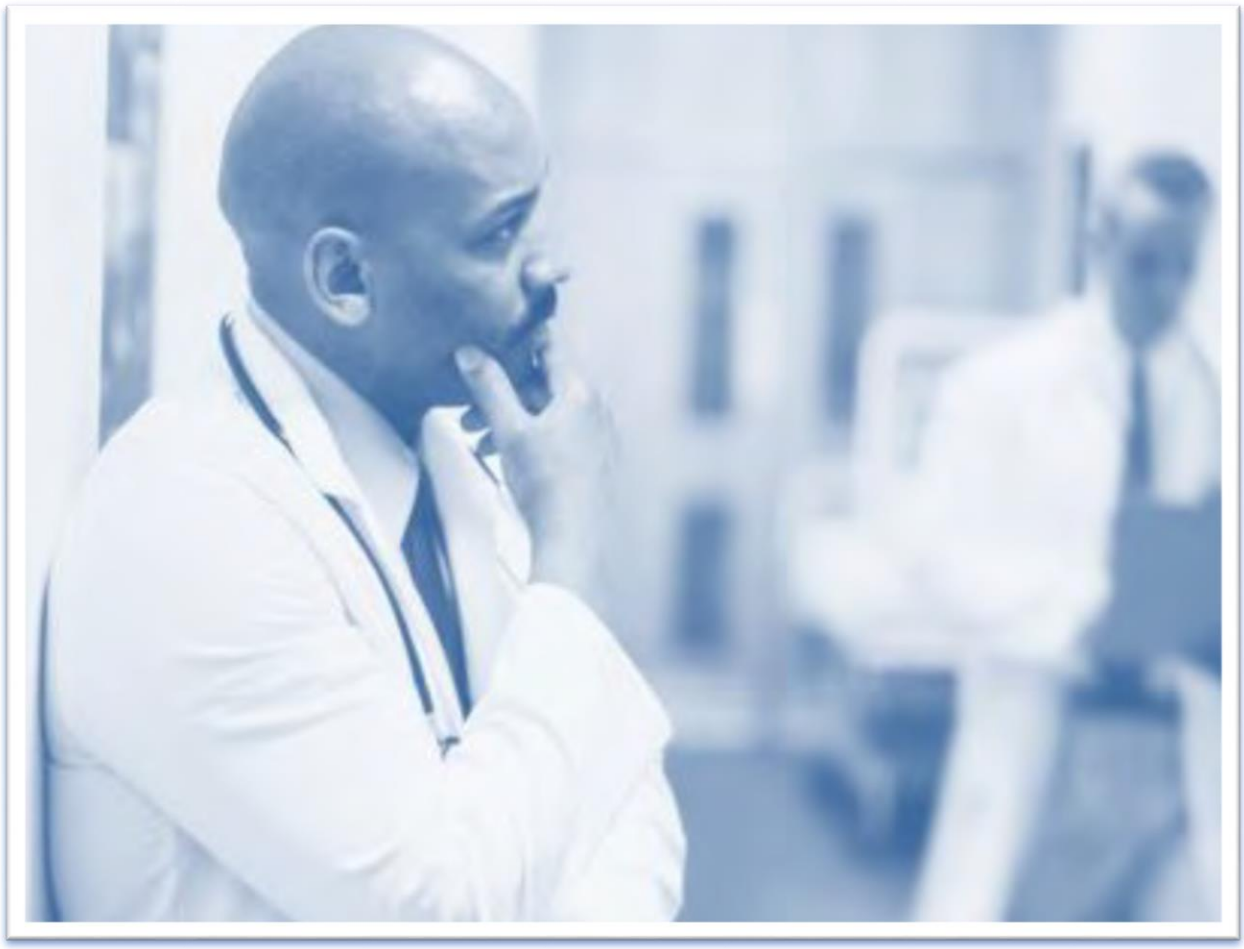
Missouri Nosocomial Infection Reporting Data:

Report to the Governor and General Assembly

December 2019



Missouri Department of Health and Senior Services

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Contents

Executive Summary

Background

In 2004, the Missouri legislature passed Senate Bill 1279, establishing the "Missouri Nosocomial Infection Reporting Act of 2004." The law requires hospitals and ambulatory surgical centers (ASCs) to report specific categories of healthcare-associated infections (HAIs) to the Department of Health and Senior Services (DHSS). This report summarizes January 1 - December 31, 2018 data on central line-associated bloodstream infections (CLABSIs), catheter-associated urinary tract infections (CAUTIs), and surgical site infections (SSIs).

Data Collection

The healthcare associated infections mandated for reporting in 19 CSR 10-33.050 are CLABSIs, CAUTIs, and SSIs. Hospitals report device-associated HAIs for CLABSIs and CAUTIs for specified intensive care units (ICUs) and wards. Hospitals report SSIs associated with abdominal hysterectomy and colon surgery, and ASCs report SSIs associated with hernia repair and breast surgery. SSIs are reported by facility rather than by ICU or ward. Hospitals report data to the DHSS through the Centers for Disease Control and Prevention's (CDC), National Healthcare Safety Network (NHSN) website, and ASCs report data directly to DHSS through the Missouri Healthcare-Associated Infection Reporting System (MHIRS) website.

Reporting to the Public

In 2009, the Department of Health and Senior Services developed a website to report healthcare-associated infection rates to the public. This site provides the most current four quarters of data for viewing. At the time this report was prepared, ASC SSI data for January 1 - December 31, 2018 were available (https://health.mo.gov/data/hai/drive_noso.php). Due to changes in statute, hospital data will no longer be updated on this website. Instead, the department encourages consumers and stakeholders to visit the Centers for Medicare and Medicaid (CMS) Hospital Compare website, which publishes information related to hospital services and quality of care (https://www.medicare.gov/hospitalcompare/search.html). A direct link to Hospital Compare can also be found on the healthcare-associated infections page of the DHSS website. Historical data for hospitals and ASCs are also available through a DHSS website (https://healthapps.dhss.mo.gov/haihistory/Hospitals.aspx). Historical data are available for years 2006-2016.

Data Summary

For January 1- December 31, 2018, approximately 70 acute care hospitals reported on at least one of the following HAI measures: device-associated CLABSIs, CAUTIs, or SSIs for abdominal hysterectomy and colon surgeries. Twenty ambulatory surgery centers reported on hernia repair and/or breast surgeries. Hospital data are reported here using the Standardized Infection Ratio (SIR) statistic, which is a national standard for infection reporting. This is a change from

reporting in prior editions of this annual report. Because ASCs are not mandated to report through NHSN and virtually all facilities report directly to DHSS, this report continues to use a state-defined infection statistic. The infection rates reported here for ASCs employ the same statistic as in previous editions of this report.

Of those hospitals that reported enough data to calculate a standard infection ratio, the statewide SIR for device associated CAUTIs showed the lowest value (0.801) across the four HAI categories listed in the table below. When values were assessed at the hospital level, results for CAUTIs showed that 49 of the reporting hospitals met the criteria to calculate an overall hospital level SIR. Of those hospitals, 86% showed SIR values that were no different than the 2015 national benchmark SIR of 1.00, while 14% showed SIR values that were better than the national benchmark. CLABSI patterns were similar with a 0.808 SIR and 14% of 42 qualifying facilities having SIR values that were better than the national benchmark. For hospitals, the SSI for colon surgeries in Missouri was statistically significantly better than the national benchmark while there was no statistically significant difference for abdominal hysterectomy surgeries.

Hospitals - Summary Year 2018	
Overall by HAI Category	**Standardized Infection Ratio (SIR)**
Device Associated - CLABSI	0.808
Device Associated - CAUTI	0.801
SSI - COLON	0.832
SSI - HYSTERCTOMY	0.874

For ASCs, SSIs for hernia repair showed a lower infection rate (0.20 per 100 surgeries) compared to breast surgeries. The 2018 rate for hernia repairs was 35% lower than the 2017 rate.

ASCs - Summary Year 2018	
Overall by HAI Category	**Statewide Infection Rate**
SSI – HERNIA REPAIR	0.20
SSI - BREAST	0.34

Cautions

Infection rates are affected by a facility's level of resources and commitment to infection control, the severity of the illnesses it treats, and the care with which data are collected and reported. A consumer who is choosing a facility for healthcare should consider the advice of their physician, the experience of facility staff, and all the other factors that are unique to his or her situation, in addition to the infection data reported on the DHSS website and CMS's Hospital Compare website.

2019 Data Report

Background

Healthcare-associated infections (HAI), also known as nosocomial infections, are infections that occur while patients are in a healthcare setting. Because of the seriousness of their conditions, patients treated in intensive care units have an especially high risk of HAIs. These infections can severely aggravate an illness, lengthen hospital stays and spread to other individuals. HAIs continue to be a major public health problem in the United States. Public reporting of HAI rates allows patients and providers to compare the quality of infection prevention across health care facilities.[1] Hospitals typically collect such data using the Centers for Disease Control and Prevention's (CDC), National Healthcare Safety Network (NHSN) process. Nationally, among acute care hospitals, there was a statistically significant decrease of 8-12% in catheter associated urinary tract infections (CAUTIs), central line-associated bloodstream infections (CLABSI), and hospital-onset C. difficile infections between 2017 and 2018. There were no significant changes in ventilator-associated events (VAE), surgical site infections (SSIs), or hospital onset Methicillin-resistant Staphylococcus aureus (MRSA) bacteremias.[2]

In 2004, the Missouri legislature passed Senate Bill 1279, establishing the "Missouri Nosocomial Infection Reporting Act of 2004." The intent of the law is to establish conditions that lead to a decrease in HAIs in Missouri. The law requires hospitals and ambulatory surgical centers to report specific categories of HAIs to the Department of Health and Senior Services (DHSS). The law also requires the DHSS to publish reports on the department's website and to submit an annual report to the Governor and members of the General Assembly. Rather than including copies of every table from the website, this report summarizes the data and presents representative tables.

