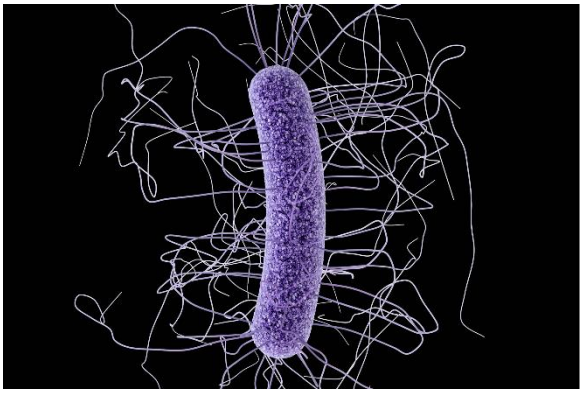

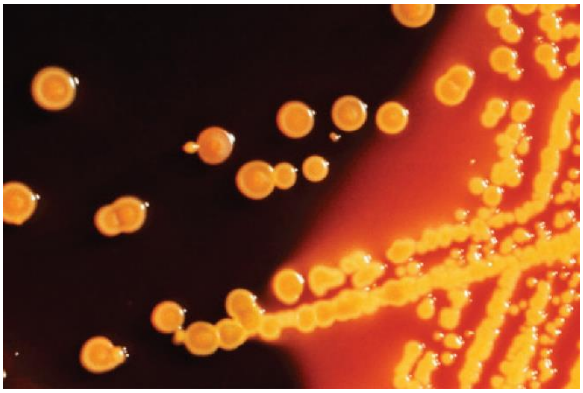

Healthcare-Associated Infections in Colorado July 2018

Submitted to the Colorado General Assembly
by the Disease Control and Environmental Epidemiology Division

COLORADO
Department of Public Health & Environment

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Executive summary

This report presents data on healthcare-associated infections (HAIs) reported by Colorado healthcare facilities to the Colorado Department of Public Health and Environment (Department). HAIs are infections that patients acquire during treatment for other conditions within a healthcare setting. HAIs included in this report include infections associated with surgeries, central lines, and dialysis treatment, as well as a bacterium found in healthcare settings, *Clostridium difficile*. HAIs can be devastating to patients and families, causing a significant financial burden due to additional medicines, treatment, procedures, and lost wages, and can cause pain, suffering and death.[1] Recognizing the seriousness of HAIs, Colorado passed the HAI Disclosure Law in 2006, which was revised and updated in 2016 (Section 25-3-601, C.R.S.).[2] Administrative changes in 2016 included a change in reporting timeframe from fiscal to calendar year, and a change in the annual report submission date to the Colorado General Assembly from January 15 to July 15 of each year. Changes in 2016 also included a change to the definition of healthcare facility to include "all state licensed or certified facilities submitting data to the National Healthcare Safety Network (NHSN)".[3] Therefore, acute care hospitals, rehabilitation hospitals, long-term acute care hospitals, ambulatory surgery centers (ASC) and outpatient dialysis facilities are required to report designated HAI data as a condition of their state licensure.

This report fulfills reporting requirements set forth in the disclosure law and is the eleventh annual report published by the Department. The report presents information about HAI reporting requirements, processes and limitations; functions of implementing the disclosure law; and HAI data submitted by Colorado healthcare facilities on surgical site infections (SSI), central-line associated bloodstream infections (CLABSI), *Clostridium difficile* infections, and dialysis-related infections. HAI data presented in this report are for the period January 1, 2015 through December 31, 2017.

Table 1 is a summary of reportable HAIs, facility types, and comparisons of Colorado data to national benchmarks. Key findings described in this report include the following:

- In 2017, the statewide SSI rates for coronary artery bypass surgeries and abdominal hysterectomies performed in hospitals for adult patients were better than the national rates; rates for all other SSIs were the same as the national rates.
- For pediatric patients, procedure volume and infections counts were low for reported conditions, resulting in data suppression for SSIs in most facilities.
- National comparisons were not available this year for SSIs in ASCs.
- In 2017, the statewide CLABSI rates in long-term acute care hospitals, hospital adult critical care units, and neonatal critical care units were better than the national rate, with the neonatal critical care unit CLABSI rates improving over three years from worse than the national rate in 2015, to the same in 2016 and better in 2017.
- Of reportable surgeries in Colorado, the most common surgeries performed include knee and hip replacements in hospitals, and breast surgeries and hernia repairs in ASCs.
- For the last three years, Colorado local access infection rates in dialysis facilities have been worse than the national rates, while the access-related bloodstream infection rates have been the same.

- The statewide *Clostridium difficile* rate has improved over three years, with Colorado hospitals performing worse than the national rate in 2015, the same in 2016, and better in 2017.
- Most Colorado healthcare facilities had HAI rates similar to national rates for most reportable HAIs.

While this report only includes information on a subset of HAIs, the information provided can be used as an important indicator of healthcare quality and infection prevention efforts in reporting Colorado facilities. Beyond the number and rate of HAIs for each facility, consumers can see the volume of procedures performed at each facility, which can be an indicator of experience and practice.

The Department continues work to reduce HAIs in Colorado through various activities, including the tracking and publishing of HAI data, guidance and technical assistance, completion of HAI data validation studies, direct observation of facility practices, and collaboration with internal and external partners committed to patient safety. Ideally, healthcare facilities will use the data in this report to target and improve infection prevention efforts, and consumers will use the data to make informed healthcare choices.

Table 1: Healthcare-Associated Infections Summary Table — Colorado, 2017

Healthcare-Associated Infection Type	No. of Facilities Reporting Data	No. of Facilities *Better* than National Benchmark	No. of Facilities *Same as* National Benchmark	No. of Facilities *Worse* than National Benchmark	No. of Facilities for which Data Are Suppressed	Comparison: Colorado to National Benchmark
Surgical Site Infections in Acute Care Hospitals Among Adults						
Procedure Type						
Abdominal Hysterectomy	53	0	24	1	28	Better
Breast Surgery	55	1	18	2	34	Same
Colon Surgery	54	2	32	3	17	Same
Coronary Artery Bypass Graft	15	0	12	0	3	Better
Hip Replacement	61	1	26	0	34	Same
Knee Replacement	62	0	23	1	38	Same
Surgical Site Infections in Acute Care Hospitals Among Pediatrics						
Procedure Type						
Abdominal Hysterectomy	3	0	0	0	3	***
Colon Surgery	16	0	2	0	14	Same
Hip Replacement	4	0	0	0	4	***
Knee Replacement	3	0	0	0	3	***
Surgical Site Infections in Ambulatory Surgery Centers Among Adults and Pediatrics						
Procedure Type						
Abdominal Hysterectomy	6	Data for national comparisons not available				
Breast Surgery	33	Data for national comparisons not available				
Hernia	35	Data for national comparisons not available				
Hip Replacement	10	Data for national comparisons not available				
Knee Replacement	14	Data for national comparisons not available				
Vaginal Hysterectomy	2	Data for national comparisons not available				
Central Line-Associated Bloodstream Infections						
Facility/Unit Type						
Adult Critical Care	64*	2	33	2	27	Better
Inpatient Rehabilitation Facility/Ward	18	0	0	0	18	Same
Long-Term Acute Care Hospital	8	0	7	0	1	Better
Neonatal Critical Care	18	1	5	0	12	Better
Dialysis Related Infections						
Infection Type						
Access-Related Bloodstream	73	1	67	5	0	Same
Local Vascular Access	73	3	59	11	0	Worse
***Clostridium difficile* Infections in Acute Care Hospitals**						
Facility Wide - Lab Identified	52	11	30	4	7	Better

Introduction

Healthcare-associated infections (HAIs) are infections that patients acquire during treatment for other conditions within a healthcare setting. HAIs included in this report include infections associated with surgeries, central lines, and dialysis treatment, as well as a bacterium found in healthcare settings, *Clostridium difficile*. HAIs can be devastating to patients and families, causing a significant financial burden due to additional medicines, treatment, procedures, and lost wages, and can cause pain, suffering and death.[1] Recognizing the seriousness of HAIs, Colorado passed the HAI Disclosure Law in 2006, which was revised and updated in 2016 (Section 25-3-601, C.R.S.).[2] Administrative changes in 2016 included a change in reporting timeframe from fiscal to calendar year, and a change in the annual report submission date to the Colorado General Assembly from January 15 to July 15 of each year. Changes in 2016 also included a change to the definition of healthcare facility to include "all state licensed or certified facilities submitting data to the National Healthcare Safety Network (NHSN)".[3] This definition currently includes hospitals, long-term acute care hospitals, hospital units, inpatient rehabilitation facilities, ambulatory surgery centers, and dialysis facilities, but may include additional facility types as they report to NHSN. These facility types are required to report designated HAI data as a condition of state licensure.

The disclosure law mandates certain healthcare facilities to report their HAI data through NHSN, a national web-based surveillance and reporting system managed by the Centers for Disease Control and Prevention (CDC). The use of NHSN improves the validity of reported HAI data because facilities must use standard definitions and reporting rules. Reporting consistency allows facility HAI data to be compared to national rates and be more easily understood by healthcare facilities and the public.

The report presents information about HAI reporting requirements, processes and limitations; functions of implementing the disclosure law; and HAI data submitted by Colorado healthcare facilities on selected surgical site infections (SSI), central line-associated bloodstream infections (CLABSI), *Clostridium difficile* and dialysis-related infections. All data presented in this report were submitted for patients receiving treatment or having procedures during the 2015, 2016, and 2017 calendar years.

Healthcare-associated infections disclosure law

Implementing Colorado's healthcare-associated infections (HAI) Disclosure Law involves four main functions, as described below:

1. Appointment of an HAI advisory committee;
2. Selection of clinical metrics;
3. Oversight of data entered into the National Healthcare Safety Network (NHSN); and
4. Public reporting of results by facility.

Appointment and coordination of an HAI advisory committee

Advisory committee members

Katie Cary, MPH, MT (ASCP), CIC
HCA/Health One

Colleen Casaceli, BSN, MPH, CIC
Platte Valley Medical Center

Tracy Flitcraft, BSN, RN
Fresenius Kidney Care

Michaela Halcomb, BSN, RN, CIC
Pinnacle III Surgical Centers

Paul Hill
Yampa Valley Medical Center

Ann Kokish, NHA
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Allison Lee Sabel-Soteres, MD, PhD
Denver Health Medical Center

Christine Lentz, BS, MBA
Coalition for Sepsis and Limb Preservation Foundation

Robin Meinberg, MSN, RN, CIC
Kaiser Permanente

Michelle Shockey, RN
Life Care Centers of America

Heather Young, MD
Denver Health Medical Center

Colorado's HAI disclosure law requires the Department's executive director to appoint an 11-member HAI advisory committee, the Colorado Healthcare-Associated Infections Advisory Committee, with the following composition: one representative from an urban hospital; one representative from a rural hospital; one board-certified or board-eligible physician licensed in Colorado who is affiliated with a Colorado hospital or medical school and an active member of a national organization specializing in healthcare epidemiology or infection control; four infection control practitioners (one from a stand-alone ambulatory surgery center [ASC], one certified in infection control and epidemiology, one from a long-term care setting, and one other healthcare professional); one medical statistician or clinical microbiologist with an advanced degree; one representative from a health consumer organization; one representative from a health insurer; and one purchaser of health insurance.

The mission of the committee is to provide oversight of legislatively-mandated HAI reporting to ensure accountability and improvement of patient healthcare through education, validation of data, and review of reporting requirements and surveillance practices. The goals of the committee are to:

- Ensure all components of the Colorado disclosure law are implemented,
- Provide guidance in selecting HAI reporting metrics,

- Evaluate relevancy and accuracy of reporting requirements,
- Establish priorities for completing data validation studies,
- Provide input on outreach activities, research projects, and other HAI-related projects as needed,
- Provide guidance regarding the annual report and other reports developed for consumers and healthcare personnel, and
- Promote safe healthcare for Colorado citizens.

Selection of clinical metrics

The current HAI reporting metrics include infections related to central lines, surgeries and outpatient dialysis treatment, as well as *Clostridium difficile (C. difficile)*. Central line-associated bloodstream infections (CLABSI) are associated with the presence of central lines in patients. A central line is an intravascular catheter (tube in a vein) that terminates at or close to the heart or in one of the great vessels (e.g., aorta, superior vena cava). Central lines, which may be temporary or permanent, are used to infuse fluids and medications, withdraw blood, or monitor fluid volume in patients. The surgeries for which surgical site infections (SSI) are reported were selected based on their high volume and risk for infection. Dialysis-related infections include bloodstream infections and localized infections of the vascular access site. Dialysis is a method for removing waste products and fluid from a patient's blood when the kidneys are failing. Because of frequent hospitalizations and weakened immune systems, dialysis patients are at high risk for infection. *C. difficile* infection is a diarrheal disease that generally occurs in patients exposed to healthcare and antibiotics. **Table 2** lists the current reporting metrics for this report.

