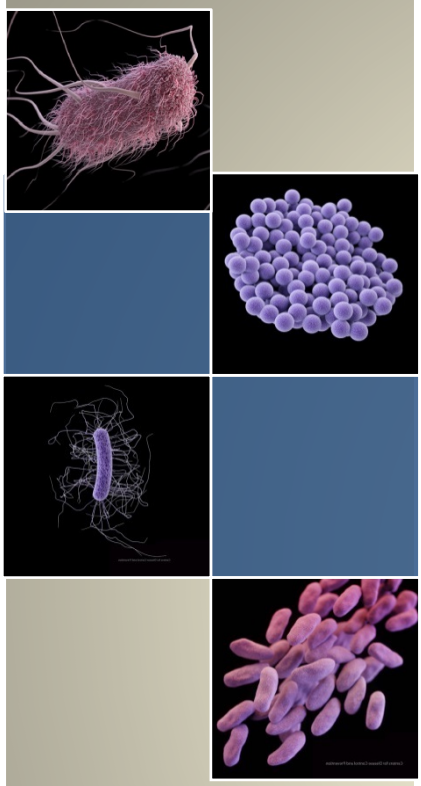
2016



Virginia Healthcare-Associated Infections Report

For a Healthcare Provider Audience

January 1, 2016 – December 31, 2016

Virginia Department of Health
Healthcare-Associated Infections and
Antimicrobial Resistance Program
September 2018

Virgie S. Fields, MS, CPH
Healthcare-Associated Infections Epidemiologist

Sarah File Lineberger, MPH
Healthcare-Associated Infections Program Manager

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ABBREVIATIONS

A/R – Admission/Readmission

ASA – American Society of Anesthesiologists

BMI – Body mass index

CAUTI – Catheter-associated urinary tract infection

CCN – CMS certification number

CDC – Centers for Disease Control and Prevention

CI – Confidence interval

CLABSI – Central line-associated bloodstream infection

CLD – Central line days

CMS – Centers for Medicare and Medicaid Services

COLO – Colon procedure

CSTE – Council of State and Territorial Epidemiologists

DIP – Deep incisional primary SSI

DIS – Deep incisional secondary SSI

ED – Emergency department

HAI – Healthcare-associated infection

HHS – United States Department of Health and Human Services

HYST – Abdominal hysterectomy procedure

ICU – Intensive care unit

LabID – Laboratory-identified

LTACH – Long-term acute care hospital

MRSA – Methicillin-resistant *Staphylococcus aureus*

NHSN – National Healthcare Safety Network

NICU – Neonatal intensive care unit

SIP – Superficial incisional primary SSI

SIR – Standardized infection ratio

SIS – Superficial incisional secondary SSI

SSI – Surgical site infection

SUR – Standardized utilization ratio

VA – Virginia

VDH – Virginia Department of Health

EXECUTIVE SUMMARY

Healthcare-associated infections (HAIs) are a public health concern that continue to pose a threat to patient safety. According to the Centers for Disease Control and Prevention (CDC), an estimated 722,000 HAIs occurred nationally in 2011, affecting approximately 1 in 25 hospital patients. As of 2015, all HAI data reported to the Centers for Medicare and Medicaid Services (CMS) Hospital Inpatient Quality Reporting Program are required to be shared with the Virginia Department of Health (VDH). This annual report summarizes the performance of Virginia's acute care hospitals on HAIs in 2016, and healthcare personnel influenza vaccination for the 2016-2017 influenza season.

Key Findings

- In 2016, there were **24% fewer** central line-associated bloodstream infections (CLABSIs) in Virginia acute care hospitals than predicted based on the national experience from 2015. This was a statistically significant reduction from the national baseline.
- In 2016, there were **about the same** number of catheter-associated urinary tract infections (CAUTIs) in Virginia acute care hospitals as predicted based on the national experience from 2015.
- In 2016, there were **about the same** number of surgical site infections (SSIs) following abdominal hysterectomies and **about the same** number of SSIs following colon surgeries in adult patients (≥18 years) in Virginia acute care hospitals as predicted based on the national experience from 2015.
- In 2016, there were **14% fewer** hospital-onset methicillin-resistant *Staphylococcus aureus* (MRSA) bacteremia laboratory-identified events in Virginia acute care hospitals than predicted based on the national experience from 2015. This was a statistically significant reduction from the national baseline.
- In 2016, there were **about the same** number of hospital-onset *Clostridium difficile* laboratory-identified events in Virginia acute care hospitals as predicted based on the national experience from 2015.
- For the 2016-2017 influenza season, over half (**58%**) of Virginia hospitals met the U.S. Department of Health and Human Services Healthy People 2020 goal of 90% vaccination of healthcare personnel.

Overall, Virginia acute care hospitals have shown progress in preventing CLABSI and MRSA bacteremia laboratory-identified events in 2016 when compared to the national experience. Further action is needed to reduce other HAIs, including CAUTIs and SSIs following abdominal hysterectomies and colon surgeries for adult patients, as hospitals did not show any significant changes in 2016 from the national baseline. Prevention of *Clostridium difficile* infections also remains a priority for Virginia, as the data did not show any significant improvement for hospitals in this measure.

The Virginia HAI program continues to work with partner organizations, key stakeholders, and healthcare facilities to improve existing programs and develop new strategies to reduce the number of HAIs in Virginia hospitals and to ultimately protect patients from harm.

BACKGROUND

Every year, an estimated 1 in 25 hospitalized patients in the United States, or approximately 722,000 people, acquire a healthcare-associated infection (HAI) while receiving medical treatment.[1] This report summarizes the performance of Virginia hospitals with respect to HAIs in 2016, specifically focusing on the performance of acute care hospitals that share HAI data with the Virginia Department of Health (VDH). Data from long-term acute care hospitals (LTACHs), children's hospitals, inpatient psychiatric hospitals, inpatient rehabilitation hospitals, and military hospitals are not provided to VDH, and are not included in this report. Although VDH receives data from four of the seven critical access hospitals (CAHs) in Virginia,[2] CAHs are not required to report NHSN data to VDH per our regulations. VDH included data from CAHs in the 2015 annual report, however, because data from CAHs are not complete, available data from those facilities are not included in this report.

What is the purpose of the report?

This report is meant to enable readers to view hospital-specific HAI performance, understand the HAI performance of the state as a whole, and to compare a hospital's HAI performance to that of the rest of the country. This version is intended for those interested in detailed HAI and healthcare personnel influenza vaccination data for Virginia as a whole or for specific hospitals. The hospital-specific tables assume a working knowledge of HAI metrics and may be most appropriate for healthcare providers, administrators, and quality improvement and public health professionals.

This report focuses on the following HAIs:

1. Central line-associated bloodstream infections (CLABSIs)
2. Catheter-associated urinary tract infections (CAUTIs)
3. Surgical site infections (SSIs) following colon and abdominal hysterectomy procedures
4. Positive laboratory results for methicillin-resistant *Staphylococcus aureus* (MRSA) in blood
5. Positive laboratory results for *Clostridium difficile* (*C. difficile*) in stool

The report also shares information on healthcare personnel influenza vaccination rates. It is recommended by the Centers for Disease Control and Prevention (CDC) and VDH that all personnel who work in a healthcare setting receive the influenza vaccine each year to help prevent its spread.[3]

These measures do not represent all possible HAIs. They were selected by the federal government and VDH because they give a good overview of how a hospital is doing in preventing HAIs. The majority of HAIs are

For a guide to understanding healthcare personnel influenza vaccination data, see Appendix A.

For information about things healthcare personnel can do to prevent infections, see Appendix B.

[1] Magill *et al*. (2014). Multistate Point-Prevalence Survey of Healthcare–Associated Infections. *New England Journal of Medicine*, 370:1198–1208.

[2] Critical access hospitals have ≤25 inpatient beds, maintain an annual average length of stay of ≤96 hours for acute inpatient care, offer 24-hour emergency care, and are located in rural areas ≥35 miles away from another hospital.

[3] Influenza Vaccination Information for Health Care Workers. Updated October 3, 2017.

preventable when healthcare providers use infection prevention steps recommended by the CDC and VDH.

Virginia Healthcare System

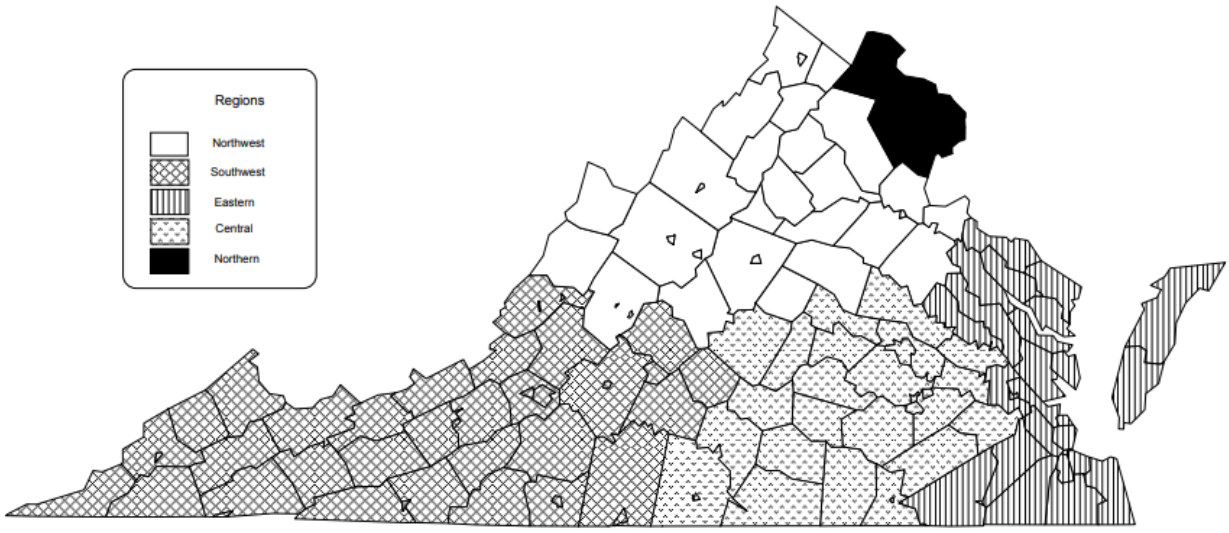
According to the United States Census Bureau, in 2016, Virginia had an estimated population of approximately 8.4 million people.[4] It is the 12th largest state (by population) in the United States.

There are five public health planning regions in Virginia, as depicted in Figure 1. The health planning regions allow public health to conduct surveillance in areas with evenly distributed populations.

Across the state, there are 78 acute care hospitals, seven critical access hospitals, 52 ambulatory surgery centers, over 160 dialysis centers, roughly 250 nursing homes, 41 military/Veterans Affairs hospitals and clinics, and a number of rural/community health clinics.

The annual volume of acute care hospitals in Virginia is estimated to be greater than 3,000,000 patient days for approximately 16,000 inpatient beds.

Figure 1. Health Planning Regions, Virginia Department of Health



[4] United States Census Bureau.

METHODS

Virginia HAI Reporting Requirements

In September 2015, the VDH HAI reporting regulations aligned with those of the Centers for Medicare and Medicaid Services (CMS) Hospital Inpatient Quality Reporting Program.[5] Hospitals are required to share data on HAIs from particular units or procedures, as well as healthcare personnel influenza vaccination rates, with VDH (as specified in Table 1). More information about Virginia's mandatory reporting can be found on the VDH website.

Table 1. Virginia HAI Reporting Requirements

HAI Event	Applicable Units	Reporting Start Date	Original National Baseline	2015 National Baseline
Central line-associated bloodstream infections (CLABSIs)	Adult, pediatric, and neonatal intensive care units	July 2008 (VDH); January 2011 (CMS)	2006-2008	2015
CLABSIs	Adult and pediatric medical, surgical, and medical/surgical inpatient wards	January 2015	2006-2008	2015
Catheter-associated urinary tract infections (CAUTIs)	Adult and pediatric intensive care units	January 2012	2009	2015
CAUTIs	Adult and pediatric medical, surgical, and medical/surgical inpatient wards	January 2015	2009	2015
Surgical site infections (SSIs) following colon procedures	Inpatient procedures	January 2012	2006-2008	2015
SSIs following abdominal hysterectomy procedures	Inpatient procedures	January 2012	2006-2008	2015
Methicillin-resistant *Staphylococcus aureus* (MRSA) bacteremia laboratory-identified events	Facility-wide inpatients (FacWideIN) including emergency department, 24-hour observation	January 2013	2010-2011	2015
Clostridium difficile laboratory-identified events	Facility-wide inpatients (FacWideIN) including emergency department, 24-hour observation	January 2013	2010-2011	2015
Healthcare personnel influenza vaccination	All inpatient and outpatient healthcare personnel	January 2013	N/A	N/A

[5] Healthcare Facility HAI Reporting Requirements to CMS via NHSN.

Hospital Data Submission

Hospitals self-report HAI data to the CDC and to VDH using a free, web-based software system called the National Healthcare Safety Network (NHSN). CDC and the VDH HAI Program provide training to hospital staff on the appropriate use of this system, and provide guidance on how to track infections in a standardized way.

The 2016 NHSN Hospital Survey was used to gather information on hospital characteristics (*e.g.*, hospital bed size and medical school affiliation).

Data collected from January 1, 2016 to December 31, 2016 and downloaded from NHSN on August 18, 2017 are covered in this report; any changes made to the data after this date are not reflected in the results. Tables for this report were created using SAS 9.3 (Cary, North Carolina).

More information about NHSN can be found on the NHSN website.

Data Metrics

Standardized Infection Ratio (SIR)

The standardized infection ratio (SIR) was used to characterize hospital HAI performance. The SIR shows whether a hospital had significantly more HAIs, fewer HAIs, or about the same number of HAIs compared to the number predicted for that hospital based on national baseline data.

$$\textbf{SIR} = \frac{\textbf{Number of observed infections}}{\textbf{Number of predicted infections}}$$

The SIR is a summary measure that can be used to track HAIs over time and can be calculated on a variety of levels, such as unit, facility, state, and nation. The SIR adjusts for differences between hospitals, such as types of patients and procedures, as well as other factors (see Risk Adjustment and Data Exclusions). The measure compares the number of infections reported in a given time period to the number of infections that would be predicted using national data from a baseline time period, which is now calendar year 2015 (Table 1). A lower SIR indicates better performance.

The SIR value can be interpreted as follows:

- An SIR **less than 1.0** indicates that fewer infections were reported during the surveillance period than would have been predicted, given the baseline data.
- An SIR **equal to 1.0** indicates that the number of infections reported during the surveillance period was the same as the number of infections predicted, given the baseline data.
- An SIR **greater than 1.0** indicates that more infections were reported during the surveillance period than would have been predicted, given the baseline data.

It is important not only to consider the SIR interpretation for each hospital, but also to look at the total number of procedures performed and the total number of infections observed in the surveillance time period.

Number of Observed Infections

The number of observed infections for each infection type is the number of infections that a hospital detected during 2016. If the number of observed infections is zero (0), then the lower bound of the 95% confidence interval of the SIR will not be calculated.

If a hospital has zero observed infections, it does not mean that the hospital failed to report infections. When evaluating the performance of a hospital that observed zero infections, it may be important to consider the size of the hospital, the total number of procedures performed, device days or patient days, and the total number of infections that were predicted (shown in the data tables).

Number of Predicted Infections

Previously, the number of predicted infections for each infection type was estimated based on data reported to NHSN by participating hospitals nationwide during the original baseline time periods specified in Table 1. In-plan data reported by May 16, 2016 to NHSN for January-December 2015 were used to generate the new national baseline.[6] Facilities from all states, territories, and Department of Defense installations were included in the establishment of the new baseline measures.

In addition to the updated baseline, new risk models were developed for more HAIs and settings than previously existed. Changing the baseline improved risk adjustment over previous models and methods as the new models use the most current surveillance definitions for each infection type and with more timely national HAI incidence. Unfortunately, SIRs calculated based on the new baseline cannot be compared to SIRs calculated based on the original baseline because of the different risk adjustment methods and the different referent population. Therefore, the data in the VDH HAI Annual Report for 2015 (published November 2016) should not be compared with data in this report.

The number of predicted infections in this report is calculated based on the 2015 national aggregate data and adjusted for each facility using variables found to be significant predictors of HAI incidence. NHSN uses a logistic regression model 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.*, CLABSI, CAUTI, MRSA, and *C. difficile*).

If the number of predicted infections is less than 1, an SIR will not be calculated because the number of device days or surgical procedures is too low to calculate a precise SIR and comparative statistics. In these situations, the "SIR Interpretation" column says "*No Conclusion*". This does not mean the hospital failed to report data; it only means that during the specified time period, the number of patients, devices (central lines or urinary catheters), and/or procedures that were seen at this hospital did not meet the established threshold (minimum value) for calculating an SIR.

[6] NHSN 2015 Rebaseline. Updated January 23, 2018.

Healthcare Personnel Influenza Vaccination

The healthcare personnel influenza vaccination data show the percentage of healthcare personnel in each hospital who were vaccinated during the 2016-2017 influenza season (October 1, 2016 – March 31, 2017). Hospitals are required to submit vaccination data for healthcare personnel from inpatient departments; starting with the 2014-2015 influenza season, hospitals were also required to submit vaccination data for healthcare personnel from outpatient departments. Healthcare personnel are defined as employees, licensed independent practitioners (LIPs), and adult students/trainees and volunteers. Contract personnel are excluded from all categories.

The report indicates whether a hospital had a statistically higher percentage, lower percentage, or similar percentage of vaccinated healthcare personnel compared to the Department of Health and Human Services (HHS) Healthy People 2020 goal of 90%. Hospitals were indicated to have met the 90% goal if the percentage of all hospital personnel vaccinated was greater than or equal to 90.0%. The calculation of the percentage of all hospital personnel vaccinated across all Virginia hospitals (state benchmark) is a pooled mean calculated by summing the numerator counts (number vaccinated) across all hospitals divided by the sum of denominator counts (number of personnel) from all hospitals in the state.

Statistical Significance

The p-value and 95% confidence interval (CI) are statistical measures that describe the likelihood that what was observed was due to random chance. The 95% CI is a range of values used to describe statistical significance when reporting the SIR. There is a high degree of confidence (in this case, 95%) that the true SIR lies within this range. The upper and lower limits are used to determine the significance and precision of the SIR. If the confidence interval includes the value of 1, then the SIR is *not significant* (*i.e.*, the number of observed events is not significantly different than the number predicted). If the confidence interval does not include the value of 1, then the SIR *is significant* (*i.e.*, the number of observed events is significantly different than the number predicted). When the SIR is zero (0), the lower bound of the 95% CI cannot be calculated. However, for ease of interpretation, it can be considered zero. A narrow CI (*i.e.*, numbers close together) indicates that there is a greater chance of obtaining an SIR within that interval, therefore increasing the precision of the SIR. Consistent with CDC/NHSN methodology, exact mid-p confidence intervals were used when observed and predicted numbers of events were less than or equal to 100; otherwise, the Byar approximation method was used.[7]

For healthcare personnel influenza vaccination rates, the p-value is used to compare the observed vaccination percentage to the Healthy People 2020 goal (90%). Statistical significance was determined by using the two-sided mid-P test for a single sample proportion. [8] If the p-value is less than or equal to 0.05, it can be concluded that the hospital vaccination percentage is significantly different than the 90%

[7] Geoffrey RC, Shu-Ying Y (1994). Mid-p Confidence Intervals for the Poisson Expectation. *Statistics in Medicine*, 13, 2189-2203.

[8] NHSN Mid-p Test for Single Sample Proportions.

goal. If the p-value is greater than 0.05, it can be concluded that the hospital vaccination percentage is not statistically different than 90%.

Risk Adjustment and Data Exclusions

The SIR is adjusted for risk factors that may impact the likelihood of developing an HAI and/or hospital-level characteristics that may influence the number of infections reported by a hospital. This ensures that every unit, hospital, or state can be compared to the baseline population in the same standardized way. Different individual-level risk-adjustment methods are used for different types of HAIs.

Device-Associated Infections

The SIR for **CLABSIs** in acute care hospitals is adjusted for:[9]

- Type of facility
- Medical school affiliation
- Number of inpatient beds in facility
- Type of patient care location
- Birthweight (for NICU patients)

The SIR for **CAUTIs** in acute care hospitals is adjusted for:[9]

- Type of facility
- Medical school affiliation
- Number of inpatient beds in facility
- Type of patient care location

Surgical Site Infections

In 2015, procedures in NHSN were defined using ICD-10 codes, including codes for abdominal hysterectomy procedures (HYST) and colon procedures (COLO).

SSI SIRs are presented using the CDC Complex Admission/Readmission (A/R) model. Under the 2015 SIR baseline, procedures and associated SSI events occurring in adult and pediatric patients are modeled separately. Only deep incisional primary and organ/space infections detected during the same admission as the surgical procedure or upon readmission to the same hospital that performed the surgical procedure are included in the reported SIR. Superficial incisional primary (SIP), superficial incisional secondary (SIS) and deep incisional secondary (DIS) SSIs, as well as any SSI identified on post discharge surveillance, are excluded. The model includes procedures and associated SSIs that were reported with primary or other than primary closure technique. More details on the Complex A/R model, as well as definitions for the different types of SSIs, can be found in the NHSN SSI Protocol.[10] For information about additional SSI models, see Appendix H.

[9] The NHSN Standardized Infection Ratio (SIR): A Guide to the SIR. Updated July 2017.

[10] Surgical Site Infection (SSI) Event.

The SIR for SSIs following adult **colon procedures** (COLO) is adjusted for:[9]

- Number of inpatient beds in facility
- Duration of procedure
- Surgical wound class
- Use of endoscope(s)
- Closure technique
- Trauma
- Anesthesia
- Patient age
- Patient sex
- Patient diabetes diagnosis
- Patient body mass index (BMI)
- Patient assessment prior to surgery (ASA score)

The SIR for SSIs following adult **abdominal hysterectomies** (HYST) is adjusted for:[9]

- Number of inpatient beds in facility
- Duration of procedure
- Use of endoscope(s)
- Patient age
- Patient diabetes diagnosis
- Patient BMI
- Patient assessment prior to surgery (ASA score)

Laboratory-Identified Events

Laboratory-identified (LabID) events are positive results identified through laboratory testing without consideration of a patient's clinical status. SIRs for MRSA bacteremia and *C. difficile* LabID events are calculated for inpatient facility-wide hospital-onset events (*i.e.*, those that occur after day 3 of hospital admission). MRSA and *C. difficile* LabID events reported from rehabilitation wards and behavioral health/psychiatric wards that have a CMS Certification Number (CCN) that is different from the hospital are excluded from analyses.

The SIR for hospital-onset **MRSA bacteremia** LabID events is adjusted for:[9]

- Type of facility
- Medical school affiliation
- Number of ICU beds in facility
- Average length of stay
- The number of patients admitted to the hospital who already have an MRSA bloodstream LabID event per 100 admissions ("inpatient community-onset prevalence rate")
- The number of patients who visited the emergency department (ED) or 24-hour observation unit and had an MRSA bloodstream LabID event per 100 encounters ("outpatient community-onset prevalence rate")

The SIR for hospital-onset ***C. difficile*** LabID events is adjusted for:[9]

- Type of facility
- Medical school affiliation
- Number of inpatient beds in facility
- Number of ICU beds in facility
- The number of patients admitted to the hospital who already have a *C. difficile* LabID event per 100 admissions ("inpatient community-onset prevalence rate")
- The type of test the hospital laboratory used to identify *C. difficile* from patient specimens (hospitals self-report quarterly)
- Reporting *C. difficile* from an ED or 24-hour observation unit (yes/no)

The inpatient community-onset prevalence rate can be described as the number of patients admitted to the hospital who already have a *C. difficile* LabID event (per 100 admissions). If the inpatient community-onset *C. difficile* prevalence rate in a hospital exceeds 2.6 for a quarter, the number of predicted infections and the SIR will not be calculated for that quarter. MRSA and *C. difficile* LabID SIR calculations exclude months where patient days and/or admissions are missing, and where *C. difficile* laboratory test method data are missing.

More information about LabID definitions and exclusions can be found in the NHSN Multidrug-Resistant Organism and *C. difficile* Infection Module Protocol.[11]

Quality Assurance and Data Validation

The NHSN system has a number of built-in validation steps and point-of-entry checks to reduce common data entry errors. Hospitals have the ability to enter the system and view, edit, and analyze their data at any time.

For further quality assurance, the VDH HAI program sent a hospital-specific Data Cleaning Report to all acute care and critical access hospitals in the state that share their data with VDH. The report contained lists of data elements from 2016 that were identified as missing, questionable, inconsistent, or duplicative. Hospitals were given two weeks to review the report and make data corrections in NHSN as appropriate. The purpose of the Data Cleaning Report was to ensure that the NHSN data are accurately reflected in this annual report. Please note that data for Quarters 3 and 4 (July-December) of 2016 have **not** been quality assured by VDH due to staffing vacancies.

Although efforts were made by hospitals and the VDH HAI Program to ensure that the data are accurate and complete, a formal validation of the data (*i.e.*, validation with on-site chart review) was not performed. However, some hospitals conduct their own validation studies. Ongoing monitoring, education and training are provided to ensure integrity of the data reported to VDH.

[11] NHSN Multidrug-Resistant Organism and *C.difficile* Infection Module Protocol.

Data Caveats and Limitations

Laboratory-Identified Events

Clostridium difficile and methicillin-resistant *Staphylococcus aureus* (MRSA) bacteremia LabID event definitions use laboratory and limited admission data. LabID Event reporting allows laboratory testing data to be used without clinical evaluation of the patient.

There are certain caveats in using and interpreting LabID event data. For example, experience in other states has shown that *C. difficile* rates tend to be higher when using LabID event data compared to clinical case definitions.[12] Reasons for this may include differences in how individual hospitals define and classify clinical disease, and timing of specimen collection. LabID events may detect colonization, which is asymptomatic carriage of the bacteria, and which does not represent true infection. LabID events should be considered a 'proxy' measure used to estimate the number of *C. difficile* and MRSA bacteremia infections that occurred in a given time period.

Despite these caveats, there are benefits to using LabID criteria. LabID events do not depend on clinical interpretation by providers, and thus offer a more standardized and consistent method of collecting and reporting *C. difficile* and MRSA bacteremia surveillance data. The SIR adjusts for *C. difficile* test type to account for differences in test sensitivity and specificity. Moreover, LabID events are being used by CMS for quality reporting programs. Hospitals are required to follow the NHSN Multidrug-Resistant Organism and *C. difficile* Infection Module Protocol, which is updated each year with LabID event surveillance definitions and reporting instructions.[11] Improving prevention practices (as described in existing clinical guidelines) should result in a decrease in the number of observed *C. difficile* and MRSA bacteremia LabID events, as well as a decrease in the number of clinical infections.

Other Data Limitations

Although efforts were made through education and training to improve the standardization and understanding of NHSN surveillance guidelines, definitions, and criteria, there can be variability in interpretation and application, leading to differences in reporting practices among hospitals. Furthermore, hospitals with more financial or personnel resources for HAI surveillance may be able to identify and report more infections compared to a hospital with fewer resources.

While NHSN collects information on many important factors that may put a patient at risk for an HAI, the system is not able to collect data about all potential risks. Each patient and healthcare location has a different set of risks that may not be fully accounted for in the calculation of the SIR.

[12] Gase *et al*. (2013). Comparison of 2 *Clostridium difficile* surveillance methods National Healthcare Safety Network's laboratory-identified event reporting module versus clinical infection surveillance. *Infection Control & Hospital Epidemiology*, 34(03), 284–290.

