically **FEWER** infections than national baseline

▲ Statistically **MORE** infections than national baseline

-- Predicted to have less than one infection for the year, but had one or more infections, as defined by NHSN, in 2016

** Predicted to have less than one infection for the year, and did **NOT** have an infection, as defined by NHSN, in 2016

▽ **FEWER** infections than national baseline, but not statistically different

△ **MORE** infections than national baseline, but not statistically different

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 healthcare 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]

The Centers for Disease Control and Prevention (CDC) has classified C. difficile as an

urgent drug-related threat

to patients in the United States.

HAZARD LEVEL
SERIOUS

A Look at MRSA Bacteremia in Utah in 2016

34 MRSA bacteremia infections were reported

▼ 36% fewer MRSA bacteremia infections in Utah acute care facilities compared to the national baseline

44 facilities met the criteria for required reporting of MRSA bacteremia infections

32 had infections not statistically significant from what was expected nationally

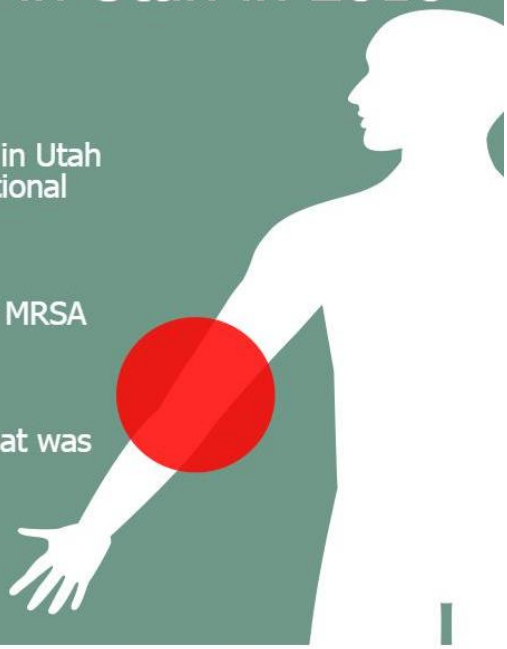


Figure 12. Methicillin-resistant *Staphylococcus aureus* bacteremia in acute care facilities, Utah, 2016+

Hospital	SIR
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	**
HealthSouth Rehabilitation Hospital of Utah	**
Heber Valley Hospital	**
Intermountain Medical Center	▽
Jordan Valley Medical Center	△
Jordan Valley Medical Center West Valley Campus	--
Lakeview Hospital	--
Landmark Hospital	**
LDS Hospital	▽
Logan Regional Hospital	**
Lone Peak Hospital	**

Hospital	SIR
State of Utah	▼
McKay Dee Hospital	▽
Mountain Point Medical Center	**
Mountain View Hospital	**
Mountain West Medical Center	**
Northern Utah Rehabilitation Hospital	**
Ogden Regional Medical Center	▽
Orem Community Hospital	**
Park City Medical Center	**
Primary Children's Hospital	△
Promise Hospital of Salt Lake	▽
Riverton Hospital	**
Salt Lake Regional Medical Center	**
Sanpete Valley Hospital	**
Sevier Valley Hospital	**
South Davis Community Hospital	▽
St. Mark's Hospital	▽
The Orthopedic Specialty Hospital	**
Timpanogos Regional Hospital	--
Uintah Basin Medical Center	--
University Hospital	▽
Utah Valley Hospital	▽
Utah Valley Specialty Hospital	▽

+Source: NHSN data

▼ Statistically **FEWER** infections than national baseline

▲ Statistically **MORE** infections than national baseline

-- Predicted to have less than one infection for the year, but had one or more infections, as defined by NHSN, in 2016

** Predicted to have less than one infection for the year, and did **NOT** have an infection, as defined by NHSN, in 2016

▽ **FEWER** infections than national baseline, but not statistically different

△ **MORE** infections than national baseline, but not statistically different

Dialysis Infection Events

The kidneys perform several critical functions:

- Clean blood
- Remove excess fluid from the body
- Produce hormones needed for important bodily functions

When the kidneys are unable to perform these functions, they can fail, resulting in the need for hemodialysis.

Hemodialysis is 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:

Number of patients requiring initiation of intravenous antimicrobial therapy	Number of patients with laboratory results indicating infection in their bloodstream	Patients with signs and symptoms of vascular access infections (i.e., redness, swelling, and/or pus)

A Look at Dialysis Infections in Utah in 2016

110 dialysis infection events were reported
▼ 1% fewer dialysis infections in Utah dialysis facilities compared to the national baseline

36 facilities met the criteria for required reporting of dialysis infection events

3 of Utah's facilities had significantly fewer infections compared to what was expected nationally

2 of Utah's facilities had significantly fewer infections compared to what was expected nationally

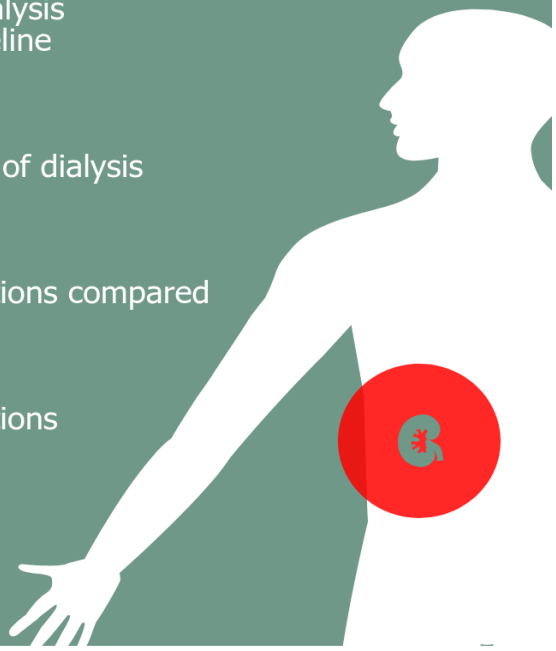


Figure 13. Dialysis event bloodstream infections, Utah, 2016[+]

Facility	SIR
State of Utah	▽
American Fork Dialysis Center	▽
Blue Mountain Hospital Dialysis Center	△
Bonneville Dialysis Center	△
Castleview Dialysis Center	▽
Farmington Bay Dialysis Center	▽
Hurricane Dialysis	**
Intermountain Medical Center Dialysis Center	▽
Iron Mission Dialysis Center	△
Kolff Dialysis Center	△
Lakeside Dialysis Center	△
Liberty Dialysis Layton	▼
Liberty Dialysis St. George	△
Liberty Dialysis West Jordan	▽
Logan Regional Dialysis Center	▽
Lone Peak Dialysis	△
Mark Lindsay Dialysis Center	△
Oquirrh Artificial Kidney Center	▽
Payson Regional Dialysis	△

Facility	SIR
State of Utah	▽
Pleasant View Dialysis Center	△
Primary Children's Dialysis Center	▲
Provo Dialysis	▽
Sevier Valley Dialysis	▽
South Mountain Dialysis	▽
South Valley Dialysis Center	▽
Tooele Valley Dialysis	▽
UBMC Dialysis Roosevelt	▽
Uintah Basin Medical Center Dialysis Vernal	--
University of Utah Dialysis Program Dixie Dialysis	▲
Utah Dialysis Center	▽
Utah Valley Dialysis Center	▲
Wasatch Artificial Kidney Center	▼
Weber Valley Dialysis	△
West Bountiful Dialysis	--
West Valley Dialysis Clinic	▼
Woods Cross Dialysis	△

[+]Source: NHSN

▼ Statistically **FEWER** infections than national baseline

▲ Statistically **MORE** infections than national baseline

-- Predicted to have less than one infection for the year, but had one or more infections, as defined by NHSN, in 2016

** Predicted to have less than one infection for the year, and did **NOT** have an infection, as defined by NHSN, in 2016

▽ **FEWER** infections than national baseline, but not statistically different

△ **MORE** infections than national baseline, but not statistically different

Data Quality Validation

Background

The UDOH is required under Utah Title 26-6-31, Public Reporting of Healthcare Associated Infections, to validate data reported to NHSN. Guidance from the CDC helped to guide the selection of infection types for validation of 2016 NHSN data. This guidance included the use of results of TAP reports to prioritize activities, an increased focus on antimicrobial resistance and activities directed towards *C. difficile* prevention, and a change in focus of prevention efforts to target networks among healthcare facilities, not specific facility types. This information led UDOH to perform validation of CAUTIs and *C. difficile* infection (CDI) LabID events.

