HEALTHCARE-ASSOCIATED INFECTIONS IN UTAH 2012 ANNUAL REPORT

Utah Department of Health
Division of Disease Control and Prevention
Bureau of Epidemiology

Published October 2013

Healthcare-Associated Infections in Utah

State of Utah: 2012

Prepared by

Rebecca L. Ward
Bureau of Epidemiology
Utah Department of Health

Special thanks to the following individuals for their subject matter expertise, data resources, editing and consultations.

Utah Department of Health

Executive Directors Office
Robert T. Rolfs, MD

Bureau of Epidemiology
Allyn Nakashima, MD

Healthcare-Associated Infections Prevention Program
Felicia Alvarez
Louise Eutropius
Jordan Pyper
Sherry Varley

Communicable Disease Investigation and Response Program
Melissa Stevens Dimond

Office of Public Health Assessment
Kim Neerings

Utah Hospitals
Chief Executive Officers
Infection Preventionists
Chief Medical Officers
Chief Nursing Officers
Quality Improvement Directors

Suggested Citation: Utah Department of Health. *Healthcare-Associated Infections in Utah, 2012 Annual Report.* Salt Lake City, UT: Utah Department of Health; October 2013. http://health.utah.gov/epi/HAI/documents/2012_HAI_Report.pdf.

Table of Contents

Introduction 1

Background 1

Report Overview 2

Healthcare-Associated Infections Data

Calculating Standardized Infection Ratios 2

Central Line-Associated Bloodstream Infections (CLABSIs) 3

Catheter-Associated Urinary Tract Infections (CAUTIs) 3

Surgical Site Infections (SSIs)

Colon Surgeries 4

Abdominal Hysterectomy Surgeries 4

Dialysis Infections 5

Data Quality Validation 5

Key Findings 6

Conclusion 6

Understanding CAUTI and CLABSI Data 7

Figure 1. CLABSIs in acute care facilities with intensive care units 9

Table 1. CLABSIs in acute care facilities with intensive care units 10

Figure 2. CAUTIs in acute care facilities with intensive care units 11

Table 2. CAUTIs in acute care facilities with intensive care units 12

Understanding SSI Data 13

Figure 3. SSIs associated with colon surgeries in acute care facilities 15

Table 3. SSIs associated with colon surgeries in acute care facilities 16

Table of Contents

Figure 4. SSIs associated with abdominal hysterectomy surgeries in acute care facilities 17

Table 4. SSIs associated with abdominal hysterectomy surgeries in acute care facilities 18

Definitions 19

References 21

Introduction

Acquiring a healthcare-associated infection (HAI) is a potential risk to anyone who has invasive medical treatment, surgery, or is hospitalized. An HAI is a type of infection that patients acquire while receiving treatment in a health care setting that was not present or developing before admission to the facility. Health care settings may include hospitals, clinics, long-term care facilities, dialysis centers and/or rehabilitation facilities. HAIs are the most common type of harmful event experienced by hospitalized patients, causing an estimated 1.7 million infections each year in the nation.[1] Infections may occur as a result of complications following a surgical procedure, known as a surgical site infection (SSI), or failing to closely follow infection control practices, such as hand washing. HAIs may also be caused by the use of various types of invasive devices, such as a central line or a 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.[2] 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.[3] 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.[4]

Background

Identifying HAIs requires an organized approach involving several different types of activity. It is important to determine if infections are healthcare-associated or already present upon facility admission. Because of the concerns with these deadly and costly HAIs, state regulation (Rule 386-705, Epidemiology, Healthcare-Associated Infection) requires the Utah Department of Health (UDOH) to collect and report data on HAIs. Since 2008, acute care hospitals with intensive care units have submitted data directly to the UDOH for the annual HAI report; however, reporting facilities were not identified by name. In 2011, the Centers for Medicare and Medicaid Services (CMS) required acute healthcare facilities to report specific HAI data to the National Healthcare Safety Network (NHSN) for payment reimbursement. In 2012, House Bill (HB) 55 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. Validation activities included reviewing the facilities' surveillance processes for accurately identifying and reporting infections.

