

SOUTH DAKOTA'S REPORT ON HEALTHCARE-ASSOCIATED INFECTIONS

January 1, 2013–December 31, 2017
NHSN data analysis
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BACKGROUND

Healthcare-associated infections (HAIs) are complications of healthcare and linked with high morbidity and mortality. Each year, about 1 in 25 U.S. hospital patients is diagnosed with at least one infection related to hospital care alone; additional infections occur in other healthcare settings. Many HAIs are caused by the most urgent and serious antibiotic-resistant (AR) bacteria and may lead to sepsis or death. Healthcare-associated infections have been identified as one of the winnable battles by CDC. CDC and state health departments use National Healthcare Safety Network (NHSN) as an instrument to monitor and assess HAI trends and target preventive actions. We used NHSN data downloaded on May 29, 2018 to prepare the current report on HAIs in South Dakota for 2013-2017 years. The South Dakota Department of Health (SDDOH) has no reporting mandate on healthcare-associated infections. Therefore, in the current document we report only aggregate statewide rates and ratios.

METHODS

Risk Adjustment

Risk adjustment is a statistical technique that allows hospitals to be compared fairly by accounting for differences in patient populations in terms of illness severity and other factors that may affect the risk of developing a HAI. For example, a hospital that performs a large number of complex procedures on very sick patients would be expected to have a higher infection rate than a hospital that performs more routine procedures on healthier patients. Therefore, before comparing the infection rates of hospitals, it is important to adjust for the number and proportion of high- and low-risk patients by calculating a statistically 'expected' or predicted number of infections. Different risk adjustment methods are used for different types of HAIs.

What is the SIR?

The standardized infection ratio (SIR) is a summary measure used to track HAIs at a national, state, or local level over time. The SIR adjusts for various facility and/or patient-level factors that contribute to HAI risk within each facility. In the HAI data analysis, the SIR compares the actual number of HAIs reported to the number that would be predicted, given the standard population (i.e., NHSN baseline), adjusting for several risk factors that have been found to be significantly associated with differences in infection incidence. For interpretation, an SIR greater than 1.0 indicates that more HAIs were observed than predicted; conversely, an SIR less than 1.0 indicates that fewer HAIs were observed than predicted. SIRs are currently calculated in NHSN for the following HAI types: central line-associated bloodstream infections (CLABSI), mucosal barrier injury laboratory-confirmed bloodstream infections (MBI-LCBI), catheter-associated urinary tract infections (CAUTI), surgical site infections (SSI), *Clostridium difficile* infections (CDI), methicillin-resistant *Staphylococcus aureus* bloodstream infections (MRSA), and ventilator-associated events (VAE).

The SIR is calculated by dividing the number of observed infections by the number of predicted infections. The number of observed infections is the number of infections reported into NHSN by healthcare facilities. The number of predicted infections is calculated using multivariable regression models generated from nationally aggregated data during a baseline time period. These models are applied to a facility's denominator and risk factor data to generate a predicted number of infections. Please refer to the SIR Guide Supplement at the end of this document for more details regarding the models.

$SIR = \text{Observed (O) HAIs} / \text{Predicted (P) HAIs}$

In order to enforce a minimum precision criterion, SIRs are currently not calculated when the number of predicted infections is less than 1.0. This rule was instituted to avoid the calculation and interpretation of statistically imprecise SIRs, which typically have extreme values.

Calculating the Number of Predicted Infections

The number of predicted infections in NHSN is calculated based on the 2015 national HAI aggregate data and is adjusted for each South Dakota facility using variables found to be significant predictors of HAI incidence. NHSN uses either a logistic regression model or a negative binomial regression model to perform this calculation. Logistic regression models are used when there is an opportunity for a single outcome for each exposure (e.g., SSI following a procedure). Negative binomial regression models are used when estimating incidence from a summarized population (e.g., CLABSIs in a Medical ICU).

The logistic regression model is the specific type of model used for surgical site infection risk adjustment. At a high level, the model uses a set of fixed parameters (adjustment variables) to predict the log-odds of a surgical site infection following an inpatient procedure. To obtain the total number of predicted SSIs, the following steps are completed in NHSN:

1. Determine the log-odds for each procedure
2. Convert the log-odds into a probability, or risk of infection (p), for each procedure
3. Sum the risk of infections across all procedures in a given timeframe

The sum of the risks from a set of procedures will amount to the total number of predicted infections for that same set of procedures.

EXECUTIVE SUMMARY

Key findings:

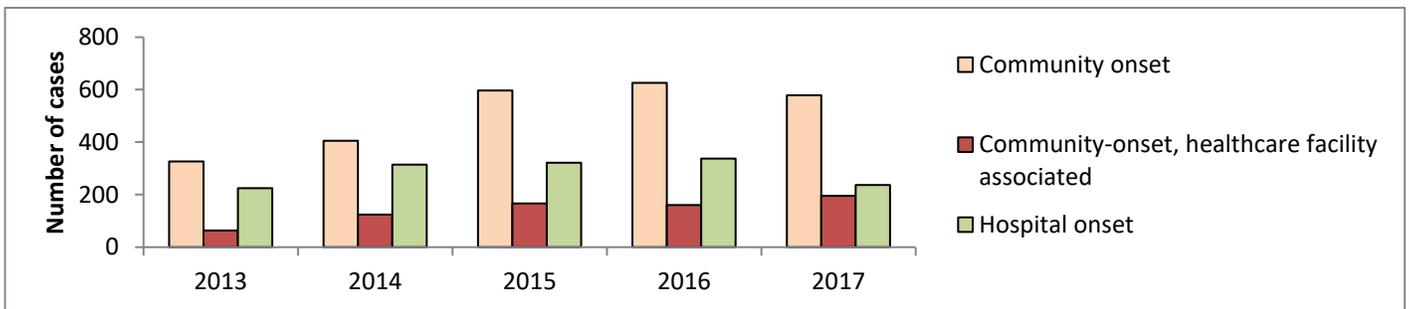
- Community-onset cases account for more than a half (54.1%) of all *Clostridium difficile* cases in SD. However Standardized Infection Ratio (SIR) for Healthcare-Onset *C. difficile* Infection LabID events for Acute Care Hospitals is below NHSN baseline.

- SIR for Healthcare-Onset Methicillin-resistant *Staphylococcus aureus* (MRSA) Bacteremia Laboratory-Identified (LabID) Events for Acute Care Hospitals remains well below the NHSN baseline. But admission prevalence rate (community onset cases) remains high.
- SIR for colon surgery (COLO) and abdominal hysterectomy (HYST) surgical site SSI remains higher than the NHSN baseline across all 12 quarters (2015-2017). Rates per 100 procedures are higher for COLOs than for HYST.
- SIR of CLABSI remains below the NHSN baseline. Most commonly isolated pathogen during CLABSI is *Staphylococcus aureus*.
- Device utilization ratios are high for both, central line and urinary catheters.

Clostridium difficile LabID event

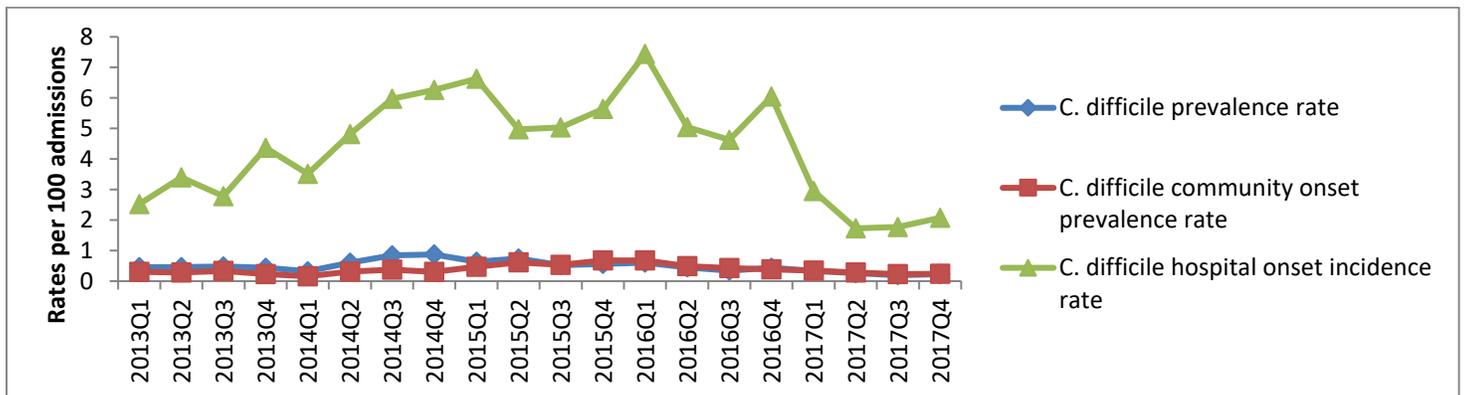
During 2013-2017, a total of 4,681 *C. difficile* cases have been reported through NHSN from 16 acute care hospitals, an average 936 cases per year (incidence 107 per 100,000 population per year). Median age at onset was 64 years (range 0-101) and 2,562 (54.7%) were females. Community onset cases accounted for the largest share (n=2,534, 54.1%), followed by healthcare-facility onset (n=1,436, 30.7%) and community onset, healthcare-facility associated cases (n=711, 15.2%). A total of 518 (11%) *C. difficile* cases were previously positive during 2015-2017. Three hundred and sixty eight (11.4%) patients were admitted to ED.