In selecting metrics, the following factors were considered:[4]

- Impact – extent to which the infection affects the patient or family (disability, mortality and economic costs);
- Improvability – extent to which reporting infection improves practice to prevent the infection;
- Inclusiveness – range of individuals affected by the infection type (e.g., age, gender, socioeconomic status and ethnicity/race);
- Frequency – how often the infection occurs;
- Feasibility – ability for the data to be collected with minimal burden on the facilities;
- Functionality – extent to which the intended audience (patients, care providers and hospital administrators) can understand and apply the results.

Table 2: Colorado Healthcare-Associated Infection Reporting Metrics

Facility Type	Reported HAI	Reporting Hospital Unit(s)
Acute Care Hospitals	• Breast Surgical Site Infections (SSIs) • Colon SSIs • Coronary Bypass Graft SSIs • Hip Replacement SSIs • Knee Replacement SSIs	Inpatient and Outpatient Operating Rooms

	• Abdominal Hysterectomy SSIs	
	• Central Line-Associated Bloodstream Infections (CLABSIs)*	Adult Critical Care Units
		Neonatal Critical Care Units Level II/III and III
		Inpatient Rehabilitation Units
	• *Clostridium difficile* infections**	Facility-Wide Inpatient
Inpatient Rehabilitation Facilities and Long-Term Acute Care Hospitals	• CLABSIs	Adult and Pediatric Critical Care Units and Wards
Ambulatory Surgery Centers	• Breast SSIs • Hernia Repair SSIs • Hip and Knee Replacement SSIs • Abdominal Hysterectomy SSIs • Vaginal Hysterectomy SSIs	Not Applicable
Outpatient Dialysis Facilities	• Dialysis Events	Not Applicable

*Stand-alone children's hospitals report neonatal critical care data only.
Excluding critical access hospitals (defined in **Appendix C glossary) and stand-alone children's hospitals.

Oversight and validation of data

Colorado's healthcare facilities grant the Department access to data entered into NHSN, allowing the Department to monitor, analyze and produce public reports. NHSN maintains stringent policies and rules to ensure data security, integrity, confidentiality and data sharing in strict accordance to federal laws.

Colorado's HAI disclosure law requires healthcare facilities to report HAI data within 90 days of each month's end, and the department provides guidance and technical assistance to ensure the timely and accurate reporting of data. The Department also performs systematic monitoring and validation of the HAI data submitted, which allows for the identification and correction of incomplete and incorrectly entered data. The Department has completed data validation studies for CLABSIs, SSIs, dialysis-related infections, and *C. difficile* and will conduct validation studies of additional infections as funding and staffing permit. See **Appendix A** for a description of validation studies and HAI prevention projects completed or underway.

The HAI disclosure law also specifies requirements for healthcare facility employees who collect and report HAI data. These individuals must be certified in infection control and epidemiology[5] or become certified within six months after becoming eligible to take the certification test as recommended by the Certification Board of Infection Control and Epidemiology, Inc., or its successor. These certification requirements do not apply to staff in hospitals with 50 or fewer beds, dialysis facilities, ASCs, or long-term care facilities. However, staff members in these facilities must

complete specified NHSN educational programs before enrolling in NHSN, complete 10 hours of relevant infection prevention education annually, and maintain a log of the completed education.

Reporting results

This report is the eleventh annual report published by the Department. All HAI reports can be found at https://www.colorado.gov/cdphe/health-care-facility-infection-data

Participating facilities

In 2017, 78 hospitals, 10 long-term acute care hospitals (LTACHs), five inpatient rehabilitation facilities (IRFs), 60 ambulatory surgery centers (ASCs), and 76 dialysis facilities reported healthcare-associated infection (HAI) data into the National Healthcare Safety Network (NHSN) accessible to the Department. **Table 3** shows the number of hospitals that report central-line associated bloodstream infections (CLABSIs) by type of critical care unit, and **Table 4** lists reportable surgical procedures and the numbers of hospitals and ASCs that report them.

Table 3: Healthcare Facilities and Units Reporting Central Line-Associated Bloodstream Infections — Colorado, January 1, 2017 - December 31, 2017

Type of Facility/Critical Care Unit	No. of Hospitals
Burn Critical Care	2
Medical Cardiac Critical Care	2
Medical Critical Care	4
Medical/Surgical Critical Care	40
Neurosurgical Critical Care	5
Pediatric Medical/Surgical Critical Care	4
Surgical Cardiothoracic Critical Care	4
Surgical Critical Care	1
Trauma Critical Care	2
Inpatient Rehabilitation Facilities	5
Inpatient Rehabilitation Wards within Hospitals	13
Long-Term Acute Care Hospitals	8
Level II/III Neonatal Critical Care	5
Level III Neonatal Critical Care	13

Data source: National Healthcare Safety Network (NHSN) Database
Prepared by: Colorado Healthcare-Associated Infections Program, Colorado Department of Public Health and Environment

Table 4: Healthcare Facilities Reporting Surgical Procedures — Colorado, January 1, 2017 - December 31, 2017

Procedure Type	No. of Acute Care Hospitals	No. of Ambulatory Surgery Centers	No. of Facilities (Total)
Abdominal Hysterectomy	53	6	59
Breast Surgery	55	33	88
Colon Surgery	54	---	54
Coronary Artery Bypass Graft	15	---	15
Hernia	***	35	35
Hip Replacement	61	10	71
Knee Replacement	62	14	76
Vaginal Hysterectomy	***	2	2

*** Acute care hospitals do not report these procedures.
--- Ambulatory surgery centers do not report these procedures.
Data source: National Healthcare Safety Network (NHSN) Database
Prepared by: Colorado Healthcare-Associated Infections Program, Colorado Department of Public Health and Environment

Data format and cautions

Data presented in this report include surgical site infections (SSIs), central-line associated bloodstream infections (CLABSIs), dialysis-related infections, and *Clostridium difficile* (*C. difficile*) in patients receiving medical care between January 1, 2015 and December 31, 2017. Two forms of healthcare-associated infection (HAI) data are presented: infection rates that combine all Colorado facilities (aggregate data) and infection rates for each individual facility (facility-specific data). The report further classifies HAI data by procedure and/or device so facilities can readily identify areas in need of process improvements and target infection prevention efforts.

The following data tables include the facility name and city, and for each facility, the number of infections and depending on the type of infection, the number of surgeries (for SSIs), patient line days (for CLABSIs), patient-months (for dialysis-related infections), and patient-days (for *C. difficile*). Patient-months is a measure of the number of patients multiplied by the number of months of care; for example, if five patients each received two months of care, the number of patient-months is 10. Patient-days is a similar measure multiplying the number of patients by the number of days.

Most tables present a standardized infection ratio (SIR), which is a summary measure that describes the infection prevention performance of a facility or region while considering the risk of that facility or region's patient population. The SIR is a ratio that compares a facility's observed number of infections to the predicted number of infections. This adjusts for some risk factors that could affect differences in infection numbers. Predicted number of infections is calculated by the National Healthcare Safety Network (NHSN) during a baseline period. In this report, the baseline period is 2015. This is the first report to use the 2015 baseline. Previous reports used a 2009 baseline; comparisons should not be made between reports that use different baselines. A SIR of one means that a facility's observed number of infections is equal to the predicted number of infections. If the SIR value is greater than one, there are more infections than expected, and if the SIR is less than one, there are fewer infections than expected. For a more detailed explanation of how the SIR is calculated, see **Appendix B**.

In this report, national comparisons are reported for all infection types except SSIs in ambulatory surgery centers (ASCs), for which national benchmark data during 2015 baseline period are not yet available. SIRs are not reported for SSIs in ASCs or dialysis-related infections in dialysis facilities; SIRs are available for SSIs in hospitals, CLABSIs, and *C. difficile*.

National comparisons. National comparisons are shown for some conditions and facility types, when available through NHSN. National comparisons using SIRs use the facility's observed and expected number of infections, denominator size, and a statistical test of difference. The statistical test of difference, known as the Poisson test, calculates the magnitude of difference between a facility's observed and predicted number of infections.

- If there is no significant difference between the facility's observed and predicted number of infections, the facility's infection rate is designated as "same."

- If the difference is statistically significant and the SIR is greater than one, the facility has significantly more infections than predicted and is designated as “worse.”
- If the difference is statistically significant and the SIR is less than one, the facility has significantly fewer HAI than expected and is designated as “better.”

National comparisons using rates are used for dialysis events. For each dialysis event type, the rates are ranked, and a statistical test is applied to calculate what is known as a p-value.

- If the p-value is greater than or equal to 0.05, and regardless of the percentile ranking, the difference between the facility’s rate and the NHSN aggregate rate is not statistically significant, and the facility’s infection rate is designated as “same.”
- If the p-value is less than 0.05 and the percentile is low, the difference between the facility’s rate and the NHSN aggregate rate is statistically significant, and the facility’s infection rate is designated as “better.”
- If the p-value is less than 0.05 and the percentile is high, the difference between the facility’s rate and the NHSN aggregate rate is statistically significant, and the facility’s infection rate is designated as “worse.”

Infection rates in this report were calculated using NHSNs 2015 updated baseline data. NHSN updates baselines, which affect national comparisons, every few years; the last updated baseline was in 2009, which was used in previous years’ reports. At the time of this report submission, SIR calculations using the 2015 updated baseline were unavailable for outpatient procedures; only inpatient procedures are presented for hospital SSIs, and only rates are presented for ASCs.

Cautions. The Department and the Colorado HAI Advisory Committee recommend caution be used when drawing conclusions from these data for multiple reasons. For one, direct comparisons between facilities may not provide the most accurate assessment because infection rates are influenced by the types of patients treated. Facilities that treat higher volumes of severely ill patients may have higher infection rates regardless of their prevention efforts. While the NHSN system provides the best risk adjustment possible to account for this at present, there always will be patient risk factors that cannot be measured (e.g., individual ability to heal, smoking cessation days, severe suppression of the immune system) that contribute to infection risk.

Second, NHSN surveillance manuals are developed by CDC subject matter experts. Although the definitions and criteria are updated each year, they can be challenging to apply to patients with complicated medical histories. Additionally, facilities use different surveillance techniques to find infections. Some infection preventionists have more resources for surveillance, thus may find and report more infections than other facilities. In those cases, higher infection rates may be based on better surveillance practices rather than poor infection control practices. It is noteworthy that ASCs traditionally report lower numbers of SSIs than hospitals, which may be due, in part, to reduced opportunity to conduct post-surgical follow-up with patients and surgeons.

Finally, report users should note that the data presented are self-reported by each facility and, although data validation studies have been completed for selected CLABSIs, SSIs, dialysis-related

infections, and *C. difficile*, validation is not performed on every infection, nor on every condition reported each year. We recommend conclusions regarding healthcare quality be made in conjunction with other quality indicators and consumers consult with doctors, healthcare facilities, health insurance carriers, healthcare websites from reputable sources (e.g., Hospital Compare, Colorado Hospital Report Card, Leap Frog), and with their families and friends before deciding where to receive care. Ideally, facilities will use the data in this report to target and improve infection prevention efforts, and consumers will use the data to make more informed healthcare decisions.

Colorado state-level data

Aggregate surgical site infection data

Surgical site infections (SSIs) are infections directly related to a surgical procedure. **Tables 5A** and **5B** show the statewide aggregate number of SSIs for reportable procedures for the 2015, 2016, and 2017 calendar years. SSI data are presented for both hospitals and ambulatory surgical centers (ASCs).

This year's statewide SSI rates for abdominal hysterectomies and coronary artery bypass grafts in hospitals for adult patients were better than the national rate.

Hospitals. In 2017, statewide SSI rates in Colorado hospitals were better than national rates for abdominal hysterectomies and coronary artery bypass grafts for adult patients. The statewide SSI rate in Colorado hospitals following breast procedures was the same as the national rate in 2017, a change from 2016 when the statewide rate was better than the national rate. The statewide SSI rate following hip surgeries improved from worse than the national rate in 2015 to the same as the national rate in 2016 and 2017. In pediatric patients, data for SSIs are largely suppressed due to low predicted number of infections or fewer than 20 procedures performed; however, SSI rates in Colorado hospitals were the same for colon surgeries in pediatric patients.