Data Collection

HAIs are reported to the DHSS according to 19 CSR 10-33.050, which became effective April 30, 2018. The reporting rule was promulgated under the authority of the revised statute that mandates data reporting by hospitals and ambulatory surgical centers (ASCs) (Section 192.667, RSMo). Acute care hospitals are now required to use National Healthcare Safety Network (NHSN) and to follow their guidance when reporting HAI data. ASCs are given a choice of reporting data through the department's Missouri Healthcare-Associated Infection Reporting System (MHIRS) site or NHSN.

Hospitals and ASCs differ in the infections they report. Hospitals are required to report on device associated central line-associated bloodstream infections and catheter associated urinary tract infections as well as SSIs for abdominal hysterectomy and colon surgeries. Because patients in intensive care units are particularly at risk for HAIs, hospital reporting of CLABSIs and CAUTIs is further subdivided into specific ICUs and wards where ASCs report only SSI data, and are

limited to reporting infections associated with procedures for hernia repair and breast surgery. To provide denominators for the infection rates, ASCs report all selected procedures regardless of whether the procedure resulted in an infection. ASCs must report SSIs in the current year if they performed at least 20 of the specified surgeries in the prior year.

ASCs report HAI data through MHIRS, a web-based system developed by DHSS staff and the Information Technology Support Division of the Office of Administration. MHIRS allows ASCs to report HAI data directly to the DHSS monthly. MHIRS was formerly used by hospitals. In 2012, the Center for Medicare and Medicaid Services (CMS) began requiring qualifying hospitals to submit certain reports to them through NHSN, a national HAI tracking system maintained by the Centers for Disease Control and Prevention. Beginning in September 2012, the DHSS developed a way to query and download NHSN data for facilities participating in the CMS program. However, some hospitals continued to utilize MHIRS, and this meant less information for assessment of HAI progress from a national standpoint. In 2018, the DHSS modified their regulation to require all acute care hospitals to report their data through NHSN. The data reported through NHSN provides CMS and the DHSS with information needed for public health reports and analysis.

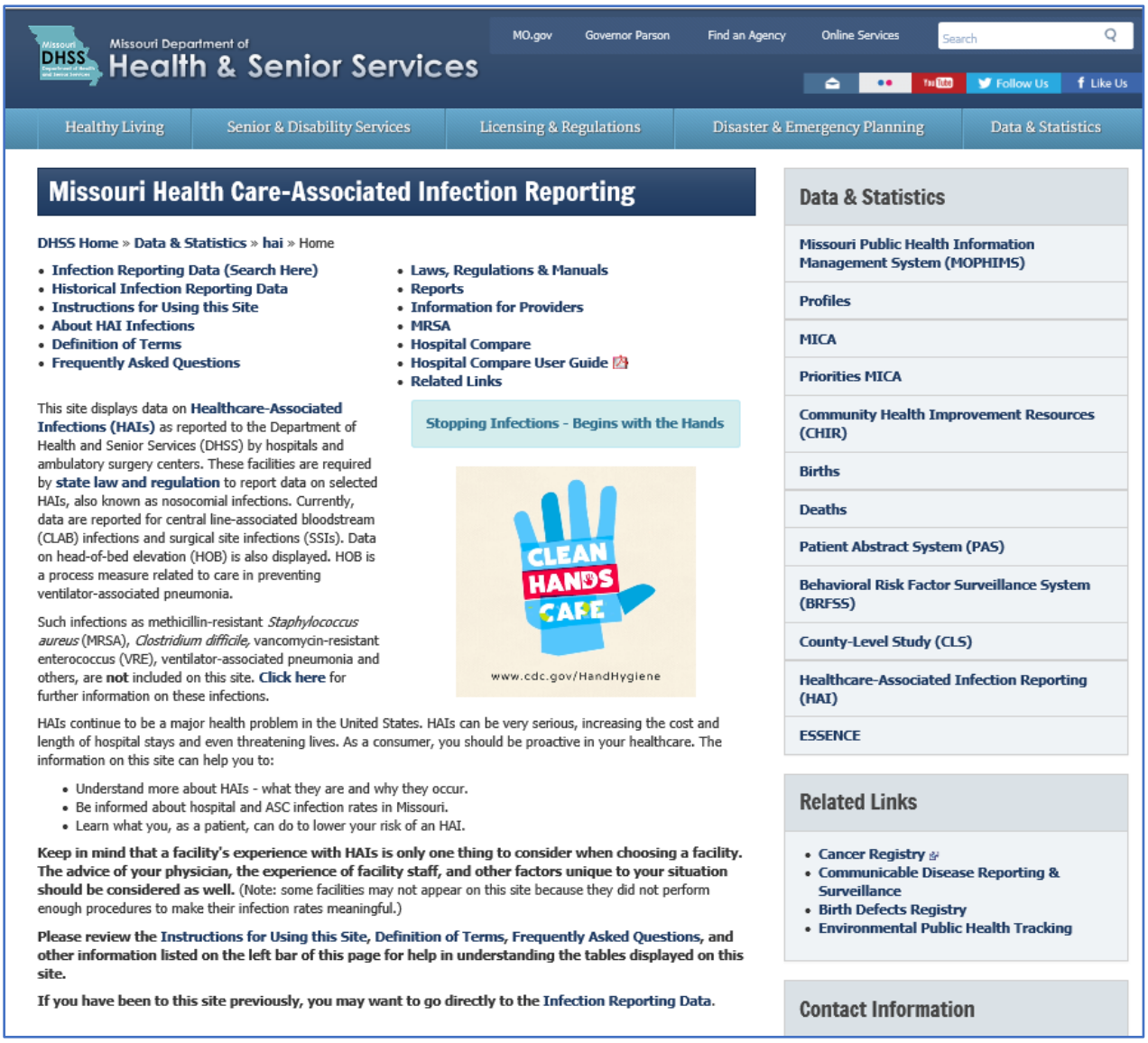
Registration for reporting by ASCs occurs annually in March and April. Similarly, the CDC in conjunction with CMS requires acute care hospitals to complete an annual survey through the CDC's NHSN site. Information provided during the annual ASC registration and the NHSN survey help determine which facilities report and what indicators they will include.

The DHSS provides historical HAI data through its public reporting website. The main page for Missouri Healthcare Associated Infection Reporting provides visitors with a link to view historical information for either hospitals or ASCs. For the selected facility, users can view numerators, denominators and rates for CLABSIs and SSIs. Currently displayed are data for years 2006-2016. Due to a recent change in statute, hospital data will no longer be updated on the website. It is suggested that individuals with an interest in comparing the available services and quality of care provided by hospitals, visit the CMS, Hospital Compare website. The data reported through NHSN are used in the CMS's Hospital Compare site. ASC data will continue to be updated to the DHSS public website as each calendar year of data is finalized.

Reporting to the Public

Figure 1 depicts the main page of the DHSS public reporting site. This page introduces users to the site and presents a brief overview of HAIs. “Related Links” connect the user to other sites that have information on HAIs; “Healthcare-Associated Infections” provides expanded information on HAIs; “Instructions for Using this Site” helps the user interpret the selection page and data tables; “Definition of Terms” is a list of technical terms and their definitions; “Laws, Regulations and Manuals” link the user to Section 192.667, RSMo and related chapters and regulations, and allows the user to view the manuals and forms used by facilities to report data; “MRSA” summarizes information on Methicillin-resistant Staphylococcus aureus infections; “Infection Reporting Data” brings up the main selection page for accessing DHSS HAI data.

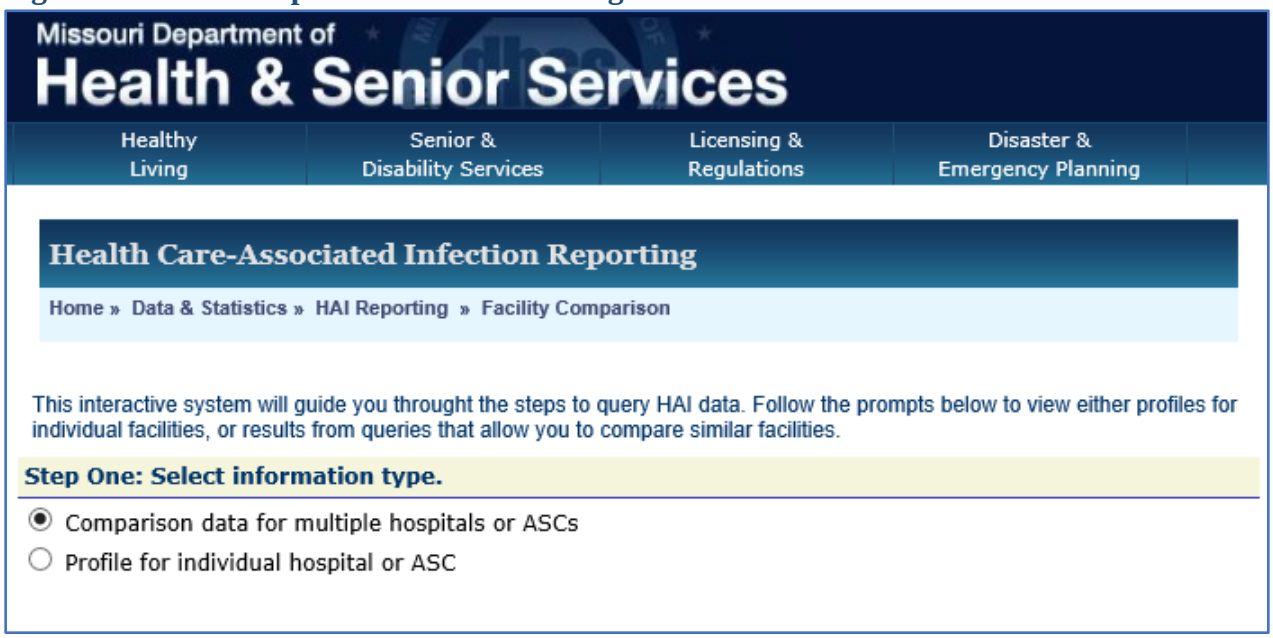
Figure 1. Missouri Healthcare-Associated Infection Reporting