Figure 1: Number of reported LabID events of *C. difficile* from all participating hospitals by onset type – South Dakota, 2013-2017.



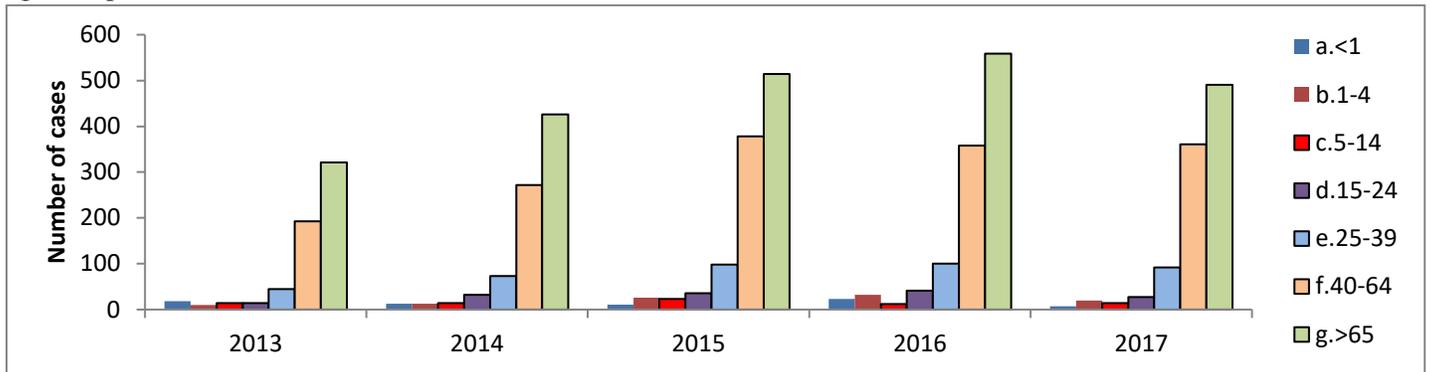
Hospital onset incidence rate was also higher compared with community onset prevalence and overall prevalence rates.

Figure 2: *C. difficile* Infection (CDI) Laboratory-Identified (LabID) Events Pooled Mean Incidence and Prevalence Rates in Acute Care Hospitals by quarter– South Dakota, 2013-2017.



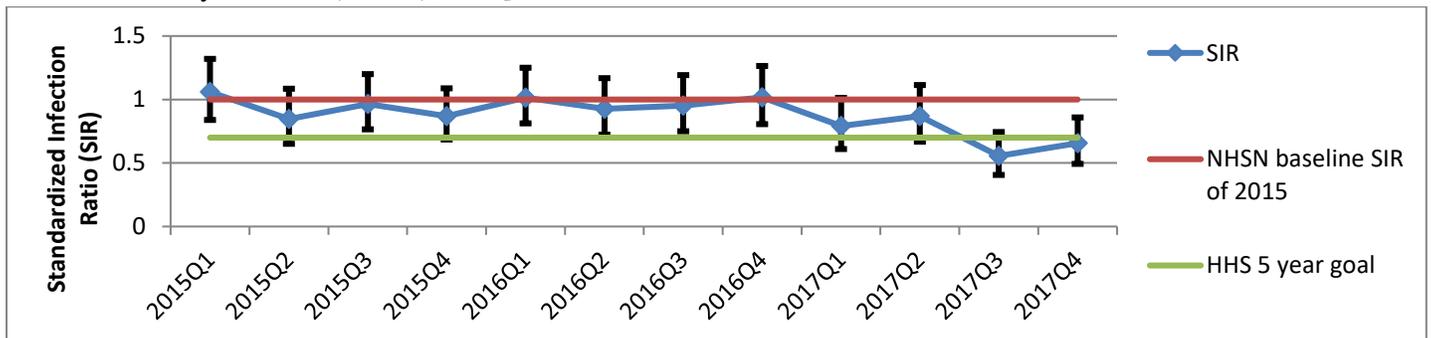
Among healthcare-facility onset cases, the median incubation period was 6 days (range 3-287 days). Patients aged >40 constitute a vast majority of LabID cases.

Figure 3: Number of reported LabID events of *C. difficile* from all participating hospitals by year of symptom onset and age of a patient – South Dakota, 2013-2017



Standardized Infection Ratio (SIR) was available for 16 facilities reporting *C. difficile* LabID event data for 2015-2017 years. From January-March 2015 to October-December 2017, the overall healthcare facility onset *C. difficile* LabID SIR in acute care hospitals in South Dakota decreased from 1.059 to 0.657. This is slightly below the U.S. Department of Health and Human Services’ National Action Plan to Prevent Healthcare-Associated Infections prevention target of SIR = 0.70. The overall healthcare facility-onset *C. difficile* LabID SIR for acute care hospitals in South Dakota was statistically significantly lower than the national SIR of 1 during the last 2 quarters of 2017 (Q3, 2017: 95% CI: 0.4-0.7; Q4 2017, 95% CI: 0.5-0.9). In the first quarter of 2015 SIR of South Dakota facilities was higher than 1 (SIR of Q1, 2015=1.1, 95% CI: 0.8-1.3). However, the trend of South Dakota SIR is coming down.

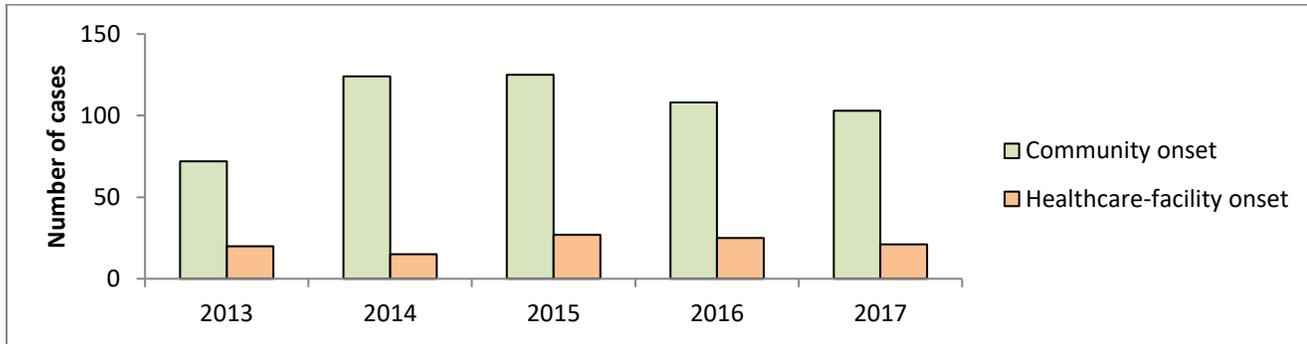
Figure 4: Standardized Infection Ratio (SIR) for Healthcare-Onset *C. difficile* Infection (CDI) Laboratory-Identified (LabID) Events for Acute Care Hospitals by Quarter – South Dakota, 2015–2017 [Reference standard: National Healthcare Safety Network (NHSN), 2015]



MRSA

During 2013-2017 a total of 640 MRSA cases have been reported through NHSN from 15 acute care hospitals, on average, 128 cases per year (incidence 14.7 per 100,000 population per year). Median age at onset was 64 years (range 0-96) and 292 (45.6%) were females. Community onset cases accounted for the largest share (532 cases, 83.1%), while healthcare-facility associated cases accounted for 108 (16.9%) of all cases.