Ambulatory surgery centers (ASCs). Only rates are presented for ASCs, as national comparisons are currently not available. Therefore, use caution when comparing rates among specific ASCs, since factors that can affect rates (e.g., patient acuity or few performed surgeries) are not taken into consideration.

Aggregate central-line associated bloodstream infection data

Central line-associated bloodstream infections (CLABSIs) are associated with specific intravascular catheters used to infuse fluids or medications, withdraw blood, or monitor fluid volume in patients. **Table 6** shows the statewide aggregate number of CLABSIs adult critical care units, neonatal critical care units, long-term acute care hospitals (LTACHs), inpatient rehabilitation facilities (IRFs), and rehabilitation wards in hospitals in Colorado for the 2015, 2016, and 2017 calendar years.

Statewide, Colorado's CLABSI rates in hospital critical care units, LTACHs, and neonatal critical care units are better than the national rates in 2017. The CLABSI rate in IRFs and rehabilitation wards in hospitals is the same as the national rate in 2017 after being better in 2016. The statewide CLABSI rate for neonatal critical care units has improved from worse than the national rate in 2015, to the same in 2016 and better in 2017.

The statewide CLABSI rate for neonatal critical care units has improved over three years from worse than the national rate in 2015, to the same in 2016 and better in 2017.

Aggregate dialysis infection data

Dialysis infection data is presented for two types of infection. An access-related bloodstream infection (ARB) is the presence of a bacterium in the blood, identified by a positive blood culture, with the source of the bacterium identified as the vascular access site (where needles for dialysis are inserted). A local access infection (LAI) is the presence of pus, redness, or swelling of the vascular access site without a bacterium identified in the blood. An ARB is usually a more serious infection than an LAI. **Table 7** shows statewide aggregate data for ARBs and LAIs in Colorado outpatient dialysis facilities for the 2015, 2016, and 2017 calendar years.

For the last three years, Colorado local access infection rates in dialysis facilities have been worse than the national rates.

Colorado's aggregate ARB rate has been the same as the national rate for three years. For three years (2015-2017), Colorado LAI rates have been found to be worse than the national rates.

Aggregate *Clostridium difficile* data

Clostridium difficile (*C. difficile*) is a spore-forming bacterium that can cause symptoms ranging from bloating, diarrhea, fever and abdominal pain to life-threatening colon inflammation, sepsis and death. **Table 8** shows statewide aggregate data for hospital-onset *C. difficile* in Colorado hospitals for the 2015, 2016, and 2017 calendar years. The statewide *C. difficile* rate has improved from worse than the national rate in 2015, to better than the national rate in 2017.

The statewide *C. difficile* infection rate has improved, with Colorado hospitals performing better than the national rate in 2017.

Table 5A: Surgical Site Infections in Hospitals — Colorado, January 1, 2015 - December 31, 2017

Patient Type and Procedure	2015				2016				2017			
	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
Adult patients												
Abdominal Hysterectomy	4,500	49	0.8	Same	5,374	66	0.9	Same	5,636	54	0.8	Better
Breast Surgery	3,687	49	0.8	Same	3,745	43	0.7	Better	4,054	63	1.0	Same
Colon Surgery	4,859	212	1.0	Same	5,016	225	1.0	Same	5,290	234	0.9	Same
Coronary Artery Bypass Graft	1,796	20	0.7	Same	1,818	24	0.8	Same	1,696	13	0.5	Better
Hip Replacement	9,956	122	1.2	Worse	10,116	103	1.0	Same	10,024	94	1.0	Same
Knee Replacement	14,063	83	1.1	Same	15,195	96	1.1	Same	15,528	93	1.1	Same
Pediatric patients												
Abdominal Hysterectomy	1	***	***	***	1	***	***	***	3	***	***	***
Colon Surgery	113	2	0.5	Same	160	4	0.6	Same	154	4	0.6	Same
Hip Replacement	14	***	***	***	11	***	***	***	14	***	***	***
Knee Replacement	3	***	***	***	9	***	***	***	3	***	***	***

The standardized infection ratio (SIR) is the quotient of the numbers of observed and predicted infections.
National comparisons based on data collected and reported by facilities participating in the National Healthcare Safety Network (NHSN) from January-December, 2015.
Adults include patients >= 18 years of age. Pediatrics include patients < 18 years of age.
*** Indicates suppression of data, either because the predicted number of infections was less than one for the procedure/year combination or there were fewer than 20 procedures of this type in this year.
Data source: National Healthcare Safety Network (NHSN) Database.
Prepared by: Colorado Healthcare-Associated Infections Program, Colorado Department of Public Health and Environment.

Table 5B: Surgical Site Infections in Ambulatory Surgery Centers — Colorado, January 1, 2015 - December 31, 2017

Procedure	2015			2016			2017		
	No. of Procedures	No. of Infections	Rate	No. of Procedures	No. of Infections	Rate	No. of Procedures	No. of Infections	Rate
Abdominal Hysterectomy	34	1	2.9	78	0	0	56	0	0
Breast Surgery	6,590	20	0.3	6,201	11	0.2	6,614	12	0.2
Hernia	5,558	6	0.1	5,629	8	0.1	5,509	7	0.1
Hip Replacement	583	10	1.7	676	5	0.7	842	10	1.2
Knee Replacement	735	2	0.3	886	1	0.1	1,108	2	0.2
Vaginal Hysterectomy	65	0	0	79	0	0	34	0	0

Rates are per 100 procedures. NOTE: These rates are not adjusted for risk.
Data include adults and pediatric patients.
Data source: National Healthcare Safety Network (NHSN) Database.
Prepared by: Colorado Healthcare-Associated Infections Program, Colorado Department of Public Health and Environment.

Table 6: Central Line-Associated Bloodstream Infections in Healthcare Facilities by Facility/Unit Type — Colorado, January 1, 2015 - December 31, 2017

Facility/Unit Type	2015				2016				2017			
	No. of Central Line Days	No. of Infections	SIR	National Comparison	No. of Central Line Days	No. of Infections	SIR	National Comparison	No. of Central Line Days	No. of Infections	SIR	National Comparison
Adult Critical Care	110,609	93	0.9	Same	106,749	81	0.8	Better	104,943	77	0.7	Better
Inpatient Rehabilitation Facility/Ward	9,849	2	0.4	Same	8,600	1	0.2	Better	8,396	1	0.2	Same
Long-Term Acute Care Hospital	34,098	25	0.7	Better	31,009	20	0.6	Better	27,155	20	0.7	Better
Neonatal Critical Care	19,161	37	1.7	Worse	18,712	27	1.2	Same	16,964	5	0.2	Better

The standardized infection ratio (SIR) is the quotient of the numbers of observed and predicted infections.
National comparisons based on data collected and reported by facilities participating in the National Healthcare Safety Network (NHSN) from January-December, 2015.
Data source: NHSN Database.
Prepared by: Colorado Healthcare-Associated Infections Program, Colorado Department of Public Health and Environment.

Table 7: Dialysis-Related Infections in Outpatient Dialysis Facilities — Colorado, January 1, 2015 - December 31, 2017

Infection Type	2015				2016				2017			
	No. of Patient-months	No. of Infections	Rate	National Comparison	No. of Patient-months	No. of Infections	Rate	National Comparison	No. of Patient-months	No. of Infections	Rate	National Comparison
Access-Related Bloodstream (ARB)	42,589	213	0.5	Same	43,392	202	0.5	Same	44,327	223	0.5	Same
Local Access Infection (LAI)	42,589	349	0.8	Worse	43,392	314	0.7	Worse	44,327	331	0.7	Worse

Rates are per 100 patient-months. NOTE: These rates are not adjusted for risk.
National comparisons based on data collected and reported by facilities participating in the National Healthcare Safety Network (NHSN) from January-December, 2015.
Data include the following access types: fistula, graft, tunneled central line, and non-tunneled central line.
Data source: NHSN Database.
Prepared by: Colorado Healthcare-Associated Infections Program, Colorado Department of Public Health and Environment.

Table 8: *Clostridium difficile* in Hospitals — Colorado, January 1, 2015 - December 31, 2017

	2015				2016				2017			
	No. of Patient Days	No. of Infections	SIR	National Comparison	No. of Patient Days	No. of Infections	SIR	National Comparison	No. of Patient Days	No. of Infections	SIR	National Comparison
Clostridium difficile infection	1,537,511	1,290	1.1	Worse	1,523,679	1,286	1.1	Same	1,543,917	1,116	0.9	Better

The standardized infection ratio (SIR) is the quotient of the numbers of observed and predicted infections.
National comparisons based on data collected and reported by facilities participating in the National Healthcare Safety Network (NHSN) from January-December, 2015.
Data source: NHSN Database.
Prepared by: Colorado Healthcare-Associated Infections Program, Colorado Department of Public Health and Environment.

Colorado facility-specific data

Surgical site infections

Overview

Surgical site infections (SSIs) are infections directly related to a surgical procedure. In a recent point prevalence survey of healthcare-associated infections (HAIs) in US hospitals, 22 percent of HAIs were SSIs.[6] SSIs can lead to longer facility stays, additional treatment, and higher costs. The average attributable cost of an SSI per patient occurrence is estimated to be between $10,443 and $25,546. Overall in the US, SSI can cost consumers and healthcare payers from 3 to 10 billion dollars each year.[1]

Surgical procedures required for SSI reporting are selected because they are (1) performed at a high volume, (2) performed at a variety of facilities, and (3) associated with a high risk for SSIs. The surgeries monitored for SSI in Colorado include: cardiac procedures; hip and knee replacements; hernia repairs; abdominal and vaginal hysterectomies; breast surgeries; and colon surgeries. The NHSN manual defines a reportable surgical procedure as an operation that takes place in an operating room, where at least one incision (including laparoscopic approach and cranial Burr holes) is made through the skin or mucous membrane, or reoperation via an incision that was left open during a prior operative procedure.[3] Surgeries are performed as either inpatient or outpatient procedures.

Reportable infections occur within 30 or 90 days of the procedure, depending on the type of procedure and infection depth. Common signs of infection include fever, pain or tenderness, drainage from the incision site, redness, or presence of an abscess. In NHSN, SSIs are classified into three different categories based on the depth of the infection:

- Superficial incision infection, which involves only the top layers of the skin;
- Deep incision, which involves deeper soft tissues (e.g., fascia and muscle layers); and
- Organ space, which involves any part of the body that is opened or manipulated during the surgical procedure, excluding the top layers of skin, fascia or muscle layers.

Every table presenting SSI data below lists each facility in Colorado that performed the designated procedure, the city where the facility is located, the number of procedures performed, and number of infections. Hospital tables include inpatient procedures only, and list the standardized infection ratio (SIR) and a comparison to national infection data. Ambulatory surgery centers (ASCs) present rates (SIRs and national comparisons are not available for outpatient procedures). Use caution when comparing rates among specific ASCs, since factors that can affect rates (e.g., patient acuity or few performed surgeries) are not taken into consideration.

For a detailed explanation of how the SIR is calculated for hospitals, see **Appendix B**. There are three categories that indicate how a facility's own infection rate compares to the national infection rate:

1. Statistically fewer infections than expected based on national infection rates (better);

2. Statistically similar infections as expected based on the national infection rates (same); or
3. Statistically more infections than expected based on national infection rates (worse).

Coronary artery bypass graft surgeries

Overview

A heart bypass, also known as a coronary artery bypass graft (CABG), is a surgery used to bypass blocked heart arteries by creating new passages for blood to flow to the heart muscle. Arteries or veins from other parts of the body are used as grafts to create alternative blood-flow pathways. There are two types of CABG surgeries: one that has both chest and donor site incisions (CBGB) and one that uses a chest incision only (CBGC). Both types involve replacing damaged sections of one or more coronary arteries with undamaged arteries or veins such as the internal mammary artery (thoracic) and saphenous vein (leg) to increase cardiac blood flow. Most cardiac operative procedures performed in Colorado hospitals are CBGB. Data for both procedures are combined in this report.

Surgical site infections (SSIs) following CABG surgeries are reportable by hospitals. In 2018, the Healthcare-Associated Infections (HAI) Advisory Committee voted to stop collection of data for SSIs following CABG procedures. Only a limited number of hospitals in Colorado perform CABG procedures, the number of CABG procedures compared to other procedures is much lower, and Colorado's SSI rates following CABG have consistently been the same or better than the national rate.

In 2017, Colorado's statewide SSI rate for coronary artery bypass surgeries was better than the national rate.

Results

Table 9 shows facility-specific data for SSIs attributed to CABG surgeries performed in hospitals during the 2015, 2016, and 2017 calendar years. Fifteen hospitals reported a total of 1,696 CABG surgeries in 2017. In 2017, seven hospitals reported zero SSIs, and all hospitals had SSI rates similar to the national rate. Colorado's statewide CABG SSI rate was better than the national rate in 2017 (**Table 5A**).