In Figure 2, the main selection page for DHSS is displayed. Users can choose to compare ASCs to selected comparison groups, or to view an individual facility profile. Here is a link to the website: https://health.mo.gov/data/hai/drive_noso.php

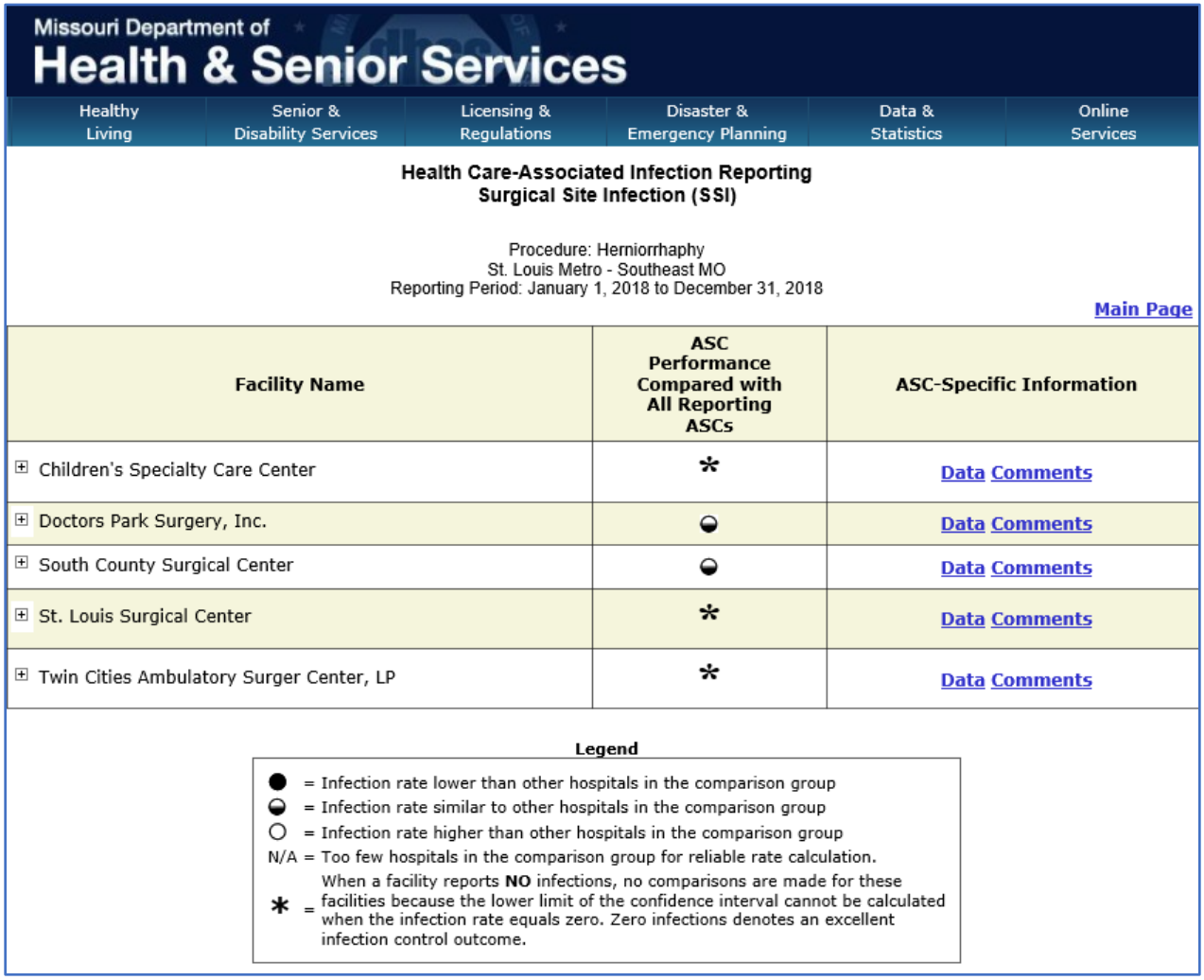
To view comparison data, a user first selects the comparison option and then selects a reporting category (SSI), then a facility type (ASC), a surgery type (breast or hernia), and finally a region. Passing the computer mouse over a displayed map of Missouri produces a list of the reporting facilities by region. A link at the bottom of the page explains that facilities do not appear on the list if they had too few surgeries to meet the reporting requirements.

Figure 2. DHSS Compare Main Selection Page



In Figure 3, an ASC comparison table for SSIs related to hernia repair procedures is displayed. The symbols in the center column indicate whether the SSI rate was similar to, higher than or lower than that of a comparison group. In the example below, ASCs located in the St. Louis Metro-Southeast Missouri region are compared to all ASCs that report to DHSS.

Figure 3. Hernia Repair Comparison Page



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Health Care-Associated Infection Reporting
Surgical Site Infection (SSI)

Procedure: Herniorrhaphy
St. Louis Metro - Southeast MO
Reporting Period: January 1, 2018 to December 31, 2018

Main Page

Facility Name	ASC Performance Compared with All Reporting ASCs	ASC-Specific Information
⊞ Children's Specialty Care Center	*	Data Comments
⊞ Doctors Park Surgery, Inc.	◒	Data Comments
⊞ South County Surgical Center	◒	Data Comments
⊞ St. Louis Surgical Center	*	Data Comments
⊞ Twin Cities Ambulatory Surger Center, LP	*	Data Comments

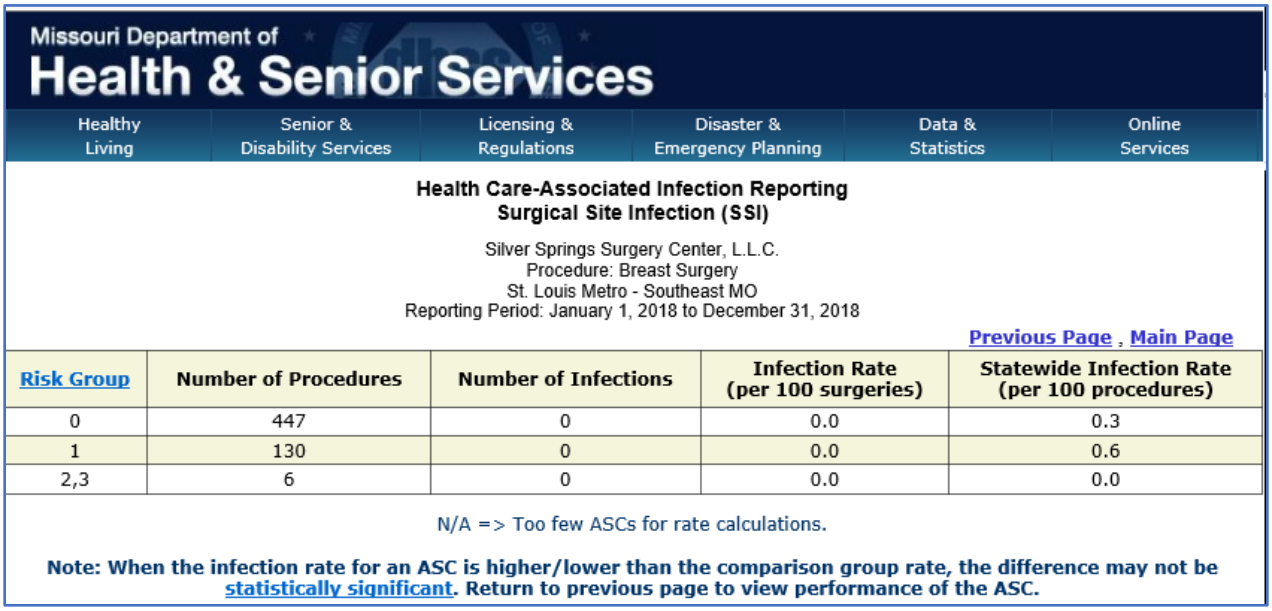
Legend

● = Infection rate lower than other hospitals in the comparison group
◒ = Infection rate similar to other hospitals in the comparison group
○ = Infection rate higher than other hospitals in the comparison group
N/A = Too few hospitals in the comparison group for reliable rate calculation.
* = When a facility reports **NO** infections, no comparisons are made for these facilities because the lower limit of the confidence interval cannot be calculated when the infection rate equals zero. Zero infections denotes an excellent infection control outcome.

Facilities vary according to the seriousness of the procedures they undertake and the kinds of illnesses they treat. To make SSI comparisons fairer among ASCs, infection rates are adjusted for the level of procedure risk and the underlying condition of the patient. Factors that are taken into account in adjusting the rates are 1) the degree of contamination of the wound at the time of the operation, 2) the duration of the procedure and 3) the American Society of Anesthesiologists' physical status classification system. When a user selects 'Data' in a comparison table, infection rates are shown according to the risk factor group. This can be seen in Figure 4 where detailed information on Risk Groups for breast surgery for Silver Springs Surgery Center are provided.