Report Overview

For an HAI to be publicly reported in Utah under HB 55, 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 an important threat to patient safety.

For the 2012 HAI report, data are included on CLABSIs, CAUTIs and SSIs (exclusive to colon surgeries and abdominal hysterectomy surgeries). There were insufficient data regarding infection events from dialysis facilities to provide a national comparison.

This report contains data for the 2012 calendar year and was developed by the UDOH, in partnership with the UDOH's HAI advisory group, Utah Healthcare Infection Prevention Governance Committee (UHIP GC). This report compares data for the identified reporting acute care facilities (Tables 1-4). Facilities are also rated based on their performance when compared to the national rate (Figures 1-4). All infections required by CMS to be reported to NHSN, according to the CMS Healthcare Facility HAI Reporting Requirements timeline, are included.[5]

NOTE: The Utah data are self-reported to NHSN by each facility required to report HAIs by CMS. Data are complete at the time of report generation. Because individual patient records were not reviewed for validation by the UDOH, the self-reported data reflecting the number of infections have not been verified.

Healthcare-Associated Infection Data

Calculating Standardized Infection Ratios (SIRs)

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 events in a heathcare facility to the *predicted* number of HAI events, based on "standard population" data. For purposes of this report, the standard population is 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. Prior to 2011, the SIR was not included in the UDOH's annual HAI reports as reporting HAI data to NHSN was not required. Infection rates of reporting acute care facilities were based solely on information submitted to the UDOH; these data were reported only for CLABSIs.

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.

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.

CLABSI data for 2012 were reported only by acute care facilities with intensive care units (ICUs). ICU types include trauma, respiratory, cardiac, medical, burn, pediatric, surgical, neonatal and neurosurgical.

In 2012, 98 ICU-related CLABSIs were reported in Utah acute care facilities and associated with 69,436 central line catheter days (Table 1). Compared to the national rate, patients in Utah facilities had 36 percent fewer CLABSIs in 2012 than would have been predicted. Twenty-five facilities met the criteria for required CLABSI reporting. Of these 25, 21 facilities had infectious rates not significantly different from what was expected nationally; of the remaining four facilities, three had significantly fewer infections, and one had significantly higher infections compared to what was expected nationally. Eleven facilities did not have enough usage of central line catheter days to provide an accurate assessment of their performance (Figure 1).

CLABSI data from 2008 through 2012 in Utah acute care facilities ranged from a rate of 1.0 to 2.2 per 1,000 central line days with an average rate of 1.6. The information is pertinent because it identifies the current trend for CLABSIs within ICUs in the state of Utah. Recognition of the infection burden is necessary to promote proven interventions and prevention strategies.

Catheter-Associated Urinary Tract Infections (CAUTIs)

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

CAUTI data for 2012 were reported only by acute care facilities with intensive care units (ICU). ICU types include trauma, respiratory, cardiac, medical, burn, pediatric, surgical, neonatal and neurosurgical.

In 2012, 252 ICU-related CAUTIs were reported in Utah acute care facilities and associated with 61,723 catheter days (Table 2). Compared to the national rate, none of the Utah facilities had fewer CAUTIs in 2012 than would have been predicted. Twenty-five facilities met the criteria for required CAUTI reporting. Of these 25, 19 facilities had CAUTI rates not significantly different from expected national rates; the remaining six facilities had significantly higher infections compared to what was expected nationally. Nine facilities did not have enough usage of catheter days to provide an accurate assessment of their performance (Figure 2).

Surgical Site Infections (SSIs)

A surgical site infection is an infection that occurs after surgery in the part of the body where the surgery took place. Surgical site infections are the second most common type of HAI in the United States (290,000 SSIs per year). The two SSI types required for reporting in Utah are those following colon surgeries and abdominal hysterectomy surgeries.

Colon Surgeries

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

Colon surgical data for 2012 were reported only by acute care facilities.

In 2012, 96 SSIs associated with colon surgeries were reported in Utah and associated with 1,921 colon surgeries (Table 3). Compared to the national rate, none of the Utah facilities had fewer SSIs associated with colon surgeries in 2012 than would have been predicted. Thirty facilities met the criteria for required reporting of SSIs associated with colon surgeries. Of these 30, 26 facilities had infection rates not statistically significant from what was expected nationally; the remaining four facilities had significantly higher infection rates. Fourteen facilities did not have enough data to provide an accurate assessment of their performance (Figure 3).