There may be variations between results published by VDH and results published elsewhere (*e.g.*, CMS Hospital Compare[13] or CDC). Hospitals have the ability to modify their data at any time once entered; thus, results may vary if other sources use different data collection periods or include different hospitals.

It is important to understand that the numbers alone will not show how well a hospital is preventing HAIs. This report shows how hospitals performed during a single year (2016) and compares each hospital's performance to the national baseline. Tracking hospital performance over time is not the primary purpose of this report. Data for a single year does not reflect the activities a hospital has engaged in to prevent and control infections. More information about a hospital's improvement activities can be available on the hospital's website or by contacting the Infection Preventionist or Quality Improvement Director.

[13] CMS Hospital Compare.

RESULTS

Virginia Hospital Characteristics

Characteristics of hospitals included in this report are displayed below (Table 2), including hospital type, Virginia health planning region, medical school affiliation, and bed size. Individual hospital characteristics can be found in Appendix C (Table 12). Nearly one in three (30%) Virginia hospitals were located in the Southwest region of the state, and more than half (60%) were affiliated with a medical school. The average number of hospital beds was 195, with the largest hospital containing 984 beds and the smallest containing 15.

Table 2. Characteristics of Virginia Acute Care Hospitals, January – December 2016

	Number of Hospitals	Percent
Total, Virginia	78	-
Hospital Type		
General Acute Care	78	100.0%
Region[a]		
Central	16	20.5%
Eastern	17	21.8%
Northern	11	14.1%
Northwest	11	14.1%
Southwest	23	29.5%
Total Number of Beds[b]		
≤100	26	33.3%
101-200	26	33.3%
>200	26	33.3%
Medical School Affiliation[c]		
Yes	47	60.3%
No	31	39.7%

[a] For Virginia regional divisions see Figure 1.
[b] Bed size is defined as the number of beds set up and staffed in all inpatient locations.[14]
[c] Medical School Affiliation equals 'Yes' if hospital answered 'Yes' to the following question on the NHSN Patient Safety Component Annual Hospital Survey: Is your hospital a teaching hospital for physicians and/or physicians-in-training? Includes major teaching (facility has a program for medical students and post-graduate medical training), graduate teaching (facility has a program for post-graduate medical training only, *i.e.*, residency and/or fellowships), or undergraduate teaching (facility has a program for medical students only).

[14] Instructions for Completion of the Patient Safety Component – Annual Hospital Survey. Updated January 2017.

Summary of Healthcare-Associated Infections in Virginia, 2016

Table 3 shows the statewide summary of SIRs for all reportable HAIs in 2016. Overall, statistically significant reductions from the national baseline were observed for CLABSIs and MRSA bacteremia. No significant differences were noted for CAUTIs, *C. difficile*, or SSIs following colon procedures and abdominal hysterectomies in adult patients. For a summary of statewide HAI data from 2015, see Appendix E (Table 13).

Table 3. Statewide Standardized Infection Ratios (SIRs) for Central Line-Associated Bloodstream Infections (CLABSIs), Catheter-Associated Urinary Tract Infections (CAUTIs), Surgical Site Infections (SSIs), and Laboratory-Identified Hospital-Onset Methicillin-Resistant *Staphylococcus aureus* (MRSA) Bacteremia and *Clostridium difficile* Events, Virginia Acute Care Hospitals, 2016

				Number of Infections		Standardized Infection Ratio (SIR) and 95% Confidence Interval (CI)		
HAI	**Unit/Type**	**No. of Facilities**	**Device Days/ Procedures Performed/ Patient Days**	**Observed**	**Predicted**	**SIR**	**Lower**	**Upper**
CLABSI	**All ICUs[b] and Wards[c] (total)**	78	429,493	313	411.88	0.76	0.68	0.85
	Adult and Pediatric ICUs[b] (only)	75	197,384	159	203.79	0.78	0.67	0.91
	Adult and Pediatric Wards[c] (only)	78	200,295	119	165.70	0.72	0.60	0.86
	Neonatal ICUs (only)	25	30,741	33	41.31	0.80	0.56	1.11
CAUTI	**All ICUs[b] and Wards[c] (total)**	78	437,203	474	476.49	1.00	0.91	1.09
	Adult and Pediatric ICUs[b] (only)	75	223,068	303	290.30	1.04	0.93	1.17
	Adult and Pediatric Wards[c] (only)	78	213,374	168	185.51	0.91	0.78	1.05
SSI Adult[a]	**Colon Surgery**	74	7,594	209	182.95	1.14	1.00	1.31
	Abdominal Hysterectomy	65	8,347	53	52.11	1.02	0.77	1.32
MRSA	**Facility-wide LabID**	78	3,453,257	177	205.81	0.86	0.74	0.99
C. difficile	**Facility-wide LabID**	78	3,146,854	2,312	2,400.26	0.96	0.93	1.00

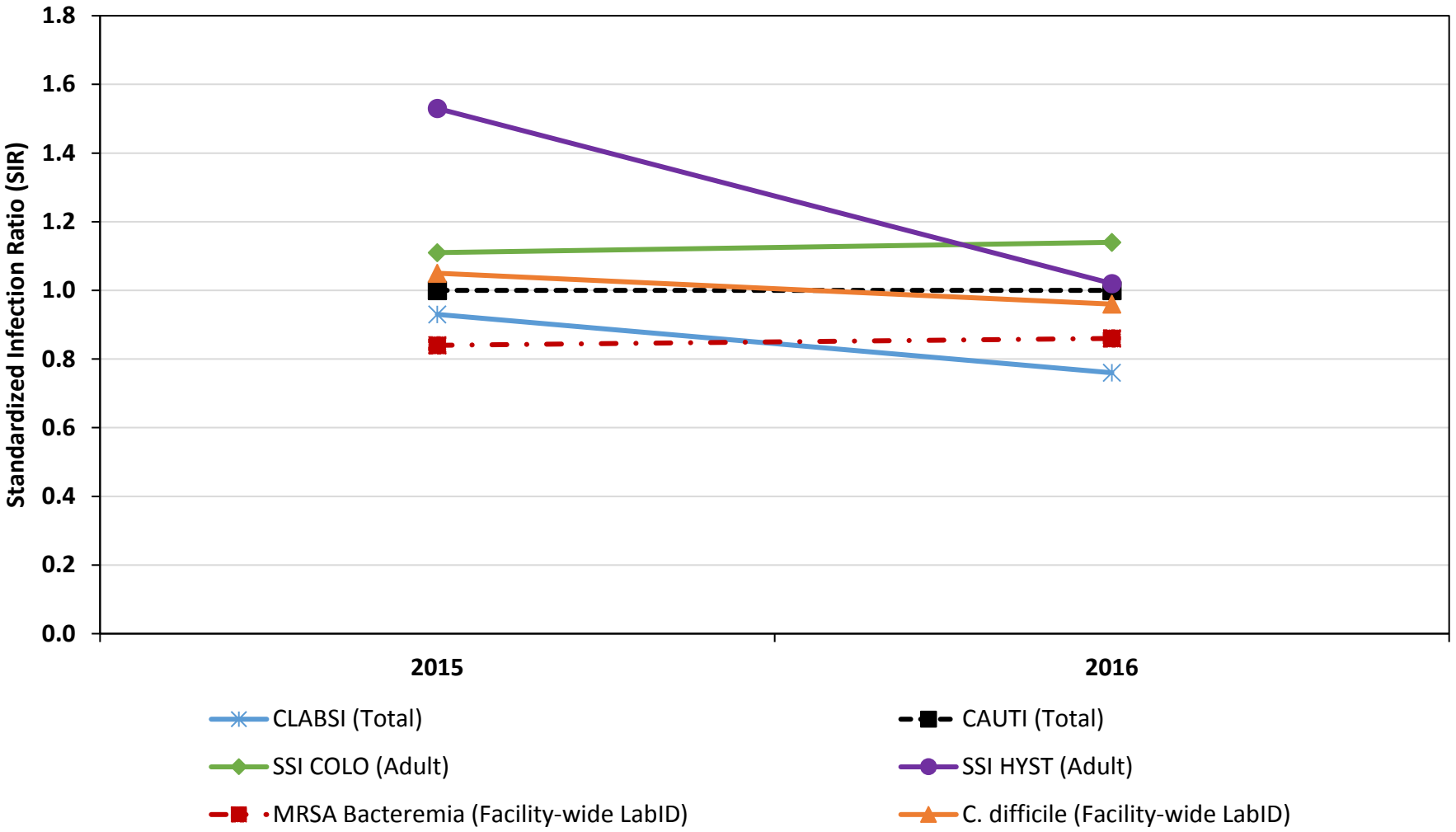
Green highlighting indicates an SIR significantly LOWER than the national baseline. Baseline period for CLABSI, CAUTI, SSI, MRSA, and *C. difficile* is calendar year 2015.

[a] SSI SIRs are based on the complex admission/readmission model for adult patients (≥18 years).

[b] NHSN has a separate CLABSI and CAUTI risk model for oncology intensive care units (ICUs); these data are not shown separately here. Oncology ICUs are included in the total for CLABSI and CAUTI but are excluded from the ICU only data. Hospital-specific CLABSI and CAUTI totals in subsequent tables include oncology ICUs.

[c] Inpatient ward locations included are adult and pediatric medical, surgical, and medical/surgical wards.

Figure 2. Statewide Standardized Infection Ratios (SIRs) by Infection Type, Virginia, 2015-2016



For national baseline and reporting requirement information, see Table 1.
2016Q3 and 2016Q4 did not undergo quality assurance by VDH.
SSI SIRs are based on the complex admission/readmission model.

Legend									
★	Fewer infections (**better**) than predicted based on the national experience.*	=	About the **same** number of infections as predicted based on the national experience.*	✖	More infections (**worse**) than predicted based on the national experience.*	**No Conclusion**	When the number of predicted infections is less than 1, no conclusion can be made.	**N/A**	Hospital did not perform that surgical procedure or had no eligible procedures** in 2016.

*National experience contains data from 2015 for CLABSI, CAUTI, SSI, and MRSA and *C. difficile* laboratory-Identified events.
**Eligible procedures are those that fit the Complex Admission/Readmission SSI model.

Table 4. Infections in Virginia Compared to the National Experience, by Acute Care Hospital, Virginia, 2016

Hospital Name	Bloodstream Infections (CLABSIs)[a]	Urinary Tract Infections (CAUTIs)[a]	Surgical Site Infections (SSIs) from Adult Colon Surgeries	SSIs from Adult Abdominal Hysterectomies	Methicillin-Resistant *Staphylococcus aureus* (MRSA) Bacteremia LabID Events	*Clostridium difficile* LabID Events
All Virginia Acute Care Hospitals (n=78)	★	=	=	=	★	=
Augusta Health	=	=	=	**No Conclusion**	=	=
Bon Secours DePaul Medical Center	=	=	=	**No Conclusion**	=	★
Bon Secours Mary Immaculate Hospital	=	=	**No Conclusion**	**No Conclusion**	=	=
Bon Secours Maryview Medical Center	=	=	=	**No Conclusion**	✖	★
Bon Secours Memorial Regional Medical Center	=	=	=	**No Conclusion**	=	★
Bon Secours Richmond Community Hospital	**No Conclusion**	**No Conclusion**	**N/A**	**N/A**	**No Conclusion**	★
Bon Secours St. Francis Medical Center	=	=	=	=	=	★
Bon Secours St. Mary's Hospital	★	=	=	=	=	★
Buchanan General Hospital	**No Conclusion**	=	**N/A**	**N/A**	**No Conclusion**	=
Carilion Franklin Memorial Hospital	**No Conclusion**	**No Conclusion**	**No Conclusion**	**N/A**	**No Conclusion**	=
Carilion New River Valley Medical Center	=	★	=	**No Conclusion**	=	=
Carilion Roanoke Memorial Hospital	=	✖	=	=	★	✖

Hospital Name	Bloodstream Infections (CLABSIs)[a]	Urinary Tract Infections (CAUTIs)[a]	Surgical Site Infections (SSIs) from Adult Colon Surgeries	SSIs from Adult Abdominal Hysterectomies	Methicillin-Resistant *Staphylococcus aureus* (MRSA) Bacteremia LabID Events	*Clostridium difficile* LabID Events
All Virginia Acute Care Hospitals (n=78)	★	=	=	=	★	=
Carilion Tazewell Community Hospital	**No Conclusion**	**No Conclusion**	**N/A**	**N/A**	**No Conclusion**	**No Conclusion**
Centra Bedford Memorial Hospital	**No Conclusion**	**No Conclusion**	**No Conclusion**	**No Conclusion**	**No Conclusion**	=
Centra Lynchburg General Hospital	=	=	★	**No Conclusion**	=	=
Centra Southside Community Hospital	**No Conclusion**	=	**No Conclusion**	**No Conclusion**	**No Conclusion**	=
Centra Virginia Baptist Hospital	**No Conclusion**	**No Conclusion**	**No Conclusion**	**No Conclusion**	**No Conclusion**	★
Chesapeake Regional Medical Center	=	=	=	=	=	✖
Clinch Valley Medical Center	=	=	**No Conclusion**	**No Conclusion**	**No Conclusion**	★
Fauquier Health	=	=	**No Conclusion**	**No Conclusion**	**No Conclusion**	=
HCA CJW Medical Center Chippenham Hospital	=	✖	=	**No Conclusion**	=	✖
HCA CJW Medical Center Johnston-Willis Hospital	=	✖	=	=	=	=
HCA Henrico Doctors' Hospital	=	=	=	=	=	=
HCA John Randolph Medical Center	**No Conclusion**	=	**No Conclusion**	**N/A**	**No Conclusion**	✖
HCA LewisGale Hospital Alleghany	**No Conclusion**	**No Conclusion**	**No Conclusion**	**N/A**	**No Conclusion**	=
HCA LewisGale Hospital Montgomery	=	=	**No Conclusion**	**No Conclusion**	**No Conclusion**	=
HCA LewisGale Hospital Pulaski	**No Conclusion**	**No Conclusion**	**No Conclusion**	**N/A**	**No Conclusion**	✖
HCA LewisGale Medical Center	=	=	=	=	=	✖
HCA Parham Doctors' Hospital	=	✖	**No Conclusion**	**N/A**	=	=
HCA Reston Hospital Center	=	=	=	**No Conclusion**	=	=

Hospital Name	Bloodstream Infections (CLABSIs)[a]	Urinary Tract Infections (CAUTIs)[a]	Surgical Site Infections (SSIs) from Adult Colon Surgeries	SSIs from Adult Abdominal Hysterectomies	Methicillin-Resistant *Staphylococcus aureus* (MRSA) Bacteremia LabID Events	*Clostridium difficile* LabID Events
All Virginia Acute Care Hospitals (n=78)	★	=	=	=	★	=
HCA Retreat Doctors' Hospital	=	✖	=	**No Conclusion**	**No Conclusion**	=
HCA Spotsylvania Regional Medical Center	**No Conclusion**	=	**No Conclusion**	**No Conclusion**	**No Conclusion**	=
HCA StoneSprings Hospital Center	**No Conclusion**	**No Conclusion**	**No Conclusion**	**No Conclusion**	**No Conclusion**	=
Inova Alexandria Hospital	=	=	✖	**No Conclusion**	=	=
Inova Fair Oaks Hospital	✖	=	=	**No Conclusion**	=	=
Inova Fairfax Medical Campus	=	=	=	=	=	★
Inova Loudoun Hospital	=	=	=	**No Conclusion**	=	★
Inova Mount Vernon Hospital	=	=	**No Conclusion**	**No Conclusion**	=	=
Mary Washington Hospital	=	★	=	**No Conclusion**	=	★
MSHA Johnston Memorial Hospital	=	=	=	**No Conclusion**	=	=
MSHA Norton Community Hospital	=	=	**No Conclusion**	**No Conclusion**	**No Conclusion**	★
MSHA Russell County Medical Center	**No Conclusion**	**No Conclusion**	**N/A**	**N/A**	**No Conclusion**	=
MSHA Smyth County Community Hospital	**No Conclusion**	**No Conclusion**	**No Conclusion**	**No Conclusion**	**No Conclusion**	=
Novant Health UVA Health System Culpeper Medical Center	**No Conclusion**	=	**No Conclusion**	**No Conclusion**	**No Conclusion**	=
Novant Health UVA Health System Haymarket Medical Center	**No Conclusion**	**No Conclusion**	**No Conclusion**	**No Conclusion**	**No Conclusion**	=
Novant Health UVA Health System Prince William Medical Center	=	✖	=	**No Conclusion**	=	=
Riverside Doctors' Hospital Williamsburg	**No Conclusion**	**No Conclusion**	**No Conclusion**	**No Conclusion**	**No Conclusion**	=
Riverside Regional Medical Center	★	=	=	=	=	=

Hospital Name	Bloodstream Infections (CLABSIs)[a]	Urinary Tract Infections (CAUTIs)[a]	Surgical Site Infections (SSIs) from Adult Colon Surgeries	SSIs from Adult Abdominal Hysterectomies	Methicillin-Resistant *Staphylococcus aureus* (MRSA) Bacteremia LabID Events	*Clostridium difficile* LabID Events
All Virginia Acute Care Hospitals (n=78)	★	=	=	=	★	=
Riverside Shore Memorial Hospital	**No Conclusion**	**No Conclusion**	**No Conclusion**	**No Conclusion**	**No Conclusion**	=
Riverside Tappahannock Hospital	**No Conclusion**	**No Conclusion**	**No Conclusion**	**N/A**	**No Conclusion**	=
Riverside Walter Reed Hospital	**No Conclusion**	**No Conclusion**	**No Conclusion**	**N/A**	**No Conclusion**	=
Sentara CarePlex Hospital	=	=	=	**No Conclusion**	=	=
Sentara Halifax Regional Hospital	**No Conclusion**	=	**No Conclusion**	**No Conclusion**	**No Conclusion**	=
Sentara Leigh Hospital	★	★	=	=	=	=
Sentara Martha Jefferson Hospital	=	=	=	**No Conclusion**	=	=
Sentara Norfolk General Hospital	★	=	✖	**No Conclusion**	=	=
Sentara Northern Virginia Medical Center	=	=	=	**No Conclusion**	=	=
Sentara Obici Hospital	=	=	=	**No Conclusion**	=	=
Sentara Princess Anne Hospital	=	=	=	**No Conclusion**	=	=
Sentara RMH Medical Center	=	=	=	**No Conclusion**	=	=
Sentara Virginia Beach General Hospital	★	=	=	=	=	=
Sentara Williamsburg Regional Medical Center	=	=	=	**No Conclusion**	=	★
Southampton Memorial Hospital	**No Conclusion**	**No Conclusion**	**No Conclusion**	**No Conclusion**	**No Conclusion**	=
Southern Virginia Regional Medical Center	**No Conclusion**	**No Conclusion**	**No Conclusion**	**N/A**	**No Conclusion**	=
Southside Regional Medical Center	=	=	=	**No Conclusion**	=	✖
SOVAH Health - Danville	✖	=	=	**No Conclusion**	=	★

Hospital Name	Bloodstream Infections (CLABSIs)[a]	Urinary Tract Infections (CAUTIs)[a]	Surgical Site Infections (SSIs) from Adult Colon Surgeries	SSIs from Adult Abdominal Hysterectomies	Methicillin-Resistant *Staphylococcus aureus* (MRSA) Bacteremia LabID Events	*Clostridium difficile* LabID Events
All Virginia Acute Care Hospitals (n=78)	★	=	=	=	★	=
SOVAH Health - Martinsville	✖	=	**No Conclusion**	**No Conclusion**	=	=
Stafford Hospital	=	=	**No Conclusion**	**No Conclusion**	**No Conclusion**	★
Twin County Regional Healthcare	**No Conclusion**	**No Conclusion**	**No Conclusion**	**No Conclusion**	**No Conclusion**	=
UVA Medical Center	=	=	=	=	=	✖
VCU Community Memorial Hospital	=	=	**No Conclusion**	**No Conclusion**	**No Conclusion**	=
VCU Medical Center	=	★	=	✖	=	✖
Virginia Hospital Center	★	=	=	=	=	=
Warren Memorial Hospital	**No Conclusion**	**No Conclusion**	**No Conclusion**	**No Conclusion**	**No Conclusion**	=
Wellmont Lonesome Pine Hospital	**No Conclusion**	**No Conclusion**	**No Conclusion**	**No Conclusion**	**No Conclusion**	**No Conclusion**
Wellmont Mountain View Regional Medical Center	**No Conclusion**	=	**No Conclusion**	**N/A**	**No Conclusion**	=
Winchester Medical Center	★	=	✖	**No Conclusion**	=	✖
Wythe County Community Hospital	**No Conclusion**	=	**No Conclusion**	**No Conclusion**	**No Conclusion**	=

[a]Aggregate data includes intensive care unit and inpatient ward (adult and pediatric medical, surgical, and medical/surgical) data.

Reading Guide for HAI Data Tables

This column is only shown in tables summarizing LabID events (*i.e.*, MRSA & *C. difficile*)

Observed = Number of infections (or events) identified
Predicted = Number of infections (or events) predicted based on NHSN national baseline data

Standardized Infection Ratio (SIR):

$$SIR = \frac{\text{Number of infections observed}}{\text{Number of infections predicted}}$$

SIR= 1.5 means **50% more** infections than predicted
SIR= 0.5 means **50% fewer** infections than predicted

Statewide aggregate data are found in the first row.

Hospital Name	Months Included	Device Days/ No. of Procedures/ Patient Days	Number of Infections		SIR and 95% Confidence Interval		SIR Interpretation
			Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals	12	447,204	411	783.62	0.52	(0.48, 0.58)	★Better
Hospital A	12	1,270	2	1.72	1.16	(0.19, 3.84)	= Same
Hospital B	9	1,794	0	3.08	0.51	(0.41, 0.54)	★Better
Hospital C	12	374	0	0.60	N/A	N/A	**No Conclusion**
Hospital D	12	3,659	11	5.07	2.17	(1.14, 3.77)	✖ Worse

Example: Hospital A

Device Days	Obs.	Pred.	SIR	95% CI	Interpretation
1,270	2	1.72	1.16	(0.19, 3.84)	= Same

Hospital A reported:

- 1,270 denominator days
- Observed 2 infections
- Predicted 1.72 infections

Hospital A SIR:

- Not statistically significantly different from baseline SIR of 1 (CI crosses 1.0).
- 16% more infections than predicted.

Legend							
★	Fewer infections (**better**) than predicted based on the national experience.	=	About the **same** number of infections as predicted based on the national experience.	✖	More infections (**worse**) than predicted based on the national experience.	**No Conclusion**	When the number of predicted infections is less than 1, no conclusion can be made.

For an explanation of each variable, see Appendix D. Variable Definitions.

Central Line-Associated Bloodstream Infections (CLABSIs)

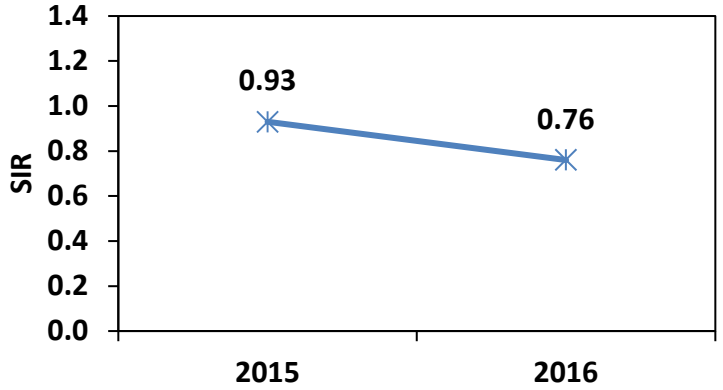
Central Line-Associated Bloodstream Infections (CLABSIs) – Adult, Neonatal, and Pediatric Intensive Care Units and Adult and Pediatric Medical, Surgical, and Medical/Surgical Inpatient Wards

In 2016, 78 Virginia acute care hospitals reported CLABSI data for adult and pediatric medical, surgical and medical/surgical inpatient wards. Seventy-five hospitals reported CLABSI data for adult and pediatric intensive care units (ICUs), and 25 hospitals reported data for neonatal ICUs (NICUs).

The 2016 overall CLABSI SIR for Virginia hospitals was 0.76 (95% CI: 0.68, 0.85) and was statistically significantly lower than 1.00. This SIR indicates that the number of CLABSIs observed in Virginia was 24% lower than predicted, based on the national experience from 2015. Thirty-three (42%) hospitals reported zero CLABSIs in 2016 from their ICUs and inpatient wards. Among the 50 hospitals that had a calculated CLABSI SIR for all reportable ICUs and inpatient wards, seven (14%) reported an SIR statistically significantly lower than 1.00; three (6%) reported an SIR statistically significantly higher than 1.00.

Additional information about specific unit types is contained in Appendix G.

Figure 3. CLABSI SIRs, Total, Virginia, 2015-2016



- Among the 35 hospitals that had a calculated CLABSI SIR for adult and pediatric ICUs (only), four (11%) reported an SIR statistically significantly lower than 1.00 (Table 16). Three hospitals (9%) reported an SIR statistically significantly higher than 1.00. The 2016 state SIR for adult and pediatric ICUs was 0.78 (95% CI: 0.67, 0.91) and was also statistically significantly lower than 1.00. This indicates that the number of CLABSIs seen for these units was 22% lower than predicted, based on the national experience from 2015.

- Among the ten hospitals that had a calculated CLABSI SIR for NICUs (only), none reported a statistically significant difference from 1.00 (Table 17). The 2016 state SIR for NICUs was 0.80 (95% CI: 0.56, 1.11) and was not statistically significantly different from 1.00.

- Among the 39 hospitals that had a calculated CLABSI SIR for adult and pediatric inpatient wards (only), four (10%) reported an SIR statistically significantly lower than 1.00 (Table 18). Three hospitals (8%) reported an SIR statistically significantly higher than 1.00. The 2016 state SIR for wards was 0.72 (95% CI: 0.60, 0.86) and was also statistically significantly lower than 1.00. This indicates that the number of CLABSIs seen for these units was 28% lower than predicted, based on the national experience from 2015.

Legend							
★	Fewer infections (**better**) than predicted based on the national experience.*	=	About the **same** number of infections as predicted based on the national experience.*	✖	More infections (**worse**) than predicted based on the national experience.*	**No Conclusion**	When the number of predicted infections is less than 1, no conclusion can be made.
*National experience contains data from 2015 for CLABSI.							