Users of the site should be careful, because a small number of infections resulting from a small number of procedures can result in a relatively large infection rate. For example, if by chance there had been just one infection for the six procedures in risk group "2, 3", the rate would have been 16.7/100 procedures. This should caution the user of these data to focus on the results of the statistical tests (table of circles) in Figure 3 rather than particular rates. Rates based on a small number of patient procedures will tend to be unreliable.

Figure 4. Risk Groups



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Health Care-Associated Infection Reporting
Surgical Site Infection (SSI)

Silver Springs Surgery Center, L.L.C.
Procedure: Breast Surgery
St. Louis Metro - Southeast MO
Reporting Period: January 1, 2018 to December 31, 2018

Previous Page , Main Page

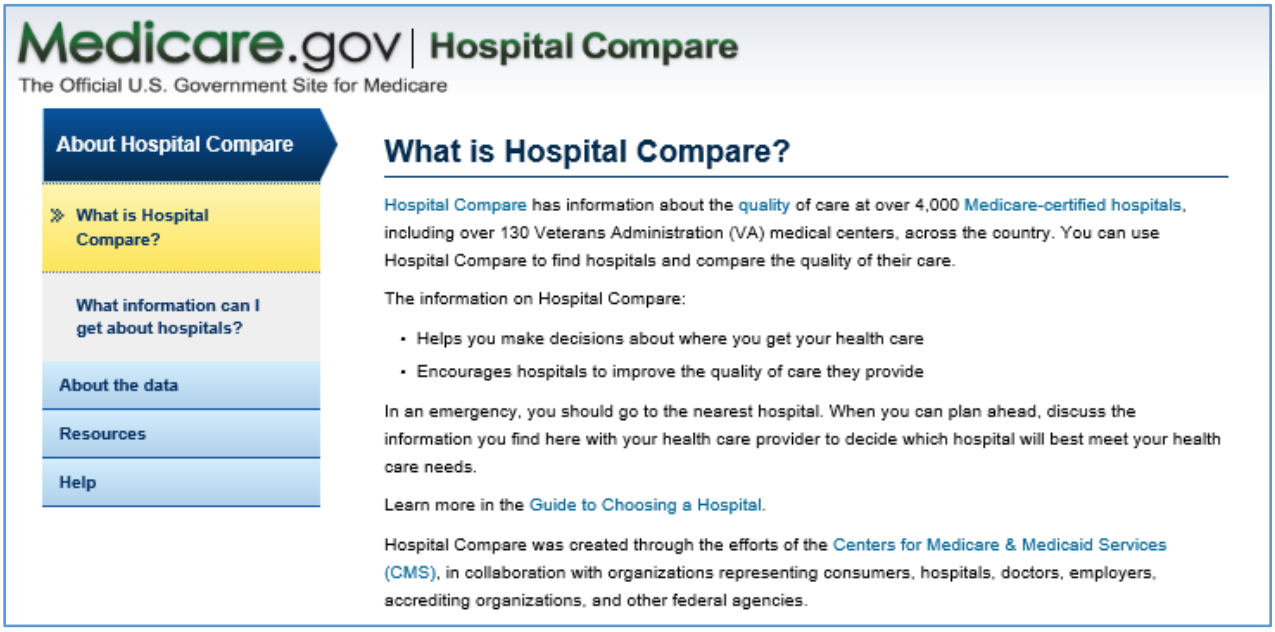
Risk Group	Number of Procedures	Number of Infections	Infection Rate (per 100 surgeries)	Statewide Infection Rate (per 100 procedures)
0	447	0	0.0	0.3
1	130	0	0.0	0.6
2,3	6	0	0.0	0.0

N/A => Too few ASCs for rate calculations.

Note: When the infection rate for an ASC is higher/lower than the comparison group rate, the difference may not be statistically significant. Return to previous page to view performance of the ASC.

To view current information about Medicare certified hospitals, individuals may visit the CMS "Hospital Compare" website (https://www.medicare.gov/hospitalcompare/search.html) (Figure 5).

Figure 5. CMS Hospital Compare Home Page



To view information specific to Missouri hospitals, a user may enter the word "Missouri" into the search box displayed in (Figure 6).

Figure 6. Find a Hospital

After entering "Missouri" into the search box, the user will see the following page where multiple hospitals will be available for selection (Figure 7). It is here that users can select to view information about an individual hospital or may choose to compare multiple hospitals. After making a selection, the user will have access to view more detail about the services and quality of care provided at any given facility.

Figure 7. CMS Hospital Compare - Main Selection Page

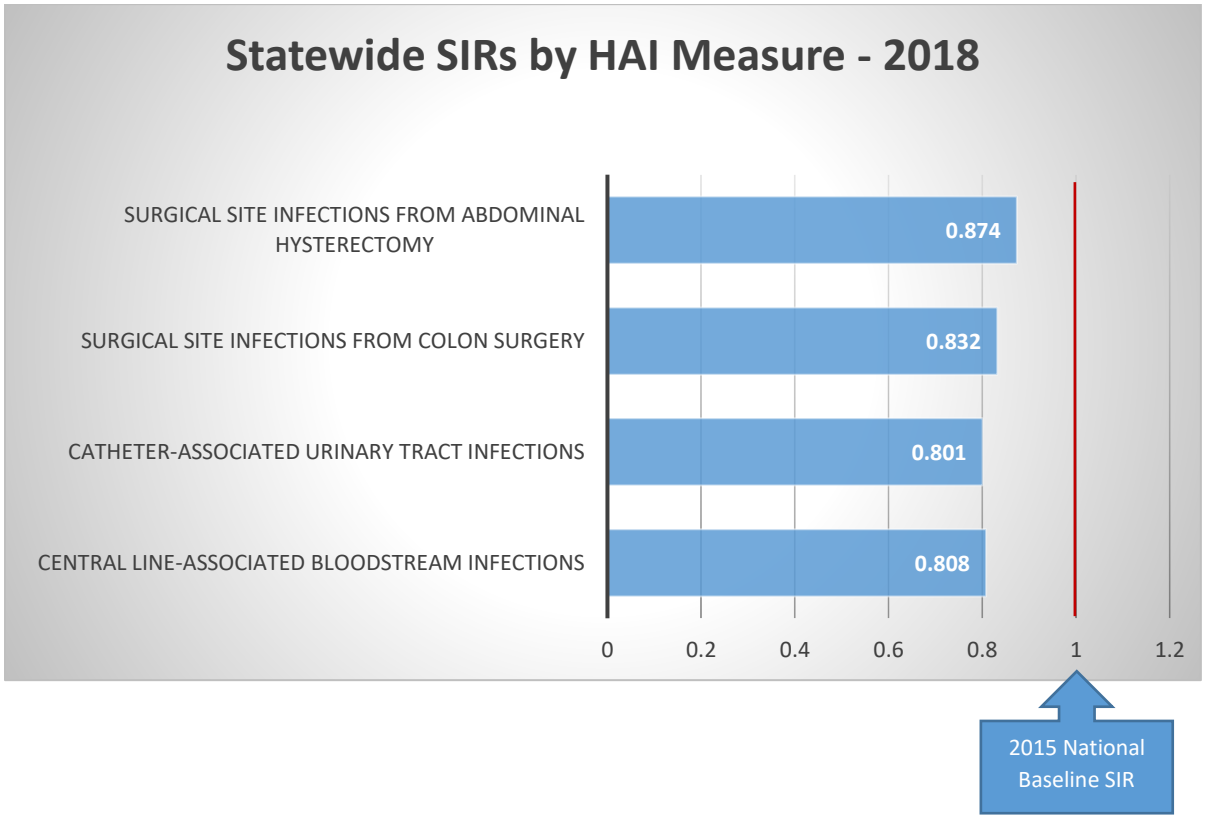
Data Summary

Hospitals

The Hospitals section of this report will focus on the standardized infection ratio (SIR) as the key statistic related to hospital infections. The SIR is used to measure infections at the facility, state and national level. It uses national baseline data and risk adjustments to determine a predicted number of infections. This predicted value serves as the denominator. The actual number of infections observed is then used as the numerator in the SIR ratio. Therefore, a ratio above 1.00 would indicate that the number of observed infections was greater than expected and a value less than 1.00 indicates that the number of observed infections was less than expected.

In figure 8, Statewide SIRs for the four HAI categories discussed within this section are displayed. Calendar year 2018 results showed SSI rates were higher when compared to device-associated infections. The statewide SIR for abdominal hysterectomy was highest at 0.874. All categories were lower when compared to the 2015 National Baseline SIR.