Abdominal Hysterectomy Surgeries

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

Abdominal hysterectomy surgical data for 2012 were reported only by acute care facilities.

In 2012, 24 SSIs associated with abdominal hysterectomies were reported in Utah and associated with 2,645 abdominal hysterectomy surgeries (Table 4). Compared to the national rate, none of the Utah facilities had fewer SSIs associated with abdominal hysterectomies in 2012 than would have been predicted. Thirty facilities met the criteria for required reporting of SSIs associated with abdominal hysterectomies. Of these 30, there were no facilities that had

significantly higher infections compared to what is expected nationally. Twenty-one facilities did not have enough data to provide an accurate assessment of their performance (Figure 4).

Dialysis Infections

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

Dialysis facilities are required to report the number of patients requiring initiation of antibiotic therapy, the number of patients with laboratory results indicating infection in their bloodstream, and patients with signs and symptoms of catheter access infections (i.e., redness and/or pus).

In 2012, 37 outpatient dialysis facilities in Utah met the criteria for required reporting. Because 2012 was the first year dialysis facilities provided this information to NHSN, there is currently insufficient data to establish a national comparison. When there is sufficient information that can be deemed reliable, it will be contained in future reports.

Data Quality Validation

A validation audit was conducted in June 2013 based on standards recommended by the Utah Healthcare Infection Prevention Governance Committee. Validation, conducted by UDOH HAI Prevention Program staff, included site visits and interviews with the infection prevention and control program staff of five randomly selected facilities. The interviews with staff included discussion on ways to improve standardized data collection. The focus of the validation was to determine how NHSN CLABSI standards were interpreted and applied to data collection.

The validation audit revealed that interpretation of NHSN CLABSI standards varied between facilities. These standards are challenging because NHSN definitions are complex, sometimes requiring individual interpretation, and may involve tracking and linking information from multiple staff members and sources (i.e., laboratory, admissions and clinical data), in paper and/or electronic format. While all facility infection preventionists (IP) appeared to understand the NHSN CLABSI definitions appropriately, difficulties with applying the NHSN standards were noted in several facilities, which could have led to over or under counting their facility's central line-associated bloodstream infections.

Key Findings

Acute care facilities have been reporting CLABSI data since 2008, but 2012 is the first year that data for CAUTIs, SSIs and Dialysis events have been reported as mandated by HB 55.

- As this is the first year of required reporting for CAUTI and SSI data, Utah can now establish a baseline comparison to the rest of the nation's acute care facilities.
- Data show that Utah has significantly fewer CLABSIs than the national rate.
- Data show that Utah has significantly more CAUTIs and colon SSIs than the national rate.
- Data show that Utah aligns with the national rate for abdominal hysterectomy SSIs.
- There is insufficient national data to make a conclusion regarding reported dialysis facility infection data.
- Reported HAI data can be used to provide direction for quality improvement efforts.
- UDOH validation results indicate there is confusion and variation in the interpretation of the national HAI surveillance protocols and criteria among reporting facilities. The NHSN, the national repository where healthcare facilities in the United States report their HAIs, has continued to revise and improve their infection surveillance definitions.
- To accurately compare rates between reporting acute care facilities, it is critical that facility infection preventionists (IPs) who report these surveillance definitions are appropriately trained and that IPs also educate others to correctly apply the criterion.
- In order to accomplish the "winnable battle"[6] of reduction and elimination of HAIs, all health care facilities must support the IPs to not only *identify and report* the infections accurately and completely, but support resources to *prevent* the infections from occurring.

Conclusion

Healthcare-associated infections are a public health challenge because they are costly, harmful and potentially fatal. These infections have a significant impact on the health of patients. The implementation of Utah's House Bill 55 provides the Utah Department of Health access to data of these harmful events as reported by Utah's healthcare facilities to NHSN. As HAI data are steadily collected and analyzed nationally and within the state of Utah, results show that healthcare facilities in Utah as well as the United States must continue efforts toward reduction and elimination of these infections. Focused efforts will improve patients' lives and help to curb the ever-increasing cost of healthcare.