Figure 5: Number of reported LabID events of MRSA from all participating hospitals by onset type – South Dakota, 2013-2017.



Similar to a greater proportion of the MRSA being community onset, there was a higher admission prevalence rate (number of MRSA blood cultures/1000 admissions) compared with MRSA bloodstream infection incidence rate (number of MRSA blood cultures/1000 patient-days).

Figure 6: Figure X: MRSA Laboratory-Identified (LabID) Events Pooled Mean infection admission prevalence and infection incidence rates in Acute Care Hospitals by quarter – South Dakota, 2013-2017.

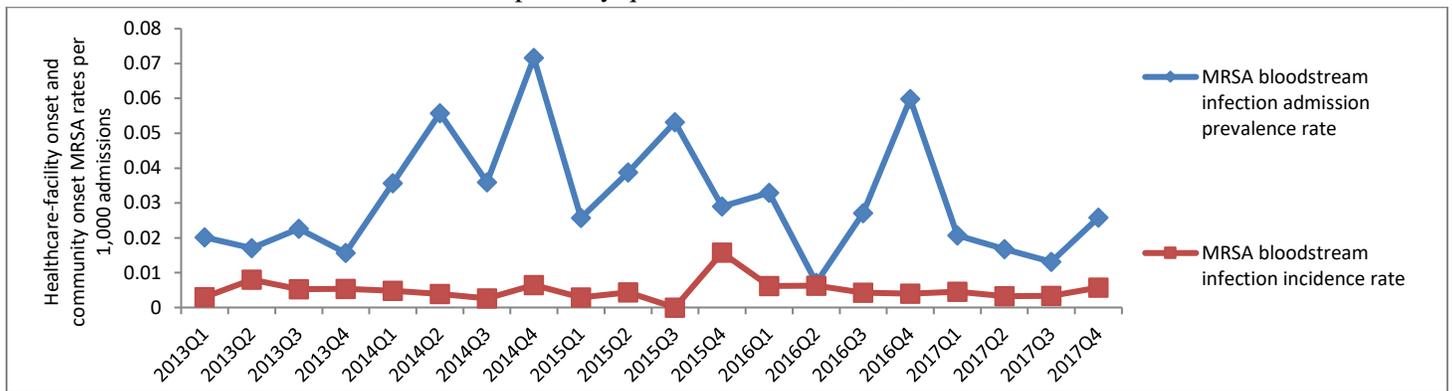
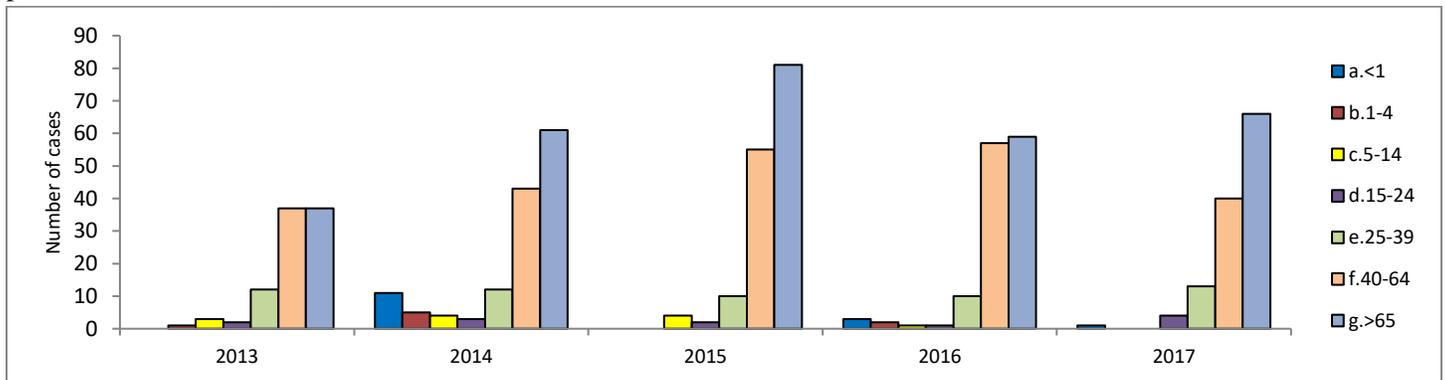
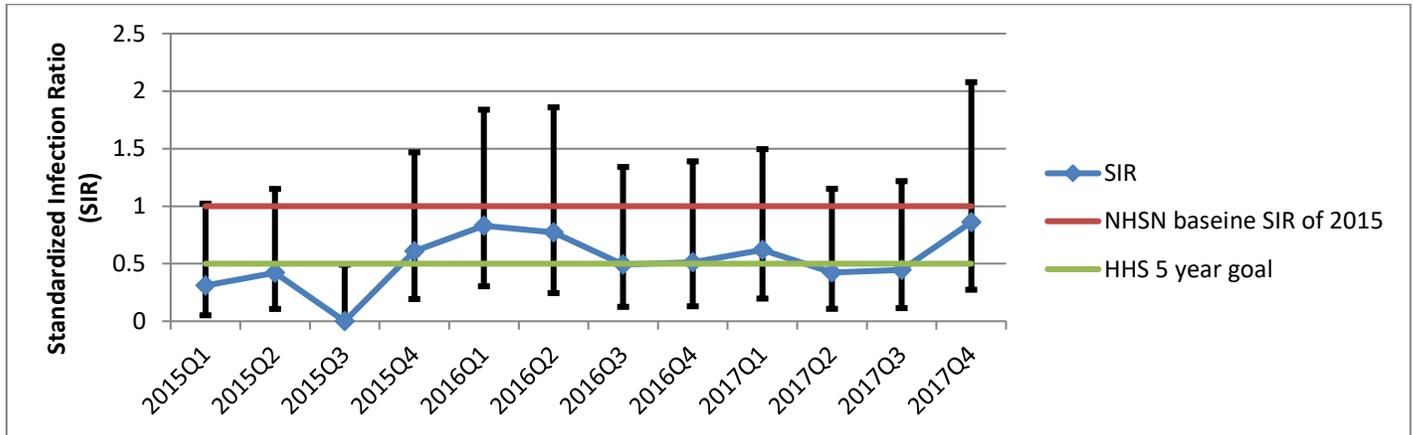


Figure 7: Number of reported MRSA LabID events from all participating hospitals by year of symptom onset and age of a patient – South Dakota, 2013-2017



Standardized Infection Ratios from January-March 2015 to October-December 2017 of healthcare facility onset MRSA LabID SIR in acute care hospitals of South Dakota was below the NHSN baseline across all 12 quarters. However, it was statistically significantly lower than the national SIR during only a single quarter. Overall, state’s performance is pretty close to the prevention SIR target of 0.5.

Figure 8: Standardized Infection Ratio (SIR) for Healthcare-Onset Methicillin-resistant *Staphylococcus aureus* (MRSA) Bacteremia Laboratory-Identified (LabID) Events for Acute Care Hospitals by Quarter – South Dakota, 2015-2017 [Reference standard: National Healthcare Safety Network (NHSN), 2015]



Surgical Site Infections (SSI)

A surgical site infection (SSI) is an infection that occurs after surgery at the site 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. Healthcare facilities can prevent SSIs by following appropriate infection prevention recommendations before, during, and after surgery.

For individuals undergoing surgical procedures, risk adjustment is calculated through logistic regression models which use national NHSN baseline data from 2015 to represent a standard population. With this method, risk factors are procedure-specific and each risk factor’s contribution varies according to its association with risk of the SSI.

For statewide SSI data, both crude (unadjusted) rates and SIRs are presented. Crude SSI rates are calculated as follows:

$$\text{SSI rate} = \frac{\text{Number of SSI reported}}{\text{Number of procedures reported}} * 100$$

For this report, SSI SIRs are generated by NHSN, and come in two forms: All SSI and Complex Admission/Readmission SIRs. For current report we used both models.

The All SSI SIR includes:

- Only inpatient procedures
- Superficial, Deep & Organ/Space SSIs
- Superficial & Deep Incisional SSIs limited to primary incisional SSIs only
- SSIs identified on admission, readmission & via post-discharge surveillance

The Complex Admission/Readmission (A/R) SSI SIR includes:

- Only inpatient procedures
- Only Deep Incisional Primary SSIs & Organ/Space SSIs
- Only SSIs identified on Admission/Readmission to the facility where the procedure was performed

Complex Admission/Readmission is used for the annual CDC publication of national benchmarks.