Table 5. Central Line-Associated Bloodstream Infection (CLABSI) SIR Report, All Reportable Intensive Care Units and Inpatient Wards, by Acute Care Hospital, Virginia, 2016

Hospital Name	Device Days	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=78)	**429,493**	**313**	**411.88**	**0.76**	**(0.68, 0.85)**	**★Better**
Augusta Health	2,280	2	1.58	1.27	(0.21, 4.19)	= Same
Bon Secours DePaul Medical Center	3,532	1	3.30	0.30	(0.02, 1.49)	= Same
Bon Secours Mary Immaculate Hospital	2,379	0	1.67	0.00	(., 1.80)	= Same
Bon Secours Maryview Medical Center	5,318	3	5.01	0.60	(0.15, 1.63)	= Same
Bon Secours Memorial Regional Medical Center	7,669	6	6.20	0.97	(0.39, 2.01)	= Same
Bon Secours Richmond Community Hospital	310	1	0.22	N/A	N/A	**No Conclusion**
Bon Secours St. Francis Medical Center	5,653	5	4.47	1.12	(0.41, 2.48)	= Same
Bon Secours St. Mary's Hospital	13,516	3	14.12	0.21	(0.05, 0.58)	★Better
Buchanan General Hospital	121	0	0.07	N/A	N/A	**No Conclusion**
Carilion Franklin Memorial Hospital	465	0	0.35	N/A	N/A	**No Conclusion**
Carilion New River Valley Medical Center	4,135	2	3.66	0.55	(0.09, 1.80)	= Same
Carilion Roanoke Memorial Hospital	21,067	18	24.87	0.72	(0.44, 1.12)	= Same
Carilion Tazewell Community Hospital	311	0	0.18	N/A	N/A	**No Conclusion**
Centra Bedford Memorial Hospital	175	0	0.11	N/A	N/A	**No Conclusion**

Hospital Name	Device Days	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=78)	**429,493**	**313**	**411.88**	**0.76**	**(0.68, 0.85)**	**★Better**
Centra Lynchburg General Hospital	16,674	21	15.32	1.37	(0.87, 2.06)	= Same
Centra Southside Community Hospital	460	0	0.28	N/A	N/A	**No Conclusion**
Centra Virginia Baptist Hospital	680	1	0.62	N/A	N/A	**No Conclusion**
Chesapeake Regional Medical Center	6,107	7	4.81	1.46	(0.64, 2.88)	= Same
Clinch Valley Medical Center	2,060	0	1.39	0.00	(., 2.16)	= Same
Fauquier Health	3,245	0	2.24	0.00	(., 1.34)	= Same
HCA CJW Medical Center Chippenham Hospital	12,912	16	12.85	1.25	(0.74, 1.98)	= Same
HCA CJW Medical Center Johnston-Willis Hospital	4,982	3	5.17	0.58	(0.15, 1.58)	= Same
HCA Henrico Doctors' Hospital	7,906	4	7.46	0.54	(0.17, 1.29)	= Same
HCA John Randolph Medical Center	1,159	0	0.84	N/A	N/A	**No Conclusion**
HCA LewisGale Hospital Alleghany	677	0	0.41	N/A	N/A	**No Conclusion**
HCA LewisGale Hospital Montgomery	1,220	1	1.14	0.88	(0.04, 4.32)	= Same
HCA LewisGale Hospital Pulaski	734	0	0.45	N/A	N/A	**No Conclusion**
HCA LewisGale Medical Center	14,340	6	11.65	0.52	(0.21, 1.07)	= Same
HCA Parham Doctors' Hospital	1,986	1	1.38	0.73	(0.04, 3.58)	= Same
HCA Reston Hospital Center	5,916	4	4.18	0.96	(0.30, 2.31)	= Same
HCA Retreat Doctors' Hospital	2,057	2	1.22	1.64	(0.28, 5.42)	= Same
HCA Spotsylvania Regional Medical Center	1,413	0	0.99	N/A	N/A	**No Conclusion**
HCA StoneSprings Hospital Center	811	0	0.55	N/A	N/A	**No Conclusion**
Inova Alexandria Hospital	7,471	7	6.40	1.09	(0.48, 2.16)	= Same

Hospital Name	Device Days	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=78)	**429,493**	**313**	**411.88**	**0.76**	**(0.68, 0.85)**	★Better
Inova Fair Oaks Hospital	3,348	6	2.41	2.49	(1.01, 5.17)	✖Worse
Inova Fairfax Medical Campus	35,573	44	41.69	1.06	(0.78, 1.40)	= Same
Inova Loudoun Hospital	2,909	1	2.08	0.48	(0.02, 2.37)	= Same
Inova Mount Vernon Hospital	2,375	4	2.19	1.83	(0.58, 4.40)	= Same
Mary Washington Hospital	13,269	9	10.79	0.83	(0.41, 1.53)	= Same
MSHA Johnston Memorial Hospital	2,634	0	2.09	0.00	(., 1.44)	= Same
MSHA Norton Community Hospital	1,400	0	1.00	0.00	(., 2.99)	= Same
MSHA Russell County Medical Center	233	0	0.14	N/A	N/A	**No Conclusion**
MSHA Smyth County Community Hospital	93	0	0.06	N/A	N/A	**No Conclusion**
Novant Health UVA Health System Culpeper Medical Center	457	0	0.37	N/A	N/A	**No Conclusion**
Novant Health UVA Health System Haymarket Medical Center	656	0	0.41	N/A	N/A	**No Conclusion**
Novant Health UVA Health System Prince William Medical Center	2,289	2	2.00	1.00	(0.17, 3.31)	= Same
Riverside Doctors' Hospital Williamsburg	665	0	0.41	N/A	N/A	**No Conclusion**
Riverside Regional Medical Center	13,092	4	12.55	0.32	(0.10, 0.77)	★Better
Riverside Shore Memorial Hospital	974	0	0.62	N/A	N/A	**No Conclusion**
Riverside Tappahannock Hospital	389	0	0.24	N/A	N/A	**No Conclusion**
Riverside Walter Reed Hospital	1,408	0	0.87	N/A	N/A	**No Conclusion**
Sentara CarePlex Hospital	4,184	3	3.38	0.89	(0.23, 2.42)	= Same
Sentara Halifax Regional Hospital	708	0	0.49	N/A	N/A	**No Conclusion**

Hospital Name	Device Days	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=78)	**429,493**	**313**	**411.88**	**0.76**	**(0.68, 0.85)**	★Better
Sentara Leigh Hospital	6,413	1	6.59	0.15	(0.01, 0.75)	★Better
Sentara Martha Jefferson Hospital	4,859	1	3.24	0.31	(0.02, 1.52)	= Same
Sentara Norfolk General Hospital	22,599	11	24.28	0.45	(0.24, 0.79)	★Better
Sentara Northern Virginia Medical Center	3,596	0	2.53	0.00	(., 1.18)	= Same
Sentara Obici Hospital	3,265	1	2.64	0.38	(0.02, 1.87)	= Same
Sentara Princess Anne Hospital	6,902	3	5.14	0.58	(0.15, 1.59)	= Same
Sentara RMH Medical Center	5,443	1	4.30	0.23	(0.01, 1.15)	= Same
Sentara Virginia Beach General Hospital	7,560	1	6.20	0.16	(0.01, 0.80)	★Better
Sentara Williamsburg Regional Medical Center	2,105	0	1.44	0.00	(., 2.08)	= Same
Southampton Memorial Hospital	467	0	0.29	N/A	N/A	**No Conclusion**
Southern Virginia Regional Medical Center	460	0	0.28	N/A	N/A	**No Conclusion**
Southside Regional Medical Center	6,882	6	5.54	1.08	(0.44, 2.25)	= Same
SOVAH Health - Danville	2,610	6	2.39	2.51	(1.02, 5.22)	✖Worse
SOVAH Health - Martinsville	3,191	6	2.25	2.66	(1.08, 5.54)	✖Worse
Stafford Hospital	2,224	2	1.34	1.49	(0.25, 4.93)	= Same
Twin County Regional Healthcare	363	0	0.23	N/A	N/A	**No Conclusion**
UVA Medical Center	34,377	42	38.38	1.09	(0.80, 1.47)	= Same
VCU Community Memorial Hospital	1,550	1	1.05	0.96	(0.05, 4.72)	= Same
VCU Medical Center	42,192	37	49.71	0.74	(0.53, 1.02)	= Same
Virginia Hospital Center	9,521	3	9.80	0.31	(0.08, 0.83)	★Better

Hospital Name	Device Days	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=78)	**429,493**	**313**	**411.88**	**0.76**	**(0.68, 0.85)**	**★Better**
Warren Memorial Hospital	244	0	0.20	N/A	N/A	**No Conclusion**
Wellmont Lonesome Pine Hospital	311	0	0.25	N/A	N/A	**No Conclusion**
Wellmont Mountain View Regional Medical Center	489	0	0.44	N/A	N/A	**No Conclusion**
Winchester Medical Center	15,358	4	14.35	0.28	(0.09, 0.67)	**★Better**
Wythe County Community Hospital	115	0	0.08	N/A	N/A	**No Conclusion**

[a] When the SIR is 0, the lower bound of the 95% confidence interval cannot be calculated. However, for ease of interpretation, it can be considered 0.

Catheter-Associated Urinary Tract Infections (CAUTIs)

Catheter-Associated Urinary Tract Infections (CAUTIs) – Adult and Pediatric Intensive Care Units and Medical, Surgical, and Medical/Surgical Inpatient Wards

In 2016, 78 Virginia acute care hospitals reported CAUTI data for all adult and pediatric medical, surgical, and medical/surgical inpatient wards. Seventy-five hospitals reported CAUTI data for adult and pediatric intensive care units (ICUs).

The 2016 overall CAUTI SIR for Virginia hospitals was 1.00 (95% CI: 0.91, 1.09) and was not statistically significantly different from 1.00, based on the national experience from 2015. Twenty-five hospitals (32%) reported zero CAUTIs in 2016 from their ICUs and inpatient wards. Among the 58 hospitals that had a calculated SIR for all reportable ICUs and inpatient wards, four (7%) reported an SIR statistically significantly lower than 1.00. Six hospitals (10%) reported an SIR statistically significantly higher than 1.00.

Additional information about specific unit types is contained in Appendix G.

Figure 4. CAUTI SIRs, Total, Virginia, 2015-2016

- Among the 38 hospitals that had a calculated CAUTI SIR for adult and pediatric ICUs (only), one (3%) reported an SIR statistically significantly lower than 1.00 (Table 19). Six hospitals (16%) reported an SIR statistically significantly higher than 1.00. The 2016 state SIR for adult and pediatric ICUs was 1.04 (95% CI: 0.93, 1.17) and was not statistically significantly different from 1.00.

- Among the 46 hospitals that had a calculated CAUTI SIR for adult and pediatric inpatient wards (only), five (11%) reported an SIR statistically significantly lower than 1.00 (Table 20). Six hospitals (13%) reported an SIR statistically significantly higher than 1.00. The 2016 state SIR for adult and pediatric inpatient wards was 0.91 (95% CI: 0.78, 1.05) and was not statistically significantly different from 1.00.

Legend							
★	Fewer infections (**better**) than predicted based on the national experience.*	=	About the **same** number of infections as predicted based on the national experience.*	✖	More infections (**worse**) than predicted based on the national experience.*	**No Conclusion**	When the number of predicted infections is less than 1, no conclusion can be made.
*National experience contains data from 2015 for CAUTI.							

Table 6. Catheter-Associated Urinary Tract Infection (CAUTI) SIR Report, All Reportable Intensive Care Units and Inpatient Wards, by Acute Care Hospital, Virginia, 2016

Hospital Name	Device Days	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=78)	**437,203**	**474**	**476.49**	**1.00**	**(0.91, 1.09)**	= Same
Augusta Health	4,583	4	3.19	1.25	(0.40, 3.03)	= Same
Bon Secours DePaul Medical Center	4,380	7	6.58	1.06	(0.47, 2.10)	= Same
Bon Secours Mary Immaculate Hospital	2,473	1	1.74	0.58	(0.03, 2.84)	= Same
Bon Secours Maryview Medical Center	4,884	1	4.84	0.21	(0.01, 1.02)	= Same
Bon Secours Memorial Regional Medical Center	5,647	5	4.86	1.03	(0.38, 2.28)	= Same
Bon Secours Richmond Community Hospital	144	0	0.10	N/A	N/A	**No Conclusion**
Bon Secours St. Francis Medical Center	4,688	5	3.75	1.33	(0.49, 2.96)	= Same
Bon Secours St. Mary's Hospital	8,703	7	8.89	0.79	(0.34, 1.56)	= Same
Buchanan General Hospital	2,060	0	1.05	0.00	(., 2.87)	= Same
Carilion Franklin Memorial Hospital	626	0	0.45	N/A	N/A	**No Conclusion**
Carilion New River Valley Medical Center	5,316	0	5.22	0.00	(., 0.57)	★Better
Carilion Roanoke Memorial Hospital	17,038	41	26.60	1.54	(1.12, 2.07)	✖Worse
Carilion Tazewell Community Hospital	566	1	0.28	N/A	N/A	**No Conclusion**
Centra Bedford Memorial Hospital	677	0	0.35	N/A	N/A	**No Conclusion**

Hospital Name	Device Days	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=78)	**437,203**	**474**	**476.49**	**1.00**	**(0.91, 1.09)**	= Same
Centra Lynchburg General Hospital	14,344	20	16.09	1.24	(0.78, 1.89)	= Same
Centra Southside Community Hospital	3,061	0	1.55	0.00	(., 1.94)	= Same
Centra Virginia Baptist Hospital	533	0	0.40	N/A	N/A	**No Conclusion**
Chesapeake Regional Medical Center	10,356	14	8.83	1.59	(0.90, 2.60)	= Same
Clinch Valley Medical Center	2,813	0	1.93	0.00	(., 1.55)	= Same
Fauquier Health	3,668	2	2.50	0.80	(0.13, 2.65)	= Same
HCA CJW Medical Center Chippenham Hospital	10,666	22	10.72	2.05	(1.32, 3.06)	✖ Worse
HCA CJW Medical Center Johnston-Willis Hospital	4,380	16	6.85	2.34	(1.38, 3.71)	✖ Worse
HCA Henrico Doctors' Hospital	6,960	4	6.85	0.58	(0.19, 1.41)	= Same
HCA John Randolph Medical Center	1,749	1	1.22	0.82	(0.04, 4.03)	= Same
HCA LewisGale Hospital Alleghany	1,262	0	0.69	N/A	N/A	**No Conclusion**
HCA LewisGale Hospital Montgomery	1,400	1	1.42	0.71	(0.04, 3.48)	= Same
HCA LewisGale Hospital Pulaski	1,268	2	0.65	N/A	N/A	**No Conclusion**
HCA LewisGale Medical Center	14,479	16	14.17	1.13	(0.67, 1.80)	= Same
HCA Parham Doctors' Hospital	2,821	6	2.00	2.99	(1.21, 6.23)	✖ Worse
HCA Reston Hospital Center	7,859	5	5.46	0.92	(0.34, 2.03)	= Same
HCA Retreat Doctors' Hospital	2,487	5	1.24	4.03	(1.48, 8.92)	✖ Worse
HCA Spotsylvania Regional Medical Center	2,229	1	1.53	0.65	(0.03, 3.22)	= Same
HCA StoneSprings Hospital Center	483	1	0.33	N/A	N/A	**No Conclusion**
Inova Alexandria Hospital	6,464	8	5.59	1.43	(0.66, 2.72)	= Same

Hospital Name	Device Days	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=78)	**437,203**	**474**	**476.49**	**1.00**	**(0.91, 1.09)**	= Same
Inova Fair Oaks Hospital	3,249	2	2.25	0.89	(0.15, 2.94)	= Same
Inova Fairfax Medical Campus	22,891	52	41.56	1.25	(0.94, 1.63)	= Same
Inova Loudoun Hospital	4,535	4	3.16	1.27	(0.40, 3.05)	= Same
Inova Mount Vernon Hospital	2,566	2	2.55	0.78	(0.13, 2.59)	= Same
Mary Washington Hospital	21,043	7	17.74	0.40	(0.17, 0.78)	★Better
MSHA Johnston Memorial Hospital	6,339	1	4.88	0.21	(0.01, 1.01)	= Same
MSHA Norton Community Hospital	2,666	0	1.56	0.00	(., 1.92)	= Same
MSHA Russell County Medical Center	1,171	0	0.64	N/A	N/A	**No Conclusion**
MSHA Smyth County Community Hospital	739	0	0.37	N/A	N/A	**No Conclusion**
Novant Health UVA Health System Culpeper Medical Center	1,783	0	1.34	0.00	(., 2.24)	= Same
Novant Health UVA Health System Haymarket Medical Center	1,004	1	0.52	N/A	N/A	**No Conclusion**
Novant Health UVA Health System Prince William Medical Center	2,097	5	1.72	2.91	(1.07, 6.46)	✖Worse
Riverside Doctors' Hospital Williamsburg	854	0	0.44	N/A	N/A	**No Conclusion**
Riverside Regional Medical Center	11,570	19	13.34	1.42	(0.88, 2.18)	= Same
Riverside Shore Memorial Hospital	1,084	0	0.61	N/A	N/A	**No Conclusion**
Riverside Tappahannock Hospital	1,021	1	0.53	N/A	N/A	**No Conclusion**
Riverside Walter Reed Hospital	1,838	1	0.95	N/A	N/A	**No Conclusion**
Sentara CarePlex Hospital	3,462	5	2.97	1.68	(0.62, 3.73)	= Same
Sentara Halifax Regional Hospital	2,172	0	1.57	0.00	(., 1.91)	= Same

Hospital Name	Device Days	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=78)	**437,203**	**474**	**476.49**	**1.00**	**(0.91, 1.09)**	= Same
Sentara Leigh Hospital	11,204	4	13.99	0.29	(0.09, 0.69)	★Better
Sentara Martha Jefferson Hospital	4,825	1	3.46	0.29	(0.01, 1.43)	= Same
Sentara Norfolk General Hospital	19,295	36	30.75	1.17	(0.83, 1.60)	= Same
Sentara Northern Virginia Medical Center	4,652	2	3.19	0.63	(0.11, 2.07)	= Same
Sentara Obici Hospital	2,734	0	2.17	0.00	(., 1.38)	= Same
Sentara Princess Anne Hospital	6,109	7	4.29	1.63	(0.71, 3.23)	= Same
Sentara RMH Medical Center	11,462	9	9.41	0.96	(0.47, 1.76)	= Same
Sentara Virginia Beach General Hospital	9,323	7	8.33	0.84	(0.37, 1.66)	= Same
Sentara Williamsburg Regional Medical Center	3,209	1	2.41	0.41	(0.02, 2.04)	= Same
Southampton Memorial Hospital	1,272	0	0.87	N/A	N/A	**No Conclusion**
Southern Virginia Regional Medical Center	1,066	0	0.54	N/A	N/A	**No Conclusion**
Southside Regional Medical Center	7,606	8	6.72	1.19	(0.55, 2.26)	= Same
SOVAH Health - Danville	6,912	6	6.84	0.88	(0.36, 1.82)	= Same
SOVAH Health - Martinsville	4,891	1	3.41	0.29	(0.02, 1.45)	= Same
Stafford Hospital	3,473	3	2.40	1.25	(0.32, 3.40)	= Same
Twin County Regional Healthcare	1,815	0	0.94	N/A	N/A	**No Conclusion**
UVA Medical Center	21,595	32	33.34	0.96	(0.67, 1.34)	= Same
VCU Community Memorial Hospital	3,489	0	2.37	0.00	(., 1.27)	= Same
VCU Medical Center	26,724	31	50.71	0.61	(0.42, 0.86)	★Better
Virginia Hospital Center	7,497	12	9.37	1.28	(0.69, 2.18)	= Same

Hospital Name	Device Days	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=78)	**437,203**	**474**	**476.49**	**1.00**	**(0.91, 1.09)**	**= Same**
Warren Memorial Hospital	1,267	0	0.96	N/A	N/A	**No Conclusion**
Wellmont Lonesome Pine Hospital	1,062	0	0.79	N/A	N/A	**No Conclusion**
Wellmont Mountain View Regional Medical Center	1,397	0	1.41	0.00	(., 2.13)	**= Same**
Winchester Medical Center	19,723	18	20.13	0.89	(0.55, 1.39)	**= Same**
Wythe County Community Hospital	1,450	0	1.03	0.00	(., 2.90)	**= Same**

[a] When the SIR is 0, the lower bound of the 95% confidence interval cannot be calculated. However, for ease of interpretation, it can be considered 0.

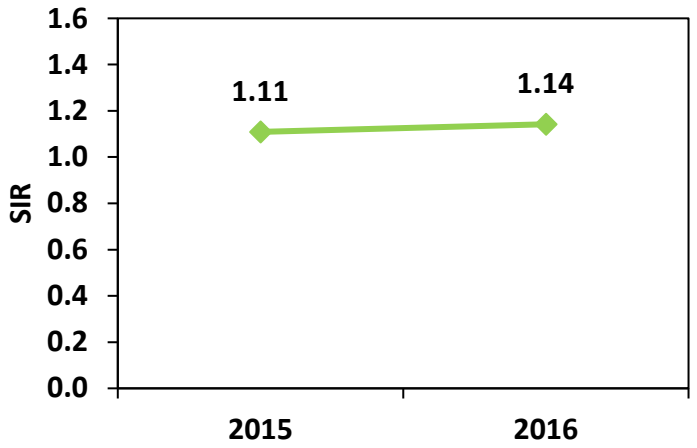
Surgical Site Infections (SSIs)

Surgical Site Infections (SSIs) – Adult Colon (COLO) Procedures – Complex A/R Model

In 2016, 74 Virginia acute care hospitals reported performing colon procedures on patients ≥18 years. The 2016 overall COLO SIR for Virginia hospitals was 1.14 (95% CI: 1.00, 1.31) and was not statistically significantly different from 1.00, based on the national experience from 2015.

- In 2016, 26 hospitals (35%) reported zero SSIs following adult COLO procedures.
- SIRs were calculated for 40 (54%) hospitals; for 34 hospitals, the SIR was not calculated because the number of predicted infections was less than 1.
- Among the hospitals that had a calculated COLO SIR, only one hospital (3%) reported an SIR statistically significantly lower than 1.00.
- Among the hospitals that had a calculated COLO SIR, three (8%) reported an SIR statistically significantly higher than 1.00.

Figure 5. SSI SIRs, Adult Colon Procedures, Virginia, 2015-2016



Legend					
★	Fewer infections (**better**) than predicted based on the national experience.*	=	About the **same** number of infections as predicted based on the national experience.*	✖	More infections (**worse**) than predicted based on the national experience.*
No Conclusion	When the number of predicted infections is less than 1, no conclusion can be made.				
*National experience contains data from 2015 for SSIs.					

Table 7. Surgical Site Infection (SSI) SIR Report, Adult Colon Procedures, by Acute Care Hospital, Virginia, 2016

Hospital Name	Number of Procedures	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=74)	**7,594**	**209**	**182.95**	**1.14**	**(1.00, 1.31)**	= Same
Augusta Health	102	3	2.23	1.35	(0.34, 3.66)	= Same
Bon Secours DePaul Medical Center	77	2	1.75	1.14	(0.19, 3.77)	= Same
Bon Secours Mary Immaculate Hospital	50	2	0.84	N/A	N/A	**No Conclusion**
Bon Secours Maryview Medical Center	79	0	2.42	0.00	(., 1.24)	= Same
Bon Secours Memorial Regional Medical Center	219	1	4.57	0.22	(0.01, 1.08)	= Same

Hospital Name	Number of Procedures	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=74)	**7,594**	**209**	**182.95**	**1.14**	**(1.00, 1.31)**	= Same
Bon Secours St. Francis Medical Center	112	3	2.35	1.28	(0.33, 3.47)	= Same
Bon Secours St. Mary's Hospital	253	8	6.08	1.32	(0.61, 2.50)	= Same
Carilion Franklin Memorial Hospital	7	0	0.14	N/A	N/A	**No Conclusion**
Carilion New River Valley Medical Center	91	0	2.04	0.00	(., 1.47)	= Same
Carilion Roanoke Memorial Hospital	464	17	15.59	1.09	(0.66, 1.71)	= Same
Centra Bedford Memorial Hospital	6	0	0.15	N/A	N/A	**No Conclusion**
Centra Lynchburg General Hospital	249	1	5.90	0.17	(0.01, 0.84)	★Better
Centra Southside Community Hospital	31	0	0.63	N/A	N/A	**No Conclusion**
Centra Virginia Baptist Hospital	29	0	0.55	N/A	N/A	**No Conclusion**
Chesapeake Regional Medical Center	273	3	5.60	0.54	(0.14, 1.46)	= Same
Clinch Valley Medical Center	24	3	0.54	N/A	N/A	**No Conclusion**
Fauquier Health	33	1	0.55	N/A	N/A	**No Conclusion**
HCA CJW Medical Center Chippenham Hospital	91	2	2.23	0.90	(0.15, 2.96)	= Same
HCA CJW Medical Center Johnston-Willis Hospital	191	4	3.95	1.01	(0.32, 2.44)	= Same
HCA Henrico Doctors' Hospital	227	8	5.12	1.56	(0.73, 2.97)	= Same
HCA John Randolph Medical Center	17	0	0.56	N/A	N/A	**No Conclusion**
HCA LewisGale Hospital Alleghany	22	0	0.45	N/A	N/A	**No Conclusion**
HCA LewisGale Hospital Montgomery	27	2	0.54	N/A	N/A	**No Conclusion**
HCA LewisGale Hospital Pulaski	14	0	0.25	N/A	N/A	**No Conclusion**
HCA LewisGale Medical Center	152	4	3.13	1.28	(0.41, 3.08)	= Same

Hospital Name	Number of Procedures	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=74)	**7,594**	**209**	**182.95**	**1.14**	**(1.00, 1.31)**	= Same
HCA Parham Doctors' Hospital	21	1	0.38	N/A	N/A	**No Conclusion**
HCA Reston Hospital Center	151	5	3.05	1.64	(0.60, 3.63)	= Same
HCA Retreat Doctors' Hospital	81	2	1.14	1.76	(0.30, 5.82)	= Same
HCA Spotsylvania Regional Medical Center	30	1	0.57	N/A	N/A	**No Conclusion**
HCA StoneSprings Hospital Center	8	1	0.25	N/A	N/A	**No Conclusion**
Inova Alexandria Hospital	138	7	2.73	2.56	(1.12, 5.07)	✖Worse
Inova Fair Oaks Hospital	131	5	2.69	1.86	(0.68, 4.12)	= Same
Inova Fairfax Medical Campus	563	17	15.80	1.08	(0.65, 1.69)	= Same
Inova Loudoun Hospital	121	0	2.35	0.00	(., 1.28)	= Same
Inova Mount Vernon Hospital	20	0	0.45	N/A	N/A	**No Conclusion**
Mary Washington Hospital	229	6	6.19	0.97	(0.39, 2.02)	= Same
MSHA Johnston Memorial Hospital	57	2	1.24	1.61	(0.27, 5.33)	= Same
MSHA Norton Community Hospital	14	0	0.26	N/A	N/A	**No Conclusion**
MSHA Smyth County Community Hospital	5	1	0.08	N/A	N/A	**No Conclusion**
Novant Health UVA Health System Culpeper Medical Center	18	0	0.39	N/A	N/A	**No Conclusion**
Novant Health UVA Health System Haymarket Medical Center	32	2	0.46	N/A	N/A	**No Conclusion**
Novant Health UVA Health System Prince William Medical Center	64	3	1.23	2.44	(0.62, 6.64)	= Same
Riverside Doctors' Hospital Williamsburg	18	0	0.25	N/A	N/A	**No Conclusion**
Riverside Regional Medical Center	162	1	3.38	0.30	(0.02, 1.46)	= Same

Hospital Name	Number of Procedures	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=74)	**7,594**	**209**	**182.95**	**1.14**	**(1.00, 1.31)**	= Same
Riverside Shore Memorial Hospital	12	1	0.24	N/A	N/A	**No Conclusion**
Riverside Tappahannock Hospital	23	0	0.46	N/A	N/A	**No Conclusion**
Riverside Walter Reed Hospital	19	1	0.33	N/A	N/A	**No Conclusion**
Sentara CarePlex Hospital	128	2	3.13	0.64	(0.11, 2.11)	= Same
Sentara Halifax Regional Hospital	27	2	0.70	N/A	N/A	**No Conclusion**
Sentara Leigh Hospital	210	5	4.77	1.05	(0.38, 2.32)	= Same
Sentara Martha Jefferson Hospital	112	1	2.59	0.39	(0.02, 1.90)	= Same
Sentara Norfolk General Hospital	184	13	6.70	1.94	(1.08, 3.24)	✖ Worse
Sentara Northern Virginia Medical Center	83	1	1.59	0.63	(0.03, 3.11)	= Same
Sentara Obici Hospital	68	2	1.58	1.27	(0.21, 4.19)	= Same
Sentara Princess Anne Hospital	66	0	1.38	0.00	(., 2.18)	= Same
Sentara RMH Medical Center	76	1	1.51	0.66	(0.03, 3.26)	= Same
Sentara Virginia Beach General Hospital	197	5	4.51	1.11	(0.41, 2.46)	= Same
Sentara Williamsburg Regional Medical Center	54	0	1.19	0.00	(., 2.53)	= Same
Southampton Memorial Hospital	5	0	0.10	N/A	N/A	**No Conclusion**
Southern Virginia Regional Medical Center	2	0	0.03	N/A	N/A	**No Conclusion**
Southside Regional Medical Center	54	1	1.26	0.79	(0.04, 3.92)	= Same
SOVAH Health - Danville	57	2	1.10	1.82	(0.31, 6.00)	= Same
SOVAH Health - Martinsville	48	0	0.84	N/A	N/A	**No Conclusion**
Stafford Hospital	42	0	0.95	N/A	N/A	**No Conclusion**

Hospital Name	Number of Procedures	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=74)	**7,594**	**209**	**182.95**	**1.14**	**(1.00, 1.31)**	= Same
Twin County Regional Healthcare	27	0	0.49	N/A	N/A	**No Conclusion**
UVA Medical Center	406	10	11.61	0.86	(0.44, 1.54)	= Same
VCU Community Memorial Hospital	15	1	0.38	N/A	N/A	**No Conclusion**
VCU Medical Center	299	16	10.11	1.58	(0.94, 2.51)	= Same
Virginia Hospital Center	289	6	6.31	0.95	(0.39, 1.98)	= Same
Warren Memorial Hospital	3	0	0.06	N/A	N/A	**No Conclusion**
Wellmont Lonesome Pine Hospital	11	0	0.15	N/A	N/A	**No Conclusion**
Wellmont Mountain View Regional Medical Center	14	0	0.38	N/A	N/A	**No Conclusion**
Winchester Medical Center	352	21	7.33	2.87	(1.82, 4.31)	✖ **Worse**
Wythe County Community Hospital	8	0	0.16	N/A	N/A	**No Conclusion**

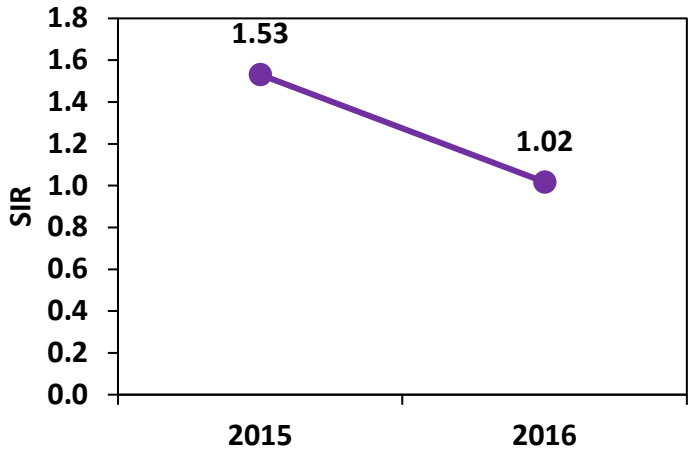
[a] When the SIR is 0, the lower bound of the 95% confidence interval cannot be calculated. However, for ease of interpretation, it can be considered 0.
If a hospital is not listed in the table, then the hospital did not perform any COLO procedures in 2016, or the procedures were excluded from the complex A/R model.