Figure 8. HAI Measures Compared to 2015 National Baseline – 2018



"In 2010 an estimated 16 million operative procedures were performed in acute care hospitals in the United States and an American prevalence study found that SSIs were the most common healthcare-associated infections, accounting for 31% of all HAIs among hospitalized patients." [3] *- Werra, C, et al.*

Device-Associated Infections

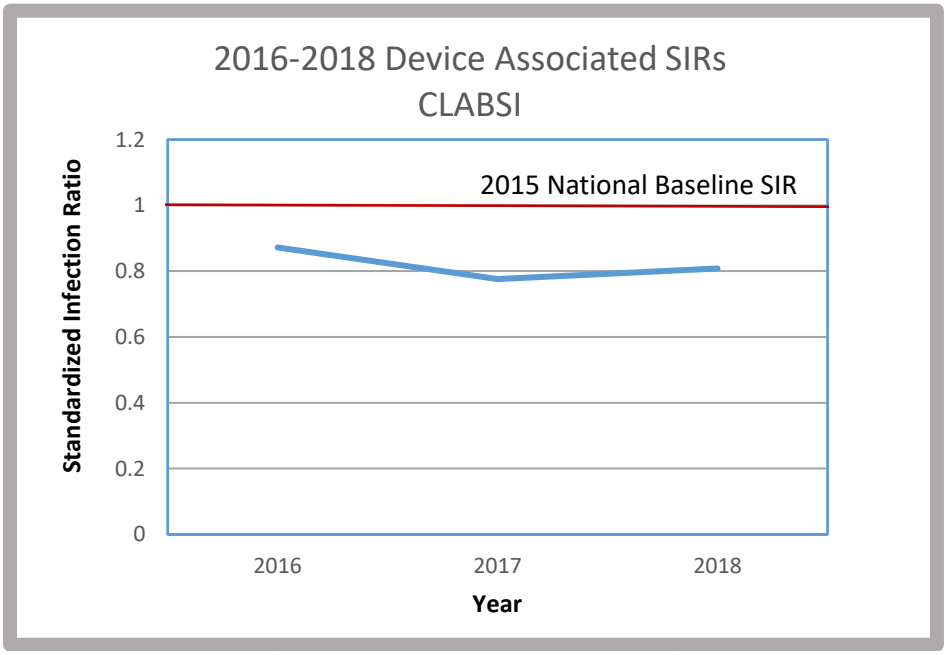
Central Line-Associated Bloodstream Infections (CLABSI)

NHSN provides several different options for reporting CLABSI rates for Missouri and its hospitals. This report will mostly focus on 2018 CLABSI results for hospitals that are aggregated to the state level. Additional breakouts provide SIR for intensive (or critical) care units (ICUs), neonatal intensive care units (NICUs) and wards. As points of comparison, data from 2016 and 2017 are also included. Data from 2015 was used to establish the SIR risk adjusted baseline rates and mucosal barrier injury (MBI) infections were excluded.

A total of 70 hospitals reported CLABSI data for January 1 – December 31, 2018. Of these, 68 were acute care hospitals and two were children's hospitals. There were a total of 42 hospitals that had enough central-line days to calculate an SIR. Of those, six facilities had rates that were statistically significantly better than the national benchmark and the remaining 36 were not different than the national benchmark. No facility was statistically significantly worse than the national benchmark.

There were a total of 289 CLABSIs in 2018 and the SIR was 0.808. The total number of central-line days this rate was based on was 355,821. The 2018 CLABSI rate is statistically significantly lower than the 1.00 SIR baseline. Both the 2018 count and SIR were up slightly from 2017 (a 4% increase in SIR). However, the 2018 SIR was down 7% from 2016 when there were 314 infections. For all 3 years, the CLABSI rate was below the 1.00 threshold (Figure 9).

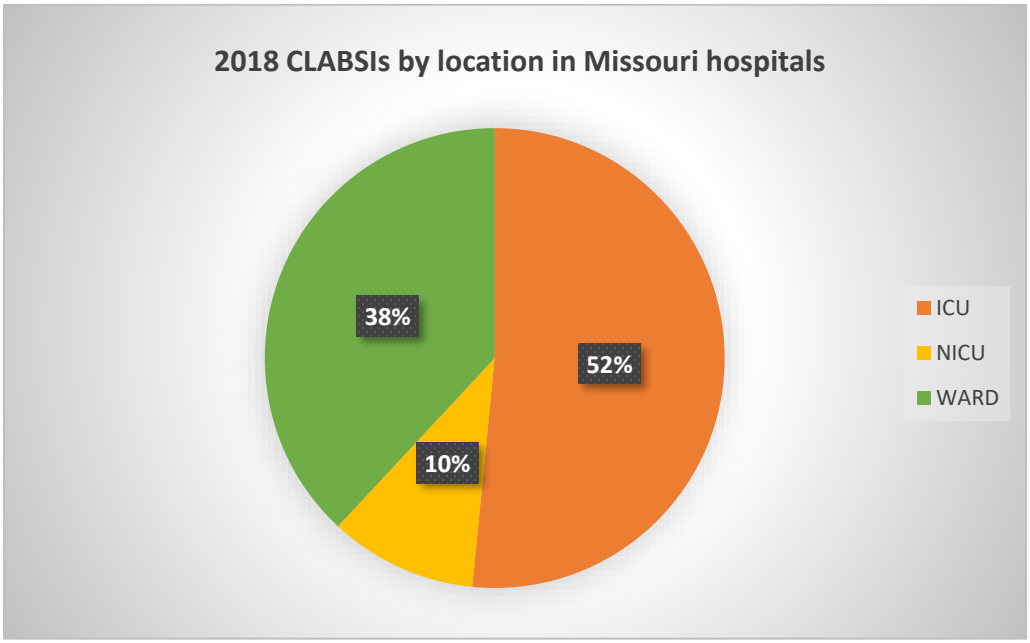
Figure 9. CLABSI SIRs 2016-2018



Source: National Healthcare Safety Network (NHSN) Report, Summary data for 2016-2018, downloaded November 8, 2019. https://www.cdc.gov/nhsn/index.html Patient Safety Component/Data Analysis/Reports/CMS_IQR Data

Because many hospitals will have multiple ICUs/wards required to report, the total number of units reporting is much greater. For 2018, there were a total of 106 wards, 88 ICUs and 25 NICUs in the dataset. The ICUs had 52% of the total CLABSIs, wards had 38% and NICUs 10% (Figure 10). The ICUs had the highest SIR in Missouri with a rate of 0.962 with 149 infections from 139,243 central-line days. NICUs had the second highest infection rate with an SIR of 0.730 based on 30 infections and 32,797 central-line days. Wards had the lowest SIR at 0.680, based on 110 infections and 183,781 central-line days.

Figure 10. CLABSIs by Location Type 2018

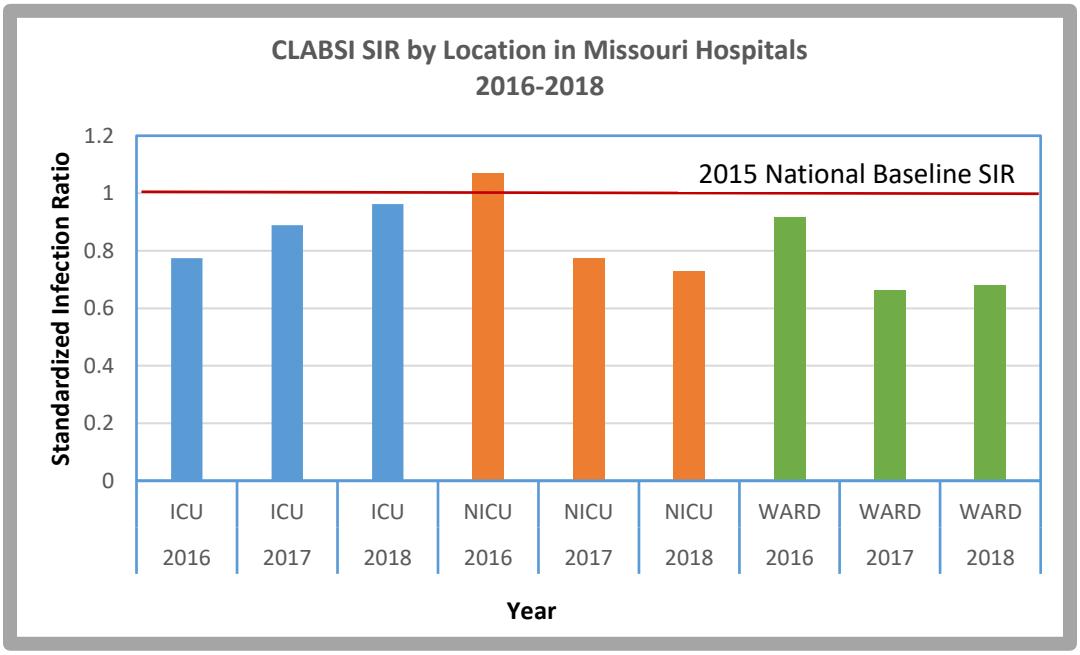


Source: National Healthcare Safety Network (NHSN) Report, Summary data for 2016-2018, downloaded November 8, 2019. https://www.cdc.gov/nhsn/index.html Patient Safety Component/Data Analysis/Reports/CMS_IQR Data

"…the risk of CLABSI in ICU patients is high. Reasons for this include the frequent insertion of multiple catheters, the use of specific types of catheters that are almost exclusively inserted in ICU patients and associated with substantial risk (e.g., pulmonary artery catheter introducers), and the fact that catheters are frequently placed in emergency circumstances, repeatedly accessed each day, and often needed for extended periods."[4] *--Marschall J., et al.*

Trend analysis shows that the ICU SIR rate increased by 24% compared to 2016. NICUs SIRs went in the opposite direction, decreasing by 32% over the same time period. The 2016 NICU rate was the only SIR for CLABSIs that was above the 1.00 threshold. Wards also experienced a decline over the 3 years, declining by a similar 26% (Figure 11).