A total of 413 cases of colon surgery (COLO) SSIs from 10 acute care hospitals and 91 cases of abdominal hysterectomy (HYST) SSIs from 11 acute care hospitals have been identified during 2013-2017. Median age of colon surgery SSI patients was 63 (range 0-91) and for abdominal hysterectomy patients was 47 (range 22-87). All 91 patients in the HYST group were females while 196 (47%) patients in COLO group were male. Rate of SSIs per 100 procedures was much higher for COLO than HYST procedures and showed seasonal variation.

Figure 9: Rates of all SSI per 100 procedures performed by quarter and procedure type - South Dakota, 2015-2017

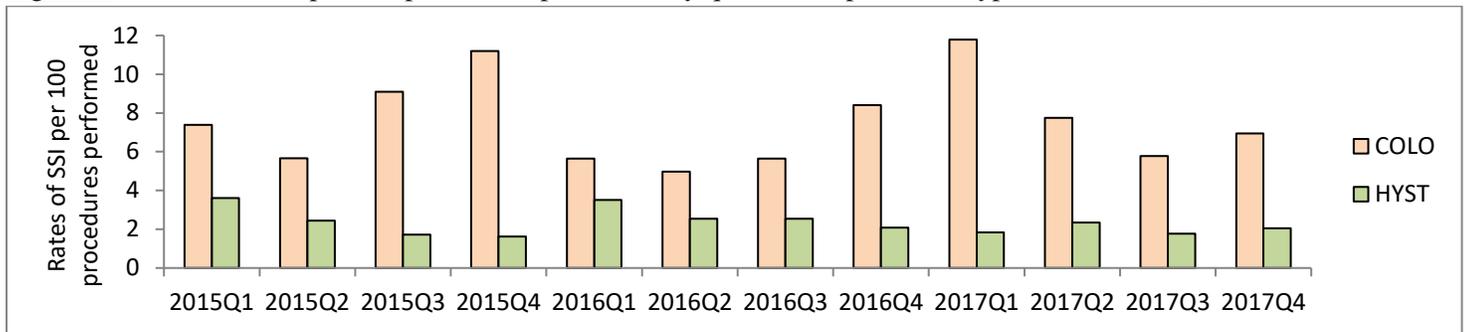


Table 1: Types of all SSI by site and procedure code - South Dakota, 2013-2017

Procedure code		Deep incisional primary	Gastrointestinal tract	Intraabdominal infection	Other infection of the male or female reproductive tract	Superficial incisional primary	Vaginal cuff infection	Total
COLO	Number of infections	36	2	168	1	206	0	413
	Percent	8.72	0.48	40.68	0.24	49.88	0	
HYST	Number of infections	3	0	25	18	36	9	91
	Percent	3.3	0	27.47	19.78	39.56	9.89	

SSIs of Colon Surgery (COLO)

Standardized Infection Ratios for COLO SSIs were higher than the NHSN baseline SIR. In 5 (41%) out of 12 quarters, SIR of SD hospitals was statistically significantly higher compared to the NHSN baseline and was almost twice as high as the HHS 5 year goal of 0.7.

Figure 10: Colon Surgery (COLO), all Surgical Site Infection (SSI) Standardized Infection Ratios (SIRs) by Quarter – South Dakota, 2015–2017 [Reference standard: National Healthcare Safety Network (NHSN), 2015]

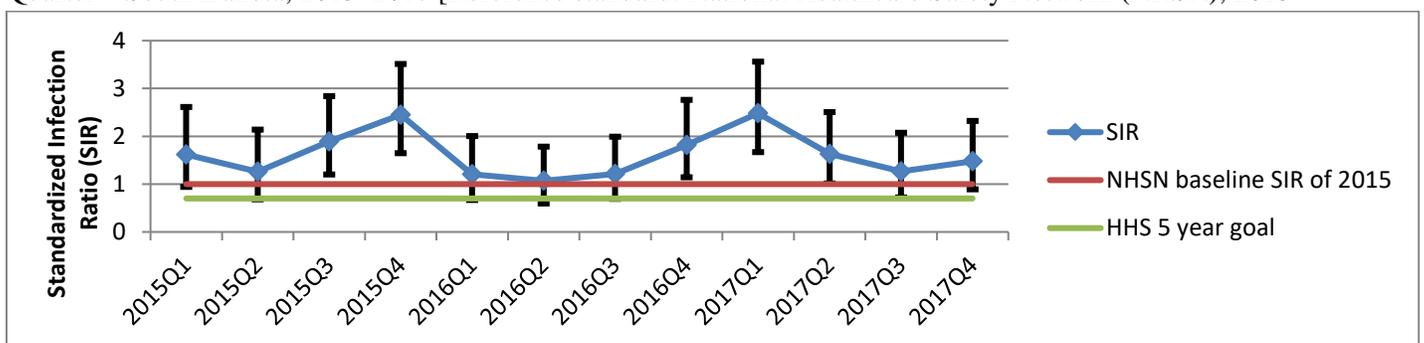
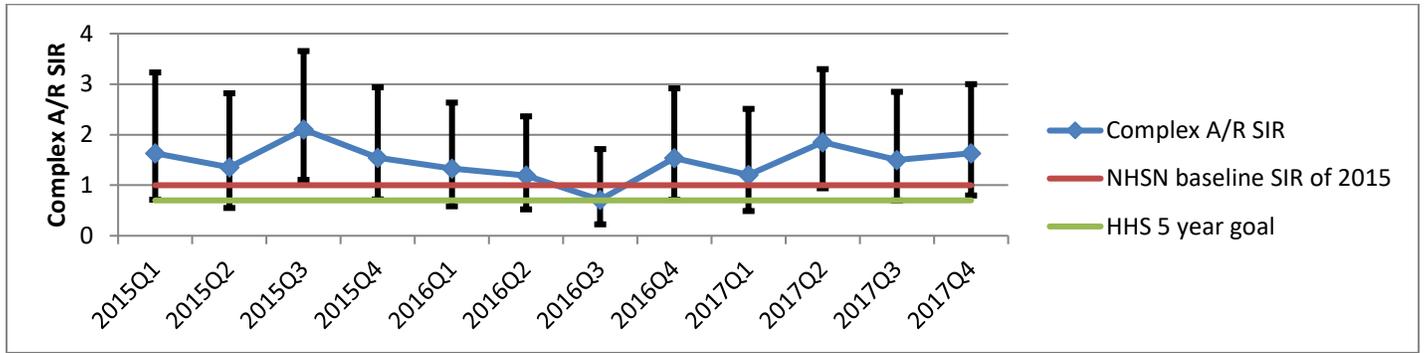


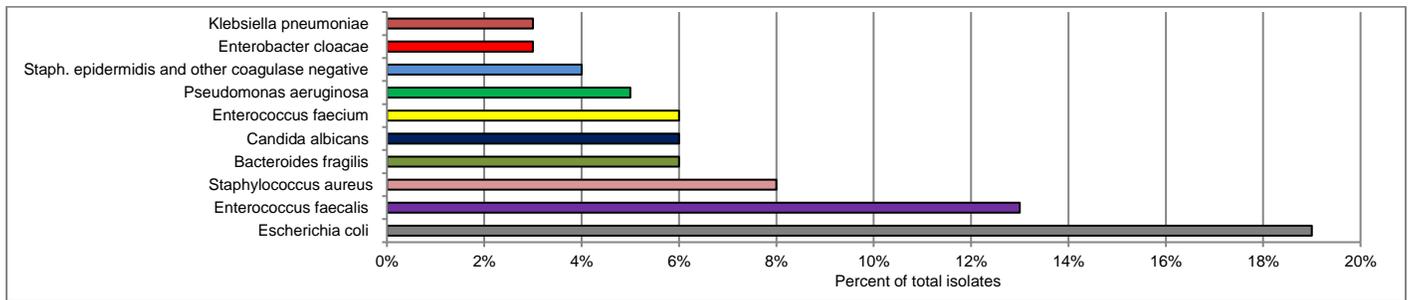
Figure 11: Colon Surgery (COLO), Complex Admission/Readmission (A/R) SSI Standardized Infection Ratios (SIRs) by Quarter – South Dakota, 2015–2017 [Reference standard: National Healthcare Safety Network (NHSN), 2015]



Among the 509 pathogens isolated from 413 SSIs following colon procedures during 2013-2017, the most common pathogens were *E. coli* (19%), *Enterococcus faecalis* (13%), and *Staphylococcus aureus* (8%). An average of 1.2 pathogens were identified per SSI.