Surgical Site Infections (SSIs) – Adult Abdominal Hysterectomy (HYST) Procedures – Complex A/R Model

In 2016, 65 Virginia acute care hospitals reported performing abdominal hysterectomies on patients ≥18 years. The 2016 overall HYST SIR for Virginia hospitals was 1.02 (95% CI: 0.77, 1.32) and was not statistically significantly different from 1.00, based on the national experience from 2015.

- In 2016, 42 hospitals (65%) reported zero SSIs following HYST procedures.
- SIRs were calculated for 14 (22%) hospitals; for 51 hospitals, the SIR was not calculated because the number of predicted infections was less than 1.
- Among the hospitals that had a calculated HYST SIR, no hospitals reported an SIR statistically significantly lower than 1.00.
- Among the hospitals that had a calculated HYST SIR, only one hospital (7%) reported an SIR statistically significantly higher than 1.00.

Figure 6. SSI SIRs, Adult Abdominal Hysterectomy Procedures, Virginia, 2015-2016



Legend					
★	Fewer infections (**better**) than predicted based on the national experience*.	=	About the **same** number of infections as predicted based on the national experience.*	✖	More infections (**worse**) than predicted based on the national experience.*	**No Conclusion**	When the number of predicted infections is less than 1, no conclusion can be made.
*National experience contains data from 2015 for SSIs.							

Table 8. Surgical Site Infection (SSI) SIR Report, Adult Abdominal Hysterectomy Procedures, by Acute Care Hospital, Virginia, 2016

Hospital Name	Number of Procedures	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=65)	**8,347**	**53**	**52.11**	**1.02**	**(0.77, 1.32)**	= Same
Augusta Health	59	0	0.42	N/A	N/A	**No Conclusion**
Bon Secours DePaul Medical Center	158	0	0.78	N/A	N/A	**No Conclusion**
Bon Secours Mary Immaculate Hospital	171	0	0.89	N/A	N/A	**No Conclusion**
Bon Secours Maryview Medical Center	117	0	0.72	N/A	N/A	**No Conclusion**

Hospital Name	Number of Procedures	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=65)	**8,347**	**53**	**52.11**	**1.02**	**(0.77, 1.32)**	= Same
Bon Secours Memorial Regional Medical Center	149	0	0.90	N/A	N/A	**No Conclusion**
Bon Secours St. Francis Medical Center	266	1	1.23	0.82	(0.04, 4.02)	= Same
Bon Secours St. Mary's Hospital	481	5	2.58	1.94	(0.71, 4.30)	= Same
Carilion New River Valley Medical Center	104	0	0.48	N/A	N/A	**No Conclusion**
Carilion Roanoke Memorial Hospital	342	3	2.65	1.13	(0.29, 3.08)	= Same
Centra Bedford Memorial Hospital	3	0	0.01	N/A	N/A	**No Conclusion**
Centra Lynchburg General Hospital	2	0	0.02	N/A	N/A	**No Conclusion**
Centra Southside Community Hospital	8	0	0.06	N/A	N/A	**No Conclusion**
Centra Virginia Baptist Hospital	142	1	0.75	N/A	N/A	**No Conclusion**
Chesapeake Regional Medical Center	388	4	2.59	1.55	(0.49, 3.73)	= Same
Clinch Valley Medical Center	69	0	0.44	N/A	N/A	**No Conclusion**
Fauquier Health	33	0	0.17	N/A	N/A	**No Conclusion**
HCA CJW Medical Center Chippenham Hospital	94	2	0.59	N/A	N/A	**No Conclusion**
HCA CJW Medical Center Johnston-Willis Hospital	629	3	3.77	0.80	(0.20, 2.17)	= Same
HCA Henrico Doctors' Hospital	549	6	3.00	2.00	(0.81, 4.16)	= Same
HCA LewisGale Hospital Montgomery	22	0	0.18	N/A	N/A	**No Conclusion**
HCA LewisGale Medical Center	220	0	1.44	0.00	(., 2.08)	= Same
HCA Reston Hospital Center	104	0	0.45	N/A	N/A	**No Conclusion**
HCA Retreat Doctors' Hospital	40	0	0.24	N/A	N/A	**No Conclusion**
HCA Spotsylvania Regional Medical Center	28	0	0.15	N/A	N/A	**No Conclusion**

Hospital Name	Number of Procedures	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=65)	**8,347**	**53**	**52.11**	**1.02**	**(0.77, 1.32)**	**= Same**
HCA StoneSprings Hospital Center	1	0	0.00	N/A	N/A	**No Conclusion**
Inova Alexandria Hospital	103	0	0.52	N/A	N/A	**No Conclusion**
Inova Fair Oaks Hospital	42	0	0.23	N/A	N/A	**No Conclusion**
Inova Fairfax Medical Campus	992	5	5.94	0.84	(0.31, 1.87)	**= Same**
Inova Loudoun Hospital	102	0	0.52	N/A	N/A	**No Conclusion**
Inova Mount Vernon Hospital	3	0	0.02	N/A	N/A	**No Conclusion**
Mary Washington Hospital	129	1	0.99	N/A	N/A	**No Conclusion**
MSHA Johnston Memorial Hospital	23	0	0.15	N/A	N/A	**No Conclusion**
MSHA Norton Community Hospital	8	0	0.06	N/A	N/A	**No Conclusion**
MSHA Smyth County Community Hospital	8	0	0.05	N/A	N/A	**No Conclusion**
Novant Health UVA Health System Culpeper Medical Center	10	0	0.06	N/A	N/A	**No Conclusion**
Novant Health UVA Health System Haymarket Medical Center	26	0	0.13	N/A	N/A	**No Conclusion**
Novant Health UVA Health System Prince William Medical Center	36	0	0.21	N/A	N/A	**No Conclusion**
Riverside Doctors' Hospital Williamsburg	31	0	0.12	N/A	N/A	**No Conclusion**
Riverside Regional Medical Center	117	0	1.32	0.00	(., 2.26)	**= Same**
Riverside Shore Memorial Hospital	11	0	0.06	N/A	N/A	**No Conclusion**
Sentara CarePlex Hospital	74	1	0.46	N/A	N/A	**No Conclusion**
Sentara Halifax Regional Hospital	31	0	0.19	N/A	N/A	**No Conclusion**
Sentara Leigh Hospital	340	3	1.85	1.62	(0.41, 4.41)	**= Same**

Hospital Name	Number of Procedures	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=65)	**8,347**	**53**	**52.11**	**1.02**	**(0.77, 1.32)**	= Same
Sentara Martha Jefferson Hospital	72	1	0.34	N/A	N/A	**No Conclusion**
Sentara Norfolk General Hospital	64	0	0.77	N/A	N/A	**No Conclusion**
Sentara Northern Virginia Medical Center	79	0	0.39	N/A	N/A	**No Conclusion**
Sentara Obici Hospital	123	2	0.76	N/A	N/A	**No Conclusion**
Sentara Princess Anne Hospital	69	1	0.40	N/A	N/A	**No Conclusion**
Sentara RMH Medical Center	104	1	0.59	N/A	N/A	**No Conclusion**
Sentara Virginia Beach General Hospital	243	0	1.19	0.00	(., 2.51)	= Same
Sentara Williamsburg Regional Medical Center	24	0	0.13	N/A	N/A	**No Conclusion**
Southampton Memorial Hospital	7	0	0.04	N/A	N/A	**No Conclusion**
Southside Regional Medical Center	50	0	0.40	N/A	N/A	**No Conclusion**
SOVAH Health - Danville	45	0	0.19	N/A	N/A	**No Conclusion**
SOVAH Health - Martinsville	23	1	0.18	N/A	N/A	**No Conclusion**
Stafford Hospital	130	0	0.57	N/A	N/A	**No Conclusion**
Twin County Regional Healthcare	35	1	0.18	N/A	N/A	**No Conclusion**
UVA Medical Center	472	2	4.32	0.46	(0.08, 1.53)	= Same
VCU Community Memorial Hospital	4	0	0.04	N/A	N/A	**No Conclusion**
VCU Medical Center	176	5	1.76	2.84	(1.04, 6.30)	✖Worse
Virginia Hospital Center	230	2	1.63	1.23	(0.21, 4.06)	= Same
Warren Memorial Hospital	9	0	0.04	N/A	N/A	**No Conclusion**
Wellmont Lonesome Pine Hospital	15	1	0.09	N/A	N/A	**No Conclusion**

Hospital Name	Number of Procedures	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=65)	**8,347**	**53**	**52.11**	**1.02**	**(0.77, 1.32)**	**= Same**
Winchester Medical Center	67	1	0.51	N/A	N/A	**No Conclusion**
Wythe County Community Hospital	41	0	0.24	N/A	N/A	**No Conclusion**

[a]When the SIR is 0, the lower bound of the 95% confidence interval cannot be calculated. However, for ease of interpretation, it can be considered 0.
If a hospital is not listed in the table, then the hospital did not perform any HYST procedures in 2016, or the procedures were excluded from the complex A/R model.

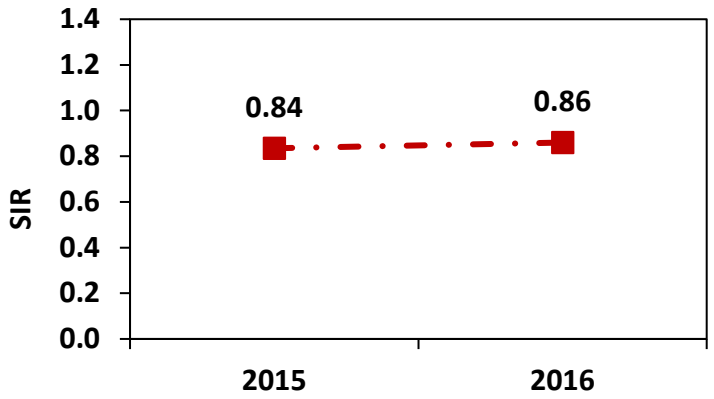
Methicillin-Resistant *Staphylococcus aureus* (MRSA) Bacteremia Laboratory-Identified Events

Methicillin-Resistant *Staphylococcus aureus* (MRSA) Bacteremia LabID Events

In 2016, 78 Virginia hospitals reported data for hospital-onset laboratory-identified MRSA bacteremia events. The 2016 overall MRSA SIR for Virginia hospitals was 0.86 (95% CI: 0.74, 0.99) and was statistically significantly lower than 1.00. This SIR indicates that the number of MRSA bacteremia events observed in Virginia was 14% lower than predicted, based on the national experience from 2015.

- Thirty-seven hospitals (47%) reported zero MRSA bacteremia LabID events in 2016.
- SIRs were calculated for 43 (55%) hospitals; for 35 hospitals, the SIR was not calculated because the number of predicted infections was less than 1.
- Among the hospitals that had a calculated MRSA bacteremia SIR, one (2%) reported an SIR statistically significantly lower than 1.00.
- Among the hospitals that had a calculated MRSA bacteremia SIR, one (2%) reported an SIR statistically significantly higher than 1.00.

Figure 7. MRSA Bacteremia SIRs, Facility-Wide Hospital-Onset LabID Events, Virginia, 2015-2016



Legend							
★	Fewer infections (**better**) than predicted based on the national experience.*	=	About the **same** number of infections as predicted based on the national experience.*	✖	More infections (**worse**) than predicted based on the national experience.*	**No Conclusion**	When the number of predicted infections is less than 1, no conclusion can be made.
*National experience contains data from 2015 for MRSA bacteremia laboratory-identified events.							

Table 9. Methicillin-Resistant Staphylococcus aureus (MRSA) Bacteremia SIR Report, Hospital-Onset Laboratory-Identified Events, by Acute Care Hospital, Virginia, 2016

Hospital Name	Months Included	Patient Days	Number of Events		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
			Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=78)	**12**	**3,453,257**	**177**	**205.81**	**0.86**	**(0.74, 0.99)**	★Better
Augusta Health	12	44,611	0	1.84	0.00	(., 1.63)	= Same
Bon Secours DePaul Medical Center	12	28,062	1	1.39	0.72	(0.04, 3.56)	= Same
Bon Secours Mary Immaculate Hospital	12	27,276	0	1.24	0.00	(., 2.42)	= Same
Bon Secours Maryview Medical Center	12	43,893	6	2.03	2.96	(1.20, 6.15)	✖Worse

Hospital Name	Months Included	Patient Days	Number of Events		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
			Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=78)	**12**	**3,453,257**	**177**	**205.81**	**0.86**	**(0.74, 0.99)**	**★Better**
Bon Secours Memorial Regional Medical Center	12	60,266	4	3.51	1.14	(0.36, 2.75)	= Same
Bon Secours Richmond Community Hospital	12	10,174	0	0.32	N/A	N/A	**No Conclusion**
Bon Secours St. Francis Medical Center	12	40,669	0	1.74	0.00	(., 1.72)	= Same
Bon Secours St. Mary's Hospital	12	90,390	7	6.56	1.07	(0.47, 2.11)	= Same
Buchanan General Hospital	12	7,414	0	0.24	N/A	N/A	**No Conclusion**
Carilion Franklin Memorial Hospital	12	5,672	0	0.15	N/A	N/A	**No Conclusion**
Carilion New River Valley Medical Center	12	24,711	1	1.38	0.72	(0.04, 3.57)	= Same
Carilion Roanoke Memorial Hospital	12	198,125	8	19.94	0.40	(0.19, 0.76)	★Better
Carilion Tazewell Community Hospital	12	2,418	0	0.04	N/A	N/A	**No Conclusion**
Centra Bedford Memorial Hospital	12	5,294	0	0.11	N/A	N/A	**No Conclusion**
Centra Lynchburg General Hospital	12	94,702	3	5.58	0.54	(0.14, 1.46)	= Same
Centra Southside Community Hospital	12	12,759	0	0.32	N/A	N/A	**No Conclusion**
Centra Virginia Baptist Hospital	12	23,170	0	0.79	N/A	N/A	**No Conclusion**
Chesapeake Regional Medical Center	12	70,455	3	2.62	1.15	(0.29, 3.12)	= Same
Clinch Valley Medical Center	12	15,454	0	0.43	N/A	N/A	**No Conclusion**
Fauquier Health	12	20,217	0	0.78	N/A	N/A	**No Conclusion**
HCA CJW Medical Center Chippenham Hospital	12	85,032	2	6.19	0.32	(0.05, 1.07)	= Same
HCA CJW Medical Center Johnston-Willis Hospital	12	62,324	1	4.70	0.21	(0.01, 1.05)	= Same
HCA Henrico Doctors' Hospital	12	79,759	7	6.95	1.01	(0.44, 1.99)	= Same

Hospital Name	Months Included	Patient Days	Number of Events		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
			Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=78)	**12**	**3,453,257**	**177**	**205.81**	**0.86**	**(0.74, 0.99)**	**★Better**
HCA John Randolph Medical Center	12	13,896	1	0.68	N/A	N/A	**No Conclusion**
HCA LewisGale Hospital Alleghany	12	11,825	1	0.67	N/A	N/A	**No Conclusion**
HCA LewisGale Hospital Montgomery	12	14,496	0	0.53	N/A	N/A	**No Conclusion**
HCA LewisGale Hospital Pulaski	12	6,114	0	0.29	N/A	N/A	**No Conclusion**
HCA LewisGale Medical Center	12	79,369	4	5.31	0.75	(0.24, 1.82)	= Same
HCA Parham Doctors' Hospital	12	18,495	0	1.14	0.00	(., 2.63)	= Same
HCA Reston Hospital Center	12	55,042	2	2.01	1.00	(0.17, 3.29)	= Same
HCA Retreat Doctors' Hospital	12	9,255	2	0.53	N/A	N/A	**No Conclusion**
HCA Spotsylvania Regional Medical Center	12	20,138	3	0.82	N/A	N/A	**No Conclusion**
HCA StoneSprings Hospital Center	12	4,003	0	0.12	N/A	N/A	**No Conclusion**
Inova Alexandria Hospital	12	61,749	3	2.59	1.16	(0.30, 3.16)	= Same
Inova Fair Oaks Hospital	12	46,007	3	1.54	1.95	(0.50, 5.32)	= Same
Inova Fairfax Medical Campus	12	253,120	17	17.12	0.99	(0.60, 1.56)	= Same
Inova Loudoun Hospital	12	48,536	0	2.14	0.00	(., 1.40)	= Same
Inova Mount Vernon Hospital	12	31,597	1	1.46	0.69	(0.03, 3.38)	= Same
Mary Washington Hospital	12	108,766	3	5.67	0.53	(0.14, 1.44)	= Same
MSHA Johnston Memorial Hospital	12	33,718	0	1.34	0.00	(., 2.24)	= Same
MSHA Norton Community Hospital	12	11,651	0	0.53	N/A	N/A	**No Conclusion**
MSHA Russell County Medical Center	12	4,269	0	0.10	N/A	N/A	**No Conclusion**

Hospital Name	Months Included	Patient Days	Number of Events		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
			Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=78)	**12**	**3,453,257**	**177**	**205.81**	**0.86**	**(0.74, 0.99)**	**★Better**
MSHA Smyth County Community Hospital	12	5,221	0	0.11	N/A	N/A	**No Conclusion**
Novant Health UVA Health System Culpeper Medical Center	12	15,201	1	0.51	N/A	N/A	**No Conclusion**
Novant Health UVA Health System Haymarket Medical Center	12	7,922	0	0.39	N/A	N/A	**No Conclusion**
Novant Health UVA Health System Prince William Medical Center	12	23,788	1	1.17	0.86	(0.04, 4.22)	**= Same**
Riverside Doctors' Hospital Williamsburg	12	5,724	0	0.18	N/A	N/A	**No Conclusion**
Riverside Regional Medical Center	12	89,138	4	6.14	0.65	(0.21, 1.57)	**= Same**
Riverside Shore Memorial Hospital	12	11,707	0	0.29	N/A	N/A	**No Conclusion**
Riverside Tappahannock Hospital	12	6,655	0	0.30	N/A	N/A	**No Conclusion**
Riverside Walter Reed Hospital	12	12,465	2	0.50	N/A	N/A	**No Conclusion**
Sentara CarePlex Hospital	12	38,570	1	2.14	0.47	(0.02, 2.30)	**= Same**
Sentara Halifax Regional Hospital	12	15,465	0	0.54	N/A	N/A	**No Conclusion**
Sentara Leigh Hospital	12	68,261	2	3.29	0.61	(0.10, 2.01)	**= Same**
Sentara Martha Jefferson Hospital	12	41,887	0	1.40	0.00	(., 2.15)	**= Same**
Sentara Norfolk General Hospital	12	154,803	11	11.68	0.94	(0.50, 1.64)	**= Same**
Sentara Northern Virginia Medical Center	12	42,592	1	1.65	0.61	(0.03, 2.99)	**= Same**
Sentara Obici Hospital	12	37,107	0	1.75	0.00	(., 1.71)	**= Same**
Sentara Princess Anne Hospital	12	57,166	1	2.14	0.47	(0.02, 2.30)	**= Same**
Sentara RMH Medical Center	12	45,820	0	1.82	0.00	(., 1.65)	**= Same**
Sentara Virginia Beach General Hospital	12	61,175	3	3.23	0.93	(0.24, 2.53)	**= Same**

Hospital Name	Months Included	Patient Days	Number of Events		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
			Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=78)	**12**	**3,453,257**	**177**	**205.81**	**0.86**	**(0.74, 0.99)**	**★Better**
Sentara Williamsburg Regional Medical Center	12	28,253	0	1.12	0.00	(., 2.69)	= Same
Southampton Memorial Hospital	12	5,866	0	0.19	N/A	N/A	**No Conclusion**
Southern Virginia Regional Medical Center	12	6,322	0	0.22	N/A	N/A	**No Conclusion**
Southside Regional Medical Center	12	59,279	4	2.32	1.72	(0.55, 4.16)	= Same
SOVAH Health - Danville	12	32,094	3	2.12	1.41	(0.36, 3.85)	= Same
SOVAH Health - Martinsville	12	24,755	3	1.06	2.82	(0.72, 7.67)	= Same
Stafford Hospital	12	18,274	1	0.36	N/A	N/A	**No Conclusion**
Twin County Regional Healthcare	12	10,674	0	0.30	N/A	N/A	**No Conclusion**
UVA Medical Center	12	171,426	18	11.98	1.50	(0.92, 2.33)	= Same
VCU Community Memorial Hospital	12	16,120	2	0.81	N/A	N/A	**No Conclusion**
VCU Medical Center	12	219,293	23	18.88	1.22	(0.79, 1.80)	= Same
Virginia Hospital Center	12	98,224	5	5.93	0.84	(0.31, 1.87)	= Same
Warren Memorial Hospital	12	8,283	0	0.41	N/A	N/A	**No Conclusion**
Wellmont Lonesome Pine Hospital	12	3,439	0	0.10	N/A	N/A	**No Conclusion**
Wellmont Mountain View Regional Medical Center	12	3,700	0	0.09	N/A	N/A	**No Conclusion**
Winchester Medical Center	12	113,458	8	7.00	1.14	(0.53, 2.17)	= Same
Wythe County Community Hospital	12	8,237	0	0.24	N/A	N/A	**No Conclusion**

[a]When the SIR is 0, the lower bound of the 95% confidence interval cannot be calculated. However, for ease of interpretation, it can be considered 0.

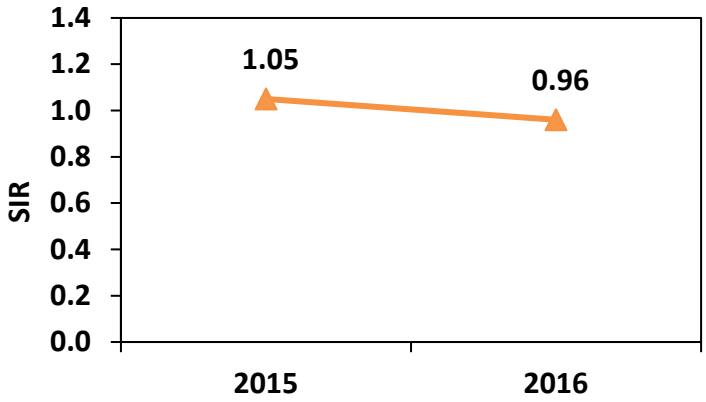
Clostridium difficile Laboratory-Identified Events

Clostridium difficile Hospital-Onset LabID Events

In 2016, 78 Virginia hospitals reported data for hospital-onset laboratory-identified *C. difficile* events. The 2016 overall *C. difficile* SIR for Virginia hospitals was 0.96 (95% CI: 0.93, 1.00) and was not statistically significantly different from 1.00, based on the national experience from 2015.

- Five hospitals (6%) reported zero *C. difficile* laboratory-identified events in 2016.
- SIRs were calculated for 76 (97%) hospitals; for two hospitals, the SIR was not calculated because the number of predicted infections was less than 1.
- Among the hospitals that had a calculated *C. difficile* SIR, 15 (20%) reported an SIR statistically significantly lower than 1.00.
- Among the hospitals that had a calculated *C. difficile* SIR, 10 (13%) reported an SIR statistically significantly higher than 1.00.

Figure 8. *C. difficile* SIRs, Facility-Wide Hospital-Onset LabID Events, Virginia, 2015-2016



Legend					
★	Fewer infections (**better**) than predicted based on the national experience.*	=	About the **same** number of infections as predicted based on the national experience.*	✖	More infections (**worse**) than predicted based on the national experience.*
No Conclusion	When the number of predicted infections is less than 1, no conclusion can be made.				
*National experience contains data from 2015 for *C. difficile* laboratory-identified events.					