Figure 11. CLABSI SIRs by Location 2016-2018



Source: National Healthcare Safety Network (NHSN) Report, Summary data for 2016-2018, downloaded November 8, 2019. https://www.cdc.gov/nhsn/index.html Patient Safety Component/Data Analysis/Reports/CMS_IQR Data

Catheter-Associated Urinary Tract Infections (CAUTI)

Under the new reporting requirements, hospitals also have to report CAUTIs through NHSN. Much like with CLABSIs, there are several reporting options through NHSN. This report will focus mostly on the 2018 state level reporting for CAUTIs with some additional breakouts by ICUs and wards. As a point of comparison, data from 2016 and 2017 are also included in this report. Data from 2015 was used to establish the SIR baseline and all data was risk adjusted.

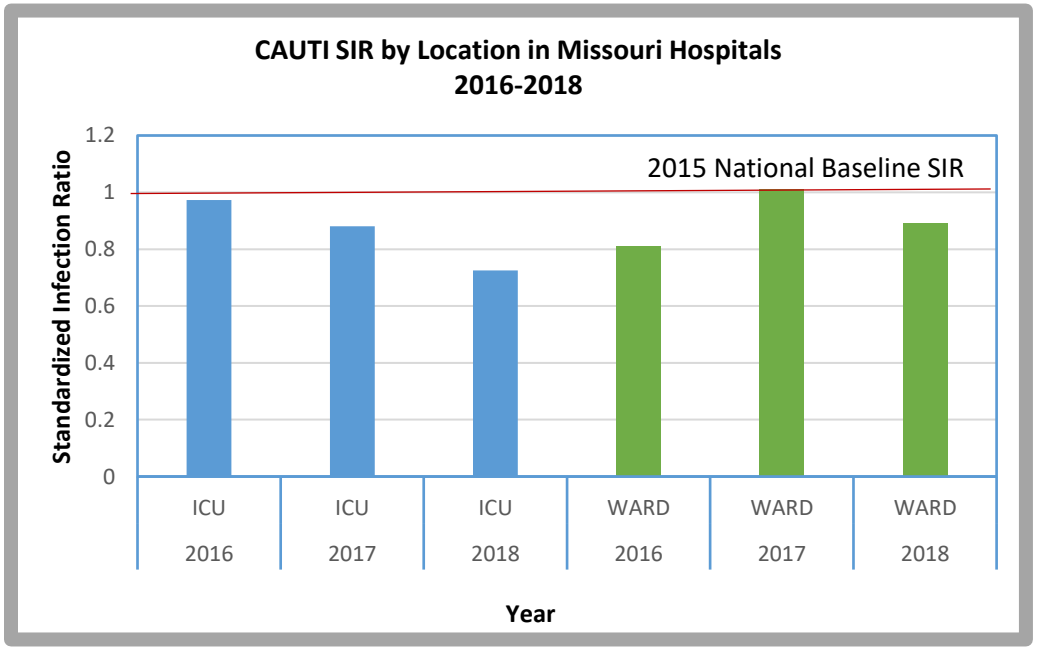
A total of 69 hospitals reported CAUTI data for January 1 – December 31, 2018. Of these, 67 were acute care hospitals and 2 were children's hospitals. There were a total of 49 hospitals that had enough catheter days to calculate an SIR. Of those, seven facilities had rates that were statistically significantly better than the national benchmark and the remaining 42 were not different than the national benchmark. No facility was statistically significantly worse than the national benchmark.

There were a total of 301 CAUTIs in 2018 and the SIR rate was 0.801. The total number of catheter days this rate was based on was 343,796. The 2018 SIR CAUTI was statistically significantly lower than the 1.00 SIR baseline. Both the 2018 count and SIR were down compared to 2017 (a 15% decrease in SIR and a decline of 65 infections). The 2018 SIR was also down 11% from 2016 when there were 349 infections. For all three years, the CAUTI rate was below the 1.00 threshold.

For 2018, there were a total of 107 wards and 91 ICUs in the CAUTI dataset. The ICUs had a lower SIR in Missouri with a rate of 0.725 based on 148 infections from 168,835 catheter days. In contrast, wards had an SIR of 0.891, based on 153 infections and 174,961 catheter days.

Trend analysis shows that the ICU SIR rate decreased each of the 3 years with similar sized declines in both 2017 and 2018. Overall, the 2018 rate is down 25% compared to 2016. The ward rate has fluctuated over the 3 years for which we have data. The SIR was lowest in 2016 (0.811) before increasing to 1.01 in 2017. The 2018 rate was back down to 0.891. The 2017 ward SIR was the only CAUTI SIR above 1.00 between 2016 and 2018 (Figure 12).

Figure 12. CAUTI SIRs by Location Type 2016-2018



Source: National Healthcare Safety Network (NHSN) Report, Summary data for 2016-2018, downloaded November 8, 2019. https://www.cdc.gov/nhsn/index.html Patient Safety Component/Data Analysis/Reports/CMS_IQR Data

Surgical Site Infections

Hospitals – Abdominal Hysterectomy and Colon Surgeries

Fifteen acute care hospitals reported enough data to calculate an SIR for abdominal hysterectomies and 42 facilities for colon surgeries. The SIR for abdominal hysterectomy surgeries for 2018 was 0.874 and represented 44 infections. The total number of abdominal hysterectomy surgeries was 6,059. The 2018 SIR for colon surgery was 0.832 and represented 168 infections. The total number of colon surgeries was 7,328. The colon surgery SIR was statistically significantly lower than the SIR 1.00 baseline; however, the abdominal hysterectomy surgery SIR was not statistically significantly lower than the baseline. At the facility level for colon surgeries, 38 facilities had SIRs that were no different than the national benchmark, while 3 had SIRs statistically significantly better than the national benchmark and one facility had an SIR statistically significantly worse than the national benchmark. For abdominal hysterectomy surgeries, all 15 facilities that had enough data to calculate an SIR were no different than the national benchmark (Figure 13).

Figure 13. Hospitals - Surgical Site Infection Summary Data by Surgery Type

Surgery Type	Number of Facilities Reporting	Statewide Standard Infection Ratio (SIR)
ABDOMINAL HYSTERECTOMY	**15**	**0.874**
COLON SURGERIES	**42**	**0.832****

Source: National Healthcare Safety Network (NHSN) Report, Summary data for 2016-2018, downloaded November 8, 2019. https://www.cdc.gov/nhsn/index.html Patient Safety Component/Data Analysis/Reports/CMS_IQR Data

*Adjusted for surgery severity level using the National Benchmark as a standard.
**Significantly lower than the 2015 National Baseline SIR.

Surgical site infection trends (Figure 14) show the SIR for abdominal hysterectomy surgeries increased by 38.5% between 2017 and 2018. The SIR for colon surgeries was basically unchanged between 2017 and 2018, declining by a modest 1.3%.

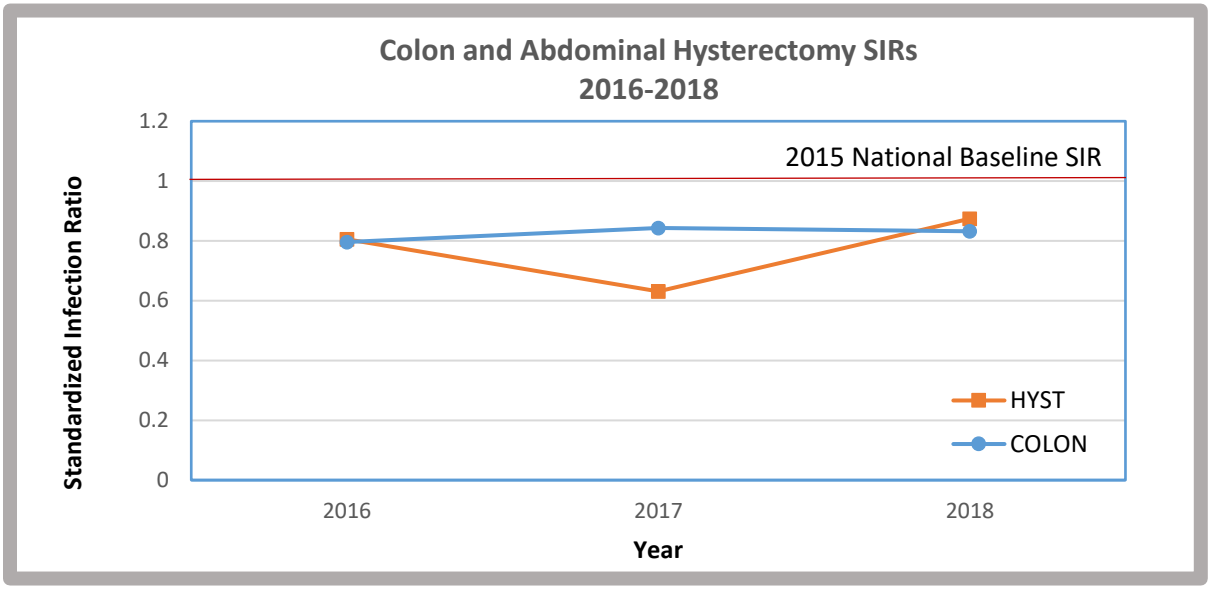
Figure 14. Hospitals – SSI SIRs - Percent Change

Surgery Type	2017 Standardized Infection Ratio	2018 Standardized Infection Ratio	Percent Change from 2017 to 2018
ABDOMINAL HYSTERECTOMY	0.631	0.874	↑ 38.5%
COLON	0.843	0.832	↓ -1.3%

Source: National Healthcare Safety Network (NHSN) Report, Summary data for 2016-2018, downloaded November 8, 2019. https://www.cdc.gov/nhsn/index.html Patient Safety Component/Data Analysis/Reports/CMS_IQR Data.