Table 9: Surgical Site Infections for Coronary Artery Bypass Grafts with Chest and Donor Site Incisions in Hospitals among Adults — Colorado, January 1, 2015 - December 31, 2017

Facility Name and City		2015				2016				2017			
		No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
Boulder Community Hospital, Foothills	Boulder	77	0	***	***	75	1	***	***	68	1	***	***
Exempla Lutheran Medical Center	Wheat Ridge	71	0	***	***	92	1	0.6	Same	81	3	2.1	Same
Exempla St. Joseph Hospital	Denver	222	2	0.5	Same	255	1	0.2	Better	130	1	0.4	Same
Medical Center of the Rockies	Loveland	228	3	0.9	Same	232	0	0	Better	225	1	0.3	Same
Memorial Health System	Colorado Springs	156	3	1.5	Same	131	2	1.3	Same	148	0	0	Same
North Colorado Medical Center	Greeley	68	0	***	***	76	0	0	Same	92	2	1.7	Same
Parkview Medical Center	Pueblo	78	2	1.2	Same	79	0	0	Same	123	0	0	Same
Penrose St. Francis Health Services	Colorado Springs	205	0	0	Same	176	2	0.9	Same	177	0	0	Same
Porter Adventist Hospital	Denver	115	2	1.5	Same	115	1	0.7	Same	110	0	0	Same
Rose Medical Center	Denver	42	3	***	***	32	1	***	***	28	0	***	***
St. Anthony Hospital	Lakewood	89	0	0	Same	121	3	1.5	Same	59	0	***	***
St. Mary's Hospital	Grand Junction	119	1	0.7	Same	137	6	3.2	Worse	92	1	0.7	Same
Swedish Medical Center	Englewood	81	1	0.9	Same	92	1	0.6	Same	75	1	0.7	Same
The Medical Center of Aurora	Aurora	118	0	0	Same	99	0	0	Same	106	0	0	Same
University of Colorado Hospital	Aurora	127	3	1.1	Same	106	5	2.3	Same	182	3	1.0	Same

The standardized infection ratio (SIR) is the quotient of the numbers of observed and predicted infections.
National comparisons based on data collected and reported by facilities participating in the National Healthcare Safety Network (NHSN) from January-December, 2015.
Adults include patients >= 18 years of age.
*** Indicates suppression of data, either because the predicted number of infections was less than one or the facility had fewer than 20 procedures of this type in this year. These facilities have met the NHSN reporting requirements.
--- Indicates that the facility was not operating or reporting data in this year.
Data source: NHSN Database.
Prepared by: Colorado Healthcare-Associated Infections Program, Colorado Department of Public Health and Environment.

Hip and knee replacement surgeries

Overview

A total or partial hip replacement is a surgery for people with severe hip damage or pain related to chronic osteoarthritis, rheumatoid arthritis, or other degenerative processes involving the hip joint. The surgical procedure for a hip replacement involves removing the damaged cartilage and bone from the hip joint and replacing them with an artificial device. The procedure consists of placing a cup, which is typically plastic, ceramic, or metal, to replace the hip socket, a metal or ceramic ball to replace the head of the femur (thigh bone), and a metal stem to attach to the bone.

For hip surgeries, four hospitals reported SSI rates better than the national rate, compared to none last year.

A total or partial knee replacement is a surgery for people with severe knee damage and pain related to osteoarthritis, rheumatoid arthritis or traumatic arthritis. A total knee replacement involves removing the damaged cartilage and bone from the surface of the knee joint and replacing them with an artificial device. In this procedure, the patella (kneecap) is removed, the femur (thigh bone) and tibia (shin bone) are cut down, and a metal, ceramic, or plastic prosthesis is put in place.

Results

Tables 10A, **10B**, and **11** show facility-specific data for surgical site infections (SSIs) attributed to hip replacements; **Tables 12A**, **12B**, and **13** show facility-specific data for SSIs attributed to knee replacements. **Tables 10A**, **10B**, **12A**, and **12B** show SSIs following procedures in hospitals (inpatient only); hospital data is divided by procedures performed among adults and children (<18 years of age)**. Tables 11** and **13** show SSIs performed in ambulatory surgery centers (ASCs, outpatient only), which includes adults and children combined. Only rates are presented for ASCs, as SIRs and national comparisons are not available for outpatient procedures; use caution when comparing rates among specific ASCs, since factors that can affect rates, such as patient acuity or few surgeries performed, are not taken into consideration.

In 2017, 62 hospitals performed 10,024 hip replacement surgeries in adults. One hospital had a hip replacement SSI rate among adult patients better than the national rate (**Table 10A)**. Excluding suppressed data, in 2017, 14 hospitals reported no SSIs following hip replacements. The statewide SSI rates in Colorado for hip replacements were better than the national rate in 2016 and 2017 among adult patients in hospitals (**Table 5A**).

Only four hospitals performed 14 hip replacement surgeries in children. SSI data among children in hospitals was largely suppressed as very few hip replacements are performed in this age group (**Table 10B**).

Ten ASCs performed 842 hip replacement surgeries and six ASCs reported no SSIs following hip replacements **(Table 11).**

> Statewide, the SSI rate for knee and hip replacements in adult patients among Colorado hospitals has been the same as the national rate for two consecutive years.

In 2017, 62 hospitals performed 15,528 knee replacement surgeries in adults. One hospital had a knee replacement SSI rate among adult patients worse than the national rate in 2017 (**Table 12A**). Excluding suppressed data, in 2017, 23 hospitals reported no SSIs following knee replacements. The statewide SSI rate in Colorado for knee replacements was better than the national rate in 2016 and 2017 among adult patients in hospitals (**Table 5A**).

Only three hospitals performed three knee replacement surgeries in children. SSI data among children in hospitals was largely suppressed as very few knee replacements were performed in this age group (**Table 12B**).

Fourteen ASCs performed 1,108 knee replacement surgeries and eight ASCs reported no SSIs following knee replacements (**Table 13**).

Table 10A: Surgical Site Infections for Hip Replacements (Total or Partial) in Hospitals among Adults — Colorado, January 1, 2015 - December 31, 2017

Facility Name and City		2015				2016				2017			
		No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
Animas Surgical Hospital	Durango	101	0	0	Same	111	0	0	Same	143	1	0.8	Same
Arkansas Valley Regional Medical Center	La Junta	14	***	***	***	6	***	***	***	20	0	***	***
Aspen Valley Hospital	Aspen	51	0	***	***	10	***	***	***	10	***	***	***
Avista Adventist Hospital	Louisville	110	1	0.8	Same	97	2	***	***	96	2	***	***
Banner Fort Collins Medical Center	Fort Collins	9	***	***	***	34	0	***	***	62	0	***	***
Boulder Community Hospital, Foothills	Boulder	392	4	1.8	Same	389	2	0.9	Same	280	0	0	Same
Castle Rock Adventist Hospital	Castle Rock	27	0	***	***	30	0	***	***	63	1	***	***
Children's Hospital Colorado	Aurora	<5	***	***	***	5	***	***	***	9	***	***	***
Colorado Canyons Hospital and Medical Center	Fruita	---	---	---	---	<5	***	***	***	14	***	***	***
Colorado Plains Medical Center	Fort Morgan	30	0	***	***	24	0	***	***	10	***	***	***
Community Hospital	Grand Junction	102	3	3.0	Same	80	1	***	***	84	1	***	***
Delta County Memorial Hospital	Delta	65	1	***	***	25	0	***	***	25	0	***	***
Denver Health Medical Center	Denver	151	8	3.8	Worse	109	2	1.2	Same	92	3	2.6	Same
East Morgan County Hospital	Brush	---	---	---	---	---	---	---	---	<5	***	***	***
Estes Park Medical Center	Estes Park	16	***	***	***	7	***	***	***	---	---	---	---
Exempla Good Samaritan Medical Center	Lafayette	451	11	2.8	Worse	518	7	1.6	Same	476	4	1.0	Same
Exempla Lutheran Medical Center	Wheat Ridge	149	3	2.1	Same	206	5	2.1	Same	243	2	0.8	Same
Exempla St. Joseph Hospital	Denver	737	5	0.7	Same	752	3	0.4	Same	369	2	0.6	Same
Gunnison Valley Hospital	Gunnison	<5	***	***	***	14	***	***	***	19	***	***	***
Heart of the Rockies Regional Medical Center	Salida	24	0	***	***	29	0	***	***	18	***	***	***
Littleton Adventist Hospital	Littleton	185	0	0	Same	182	3	1.5	Same	161	3	2.1	Same
Longmont United Hospital	Longmont	158	0	0	Same	94	1	0.9	Same	112	0	0	Same
Longs Peak Hospital	Longmont	---	---	---	---	---	---	---	---	7	***	***	***
McKee Medical Center	Loveland	130	2	2.0	Same	101	2	***	***	112	0	***	***
Medical Center of the Rockies	Loveland	174	1	0.6	Same	192	4	2.1	Same	238	2	0.9	Same
Melissa Memorial Hospital	Holyoke	---	---	---	---	---	---	---	---	<5	***	***	***
Memorial Health System	Colorado Springs	171	2	0.9	Same	139	0	0	Same	157	2	1.2	Same

Facility Name and City		2015				2016				2017			
		No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
Memorial Hospital North	Colorado Springs	142	2	1.4	Same	162	1	0.6	Same	163	0	0	Same
Mercy Regional Medical Center	Durango	125	2	***	***	109	1	***	***	97	0	***	***
Montrose Memorial Hospital	Montrose	73	0	***	***	78	0	***	***	75	0	***	***
North Colorado Medical Center	Greeley	217	2	0.8	Same	157	1	0.6	Same	149	0	0	Same
North Suburban Medical Center	Thornton	52	1	***	***	63	0	***	***	92	2	***	***
Pagosa Springs Medical Center	Pagosa Springs	9	***	***	***	11	***	***	***	19	***	***	***
Parker Adventist Hospital	Parker	155	3	1.7	Same	154	6	3.6	Worse	143	3	2.2	Same
Parkview Medical Center	Pueblo	227	2	0.7	Same	214	1	0.3	Same	165	2	0.8	Same
Penrose St. Francis Health Services	Colorado Springs	532	5	1.0	Same	555	0	0	Better	609	1	0.2	Better
Pikes Peak Regional Hospital	Woodland Park	11	***	***	***	10	***	***	***	10	***	***	***
Pioneers Medical Center	Meeker	---	---	---	---	15	***	***	***	20	0	***	***
Platte Valley Medical Center	Brighton	55	1	***	***	79	2	***	***	75	0	***	***
Porter Adventist Hospital	Denver	807	5	0.7	Same	854	9	1.3	Same	711	4	0.6	Same
Poudre Valley Health System	Fort Collins	599	3	0.7	Same	670	5	1.0	Same	607	6	1.4	Same
Presbyterian St. Luke's Medical Center	Denver	221	7	1.6	Same	197	11	2.8	Worse	175	5	1.7	Same
Rose Medical Center	Denver	318	2	0.8	Same	277	0	0	Same	308	3	1.5	Same
SCL Health Community Hospital, Westminster	Westminster	---	---	---	---	---	---	---	---	<5	***	***	***
San Luis Valley Regional Medical Center	Alamosa	34	2	***	***	28	0	***	***	60	0	***	***
Sky Ridge Medical Center	Lone Tree	1,043	12	1.3	Same	963	10	1.1	Same	1,034	7	0.8	Same
Southwest Memorial Hospital	Cortez	13	***	***	***	19	***	***	***	15	***	***	***
St. Anthony Hospital	Lakewood	131	2	1.1	Same	116	1	0.6	Same	110	2	1.3	Same
St. Anthony North Health Campus	Westminster	32	1	***	***	67	1	***	***	89	1	***	***
St. Anthony Summit Medical Center	Frisco	9	***	***	***	35	0	***	***	42	0	***	***
St. Francis Medical Center	Colorado Springs	292	5	1.7	Same	349	3	0.9	Same	358	4	1.1	Same
St. Mary Corwin Medical Center	Pueblo	186	3	1.4	Same	225	2	0.7	Same	231	2	0.8	Same
St. Mary's Hospital	Grand Junction	344	1	0.3	Same	325	0	0	Same	390	3	0.9	Same
St. Thomas More Hospital	Canon City	26	1	***	***	39	1	***	***	70	1	***	***
Sterling Regional Medical Center	Sterling	27	0	***	***	40	0	***	***	40	1	***	***

Facility Name and City		2015				2016				2017			
		No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
Swedish Medical Center	**Englewood**	298	6	1.8	Same	307	5	1.5	Same	358	6	1.5	Same
The Medical Center of Aurora	**Aurora**	215	3	1.3	Same	207	3	1.3	Same	223	1	0.4	Same
The Memorial Hospital	**Craig**	<5	***	***	***	26	0	***	***	---	---	---	---
UCHealth Yampa Valley Medical Center	**Steamboat Springs**	82	0	***	***	76	1	***	***	85	1	***	***
University of Colorado Hospital	**Aurora**	346	4	0.9	Same	384	6	1.2	Same	461	10	1.7	Same
Vail Valley Medical Center	**Vail**	<5	***	***	***	25	0	***	***	105	1	***	***
Valley View Hospital	**Glenwood Springs**	75	4	***	***	124	1	***	***	95	2	***	***
Wray Community District Hospital	**Wray**	<5	***	***	***	<5	***	***	***	15	***	***	***

The standardized infection ratio (SIR) is the quotient of the numbers of observed and predicted infections.
National comparisons based on data collected and reported by facilities participating in the National Healthcare Safety Network (NHSN) from January-December, 2015.
Adults include patients >= 18 years of age.
*** Indicates suppression of data, either because the predicted number of infections was less than one or the facility had fewer than 20 procedures of this type in this year. These facilities have met the NHSN reporting requirements.
--- Indicates that the facility was not operating or reporting data in this year.
Data source: NHSN Database.
Prepared by: Colorado Healthcare-Associated Infections Program, Colorado Department of Public Health and Environment.