Table 10. *Clostridium difficile* SIR Report, Hospital-Onset Laboratory-Identified Events, by Acute Care Hospital, Virginia, 2016

Hospital Name	Months Included	Patient Days	Number of Events		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
			Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=78)	**12**	**3,146,854**	**2,312**	**2,400.26**	**0.96**	**(0.93, 1.00)**	= Same
Augusta Health	12	41,711	23	31.83	0.72	(0.47, 1.07)	= Same
Bon Secours DePaul Medical Center	12	25,116	7	18.24	0.38	(0.17, 0.76)	★Better
Bon Secours Mary Immaculate Hospital	12	23,325	11	13.57	0.81	(0.43, 1.41)	= Same
Bon Secours Maryview Medical Center	12	42,356	13	31.90	0.41	(0.23, 0.68)	★Better

Hospital Name	Months Included	Patient Days	Number of Events		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
			Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=78)	**12**	**3,146,854**	**2,312**	**2,400.26**	**0.96**	**(0.93, 1.00)**	= Same
Bon Secours Memorial Regional Medical Center	12	56,422	14	37.23	0.38	(0.21, 0.62)	★Better
Bon Secours Richmond Community Hospital	12	10,174	1	5.26	0.19	(0.01, 0.94)	★Better
Bon Secours St. Francis Medical Center	12	34,621	7	25.55	0.27	(0.12, 0.54)	★Better
Bon Secours St. Mary's Hospital	12	90,390	34	69.35	0.49	(0.35, 0.68)	★Better
Buchanan General Hospital	12	7,414	0	2.74	0.00	(., 1.09)	= Same
Carilion Franklin Memorial Hospital	12	5,672	2	2.24	0.89	(0.15, 2.95)	= Same
Carilion New River Valley Medical Center	12	21,760	25	22.62	1.11	(0.73, 1.61)	= Same
Carilion Roanoke Memorial Hospital	12	177,809	182	151.75	1.20	(1.03, 1.38)	✖Worse
Carilion Tazewell Community Hospital	12	2,418	1	0.81	N/A	N/A	**No Conclusion**
Centra Bedford Memorial Hospital	12	5,294	4	2.47	1.62	(0.51, 3.90)	= Same
Centra Lynchburg General Hospital	12	94,702	63	79.32	0.79	(0.62, 1.01)	= Same
Centra Southside Community Hospital	12	12,079	9	7.67	1.17	(0.57, 2.15)	= Same
Centra Virginia Baptist Hospital	12	14,440	1	6.47	0.15	(0.01, 0.76)	★Better
Chesapeake Regional Medical Center	12	64,430	63	48.53	1.30	(1.01, 1.65)	✖Worse
Clinch Valley Medical Center	12	14,647	1	5.31	0.19	(0.01, 0.93)	★Better
Fauquier Health	12	18,605	8	13.05	0.61	(0.29, 1.16)	= Same
HCA CJW Medical Center Chippenham Hospital	12	78,856	89	71.52	1.24	(1.01, 1.52)	✖Worse
HCA CJW Medical Center Johnston-Willis Hospital	12	55,467	50	45.81	1.09	(0.82, 1.43)	= Same
HCA Henrico Doctors' Hospital	12	63,382	45	47.63	0.95	(0.70, 1.25)	= Same

Hospital Name	Months Included	Patient Days	Number of Events		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
			Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=78)	**12**	**3,146,854**	**2,312**	**2,400.26**	**0.96**	**(0.93, 1.00)**	= Same
HCA John Randolph Medical Center	12	13,896	14	6.90	2.03	(1.15, 3.32)	✖Worse
HCA LewisGale Hospital Alleghany	12	11,825	21	18.99	1.11	(0.70, 1.66)	= Same
HCA LewisGale Hospital Montgomery	12	14,399	10	12.92	0.77	(0.39, 1.38)	= Same
HCA LewisGale Hospital Pulaski	12	6,114	9	3.85	2.34	(1.14, 4.29)	✖Worse
HCA LewisGale Medical Center	12	76,628	83	58.21	1.43	(1.14, 1.76)	✖Worse
HCA Parham Doctors' Hospital	12	18,495	10	12.71	0.79	(0.40, 1.40)	= Same
HCA Reston Hospital Center	12	45,449	27	30.50	0.89	(0.60, 1.27)	= Same
HCA Retreat Doctors' Hospital	12	9,255	7	4.65	1.51	(0.66, 2.98)	= Same
HCA Spotsylvania Regional Medical Center	12	18,517	12	11.30	1.06	(0.58, 1.81)	= Same
HCA StoneSprings Hospital Center	12	3,626	2	2.34	0.86	(0.14, 2.83)	= Same
Inova Alexandria Hospital	12	58,495	35	38.96	0.90	(0.64, 1.24)	= Same
Inova Fair Oaks Hospital	12	41,434	21	28.22	0.74	(0.47, 1.12)	= Same
Inova Fairfax Medical Campus	12	208,373	124	171.90	0.72	(0.60, 0.86)	★Better
Inova Loudoun Hospital	12	40,760	16	27.30	0.59	(0.35, 0.93)	★Better
Inova Mount Vernon Hospital	12	31,597	12	19.07	0.63	(0.34, 1.07)	= Same
Mary Washington Hospital	12	99,289	75	99.24	0.76	(0.60, 0.94)	★Better
MSHA Johnston Memorial Hospital	12	31,710	22	18.76	1.17	(0.75, 1.75)	= Same
MSHA Norton Community Hospital	12	10,941	2	6.73	0.30	(0.05, 0.98)	★Better
MSHA Russell County Medical Center	12	3,847	1	1.92	0.52	(0.03, 2.57)	= Same

Hospital Name	Months Included	Patient Days	Number of Events		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
			Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=78)	**12**	**3,146,854**	**2,312**	**2,400.26**	**0.96**	**(0.93, 1.00)**	= Same
MSHA Smyth County Community Hospital	12	5,221	0	1.52	0.00	(., 1.97)	= Same
Novant Health UVA Health System Culpeper Medical Center	12	13,943	3	7.75	0.39	(0.10, 1.05)	= Same
Novant Health UVA Health System Haymarket Medical Center	12	6,602	2	3.83	0.52	(0.09, 1.73)	= Same
Novant Health UVA Health System Prince William Medical Center	12	18,324	8	15.09	0.53	(0.25, 1.01)	= Same
Riverside Doctors' Hospital Williamsburg	12	5,724	4	3.45	1.16	(0.37, 2.80)	= Same
Riverside Regional Medical Center	12	79,996	53	55.31	0.96	(0.73, 1.24)	= Same
Riverside Shore Memorial Hospital	12	11,139	4	4.28	0.94	(0.30, 2.26)	= Same
Riverside Tappahannock Hospital	12	6,655	4	3.27	1.22	(0.39, 2.95)	= Same
Riverside Walter Reed Hospital	12	12,465	6	8.04	0.75	(0.30, 1.55)	= Same
Sentara CarePlex Hospital	12	38,570	24	32.79	0.73	(0.48, 1.07)	= Same
Sentara Halifax Regional Hospital	12	14,594	8	13.21	0.61	(0.28, 1.15)	= Same
Sentara Leigh Hospital	12	63,293	45	44.42	1.01	(0.75, 1.34)	= Same
Sentara Martha Jefferson Hospital	12	38,352	17	21.90	0.78	(0.47, 1.22)	= Same
Sentara Norfolk General Hospital	12	136,441	90	101.60	0.89	(0.72, 1.08)	= Same
Sentara Northern Virginia Medical Center	12	38,292	18	20.73	0.87	(0.53, 1.35)	= Same
Sentara Obici Hospital	12	33,710	15	23.43	0.64	(0.37, 1.03)	= Same
Sentara Princess Anne Hospital	12	48,545	37	35.92	1.03	(0.74, 1.41)	= Same
Sentara RMH Medical Center	12	45,820	39	29.16	1.34	(0.96, 1.81)	= Same
Sentara Virginia Beach General Hospital	12	61,175	49	50.59	0.97	(0.72, 1.27)	= Same

Hospital Name	Months Included	Patient Days	Number of Events		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
			Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=78)	**12**	**3,146,854**	**2,312**	**2,400.26**	**0.96**	**(0.93, 1.00)**	= Same
Sentara Williamsburg Regional Medical Center	12	26,122	6	15.03	0.40	(0.16, 0.83)	★Better
Southampton Memorial Hospital	12	5,866	2	2.05	0.97	(0.16, 3.22)	= Same
Southern Virginia Regional Medical Center	12	6,322	0	2.34	0.00	(., 1.28)	= Same
Southside Regional Medical Center	12	58,778	69	44.10	1.57	(1.23, 1.97)	✖Worse
SOVAH Health - Danville	12	30,690	39	55.45	0.70	(0.51, 0.95)	★Better
SOVAH Health - Martinsville	12	23,956	20	19.08	1.05	(0.66, 1.59)	= Same
Stafford Hospital	12	15,893	7	14.51	0.48	(0.21, 0.95)	★Better
Twin County Regional Healthcare	12	10,092	6	6.39	0.94	(0.38, 1.95)	= Same
UVA Medical Center	12	157,386	186	121.89	1.53	(1.32, 1.76)	✖Worse
VCU Community Memorial Hospital	12	16,120	6	5.65	1.06	(0.43, 2.21)	= Same
VCU Medical Center	12	202,617	221	168.38	1.31	(1.15, 1.49)	✖Worse
Virginia Hospital Center	12	81,779	53	59.30	0.89	(0.68, 1.16)	= Same
Warren Memorial Hospital	12	7,527	5	4.59	1.09	(0.40, 2.42)	= Same
Wellmont Lonesome Pine Hospital	12	3,439	0	0.83	N/A	N/A	**No Conclusion**
Wellmont Mountain View Regional Medical Center	12	3,700	0	2.25	0.00	(., 1.33)	= Same
Winchester Medical Center	12	104,100	107	82.47	1.30	(1.07, 1.56)	✖Worse
Wythe County Community Hospital	12	7,866	3	4.36	0.69	(0.18, 1.87)	= Same

[a]When the SIR is 0, the lower bound of the 95% confidence interval cannot be calculated. However, for ease of interpretation, it can be considered 0.

Healthcare Personnel Influenza Vaccination

Reading Guide for the Influenza Vaccination Table

Percentage of all healthcare personnel for each hospital that received the influenza vaccination (includes employees, licensed independent practitioners, and adult students/trainees and volunteers)

Statewide aggregate data are found in the first row of each page.

Hospital Name	Percentage of All Healthcare Personnel Vaccinated[a]	Comparison P-value[b]	How Does This Hospital Compare to the Healthy People 2020 Goal?[c]
All Virginia Acute Care Hospitals[d]	**87.5%**	0.038	✖ Worse
Hospital A	93.0%	0.024	★ Better
Hospital B	75.5%	0.001	✖ Worse
Hospital C	90.0%	0.132	= Same
Hospital D	91.5%	0.043	★ Better

*The 2016-2017 influenza season was from October 1, 2016 – March 31, 2017.
[a] Healthcare personnel includes employees, licensed independent practitioners, and adult students/trainees and volunteers. Contract personnel are excluded from all categories.
[b] Two-sided p-value ≤ 0.05 is considered statistically significant.
[c] The Healthy People 2020 goal for healthcare personnel influenza vaccination in the United States is 90%. For more information about the healthcare personnel vaccination goal, see Appendix A.
[d] The statewide healthcare personnel influenza vaccination percentage was calculated using pooled means. For further explanation of the calculation, see the Healthcare Personnel Influenza Vaccination section in the methods.

Example: Hospital B

Percent Vaccinated	P-value	Healthy People 2020 Goal
75.5%	0.001	✖ Worse

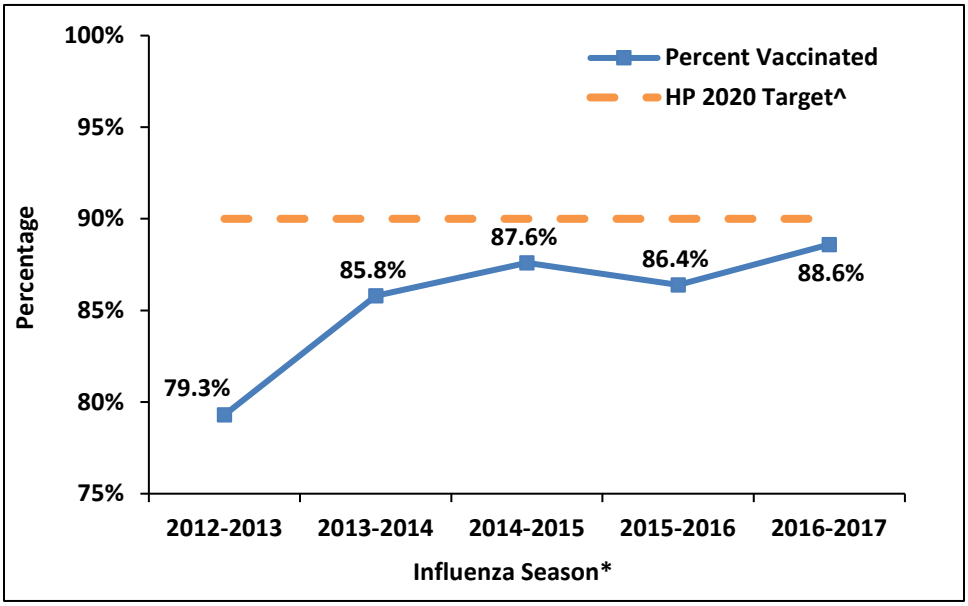
- 75.5% received influenza vaccination during this flu season.
- Did not reach Healthy People 2020 Goal (90%).
- Hospital B's vaccination percentage was significantly lower than Healthy People 2020 Goal (p-value <0.05).

Legend		
★ Vaccination is higher (**better**) than the Healthy People 2020 Goal.	= Vaccination is **similar** to the Healthy People 2020 Goal.	✖ Vaccination is lower (**worse**) than the Healthy People 2020 Goal.

For an explanation of each variable, see: Appendix D. Variable Definitions.

Influenza Vaccination Data

Figure 9. Healthcare Personnel Vaccination by Influenza Season, Virginia Acute Care Hospitals



*An influenza season is from October 1st through March 31st of the following year.

^The HHS Healthy People 2020 goal for healthcare personnel influenza vaccination in the United States is 90%.

For the 2016-2017 influenza season (n=78 acute care hospitals):

- The 2016-2017 overall healthcare personnel vaccination percentage for Virginia was **88.6%**, which was significantly lower than the Healthy People 2020 goal of 90.0%. Hospital vaccination percentages ranged from 55.9% to 99.7%.
    - Thirty-nine (50%) Virginia acute care hospitals had a healthcare personnel vaccination percentage significantly higher than the 90.0% goal.
    - Thirty-one (40%) Virginia acute care hospitals had a healthcare personnel vaccination percentage significantly lower than the 90.0% goal.
- In Virginia, 45 acute care hospitals (58%) met or exceeded the 90.0% goal.

For the 2015-2016 influenza season (n=77 acute care hospitals):

- Hospital vaccination percentages ranged from 46.2% to 99.5%
- 40 acute care hospitals (52%) met or exceeded the 90.0% goal

For the 2014-2015 influenza season (n=77 acute care hospitals):

- Hospital vaccination percentages ranged from 62.6% to 99.4%
- 41 acute care hospitals (53%) met or exceeded the 90.0% goal

For the 2013-2014 influenza season (n=75 acute care hospitals):

- Hospital vaccination percentages ranged from 57.0% to 100%
- 32 acute care hospitals (43%) met or exceeded the 90.0% goal

For the 2012-2013 influenza season (n=73 acute care hospitals):

- Hospital vaccination percentages ranged from 27.5% to 99.1%
- 16 acute care hospitals (22%) met or exceeded the 90.0% goal

Legend					
★	Vaccination is higher (**better**) than the Healthy People 2020 Goal.	=	Vaccination is **similar** to the Healthy People 2020 Goal.	✖	Vaccination is lower (**worse**) than the Healthy People 2020 Goal.

Table 11. Healthcare Personnel Influenza Vaccination Percentages, by Acute Care Hospital, Virginia, 2016-2017 Influenza Season*

Hospital Name	Percentage (%) of All Healthcare Personnel Vaccinated[a]	Comparison P-value[b]	How Does This Hospital Compare to the Healthy People 2020 Goal?[c]
All Virginia Acute Care Hospitals[d] (n=78)	**88.6%**	**<0.001**	✖Worse
Augusta Health	55.9%	<0.001	✖Worse
Bon Secours DePaul Medical Center	92.1%	0.004	★Better
Bon Secours Mary Immaculate Hospital	86.3%	<0.001	✖Worse
Bon Secours Maryview Medical Center	76.6%	<0.001	✖Worse
Bon Secours Memorial Regional Medical Center	95.5%	<0.001	★Better
Bon Secours Richmond Community Hospital	95.8%	<0.001	★Better
Bon Secours St. Francis Medical Center	96.6%	<0.001	★Better
Bon Secours St. Mary's Hospital	97.4%	<0.001	★Better
Buchanan General Hospital	92.3%	0.182	= Same
Carilion Franklin Memorial Hospital	74.4%	<0.001	✖Worse
Carilion New River Valley Medical Center	74.1%	<0.001	✖Worse
Carilion Roanoke Memorial Hospital	74.3%	<0.001	✖Worse
Carilion Tazewell Community Hospital	73.4%	<0.001	✖Worse
Centra Bedford Memorial Hospital	99.7%	<0.001	★Better
Centra Lynchburg General Hospital	99.2%	<0.001	★Better
Centra Southside Community Hospital	99.0%	<0.001	★Better
Centra Virginia Baptist Hospital	98.8%	<0.001	★Better
Chesapeake Regional Medical Center	97.3%	<0.001	★Better
Clinch Valley Medical Center	98.1%	<0.001	★Better
Fauquier Health	84.7%	<0.001	✖Worse
HCA CJW Medical Center Chippenham Hospital	90.0%	0.978	= Same
HCA CJW Medical Center Johnston-Willis Hospital	93.6%	<0.001	★Better
HCA Henrico Doctors' Hospital	82.2%	<0.001	✖Worse
HCA John Randolph Medical Center	77.8%	<0.001	✖Worse
HCA LewisGale Hospital Alleghany	84.1%	<0.001	✖Worse
HCA LewisGale Hospital Montgomery	91.5%	0.167	= Same
HCA LewisGale Hospital Pulaski	96.4%	<0.001	★Better
HCA LewisGale Medical Center	81.7%	<0.001	✖Worse

Hospital Name	Percentage (%) of All Healthcare Personnel Vaccinated[a]	Comparison P-value[b]	How Does This Hospital Compare to the Healthy People 2020 Goal?[c]
All Virginia Acute Care Hospitals[d] (n=78)	**88.6%**	**<0.001**	✖Worse
HCA Parham Doctors' Hospital	77.5%	<0.001	✖Worse
HCA Reston Hospital Center	61.4%	<0.001	✖Worse
HCA Retreat Doctors' Hospital	90.1%	0.965	= Same
HCA Spotsylvania Regional Medical Center	70.6%	<0.001	✖Worse
HCA StoneSprings Hospital Center	63.1%	<0.001	✖Worse
Inova Alexandria Hospital	97.5%	<0.001	★Better
Inova Fair Oaks Hospital	95.8%	<0.001	★Better
Inova Fairfax Medical Campus	96.8%	<0.001	★Better
Inova Loudoun Hospital	98.2%	<0.001	★Better
Inova Mount Vernon Hospital	96.7%	<0.001	★Better
Mary Washington Hospital	90.1%	0.836	= Same
MSHA Johnston Memorial Hospital	99.1%	<0.001	★Better
MSHA Norton Community Hospital	97.2%	<0.001	★Better
MSHA Russell County Medical Center	97.6%	<0.001	★Better
MSHA Smyth County Community Hospital	98.2%	<0.001	★Better
Novant Health UVA Health System Culpeper Medical Center	93.3%	<0.001	★Better
Novant Health UVA Health System Haymarket Medical Center	94.9%	<0.001	★Better
Novant Health UVA Health System Prince William Medical Center	97.1%	<0.001	★Better
Riverside Doctors' Hospital Williamsburg	98.6%	<0.001	★Better
Riverside Regional Medical Center	98.2%	<0.001	★Better
Riverside Shore Memorial Hospital	97.1%	<0.001	★Better
Riverside Tappahannock Hospital	95.1%	<0.001	★Better
Riverside Walter Reed Hospital	94.3%	<0.001	★Better
Sentara CarePlex Hospital	81.5%	<0.001	✖Worse
Sentara Halifax Regional Hospital	84.6%	<0.001	✖Worse
Sentara Leigh Hospital	72.4%	<0.001	✖Worse
Sentara Martha Jefferson Hospital	90.1%	0.920	= Same
Sentara Norfolk General Hospital	77.8%	<0.001	✖Worse
Sentara Northern Virginia Medical Center	79.5%	<0.001	✖Worse
Sentara Obici Hospital	83.4%	<0.001	✖Worse
Sentara Princess Anne Hospital	82.8%	<0.001	✖Worse
Sentara RMH Medical Center	92.7%	<0.001	★Better
Sentara Virginia Beach General Hospital	78.2%	<0.001	✖Worse

Hospital Name	Percentage (%) of All Healthcare Personnel Vaccinated[a]	Comparison P-value[b]	How Does This Hospital Compare to the Healthy People 2020 Goal?[c]
All Virginia Acute Care Hospitals[d] (n=78)	**88.6%**	**<0.001**	✖Worse
Sentara Williamsburg Regional Medical Center	83.4%	<0.001	✖Worse
Southampton Memorial Hospital	65.3%	<0.001	✖Worse
Southern Virginia Regional Medical Center	70.7%	<0.001	✖Worse
Southside Regional Medical Center	72.8%	<0.001	✖Worse
SOVAH Health - Danville	88.2%	0.017	✖Worse
SOVAH Health - Martinsville	96.6%	<0.001	★Better
Stafford Hospital	88.6%	0.109	= Same
Twin County Regional Healthcare	81.2%	<0.001	✖Worse
UVA Medical Center	93.9%	<0.001	★Better
VCU Community Memorial Hospital	99.2%	<0.001	★Better
VCU Medical Center	92.6%	<0.001	★Better
Virginia Hospital Center	97.0%	<0.001	★Better
Warren Memorial Hospital	89.5%	0.656	= Same
Wellmont Lonesome Pine Hospital	98.9%	<0.001	★Better
Wellmont Mountain View Regional Medical Center	99.3%	<0.001	★Better
Winchester Medical Center	91.2%	0.006	★Better
Wythe County Community Hospital	86.0%	0.009	✖Worse

*The 2016-2017 influenza season was from October 1, 2016 – March 31, 2017.

[a] Healthcare personnel includes employees, licensed independent practitioners, and adult students/trainees and volunteers. Contract personnel are excluded from all categories.

[b] Two-sided p-value ≤0.05 is considered statistically significant.

[c] The Healthy People 2020 goal for healthcare personnel influenza vaccination in the United States is 90%. For more information about the healthcare personnel vaccination goal, see Appendix A.

[d] The statewide healthcare personnel influenza vaccination percentage was calculated using pooled means. For further explanation of the calculation, see the Healthcare Personnel Influenza Vaccination section in the methods.

CONCLUSIONS

This publication summarizes HAI data reported to the Virginia Department of Health from 78 of Virginia's acute care hospitals. These healthcare facilities account for over 3,000,000 patient days annually and approximately 16,000 inpatient beds. The analyses in this report revealed that in 2016, Virginia's hospitals showed improvement in preventing HAIs, as compared to national baseline data.

This is the first report publically released by VDH where SIRs were calculated using national baseline data from 2015. The 2015 baseline serves as the new "reference point" for comparing progress, and the Centers for Disease Control and Prevention expected hospital SIRs would increase and shift closer to 1.0. Hospitals should take the updated baseline and updated risk models into consideration when measuring incidence of an infection in their facility, reviewing their data and reporting to various entities, and when trending hospital HAI data over time. For example, SIRs calculated under two different baseline periods should not be compared to each other, as each of those SIRs were calculated using different national incidence and risk adjustment methods.

In aggregate, Virginia hospitals reported statistically significantly fewer CLABSI and MRSA bacteremia laboratory-identified events in 2016 than were predicted; the greatest reductions from baseline were observed for CLABSI (24% decrease). In 2016, no HAIs in the state as a whole were statistically above the national baseline. For each HAI except *C. difficile* laboratory-identified events, many hospitals in Virginia observed zero infections in 2016. More than half of Virginia's hospitals met the Department of Health and Human Services Healthy People 2020 goal for healthcare personnel influenza vaccination. These are accomplishments to be celebrated.

However, despite these successes, room for improvement remains. Compared to the 2015 national baseline, no significant change in CAUTIs, SSIs following adult colon surgeries or abdominal hysterectomies, or *C. difficile* laboratory-identified events was observed in Virginia in 2016.

In 2015, the Virginia HAI Advisory Group identified CAUTI and *C. difficile* as the two infection priority areas for the state due to their morbidity, preventability and the opportunity for improvement. The HAI Advisory Group's members represent multidisciplinary organizations that span the continuum of healthcare. The group meets quarterly to assure that Virginia is working toward state and federal HAI prevention goals and that Virginia's healthcare facilities have the education and tools to implement evidence-based strategies to prevent HAIs. This work is accomplished by focusing on initiatives that address the promotion of antibiotic stewardship, communication and education, and using data for action.

In addition to working within the HAI Advisory Group to drive change, the VDH HAI/AR Program continues to conduct HAI surveillance, investigation, and prevention activities in partnership with internal and external stakeholders. This includes tracking and publishing HAI data, implementing HAI prevention collaboratives with organizations such as the Virginia Hospital & Healthcare Association and Health Quality Innovators (the state Quality Innovation Network/Quality Improvement Organization), developing educational materials for healthcare consumers and providers, communicating directly with infection prevention staff to share the latest evidence-based guidelines and recommendations, and targeting prevention efforts using the Targeted Assessment for Prevention (TAP) Strategy.

Although this report only includes information on a subset of HAIs in the state, the information provided in this report can be used as an important indicator of healthcare quality and infection prevention progress in Virginia hospitals. The data in this report should be used by healthcare providers, administrators, public health professionals, and other organizations, to target and improve infection prevention efforts in hospitals throughout the Commonwealth. Preventing HAIs requires a coordinated, team approach; data can be an important catalyst to drive action and ultimately help save lives and make our healthcare facilities safer.

For a more concise version of this report with summary tables, please see the 2016 Virginia HAI Report for Consumers.

For questions regarding the data presented or to provide feedback on the report, please contact the VDH HAI/AR team at hai@vdh.virginia.gov.

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    - Mid-Atlantic Renal Coalition
    - Health Quality Innovators (HQI)
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    - Virginia Hospital & Healthcare Association (VHHA)
    - Virginia Rural Health Association
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    - Hospital administrators
    - Infection Preventionists
    - Pharmacists
    - Physicians with expertise in infectious disease epidemiology
    - Quality improvement experts
    - Representatives from long-term care facilities
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APPENDICES

Appendix A. Guide to Understanding Healthcare Personnel Influenza Vaccination

Influenza, or "the flu," is a mild to severe respiratory illness caused by the influenza virus. It is a contagious illness, spread from person to person through droplets. If healthcare personnel become infected with the flu, they can spread this illness to their coworkers and patients. Some patients in a hospital are at high risk for complications from the flu, such as the elderly, very young, or those with severe chronic illnesses or immunosuppressive conditions. Extra care should be taken to prevent the spread of the flu among healthcare personnel and patients.

The best way to prevent influenza is by getting vaccinated. The Centers for Disease Control and Prevention (CDC) recommends that all healthcare personnel who work in a healthcare setting receive the flu vaccine each year to help prevent the spread of influenza within the workplace. Healthcare personnel include all facility employees, licensed independent practitioners, adult students/trainees, and volunteers regardless of full time/part time status, clinical responsibility or patient contact. **Studies show that patients benefit when healthcare personnel get vaccinated.**

Many hospitals choose to provide the flu vaccine to their employees, and some hospitals even have policies requiring mandatory vaccination. Currently, there are no state regulations requiring vaccination of healthcare personnel in Virginia, and healthcare personnel are able to decline the flu vaccine.