The focus of these validation activities was to determine how NHSN CAUTI and CDI LabID event surveillance definitions were interpreted and applied to data collection. The validations were performed by the UDOH Healthcare-Associated Infections and Antimicrobial Resistance Program at 15 healthcare facilities throughout the state. Facilities were chosen based on an NHSN targeted selection process from the NHSN External Validation Guidance and Toolkit for 2016. The facility selection process was targeted to prioritize validation of facilities where HAIs were most expected. This method compared facilities' SIR and cumulative attributable difference (CAD) scores to help identify those facilities with high risk of HAIs, but also those facilities whose scores showed that they were performing well in their practices to prevent infection.

Validation activities are intended to compare reported information in NHSN with UDOH audit findings and outcomes to enhance accuracy and completeness of CAUTI and CDI LabID 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

An on-site medical record audit was conducted at the chosen healthcare facilities. Each visit started with an interview of at least one member of the infection prevention staff to learn about surveillance methodology, data collection, and personal training and education on applying NHSN criteria. CDC TAP Facility Assessment Tools for CAUTI and CDI were also utilized at each facility to determine current prevention practices and make recommendations based upon the responses. In each facility, up to 20 charts of patients who were determined to have a CAUTI in 2016 were reviewed to determine if they correctly met the CAUTI criteria, and up to 30 charts of patients who had a positive urine culture (a urine culture with no more than two species of organisms identified, at least one of which is a bacterium of $>10^5$ CFU/mL), but were not classified as a CAUTI, were also reviewed to determine if any reportable infections were missed. Additionally, up to 50 charts of patients with a positive laboratory test result for *C. difficile* toxin A and/or B, or a toxin-producing *C. difficile* organism detected by culture or other laboratory means, were reviewed to ensure all reportable CDI LabID were reported to NHSN in 2016. 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

UDOH auditors reviewed

475 urine cultures and **359** toxin-positive *C. difficile* tests

Auditors used CAUTI and CDI LabID event criteria from the 2016 NHSN Patient Safety Component Manual

CAUTI

- **73** total CAUTIs identified by auditors
- **68** CAUTIs reported by healthcare facilities
- **2** CAUTIs reported by facilities did not meet the NHSN criteria
- **5** additional CAUTIs identified by auditors

CDI

- **373** reportable CDI identified by auditors
- **345** CDI reported by healthcare facilities
- **28** additional CDI identified by auditors

Prevention Success Stories from Validation Facilities

- Some facilities are conducting full reviews of every infection, which may include root cause analyses (RCA) and staff interviews.
- New technologies are being used for cleaning and disinfection, such as UV lights and hydrogen peroxide mist systems.
- Facilities are taking multidisciplinary team approaches to prevention activities.
- Many facilities have created active hand hygiene campaigns, including effective key phrases for hand hygiene reminders.
- Facilities are working to incorporate prevention activities into daily patient care activities and rounding.
- Infection preventionists serve as key members of their antimicrobial stewardship teams.

The accuracy and completeness of HAI surveillance can be calculated.

Sensitivity

Answers the question, "How likely are patients with an infection accurately identified as having an infection?"

Routine surveillance performed by these facilities identified

93% of the CAUTIs occurring and

92% of the reportable CDI occurring

Specificity

Answers the question, "How likely are patients without an infection accurately identified as not having an infection?"

The calculated specificity reveals surveillance accurately "ruled out"

CAUTIs 99% of the time and

non-reportable CDI 100% of the time

Positive Predictive Value (PPV)

Represents the proportion of HAIs reported that met the surveillance criteria accurately.

The PPV reveals that surveillance identified

CAUTIs met the NHSN surveillance criteria 97% of the time and

reportable CDI met NHSN reporting criteria 100% of the time

Conclusions

Validation results indicate that the number of CAUTIs generally as accurate as reported surveillance data prior to validation activities. However, the number of CDI LabID events is much higher than initially indicated by reported surveillance data before validation activities took place.

Most infection preventionists at the validated facilities were able to correctly determine which patients met the CAUTI definition and apply the definition appropriately. When performing CAUTI validation, the criteria used to meet the definition included: a urine culture with no more than two species of organisms identified, at least one of which is a bacterium of >105 CFU/mL; an indwelling urinary catheter that had been in place for greater than two days on the date of event, and appropriate signs and symptoms that were present at the appropriate time during the infection window period. If no signs or symptoms were present but all other criteria were met, then a blood specimen with at least one matching bacterium to the bacterium in the urine specimen could be used to meet criteria for a CAUTI.

When performing validation of CDI LabID events, a specific set of criteria must be followed that are different than criteria followed for other healthcare-associated infection types. There was some confusion among infection preventionists about reporting of CDI LabID events. Some facilities mistakenly classified toxin-positive *C. difficile* tests collected within the first two days of admission as present on admission (POA); however, the POA classification does not apply to LabID events. These events within the first two days of admission would be categorized by NHSN as community-onset (CO) events, and events reported to NHSN with this classification will be included in the facility's risk adjusted SIR. Excluding these events from NHSN reporting can lead to a falsely increased SIR because the model to calculate the SIR has not been risk-adjusted based on the number of CO events reported. Also, several facilities were not aware that the NHSN LabID event criteria includes a 14-day rule to determine if a positive CDI test is a duplicate test. A duplicate *C. difficile*-positive test is defined as any *C. difficile*-toxin positive lab result from the same patient and locations, following a previous *C. difficile* toxin-positive lab result within the past two weeks (14 days). Healthcare facilities do not need to report these events to NHSN, as they will be excluded from calculations of CDI LabID rates and SIRs.

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, 2016

	Number of HAI device days	Number of HAI device events	Predicted number of HAI device events	Standardized Infection Ratio	95% Confidence Interval	Predicted number of HAI device days	Standardized Utilization Ratio	95% Confidence Interval
State of Utah	#	#	#	#	#	#	#	#
Facility A	5,817	8	13	.62	0.26-1.21	6,000	0.97	0.94-0.99
1	2	3	4	5	6	7	8	9

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 facility populations 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.
7. The predicted number of HAI device days is adjusted to allow facilities to be more fairly compared. Risk adjustments account for differences in facility populations 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 higher device days than a facility that uses fewer devices and has healthier patients. The predicted number of HAI device days for Facility A, based on comparison to a national HAI benchmark of similar hospitals, is calculated as 6,000.
8. The Standardized Utilization Ratio (SUR) is comparable to Device Utilization Rates (DURs) because they both measure device utilization, but they are slightly different in the way they are calculated. SURs are a scalable, risk-adjusted measure that can be compared across locations and facilities because they are risk-adjusted-accordingly. Whereas, DURs can only be compared amongst the same location. SURs can also indicate whether the observed number of device utilization days is better, worse, or the same than the predicted number of device utilization days.
9. A confidence interval (CI) will be provided if a SUR was estimated for a given healthcare facility. A CI describes the uncertainty associated with the SUR estimate. Facilities with more device days will have a narrower CI, which means there is less doubt associated with the accuracy of the SUR 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, 2016[+]