Users of this report should interpret the data with caution. Conclusions regarding the quality of healthcare provided by facilities reporting HAI data that occur in acute care facilities should not be based on these data alone. Consumers should always consult with their trusted medical providers, insurance carriers, and reputable web sites, such as the CMS Hospital Compare when considering healthcare options.

Understanding CLABSI and CAUTI Data

The device infection event tables depict specific device associated infections (central line-associated bloodstream infections [CLABSI], 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 what each of the data elements in the table mean. Below is an example of a fictitious hospital's data. Each column is numbered and provides an explanation of each data element and their result.

Table 1. Device infection events in acute care facility intensive care units, Utah, 2012

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

1. Only acute care facilities (hospitals) with intensive care units (ICU) are listed here by name (Hospital A).
2. For each reporting hospital 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 Hospital 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 48 hours of device removal, 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 Hospital A's intensive care units during the year.
4. The predicted number of HAI device events is adjusted to allow hospitals 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 a HAI. A hospital that uses many devices on very sick patients would be predicted to have a higher device infection rate than a hospital that uses fewer devices and has healthier patients. The predicted number of HAI

device events for Hospital A, based on comparison to a national HAI benchmark of similar hospitals, is calculated as 13.

5. The standardized infection ratio or 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 Hospital 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 Hospital A, based on comparison to a national HAI benchmark of hospitals that are similar to Hospital A, is calculated as 0.62. Hospitals 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 healthcare facilities with a predicted number less than one.
6. A confidence interval (CI) will be provided if an 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.

Figure 1. Central line-associated bloodstream infections in acute care facilities with intensive care units, Utah, 2012[+]

HOSPITAL	CLABSIs
State of Utah	■
Davis Hospital and Medical Center	●
Dixie Regional Hospital	●
Intermountain Medical Center	■
Jordan Valley Hospital*	●
Lakeview Hospital	●
LDS Hospital	●
McKay Dee Hospital Center	●
Ogden Regional Medical Center	●
Primary Children's Medical Center	●
Salt Lake Regional Medical Center	◆
St. Mark's Hospital	●
Timpanogos Regional Hospital	●
University Hospital**	■
Utah Valley Regional Medical Center	■

[+]Source: NHSN data.
[*]Includes Pioneer Valley Hospital.
[**]Includes Huntsman Cancer Hospital.

NOTE: Acute care facilities with insufficient data to reliably compare their data to the standard population are not listed. Omitted hospitals include: Alta View Hospital, American Fork Hospital, Ashley Regional Medical Center, Cache Valley Specialty Hospital, Castleview Hospital, Logan Regional Hospital, Mountain View Hospital, Mountain West Medical Center, Riverton Hospital, Uintah Basin Medical Center, Valley View Medical Center.

■ Significantly fewer infections than national rate

● Not significantly different than national rate

◆ Significantly more infections than national rate

Table 1. Central line-associated bloodstream infections in acute care facilities with intensive care units, Utah, 2012[+]