Table 10B: Surgical Site Infections for Hip Replacements (Total or Partial) in Hospitals among Children (<18 Years) — Colorado, January 1, 2015 - December 31, 2017

Facility Name and City		2015				2016				2017			
		No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
Animas Surgical Hospital	Durango	<5	***	***	***	---	---	---	---	---	---	---	---
Arkansas Valley Regional Medical Center	La Junta	---	---	---	---	<5	***	***	***	---	---	---	---
Children's Hospital Colorado	Aurora	9	***	***	***	6	***	***	***	10	***	***	***
Montrose Memorial Hospital	Montrose	---	---	---	---	<5	***	***	***	---	---	---	---
Porter Adventist Hospital	Denver	---	---	---	---	---	---	---	---	<5	***	***	***
Presbyterian St. Luke's Medical Center	Denver	<5	***	***	***	<5	***	***	***	<5	***	***	***
San Luis Valley Regional Medical Center	Alamosa	---	---	---	---	---	---	---	---	<5	***	***	***
Swedish Medical Center	Englewood	<5	***	***	***	---	---	---	---	---	---	---	---
University of Colorado Hospital	Aurora	<5	***	***	***	---	---	---	---	---	---	---	---

The standardized infection ratio (SIR) is the quotient of the numbers of observed and predicted infections.
National comparisons based on data collected and reported by facilities participating in the National Healthcare Safety Network (NHSN) from January-December, 2015.
Pediatrics include patients < 18 years of age.
*** Indicates suppression of data, either because the predicted number of infections was less than one or the facility had fewer than 20 procedures of this type in this year. These facilities have met the NHSN reporting requirements.
--- Indicates that the facility was not operating or reporting data in this year.
Data source: NHSN Database.

Prepared by: Colorado Healthcare-Associated Infections Program, Colorado Department of Public Health and Environment.

Table 11: Surgical Site Infections for Hip Replacements (Total or Partial) in Ambulatory Surgery Centers — Colorado, January 1, 2015 - December 31, 2017

Facility Name and City		2015			2016			2017		
		No. of Procedures	No. of Infections	Rate	No. of Procedures	No. of Infections	Rate	No. of Procedures	No. of Infections	Rate
Audubon Ambulatory Surgery Center at St. Francis	Colorado Springs	<5	***	***	12	***	***	25	0	0
Cherry Creek Surgery Center	Denver	74	1	1.4	82	0	0	106	0	0
Flatirons Surgery Center	Louisville	13	***	***	21	0	0	16	***	***
Hampden Surgery Center	Denver	<5	***	***	<5	***	***	<5	***	***
Lincoln Surgery Center	Parker	101	2	2.0	123	1	0.8	111	1	0.9
Mile High Surgery Center	Greenwood Village	---	---	---	28	0	0	30	0	0
Orthopaedic Center of the Rockies	Fort Collins	333	6	1.8	382	2	0.5	408	9	2.2
Rose Surgical Center	Denver	6	***	***	<5	***	***	---	---	---
Surgical Center at Premier	Colorado Springs	30	1	3.3	---	---	---	---	---	---
The Orthopaedic and Spine Center of Southern Colorado	Colorado Springs	---	---	---	---	---	---	67	0	0
The Surgery Center at Lutheran	Wheat Ridge	22	0	0	26	0	0	29	0	0
Vail Valley Surgery	Edwards	---	---	---	---	---	---	49	0	0

Rates are per 100 procedures. NOTE: These rates are not adjusted for risk.
*** Indicates suppression of data, either because the predicted number of infections was less than one or the facility had fewer than 20 procedures of this type in this year. These facilities have met the NHSN reporting requirements.
--- Indicates that the facility was not performing the procedure or reporting associated data in this year.
Data source: NHSN Database.

Prepared by: Colorado Healthcare-Associated Infections Program, Colorado Department of Public Health and Environment.

Table 12A: Surgical Site Infections for Knee Replacements (Total or Partial) in Hospitals among Adults — Colorado, January 1, 2015 - December 31, 2017

Facility Name and City		2015				2016				2017			
		No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
Animas Surgical Hospital	Durango	151	0	0	Same	202	0	0	Same	233	0	0	Same
Arkansas Valley Regional Medical Center	La Junta	25	0	***	***	31	0	***	***	32	0	***	***
Aspen Valley Hospital	Aspen	75	2	***	***	68	0	***	***	74	5	***	***
Avista Adventist Hospital	Louisville	195	0	***	***	177	2	***	***	190	1	***	***
Banner Fort Collins Medical Center	Fort Collins	15	***	***	***	32	0	***	***	75	0	***	***
Boulder Community Hospital, Foothills	Boulder	430	2	1.2	Same	400	4	2.8	Same	276	0	0	Same
Castle Rock Adventist Hospital	Castle Rock	45	0	***	***	82	1	***	***	105	2	***	***
Children's Hospital Colorado	Aurora	<5	***	***	***	<5	***	***	***	<5	***	***	***
Colorado Canyons Hospital and Medical Center	Fruita	---	---	---	---	7	***	***	***	18	***	***	***
Colorado Plains Medical Center	Fort Morgan	54	0	***	***	58	0	***	***	45	0	***	***
Community Hospital	Grand Junction	140	0	***	***	147	2	***	***	165	0	***	***
Delta County Memorial Hospital	Delta	100	0	***	***	131	0	***	***	124	0	***	***
Denver Health Medical Center	Denver	153	0	0	Same	160	1	1.0	Same	103	1	***	***
East Morgan County Hospital	Brush	---	---	---	---	<5	***	***	***	9	***	***	***
Estes Park Medical Center	Estes Park	20	0	***	***	9	***	***	***	11	***	***	***
Exempla Good Samaritan Medical Center	Lafayette	740	5	1.5	Same	653	3	1.1	Same	740	6	1.9	Same
Exempla Lutheran Medical Center	Wheat Ridge	163	0	***	***	157	1	***	***	256	2	1.6	Same
Exempla St. Joseph Hospital	Denver	974	5	0.9	Same	983	3	0.6	Same	464	2	0.9	Same
Gunnison Valley Hospital	Gunnison	17	***	***	***	36	0	***	***	56	1	***	***
Heart of the Rockies Regional Medical Center	Salida	56	0	***	***	62	0	***	***	31	0	***	***
Littleton Adventist Hospital	Littleton	255	1	0.7	Same	233	2	1.5	Same	230	1	0.7	Same
Longmont United Hospital	Longmont	262	2	1.4	Same	211	1	0.9	Same	277	0	0	Same
Longs Peak Hospital	Longmont	---	---	---	---	---	---	---	---	<5	***	***	***
McKee Medical Center	Loveland	121	1	***	***	148	1	***	***	137	0	***	***
Medical Center of the Rockies	Loveland	291	3	1.8	Same	338	7	3.6	Worse	328	3	1.7	Same
Melissa Memorial Hospital	Holyoke	---	---	---	---	<5	***	***	***	<5	***	***	***

Facility Name and City		2015				2016				2017			
		No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
Memorial Health System	Colorado Springs	109	2	***	***	117	0	***	***	117	0	***	***
Memorial Hospital North	Colorado Springs	418	1	0.5	Same	510	0	0	Same	436	2	1.0	Same
Mercy Regional Medical Center	Durango	189	1	0.9	Same	159	0	***	***	139	1	***	***
Montrose Memorial Hospital	Montrose	146	0	***	***	131	1	***	***	119	0	***	***
North Colorado Medical Center	Greeley	345	2	0.9	Same	327	2	0.9	Same	289	2	0.9	Same
North Suburban Medical Center	Thornton	87	1	***	***	78	0	***	***	135	0	***	***
Pagosa Springs Medical Center	Pagosa Springs	15	***	***	***	37	0	***	***	45	0	***	***
Parker Adventist Hospital	Parker	211	0	0	Same	276	1	0.8	Same	237	3	2.0	Same
Parkview Medical Center	Pueblo	368	4	1.4	Same	369	1	0.3	Same	394	5	1.5	Same
Penrose St. Francis Health Services	Colorado Springs	384	1	0.5	Same	478	2	0.8	Same	710	3	0.8	Same
Pikes Peak Regional Hospital	Woodland Park	23	0	***	***	30	0	***	***	38	0	***	***
Pioneers Medical Center	Meeker	<5	***	***	***	28	1	***	***	26	0	***	***
Platte Valley Medical Center	Brighton	120	1	***	***	174	2	2.0	Same	184	1	***	***
Porter Adventist Hospital	Denver	1,276	3	0.5	Same	1,417	5	0.8	Same	1,086	2	0.4	Same
Poudre Valley Health System	Fort Collins	899	6	1.5	Same	1,163	4	0.8	Same	1,336	3	0.6	Same
Presbyterian St. Luke's Medical Center	Denver	240	5	1.8	Same	264	9	2.6	Worse	231	12	4.0	Worse
Rose Medical Center	Denver	528	2	0.8	Same	450	4	1.3	Same	576	4	1.2	Same
SCL Health Community Hospital, Westminster	Westminster	---	---	---	---	---	---	---	---	<5	***	***	***
San Luis Valley Regional Medical Center	Alamosa	38	0	***	***	67	1	***	***	98	1	***	***
Sky Ridge Medical Center	Lone Tree	1,273	5	0.6	Same	1,348	8	0.9	Same	1,567	8	0.9	Same
Southwest Memorial Hospital	Cortez	28	0	***	***	31	0	***	***	16	***	***	***
St. Anthony Hospital	Lakewood	81	2	***	***	60	2	***	***	38	0	***	***
St. Anthony North Health Campus	Westminster	34	0	***	***	67	0	***	***	120	0	***	***
St. Anthony Summit Medical Center	Frisco	55	0	***	***	48	0	***	***	58	0	***	***
St. Francis Medical Center	Colorado Springs	630	9	2.5	Worse	708	2	0.5	Same	712	5	1.3	Same
St. Mary Corwin Medical Center	Pueblo	343	2	1.1	Same	408	2	0.9	Same	444	0	0	Same
St. Mary's Hospital	Grand Junction	423	0	0	Same	445	0	0	Same	484	0	0	Same

Facility Name and City		2015				2016				2017			
		No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
St. Thomas More Hospital	Canon City	69	0	***	***	92	2	***	***	120	2	***	***
Sterling Regional Medical Center	Sterling	24	0	***	***	23	0	***	***	32	0	***	***
Swedish Medical Center	Englewood	417	2	0.8	Same	442	2	0.7	Same	507	4	1.3	Same
The Medical Center of Aurora	Aurora	257	4	2.2	Same	334	7	3.6	Worse	285	5	2.5	Same
The Memorial Hospital	Craig	---	---	---	---	27	0	***	***	---	---	---	---
UCHealth Yampa Valley Medical Center	Steamboat Springs	148	0	***	***	139	1	***	***	112	1	***	***
University of Colorado Hospital	Aurora	376	5	1.8	Same	364	4	1.5	Same	401	3	1.0	Same
Vail Valley Medical Center	Vail	77	0	***	***	84	2	***	***	271	1	***	***
Valley View Hospital	Glenwood Springs	133	3	***	***	168	3	2.9	Same	147	0	***	***
Wray Community District Hospital	Wray	13	***	***	***	<5	***	***	***	27	1	***	***

The standardized infection ratio (SIR) is the quotient of the numbers of observed and predicted infections.
National comparisons based on data collected and reported by facilities participating in the National Healthcare Safety Network (NHSN) from January-December, 2015.
Adults include patients >= 18 years of age.
*** Indicates suppression of data, either because the predicted number of infections was less than one or the facility had fewer than 20 procedures of this type in this year. These facilities have met the NHSN reporting requirements.
--- Indicates that the facility was not operating or reporting data in this year.
Data source: NHSN Database.
Prepared by: Colorado Healthcare-Associated Infections Program, Colorado Department of Public Health and Environment.