	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]	Predicted number of central line days[6]	Standardized Utilization Ratio[7]	95% Confidence Interval[8]
State of Utah	**51,614**	**50**	**59.56**	**0.84**	**0.63 – 1.10**	**54,089**	**0.95**	**0.95 – 0.96**
Alta View Hospital	125	0	0.08	**	**	239	0.52	0.44 – 0.62
American Fork Hospital	609	0	0.41	**	**	440	1.38	1.28 – 1.50
Ashley Regional Medical Center	90	0	0.06	**	**	134	0.67	0.54 – 0.82
Cache Valley Hospital	5	0	0.00	**	**	2.3	2.17	0.80 – 4.82
Castleview Hospital	33	0	0.02	**	**	206	0.16	0.11 – 0.22
Cedar City Hospital	266	0	0.18	**	**	161	1.65	1.46 – 1.86
Davis Hospital & Medical Center	1,112	3	1.12	2.68	0.68 – 7.29	1,360	0.82	0.77 – 0.87
Dixie Regional Medical Center	3,720	4	3.23	1.24	0.39 – 2.99	2,770	1.34	1.30 – 1.39
Intermountain Medical Center	8,574	17	9.67	1.76	1.06 – 2.76	10,941	0.78	0.77 – 0.80
Jordan Valley Hospital	767	2	0.58	--	--	1,090	0.70	0.65 – 0.75
Jordan Valley Hospital West Valley Campus	672	1	0.51	--	--	841	0.80	0.74 – 0.86
Lakeview Hospital	600	0	0.45	**	**	345	1.74	1.60 – 1.88
LDS Hospital	969	1	0.98	--	--	1,022	0.95	0.89 – 1.01
Logan Regional Hospital	309	0	0.23	**	**	723	0.43	0.38 – 0.48
McKay Dee Hospital	2,931	2	2.95	0.68	0.11 – 2.24	1,928	1.52	1.47 – 1.58
Mountain Point Medical Center	144	0	0.10	**	**	362	0.40	0.34 – 0.47
Mountain View Hospital	678	0	0.51	**	**	533	1.27	1.18 – 1.37
Mountain West Medical Center	124	0	0.08	**	**	71	1.76	1.47 – 2.09
Ogden Regional Medical Center	1,842	1	1.39	0.72	0.04 – 3.55	1,328	1.39	1.33 – 1.45
Primary Children's Hospital	4,579	7	7.61	0.92	0.40 – 3.55	5,279	0.87	0.84 – 0.89
Riverton Hospital	60	0	0.04	**	**	150	0.40	0.31 – 0.51
Salt Lake Regional Medical Center	1,649	1	1.44	0.69	0.03 – 3.42	2,137	0.77	0.74 – 0.81
St. Mark's Hospital	1,960	1	1.97	0.51	0.03 – 2.50	2,246	0.87	0.83 – 0.91
Timpanogos Regional Hospital	1,108	3	0.83	--	--	1,041	1.06	1.00 – 1.13
Uintah Basin Medical Center	77	0	0.05	**	**	261	0.29	0.23 – 0.37
University Hospital[§]	11,914	7	18.33	0.38	0.17 – 0.76	13,283	0.90	0.88 – 0.91
Utah Valley Hospital	6,631	0	6.68	0.00	0.00 – 0.45	5,068	1.31	1.28 – 1.34

[+]Source: NHSN data.

See footnotes on page 40.

Table 2. Central line-associated bloodstream infections in inpatient non-intensive care locations in acute care facilities, Utah, 2016+

	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]	Predicted number of central line days[6]	Standardized Utilization Ratio[7]	95% Confidence Interval[8]
State of Utah	**50,892**	**33**	**43.51**	**0.76**	**0.53 – 1.05**	**56,421**	**0.90**	**0.89 – 0.92**
Alta View Hospital	215	0	0.12	**	**	512	0.42	0.37 – 0.48
American Fork Hospital	983	0	0.57	**	**	648	1.52	1.43 – 1.61
Ashley Regional Medical Center	72	0	0.04	**	**	150	0.48	0.38 – 0.60
Bear River Valley Hospital	18	0	0.01	**	**	59	0.31	0.19 – 0.47
Beaver Valley Hospital	0	0	0.00	**	**	55	0.00	0.00 – 0.05
Brigham City Community Hospital	52	0	0.03	**	**	80	0.65	0.49 – 0.85
Cache Valley Hospital	87	0	0.05	**	**	121	0.72	0.58 – 0.88
Castleview Hospital	196	0	0.11	**	**	165	1.19	1.03 – 1.36
Cedar City Hospital	759	0	0.44	**	**	282	2.69	2.51 – 2.89
Davis Hospital & Medical Center	457	0	0.40	**	**	965	0.47	0.43 – 0.52
Delta Community Hospital	38	0	0.01	**	**	62	0.61	0.44 – 0.83
Dixie Regional Medical Center	4,915	3	3.43	0.87	0.22 – 2.38	3,588	1.37	1.33 – 1.41
Fillmore Community Hospital	86	0	0.02	**	**	257	0.34	0.27 – 0.41
Garfield Memorial Hospital	28	0	0.01	**	**	83	0.34	0.23 – 0.48
Heber Valley Medical Center	5	0	0.00	**	**	51	0.10	0.04 – 0.22
Intermountain Medical Center	10,167	7	9.57	0.73	0.32 – 1.45	14,347	0.71	0.69 – 0.72
Jordan Valley Hospital	959	0	0.53	**	**	1,721	0.56	0.52 – 0.59
Jordan Valley Hospital West Valley Campus	270	1	0.18	--	--	566	0.48	0.42 – 0.54
Lakeview Hospital	344	0	0.22	**	**	374	0.92	0.83 – 1.02
LDS Hospital	1,894	1	1.65	0.61	0.03 – 2.99	1,835	1.03	0.99 – 1.08
Logan Regional Hospital	535	0	0.35	**	**	858	0.62	0.57 – 0.68
Lone Peak Hospital	156	0	0.09	**	**	141	1.10	0.94 – 1.29
McKay Dee Hospital	941	1	0.70	--	--	1,368	0.69	0.64 – 0.73
Mountain Point Medical Center	42	0	0.02	**	**	37	1.15	0.84 – 1.54
Mountain View Hospital	453	0	0.29	**	**	363	1.25	1.14 – 1.37
Mountain West Medical Center	142	0	0.08	**	**	150	0.95	0.80 – 1.11
Ogden Regional Medical Center	1,501	2	0.98	--	--	1,494	1.00	0.96 – 1.06
Orem Community Hospital	2	0	0.00	**	**	11	0.18	0.03 – 0.58
Park City Hospital	107	0	0.06	**	**	191	0.56	0.46 – 0.67

Table 2 continued

	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]	Predicted number of central line days[6]	Standardized Utilization Ratio[7]	95% Confidence Interval[8]
Primary Children's Hospital	6,226	6	7.09	0.85	0.34 – 1.76	6,830	0.91	0.89 – 0.93
Riverton Hospital	232	1	0.15	--	--	631	0.37	0.32 – 0.42
Salt Lake Regional Medical Center	388	0	0.18	**	**	534	0.73	0.60 – 0.88
Sanpete Valley Hospital	100	0	0.03	**	**	119	0.84	0.69 – 1.02
Sevier Valley Hospital	108	0	0.06	**	**	147	0.73	0.60 – 0.88
St. Mark's Hospital	1,891	1	1.42	0.70	0.04 – 3.46	2,299	0.82	0.79 – 0.86
Timpanogos Regional Hospital	515	0	0.34	**	**	337	1.53	1.40 – 1.66
Uintah Basin Medical Center	223	0	0.13	**	**	242	0.92	0.81 – 1.05
University Hospital[§]	10,714	10	10.07	0.99	0.50 – 1.77	11,168	0.96	0.94 – 0.98
Utah Valley Hospital	4,995	0	4.01	0.00	0.00 – 0.75	3,525	1.42	1.38 – 1.46

[+]Source: NHSN data.

See footnotes on page 40.