This report shows the percentage of all healthcare personnel in each hospital who received the flu vaccine. Higher percentages are better, because this indicates that a greater number of healthcare personnel are protected against the flu. For the 2016-2017 flu season, Virginia's overall vaccination percentage was 88.6%. The U.S. Department of Health and Human Services (HHS) Healthy People 2020 goal for healthcare personnel flu vaccination in the United States is 90%. In Virginia, 58% of hospitals met this goal for the 2016-2017 flu season.

For more information about the CDC recommendations and the national trends of influenza vaccination coverage, see: http://www.cdc.gov/flu/healthcareworkers.htm

For more information about the HHS Healthy People 2020 goal for healthcare personnel flu vaccination, see: https://www.healthypeople.gov/2020/topics-objectives/topic/immunization-and-infectious-diseases/objectives

Appendix B. What Healthcare Providers Can Do to Prevent Infections

To prevent *all* infections:

- Follow standard and transmission-based precautions meticulously, use appropriate personal protective equipment, and perform hand hygiene as indicated.
- Ensure that all medical devices and equipment are cleaned, disinfected, sterilized, and/or discarded appropriately.
- Ensure the environment of care is maintained appropriately.
- Speak up if you see co-workers who are not following appropriate infection prevention measures.
- Ensure that information about infection and colonization is communicated during transitions of care.

To prevent central line-associated bloodstream infections (CLABSIs) and catheter-associated urinary tract infections (CAUTIs):

- Follow recommended device insertion practices.
- Follow recommended device maintenance practices.
- Every day, evaluate whether the device is still needed. Ensure it is removed as soon as it is no longer needed.

To prevent surgical site infections:

- Follow a safe surgery checklist before, during, and after surgery.
- When indicated, give an antibiotic before surgery. Make sure the dose is appropriate and the drug is discontinued in a timely manner.
- Follow recommendations for hand hygiene, personal protective equipment, and antiseptic skin preparation.
- Post-discharge, provide the patient with wound care instructions and education on symptoms of infection.

To prevent *Clostridium difficile* infections:

- Use antibiotics judiciously.
- Implement contact precautions for patients with known or suspected *C. difficile* infection.
- Ensure proper cleaning and disinfection of the environment.

To prevent methicillin-resistant *Staphylococcus aureus* (MRSA) infections:

- Ensure compliance with contact precautions for MRSA-colonized and infected patients.
- Ensure proper cleaning and disinfection of the environment.
- Implement an alert system to enable prompt notification of laboratory-identified or readmitted patients with MRSA to allow timely initiation of control measures.

To prevent influenza infections:

- Promote good respiratory hygiene practices.
- Encourage people in common areas who have respiratory symptoms to distance themselves from others or wear a surgical mask, if they are able to tolerate it.
- Implement droplet precautions for patients with influenza.
- Administer antiviral treatment and chemoprophylaxis to patients and healthcare personnel when appropriate.
- If sick with flu-like illness, stay home for at least 24 hours after fever subsides and limit contact with other people.

For more information on HAI prevention strategies, see: http://www.vdh.virginia.gov/surveillance-and-investigation/hai/ and www.cdc.gov/hai

Appendix C. Hospital Characteristics

A summary of statewide Virginia hospital characteristics with descriptions can be found in Table 2.

Table 12. Hospital-Specific Characteristics by Acute Care Hospital, Virginia, January – December 2016

Hospital Name	Hospital System	Hospital Type	Region	Bed Size Category	Medical School Affiliation
Augusta Health	None	Acute Care	Northwest	>200	No
Bon Secours DePaul Medical Center	Bon Secours	Acute Care	Eastern	101-200	Yes
Bon Secours Mary Immaculate Hospital	Bon Secours	Acute Care	Eastern	101-200	Yes
Bon Secours Maryview Medical Center	Bon Secours	Acute Care	Eastern	>200	Yes
Bon Secours Memorial Regional Medical Center	Bon Secours	Acute Care	Central	>200	No
Bon Secours Richmond Community Hospital	Bon Secours	Acute Care	Central	101-200	No
Bon Secours St. Francis Medical Center	Bon Secours	Acute Care	Central	101-200	Yes
Bon Secours St. Mary's Hospital	Bon Secours	Acute Care	Central	>200	Yes
Buchanan General Hospital	None	Acute Care	Southwest	≤100	No
Carilion Franklin Memorial Hospital	Carilion Clinic	Acute Care	Southwest	≤100	Yes
Carilion New River Valley Medical Center	Carilion Clinic	Acute Care	Southwest	101-200	Yes
Carilion Roanoke Memorial Hospital	Carilion Clinic	Acute Care	Southwest	>200	Yes
Carilion Tazewell Community Hospital	Carilion Clinic	Acute Care	Southwest	≤100	No
Centra Bedford Memorial Hospital	Centra Health	Acute Care	Southwest	≤100	No
Centra Lynchburg General Hospital	Centra Health	Acute Care	Southwest	>200	Yes
Centra Southside Community Hospital	Centra Health	Acute Care	Central	≤100	Yes
Centra Virginia Baptist Hospital	Centra Health	Acute Care	Southwest	101-200	Yes
Chesapeake Regional Medical Center	None	Acute Care	Eastern	>200	No
Clinch Valley Medical Center	LifePoint	Acute Care	Southwest	101-200	Yes
Fauquier Health	LifePoint	Acute Care	Northwest	≤100	No
HCA CJW Medical Center Chippenham Hospital	HCA	Acute Care	Central	>200	Yes
HCA CJW Medical Center Johnston-Willis Hospital	HCA	Acute Care	Central	>200	Yes
HCA Henrico Doctors' Hospital	HCA	Acute Care	Central	>200	Yes
HCA John Randolph Medical Center	HCA	Acute Care	Central	101-200	Yes
HCA LewisGale Hospital Alleghany	HCA	Acute Care	Southwest	≤100	Yes
HCA LewisGale Hospital Montgomery	HCA	Acute Care	Southwest	101-200	Yes
HCA LewisGale Hospital Pulaski	HCA	Acute Care	Southwest	≤100	Yes
HCA LewisGale Medical Center	HCA	Acute Care	Southwest	>200	Yes
HCA Parham Doctors' Hospital	HCA	Acute Care	Central	101-200	Yes
HCA Reston Hospital Center	HCA	Acute Care	Northern	101-200	No
HCA Retreat Doctors' Hospital	HCA	Acute Care	Central	≤100	Yes

Hospital Name	Hospital System	Hospital Type	Region	Bed Size Category	Medical School Affiliation
HCA Spotsylvania Regional Medical Center	HCA	Acute Care	Northwest	101-200	Yes
HCA StoneSprings Hospital Center	HCA	Acute Care	Northern	101-200	No
Inova Alexandria Hospital	Inova	Acute Care	Northern	>200	No
Inova Fair Oaks Hospital	Inova	Acute Care	Northern	101-200	No
Inova Fairfax Medical Campus	Inova	Acute Care	Northern	>200	Yes
Inova Loudoun Hospital	Inova	Acute Care	Northern	101-200	No
Inova Mount Vernon Hospital	Inova	Acute Care	Northern	>200	Yes
Mary Washington Hospital	Mary Washington Healthcare	Acute Care	Northwest	>200	No
MSHA Johnston Memorial Hospital	Mountain States Health Alliance	Acute Care	Southwest	101-200	Yes
MSHA Norton Community Hospital	Mountain States Health Alliance	Acute Care	Southwest	≤100	Yes
MSHA Russell County Medical Center	Mountain States Health Alliance	Acute Care	Southwest	≤100	No
MSHA Smyth County Community Hospital	Mountain States Health Alliance	Acute Care	Southwest	≤100	No
Novant Health UVA Health System Culpeper Medical Center	Novant Health/ UVA Health System	Acute Care	Northwest	≤100	Yes
Novant Health UVA Health System Haymarket Medical Center	Novant Health/ UVA Health System	Acute Care	Northern	≤100	No
Novant Health UVA Health System Prince William Medical Center	Novant Health/ UVA Health System	Acute Care	Northern	101-200	Yes
Riverside Doctors' Hospital Williamsburg	Riverside Health System	Acute Care	Eastern	≤100	No
Riverside Regional Medical Center	Riverside Health System	Acute Care	Eastern	>200	Yes
Riverside Shore Memorial Hospital	Riverside Health System	Acute Care	Eastern	≤100	No
Riverside Tappahannock Hospital	Riverside Health System	Acute Care	Eastern	≤100	No
Riverside Walter Reed Hospital	Riverside Health System	Acute Care	Eastern	≤100	No
Sentara CarePlex Hospital	Sentara Healthcare	Acute Care	Eastern	>200	Yes
Sentara Halifax Regional Hospital	Sentara Healthcare	Acute Care	Central	101-200	No
Sentara Leigh Hospital	Sentara Healthcare	Acute Care	Eastern	>200	Yes
Sentara Martha Jefferson Hospital	Sentara Healthcare	Acute Care	Northwest	101-200	Yes
Sentara Norfolk General Hospital	Sentara Healthcare	Acute Care	Eastern	>200	Yes

Hospital Name	Hospital System	Hospital Type	Region	Bed Size Category	Medical School Affiliation
Sentara Northern Virginia Medical Center	Sentara Healthcare	Acute Care	Northern	101-200	No
Sentara Obici Hospital	Sentara Healthcare	Acute Care	Eastern	101-200	Yes
Sentara Princess Anne Hospital	Sentara Healthcare	Acute Care	Eastern	101-200	Yes
Sentara RMH Medical Center	Sentara Healthcare	Acute Care	Northwest	>200	No
Sentara Virginia Beach General Hospital	Sentara Healthcare	Acute Care	Eastern	>200	Yes
Sentara Williamsburg Regional Medical Center	Sentara Healthcare	Acute Care	Eastern	101-200	Yes
Southampton Memorial Hospital	Community Health Systems	Acute Care	Eastern	≤100	No
Southern Virginia Regional Medical Center	Community Health Systems	Acute Care	Central	≤100	No
Southside Regional Medical Center	Community Health Systems	Acute Care	Central	>200	No
SOVAH Health - Danville	SOVAH Health	Acute Care	Southwest	101-200	Yes
SOVAH Health - Martinsville	SOVAH Health	Acute Care	Southwest	101-200	No
Stafford Hospital	Mary Washington Healthcare	Acute Care	Northwest	≤100	No
Twin County Regional Healthcare	LifePoint	Acute Care	Southwest	≤100	No
UVA Medical Center	UVA Health System	Acute Care	Northwest	>200	Yes
VCU Community Memorial Hospital	VCU Health	Acute Care	Central	≤100	No
VCU Medical Center	VCU Health	Acute Care	Central	>200	Yes
Virginia Hospital Center	None	Acute Care	Northern	>200	Yes
Warren Memorial Hospital	Valley Health	Acute Care	Northwest	≤100	Yes
Wellmont Lonesome Pine Hospital	Wellmont Health System	Acute Care	Southwest	≤100	Yes
Wellmont Mountain View Regional Medical Center	Wellmont Health System	Acute Care	Southwest	101-200	Yes
Winchester Medical Center	Valley Health	Acute Care	Northwest	>200	Yes
Wythe County Community Hospital	LifePoint	Acute Care	Southwest	≤100	Yes

Appendix D. Variable Definitions

Variables in the HAI Data Tables

- **Title**: The title of the table provides information about the HAI type, time period, geographic location, and facility type included in the table.

- **Hospital Name:** This is the name of the facility. Facilities with multiple campuses will have each campus identified separately.

- **Months Included**: This is the number of months that were included in the SIR calculation.

- **Number of Procedures:** This is the total number of surgeries performed by a facility during a specified time period.

- **Device Days:** This is the number of device days that were reported by the facility for device-associated infections. A device day is a daily count of the number of patients with a specific device in the patient care location during a specified time period. These are central line days for CLABSI and urinary catheter days for CAUTI.

- **Patient Days**: This is a daily count of the number of patients in a patient care location during a specified time period. Patient days are calculated by recording the number of patients each day at the same time in a specific patient care location. At the end of each month, the daily counts are added together. This is displayed for LabID events only (MRSA bacteremia and *Clostridium difficile*).

- **Observed Infections:** This is the number of infections (or events, for LabID measures) that were reported by the facility.

- **Predicted Infections:** This is a calculated value that reflects the number of infections (or events, for LabID measures) that have been "predicted" to occur in a facility, based on the national experience during 2015.

- **Standardized Infection Ratio (SIR)**: This measure divides the number of observed infections (or events) by the number of predicted infections (or events). A value of 1 indicates that the facility observed the same number of infections (or events) as were predicted. Lower SIR values are better.

- **95% Confidence Interval (CI)**: Indicates that there is a high degree of confidence (95%) that the true SIR lies within this range of values. If this range includes the value of 1, then the SIR is *not statistically significant* (*i.e.*, the number of observed infections or events is not significantly different than the number predicted). A confidence interval cannot be calculated if the SIR is not calculated. When the SIR is zero (0), the lower

bound of the 95% confidence interval cannot be calculated. However, for ease of interpretation, it can be considered zero.

- **SIR Interpretation**: Colors and symbols are used to help the reader quickly understand and interpret the statistical significance of the SIR. This is the "take-home message" about the facility's performance on this HAI measure.

  ★ Indicates that the facility had significantly fewer infections than were predicted (better than the national baseline)

  = Indicates that the facility had about the same number of infections as were predicted (same as the national baseline)

  ✖ Indicates that the facility had significantly more infections than were predicted (worse than the national baseline)

  No Conclusion: Indicates that this facility reported data, but there was not enough information to make a reliable comparison to the national baseline (number of predicted infections was less than 1).

Variables in the Healthcare Personnel Influenza Vaccination Table

- **Title**: The title of the table provides information about the time period (flu season), geographic location, and facility type included in the table.

- **Hospital Name:** This is the name of the facility. Facilities with multiple campuses will have each campus identified separately.

- **Percentage of Healthcare Personnel Vaccinated:** This is calculated as a percentage (how many per hundred) of all healthcare personnel in the hospital who received the flu vaccine. This includes all facility employees, licensed independent practitioners, and adult students/trainees and volunteers. Contract personnel are excluded from the calculation.

    - **Employees** – Persons who receive a direct paycheck from the hospital (*i.e.*, on the hospital's payroll), regardless of clinical responsibility or patient contact.

    - **Licensed Independent Practitioners (LIPs)** – Physicians (MD, DO), advanced practice nurses, and physician assistants who are affiliated with the healthcare facility, but are not directly employed by it (*i.e.*, they do not receive a paycheck from the hospital), regardless of clinical responsibility or patient contact. Post-residency fellows are also included in this category if they are not on a hospital's payroll.

    - **Adult Students/Trainees and Volunteers** – Medical, nursing, or other health professional students, interns, medical residents or volunteers aged 18 or older that are affiliated with the hospital, but are not directly employed by it, regardless of clinical responsibility or patient contact.

    - **Contract Personnel** – Persons providing care, treatment, or services at the hospital through a contract, regardless of clinical responsibility or patient contact, who do not meet the definition of employees, LIPs, or adult students/trainees and volunteers.

$$\frac{\textbf{Number of healthcare workers vaccinated}}{\textbf{Total number of healthcare workers at the hospital}} \times 100\%$$

- **Comparison P-Value**: If the p-value is less than or equal to 0.05, one can conclude that the healthcare personnel influenza vaccination percentage is *significantly different* than the comparison group's value (*i.e.*, 90%). If the p-value is greater than 0.05, one can conclude that the healthcare personnel influenza vaccination percentage *is not significantly different* than the comparison group.

- **"How Does This Facility Compare to the Healthy People 2020 Goal"?**

    1. Vaccination is significantly higher (**better**) than the Healthy People 2020 Goal: ★ **Better**
    2. Vaccination is **similar** to the Healthy People 2020 Goal: **= Same**
    3. Vaccination is significantly lower (**worse**) than the Healthy People 2020 Goal: ✖ **Worse**
    4. Data were not reported from this facility: **not reported** (no affiliated symbol)

Appendix E. Summary of Healthcare-Associated Infections in Virginia, 2015

Table 13. Statewide Standardized Infection Ratios (SIRs) for Central Line-Associated Bloodstream Infections (CLABSIs), Catheter-Associated Urinary Tract Infections (CAUTIs), Surgical Site Infections (SSIs), and Laboratory-Identified Hospital-Onset Methicillin-Resistant *Staphylococcus aureus* (MRSA) Bacteremia and *Clostridium difficile* Events, Virginia Acute Care Hospitals, 2015

				Number of Infections		Standardized Infection Ratio (SIR) and 95% CI		
HAI	Unit/Type	No. of Facilities	Device Days/ Procedures Performed/ Patient Days	Observed	Predicted	SIR	Lower	Upper
CLABSI	All ICUs[b] and Wards[c] (total)	77	445,979	399	428.62	0.93	0.84	1.03
	Adult and Pediatric ICUs[b] (only)	74	196,191	200	203.54	0.98	0.85	1.13
	Adult and Pediatric Wards[c] (only)	77	217,800	168	182.17	0.92	0.79	1.07
	Neonatal ICUs (only)	25	31,053	31	41.98	0.74	0.51	1.04
CAUTI	All ICUs[b] and Wards[c] (total)	77	460,750	504	505.28	1.00	0.91	1.09
	Adult and Pediatric ICUs[b] (only)	74	229,241	316	301.84	1.05	0.94	1.17
	Adult and Pediatric Wards[c] (only)	77	230,754	187	202.77	0.92	0.80	1.06
SSI Adult[a]	Colon Surgery	73	7,380	203	182.98	1.11	0.97	1.27
	Abdominal Hysterectomy	67	8,492	85	55.53	1.53	1.23	1.88
MRSA	Facility-wide LabID	77	3,452,359	177	211.95	0.84	0.72	0.97
C. difficile	Facility-wide LabID	77	3,156,573	2,550	2419.16	1.05	1.01	1.10

Green highlighting indicates an SIR significantly LOWER than the national baseline. Baseline period for CLABSI, CAUTI, SSI, MRSA, and *C. difficile* is calendar year 2015.
Red highlighting indicates an SIR significantly HIGHER than the national baseline.
[a] SSI SIRs are based on the complex admission/readmission model for adult patients (≥18 years).
[b] NHSN has a separate CLABSI and CAUTI risk model for oncology intensive care units (ICUs); these data are not shown separately here. Oncology ICUs are included in the total for CLABSI and CAUTI but are excluded from the ICU only data.
[c] Inpatient ward locations included are adult and pediatric medical, surgical, and medical/surgical wards.

Appendix F. Standardized Utilization Ratio Tables for Central Line and Urinary Catheter Use

In 2017, NHSN released *Standardized Utilization Ratio* (SUR) reports. The SUR measures device utilization and is a scalable, risk-adjusted measure that can be compared across locations and facilities. SURs indicate whether the observed number of device days is higher, lower, or similar to the predicted number of device days. The SUR is calculated by dividing the number of observed device days by the number of predicted device days, similar to the SIR. The number of predicted device days is calculated using a logistic regression model. For non-NICU locations in acute care hospitals, central line and urinary catheter SURs are risk-adjusted for type of facility, medical school affiliation, number of inpatient beds in facility, and type of patient care location. The SUR for central lines in NICU locations are adjusted for type of facility, medical school affiliation, number of inpatient beds in facility, type of NICU (Level II/III vs. Level III), and birthweight of NICU patient. Please note that SURs are not an indicator of performance, unlike the SIR. Instead, SURs are meant to serve as an indicator for prevention of device-associated HAIs since device use is the mode of exposure for these infections.

$$\textbf{SUR} = \frac{\textbf{Number of observed device days}}{\textbf{Number of predicted device days}}$$

The SUR value can be interpreted as follows:

- If the SUR is **less than 1**, then fewer device days were observed than predicted, based on the national baseline.
- If the SUR is **equal to 1**, then the same number of device days were observed as predicted, based on the national baseline.
- If the SUR is **greater than 1**, then more device days were observed than predicted, based on the national baseline.

Table 14. Statewide Central Line and Urinary Catheter Standardized Utilization Ratios (SURs), Virginia Acute Care Hospitals, 2016

			Number of Device Days		Standardized Utilization Ratio (SUR) and 95% CI		
Device Type	**Unit/Type**	**No. of Facilities**	**Observed**	**Predicted**	**SUR**	**Lower**	**Upper**
Central Line	**All ICUs[a] and Wards[b] (total)**	78	429,493	448,049.91	0.96	0.96	0.96
	Adult and Pediatric ICUs[a] (only)	75	197,384	202,293.32	0.98	0.97	0.98
	Adult and Pediatric Wards[b] (only)	78	200,295	211,743.35	0.95	0.94	0.95
	Neonatal ICUs (only)	25	30,741	33,075.71	0.93	0.92	0.94
Urinary Catheter	**All ICUs and Wards[b] (total)**	78	437,203	469,335.48	0.93	0.93	0.93
	Adult and Pediatric ICUs[a] (only)	75	223,068	240,897.89	0.93	0.92	0.93
	Adult and Pediatric Wards[b] (only)	78	213,374	227,284.40	0.94	0.94	0.94

[a] NHSN has a separate risk model for oncology intensive care units (ICUs); these data are not shown separately here. Oncology ICUs are included in the total for central line and urinary catheter use but are excluded from the ICU only data.

[b] Inpatient ward locations included are adult and pediatric medical, surgical, and medical/surgical wards.

Table 15. Statewide Central Line and Urinary Catheter Standardized Utilization Ratios (SURs), Virginia Acute Care Hospitals, 2015

			Number of Device Days		Standardized Utilization Ratio (SUR) and 95% CI		
Device Type	**Unit/Type**	**No. of Facilities**	**Observed**	**Predicted**	**SUR**	**Lower**	**Upper**
Central Line	**All ICUs[a] and Wards[b] (total)**	77	445,979	441,250.04	1.01	1.01	1.01
	Adult and Pediatric ICUs[a] (only)	74	196,191	196,898.35	1.00	0.99	1.00
	Adult and Pediatric Wards[b] (only)	77	217,800	212,362.26	1.03	1.02	1.03
	Neonatal ICUs (only)	25	31,053	31,063.59	1.00	0.99	1.01
Urinary Catheter	**All ICUs[a] and Wards[b] (total)**	77	460,750	459,473.17	1.00	1.00	1.01
	Adult and Pediatric ICUs[a] (only)	74	229,241	233,100.53	0.98	0.98	0.99
	Adult and Pediatric Wards[b] (only)	77	230,754	225,233.84	1.03	1.02	1.03

[a] NHSN has a separate risk model for oncology intensive care units (ICUs); these data are not shown separately here. Oncology ICUs are included in the total for central line and urinary catheter use but are excluded from the ICU only data.

[b] Inpatient ward locations included are adult and pediatric medical, surgical, and medical/surgical wards.

Appendix G. Unit-Specific Device-Associated Infection Tables

CLABSI – Adult and Pediatric Intensive Care Units (ICUs)

Legend							
★	Fewer infections (**better**) than predicted based on the national experience.*	=	About the **same** number of infections as predicted based on the national experience.*	✖	More infections (**worse**) than predicted based on the national experience.*	**No Conclusion**	When the number of predicted infections is less than 1, no conclusion can be made.
*National experience contains data from 2015 for CLABSI.							

Table 16. CLABSI SIR Report, Adult and Pediatric Intensive Care Units, by Acute Care Hospital, Virginia, 2016

Hospital Name	Device Days	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=75)	**197,384**	**159**	**203.79**	**0.78**	**(0.67, 0.91)**	**★Better**
Augusta Health	915	2	0.69	N/A	N/A	**No Conclusion**
Bon Secours DePaul Medical Center	2,343	1	2.30	0.44	(0.02, 2.15)	= Same
Bon Secours Mary Immaculate Hospital	1,007	0	0.76	N/A	N/A	**No Conclusion**
Bon Secours Maryview Medical Center	2,803	0	2.82	0.00	(., 1.06)	= Same
Bon Secours Memorial Regional Medical Center	3,691	3	3.20	0.94	(0.24, 2.55)	= Same
Bon Secours Richmond Community Hospital	135	1	0.10	N/A	N/A	**No Conclusion**
Bon Secours St. Francis Medical Center	1,590	2	1.39	1.44	(0.24, 4.75)	= Same
Bon Secours St. Mary's Hospital	6,138	2	6.34	0.32	(0.05, 1.04)	= Same
Buchanan General Hospital	40	0	0.03	N/A	N/A	**No Conclusion**
Carilion New River Valley Medical Center	1,212	0	1.19	0.00	(., 2.52)	= Same
Carilion Roanoke Memorial Hospital	14,171	12	16.62	0.72	(0.39, 1.23)	= Same
Centra Bedford Memorial Hospital	56	0	0.04	N/A	N/A	**No Conclusion**

Hospital Name	Device Days	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=75)	**197,384**	**159**	**203.79**	**0.78**	**(0.67, 0.91)**	★Better
Centra Lynchburg General Hospital	5,877	12	5.92	2.03	(1.10, 3.45)	✖Worse
Centra Southside Community Hospital	110	0	0.07	N/A	N/A	**No Conclusion**
Chesapeake Regional Medical Center	1,954	1	1.70	0.59	(0.03, 2.91)	= Same
Clinch Valley Medical Center	469	0	0.35	N/A	N/A	**No Conclusion**
Fauquier Health	1,209	0	0.91	N/A	N/A	**No Conclusion**
HCA CJW Medical Center Chippenham Hospital	6,643	4	6.73	0.59	(0.19, 1.43)	= Same
HCA CJW Medical Center Johnston-Willis Hospital	2,815	3	2.84	1.06	(0.27, 2.88)	= Same
HCA Henrico Doctors' Hospital	4,172	1	3.63	0.28	(0.01, 1.36)	= Same
HCA John Randolph Medical Center	819	0	0.62	N/A	N/A	**No Conclusion**
HCA LewisGale Hospital Alleghany	209	0	0.14	N/A	N/A	**No Conclusion**
HCA LewisGale Hospital Montgomery	824	0	0.81	N/A	N/A	**No Conclusion**
HCA LewisGale Hospital Pulaski	233	0	0.16	N/A	N/A	**No Conclusion**
HCA LewisGale Medical Center	7,619	4	6.61	0.61	(0.19, 1.46)	= Same
HCA Parham Doctors' Hospital	843	1	0.64	N/A	N/A	**No Conclusion**
HCA Reston Hospital Center	2,181	1	1.64	0.61	(0.03, 3.00)	= Same
HCA Retreat Doctors' Hospital	287	0	0.19	N/A	N/A	**No Conclusion**
HCA Spotsylvania Regional Medical Center	638	0	0.48	N/A	N/A	**No Conclusion**
HCA StoneSprings Hospital Center	171	0	0.13	N/A	N/A	**No Conclusion**
Inova Alexandria Hospital	3,991	5	3.46	1.44	(0.53, 3.20)	= Same
Inova Fair Oaks Hospital	976	1	0.74	N/A	N/A	**No Conclusion**

Hospital Name	Device Days	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=75)	**197,384**	**159**	**203.79**	**0.78**	**(0.67, 0.91)**	**★Better**
Inova Fairfax Medical Campus	18,095	27	21.66	1.25	(0.84, 1.79)	= Same
Inova Loudoun Hospital	1,425	1	1.07	0.93	(0.05, 4.59)	= Same
Inova Mount Vernon Hospital	903	1	0.91	N/A	N/A	**No Conclusion**
Mary Washington Hospital	4,275	4	3.71	1.08	(0.34, 2.60)	= Same
MSHA Johnston Memorial Hospital	818	0	0.72	N/A	N/A	**No Conclusion**
MSHA Norton Community Hospital	571	0	0.44	N/A	N/A	**No Conclusion**
MSHA Russell County Medical Center	57	0	0.04	N/A	N/A	**No Conclusion**
MSHA Smyth County Community Hospital	37	0	0.02	N/A	N/A	**No Conclusion**
Novant Health UVA Health System Culpeper Medical Center	228	0	0.20	N/A	N/A	**No Conclusion**
Novant Health UVA Health System Haymarket Medical Center	366	0	0.25	N/A	N/A	**No Conclusion**
Novant Health UVA Health System Prince William Medical Center	1,700	0	1.49	0.00	(., 2.02)	= Same
Riverside Doctors' Hospital Williamsburg	257	0	0.17	N/A	N/A	**No Conclusion**
Riverside Regional Medical Center	6,579	1	6.63	0.15	(0.01, 0.74)	★Better
Riverside Shore Memorial Hospital	623	0	0.42	N/A	N/A	**No Conclusion**
Riverside Tappahannock Hospital	200	0	0.13	N/A	N/A	**No Conclusion**
Riverside Walter Reed Hospital	601	0	0.40	N/A	N/A	**No Conclusion**
Sentara CarePlex Hospital	2,058	1	1.79	0.56	(0.03, 2.76)	= Same
Sentara Halifax Regional Hospital	252	0	0.19	N/A	N/A	**No Conclusion**
Sentara Leigh Hospital	2,211	1	2.49	0.40	(0.02, 1.98)	= Same

Hospital Name	Device Days	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=75)	**197,384**	**159**	**203.79**	**0.78**	**(0.67, 0.91)**	**★Better**
Sentara Martha Jefferson Hospital	761	0	0.57	N/A	N/A	**No Conclusion**
Sentara Norfolk General Hospital	12,385	9	14.28	0.63	(0.31, 1.16)	= Same
Sentara Northern Virginia Medical Center	1,535	0	1.16	0.00	(., 2.59)	= Same
Sentara Obici Hospital	1,485	1	1.30	0.77	(0.04, 3.80)	= Same
Sentara Princess Anne Hospital	2,147	0	1.62	0.00	(., 1.85)	= Same
Sentara RMH Medical Center	1,880	0	1.63	0.00	(., 1.84)	= Same
Sentara Virginia Beach General Hospital	4,534	0	3.93	0.00	(., 0.76)	★Better
Sentara Williamsburg Regional Medical Center	652	0	0.49	N/A	N/A	**No Conclusion**
Southampton Memorial Hospital	184	0	0.12	N/A	N/A	**No Conclusion**
Southern Virginia Regional Medical Center	152	0	0.10	N/A	N/A	**No Conclusion**
Southside Regional Medical Center	3,154	1	2.74	0.37	(0.02, 1.80)	= Same
SOVAH Health - Danville	1,349	2	1.32	1.51	(0.25, 5.00)	= Same
SOVAH Health - Martinsville	1,717	5	1.29	3.87	(1.42, 8.57)	✖Worse
Stafford Hospital	551	0	0.37	N/A	N/A	**No Conclusion**
Twin County Regional Healthcare	189	0	0.13	N/A	N/A	**No Conclusion**
UVA Medical Center	16,008	34	19.11	1.78	(1.25, 2.46)	✖Worse
VCU Community Memorial Hospital	357	0	0.27	N/A	N/A	**No Conclusion**
VCU Medical Center	21,834	15	28.01	0.54	(0.31, 0.86)	★Better
Virginia Hospital Center	2,067	0	2.33	0.00	(., 1.29)	= Same
Warren Memorial Hospital	116	0	0.10	N/A	N/A	**No Conclusion**

Hospital Name	Device Days	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=75)	**197,384**	**159**	**203.79**	**0.78**	**(0.67, 0.91)**	**★Better**
Wellmont Lonesome Pine Hospital	107	0	0.09	N/A	N/A	**No Conclusion**
Wellmont Mountain View Regional Medical Center	210	0	0.21	N/A	N/A	**No Conclusion**
Winchester Medical Center	6,519	0	6.57	0.00	(., 0.46)	**★Better**
Wythe County Community Hospital	94	0	0.06	N/A	N/A	**No Conclusion**

[a] When the SIR is 0, the lower bound of the 95% confidence interval cannot be calculated. However, for ease of interpretation, it can be considered 0.