Figure 12: Top ten microorganisms identified from Surgical Site Infections (SSI) following Colon Surgery (COLO) Procedures – South Dakota, 2013-2017

Total number of all isolates=509*; Number of events=413



*Top 10 isolates constitute 73% of all organisms isolated.

SSIs of Abdominal hysterectomy (HYST)

Standardized Infection Ratios for HYST SSIs were higher than the NHSN baseline SIR. In 1 (8%) out of 12 quarters, the SIR of SD hospitals was statistically significantly higher compared to the NHSN baseline. In 11 quarters, the SIR was not statistically significantly higher than the NHSN baseline.

Figure 13: Abdominal Hysterectomy Procedures (HYST). All Surgical Site Infection (SSI) Standardized Infection Ratios (SIRs) by Quarter – South Dakota, 2015–2017 [Reference standard: National Healthcare Safety Network (NHSN), 2015]

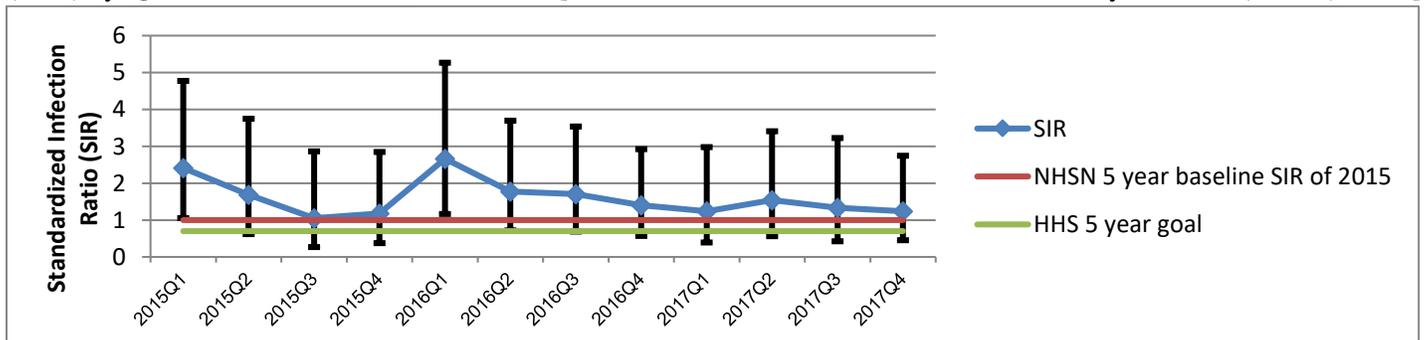
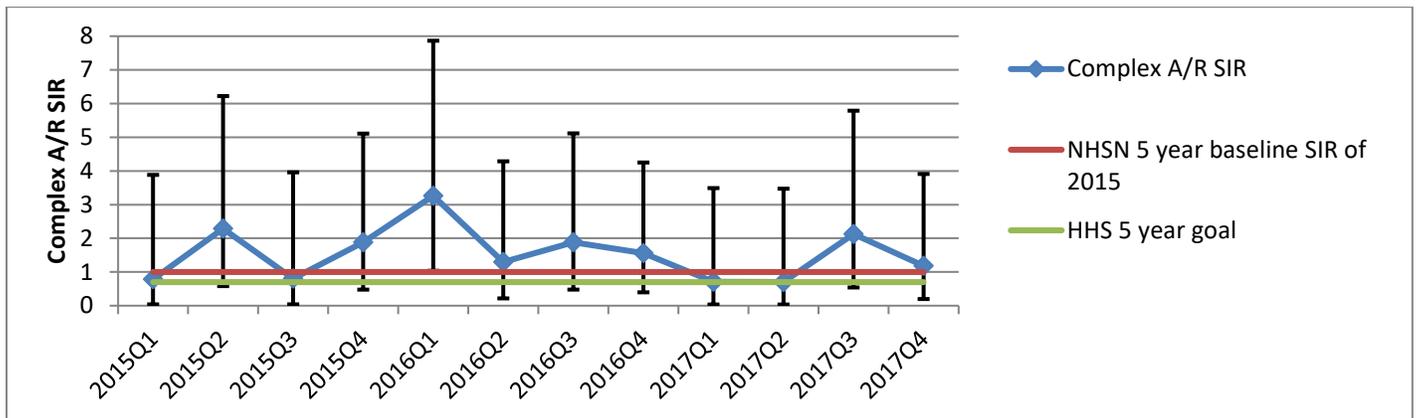


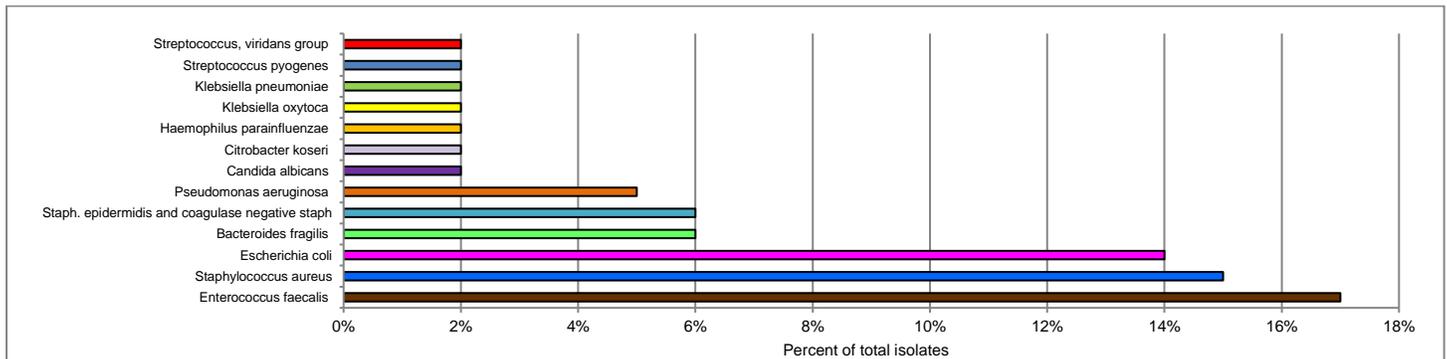
Figure 14: Abdominal Hysterectomy Procedures (HYST). Complex Admission/Readmission (A/R) SSI Standardized Infection Ratios (SIRs) by Quarter – South Dakota, 2015–2017 [Reference standard: National Healthcare Safety Network (NHSN), 2015]



Among the 96 pathogens isolated from 91 events following abdominal hysterectomy SSIs during 2013-2017, the most common pathogens were *Enterococcus faecalis* (17%), *Staphylococcus aureus* (15%), and *E. coli* (14%).

Figure 15: Top 13 microorganisms identified from Surgical Site Infections (SSI) following abdominal hysterectomy (HYST) Procedures – South Dakota, 2013–2017

Total number of all isolates=96*; Number of events=91



*Top 13 isolates constitute 77% of all organisms isolated.