Table 3. Central line-associated bloodstream infections in newborn intensive care units in acute care facilities, Utah, 2016[+]

	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]	Predicted number of central line days[6]	Standardized Utilization Ratio[7]	95% Confidence Interval[8]
State of Utah	**17,796***	**12**	**22.34**	**0.54**	**0.29 – 0.91**	**13,775 ***	**0.79***	**0.79* – 0.8**
Ashley Regional Medical Center	6	0	0.00	**	**	19	0.32	0.13 – 0.66
Davis Hospital & Medical Center	116	0	0.18	**	**	325	0.36	0.30 – 0.43
Dixie Regional Medical Center	349	0	0.48	**	**	532	0.66	0.59 – 0.73
Intermountain Medical Center	2,032	1	2.61	0.38	0.02 – 1.89	2,556	0.79	0.76 – 0.83
Jordan Valley Hospital	693	0	0.55	**	**	418	1.66	1.54 – 1.78
Logan Regional Hospital	242	0	0.17	**	**	212	1.14	1.01 – 1.30
McKay Dee Hospital	741	2	1.08	1.84	0.31 – 6.09	1,387	0.53	0.50 – 0.57
Ogden Regional Medical Center	231	0	0.35	**	**	472	0.49	0.43 – 0.56
Primary Children's Hospital	6,713	4	7.84	0.51	0.16 – 1.23	N/A	N/A	N/A
St. Mark's Hospital	559	1	0.56	--	--	876	0.64	0.59 – 0.69
Timpanogos Regional Hospital	527	0	0.50	**	**	470	1.12	1.03 – 1.22
University Hospital[§]	2,361	4	3.36	1.19	0.38 – 2.87	3,781	0.62	0.60 – 0.65
Utah Valley Hospital	3,226	0	4.66	0.00	0.00 – 0.64	2,726	1.18	1.14 – 1.22

[+]Source: NHSN data.

See footnotes on page 41.

Table 4. Catheter-associated urinary tract infections in adult and pediatric intensive care units in acute care facilities, Utah, 2016[+]

	Number of catheter days[1]	Number of CAUTI events[2]	Predicted number of CAUTI events[3]	Standardized Infection Ratio[4]	95% Confidence Interval[5]	Number of predicted catheter days[6]	Standardized Utilization Ratio[7]	95% Confidence Interval[8]
State of Utah	**58,519**	**102**	**77.93**	**1.31**	**1.07 – 1.58**	**62,660**	**0.93**	**0.93 – 0.94**
Alta View Hospital	235	1	0.13	--	--	398	0.59	0.52 – 0.67
American Fork Hospital	643	1	0.47	--	--	733	0.88	0.81 – 0.95
Ashley Regional Medical Center	200	0	0.11	**	**	324	0.62	0.54 – 0.71
Cache Valley Hospital	5	0	0.00	**	**	5.6	0.90	0.33 – 2.00
Castleview Hospital	87	1	0.05	--	--	498	0.17	0.14 – 0.21
Cedar City Hospital	355	0	0.22	**	**	389	0.91	0.82 – 1.01
Davis Hospital & Medical Center	1,639	1	1.67	0.60	0.03 – 2.95	1,929	0.85	0.81 – 0.89
Dixie Regional Medical Center	4,349	0	3.90	0.00	0.00 – 0.77	3,930	1.11	1.07 – 1.14
Intermountain Medical Center	10,512	34	17.24	1.97	1.39 – 2.72	11,867	0.89	0.87 – 0.90
Jordan Valley Hospital	1,151	3	0.84	--	--	1,547	0.74	0.70 – 0.79
Jordan Valley Hospital West Valley Campus	1,240	1	0.91	--	--	1,401	0.89	0.84 – 0.94
Lakeview Hospital	765	0	0.57	**	**	574	1.33	1.24 – 1.43
LDS Hospital	1,094	0	1.12	0.00	0.00 – 2.68	1,450	0.75	0.71 – 0.80
Logan Regional Hospital	679	0	0.51	**	**	1,204	0.56	0.52 – 0.61
McKay Dee Hospital	2,914	1	2.98	0.34	0.02 – 1.66	2,371	1.23	1.18 – 1.27
Mountain Point Medical Center	257	0	0.14	**	**	873	0.29	0.26 – 0.33
Mountain View Hospital	971	0	0.71	**	**	887	1.09	1.03 – 1.16
Mountain West Medical Center	174	0	0.10	**	**	170	1.02	0.88 – 1.18
Ogden Regional Medical Center	2,328	4	1.70	2.35	0.75 – 5.67	1,884	1.24	1.19 – 1.29
Primary Children's Hospital	2,309	4	3.51	1.14	0.36 – 2.75	1,579	1.46	1.40 – 1.52
Riverton Hospital	135	0	0.10	**	**	250	0.54	0.45 – 0.64
Salt Lake Regional Medical Center	1,721	0	1.43	0.00	0.00 – 2.09	3,032	0.57	0.54 – 0.59
St. Mark's Hospital	3,189	1	3.26	0.31	0.02 – 1.51	2,763	1.15	1.11 – 1.19
Timpanogos Regional Hospital	1,516	0	1.18	0.00	0.00 – 2.54	1,576	0.96	0.91 – 1.01
Uintah Basin Medical Center	229	0	0.13	**	**	630	0.36	0.32 – 0.41
University Hospital[§]	12,633	44	27.71	1.59	1.17 – 2.11	13,853	0.91	0.90 – 0.93
Utah Valley Hospital	7,061	6	7.21	0.83	0.34 – 1.73	6,234	1.13	1.11 – 1.16

[+]Source: NHSN data

See footnotes on page 41.

Table 5. Catheter-associated urinary tract infections in inpatient non-intensive care locations in acute care facilities, Utah, 2016+

	Number of catheter days[1]	Number of CAUTI events[2]	Predicted number of CAUTI events[3]	Standardized Infection Ratio[4]	95% Confidence Interval[5]	Predicted number of catheter days[6]	Standardized Utilization Ratio[7]	95% Confidence Interval[8]
State of Utah	**62,275**	**69**	**53.9**	**1.28**	**1.00 – 1.61**	**55,455**	**1.12**	**1.11 – 1.13**
Alta View Hospital	1,101	0	0.54	**	**	811	1.36	1.28 – 1.44
American Fork Hospital	1,014	0	0.64	**	**	978	1.04	0.97 – 1.10
Ashley Regional Medical Center	416	1	0.20	--	--	373	1.12	1.01 – 1.23
Bear River Valley Hospital	140	0	0.07	**	**	147	0.96	0.81 – 1.12
Beaver Valley Hospital	110	0	0.05	**	**	136	0.81	0.67 – 0.97
Brigham City Community Hospital	599	0	0.28	**	**	274	2.19	2.02 – 2.37
Cache Valley Hospital	289	0	0.14	**	**	401	0.72	0.64 – 0.81
Castleview Hospital	1,148	0	0.56	**	**	411	2.80	2.64 – 2.96
Cedar City Hospital	794	0	0.39	**	**	702	1.13	1.05 – 1.21
Davis Hospital & Medical Center	1,382	0	1.32	0.00	0.00 – 2.26	1,348	1.03	0.97 – 1.08
Delta Community Hospital	103	0	0.07	**	**	129	0.80	0.66 – 0.96
Dixie Regional Medical Center	5,443	2	4.58	0.44	0.07 – 1.44	3,805	1.43	1.39 – 1.47
Fillmore Community Hospital	330	0	0.22	**	**	529	0.62	0.56 – 0.69
Garfield Memorial Hospital	72	0	0.05	**	**	172	0.42	0.33 – 0.52
Heber Valley Medical Center	322	0	0.21	**	**	229	1.40	1.26 – 1.56
Intermountain Medical Center	10,856	36	12.93	2.78	1.98 – 3.81	12,054	0.90	0.88 – 0.92
Jordan Valley Hospital	2,270	2	1.48	1.35	0.23 – 4.46	2,160	1.05	1.01 – 1.09
Jordan Valley Hospital West Valley Campus	1,244	0	0.82	**	**	891	1.40	1.32 – 1.48
Lakeview Hospital	1,283	0	0.77	**	**	1,009	1.27	1.20 – 1.34
LDS Hospital	1,750	2	1.66	1.21	0.20 – 3.98	2,446	0.72	0.68 – 0.75
Logan Regional Hospital	1,465	0	1.00	0.00	0.00 – 2.99	1,425	1.03	0.98 – 1.08
Lone Peak Hospital	486	0	0.21	**	**	537	0.90	0.83 – 0.99
McKay Dee Hospital	566	0	0.57	**	**	1,025	0.55	0.51 – 0.60
Mountain Point Medical Center	218	0	0.11	**	**	91	2.40	2.09 – 2.73
Mountain View Hospital	1,985	0	1.09	0.00	0.00 – 2.75	951	2.09	2.00 – 2.18
Mountain West Medical Center	492	0	0.23	**	**	464	1.06	0.97 – 1.16
Ogden Regional Medical Center	3,871	2	2.49	0.80	0.13 – 2.65	2,720	1.42	1.38 – 1.47
Orem Community Hospital	22	0	0.01	**	**	28	0.78	0.50 – 1.16
Park City Hospital	305	0	0.15	**	**	476	0.64	0.57 – 0.72