	Number of central line days[1]	Number of CLABSI events[2]	Predicted number of CLABSI events[3]	Standardized Infection Ratio[4]	95% Confidence Interval[5]
State of Utah	**69,436**	**98**	**152.22**	**0.64**	**0.52 – 0.79**
Alta View Hospital	360	0	.54	N/A[‡]	N/A[‡]
American Fork Hospital	664	0	.99	N/A[‡]	N/A[‡]
Ashley Regional Medical Center	16	0	.02	N/A[‡]	N/A[‡]
Cache Valley Specialty Hospital	4	0	.01	N/A[‡]	N/A[‡]
Castleview Hospital	56	0	.08	N/A[‡]	N/A[‡]
Davis Hospital and Medical Center	870	2	1.47	1.36	0.17 - 4.93
Dixie Regional Medical Center	2,308	1	3.52	0.28	0.01 - 1.58
Intermountain Medical Center	13,673	14	32.11	0.44	0.24 - 0.73
Jordan Valley Medical Center*	2,136	1	3.14	0.32	0.01 - 1.77
Lakeview Hospital	684	0	1.03	0	0 - 3.60
LDS Hospital	1,634	5	3.43	1.46	0.47 - 3.40
Logan Regional Hospital	423	0	0.77	N/A[‡]	N/A[‡]
McKay Dee Hospital Center	3,245	4	5.67	0.71	0.19 - 1.81
Mountain View Hospital	452	1	0.68	N/A[‡]	N/A[‡]
Mountain West Medical Center	155	1	0.30	N/A[‡]	N/A[‡]
Ogden Regional Medical Center	1,849	3	3.27	0.92	0.19 - 2.68
Primary Children's Medical Center	11,242	26	27.85	0.93	0.61 - 1.37
Riverton Hospital	87	0	0.13	N/A[‡]	N/A[‡]
Salt Lake Regional Medical Center	1,803	7	2.71	2.59	1.04 - 5.33
St. Mark's Hospital	2,445	2	4.30	0.47	0.06 - 1.68
Timpanogos Regional Hospital	1,282	0	1.56	0	0 - 2.36
Uintah Basin Medical Center	31	0	0.05	N/A[‡]	N/A[‡]
University Hospital**	13,086	23	38.94	0.59	0.37 - 0.89
Utah Valley Regional Medical	10,691	8	19.21	0.42	0.18 - 0.82
Valley View Medical Center	240	0	0.46	N/A[‡]	N/A[‡]

[+]Source: NHSN data.
[*]Includes Pioneer Valley Hospital.
[**]Includes Huntsman Cancer Hospital.
[‡]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.

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

Figure 2. Catheter-associated urinary tract infections in acute care facilities with intensive care units, Utah, 2012[+]

HOSPITAL	CAUTIs
State of Utah	◆
Davis Hospital and Medical Center	●
Dixie Regional Hospital	●
Intermountain Medical Center	◆
Jordan Valley Hospital*	●
Lakeview Hospital	●
LDS Hospital	●
Logan Regional Hospital	●
McKay Dee Hospital Center	◆
Ogden Regional Medical Center	◆
Primary Children's Medical Center	●
Salt Lake Regional Medical Center	◆
St. Mark's Hospital	●
Timpanogos Regional Hospital	●
University Hospital**	◆
Utah Valley Regional Medical Center	◆
Valley View Medical Center	●

[+]Source: NHSN data.
[*]Includes Pioneer Valley Hospital.
[**]Includes Huntsman Cancer Hospital.

NOTE: Acute care facilities with insufficient data to reliably compare their data to the standard population are not listed. Omitted hospitals include: Alta View Hospital, American Fork Hospital, Ashley Regional Medical Center, Cache Valley Specialty Hospital, Castleview Hospital, Mountain View Hospital, Mountain West Medical Center, Riverton Hospital, Uintah Basin Medical Center.

■ Significantly fewer infections than national rate

● Not significantly different than national rate

◆ Significantly more infections than national rate

Table 2. Catheter-associated urinary tract infections in acute care facilities with intensive care units, Utah, 2012[+]