Figure 15 shows over the full 3-year time period that colon surgery SIRs have been very steady. Likewise, the total infection counts have also been very consistent, ranging from a low of 158 in 2016 to a high of 168 in 2018. Abdominal hysterectomy surgeries have shown more fluctuation. The SIR was similar in 2016 and 2018 when there were 43 and 44 infections respectively. In 2017, both the SIR and the infection count were down between 25-30%.

Figure 15. Colon and Abdominal Hysterectomy SIRs 2016-2018



Source: National Healthcare Safety Network (NHSN) Report, Summary data for 2016-2018, downloaded November 8, 2019. https://www.cdc.gov/nhsn/index.html Patient Safety Component/Data Analysis/Reports/CMS_IQR Data

ASCs

Surgical Site Infections

Ambulatory Surgery Centers - Hernia and Breast Surgeries

Infection rates for ASCs are usually lower than hospitals. ASCs tend to perform less serious surgeries and have generally healthier patient populations than inpatient facilities.[3] The relatively brief stays in the ambulatory setting reduces a patient's risk for infection; it also lessens the possibility of detecting post-surgical infections. A typical patient does not stay very long in an ASC (less than 24 hours) so an infection may not be discovered until days after the surgery. In this situation, the patient is more likely to seek care in an emergency room or a physician's office, and the ASC may never become aware of the infection. In 2018, there were 122 Missouri licensed ASCs in operation. Twenty of those facilities met SSI reporting requirements. Out of the 20 facilities, 15 reported on hernia repair procedures and 10 reported on breast surgeries (Figure 16).

Figure 16. 2018 Reporting ASCs by Surgery Type

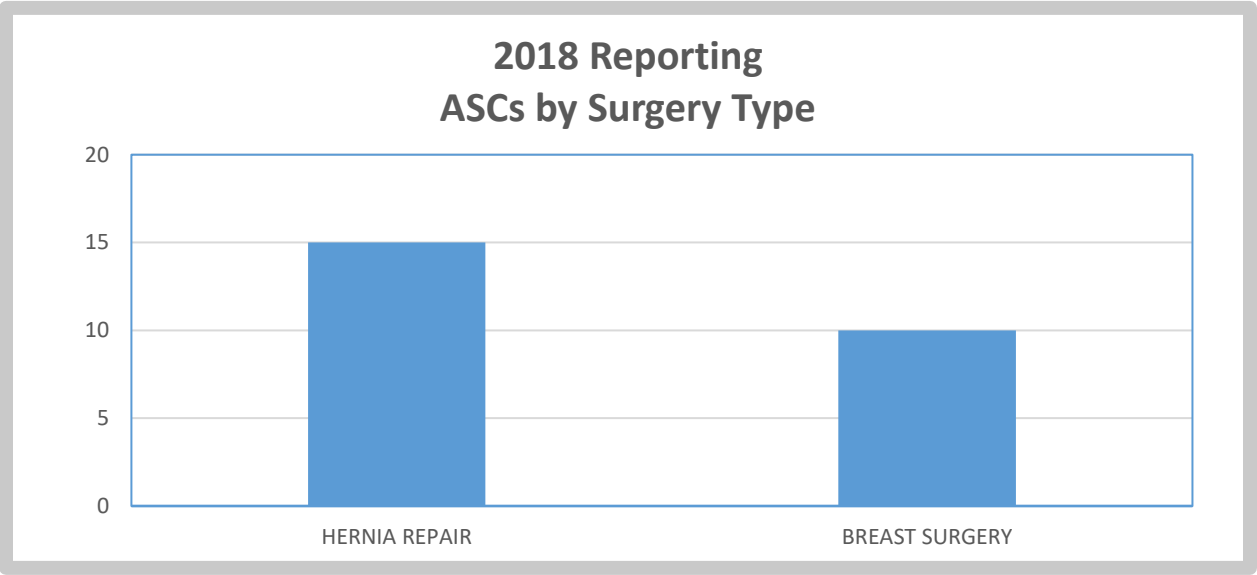


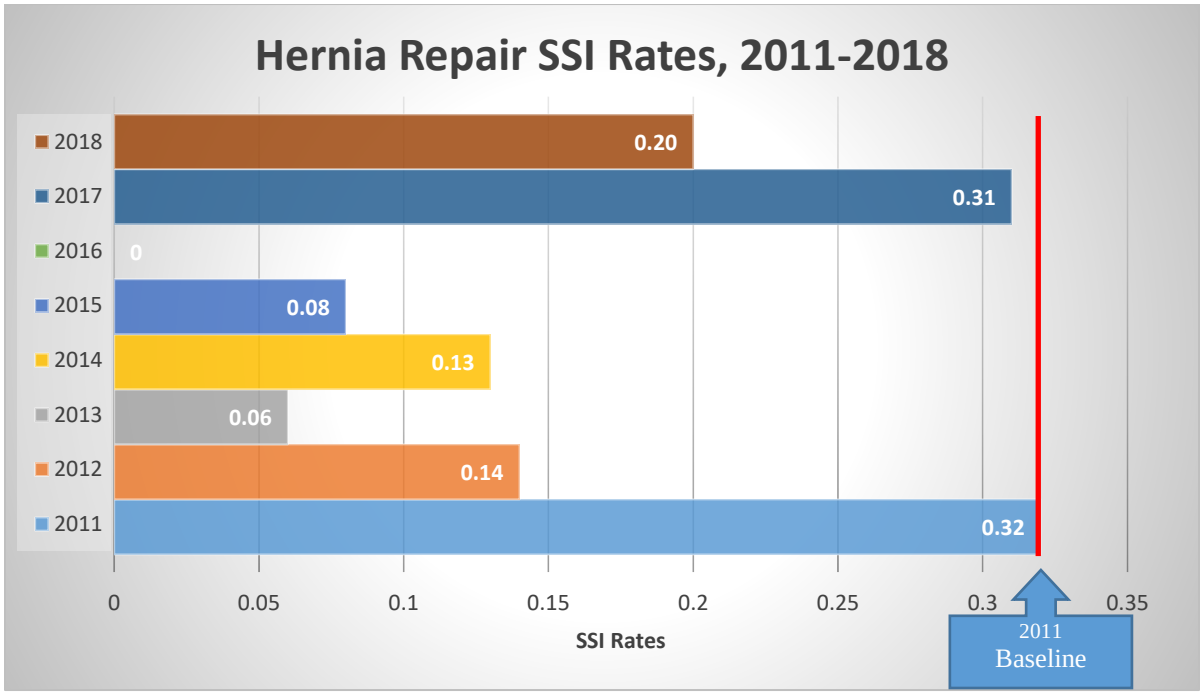
Figure 17. Hernia and Breast Surgeries Compared to Missouri Baseline Rate

SSI Comparison to Missouri Baseline (ASCs)			
Surgery	**2011 Missouri Baseline Rate**	**2018 Infection Rate**	**Percent Change**
Hernia Repair	0.32	0.20	-38%
Breast Surgery	0.18	0.34	89%
Rates are reported per 100 procedures and are adjusted based on risk group.			

Hernia Repair

Of the 1,465 hernia repair procedures reported by qualifying ASCs in Missouri, three resulted in a healthcare associated infection. The hernia repair SSI was 0.20 (per 100 procedures) in 2018. Figure 18 below shows hernia repair SSI rates for the years 2011-2018. The 2018 rate was 29% higher than the 8-year average for hernia repair infections. It was also the third highest observed in the last 8 years but 2018 did represent a 35% decline from the 2017 observed rate and 38% decline compared to the baseline rate (Figure 17). The 2011 Baseline year continues to be the highest rate for the 8-year time period. The 2016 rate, when no hernia repair SSIs were reported, was the best outcome over this time.

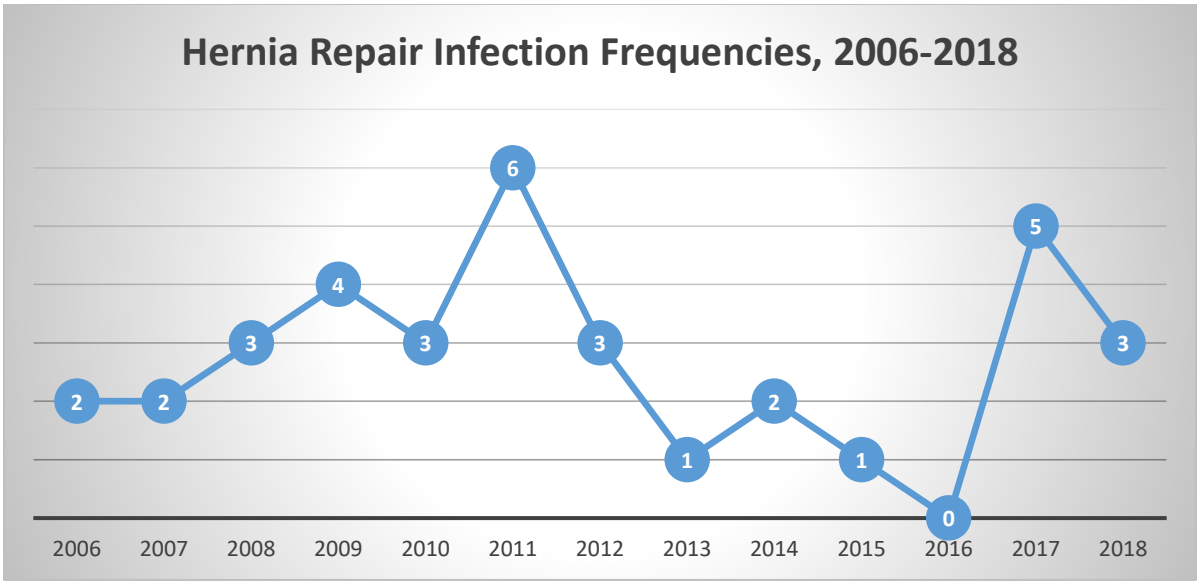
Figure 18. Hernia Repair SSI Rates 2011-2018



The low frequency of infections associated with hernia repair surgery largely explain fluctuations in rates from year-to-year. Since Missouri began collecting data on this type of surgery in 2006, there have been only 35 healthcare-associated infections related to this procedure in facilities, which met public reporting requirements. To put these frequencies into perspective, in 2011 (the year with the most reported infections), fifteen facilities reported 1,883 hernia repair surgeries, which resulted in six HAIs. A comparable number of procedures (1,757 from 16 facilities) were reported in 2013, with only one HAI associated with hernia repair procedures (Figure 19). Note that frequencies will also fluctuate based on how many facilities meet MHIRS reporting requirements each calendar year, as evidenced by 2018 when there were 15 facilities that met

reporting requirements compared to only 9 facilities in 2016. It is certainly possible that there were SSIs associated with hernia repair in Missouri in 2016, but they were simply not captured in this surveillance system because the infection occurred in a facility that did not meet the minimum reporting threshold.