Table 12B: Surgical Site Infections for Knee Replacements (Total or Partial) in Hospitals among Children (<18 Years) — Colorado, January 1, 2015 - December 31, 2017

Facility Name and City		2015				2016				2017			
		No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
Aspen Valley Hospital	Aspen	---	---	---	---	<5	***	***	***	<5	***	***	***
Children's Hospital Colorado	Aurora	<5	***	***	***	<5	***	***	***	<5	***	***	***
Denver Health Medical Center	Denver	---	---	---	---	<5	***	***	***	---	---	---	---
Exempla Good Samaritan Medical Center	Lafayette	---	---	---	---	<5	***	***	***	---	---	---	---
Montrose Memorial Hospital	Montrose	---	---	---	---	<5	***	***	***	---	---	---	---
Southwest Memorial Hospital	Cortez	---	---	---	---	<5	***	***	***	---	---	---	---
Vail Valley Medical Center	Vail	---	---	---	---	---	---	---	---	<5	***	***	***

The standardized infection ratio (SIR) is the quotient of the numbers of observed and predicted infections.
National comparisons based on data collected and reported by facilities participating in the National Healthcare Safety Network (NHSN) from January-December, 2015.
Pediatrics include patients < 18 years of age.
*** Indicates suppression of data, either because the predicted number of infections was less than one or the facility had fewer than 20 procedures of this type in this year. These facilities have met the NHSN reporting requirements.
--- Indicates that the facility was not operating or reporting data in this year.
Data source: NHSN Database.
Prepared by: Colorado Healthcare-Associated Infections Program, Colorado Department of Public Health and Environment.

Table 13: Surgical Site Infections for Knee Replacements (Total or Partial) in Ambulatory Surgery Centers — Colorado, January 1, 2015 - December 31, 2017

Facility Name and City		2015			2016			2017		
		No. of Procedures	No. of Infections	Rate	No. of Procedures	No. of Infections	Rate	No. of Procedures	No. of Infections	Rate
Audubon Ambulatory Surgery Center	Colorado Springs	<5	***	***	<5	***	***	---	---	---
Audubon Ambulatory Surgery Center at St. Francis	Colorado Springs	<5	***	***	20	0	0	41	0	0
Cherry Creek Surgery Center	Denver	35	1	2.9	75	0	0	84	0	0
Crown Point Surgery Center	Parker	---	---	---	37	0	0	10	***	***
Flatirons Surgery Center	Louisville	28	1	3.6	33	0	0	22	0	0
Grand Valley Surgical Center	Grand Junction	---	---	---	<5	***	***	<5	***	***
Hampden Surgery Center	Denver	11	***	***	11	***	***	17	***	***
Harmony Surgery Center	Fort Collins	9	***	***	13	***	***	---	---	---
Kaiser Permanente Ambulatory Surgery Center, Lone Tree	Lone Tree	---	---	---	---	---	---	<5	***	***
Lincoln Surgery Center	Parker	44	0	0	58	0	0	96	0	0
Loveland Surgery Center	Loveland	---	---	---	<5	***	***	---	---	---
Mile High Surgery Center	Greenwood Village	---	---	---	37	1	2.7	43	1	2.3
Musculoskeletal Surgery Center	Thornton	<5	***	***	<5	***	***	---	---	---
Orthopaedic Center of the Rockies	Fort Collins	504	0	0	541	0	0	572	0	0
Rose Surgical Center	Denver	24	0	0	9	***	***	<5	***	***
Surgical Center at Premier	Colorado Springs	39	0	0	---	---	---	---	---	---
The Orthopaedic and Spine Center of Southern Colorado	Colorado Springs	---	---	---	---	---	---	93	0	0
The Surgery Center at Lutheran	Wheat Ridge	25	0	0	41	0	0	39	0	0
Vail Valley Surgery	Edwards	5	***	***	<5	***	***	86	0	0
Vail Valley Surgery Center	Vail	5	***	***	<5	***	***	---	---	---

Rates are per 100 procedures. NOTE: These rates are not adjusted for risk.
*** Indicates suppression of data, either because the predicted number of infections was less than one or the facility had fewer than 20 procedures of this type in this year. These facilities have met the NHSN reporting requirements.
--- Indicates that the facility was not performing the procedure or reporting associated data in this year.
Data source: NHSN Database.
Prepared by: Colorado Healthcare-Associated Infections Program, Colorado Department of Public Health and Environment.

Abdominal surgeries

Overview

The surgeries presented in this section are hernia repairs, colon surgeries, and hysterectomies (abdominal and vaginal). Surgical site infections (SSIs) following hernia repairs are reportable by ambulatory surgery centers (ASCs), colon surgeries by hospitals, abdominal hysterectomies by hospitals and ASCs, and vaginal hysterectomies by ASCs. Hernia repairs and hysterectomies may be performed as inpatient or outpatient procedures; colon surgeries are typically performed as inpatient procedures.

A hernia procedure involves the repair of a hernia, which is a bulging of internal organs or tissues that protrude through an abnormal opening in the muscle wall. Reportable NHSN hernia procedures include inguinal, femoral, umbilical or anterior abdominal wall repairs.

Colon procedures involve surgery of the large intestines. The intestines, which are muscular tubes that extend from the end of the stomach to the rectum, carry food, products of digestion and bacteria that help break down food in the digestive process. Since the intestines house bacteria, colon surgeries have a high risk for contamination and infection.

Hysterectomies involve the surgical removal of the uterus and sometimes also fallopian tubes and/or ovaries. Indications for hysterectomy might include but are not limited to benign fibroid tumors, cancerous tumors, uterine prolapse (uterus slips down into the vagina), endometriosis (cells from the uterine lining grow outside the uterus, causing pain and bleeding), chronic pelvic pain, and others. These surgeries may involve incisions in the abdominal wall (abdominal hysterectomy), or only incisions within the vagina (vaginal hysterectomy).

Tables 14-18 present data on SSIs following hernia repairs, colon surgeries and hysterectomies.

Hernia repairs

A hernia procedure involves the repair of a hernia, which is a bulging of internal organs or tissues that protrude through an abnormal opening in the muscle wall. Reportable NHSN hernia procedures include inguinal, femoral, umbilical or anterior abdominal wall repairs. Hernia repairs are reportable for ASCs only.

Results

Table 14 shows facility specific data for SSIs following to hernia repairs performed in ASCs during the 2015, 2016, and 2017 calendar years. Only rates are presented for hernia repairs in ASCs, SIRs and national comparisons are not available for outpatient procedures; use caution when comparing rates among specific ASCs, since factors that can affect rates, such as patient acuity or few surgeries performed, are not taken into consideration.

The number of ASCs reporting no SSIs following hernia repairs has remained stable for 3 years.

In 2017, 35 ASCs reported 5,509 hernia repairs. During 2015-2017, the number of ASCs reporting no SSIs following hernia repairs has remained stable: 20 ASCs in 2017 and 2016, and 19 ASCs in 2015.

Table 14: Surgical Site Infections for Hernia Surgeries in Ambulatory Surgery Centers — Colorado, January 1, 2015 - December 31, 2017

Facility Name and City		2015			2016			2017		
		No. of Procedures	No. of Infections	Rate	No. of Procedures	No. of Infections	Rate	No. of Procedures	No. of Infections	Rate
Aberdeen Ambulatory Surgical Center	Pueblo	<5	***	***	<5	***	***	18	***	***
Arkansas Valley Surgery Center	Canon City	124	0	0	115	0	0	84	0	0
Audubon Ambulatory Surgery Center	Colorado Springs	8	***	***	<5	***	***	---	---	---
Audubon Ambulatory Surgery Center at St. Francis	Colorado Springs	519	0	0	470	1	0.2	463	0	0
Black Canyon Surgical Center	Montrose	38	0	0	42	0	0	50	0	0
Canyon View Surgery Center	Grand Junction	---	---	---	42	0	0	102	0	0
Centrum Surgical Center	Greenwood Village	<5	***	***	12	***	***	20	1	5.0
Cherry Creek Surgery Center	Denver	---	---	---	<5	***	***	---	---	---
Children's North Surgery Center	Broomfield	67	0	0	68	0	0	88	0	0
Clear Creek Surgery Center	Wheat Ridge	354	1	0.3	255	1	0.4	279	1	0.4
Crown Point Surgery Center	Parker	327	0	0	329	0	0	255	0	0
Denver Midtown Surgical Center	Denver	204	0	0	172	0	0	182	0	0
Grand Valley Surgical Center	Grand Junction	204	0	0	183	1	0.5	197	2	1.0
Harmony Surgery Center	Fort Collins	469	1	0.2	525	0	0	515	2	0.4
Harvard Park Surgery Center	Denver	20	0	0	38	0	0	46	0	0
Kaiser Permanente Ambulatory Surgery Center	Denver	426	2	0.5	464	0	0	569	1	0.2
Kaiser Permanente Ambulatory Surgery Center, Lone Tree	Lone Tree	302	0	0	368	3	0.8	377	0	0
Memorial Health System Outpatient Surgery at Printer Park	Colorado Springs	225	0	0	250	1	0.4	295	0	0
Midvalley Ambulatory Surgery Center	Basalt	<5	***	***	---	---	---	---	---	---
Mile High Surgery Center	Greenwood Village	---	---	---	86	0	0	121	0	0
Mountain Vista Surgery Center	Greeley	---	---	---	10	***	***	8	***	***
Musculoskeletal Surgery Center	Thornton	<5	***	***	<5	***	***	6	***	***
North Suburban Surgery Center	Thornton	108	0	0	106	0	0	17	***	***
Parkwest Surgery Center	Pueblo	8	***	***	15	***	***	<5	***	***
Peak One Surgery Center	Frisco	70	0	0	76	0	0	45	0	0
Physicians Surgery Center	Durango	82	0	0	18	***	***	---	---	---
Pueblo Surgery Center	Pueblo	<5	***	***	9	***	***	8	***	***

Facility Name and City		2015			2016			2017		
		No. of Procedures	No. of Infections	Rate	No. of Procedures	No. of Infections	Rate	No. of Procedures	No. of Infections	Rate
Red Rocks Surgery Center	Golden	297	0	0	248	0	0	171	0	0
Renewal Surgery Lone Tree	Lone Tree	6	***	***	9	***	***	<5	***	***
Rocky Mountain Surgery Center	Englewood	322	1	0.3	417	0	0	405	0	0
Rose Surgical Center	Denver	343	1	0.3	327	0	0	248	0	0
Sky Ridge Surgical Center	Lone Tree	246	0	0	217	0	0	252	0	0
Skyline Surgery Center	Loveland	161	0	0	210	0	0	167	0	0
Southwest Colorado Surgical Center	Cortez	11	***	***	6	***	***	6	***	***
Summit View Surgery Center	Littleton	423	0	0	384	0	0	373	0	0
Surgcenter of Castle Rock	Castle Rock	9	***	***	18	***	***	10	***	***
Surgery Center of Fort Collins	Fort Collins	7	***	***	<5	***	***	---	---	---
Surgery Center of the Rockies	Aurora	15	***	***	13	***	***	46	0	0
Surgical Center at Premier	Colorado Springs	56	0	0	---	---	---	---	---	---
The Surgery Center at Lutheran	Wheat Ridge	<5	***	***	24	0	0	14	***	***
UCHealth Longs Peak Surgery Center	Longmont	91	0	0	86	0	0	64	0	0
Vail Valley Surgery	Edwards	<5	***	***	8	***	***	---	---	---

Rates are per 100 procedures. NOTE: These rates are not adjusted for risk.
*** Indicates suppression of data, either because the predicted number of infections was less than one or the facility had fewer than 20 procedures of this type in this year. These facilities have met the NHSN reporting requirements.
--- Indicates that the facility was not performing the procedure or reporting associated data in this year.
Data source: National Healthcare Safety Network (NHSN) Database.
Prepared by: Colorado Healthcare-Associated Infections Program, Colorado Department of Public Health and Environment.