Central Line-Associated Bloodstream Infections (CLABSI)

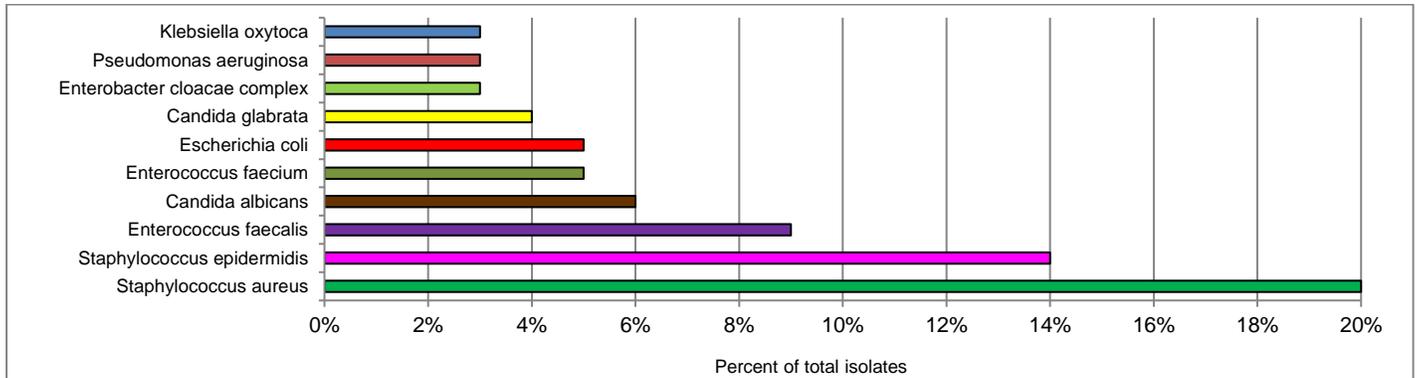
A central line or central venous catheter is a flexible tube that is inserted in a patient’s blood vessel and terminates at or close to the heart or in one of the large vessels near the heart. A central line (or an umbilical line for newborns) can be used to give fluids, antibiotics, medical treatments such as chemotherapy, and/or liquid food. If a central line is inserted incorrectly or not cared for properly, it can lead to dangerous bloodstream infections known as central line associated bloodstream infections. Healthcare facilities can prevent CLABSIs by following appropriate infection prevention recommendations when placing and maintaining a central line, and by removing a central line as soon as it is no longer medically necessary.

A total of 154 CLABSI cases have been identified during 2013-2017 from 15 acute care hospitals. The median age of patients was 52 years (range 0-93) and 73 (47%) were female.

Among the 174 pathogens isolated from 154 CLABSI events during 2013-2017, the most common pathogens were *Staphylococcus aureus* (20%), *Staphylococcus epidermidis* (14%) *Enterococcus faecalis* (9%).

Figure 16: Microorganisms Identified in Central Line-Associated Bloodstream Infections (CLABSIs) – South Dakota, 2013 - 2017

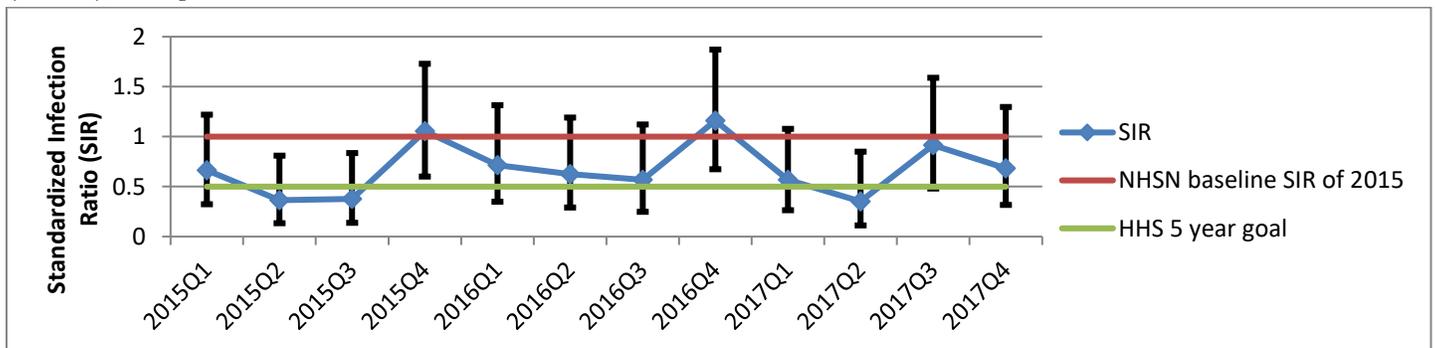
Total number of all isolates=174*; Number of events=154



*Top 10 isolates constitute 71% of all organisms isolated.

SIR in CLABSI is lower than the NHSN baseline and has a bimodal distribution. In 3 (25%) out of 12 quarters, South Dakota’s SIR was statistically significantly lower than the National baseline SIR of 2015. In 9 quarters the difference was not statistically significant. In addition 3 (25%) of 12 quarters were below the HHS 5 year goal.

Figure 17: Standardized Infection Ratios (SIR) for Central Line-Associated Bloodstream Infections (CLABSIs) by Quarter in acute care hospitals – South Dakota, 2015–2017 [Reference standard: National Healthcare Safety Network (NHSN), 2015]



Device utilization ratio

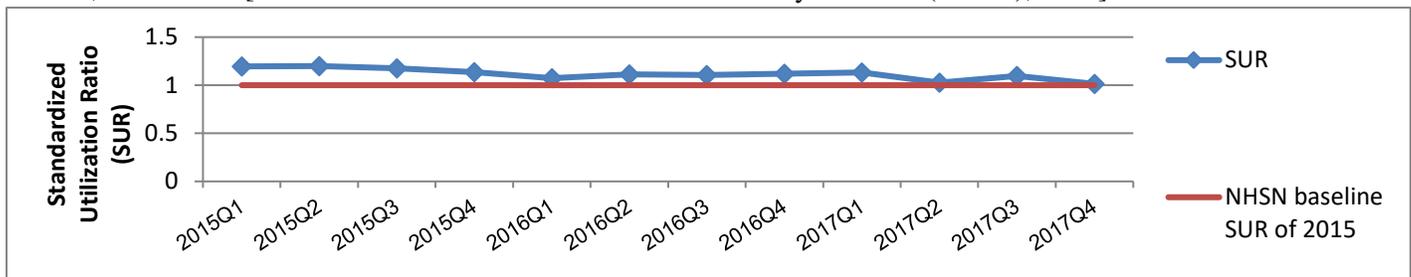
The standardized utilization ratio (SUR) is a summary measure used to track device use at a national, state, local, or facility level over time. The SUR adjusts for various facility and/or location-level factors that contribute to device use. The method of calculating a SUR is similar to the method used to calculate the Standardized Infection Ratio (SIR). In device-associated HAI data analysis, the SUR compares the actual number of device days reported to what would be predicted, given the standard population (specifically, the NHSN baseline), adjusting for several factors that have been found to be significantly associated with differences in device utilization. In other words, a SUR greater than 1.0 indicates that more device days were observed than predicted; conversely, a SUR less than 1.0 indicates that fewer device days were observed than predicted. SURs are currently calculated in NHSN for the following device types: central lines, urinary catheters, and ventilators.

The SUR is calculated by dividing the number of observed device days by the number of predicted device days. The number of predicted device days is calculated using multivariable logistic regression models generated from nationally aggregated data during a baseline time period. These models are applied to a facility’s denominator data to generate a predicted number of device days. Please refer to the SUR Guide Supplement at the end of this document for more details regarding the models. $SUR = \text{Observed (O) device days} / \text{Predicted (P) device days}$.

In order to enforce a minimum precision criterion, SURs are currently not calculated when the number of predicted device days is less than 1.0. This rule was instituted to avoid the calculation and interpretation of statistically imprecise SURs, which typically have extreme values.

South Dakota’s SUR is statistically significantly higher than the NHSN baseline SUR in 10 (83%) out of 12 quarters.

Figure 18: Standardized device utilization ratios (SURs) for central lines by quarter in acute care hospitals – South Dakota, 2015–2017 [Reference standard: National Healthcare Safety Network (NHSN), 2015]



Catheter-Associated Urinary Tract Infections (CAUTI)

An indwelling urinary catheter is a drainage tube that is inserted into the urinary bladder through the urethra, left in place, and connected to a closed collection system. When pathogens enter the urinary tract through the urinary catheter and lead to urinary tract infections, the subsequent infection is known as catheter-associated urinary tract infection.

Healthcare facilities can prevent CAUTIs by following appropriate infection prevention recommendations when inserting and maintaining indwelling urinary catheters, and by removing a urinary catheter as soon as it is no longer medically necessary.

South Dakota CAUTI rates were compared to national rates using the same statistical methods implemented in NHSN for comparing hospital rates to national rates within risk categories. For adult and pediatric ICU patients with urinary catheters, risk adjustment was limited to the type of hospital location; hospital type and unit bed size were used to categorize ICUs in some instances.