	Number of catheter days[1]	Number of CAUTI events[2]	Predicted number of CAUTI events[3]	Standardized Infection Ratio[4]	95% Confidence Interval[5]
State of Utah	**61,723**	**252**	**137.25**	**1.84**	**1.62 - 2.08**
Alta View Hospital	569	3	0.74	NA[‡]	N/A[‡]
American Fork Hospital	743	2	0.97	NA[‡]	N/A[‡]
Ashley Regional Medical Center	95	0	0.12	NA[‡]	N/A[‡]
Cache Valley Specialty Hospital	14	0	0.02	NA[‡]	N/A[‡]
Castleview Hospital	371	0	0.48	NA[‡]	N/A[‡]
Davis Hospital and Medical Center	1,088	2	1.41	1.41	0.17 - 5.11
Dixie Regional Medical Center	2,651	1	3.18	0.31	0.01 - 1.75
Intermountain Medical Center	15,295	58	44.05	1.32	1.00 - 1.70
Jordan Valley Medical Center*	2,548	7	3.18	2.20	0.89 - 4.54
Lakeview Hospital	859	2	1.12	1.79	0.22 - 6.47
LDS Hospital	1,767	5	4.06	1.23	0.40 - 2.87
Logan Regional Hospital	762	1	1.52	0.66	0.02 - 3.66
McKay Dee Hospital Center	2,811	11	3.37	3.26	1.63 - 5.84
Mountain View Hospital	624	0	0.81	NA[‡]	N/A[‡]
Mountain West Medical Center	279	0	0.56	NA[‡]	N/A[‡]
Ogden Regional Medical Center	1,135	5	1.48	3.39	1.10 - 7.91
Primary Children's Medical Center	1,987	9	5.48	1.64	0.75 - 3.12
Riverton Hospital	216	0	0.28	NA[‡]	N/A[‡]
Salt Lake Regional Medical Center	1,773	12	2.13	5.64	2.91 - 9.85
St. Mark's Hospital	2,675	5	3.21	1.56	0.51 - 3.64
Timpanogos Regional Hospital	844	1	1.01	0.99	0.03 - 5.50
Uintah Basin Medical Center	104	0	0.14	NA[‡]	N/A[‡]
University Hospital**	13,549	83	43.57	1.91	1.52 - 2.36
Utah Valley Regional Medical	8,440	44	13.31	3.31	2.40 - 4.44
Valley View Medical Center	524	1	1.05	0.95	0.02 - 5.32

[+]Source: NHSN data.
*Includes Pioneer Valley Hospital.
**Includes Huntsman Cancer Hospital.
[‡]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.

[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.

Understanding SSI Data

Surgical site infection (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 their result.

Table 2. Surgical site infection events in acute care facilities, Utah, 2012

	Number of surgical procedures	Number of SSI events	Predicted number of SSI events	Standardized Infection Ratio	95% Confidence Interval
State of Utah	#	#	#	#	#
Hospital 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 (Hospital B).
2. For each reporting hospital 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 Hospital B during the reporting period.
4. The predicted number of SSI events is adjusted to allow hospitals 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 hospital 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 Hospital B, based on comparison to a national HAI benchmark of similar hospitals, is calculated as 13.
5. The standardized infection ratio or 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 Hospital 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 Hospital B, based on comparison to a national HAI benchmark of hospitals that are similar to Hospital B, is calculated as 0.62. Hospitals 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 an 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.

Figure 3. Surgical site infections associated with colon surgeries in acute care facilities, Utah, 2012[+]

HOSPITAL	Colon Surgeries
State of Utah	◆
American Fork Hospital	●
Davis Hospital and Medical Center	◆
Dixie Regional Hospital	●
Intermountain Medical Center	◆
Jordan Valley Hospital*	●
Lakeview Hospital	●
LDS Hospital	●
Logan Regional Hospital	●
McKay Dee Hospital Center	●
Ogden Regional Medical Center	●
Riverton Hospital	●
St. Mark's Hospital	●
Timpanogos Regional Hospital	●
University Hospital**	◆
Utah Valley Regional Medical Center	◆
Valley View Medical Center	●

[+]Source: NHSN data.
[*]Includes Pioneer Valley Hospital.
[**]Includes Huntsman Cancer Hospital.

NOTE: Acute care facilities with insufficient data to reliably compare their data to the standard population are not listed. Omitted hospitals include: Alta View Hospital, Ashley Regional Medical Center, Bear River Valley Hospital, Brigham City Community Hospital, Cache Valley Specialty Hospital, Castleview Hospital, Mountain View Hospital, Mountain West Medical Center, Orem Community Hospital, Park City Medical Center, Primary Children's Medical Center, Salt Lake Regional Medical Center, Sevier Valley Medical Center, Uintah Basin Medical Center.