CLABSI – Neonatal Intensive Care Units (NICUs)

Legend							
★	Fewer infections (**better**) than predicted based on the national experience.*	=	About the **same** number of infections as predicted based on the national experience.*	✖	More infections (**worse**) than predicted based on the national experience.*	**No Conclusion**	When the number of predicted infections is less than 1, no conclusion can be made.
*National experience contains data from 2015 for CLABSI.							

Table 17. CLABSI SIR Report, Neonatal Intensive Care Units, by Acute Care Hospital, Virginia, 2016

Hospital Name	Device Days	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=25)	**30,741**	**33**	**41.31**	**0.80**	**(0.56, 1.11)**	= Same
Bon Secours Mary Immaculate Hospital	133	0	0.10	N/A	N/A	**No Conclusion**
Bon Secours Memorial Regional Medical Center	84	0	0.07	N/A	N/A	**No Conclusion**
Bon Secours St. Francis Medical Center	90	1	0.07	N/A	N/A	**No Conclusion**
Bon Secours St. Mary's Hospital	1,455	0	2.62	0.00	(., 1.14)	= Same
Carilion Roanoke Memorial Hospital	2,984	5	4.43	1.13	(0.41, 2.50)	= Same
Centra Virginia Baptist Hospital	580	1	0.55	N/A	N/A	**No Conclusion**
HCA CJW Medical Center Chippenham Hospital	1,276	1	1.77	0.57	(0.03, 2.79)	= Same
HCA CJW Medical Center Johnston-Willis Hospital	908	0	1.24	0.00	(., 2.43)	= Same
HCA Henrico Doctors' Hospital	1,677	2	2.29	0.87	(0.15, 2.89)	= Same
HCA Reston Hospital Center	462	0	0.40	N/A	N/A	**No Conclusion**
Inova Alexandria Hospital	310	1	0.56	N/A	N/A	**No Conclusion**
Inova Fair Oaks Hospital	460	1	0.43	N/A	N/A	**No Conclusion**
Inova Fairfax Medical Campus	7,696	5	10.48	0.48	(0.18, 1.06)	= Same
Inova Loudoun Hospital	194	0	0.16	N/A	N/A	**No Conclusion**

Hospital Name	Device Days	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=25)	**30,741**	**33**	**41.31**	**0.80**	**(0.56, 1.11)**	**= Same**
Mary Washington Hospital	557	2	0.75	N/A	N/A	**No Conclusion**
Novant Health UVA Health System Prince William Medical Center	147	2	0.18	N/A	N/A	**No Conclusion**
Riverside Regional Medical Center	513	0	0.55	N/A	N/A	**No Conclusion**
Sentara Norfolk General Hospital	1,688	0	1.69	0.00	(., 1.78)	**= Same**
Sentara Northern Virginia Medical Center	102	0	0.10	N/A	N/A	**No Conclusion**
Sentara Princess Anne Hospital	415	1	0.69	N/A	N/A	**No Conclusion**
Southside Regional Medical Center	69	0	0.06	N/A	N/A	**No Conclusion**
UVA Medical Center	3,483	1	4.72	0.21	(0.01, 1.05)	**= Same**
VCU Medical Center	3,689	9	5.42	1.66	(0.81, 3.05)	**= Same**
Virginia Hospital Center	1,393	0	1.56	0.00	(., 1.92)	**= Same**
Winchester Medical Center	376	1	0.41	N/A	N/A	**No Conclusion**

[a] When the SIR is 0, the lower bound of the 95% confidence interval cannot be calculated. However, for ease of interpretation, it can be considered 0.

CLABSI – Adult and Pediatric Medical, Surgical and Medical/Surgical Inpatient Wards

Legend							
★	Fewer infections (**better**) than predicted based on the national experience.*	=	About the **same** number of infections as predicted based on the national experience.*	✖	More infections (**worse**) than predicted based on the national experience.*	**No Conclusion**	When the number of predicted infections is less than 1, no conclusion can be made.
*National experience contains data from 2015 for CLABSI.							

Table 18. CLABSI SIR Report, Adult and Pediatric Medical, Surgical and Medical/Surgical Inpatient Wards, by Acute Care Hospital, Virginia, 2016

Hospital Name	Device Days	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=78)	**200,295**	**119**	**165.70**	**0.72**	**(0.60, 0.86)**	**★Better**
Augusta Health	1,365	0	0.89	N/A	N/A	**No Conclusion**
Bon Secours DePaul Medical Center	1,189	0	1.01	0.00	(., 2.98)	= Same
Bon Secours Mary Immaculate Hospital	1,239	0	0.81	N/A	N/A	**No Conclusion**
Bon Secours Maryview Medical Center	2,515	3	2.19	1.37	(0.35, 3.73)	= Same
Bon Secours Memorial Regional Medical Center	3,894	3	2.92	1.03	(0.26, 2.80)	= Same
Bon Secours Richmond Community Hospital	175	0	0.11	N/A	N/A	**No Conclusion**
Bon Secours St. Francis Medical Center	3,973	2	3.00	0.67	(0.11, 2.20)	= Same
Bon Secours St. Mary's Hospital	5,923	1	5.16	0.19	(0.01, 0.96)	★Better
Buchanan General Hospital	81	0	0.05	N/A	N/A	**No Conclusion**
Carilion Franklin Memorial Hospital	465	0	0.35	N/A	N/A	**No Conclusion**
Carilion New River Valley Medical Center	2,923	2	2.47	0.81	(0.14, 2.67)	= Same
Carilion Roanoke Memorial Hospital	3,912	1	3.82	0.26	(0.01, 1.29)	= Same
Carilion Tazewell Community Hospital	311	0	0.18	N/A	N/A	**No Conclusion**
Centra Bedford Memorial Hospital	119	0	0.07	N/A	N/A	**No Conclusion**

Hospital Name	Device Days	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=78)	**200,295**	**119**	**165.70**	**0.72**	**(0.60, 0.86)**	**★Better**
Centra Lynchburg General Hospital	10,797	9	9.40	0.96	(0.47, 1.76)	= Same
Centra Southside Community Hospital	350	0	0.20	N/A	N/A	**No Conclusion**
Centra Virginia Baptist Hospital	100	0	0.08	N/A	N/A	**No Conclusion**
Chesapeake Regional Medical Center	4,153	6	3.11	1.93	(0.78, 4.01)	= Same
Clinch Valley Medical Center	1,591	0	1.04	0.00	(., 2.89)	= Same
Fauquier Health	2,036	0	1.33	0.00	(., 2.26)	= Same
HCA CJW Medical Center Chippenham Hospital	4,993	11	4.35	2.53	(1.33, 4.40)	✖Worse
HCA CJW Medical Center Johnston-Willis Hospital	1,259	0	1.10	0.00	(., 2.73)	= Same
HCA Henrico Doctors' Hospital	2,057	1	1.54	0.65	(0.03, 3.20)	= Same
HCA John Randolph Medical Center	340	0	0.22	N/A	N/A	**No Conclusion**
HCA LewisGale Hospital Alleghany	468	0	0.27	N/A	N/A	**No Conclusion**
HCA LewisGale Hospital Montgomery	396	1	0.34	N/A	N/A	**No Conclusion**
HCA LewisGale Hospital Pulaski	501	0	0.29	N/A	N/A	**No Conclusion**
HCA LewisGale Medical Center	6,721	2	5.04	0.40	(0.07, 1.31)	= Same
HCA Parham Doctors' Hospital	1,143	0	0.74	N/A	N/A	**No Conclusion**
HCA Reston Hospital Center	3,273	3	2.13	1.41	(0.36, 3.83)	= Same
HCA Retreat Doctors' Hospital	1,770	2	1.03	1.95	(0.33, 6.44)	= Same
HCA Spotsylvania Regional Medical Center	775	0	0.50	N/A	N/A	**No Conclusion**
HCA StoneSprings Hospital Center	640	0	0.42	N/A	N/A	**No Conclusion**

Hospital Name	Device Days	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=78)	**200,295**	**119**	**165.70**	**0.72**	**(0.60, 0.86)**	**★Better**
Inova Alexandria Hospital	3,170	1	2.38	0.42	(0.02, 2.08)	= Same
Inova Fair Oaks Hospital	1,912	4	1.24	3.21	(1.02, 7.75)	✖Worse
Inova Fairfax Medical Campus	9,782	12	9.55	1.26	(0.68, 2.14)	= Same
Inova Loudoun Hospital	1,290	0	0.84	N/A	N/A	**No Conclusion**
Inova Mount Vernon Hospital	1,472	3	1.28	2.34	(0.60, 6.37)	= Same
Mary Washington Hospital	8,437	3	6.33	0.47	(0.12, 1.29)	= Same
MSHA Johnston Memorial Hospital	1,816	0	1.37	0.00	(., 2.18)	= Same
MSHA Norton Community Hospital	829	0	0.56	N/A	N/A	**No Conclusion**
MSHA Russell County Medical Center	176	0	0.10	N/A	N/A	**No Conclusion**
MSHA Smyth County Community Hospital	56	0	0.03	N/A	N/A	**No Conclusion**
Novant Health UVA Health System Culpeper Medical Center	229	0	0.17	N/A	N/A	**No Conclusion**
Novant Health UVA Health System Haymarket Medical Center	290	0	0.17	N/A	N/A	**No Conclusion**
Novant Health UVA Health System Prince William Medical Center	442	0	0.33	N/A	N/A	**No Conclusion**
Riverside Doctors' Hospital Williamsburg	408	0	0.24	N/A	N/A	**No Conclusion**
Riverside Regional Medical Center	4,927	1	4.29	0.23	(0.01, 1.15)	= Same
Riverside Shore Memorial Hospital	351	0	0.21	N/A	N/A	**No Conclusion**
Riverside Tappahannock Hospital	189	0	0.11	N/A	N/A	**No Conclusion**
Riverside Walter Reed Hospital	807	0	0.47	N/A	N/A	**No Conclusion**
Sentara CarePlex Hospital	2,126	2	1.59	1.26	(0.21, 4.15)	= Same

Hospital Name	Device Days	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=78)	**200,295**	**119**	**165.70**	**0.72**	**(0.60, 0.86)**	★Better
Sentara Halifax Regional Hospital	456	0	0.30	N/A	N/A	No Conclusion
Sentara Leigh Hospital	4,202	0	4.10	0.00	(., 0.73)	★Better
Sentara Martha Jefferson Hospital	4,098	1	2.67	0.38	(0.02, 1.85)	= Same
Sentara Norfolk General Hospital	8,526	2	8.31	0.24	(0.04, 0.80)	★Better
Sentara Northern Virginia Medical Center	1,959	0	1.28	0.00	(., 2.35)	= Same
Sentara Obici Hospital	1,780	0	1.35	0.00	(., 2.23)	= Same
Sentara Princess Anne Hospital	4,340	2	2.83	0.71	(0.12, 2.34)	= Same
Sentara RMH Medical Center	3,563	1	2.67	0.37	(0.02, 1.85)	= Same
Sentara Virginia Beach General Hospital	3,026	1	2.27	0.44	(0.02, 2.17)	= Same
Sentara Williamsburg Regional Medical Center	1,453	0	0.95	N/A	N/A	No Conclusion
Southampton Memorial Hospital	283	0	0.16	N/A	N/A	No Conclusion
Southern Virginia Regional Medical Center	308	0	0.18	N/A	N/A	No Conclusion
Southside Regional Medical Center	3,659	5	2.74	1.82	(0.67, 4.04)	= Same
SOVAH Health - Danville	1,261	4	1.07	3.75	(1.19, 9.04)	✖Worse
SOVAH Health - Martinsville	1,474	1	0.96	N/A	N/A	No Conclusion
Stafford Hospital	1,673	2	0.97	N/A	N/A	No Conclusion
Twin County Regional Healthcare	174	0	0.10	N/A	N/A	No Conclusion
UVA Medical Center	14,886	7	14.55	0.48	(0.21, 0.95)	★Better
VCU Community Memorial Hospital	1,193	1	0.78	N/A	N/A	No Conclusion
VCU Medical Center	16,669	13	16.28	0.80	(0.44, 1.33)	= Same

Hospital Name	Device Days	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=78)	**200,295**	**119**	**165.70**	**0.72**	**(0.60, 0.86)**	**★Better**
Virginia Hospital Center	6,061	3	5.91	0.51	(0.13, 1.38)	= Same
Warren Memorial Hospital	128	0	0.10	N/A	N/A	**No Conclusion**
Wellmont Lonesome Pine Hospital	204	0	0.15	N/A	N/A	**No Conclusion**
Wellmont Mountain View Regional Medical Center	279	0	0.24	N/A	N/A	**No Conclusion**
Winchester Medical Center	8,463	3	7.37	0.41	(0.10, 1.11)	= Same
Wythe County Community Hospital	21	0	0.01	N/A	N/A	**No Conclusion**

[a] When the SIR is 0, the lower bound of the 95% confidence interval cannot be calculated. However, for ease of interpretation, it can be considered 0.

CAUTI – Adult and Pediatric Intensive Care Units (ICUs)

Legend							
★	Fewer infections (**better**) than predicted based on the national experience.*	=	About the **same** number of infections as predicted based on the national experience.*	✖	More infections (**worse**) than predicted based on the national experience.*	**No Conclusion**	When the number of predicted infections is less than 1, no conclusion can be made.
*National experience contains data from 2015 for CAUTI.							

Table 19. CAUTI SIR Report, Adult and Pediatric Intensive Care Units, by Acute Care Hospital, Virginia, 2016

Hospital Name	Device Days	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=75)	**223,068**	**303**	**290.30**	**1.04**	**(0.93, 1.17)**	= Same
Augusta Health	1,542	2	1.13	1.77	(0.30, 5.86)	= Same
Bon Secours DePaul Medical Center	2,486	6	4.73	1.27	(0.51, 2.64)	= Same
Bon Secours Mary Immaculate Hospital	1,328	1	0.99	N/A	N/A	**No Conclusion**
Bon Secours Maryview Medical Center	2,776	1	2.84	0.35	(0.02, 1.74)	= Same
Bon Secours Memorial Regional Medical Center	3,073	4	2.75	1.45	(0.46, 3.51)	= Same
Bon Secours Richmond Community Hospital	83	0	0.06	N/A	N/A	**No Conclusion**
Bon Secours St. Francis Medical Center	1,789	2	1.49	1.34	(0.23, 4.43)	= Same
Bon Secours St. Mary's Hospital	4,872	6	5.29	1.13	(0.46, 2.36)	= Same
Buchanan General Hospital	613	0	0.34	N/A	N/A	**No Conclusion**
Carilion New River Valley Medical Center	1,532	0	1.63	0.00	(., 1.84)	= Same
Carilion Roanoke Memorial Hospital	15,501	37	24.76	1.49	(1.07, 2.04)	✖Worse
Centra Bedford Memorial Hospital	330	0	0.18	N/A	N/A	**No Conclusion**
Centra Lynchburg General Hospital	5,848	7	7.84	0.89	(0.39, 1.77)	= Same
Centra Southside Community Hospital	836	0	0.46	N/A	N/A	**No Conclusion**

Hospital Name	Device Days	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=75)	**223,068**	**303**	**290.30**	**1.04**	**(0.93, 1.17)**	= Same
Chesapeake Regional Medical Center	3,094	10	2.77	3.61	(1.83, 6.43)	✖Worse
Clinch Valley Medical Center	1,179	0	0.86	N/A	N/A	**No Conclusion**
Fauquier Health	1,297	1	0.95	N/A	N/A	**No Conclusion**
HCA CJW Medical Center Chippenham Hospital	6,632	15	7.04	2.13	(1.24, 3.44)	✖Worse
HCA CJW Medical Center Johnston-Willis Hospital	3,124	14	5.70	2.46	(1.40, 4.02)	✖Worse
HCA Henrico Doctors' Hospital	4,272	3	4.63	0.65	(0.17, 1.77)	= Same
HCA John Randolph Medical Center	1,042	0	0.76	N/A	N/A	**No Conclusion**
HCA LewisGale Hospital Alleghany	530	0	0.30	N/A	N/A	**No Conclusion**
HCA LewisGale Hospital Montgomery	771	1	0.82	N/A	N/A	**No Conclusion**
HCA LewisGale Hospital Pulaski	412	1	0.23	N/A	N/A	**No Conclusion**
HCA LewisGale Medical Center	7,914	12	8.66	1.39	(0.75, 2.36)	= Same
HCA Parham Doctors' Hospital	1,099	2	0.82	N/A	N/A	**No Conclusion**
HCA Reston Hospital Center	3,055	1	2.23	0.45	(0.02, 2.21)	= Same
HCA Retreat Doctors' Hospital	335	0	0.19	N/A	N/A	**No Conclusion**
HCA Spotsylvania Regional Medical Center	998	1	0.73	N/A	N/A	**No Conclusion**
HCA StoneSprings Hospital Center	182	1	0.13	N/A	N/A	**No Conclusion**
Inova Alexandria Hospital	3,639	2	3.26	0.61	(0.10, 2.03)	= Same
Inova Fair Oaks Hospital	1,026	0	0.75	N/A	N/A	**No Conclusion**
Inova Fairfax Medical Campus	15,971	35	33.16	1.06	(0.75, 1.45)	= Same

Hospital Name	Device Days	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=75)	**223,068**	**303**	**290.30**	**1.04**	**(0.93, 1.17)**	= Same
Inova Loudoun Hospital	2,761	0	2.02	0.00	(., 1.48)	= Same
Inova Mount Vernon Hospital	1,158	0	1.20	0.00	(., 2.49)	= Same
Mary Washington Hospital	6,573	4	5.89	0.68	(0.22, 1.64)	= Same
MSHA Johnston Memorial Hospital	1,833	1	1.53	0.65	(0.03, 3.23)	= Same
MSHA Norton Community Hospital	1,067	0	0.67	N/A	N/A	**No Conclusion**
MSHA Russell County Medical Center	331	0	0.18	N/A	N/A	**No Conclusion**
MSHA Smyth County Community Hospital	149	0	0.08	N/A	N/A	**No Conclusion**
Novant Health UVA Health System Culpeper Medical Center	754	0	0.60	N/A	N/A	**No Conclusion**
Novant Health UVA Health System Haymarket Medical Center	504	0	0.28	N/A	N/A	**No Conclusion**
Novant Health UVA Health System Prince William Medical Center	1,736	5	1.45	3.45	(1.27, 7.66)	✖Worse
Riverside Doctors' Hospital Williamsburg	374	0	0.21	N/A	N/A	**No Conclusion**
Riverside Regional Medical Center	7,312	16	9.28	1.72	(1.02, 2.74)	✖Worse
Riverside Shore Memorial Hospital	720	0	0.48	N/A	N/A	**No Conclusion**
Riverside Tappahannock Hospital	460	0	0.25	N/A	N/A	**No Conclusion**
Riverside Walter Reed Hospital	835	1	0.46	N/A	N/A	**No Conclusion**
Sentara CarePlex Hospital	2,072	4	1.86	2.16	(0.69, 5.20)	= Same
Sentara Halifax Regional Hospital	1,191	0	0.87	N/A	N/A	**No Conclusion**
Sentara Leigh Hospital	3,258	1	4.24	0.24	(0.01, 1.16)	= Same
Sentara Martha Jefferson Hospital	992	1	0.74	N/A	N/A	**No Conclusion**

Hospital Name	Device Days	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=75)	**223,068**	**303**	**290.30**	**1.04**	**(0.93, 1.17)**	= Same
Sentara Norfolk General Hospital	13,419	28	23.62	1.19	(0.80, 1.69)	= Same
Sentara Northern Virginia Medical Center	1,919	2	1.40	1.43	(0.24, 4.71)	= Same
Sentara Obici Hospital	1,487	0	1.24	0.00	(., 2.42)	= Same
Sentara Princess Anne Hospital	2,649	4	1.94	2.07	(0.66, 4.98)	= Same
Sentara RMH Medical Center	2,511	2	2.25	0.89	(0.15, 2.94)	= Same
Sentara Virginia Beach General Hospital	5,589	5	5.34	0.94	(0.34, 2.08)	= Same
Sentara Williamsburg Regional Medical Center	937	1	0.84	N/A	N/A	**No Conclusion**
Southampton Memorial Hospital	508	0	0.37	N/A	N/A	**No Conclusion**
Southern Virginia Regional Medical Center	293	0	0.16	N/A	N/A	**No Conclusion**
Southside Regional Medical Center	4,691	1	4.20	0.24	(0.01, 1.17)	= Same
SOVAH Health - Danville	2,448	3	2.60	1.15	(0.29, 3.14)	= Same
SOVAH Health - Martinsville	2,697	0	1.97	0.00	(., 1.52)	= Same
Stafford Hospital	817	0	0.60	N/A	N/A	**No Conclusion**
Twin County Regional Healthcare	885	0	0.49	N/A	N/A	**No Conclusion**
UVA Medical Center	14,071	22	24.30	0.91	(0.58, 1.35)	= Same
VCU Community Memorial Hospital	1,149	0	0.84	N/A	N/A	**No Conclusion**
VCU Medical Center	19,185	24	41.51	0.58	(0.38, 0.85)	★Better
Virginia Hospital Center	2,640	4	3.44	1.16	(0.37, 2.81)	= Same
Warren Memorial Hospital	724	0	0.58	N/A	N/A	**No Conclusion**
Wellmont Lonesome Pine Hospital	366	0	0.29	N/A	N/A	**No Conclusion**

Hospital Name	Device Days	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=75)	**223,068**	**303**	**290.30**	**1.04**	**(0.93, 1.17)**	= Same
Wellmont Mountain View Regional Medical Center	730	0	0.78	N/A	N/A	**No Conclusion**
Winchester Medical Center	9,533	9	10.38	0.87	(0.42, 1.59)	= Same
Wythe County Community Hospital	559	0	0.41	N/A	N/A	**No Conclusion**

[a] When the SIR is 0, the lower bound of the 95% confidence interval cannot be calculated. However, for ease of interpretation, it can be considered 0.

CAUTI – Adult and Pediatric Medical, Surgical and Medical/Surgical Inpatient Wards

Legend							
★	Fewer infections (**better**) than predicted based on the national experience.*	=	About the **same** number of infections as predicted based on the national experience.*	✖	More infections (**worse**) than predicted based on the national experience.*	**No Conclusion**	When the number of predicted infections is less than 1, no conclusion can be made.
*National experience contains data from 2015 for CAUTI.							