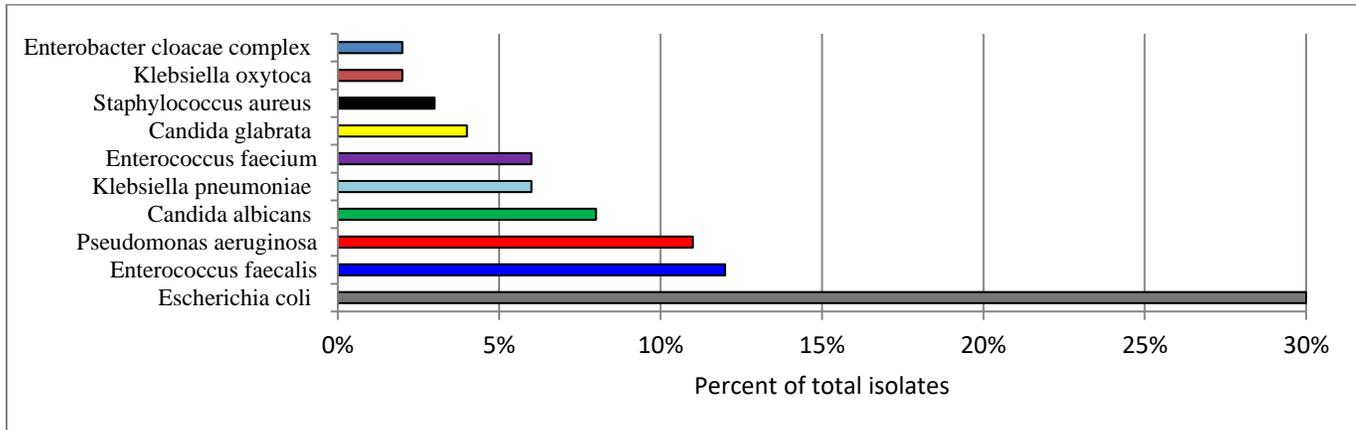
The CAUTI SIR was calculated by dividing the total number of observed CAUTI events by the predicted number of CAUTIs, using the CAUTI rates from the standard population (in this case, NHSN 2009 data). The predicted number was calculated by multiplying the national CAUTI rate from the standard population by the observed number of urinary catheter-days for each stratum.

A total of 232 CAUTI cases have been identified during 2013-2017 years from 14 acute care hospitals. The median age of patients was 65 years (range 0-97) and 149 (64%) were female.

Among the 259 pathogens isolated from 232 CAUTI events identified during 2013-2017, the most common pathogens were *E. coli* (30%), *Enterococcus faecalis* (12%), and *Pseudomonas aeruginosa* (11%).

Figure 19: Top 10 microorganisms Identified in Catheter-associated Urinary tract infections (CAUTI), South Dakota, 2013-2017

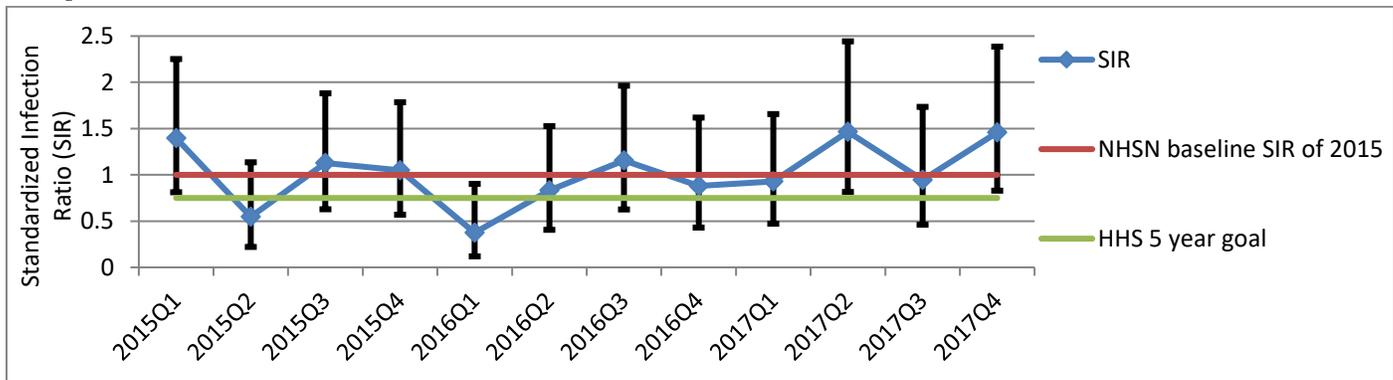
Total number of all isolates=259*; Number of events=232



*Top 10 isolates constitute 84% of all organisms isolated.

SIR of CAUTIs in South Dakota was very close to the 2015 NHSN baseline SIR. One quarter was statistically significantly lower in SD versus the 2015 NHSN baseline (Q1 - 2016).

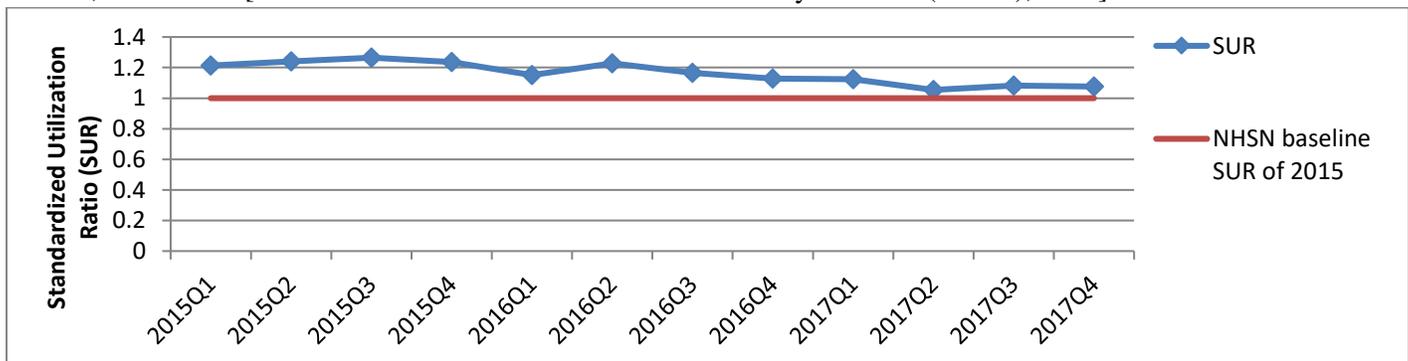
Figure 20: Standardized Infection Ratios (SIR) for Catheter-associated Urinary tract Infections (CAUTI) by Quarter in acute care hospitals – South Dakota, 2015–2017 [Reference standard: National Healthcare Safety Network (NHSN), 2015]



Device utilization ratio

South Dakota’s SUR for urinary catheter utilization was always above the NHSN baseline SUR and the difference between these two metrics was always statistically significant in all 12 quarters of 2015-2017.

Figure 21: Standardized device utilization Ratios (SURs) for urinary catheters by quarter in acute care hospitals, – South Dakota, 2015–2017 [Reference standard: National Healthcare Safety Network (NHSN), 2015]



References

- Tennessee report on healthcare associated infections
- The NHSN standardized infection ratio (SIR). Available at <https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/nhsn-sir-guide.pdf>
- The NHSN standardized utilization ratio (SUR) available at <https://www.cdc.gov/nhsn/pdfs/ps-analysis-resources/nhsn-sur-guide-508.pdf>
- National Action Plan to Prevent Health Care-Associated Infections: Road Map to Elimination available at <https://health.gov/hcq/prevent-hai-action-plan.asp>
- Tennessee's report on healthcare-associated infections October 2015 available at https://www.tn.gov/content/dam/tn/health/documents/TN_HAI_Report_Technical_October_2015.pdf