■ Significantly fewer infections than national rate

● Not significantly different than national rate

◆ Significantly more infections than national rate

Table 3. Surgical site infections associated with colon surgeries in acute care facilities, Utah, 2012[+]

	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	**1,921**	**96**	**60.16**	**1.60**	**1.29 - 1.95**
Alta View Hospital	25	2	0.68	N/A[‡]	N/A[‡]
American Fork Hospital	56	2	1.55	1.29	0.16 - 4.65
Ashley Regional Medical Center	3	0	0.08	N/A[‡]	N/A[‡]
Bear River Valley Hospital	1	0	0.02	N/A[‡]	N/A[‡]
Brigham City Community Hospital	8	0	0.26	N/A[‡]	N/A[‡]
Cache Valley Specialty Hospital	4	0	0.13	N/A[‡]	N/A[‡]
Castleview Hospital	23	0	0.75	N/A[‡]	N/A[‡]
Davis Hospital and Medical Center	54	7	1.70	4.13	1.66 - 8.50
Dixie Regional Medical Center	144	1	4.50	0.22	0.01 - 1.24
Intermountain Medical Center	243	20	7.53	2.66	1.62 - 4.10
Jordan Valley Medical Center*	42	1	1.30	0.77	0.02 - 4.30
Lakeview Hospital	33	1	1.00	1.00	0.03 - 5.55
LDS Hospital	171	8	5.27	1.52	0.66 - 2.99
Logan Regional Hospital	43	1	1.19	0.84	0.02 - 4.69
McKay Dee Hospital Center	178	9	5.76	1.56	0.72 - 2.97
Mountain View Hospital	25	2	0.78	N/A[‡]	N/A[‡]
Mountain West Medical Center	9	1	0.26	N/A[‡]	N/A[‡]
Ogden Regional Medical Center	60	2	2.14	0.94	0.11 - 3.38
Orem Community Hospital	0	0	0	N/A[‡]	N/A[‡]
Park City Medical Center	3	0	0.08	N/A[‡]	N/A[‡]
Primary Children's Medical Center	0	0	0	N/A[‡]	N/A[‡]
Riverton Hospital	32	1	1.05	0.96	0.02 - 5.33
Salt Lake Regional Medical Center	22	1	0.69	N/A[‡]	N/A[‡]
Sevier Valley Medical Center	5	0	0.13	N/A[‡]	N/A[‡]
St. Mark's Hospital	242	8	7.28	1.10	0.48 - 2.17
Timpanogos Regional Hospital	39	2	1.19	1.69	0.20 - 6.09
Uintah Basin Medical Center	14	0	0.39	N/A[‡]	N/A[‡]
University Hospital**	256	15	8.36	1.80	1.00 - 2.96
Utah Valley Regional Medical	146	12	4.81	2.49	1.29 - 4.36
Valley View Medical Center	40	0	1.30	0	0 - 2.83

[+]Source: NHSN data.
[*]Includes Pioneer Valley Hospital.
[**]Includes Huntsman Cancer Hospital.
[‡]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.

[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.

Figure 4. Surgical site infections associated with abdominal hysterectomy surgeries in acute care facilities, Utah, 2012[+]

HOSPITAL	Abdominal Hysterectomy Surgeries
State of Utah	●
Intermountain Medical Center	●
LDS Hospital	●
McKay Dee Hospital Center	●
Ogden Regional Medical Center	●
Riverton Hospital	●
St. Mark's Hospital	●
Timpanogos Regional Hospital	●
University Hospital*	●
Utah Valley Regional Medical Center	●

[+]Source: NHSN data.
[*]Includes Huntsman Cancer Hospital.

NOTE: Acute care facilities with insufficient data to reliably compare their data to the standard population are not listed. Omitted hospitals include: Alta View Hospital, American Fork Hospital, Ashley Regional Medical Center, Bear River Valley Hospital, Brigham City Community Hospital, Cache Valley Specialty Hospital, Castleview Hospital, Davis Hospital and Medical Center, Dixie Regional Hospital, Jordan Valley Hospital (includes Pioneer Valley Hospital), Lakeview Hospital, Logan Regional Hospital, Mountain View Hospital, Mountain West Medical Center, Orem Community Hospital, Park City Medical Center, Primary Children's Medical Center, Salt Lake Regional Medical Center, Sevier Valley Medical Center, Uintah Basin Medical Center, Valley View Medical Center.