Colon surgeries

Colon procedures involve surgery of the large intestines. The intestines, which are muscular tubes that extend from the end of the stomach to the rectum, carry food, products of digestion and bacteria that help break down food in the digestive process. Since the intestines house bacteria, colon surgeries have a high risk for contamination and infection.

Results

Tables 15A and **15B** display facility-specific data for SSIs following colon surgeries in adults and children (<18 years of age), respectively, performed in hospitals during the 2015, 2016, and 2017 calendar years.

The statewide rate for colon SSI in Colorado remained the same as the national rate for 3 years (2015-2017).

In 2017, 54 hospitals reported 5,290 colon surgeries among adult patients in 2017; four hospitals reported no SSIs following colon surgeries. Among surgeries performed in adult patients, two hospitals had colon SSI rates better than the national rate, and three had a rate that was worse; all others had rates similar to the national rate (**Table 15A**). When combining data across all Colorado hospitals, the statewide aggregate rate for colon SSIs has remained the same for three years for adult patients (**Table 5A**).

Sixteen hospitals reported 154 colon surgeries among pediatric patients; however, SIR could only be calculated for two facilities, whose rates were the same as the national rate **(Table 15B)**. The statewide aggregate rate for colon SSIs among children under 18 years of age was similar to the national rate (**Table 5B**).

Table 15A: Surgical Site Infections for Colon Surgeries in Hospitals among Adults — Colorado, January 1, 2015 - December 31, 2017

Facility Name and City		2015				2016				2017			
		No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
Arkansas Valley Regional Medical Center	La Junta	5	***	***	***	7	***	***	***	11	***	***	***
Aspen Valley Hospital	Aspen	11	***	***	***	21	1	***	***	6	***	***	***
Avista Adventist Hospital	Louisville	30	5	4.2	Worse	40	1	0.6	Same	55	3	1.5	Same
Banner Fort Collins Medical Center	Fort Collins	<5	***	***	***	7	***	***	***	6	***	***	***
Boulder Community Hospital, Foothills	Boulder	97	7	1.8	Same	94	5	1.6	Same	52	6	3.0	Worse
Castle Rock Adventist Hospital	Castle Rock	23	0	***	***	40	2	1.2	Same	21	0	***	***
Children's Hospital Colorado	Aurora	7	***	***	***	6	***	***	***	13	***	***	***
Colorado Plains Medical Center	Fort Morgan	5	***	***	***	8	***	***	***	9	***	***	***
Community Hospital	Grand Junction	73	1	0.4	Same	49	5	2.4	Same	53	3	1.4	Same
Delta County Memorial Hospital	Delta	33	0	0	Same	54	1	0.4	Same	61	0	0	Same
Denver Health Medical Center	Denver	124	15	2.1	Worse	129	13	1.5	Same	137	8	0.9	Same
East Morgan County Hospital	Brush	<5	***	***	***	---	---	---	---	---	---	---	---
Estes Park Medical Center	Estes Park	<5	***	***	***	<5	***	***	***	---	---	---	---
Exempla Good Samaritan Medical Center	Lafayette	190	11	1.5	Same	206	14	1.5	Same	202	10	1.0	Same
Exempla Lutheran Medical Center	Wheat Ridge	190	10	1.2	Same	166	9	1.2	Same	156	6	0.8	Same
Exempla St. Joseph Hospital	Denver	224	12	1.0	Same	266	12	0.8	Same	220	11	0.8	Same
Gunnison Valley Hospital	Gunnison	---	---	---	---	<5	***	***	***	10	***	***	***
Heart of the Rockies Regional Medical Center	Salida	16	***	***	***	21	0	***	***	14	***	***	***
Littleton Adventist Hospital	Littleton	70	1	0.3	Same	88	4	1.0	Same	95	2	0.5	Same
Longmont United Hospital	Longmont	85	2	0.6	Same	68	1	0.4	Same	85	2	0.5	Same
Longs Peak Hospital	Longmont	---	---	---	---	---	---	---	---	7	***	***	***
McKee Medical Center	Loveland	64	6	2.2	Same	50	0	0	Same	57	1	0.4	Same
Medical Center of the Rockies	Loveland	128	1	0.2	Better	150	7	0.9	Same	161	15	1.9	Worse
Memorial Health System	Colorado Springs	219	1	0.1	Better	229	5	0.5	Better	217	5	0.5	Same
Memorial Hospital North	Colorado Springs	67	0	0	Same	95	1	0.2	Same	87	1	0.2	Same
Mercy Regional Medical Center	Durango	58	1	0.4	Same	45	2	1.1	Same	47	0	0	Same
Montrose Memorial Hospital	Montrose	45	4	2.4	Same	34	3	2.5	Same	46	4	2.4	Same

Facility Name and City		2015				2016				2017			
		No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
Mt. San Rafael Hospital	Trinidad	5	***	***	***	---	---	---	---	<5	***	***	***
North Colorado Medical Center	Greeley	159	12	1.7	Same	166	15	1.9	Worse	164	12	1.6	Same
North Suburban Medical Center	Thornton	49	0	0	Same	59	4	1.8	Same	78	2	0.6	Same
Pagosa Springs Medical Center	Pagosa Springs	<5	***	***	***	<5	***	***	***	---	---	---	---
Parker Adventist Hospital	Parker	128	3	0.6	Same	131	3	0.5	Same	159	1	0.2	Better
Parkview Medical Center	Pueblo	189	17	1.8	Worse	244	11	1.0	Same	169	14	1.8	Worse
Penrose St. Francis Health Services	Colorado Springs	212	21	2.3	Worse	189	7	1.0	Same	252	11	1.0	Same
Pikes Peak Regional Hospital	Woodland Park	<5	***	***	***	---	---	---	---	---	---	---	---
Pioneers Medical Center	Meeker	---	---	---	---	<5	***	***	***	<5	***	***	***
Platte Valley Medical Center	Brighton	36	1	0.7	Same	60	4	1.9	Same	100	3	0.9	Same
Porter Adventist Hospital	Denver	68	1	0.3	Same	62	0	0	Same	59	0	0	Same
Poudre Valley Health System	Fort Collins	174	3	0.4	Same	155	3	0.4	Same	163	4	0.6	Same
Presbyterian St. Luke's Medical Center	Denver	105	2	0.5	Same	93	3	0.6	Same	133	2	0.3	Better
Rose Medical Center	Denver	213	15	2.2	Worse	174	7	1.1	Same	189	11	1.6	Same
San Luis Valley Regional Medical Center	Alamosa	18	***	***	***	17	***	***	***	17	***	***	***
Sky Ridge Medical Center	Lone Tree	256	5	0.5	Better	237	4	0.4	Better	278	8	0.6	Same
Southwest Memorial Hospital	Cortez	17	***	***	***	13	***	***	***	6	***	***	***
St. Anthony Hospital	Lakewood	138	7	1.1	Same	166	5	0.7	Same	154	7	1.0	Same
St. Anthony North Health Campus	Westminster	97	6	1.1	Same	67	5	1.4	Same	61	6	1.8	Same
St. Anthony Summit Medical Center	Frisco	<5	***	***	***	7	***	***	***	12	***	***	***
St. Francis Medical Center	Colorado Springs	86	2	0.6	Same	90	1	0.3	Same	90	2	0.6	Same
St. Mary Corwin Medical Center	Pueblo	58	2	0.7	Same	48	2	0.9	Same	55	1	0.4	Same
St. Mary's Hospital	Grand Junction	165	0	0	Better	178	6	0.8	Same	135	6	1.1	Same
St. Thomas More Hospital	Canon City	31	2	1.5	Same	37	1	0.6	Same	30	1	0.8	Same
Sterling Regional Medical Center	Sterling	19	***	***	***	<5	***	***	***	13	***	***	***
Swedish Medical Center	Englewood	307	17	1.6	Same	335	19	1.4	Same	343	14	1.0	Same
The Medical Center of Aurora	Aurora	122	5	0.9	Same	141	3	0.5	Same	139	4	0.7	Same
UCHealth Yampa Valley Medical Center	Steamboat Springs	15	***	***	***	16	***	***	***	16	***	***	***

Facility Name and City		2015				2016				2017			
		No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
University of Colorado Hospital	**Aurora**	379	10	0.4	**Better**	399	33	1.1	Same	599	43	1.0	Same
Vail Valley Medical Center	**Vail**	9	***	***	***	7	***	***	***	15	***	***	***
Valley View Hospital	**Glenwood Springs**	26	3	2.6	Same	37	1	0.6	Same	28	1	0.7	Same
Wray Community District Hospital	**Wray**	---	---	---	---	<5	***	***	***	---	---	---	---
Yuma District Hospital	**Yuma**	<5	***	***	***	---	---	---	---	---	---	---	---

• The standardized infection ratio (SIR) is the quotient of the numbers of observed and predicted infections.
National comparisons based on data collected and reported by facilities participating in the National Healthcare Safety Network (NHSN) from January-December, 2015.
Adults include patients >= 18 years of age.
*** Indicates suppression of data, either because the predicted number of infections was less than one or the facility had fewer than 20 procedures of this type in this year. These facilities have met the NHSN reporting requirements.
--- Indicates that the facility was not operating or reporting data in this year.
Data source: NHSN Database.
Prepared by: Colorado Healthcare-Associated Infections Program, Colorado Department of Public Health and Environment

Table 15B: Surgical Site Infections for Colon Surgeries in Hospitals among Children (<18 Years) — Colorado, January 1, 2015 - December 31, 2017

Facility Name and City		2015				2016				2017			
		No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
Aspen Valley Hospital	Aspen	---	---	---	---	<5	***	***	***	---	---	---	---
Boulder Community Hospital, Foothills	Boulder	---	---	---	---	<5	***	***	***	---	---	---	---
Children's Hospital Colorado	Aurora	66	1	0.4	Same	94	1	0.2	Same	95	2	0.4	Same
Delta County Memorial Hospital	Delta	---	---	---	---	<5	***	***	***	---	---	---	---
Denver Health Medical Center	Denver	<5	***	***	***	6	***	***	***	7	***	***	***
Exempla St. Joseph Hospital	Denver	<5	***	***	***	<5	***	***	***	<5	***	***	***
Littleton Adventist Hospital	Littleton	<5	***	***	***	---	---	---	---	---	---	---	---
McKee Medical Center	Loveland	<5	***	***	***	---	---	---	---	---	---	---	---
Memorial Health System	Colorado Springs	<5	***	***	***	17	***	***	***	6	***	***	***
North Colorado Medical Center	Greeley	---	---	---	---	---	---	---	---	<5	***	***	***
North Suburban Medical Center	Thornton	---	---	---	---	---	---	---	---	<5	***	***	***
Parker Adventist Hospital	Parker	<5	***	***	***	---	---	---	---	<5	***	***	***
Parkview Medical Center	Pueblo	---	---	---	---	---	---	---	---	<5	***	***	***
Penrose St. Francis Health Services	Colorado Springs	---	---	---	---	---	---	---	---	<5	***	***	***
Platte Valley Medical Center	Brighton	<5	***	***	***	---	---	---	---	---	---	---	---
Poudre Valley Health System	Fort Collins	---	---	---	---	<5	***	***	***	<5	***	***	***
Presbyterian St. Luke's Medical Center	Denver	27	0	***	***	27	1	***	***	31	1	1.0	Same
San Luis Valley Regional Medical Center	Alamosa	<5	***	***	***	<5	***	***	***	---	---	---	---
Sky Ridge Medical Center	Lone Tree	---	---	---	---	---	---	---	---	<5	***	***	***
St. Anthony Hospital	Lakewood	---	---	---	---	---	---	---	---	<5	***	***	***
St. Francis Medical Center	Colorado Springs	<5	***	***	***	---	---	---	---	---	---	---	---
St. Mary's Hospital	Grand Junction	<5	***	***	***	7	***	***	***	<5	***	***	***
Swedish Medical Center	Englewood	<5	***	***	***	---	---	---	---	<5	***	***	***
University of Colorado Hospital	Aurora	<5	***	***	***	<5	***	***	***	<5	***	***	***

Facility Name and City		2015				2016				2017			
		No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
Valley View Hospital	Glenwood Springs	<5	***	***	***	---	---	---	---	---	---	---	---

The standardized infection ratio (SIR) is the quotient of the numbers of observed and predicted infections.
National comparisons based on data collected and reported by facilities participating in the National Healthcare Safety Network (NHSN) from January-December, 2015.
Pediatrics include patients < 18 years of age.
*** Indicates suppression of data, either because the predicted number of infections was less than one or the facility had fewer than 20 procedures of this type in this year. These facilities have met the NHSN reporting requirements.
--- Indicates that the facility was not operating or reporting data in this year.
Data source: NHSN Database.
Prepared by: Colorado Healthcare-Associated Infections Program, Colorado Department of Public Health and Environment.