Appendix A. Definitions

- Abdominal hysterectomy (HYST): Hysterectomy performed through the abdomen; includes laparoscopic procedures.
- All Surgical Site Infection Standardized Infection Ratio (All SSI SIR): (See Standardized Infection Ratio.) A standardized infection ratio calculated by NHSN for surgical site infections, which includes all inpatient and outpatient procedures and all primary SSIs identified during admission, readmission, or post-discharge surveillance, as defined in the NHSN Patient Safety Component Manual.
- ASA Score: Assessment by the anesthesiologist of the patient's preoperative physical condition using the American Society of Anesthesiologists' (ASA) Classification of Physical Status. Patient is assigned one of the following which is used as one element of the SSI Basic Risk index:
 - 1 -- Normally healthy patient
 - 2 -- Patient with mild systemic disease
 - 3 -- Patient with severe systemic disease that is not incapacitating
 - 4 -- Patient with an incapacitating systemic disease that is a constant threat to life
 - 5 -- Moribund patient who is not expected to survive for 24 hours with or without the operation
- Catheter-associated urinary tract infection (CAUTI): When a patient develops a urinary tract infection while having a urinary catheter in place or within 48 hours of urinary catheter removal, the infection is considered a CAUTI.
- CAUTI infection rate: The total number of catheter-associated urinary tract infections divided by the number of urinary catheter-days, multiplied by 1,000.
- Central line: A flexible tube that is inserted in a patient's blood vessel and terminates at or close to the heart or in one of the large vessels near the heart. A central line (or an umbilical line for newborns) can be used to give fluids, antibiotics, medical treatments such as chemotherapy, and/or liquid food. If a central line is inserted incorrectly or not cared for properly, it can lead to dangerous bloodstream infections. Central lines are also sometimes called central venous lines or central venous catheters.
- Central line-associated bloodstream infection (CLABSI): When a patient develops a bloodstream infection while having a central line in place or within 48 hours of central line removal, the infection is considered a CLABSI.
- Central line-days: The total number of days a central line is in place for patients in a particular unit. The count is performed at the same time each day. Each patient with one or more central lines at the time the count is performed is counted as one central line day. In specialty care areas, central line-days are collected separately for permanent and temporary central lines (see "Central line" definition). If a patient has both a permanent and a temporary central line, the day is recorded as a temporary central line-day.
- Central line-associated bloodstream infection (CLABSI) rate: This rate is the total number of central line-associated bloodstream infections divided by the number of central line-days, multiplied by 1,000.

- Central line utilization ratio: See Device Utilization Ratio
- Clostridium difficile: A bacterium that naturally resides in the bowels of some people without symptoms of infection. Clostridium difficile (C. difficile) is responsible for a spectrum of C. difficile infections (CDI), including gastrointestinal illness which can lead to severe complications including sepsis and death. CDI can occur when C. difficile spores are transferred to patients via the hands of healthcare personnel or other contaminated surfaces or items.
- Colon surgery (COLO): Procedure performed on the large intestine; does not include rectal operations.
- Community-onset (CO): LabID event specimen collected as an outpatient or an inpatient ≤ 3 days after admission to the facility (i.e., days 1, 2, or 3 of admission).
- Community-onset healthcare facility-associated (CO-HFA): Community-onset (CO) LabID event specimen collected from a patient who was discharged from the facility ≤ 4 weeks prior to the current date of stool specimen collection (Clostridium difficile infection LabID events only).
- Complex Admission/Readmission Standardized Infection Ratio (Complex A/R SIR): (See Standardized Infection Ratio).
- A standardized infection ratio calculated by NHSN for surgical site infections, which only includes inpatient procedures and deep incisional primary and organ/space SSIs identified during admission or readmission to the reporting facility, as defined in the NHSN Patient Safety Component Manual.
- Confidence intervals: Confidence intervals describe the reliability of a point estimate, such as a standardized infection ratio or infection rate. If TDH mentions a confidence interval of 95%, it means that the TDH is 95% confident that the hospital's precise infection rate (the point estimate) falls within the range given. In this report, the confidence interval is based on the number of infections observed and the number of central line-days accumulated during the specified time period. If two hospitals have different infection rates, but the confidence intervals for the two rates overlap, then it is reasonably possible that the true rates are the same.
- Deep incisional SSI: A surgical site infection that involves the deep soft tissues (e.g., fascial and muscle layers) of the incision and meets the NHSN criteria for a deep incisional SSI as described in the NHSN Patient Safety Manual. A deep incisional SSI can be either 1) primary – identified in the primary incision in a patient that had an operation with one or more incisions (e.g., chest incision in a CBGB) or 2) secondary – identified in the secondary incision in a patient that had an operation with more than one incision (e.g., donor site (leg) incision in a CBGB).
- Device Utilization (DU) Ratio: This ratio is the number of device (central line or urinary catheter) days divided by the number of patient-days (see also: central line utilization ratio and urinary catheter utilization ratio).
- Healthcare-associated infection (HAI): For an infection to be considered healthcare-associated, there must be no evidence that the infection was present or incubating at the time of hospital admission. A HAI may be confined to one area of the body (localized) or be spread throughout (systemic). It is the body's adverse reaction to the presence of an infectious agent(s) or its toxin(s).
- Healthcare facility-onset (HO): LabID event specimen collected >3 days after admission to the facility (i.e., on or after day 4).
- Inpatient: As defined by NHSN, a patient whose date of admission to the healthcare facility and the date of discharge are different calendar days
- Laboratory-identified (LabID) event: A monitoring method for multidrug-resistant organisms which relies almost exclusively on data obtained from the laboratory. Surveillance is performed using the NHSN MDRO/CDI Module.
- Long-Term Acute Care (LTAC) Facility: LTACs provide evaluation, treatment, and management of patients suffering medically complex conditions, or who have suffered recent catastrophic illness or injury, and require and extended stay in an acute care environment.

- Methicillin-Resistant Staphylococcus aureus: Methicillin-Resistant Staphylococcus aureus (MRSA) is a type of Staphylococcus bacteria that is resistant to certain antibiotics including methicillin. MRSA can be spread via contaminated surfaces or equipment and on the hands of healthcare personnel. MRSA infections can be severe and life threatening and treatment options are often limited and expensive.
- National Healthcare Safety Network (NHSN): This is the online system that South Dakota hospitals must use to report HAI data to the South Dakota Department of Health. NHSN is a secure, internet-based surveillance (monitoring and reporting) system. Among other features, the network offers integrated patient and healthcare worker safety surveillance systems. NHSN is managed by CDC’s Division of Healthcare Quality Promotion. In NHSN, hospitals submit information that is needed to calculate HAI rates and standardized infection ratios (SIRs).
- NHSN Patient Safety Component Manual: This manual contains standardized surveillance definitions and data collection methods that are essential for fair reporting of HAIs. Surveillance definitions are updated annually;
- NHSN operative procedure: A procedure that: Is performed on a patient who is an NHSN inpatient or an NHSN outpatient, takes place during an operation where a surgeon makes at least one incision through the skin or mucous membrane, including laparoscopic approach, and closes the incision before the patient leaves the operating room.
- Operation: A single trip to the operating room (OR) where a surgeon makes at least one incision through the skin or mucous membrane, including laparoscopic approach, and closes the incision before the patient leaves the OR.
- Organ/space SSI: A surgical site infection that involves any part of the body, excluding the skin incision, fascia, or muscle layers, that is opened or manipulated during the operative procedure (e.g., osteomyelitis).
- Outpatient: As defined by NHSN, a patient whose date of admission to the healthcare facility and the date of discharge are the same calendar day.
- Standardized infection ratio (SIR): The SIR is a summary measure used to compare infection data from one population to data from a “standard” population. For HAI reports, the standard population comes from data reported from U.S. hospitals that report to NHSN. The SIR is calculated by dividing the observed number of infections by the predicted (or statistically expected) number of infections, which is calculated using data from the standard population.
- Superficial incisional SSI: A surgical site infection that involves only skin and soft tissue layers of the incision and meets the NHSN criteria for a superficial incisional SSI as described in the NHSN Patient Safety Manual. A incisional SSI can be either 1) primary – identified in the primary incision in a patient that had an operation with one or more incisions (e.g., chest incision in a CBGB) or 2) secondary – identified in the secondary incision in a patient that had an operation with more than one incision (e.g., donor site (leg) incision in a CBGB).
- Surgical Site Infection (SSI): An infection found after an operation in the part of the body where the surgery was performed.
- Urinary catheter: A drainage tube that is inserted into the urinary bladder through the urethra, left in place, and connected to a closed collection system.
- Urinary catheter days: The total number of days a urinary catheter is in place for patients in a particular unit. The count is performed at the same time each day. Each patient with urinary catheter in place at the time the count is performed is counted as one urinary catheter day.
- Urinary catheter utilization ratio: See Device Utilization Ratio
- Validation: Validation is the process of making sure that HAI data reported to NHSN are complete and accurate to:
 - Assess the accuracy and quality of data submitted to NHSN
 - Provide hospitals with information to help them correctly use the NHSN application
 - Provide education to IPs and other hospital staff to improve data accuracy and quality, if necessary

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