Table 20. CAUTI SIR Report, Adult and Pediatric Medical, Surgical and Medical/Surgical Inpatient Wards, by Acute Care Hospital, Virginia, 2016

Hospital Name	Device Days	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=78)	**213,374**	**168**	**185.51**	**0.91**	**(0.78, 1.05)**	= Same
Augusta Health	3,041	2	2.06	0.97	(0.16, 3.20)	= Same
Bon Secours DePaul Medical Center	1,894	1	1.85	0.54	(0.03, 2.66)	= Same
Bon Secours Mary Immaculate Hospital	1,145	0	0.75	N/A	N/A	**No Conclusion**
Bon Secours Maryview Medical Center	2,108	0	2.00	0.00	(., 1.50)	= Same
Bon Secours Memorial Regional Medical Center	2,574	1	2.11	0.48	(0.02, 2.34)	= Same
Bon Secours Richmond Community Hospital	61	0	0.04	N/A	N/A	**No Conclusion**
Bon Secours St. Francis Medical Center	2,899	3	2.26	1.33	(0.34, 3.62)	= Same
Bon Secours St. Mary's Hospital	3,831	1	3.60	0.28	(0.01, 1.37)	= Same
Buchanan General Hospital	1,447	0	0.71	N/A	N/A	**No Conclusion**
Carilion Franklin Memorial Hospital	626	0	0.45	N/A	N/A	**No Conclusion**
Carilion New River Valley Medical Center	3,784	0	3.59	0.00	(., 0.83)	★Better
Carilion Roanoke Memorial Hospital	1,537	4	1.84	2.18	(0.69, 5.25)	= Same
Carilion Tazewell Community Hospital	566	1	0.28	N/A	N/A	**No Conclusion**
Centra Bedford Memorial Hospital	347	0	0.17	N/A	N/A	**No Conclusion**

Hospital Name	Device Days	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=78)	**213,374**	**168**	**185.51**	**0.91**	**(0.78, 1.05)**	= Same
Centra Lynchburg General Hospital	8,496	13	8.25	1.58	(0.88, 2.63)	= Same
Centra Southside Community Hospital	2,225	0	1.09	0.00	(., 2.75)	= Same
Centra Virginia Baptist Hospital	533	0	0.40	N/A	N/A	**No Conclusion**
Chesapeake Regional Medical Center	7,262	4	6.06	0.66	(0.21, 1.59)	= Same
Clinch Valley Medical Center	1,634	0	1.07	0.00	(., 2.81)	= Same
Fauquier Health	2,371	1	1.55	0.65	(0.03, 3.19)	= Same
HCA CJW Medical Center Chippenham Hospital	4,034	7	3.68	1.90	(0.83, 3.76)	= Same
HCA CJW Medical Center Johnston-Willis Hospital	1,256	2	1.15	1.75	(0.29, 5.77)	= Same
HCA Henrico Doctors' Hospital	2,688	1	2.23	0.45	(0.02, 2.21)	= Same
HCA John Randolph Medical Center	707	1	0.46	N/A	N/A	**No Conclusion**
HCA LewisGale Hospital Alleghany	732	0	0.40	N/A	N/A	**No Conclusion**
HCA LewisGale Hospital Montgomery	629	0	0.60	N/A	N/A	**No Conclusion**
HCA LewisGale Hospital Pulaski	856	1	0.42	N/A	N/A	**No Conclusion**
HCA LewisGale Medical Center	6,565	4	5.51	0.73	(0.23, 1.75)	= Same
HCA Parham Doctors' Hospital	1,722	4	1.19	3.37	(1.07, 8.13)	✖ Worse
HCA Reston Hospital Center	4,804	4	3.23	1.24	(0.39, 2.99)	= Same
HCA Retreat Doctors' Hospital	2,152	5	1.05	4.74	(1.74, 10.51)	✖ Worse
HCA Spotsylvania Regional Medical Center	1,231	0	0.80	N/A	N/A	**No Conclusion**
HCA StoneSprings Hospital Center	301	0	0.20	N/A	N/A	**No Conclusion**

Hospital Name	Device Days	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=78)	**213,374**	**168**	**185.51**	**0.91**	**(0.78, 1.05)**	= Same
Inova Alexandria Hospital	2,825	6	2.33	2.57	(1.04, 5.35)	✖Worse
Inova Fair Oaks Hospital	2,223	2	1.50	1.33	(0.22, 4.40)	= Same
Inova Fairfax Medical Campus	6,920	17	8.40	2.02	(1.22, 3.18)	✖Worse
Inova Loudoun Hospital	1,774	4	1.14	3.50	(1.11, 8.44)	✖Worse
Inova Mount Vernon Hospital	1,408	2	1.35	1.48	(0.25, 4.90)	= Same
Mary Washington Hospital	14,470	3	11.85	0.25	(0.06, 0.69)	★Better
MSHA Johnston Memorial Hospital	4,506	0	3.36	0.00	(., 0.89)	★Better
MSHA Norton Community Hospital	1,599	0	0.89	N/A	N/A	**No Conclusion**
MSHA Russell County Medical Center	840	0	0.46	N/A	N/A	**No Conclusion**
MSHA Smyth County Community Hospital	590	0	0.29	N/A	N/A	**No Conclusion**
Novant Health UVA Health System Culpeper Medical Center	1,029	0	0.73	N/A	N/A	**No Conclusion**
Novant Health UVA Health System Haymarket Medical Center	500	1	0.25	N/A	N/A	**No Conclusion**
Novant Health UVA Health System Prince William Medical Center	361	0	0.27	N/A	N/A	**No Conclusion**
Riverside Doctors' Hospital Williamsburg	480	0	0.24	N/A	N/A	**No Conclusion**
Riverside Regional Medical Center	3,497	0	3.40	0.00	(., 0.88)	★Better
Riverside Shore Memorial Hospital	364	0	0.12	N/A	N/A	**No Conclusion**
Riverside Tappahannock Hospital	561	1	0.27	N/A	N/A	**No Conclusion**
Riverside Walter Reed Hospital	1,003	0	0.49	N/A	N/A	**No Conclusion**
Sentara CarePlex Hospital	1,390	1	1.11	0.90	(0.05, 4.43)	= Same

Hospital Name	Device Days	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=78)	**213,374**	**168**	**185.51**	**0.91**	**(0.78, 1.05)**	= Same
Sentara Halifax Regional Hospital	981	0	0.70	N/A	N/A	**No Conclusion**
Sentara Leigh Hospital	7,946	3	9.75	0.31	(0.08, 0.84)	★**Better**
Sentara Martha Jefferson Hospital	3,833	0	2.72	0.00	(., 1.10)	= Same
Sentara Norfolk General Hospital	5,876	8	7.14	1.12	(0.52, 2.13)	= Same
Sentara Northern Virginia Medical Center	2,733	0	1.79	0.00	(., 1.68)	= Same
Sentara Obici Hospital	1,247	0	0.93	N/A	N/A	**No Conclusion**
Sentara Princess Anne Hospital	3,460	3	2.35	1.27	(0.32, 3.47)	= Same
Sentara RMH Medical Center	8,951	7	7.16	0.98	(0.43, 1.93)	= Same
Sentara Virginia Beach General Hospital	3,734	2	2.99	0.67	(0.11, 2.21)	= Same
Sentara Williamsburg Regional Medical Center	2,272	0	1.57	0.00	(., 1.90)	= Same
Southampton Memorial Hospital	764	0	0.50	N/A	N/A	**No Conclusion**
Southern Virginia Regional Medical Center	773	0	0.38	N/A	N/A	**No Conclusion**
Southside Regional Medical Center	2,915	7	2.52	2.78	(1.21, 5.49)	✖**Worse**
SOVAH Health - Danville	4,464	3	4.24	0.71	(0.18, 1.93)	= Same
SOVAH Health - Martinsville	2,194	1	1.43	0.70	(0.04, 3.44)	= Same
Stafford Hospital	2,656	3	1.80	1.67	(0.42, 4.53)	= Same
Twin County Regional Healthcare	930	0	0.46	N/A	N/A	**No Conclusion**
UVA Medical Center	7,524	10	9.05	1.11	(0.56, 1.97)	= Same
VCU Community Memorial Hospital	2,340	0	1.53	0.00	(., 1.96)	= Same
VCU Medical Center	7,539	7	9.20	0.76	(0.33, 1.51)	= Same

Hospital Name	Device Days	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=78)	**213,374**	**168**	**185.51**	**0.91**	**(0.78, 1.05)**	**= Same**
Virginia Hospital Center	4,857	8	5.93	1.35	(0.63, 2.56)	**= Same**
Warren Memorial Hospital	543	0	0.39	N/A	N/A	**No Conclusion**
Wellmont Lonesome Pine Hospital	696	0	0.50	N/A	N/A	**No Conclusion**
Wellmont Mountain View Regional Medical Center	667	0	0.63	N/A	N/A	**No Conclusion**
Winchester Medical Center	10,190	9	9.75	0.92	(0.45, 1.69)	**= Same**
Wythe County Community Hospital	891	0	0.62	N/A	N/A	**No Conclusion**

[a] When the SIR is 0, the lower bound of the 95% confidence interval cannot be calculated. However, for ease of interpretation, it can be considered 0.

Appendix H. Hospital-Specific SSI Data using the Complex 30-day SSI Model

Three SSI models are available in NHSN by which SIRs can be calculated.[9] The two models used in this report are briefly described below.

Complex A/R SSI Model

The Complex A/R SSI Model is used by CDC for publishing annual progress reports. For Virginia-specific data see Table 7 and Table 8. Parameters of the model include the following:

- Includes only deep incisional primary SSIs and organ/space SSIs
- Includes only SSIs identified on admission/readmission to hospital where procedure was performed
- Includes only inpatient procedures adjusted for variables in the A/R models, see Risk Adjustment and Data Exclusions.

Complex 30-day SSI Model

The Complex 30-day SSI model is used by CMS for the Hospital Inpatient Quality Reporting Program. Results of the Complex 30-day model are published below. Parameters of the model include the following:

- Includes only in-plan, inpatient colon and abdominal hysterectomy procedures in adult patients (*i.e.*, ≥ 18 years of age)
- Includes only deep incisional primary SSIs and organ/space SSIs with an event date within 30 days of the procedure
- Includes SSIs regardless of detection method
- Adjusts for diabetes, ASA score, gender, age, BMI, closure technique, and oncology hospital for colon procedures
- Adjusts for diabetes, ASA score, age, BMI, and oncology hospital for abdominal hysterectomy procedures

Surgical Site Infections – Adult Colon (COLO) Procedures – Complex 30-day Model

In 2016, 74 Virginia acute care hospitals reported performing colon procedures. The 2016 overall COLO SIR for Virginia hospitals was 1.12 (95% CI: 0.98, 1.27) and was not statistically significantly different from 1.00, based on the national experience from 2015.

- SIRs were calculated for 43 (58%) of the hospitals reporting colon procedures in 2016; for 31 hospitals, the SIR was not calculated because the number of predicted infections was less than 1.
- Twenty-three hospitals (31%) reported zero SSIs following colon procedures in 2016.
- Among the hospitals that had a calculated COLO SIR, two (5%) reported an SIR statistically significantly lower than 1.00.
- Among the hospitals that had a calculated COLO SIR, three (7%) reported an SIR statistically significantly higher than 1.00.

Legend							
★	Fewer infections (**better**) than predicted based on the national experience.*	=	About the **same** number of infections as predicted based on the national experience.*	✖	More infections (**worse**) than predicted based on the national experience.*	**No Conclusion**	When the number of predicted infections is less than 1, no conclusion can be made.
*National experience contains data from 2015 for SSI.							

Table 21. SSI SIR Report, Colon Procedures, by Acute Care Hospital, Virginia, 2016 (Complex 30-day Model)

Facility Name	Number of Procedures	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=74)	**7,594**	**228**	**204.09**	**1.12**	**(0.98, 1.27)**	= Same
Augusta Health	102	3	2.61	1.15	(0.29, 3.14)	= Same
Bon Secours DePaul Medical Center	77	2	2.15	0.93	(0.16, 3.07)	= Same
Bon Secours Mary Immaculate Hospital	50	2	1.17	1.71	(0.29, 5.65)	= Same
Bon Secours Maryview Medical Center	79	0	2.29	0.00	(., 1.31)	= Same
Bon Secours Memorial Regional Medical Center	219	2	5.40	0.37	(0.06, 1.22)	= Same
Bon Secours St. Francis Medical Center	112	3	2.81	1.07	(0.27, 2.91)	= Same
Bon Secours St. Mary's Hospital	253	8	6.59	1.22	(0.56, 2.31)	= Same
Carilion Franklin Memorial Hospital	7	0	0.16	N/A	N/A	**No Conclusion**

Facility Name	Number of Procedures	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=74)	**7,594**	**228**	**204.09**	**1.12**	**(0.98, 1.27)**	= Same
Carilion New River Valley Medical Center	91	1	2.33	0.43	(0.02, 2.12)	= Same
Carilion Roanoke Memorial Hospital	464	17	13.12	1.30	(0.78, 2.03)	= Same
Centra Bedford Memorial Hospital	6	0	0.16	N/A	N/A	**No Conclusion**
Centra Lynchburg General Hospital	249	1	6.84	0.15	(0.01, 0.72)	★Better
Centra Southside Community Hospital	31	0	0.90	N/A	N/A	**No Conclusion**
Centra Virginia Baptist Hospital	29	0	0.73	N/A	N/A	**No Conclusion**
Chesapeake Regional Medical Center	273	3	6.78	0.44	(0.11, 1.21)	= Same
Clinch Valley Medical Center	24	3	0.68	N/A	N/A	**No Conclusion**
Fauquier Health	33	1	0.88	N/A	N/A	**No Conclusion**
HCA CJW Medical Center Chippenham Hospital	91	2	2.58	0.78	(0.13, 2.56)	= Same
HCA CJW Medical Center Johnston-Willis Hospital	191	4	4.90	0.82	(0.26, 1.97)	= Same
HCA Henrico Doctors' Hospital	227	8	5.77	1.39	(0.64, 2.63)	= Same
HCA John Randolph Medical Center	17	0	0.47	N/A	N/A	**No Conclusion**
HCA LewisGale Hospital Alleghany	22	1	0.55	N/A	N/A	**No Conclusion**
HCA LewisGale Hospital Montgomery	27	2	0.75	N/A	N/A	**No Conclusion**
HCA LewisGale Hospital Pulaski	14	0	0.37	N/A	N/A	**No Conclusion**
HCA LewisGale Medical Center	152	4	3.83	1.05	(0.33, 2.52)	= Same
HCA Parham Doctors' Hospital	21	1	0.52	N/A	N/A	**No Conclusion**
HCA Reston Hospital Center	151	5	3.77	1.33	(0.49, 2.94)	= Same
HCA Retreat Doctors' Hospital	81	2	2.01	1.00	(0.17, 3.29)	= Same

Facility Name	Number of Procedures	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=74)	**7,594**	**228**	**204.09**	**1.12**	**(0.98, 1.27)**	= Same
HCA Spotsylvania Regional Medical Center	30	1	0.80	N/A	N/A	**No Conclusion**
HCA StoneSprings Hospital Center	8	1	0.28	N/A	N/A	**No Conclusion**
Inova Alexandria Hospital	138	7	3.54	1.98	(0.87, 3.92)	= Same
Inova Fair Oaks Hospital	131	5	3.66	1.37	(0.50, 3.03)	= Same
Inova Fairfax Medical Campus	563	18	15.63	1.15	(0.70, 1.79)	= Same
Inova Loudoun Hospital	121	0	3.25	0.00	(., 0.92)	★Better
Inova Mount Vernon Hospital	20	0	0.52	N/A	N/A	**No Conclusion**
Mary Washington Hospital	229	6	6.07	0.99	(0.40, 2.06)	= Same
MSHA Johnston Memorial Hospital	57	2	1.60	1.25	(0.21, 4.14)	= Same
MSHA Norton Community Hospital	14	0	0.39	N/A	N/A	**No Conclusion**
MSHA Smyth County Community Hospital	5	1	0.11	N/A	N/A	**No Conclusion**
Novant Health UVA Health System Culpeper Medical Center	18	0	0.46	N/A	N/A	**No Conclusion**
Novant Health UVA Health System Haymarket Medical Center	32	2	0.82	N/A	N/A	**No Conclusion**
Novant Health UVA Health System Prince William Medical Center	64	3	1.59	1.89	(0.48, 5.14)	= Same
Riverside Doctors' Hospital Williamsburg	18	0	0.40	N/A	N/A	**No Conclusion**
Riverside Regional Medical Center	162	2	4.57	0.44	(0.07, 1.45)	= Same
Riverside Shore Memorial Hospital	12	1	0.34	N/A	N/A	**No Conclusion**
Riverside Tappahannock Hospital	23	0	0.62	N/A	N/A	**No Conclusion**
Riverside Walter Reed Hospital	19	1	0.52	N/A	N/A	**No Conclusion**

Facility Name	Number of Procedures	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=74)	**7,594**	**228**	**204.09**	**1.12**	**(0.98, 1.27)**	= Same
Sentara CarePlex Hospital	128	5	3.42	1.46	(0.54, 3.24)	= Same
Sentara Halifax Regional Hospital	27	2	0.73	N/A	N/A	**No Conclusion**
Sentara Leigh Hospital	210	8	5.70	1.41	(0.65, 2.67)	= Same
Sentara Martha Jefferson Hospital	112	1	2.76	0.36	(0.02, 1.79)	= Same
Sentara Norfolk General Hospital	184	15	5.87	2.56	(1.49, 4.12)	✖ Worse
Sentara Northern Virginia Medical Center	83	4	2.17	1.84	(0.59, 4.45)	= Same
Sentara Obici Hospital	68	2	1.80	1.11	(0.19, 3.67)	= Same
Sentara Princess Anne Hospital	66	1	1.82	0.55	(0.03, 2.71)	= Same
Sentara RMH Medical Center	76	1	1.90	0.53	(0.03, 2.60)	= Same
Sentara Virginia Beach General Hospital	197	6	5.37	1.12	(0.45, 2.33)	= Same
Sentara Williamsburg Regional Medical Center	54	0	1.35	0.00	(., 2.22)	= Same
Southampton Memorial Hospital	5	0	0.15	N/A	N/A	**No Conclusion**
Southern Virginia Regional Medical Center	2	0	0.05	N/A	N/A	**No Conclusion**
Southside Regional Medical Center	54	1	1.43	0.70	(0.04, 3.46)	= Same
SOVAH Health - Danville	57	2	1.62	1.23	(0.21, 4.07)	= Same
SOVAH Health - Martinsville	48	0	1.19	0.00	(., 2.52)	= Same
Stafford Hospital	42	0	1.16	0.00	(., 2.59)	= Same
Twin County Regional Healthcare	27	0	0.73	N/A	N/A	**No Conclusion**
UVA Medical Center	406	11	10.98	1.00	(0.53, 1.74)	= Same
VCU Community Memorial Hospital	15	1	0.38	N/A	N/A	**No Conclusion**

Facility Name	Number of Procedures	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=74)	**7,594**	**228**	**204.09**	**1.12**	**(0.98, 1.27)**	= Same
VCU Medical Center	299	16	9.41	1.70	(1.01, 2.70)	✖Worse
Virginia Hospital Center	289	6	7.44	0.81	(0.33, 1.68)	= Same
Warren Memorial Hospital	3	0	0.08	N/A	N/A	**No Conclusion**
Wellmont Lonesome Pine Hospital	11	0	0.29	N/A	N/A	**No Conclusion**
Wellmont Mountain View Regional Medical Center	14	0	0.37	N/A	N/A	**No Conclusion**
Winchester Medical Center	352	21	9.47	2.22	(1.41, 3.33)	✖Worse
Wythe County Community Hospital	8	0	0.19	N/A	N/A	**No Conclusion**

*When the SIR is 0, the lower bound of the 95% confidence interval cannot be calculated. However, for ease of interpretation, it can be considered 0.
If a hospital is not listed in the table, then the hospital did not perform any COLO procedures in 2016, or the procedures were excluded from the complex 30-day model.

Surgical Site Infections – Adult Abdominal Hysterectomy (HYST) Procedures – Complex 30-day Model

In 2016, 65 Virginia acute care hospitals reported performing abdominal hysterectomies. The 2016 overall HYST SIR for Virginia hospitals was 1.04 (95% CI: 0.82, 1.31) and was not statistically significantly different from 1.00, based on the national experience from 2015.

- SIRs were calculated for 22 (34%) of the hospitals reporting abdominal hysterectomies in 2016; for 43 hospitals, the SIR was not calculated because the number of predicted infections was less than 1.
- Thirty-eight hospitals (58%) reported zero SSIs following abdominal hysterectomy procedures in 2016.
- Among the hospitals that had a calculated HYST SIR, no hospitals reported an SIR statistically significantly lower than 1.00.
- Among the hospitals that had a calculated HYST SIR, only one (5%) reported an SIR statistically significantly higher than 1.00.

Legend							
★	Fewer infections (**better**) than predicted based on the national experience.*	=	About the **same** number of infections as predicted based on the national experience.*	✖	More infections (**worse**) than predicted based on the national experience.*	**No Conclusion**	When the number of predicted infections is less than 1, no conclusion can be made.
*National experience contains data from 2015 for SSI.							

Table 22. SSI SIR Report, Abdominal Hysterectomy Procedures, by Acute Care Hospital, Virginia, 2016 (Complex 30-day Model)

Facility Name	Number of Procedures	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=65)	**8,347**	**72**	**69.04**	**1.04**	**(0.82, 1.31)**	= Same
Augusta Health	59	0	0.49	N/A	N/A	**No Conclusion**
Bon Secours DePaul Medical Center	158	0	1.41	0.00	(., 2.13)	= Same
Bon Secours Mary Immaculate Hospital	171	0	1.42	0.00	(., 2.11)	= Same
Bon Secours Maryview Medical Center	117	0	1.06	0.00	(., 2.82)	= Same
Bon Secours Memorial Regional Medical Center	149	1	1.21	0.82	(0.04, 4.07)	= Same
Bon Secours St. Francis Medical Center	266	1	2.22	0.45	(0.02, 2.23)	= Same
Bon Secours St. Mary's Hospital	481	8	3.76	2.13	(0.99, 4.04)	= Same
Carilion New River Valley Medical Center	104	0	0.90	N/A	N/A	**No Conclusion**

Facility Name	Number of Procedures	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=65)	**8,347**	**72**	**69.04**	**1.04**	**(0.82, 1.31)**	= Same
Carilion Roanoke Memorial Hospital	342	5	2.98	1.68	(0.61, 3.72)	= Same
Centra Bedford Memorial Hospital	3	0	0.02	N/A	N/A	**No Conclusion**
Centra Lynchburg General Hospital	2	0	0.02	N/A	N/A	**No Conclusion**
Centra Southside Community Hospital	8	0	0.08	N/A	N/A	**No Conclusion**
Centra Virginia Baptist Hospital	142	1	1.23	0.81	(0.04, 4.00)	= Same
Chesapeake Regional Medical Center	388	5	3.19	1.57	(0.58, 3.48)	= Same
Clinch Valley Medical Center	69	0	0.60	N/A	N/A	**No Conclusion**
Fauquier Health	33	0	0.28	N/A	N/A	**No Conclusion**
HCA CJW Medical Center Chippenham Hospital	94	2	0.84	N/A	N/A	**No Conclusion**
HCA CJW Medical Center Johnston-Willis Hospital	629	3	5.33	0.56	(0.14, 1.53)	= Same
HCA Henrico Doctors' Hospital	549	6	4.33	1.39	(0.56, 2.88)	= Same
HCA LewisGale Hospital Montgomery	22	0	0.21	N/A	N/A	**No Conclusion**
HCA LewisGale Medical Center	220	0	1.94	0.00	(., 1.54)	= Same
HCA Reston Hospital Center	104	1	0.79	N/A	N/A	**No Conclusion**
HCA Retreat Doctors' Hospital	40	0	0.27	N/A	N/A	**No Conclusion**
HCA Spotsylvania Regional Medical Center	28	0	0.23	N/A	N/A	**No Conclusion**
HCA StoneSprings Hospital Center	1	0	0.01	N/A	N/A	**No Conclusion**
Inova Alexandria Hospital	103	0	0.80	N/A	N/A	**No Conclusion**
Inova Fair Oaks Hospital	42	0	0.36	N/A	N/A	**No Conclusion**
Inova Fairfax Medical Campus	992	5	7.86	0.64	(0.23, 1.41)	= Same

Facility Name	Number of Procedures	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=65)	**8,347**	**72**	**69.04**	**1.04**	**(0.82, 1.31)**	= Same
Inova Loudoun Hospital	102	0	0.82	N/A	N/A	**No Conclusion**
Inova Mount Vernon Hospital	3	0	0.03	N/A	N/A	**No Conclusion**
Mary Washington Hospital	129	1	1.02	0.98	(0.05, 4.82)	= Same
MSHA Johnston Memorial Hospital	23	0	0.19	N/A	N/A	**No Conclusion**
MSHA Norton Community Hospital	8	0	0.09	N/A	N/A	**No Conclusion**
MSHA Smyth County Community Hospital	8	0	0.07	N/A	N/A	**No Conclusion**
Novant Health UVA Health System Culpeper Medical Center	10	0	0.08	N/A	N/A	**No Conclusion**
Novant Health UVA Health System Haymarket Medical Center	26	0	0.20	N/A	N/A	**No Conclusion**
Novant Health UVA Health System Prince William Medical Center	36	0	0.28	N/A	N/A	**No Conclusion**
Riverside Doctors' Hospital Williamsburg	31	0	0.25	N/A	N/A	**No Conclusion**
Riverside Regional Medical Center	117	0	1.07	0.00	(., 2.81)	= Same
Riverside Shore Memorial Hospital	11	0	0.09	N/A	N/A	**No Conclusion**
Sentara CarePlex Hospital	74	2	0.61	N/A	N/A	**No Conclusion**
Sentara Halifax Regional Hospital	31	0	0.26	N/A	N/A	**No Conclusion**
Sentara Leigh Hospital	340	4	2.87	1.40	(0.44, 3.37)	= Same
Sentara Martha Jefferson Hospital	72	1	0.53	N/A	N/A	**No Conclusion**
Sentara Norfolk General Hospital	64	1	0.63	N/A	N/A	**No Conclusion**
Sentara Northern Virginia Medical Center	79	0	0.64	N/A	N/A	**No Conclusion**
Sentara Obici Hospital	123	2	1.09	1.83	(0.31, 6.05)	= Same

Facility Name	Number of Procedures	Number of Infections		SIR and 95% Confidence Interval (CI)[a]		SIR Interpretation
		Observed	Predicted	SIR	95% CI (lower, upper)	
All Virginia Acute Care Hospitals (n=65)	**8,347**	**72**	**69.04**	**1.04**	**(0.82, 1.31)**	= Same
Sentara Princess Anne Hospital	69	1	0.59	N/A	N/A	**No Conclusion**
Sentara RMH Medical Center	104	3	0.85	N/A	N/A	**No Conclusion**
Sentara Virginia Beach General Hospital	243	3	1.87	1.61	(0.41, 4.37)	= Same
Sentara Williamsburg Regional Medical Center	24	0	0.21	N/A	N/A	**No Conclusion**
Southampton Memorial Hospital	7	0	0.05	N/A	N/A	**No Conclusion**
Southside Regional Medical Center	50	0	0.44	N/A	N/A	**No Conclusion**
SOVAH Health - Danville	45	0	0.39	N/A	N/A	**No Conclusion**
SOVAH Health - Martinsville	23	1	0.23	N/A	N/A	**No Conclusion**
Stafford Hospital	130	0	1.05	0.00	(., 2.87)	= Same
Twin County Regional Healthcare	35	1	0.29	N/A	N/A	**No Conclusion**
UVA Medical Center	472	3	3.82	0.79	(0.20, 2.14)	= Same
VCU Community Memorial Hospital	4	0	0.05	N/A	N/A	**No Conclusion**
VCU Medical Center	176	7	1.56	4.49	(1.97, 8.89)	✖ **Worse**
Virginia Hospital Center	230	2	1.84	1.09	(0.18, 3.60)	= Same
Warren Memorial Hospital	9	0	0.08	N/A	N/A	**No Conclusion**
Wellmont Lonesome Pine Hospital	15	1	0.18	N/A	N/A	**No Conclusion**
Winchester Medical Center	67	1	0.53	N/A	N/A	**No Conclusion**
Wythe County Community Hospital	41	0	0.37	N/A	N/A	**No Conclusion**

[a] When the SIR is 0, the lower bound of the 95% confidence interval cannot be calculated. However, for ease of interpretation, it can be considered 0.
If a hospital is not listed in the table, then the hospital did not perform any HYST procedures in 2016, or the procedures were excluded from the complex 30-day model.

Appendix I. References

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