Table 5. continued

	Number of catheter days[1]	Number of CAUTI events[2]	Predicted number of CAUTI events[3]	Standardized Infection Ratio[4]	95% Confidence Interval	Predicted number of catheter days	Standardized Utilization Ratio	95% Confidence Interval
Primary Children's Hospital	1,011	2	0.90	--	--	943	1.07	1.01 – 1.14
Riverton Hospital	832	0	0.54	**	**	932	0.89	0.83 – 0.95
Salt Lake Regional Medical Center	337	0	0.25	**	**	498	0.68	0.61 – 0.75
Sanpete Valley Hospital	83	0	0.05	**	**	245	0.34	0.27 – 0.42
Sevier Valley Hospital	434	0	0.21	**	**	367	1.18	1.08 – 1.30
St. Mark's Hospital	5,102	1	4.05	0.25	0.01 – 1.22	3,012	1.69	1.65 – 1.74
Timpanogos Regional Hospital	1,213	0	0.75	**	**	905	1.34	1.27 – 1.42
Uintah Basin Medical Center	815	0	0.40	**	**	602	1.35	1.26 – 1.45
University Hospital[§]	8,416	18	10.27	1.75	1.07 – 2.72	8,263	1.02	1.00 – 1.04
Utah Valley Hospital	3,627	2	3.47	0.58	0.10 – 1.90	2,783	1.30	1.26 – 1.35

[+]Source: NHSN data.

See footnotes on page 42.

Footnotes

Table 1. Central line-associated bloodstream infections in adult and pediatric intensive care units in acute care facilities, Utah, 2016

[§]Includes Huntsman Cancer Institute.
[‡]SIR 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.
-- Predicted to have less than one infection for the year, but had one or more infections, as defined by NHSN, in 2016
[**] Predicted to have less than one infection for the year, and did NOT have an infection, as defined by NHSN, in 2016

[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.
[6]Predicted number of days that a patient has a central line in place.
[7]Standardized Utilization Ratio: Compares the total number of central line days in a hospital's ICU to a national benchmark. Rates are adjusted based on the type and size of a hospital or ICU.
[8]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, 2016

[§]Includes Huntsman Cancer Institute.
[‡]SIR 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.
-- Predicted to have less than one infection for the year, but had one or more infections, as defined by NHSN, in 2016
[**] Predicted to have less than one infection for the year, and did NOT have an infection, as defined by NHSN, in 2016

[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 non-ICU locations.
[4]Standardized Infection Ratio: Compares the total number of central line-associated bloodstream infection events in a hospital's non-ICU locations to a national benchmark. Rates are adjusted based on the type and size of a hospital or non-ICU locations.

[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.
[6]Predicted number of days that a patient has a central line in place.
[7]Standardized Utilization Ratio: Compares the total number of central line days in a hospital's non-ICU locations to a national benchmark. Rates are adjusted based on the type and size of a hospital or non-ICU locations.
[8]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, 2016

[§]Includes Huntsman Cancer Institute
[‡]SIR 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.
-- Predicted to have less than one infection for the year, but had one or more infections, as defined by NHSN, in 2016
[**] Predicted to have less than one infection for the year, and did NOT have an infection, as defined by NHSN, in 2016

[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 newborn ICUs.
[4]Standardized Infection Ratio: Compares the total number of central line-associated bloodstream infection events in a hospital's newborn ICU to a national benchmark. Rates are adjusted based on the type and size of a hospital or newborn 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.
[6]Predicted number of days that a patient has a central line in place.
[7]Standardized Utilization Ratio: Compares the total number of central line days in a hospital's ICU to a national benchmark. Rates are adjusted based on the type and size of a hospital or ICU.
[8]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 4. Catheter-associated urinary tract infections in adult and pediatric intensive care units in acute care facilities, Utah, 2016

[§]Includes Huntsman Cancer Institute.
[‡]SIR 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.
-- Predicted to have less than one infection for the year, but had one or more infections, as defined by NHSN, in 2016
[**] Predicted to have less than one infection for the year, and did NOT have an infection, as defined by NHSN, in 2016

[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.
[6]Predicted number of days that a patient has a urinary catheter in place.
[7]Standardized Utilization Ratio: Compares the total number of urinary catheter days in a hospital's ICU to a national benchmark. Rates are adjusted based on the type and size of a hospital or ICU.
[8]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, 2016

[§]Includes Huntsman Cancer Institute.
[‡]SIR 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.
-- Predicted to have less than one infection for the year, but had one or more infections, as defined by NHSN, in 2016
[**] Predicted to have less than one infection for the year, and did NOT have an infection, as defined by NHSN, in 2016

[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 non-ICU locations.
[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 non-ICU locations.
[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.
[6]Predicted number of days that a patient has a urinary catheter in place.
[7]Standardized Utilization Ratio: Compares the total number of urinary catheter days in a hospital's non-ICU locations to a national benchmark. Rates are adjusted based on the type and size of a hospital or non-ICU locations.
[8]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, 2016

	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, 2016+

	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	**2,230**	**138**	**107.73**	**1.28**	**1.08 – 1.51**
Alta View Hospital	36	0	1.62	0.00	0.00 – 1.85
American Fork Hospital	39	3	1.28	2.35	0.60 – 6.38
Ashley Regional Medical Center	14	0	0.78	**	**
Bear River Valley Hospital	3	0	0.12	**	**
Brigham City Community Hospital	22	1	1.09	0.91	0.05 – 4.5
Cache Valley Hospital	3	0	0.15	**	**
Castleview Hospital	15	3	0.63	--	--
Cedar City Hospital	37	3	1.59	1.89	0.48 – 5.15
Davis Hospital and Medical Center	57	2	2.35	0.85	0.14 – 2.82
Dixie Regional Medical Center	187	9	7.56	1.19	0.58 – 2.19
Intermountain Medical Center	234	19	14.19	1.34	0.83 – 2.05
Jordan Valley Hospital	33	4	1.35	2.95	0.94 – 7.13
Jordan Valley Hospital West Valley Campus	34	4	1.52	2.63	0.83 – 6.34
Lakeview Hospital	28	2	0.92	--	--
LDS Hospital	191	9	8.99	1.00	0.49 – 1.84
Logan Regional Medical Center	24	2	0.88	--	--
Lone Peak Hospital	12	0	0.57	**	**
McKay Dee Hospital	208	14	8.11	1.73	0.98 – 2.83
Mountain Point Medical Center	9	0	0.46	**	**
Mountain View Hospital	20	2	0.84	--	--
Mountain West Medical Center	5	0	0.18	**	**
Ogden Regional Medical Center	65	5	2.95	1.69	0.62 – 3.76
Park City Medical Center	10	1	0.40	--	--
Primary Children's Hospital	99	6	4.62	1.3	0.53 – 2.70
Riverton Hospital	29	1	1.30	0.77	0.04 – 3.79
Salt Lake Regional Medical Center	12	0	0.42	**	**
Sevier Valley Hospital	6	0	0.24	**	**
St. Mark's Hospital	184	1	7.11	0.14	0.01 – 0.69
Timpanogos Regional Hospital	25	0	1.12	0.00	0.00 – 2.68
Uintah Basin Medical Center	4	2	0.22	--	--
University Hospital§	419	44	26.58	1.66	1.22 – 2.20
Utah Valley Hospital	166	1	7.59	0.13	0.01 – 0.65

+Source: NHSN data.