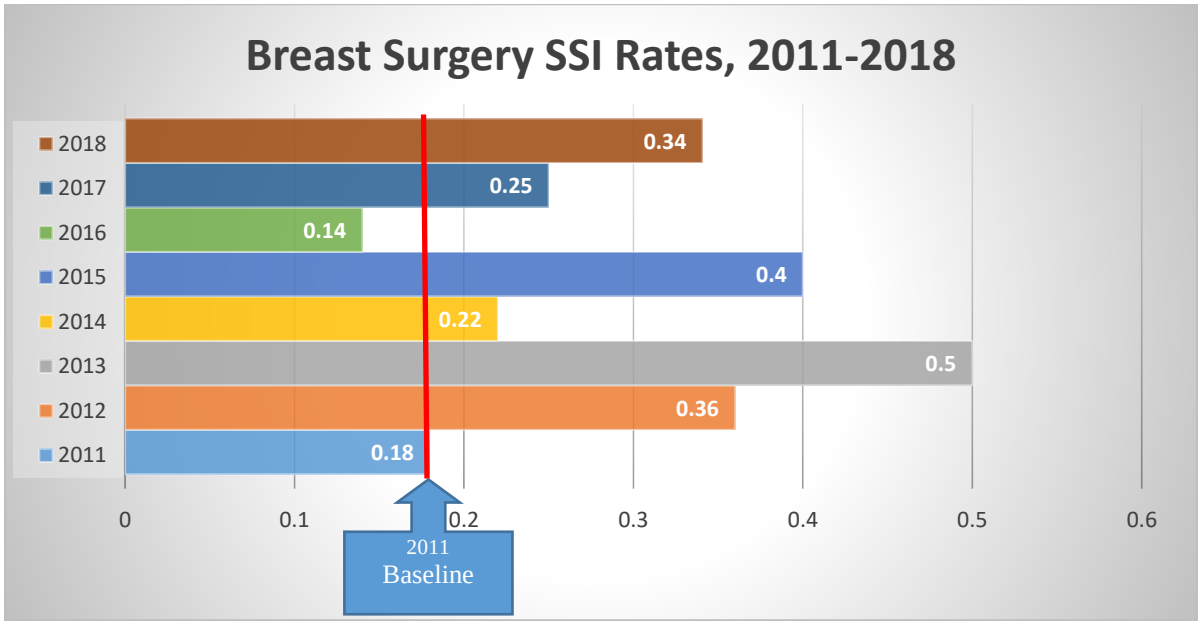
Figure 19. Hernia Repair Infection Frequencies 2006-2018



Breast Surgeries

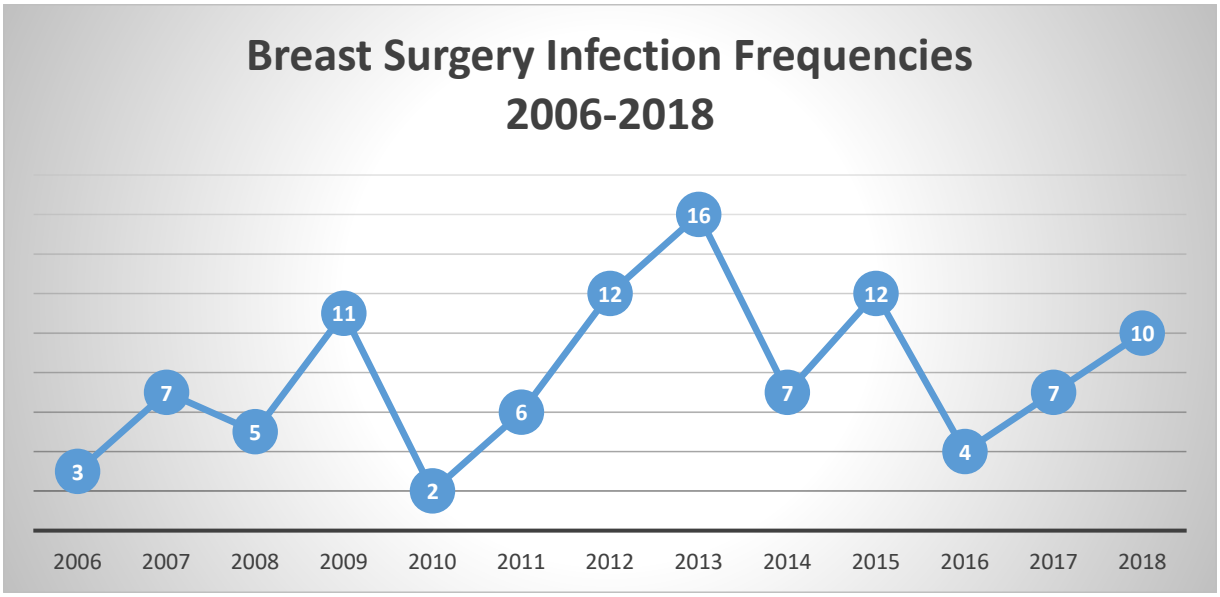
Figure 20 displays breast surgery SSI rates. There were ten breast surgery infections reported in 2018 and the infection rate was 0.34 (per 100 procedures). This represents an increase of 89% compared to the 2011 Baseline rate of 0.18. It is also an increase compared to the 2017 rate of 0.25. The 2018 rate ranks fourth highest among the past 8 years and is 14% higher than the 8-year average observed rate (0.30). The highest rate observed was in 2013 and the lowest observed rate was in 2016. The baseline rate from 2011 is actually the second lowest rate over this time-period.

Figure 20. Breast Surgery SSI Rates 2011-2018



Similar to hernia repair surgeries, the relative rareness of HAIs in conjunction with breast surgeries can cause SSI rates to fluctuate greatly from year-to-year. For the past 13 calendar years, qualifying ASCs in Missouri have averaged only 7.9 SSIs a year for this procedure (again, this represents only the infections from facilities meeting public reporting requirements). In 2006, seven facilities reported 986 breast surgeries—a relatively low number compared to the 3,230 surgeries reported by 12 facilities in 2013. In 2018, ten facilities reported on 2,934 surgeries. In the past 13 years, there have only been five times where reported infections related to breast surgeries reached double digits, with 2018 hitting that threshold with 10 (Figure 21).

Figure 21. Breast Surgery Infection Frequencies 2006-2018



Cautions

The infection rates reported by the DHSS are affected by a facility's level of resources and commitment to infection control, the severity of illnesses treated, and the care with which it collects and reports data. Beyond checking for obvious errors, the DHSS is not able to verify the data that the facilities submit each month, and it is likely that some facilities do a more accurate job of reporting than other facilities. On the other hand, it is to each facility's advantage to accurately diagnose and monitor all infections. We believe most, if not all, facilities are guided by this philosophy. A further consideration is that hospitals and ASCs vary in the types of patients they treat. A facility that treats severely ill patients will be at a higher risk for HAIs. In order to mitigate this effect, device associated CLABSIs and CAUTIs are reported separately for each type of ICU and ward. SSIs are reported at the facility level. On the Hospital Compare website, a star system exists and hospitals are graded on multiple quality measures not just HAIs. On the DHSS public website, SSI comparisons are adjusted for the severity level of the surgery and the condition of the patient and reported as a rate per 100 surgeries. While those adjustments help make the data between facilities more comparable, users of the data should understand that these adjustments are imperfect, and should not be the sole basis for choosing a healthcare facility. A consumer who is trying to select a facility for healthcare should also consider the experience of the staff, the advice of their physician, and all other factors that are unique to his or her situation.

Endnotes

1. Public Reporting of Health Care-Associated Surveillance Data: Recommendations From the Healthcare Infection Control Practices Advisory Committee. Thomas R. Talbot, MD, MPH, et al. Ann Intern Med. 2013; 159(9):631-635

2. 2018 National and State Healthcare-Associated Infections Progress Report; November 1, 2019. Centers for Disease Control and Prevention (CDC), National Health and Safety Network (NHSN)

3. SSIs in Italy: prevention and surveillance during the last five years. Werra, C., Aloia, S., Micco, R., et al. Surgical Science 2015; 6:383-394.

4. Strategies to prevent central line-associated bloodstream infections in acute care hospitals. Marschall, J., Mermel, L.A., Fakih, M., et al. Infection Control and Hospital Epidemiology 2014; 35:753-771.