■ Significantly fewer infections than national rate

● Not significantly different than national rate

◆ Significantly more infections than national rate

Table 4. Surgical site infections associated with abdominal hysterectomy surgeries in acute care facilities, Utah, 2012+

	Number of abdominal hyst[1]	Number of abdominal hyst events[2]	Predicted number of abdominal hyst events[3]	Standardized Infection Ratio[4]	95% Confidence Interval[5]
State of Utah	**2,645**	**24**	**23.97**	**1.00**	**0.64 - 1.49**
Alta View Hospital	62	0	0.58	N/A‡	N/A‡
American Fork Hospital	82	3	0.67	N/A‡	N/A‡
Ashley Regional Medical Center	18	1	0.14	N/A‡	N/A‡
Bear River Valley Hospital	1	0	0.01	N/A‡	N/A‡
Brigham City Community Hospital	25	0	0.32	N/A‡	N/A‡
Cache Valley Specialty Hospital	3	0	0.03	N/A‡	N/A‡
Castleview Hospital	6	0	0.07	N/A‡	N/A‡
Davis Hospital and Medical Center	88	0	0.69	N/A‡	N/A‡
Dixie Regional Medical Center	70	0	0.68	N/A‡	N/A‡
Intermountain Medical Center	286	5	2.56	1.95	0.63 - 4.55
Jordan Valley Medical Center*	100	0	0.60	N/A‡	N/A‡
Lakeview Hospital	12	0	0.13	N/A‡	N/A‡
LDS Hospital	196	4	1.75	2.29	0.62 - 5.86
Logan Regional Hospital	41	0	0.31	N/A‡	N/A‡
McKay Dee Hospital Center	166	1	1.43	0.70	0.02 - 3.90
Mountain View Hospital	37	0	0.32	N/A‡	N/A‡
Mountain West Medical Center	14	1	0.14	N/A‡	N/A‡
Ogden Regional Medical Center	172	1	2.22	0.45	0.01 - 2.51
Orem Community Hospital	25	0	0.19	N/A‡	N/A‡
Park City Medical Center	13	0	0.06	N/A‡	N/A‡
Primary Children's Medical Center	0	0	0	N/A‡	N/A‡
Riverton Hospital	168	1	1.48	0.68	0.02 - 3.77
Salt Lake Regional Medical Center	29	1	0.31	N/A‡	N/A‡
Sevier Valley Medical Center	11	0	0.08	N/A‡	N/AI
St. Mark's Hospital	352	3	3.00	1.00	0.21 - 2.92
Timpanogos Regional Hospital	160	0	1.34	0	0 - 2.76
Uintah Basin Medical Center	30	1	0.34	N/A‡	N/A‡
University Hospital**	260	2	2.55	0.79	0.09 - 2.83
Utah Valley Regional Medical	187	0	1.65	0	0 - 2.24
Valley View Medical Center	31	0	0.34	N/A‡	N/A‡

+Source: NHSN data.
*Includes Pioneer Valley Hospital.
**Includes Huntsman Cancer Hospital
‡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.

[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.

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. **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.

3. **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.

4. **Central line days** - 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.

5. **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 (tube).

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

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

8. **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.

9. **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 dialyzer and dialysis machine.

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

11. **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.

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

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

14. **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.

15. **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.

16. **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.

17. **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.

18. **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.

19. **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.

References

1. Department of Health and Human Services, CDC. Advisory Committee to the Director of CDC, Summary Report; October 2010.

2. How-to-Guide: Prevent Central Line-Associated Bloodstream Infections. Cambridge, MA: Institute for Healthcare Improvement; 2012.

3. CDC. Healthcare-associated Infections. http://www.cdc.gov/HAI/infectionTypes.html. Accessed June 2013.

4. CDC. Dialysis. http://www.cdc.gov/dialysis. Accessed June 2013.

5. CDC. National Healthcare Safety Network (NHSN). http://www.cdc.gov/nhsn/. Accessed June 2013.

6. CDC. Winnable Battles. http://www.cdc.gov/winnablebattles/. Accessed June 2013.

Utah Department of Health
Healthcare-Associated Infections
Prevention & Reporting Program
P.O. Box 142104
Salt Lake City, UT 84114
http://health.utah.gov/epi/HAI
PH 801-538-6191 • FAX 801-538-9923