See footnotes on page 47.

Table 7. Surgical site infections associated with abdominal hysterectomy surgeries in acute care facilities, Utah, 2016+

	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	**3,054**	**51**	**38.66**	**1.32**	**0.99 – 1.72**
Alta View Hospital	42	2	0.60	--	--
American Fork Hospital	109	1	1.01	0.99	0.05 – 4.87
Ashley Regional Medical Center	37	2	0.33	--	--
Brigham City Community Hospital	10	0	0.32	**	**
Castleview Hospital	9	0	0.20	**	**
Cedar City Hospital	29	1	0.38	--	--
Davis Hospital & Medical Center	219	1	2.69	0.37	0.02 – 1.83
Dixie Regional Medical Center	41	0	0.50	**	**
Heber Valley Medical Center	5	0	0.04	**	**
Intermountain Medical Center	210	1	3.12	0.32	0.02 – 1.58
Jordan Valley Hospital	36	1	0.66	--	--
Jordan Valley Hospital West Valley Campus	3	0	0.04	**	**
Lakeview Hospital	10	0	0.10	**	**
LDS Hospital	229	7	2.63	2.66	1.16 – 5.27
Logan Regional Hospital	60	1	0.60	--	--
Lone Peak Hospital	20	0	0.25	**	**
McKay Dee Hospital	171	0	1.84	0.00	0.00 – 1.63
Mountain Point Medical Center	2	0	0.02	**	**
Mountain View Hospital	36	0	0.52	**	**
Mountain West Medical Center	5	0	0.08	**	**
Ogden Regional Medical Center	170	1	2.41	0.41	0.02 – 2.05
Orem Community Hospital	15	0	0.24	**	**
Park City Medical Center	30	0	0.25	**	**
Riverton Hospital	180	2	2.21	0.90	0.15 – 2.99
Salt Lake Regional Medical Center	41	0	0.42	**	**
Sevier Valley Hospital	3	0	0.03	**	**
St. Mark's Hospital	427	3	4.47	0.67	0.17 – 1.83
Timpanogos Regional Medical Center	136	1	1.42	0.70	0.04 – 3.47
Uintah Basin Medical Center	26	1	0.56	--	--
University Health care Hospitals and Clinics§	378	18	6.55	2.75	1.68 – 4.26
Utah Valley Regional Medical Center	365	8	4.17	1.92	0.89 – 3.64

+Source: NHSN data.

See footnotes on page 47.

Footnotes

Table 6. Surgical site infections associated with colon surgeries in acute care facilities, Utah, 2016

[§]Includes Huntsman Cancer Institute.
[‡]SIR estimates are not reliable when the expected number is less than one. Consequently, SIRs are not provided for healthcare facilities with a predicted number less than one.
*Not required to report to CMS.
-- Predicted to have less than one infection for the year, but had one or more infections, as defined by NHSN, in 2016
[**] Predicted to have less than one infection for the year, and did NOT have an infection, as defined by NHSN, in 2016

[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, 2016

[§]Includes Huntsman Cancer Institute.
[‡]SIR 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.
*Not required to report to CMS.
-- Predicted to have less than one infection for the year, but had one or more infections, as defined by NHSN, in 2016
[**] Predicted to have less than one infection for the year, and did NOT have an infection, as defined by NHSN, in 2016

[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, 2016

	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, 2016+

	Number of patient days[1]	Number of hospital onset *C. difficile* events[2]	Predicted number of hospital onset *C. difficile* events[3]	Standardized Infection Ratio[4]	95% Confidence Interval[5]
State of Utah	**822,213**	**603**	**563.6**	**1.07**	**0.99 – 1.16**
Alta View Hospital	8,876	1	2.54	0.39	0.02 – 1.94
American Fork Hospital	14,851	6	7.34	0.82	0.33 – 1.70
Ashley Regional Medical Center	3,919	1	1.96	0.51	0.03 – 2.52
Bear River Valley Hospital	917	0	0.22	**	**
Beaver Valley Hospital	907	0	0.21	**	**
Brigham City Community Hospital	2,769	1	1.03	0.97	0.05 – 4.79
Cache Valley Hospital	2,290	0	0.52	**	**
Castleview Hospital	3,485	1	1.89	0.53	0.03 – 2.60
Cedar City Hospital	7,339	6	3.67	1.63	0.66 – 3.40
Davis Hospital & Medical Center	18,475	5	11.61	0.43	0.16 – 0.95
Dixie Regional Medical Center	54,799	30	37.07	0.81	0.56 – 1.14
Garfield Memorial Hospital	1,235	0	0.56	**	**
HealthSouth Rehabilitation Hospital of Utah	11,415	3	3.15	0.95	0.24 – 2.59
Heber Valley Medical Center	1,611	0	0.36	**	**
Intermountain Medical Center	106,832	84	79.01	1.06	0.85 – 1.31
Jordan Valley Hospital	17,341	22	13.53	1.63	1.05 – 2.42
Jordan Valley Hospital West Valley Campus	10,204	14	8.54	1.64	0.93 – 2.69
Lakeview Hospital	11,456	10	6.06	1.65	0.84 – 2.94
Landmark Hospital	7,747	9	5.69	1.58	0.77 – 2.91
LDS Hospital	32,361	37	20.68	1.80	1.28 – 2.44
Logan Regional Hospital	17,677	7	11.31	0.62	0.27 – 1.22
Lone Peak Hospital	4,161	2	1.29	1.55	0.26 – 5.13
McKay Dee Hospital	46,310	32	33.97	0.94	0.66 – 1.31
Mountain Point Medical Center	3,790	0	1.55	0.00	0.00 – 1.93
Mountain View Hospital	9,474	3	4.12	0.73	0.19 – 1.98
Mountain West Medical Center	3,863	3	1.80	1.66	0.42 – 4.53
Northern Utah Rehabilitation Hospital	6,565	1	2.65	0.38	0.02 – 1.86
Ogden Regional Medical Center	25,666	24	19.23	1.25	0.82 – 1.83
Orem Community Hospital	2,877	0	0.99	**	**
Park City Hospital	4,780	0	1.46	0.00	0.00 – 2.05
Primary Children's Hospital	54,538	45	29.99	1.50	1.11 – 1.99
Promise Hospital of Salt Lake	12,528	3	11.8	0.25	0.06 – 0.69
Riverton Hospital	14,450	4	4.10	0.97	0.31 – 2.35
Salt Lake Regional Medical Center	10,843	7	6.70	1.04	0.46 – 2.07
Sanpete Valley Hospital	1,800	1	0.40	--	--
Sevier Valley Hospital	2,371	0	0.60	**	**
Shriners Hospital for Children	1,044	0	0.16	**	**
South Davis Community Hospital	4,651	3	5.36	0.56	0.14 – 1.52
St. Mark's Hospital	47,835	42	41.10	1.02	0.75 – 1.37
The Orthopedic Specialty Hospital	4,896	0	0.74	**	**
Timpanogos Regional Medical Center	7,679	4	5.28	0.76	0.24 – 1.83

Table 8 continued

	Number of patient days[1]	Number of hospital onset *C. difficile* events[2]	Predicted number of hospital onset *C. difficile* events[3]	Standardized Infection Ratio[4]	95% Confidence Interval[5]
Uintah Basin Medical Center	7,634	0	2.22	0.00	0.00 – 1.35
University Hospital[§]	131,033	133	117.48	1.13	0.95 – 1.34
Utah Valley Hospital	67,168	44	46.65	0.94	0.69 – 1.25
Utah Valley Specialty Hospital	9,751	15	6.98	2.15	1.25 – 3.47

[+]Source: NHSN data

[§]Includes Huntsman Cancer Institute.
[I]SIR 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.
-- Predicted to have less than one infection for the year, but had one or more infections, as defined by NHSN, in 2016
[**] Predicted to have less than one infection for the year, and did NOT have an infection, as defined by NHSN, in 2016

[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. difficile* events: The total number of *C difficile* infections reported per year.
[3]Predicted number of *C. difficile* events: The number of *C. difficile* infections anticipated to occur based on historical data of comparable ICUs.
[4]Standardized Infection Ratio: Compares the total number of *C. difficile* 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, 2016+

	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	**1,010,877**	**34**	**55.24**	**0.62**	**0.43 – 0.85**
Alta View Hospital	11,480	0	0.31	**	**
American Fork Hospital	22,279	0	0.96	**	**
Ashley Regional Medical Center	4,677	0	0.10	**	**
Bear River Valley Hospital	1,108	0	0.02	**	**
Beaver Valley Hospital	997	0	0.02	**	**
Brigham City Community Hospital	2,769	0	0.06	**	**
Cache Valley Hospital	2,360	0	0.05	**	**
Castleview Hospital	4,567	0	0.10	**	**
Cedar City Hospital	8,747	0	0.16	**	**
Davis Hospital & Medical Center	22,850	0	0.74	**	**
Dixie Regional Medical Center	61,843	3	2.28	1.31	0.33 – 3.58
Garfield Memorial Hospital	1,300	0	0.03	**	**
HealthSouth Rehabilitation Hospital of Utah	11,415	0	0.22	**	**
Heber Valley Medical Center	1,842	0	0.04	**	**
Intermountain Medical Center	130,270	6	7.84	0.77	0.31 – 1.59
Jordan Valley Hospital	26,252	2	1.01	1.99	0.33 – 6.57
Jordan Valley Hospital West Valley Campus	11,481	1	0.51	--	--
Lakeview Hospital	12,754	1	0.51	--	--
Landmark Hospital	7,747	0	0.86	**	**
LDS Hospital	38,208	1	2.08	0.48	0.02 – 2.37
Logan Regional Hospital	24,213	0	0.95	**	**
Lone Peak Hospital	4,365	0	0.08	**	**
McKay Dee Hospital	62,243	1	3.09	0.32	0.02 – 1.60
Mountain Point Medical Center	5,082	0	0.14	**	**
Mountain View Hospital	10,717	0	0.33	**	**
Mountain West Medical Center	3,863	0	0.08	**	**
Northern Utah Rehabilitation Hospital	6,565	0	0.12	**	**
Ogden Regional Medical Center	33,073	0	1.72	0.00	0.00 – 1.74
Orem Community Hospital	5,227	0	0.10	**	**
Park City Hospital	5,438	0	0.11	**	**
Primary Children's Hospital	71,452	3	2.17	1.38	0.35 – 3.76
Promise Hospital of Salt Lake	12,528	0	1.59	0.00	0.00 – 1.88
Riverton Hospital	19,447	0	0.38	**	**
Salt Lake Regional Medical Center	11,865	0	0.37	**	**
Sanpete Valley Hospital	1,932	0	0.04	**	**
Sevier Valley Hospital	2,689	0	0.05	**	**
South Davis Community Hospital	4,651	0	1.15	0.00	0.00 – 2.60
St. Mark's Hospital	58,402	3	3.40	0.88	0.22 – 2.40

Table 9 continued

	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]
The Orthopedic Specialty Hospital	4,896	0	0.06	**	**
Timpanogos Regional Medical Center	14,367	1	0.50	--	--
Uintah Basin Medical Center	7,634	1	0.19	--	--
University Hospital[§]	155,536	9	14.96	0.60	0.29 – 1.10
Utah Valley Hospital	89,995	2	4.69	0.43	0.07 – 1.41
Utah Valley Specialty Hospital	9,751	0	1.08	0.00	0.00 – 2.78

[+]Source: NHSN data

[§]Includes Huntsman Cancer Institute.
[I]SIR 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.
-- Predicted to have less than one infection for the year, but had one or more infections, as defined by NHSN, in 2016
** Predicted to have less than one infection for the year, and did NOT have an infection, as defined by NHSN, in 2016

[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 (LTAC) with intensive care units (ICU) and inpatient rehabilitation facilities (IRF).

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 an LTAC or 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, 2016

	Number of HAI device days	Number of HAI device events	Predicted number of HAI device events	Standardized Infection Ratio	95% Confidence Interval	Predicted number of HAI device days	Standardized Utilization Ratio	95% Confidence Interval
State of Utah	#	#	#	#	#	#	#	#
Facility D	5,817	8	1.36	0.64-2.56				
1	2	3	4	5	6	7	8	9

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 specific device days for all patients 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 in this column (8) represents the total number of specific HAIs identified in patients in Facility D 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 D, 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 D (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 D, based on comparison to a national HAI benchmark of facilities that are similar to Facility D, 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.
7. The predicted number of HAI device days is adjusted to allow facilities to be more fairly compared. Risk adjustments account for differences in facility populations 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 higher device days than a facility that uses fewer devices and has healthier patients. The predicted number of HAI device days for Facility A, based on comparison to a national HAI benchmark of similar hospitals, is calculated as 6,000.
8. The Standardized Utilization Ratio (SUR) is comparable to Device Utilization Rates (DURs) because they both measure device utilization, but they are slightly different in the way they are calculated. SURs are a scalable, risk-adjusted measure that can be compared across locations and facilities because they are risk-adjusted-accordingly. Whereas, DURs can only be compared amongst the same location. SURs can also indicate whether the observed number of device utilization days is better, worse, or the same than the predicted number of device utilization days.
9. A confidence interval (CI) will be provided if a SUR was estimated for a given healthcare facility. A CI describes the uncertainty associated with the SUR estimate. Facilities with more device days will have a narrower CI, which means there is less doubt associated with the accuracy of the SUR 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 10. Central-line associated bloodstream infections in long-term acute care facilities with intensive care units and wards, Utah, 2016+

	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]	Predicted number of central line days[6]	Standardized Utilization Ratio[7]	95% Confidence Interval[8]
State of Utah	**21,645**	**16**	**21.95**	**0.73**	**0.43 – 1.16**	**19,066**	**1.14**	**1.12 – 1.15**
Landmark Hospital	4,927	12	5.00	2.40	1.30 – 4.08	4,023	1.22	1.19 – 1.26
Promise Hospital	8,740	1	10.87	0.09	0.01 – 0.45	8,389	1.04	1.02 – 1.06
South Davis Community Hospital	1,748	2	1.98	1.01	0.17 – 3.34	1,591	1.10	1.05 – 1.15
Utah Valley Specialty Hospital	6,230	1	4.11	0.24	0.01 – 1.20	5,063	1.23	1.20 – 1.26

+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.
[6]Predicted number of days that a patient has a central line in place.
[7]Standardized Utilization Ratio: Compares the total number of central line days in a hospital's ICU to a national benchmark. Rates are adjusted based on the type and size of a hospital or ICU.
[8]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, 2016+

	Number of catheter days[1]	Number of CAUTI events[2]	Predicted number of CAUTI events[3]	Standardized Infection Ratio[4]	95% Confidence Interval[5]	Predicted number of catheter days[6]	Standardized Utilization Days[7]	95% Confidence Interval[8]
State of Utah	**16,180**	**16**	**24.7**	**0.65**	**0.38 – 1.03**	**15,307**	**1.06**	**1.04 – 1.07**
Landmark Hospital	4,698	6	7.65	0.78	0.32 – 1.63	3,386	1.39	1.35 – 1.43
Promise Hospital	6,362	2	9.97	0.20	0.03 – 0.66	6,454	0.99	0.96 – 1.01
South Davis Community Hospital	873	2	1.84	1.09	0.18 – 3.58	1,474	0.59	0.55 – 0.63
Utah Valley Specialty Hospital	4,247	6	5.24	1.15	0.46 – 2.38	3,992	1.06	1.03 – 1.10

+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.
[6]Predicted number of days that a patient has a urinary catheter in place.
[7]Standardized Utilization Ratio: Compares the total number of urinary catheter days in a hospital's ICU to a national benchmark. Rates are adjusted based on the type and size of a hospital or ICU.
[8]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, 2016+

	Number of catheter days[1]	Number of CAUTI events[2]	Predicted number of CAUTI events[3]	Standardized Infection Ratio[4]	95% Confidence Interval[5]	Predicted number of catheter days[6]	Standardized Utilization Ratio[7]	95% Confidence Interval[8]
State of Utah	**3,477**	**11**	**4.56**	**2.41**	**1.27 – 4.19**	**4,517**	**0.77**	**0.74 – 0.8**
Davis Hospital and Medical Center	72	0	0.10	**	**	45	1.58	1.25 – 1.98
Dixie Regional Medical Center	371	2	0.54	--	--	321	1.15	1.04 – 1.28
Health South Rehabilitation Hospital of Utah	868	0	0.94	**	**	886	0.98	0.92 – 1.05
Intermountain Medical Center	210	2	0.30	--	--	533	0.39	0.34 – 0.45
Jordan Valley Hospital	195	0	0.28	**	**	181	1.08	0.93 – 1.24
McKay Dee Hospital	126	1	0.18	--	--	333	0.38	0.32 – 0.45
Northern Utah Rehabilitation Hospital	394	1	0.43	--	--	510	0.77	0.70 – 0.85
Salt Lake Regional Medical Center	76	0	0.11	**	**	149	0.51	0.41 – 0.64
St. Mark's Hospital	315	0	0.45	**	**	281	1.12	1.00 – 1.25
University Hospital§	425	2	0.61	--	--	943	0.45	0.41 – 0.50
Utah Valley Hospital	425	3	0.61	--	--	334	1.27	1.15 – 1.40

+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.
-- Predicted to have less than one infection for the year, but had one or more infections, as defined by NHSN, in 2016
** Predicted to have less than one infection for the year, and did NOT have an infection, as defined by NHSN, in 2016

[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.
[6]Predicted number of days that a patient has a urinary catheter in place.
[7]Standardized Utilization Ratio: Compares the total number of urinary catheter days in an inpatient rehabilitation facility to a national benchmark. Rates are adjusted based on the type and size of an inpatient rehabilitation facility.
[8]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 13. Dialysis event bloodstream infections, Utah, 2016+

	Number of patient months[1]	Number of Dialysis Event BSI[2]	Predicted number of Dialysis Event BSI[3]	Standardized Infection Ratio[4]	95% Confidence Interval[5]
State of Utah	**19,359**	**116**	**116.72**	**0.99**	**0.82 – 1.19**
American Fork Dialysis Center	194	0	1.20	0.00	0.00 – 2.50
Blue Mountain Hospital Dialysis Center	341	3	1.75	1.72	0.44 – 4.68
Bonneville Dialysis Center	636	6	3.98	1.51	0.61 – 3.14
Castleview Dialysis Center	371	0	2.37	0.00	0.00 – 1.26
Farmington Bay Dialysis Center	323	0	1.85	0.00	0.00 – 1.62
Hurricane Dialysis	138	0	0.85	**	**
Intermountain Medical Center Dialysis Center	1,156	5	6.17	0.81	0.30 – 1.80
Iron Mission Dialysis Center	299	3	2.35	1.28	0.32 – 3.48
Kolff Dialysis Center	551	6	3.83	1.57	0.63 – 3.26
Lakeside Dialysis Center	386	4	2.35	1.70	0.54 – 4.11
Liberty Dialysis Layton	477	0	3.38	0.00	0.00 – 0.89
Liberty Dialysis St. George	723	6	5.20	1.15	0.47 – 2.40
Liberty Dialysis West Jordan	721	2	3.85	0.52	0.09 – 1.83
Logan Regional Dialysis Center	610	0	2.97	0.00	0.00 – 1.01
Lone Peak Dialysis	738	6	4.89	1.23	0.50 – 2.55
Mark Lindsay Dialysis Center	324	3	1.89	1.59	0.40 – 4.33
Oquirrh Artificial Kidney Center	1,107	5	6.12	0.82	0.30 – 1.81
Payson Regional Dialysis	396	4	2.80	1.43	0.45 – 3.45
Pleasant View Dialysis Center	681	5	4.30	1.16	0.43 – 2.57
Provo Dialysis	420	1	3.40	0.29	0.01 – 1.45
Primary Children's Dialysis Center	134	6	1.43	4.19	1.70 – 8.72
Sevier Valley Dialysis	225	1	1.06	0.95	0.05 – 4.67
South Mountain Dialysis	537	2	3.62	0.55	0.09 – 1.83
South Valley Dialysis Center	458	2	2.35	0.85	0.14 – 2.81
Tooele Valley Dialysis	322	0	1.29	0.00	0.00 – 2.32
UBMC Dialysis Roosevelt	507	1	3.10	0.32	0.02 – 1.59
Uintah Basin Medical Center Dialysis Vernal	245	1	0.77	--	--
University of Utah Dialysis Program Dixie Dialysis	743	12	4.99	2.40	1.30 – 4.09
Utah Dialysis Center	766	1	3.96	0.25	0.01 – 1.24
Utah Valley Dialysis Center	1,247	16	6.91	2.31	1.37 – 3.68
Wasatch Artificial Kidney Center	1,039	1	7.09	0.14	0.01 – 0.70
Weber Valley Dialysis	224	2	1.20	1.67	0.28 – 5.51
West Bountiful Dialysis	142	2	0.60	--	--
West Valley Dialysis Clinic	1,165	1	5.42	0.18	0.01 – 0.91
Woods Cross Dialysis	352	4	2.42	1.65	0.52 – 3.98

+Source: NHSN data.
See footnotes on page 60.

[I]SIR 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.

-- Predicted to have less than one infection for the year, but had one or more infections, as defined by NHSN, in 2016

** Predicted to have less than one infection for the year, and did NOT have an infection, as defined by NHSN, in 2016

[1]Number of patient months: The number of patient-months are equal to the summed number of patient-month denominators reported by the facility during the year. To calculate patient-months, facilities report the number of hemodialysis outpatients who were dialyzed in the facility on the first two working days of the month, using the *Denominators for Dialysis Event Surveillance* form. This count is used to estimate the number of patient-months that there is risk of a healthcare-associated infection.

[2]Number of dialysis event BSI: The total number of bloodstream infections that were reported per year.

[3]Predicted number of dialysis event BSI: The number of bloodstream infections anticipated to occur based on historical data of comparable dialysis facilities.

[4]Standardized Infection Ratio: Compares the total number of bloodstream infections in dialysis 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 (LTAC) -** 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. **Standardized utilization ratios (SUR) –** A statistic used to track trends in device use over time. This includes use of urinary catheters, central lines, and ventilators. Progress is measured at the national, state, local, or facility level.

23. **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.

24. **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.

25. **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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