Hysterectomies

In the past, hysterectomies were performed by making a large abdominal incision to access the uterus and surrounding anatomy. This traditional, open abdominal surgery often causes significant pain, threat to surrounding organs and nerves, long recovery periods, and a higher risk of bleeding and infection.[7] Surgeons now typically use less invasive techniques such as vaginal hysterectomies and abdominal hysterectomies using smaller incisions and scopes. In vaginal hysterectomies, the procedure is completed through the vagina with no abdominal incisions. Compared to traditional, open abdominal hysterectomies, vaginal hysterectomies have been shown to result in fewer surgical complications and infections.[8] Surgical site infections (SSIs) following abdominal hysterectomies are reportable by hospitals and ambulatory surgery centers (ASCs); only ASCs are required to report vaginal hysterectomies. This report presents SSI data for both abdominal and vaginal hysterectomies.

Results

Tables 16-18 show facility-specific data for SSIs following abdominal and vaginal hysterectomies performed during the 2015, 2016, and 2017 calendar years. Only rates are presented for ASCs, as national comparisons are currently not available; use caution when comparing rates among specific ASCs, since factors that can affect rates, such as patient acuity or few surgeries performed, are not taken into consideration.

In 2017, the statewide SSI rate for abdominal hysterectomies in hospitals was better than the national rate.

In 2017, 55 hospitals reported 5,636 abdominal hysterectomies among adult patients (**Table 16A**). One hospital had an SSI rate following abdominal hysterectomies that was worse than the national rate. Sixteen hospitals reported no SSIs following abdominal hysterectomies. In 2017, the statewide SSI rate for abdominal hysterectomies was better than the national rate for adult patients in hospitals (**Table 5A**).

Only three hospitals reported a total of three abdominal hysterectomies among pediatric patients less than 18 years of age (**Table 16B**); infection rates could not be calculated for pediatric patients.

Six ASCs reported 56 abdominal hysterectomies (**Table 17**), with 2 ASCs reporting no SSIs following abdominal hysterectomies.

Two ASCs reported 34 vaginal hysterectomies with one facility reporting 33 (**Table 18**). Since ASCs began reporting SSI following vaginal hysterectomies in 2011, zero SSIs have been reported.

Table 16A: Surgical Site Infections for Abdominal Hysterectomies in Hospitals among Adults — Colorado, January 1, 2015 - December 31, 2017

Facility Name and City		2015				2016				2017			
		No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
Animas Surgical Hospital	Durango	6	***	***	***	8	***	***	***	<5	***	***	***
Arkansas Valley Regional Medical Center	La Junta	9	***	***	***	<5	***	***	***	---	---	---	---
Aspen Valley Hospital	Aspen	9	***	***	***	6	***	***	***	6	***	***	***
Avista Adventist Hospital	Louisville	116	3	2.2	Same	156	1	0.5	Same	148	0	0	Same
Banner Fort Collins Medical Center	Fort Collins	6	***	***	***	33	0	***	***	30	0	***	***
Boulder Community Hospital, Foothills	Boulder	78	2	***	***	76	0	***	***	67	0	***	***
Castle Rock Adventist Hospital	Castle Rock	29	0	***	***	27	0	***	***	16	***	***	***
Colorado Plains Medical Center	Fort Morgan	19	***	***	***	18	***	***	***	22	0	***	***
Community Hospital	Grand Junction	67	0	***	***	72	3	2.9	Same	80	1	0.6	Same
Delta County Memorial Hospital	Delta	20	0	***	***	5	***	***	***	7	***	***	***
Denver Health Medical Center	Denver	74	3	1.4	Same	74	1	0.5	Same	76	4	1.9	Same
East Morgan County Hospital	Brush	5	***	***	***	7	***	***	***	---	---	---	---
Estes Park Medical Center	Estes Park	<5	***	***	***	<5	***	***	***	<5	***	***	***
Exempla Good Samaritan Medical Center	Lafayette	143	2	1.2	Same	106	0	0	Same	90	0	***	***
Exempla Lutheran Medical Center	Wheat Ridge	174	3	1.5	Same	225	3	1.3	Same	218	1	0.5	Same
Exempla St. Joseph Hospital	Denver	408	9	1.1	Same	372	1	0.1	Better	277	3	0.6	Same
Gunnison Valley Hospital	Gunnison	<5	***	***	***	<5	***	***	***	5	***	***	***
Heart of the Rockies Regional Medical Center	Salida	<5	***	***	***	9	***	***	***	<5	***	***	***
Littleton Adventist Hospital	Littleton	224	1	0.3	Same	337	3	0.7	Same	392	3	1.0	Same
Longmont United Hospital	Longmont	25	0	***	***	40	0	***	***	141	2	1.6	Same
Longs Peak Hospital	Longmont	---	---	---	---	---	---	---	---	28	1	***	***
McKee Medical Center	Loveland	264	5	2.3	Same	277	5	2.1	Same	282	3	1.3	Same
Medical Center of the Rockies	Loveland	18	***	***	***	79	1	0.7	Same	149	1	0.4	Same
Memorial Health System	Colorado Springs	35	0	***	***	31	2	***	***	155	1	0.4	Same
Memorial Hospital North	Colorado Springs	21	0	***	***	14	***	***	***	74	0	0	Same
Mercy Regional Medical Center	Durango	67	0	0	Same	63	1	***	***	62	1	***	***
Montrose Memorial Hospital	Montrose	34	0	***	***	101	1	***	***	75	0	***	***

Facility Name and City		2015				2016				2017			
		No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
Mt. San Rafael Hospital	Trinidad	<5	***	***	***	<5	***	***	***	5	***	***	***
North Colorado Medical Center	Greeley	122	3	2.5	Same	70	3	***	***	47	0	***	***
North Suburban Medical Center	Thornton	114	0	***	***	154	1	0.7	Same	158	1	0.7	Same
Pagosa Springs Medical Center	Pagosa Springs	<5	***	***	***	---	---	---	---	---	---	---	---
Parker Adventist Hospital	Parker	191	2	0.7	Same	198	1	0.4	Same	237	4	1.8	Same
Parkview Medical Center	Pueblo	182	0	0	Same	264	0	0	Better	153	1	0.6	Same
Penrose St. Francis Health Services	Colorado Springs	95	3	2.3	Same	253	1	0.4	Same	322	3	0.7	Same
Pikes Peak Regional Hospital	Woodland Park	<5	***	***	***	---	---	---	---	---	---	---	---
Platte Valley Medical Center	Brighton	50	0	***	***	75	2	***	***	49	1	***	***
Porter Adventist Hospital	Denver	47	1	***	***	60	0	***	***	27	0	***	***
Poudre Valley Health System	Fort Collins	67	0	0	Same	216	3	0.9	Same	239	1	0.3	Same
Presbyterian St. Luke's Medical Center	Denver	113	0	0	Same	121	0	0	Same	155	1	0.5	Same
Rose Medical Center	Denver	220	4	1.3	Same	272	1	0.3	Same	221	2	0.7	Same
San Luis Valley Regional Medical Center	Alamosa	20	0	***	***	20	0	***	***	16	***	***	***
Sky Ridge Medical Center	Lone Tree	223	0	0	Same	250	0	0	Same	323	1	0.3	Same
Southwest Memorial Hospital	Cortez	11	***	***	***	7	***	***	***	13	***	***	***
St. Anthony Hospital	Lakewood	27	0	***	***	18	***	***	***	34	0	***	***
St. Anthony North Health Campus	Westminster	68	1	0.7	Same	74	5	4.2	Worse	88	0	0	Same
St. Anthony Summit Med Center	Frisco	29	0	***	***	19	***	***	***	23	0	***	***
St. Francis Medical Center	Colorado Springs	84	0	***	***	237	5	2.1	Same	293	1	0.4	Same
St. Mary Corwin Medical Center	Pueblo	45	1	***	***	43	0	***	***	22	0	***	***
St. Mary's Hospital	Grand Junction	172	0	0	Same	150	0	0	Same	159	1	0.6	Same
St. Thomas More Hospital	Canon City	29	2	***	***	46	1	***	***	28	0	***	***
Sterling Regional Medical Center	Sterling	5	***	***	***	<5	***	***	***	<5	***	***	***
Swedish Medical Center	Englewood	415	1	0.2	Same	325	3	0.7	Same	262	0	0	Same
The Medical Center of Aurora	Aurora	55	0	***	***	78	1	***	***	98	1	0.7	Same
The Memorial Hospital	Craig	---	---	---	---	<5	***	***	***	---	---	---	---
UCHealth Yampa Valley Medical Center	Steamboat Springs	10	***	***	***	6	***	***	***	6	***	***	***

Facility Name and City		2015				2016				2017			
		No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
University of Colorado Hospital	Aurora	207	2	0.4	Same	213	13	2.2	Worse	199	15	2.6	Worse
Vail Valley Medical Center	Vail	10	***	***	***	12	***	***	***	6	***	***	***
Valley View Hospital	Glenwood Springs	25	1	***	***	42	0	***	***	45	0	***	***

The standardized infection ratio (SIR) is the quotient of the numbers of observed and predicted infections.
National comparisons based on data collected and reported by facilities participating in the National Healthcare Safety Network (NHSN) from January-December, 2015.
Adults include patients >= 18 years of age.
*** Indicates suppression of data, either because the predicted number of infections was less than one or the facility had fewer than 20 procedures of this type in this year. These facilities have met the NHSN reporting requirements.
--- Indicates that the facility was not operating or reporting data in this year.
Data source: NHSN Database.
Prepared by: Colorado Healthcare-Associated Infections Program, Colorado Department of Public Health and Environment.

Table 16B: Surgical Site Infections for Abdominal Hysterectomies in Hospitals among Children (<18 Years) — Colorado, January 1, 2015 - December 31, 2017

Facility Name and City		2015				2016				2017			
		No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
McKee Medical Center	Loveland	---	---	---	---	---	---	---	---	<5	***	***	***
Presbyterian St. Luke's Medical Center	Denver	<5	***	***	***	---	---	---	---	---	---	---	---
St. Mary's Hospital	Grand Junction	---	---	---	---	---	---	---	---	<5	***	***	***
University of Colorado Hospital	Aurora	---	---	---	---	<5	***	***	***	<5	***	***	***

The standardized infection ratio (SIR) is the quotient of the numbers of observed and predicted infections.
National comparisons based on data collected and reported by facilities participating in the National Healthcare Safety Network (NHSN) from January-December, 2015.
Pediatrics include patients < 18 years of age.
*** Indicates suppression of data, either because the predicted number of infections was less than one or the facility had fewer than 20 procedures of this type in this year. These facilities have met the NHSN reporting requirements.
--- Indicates that the facility was not operating or reporting data in this year.
Data source: NHSN Database.
Prepared by: Colorado Healthcare-Associated Infections Program, Colorado Department of Public Health and Environment.

Table 17: Surgical Site Infections for Abdominal Hysterectomies in Ambulatory Surgery Centers — Colorado, January 1, 2015 - December 31, 2017

Facility Name and City		2015			2016			2017		
		No. of Procedures	No. of Infections	Rate	No. of Procedures	No. of Infections	Rate	No. of Procedures	No. of Infections	Rate
Harvard Park Surgery Center	Denver	---	---	---	6	***	***	<5	***	***
Kaiser Permanente Ambulatory Surgery Center	Denver	24	0	0	38	0	0	26	0	0
Kaiser Permanente Ambulatory Surgery Center, Lone Tree	Lone Tree	<5	***	***	21	0	0	21	0	0
Memorial Health System Outpatient Surgery at Printer Park	Colorado Springs	<5	***	***	6	***	***	---	---	---
Peak One Surgery Center	Frisco	---	---	---	---	---	---	<5	***	***
Pueblo Surgery Center	Pueblo	---	---	---	---	---	---	<5	***	***
Sky Ridge Surgical Center	Lone Tree	<5	***	***	6	***	***	6	***	***
Vail Valley Surgery	Edwards	---	---	---	<5	***	***	---	---	---

Rates are per 100 procedures. NOTE: These rates are not adjusted for risk.
*** Indicates suppression of data, either because the predicted number of infections was less than one or the facility had fewer than 20 procedures of this type in this year. These facilities have met the National Healthcare Safety Network (NHSN) reporting requirements.
--- Indicates that the facility was not performing the procedure or reporting associated data in this year.
Data source: NHSN Database.

Prepared by: Colorado Healthcare-Associated Infections Program, Colorado Department of Public Health and Environment.

Table 18: Surgical Site Infections for Vaginal Hysterectomies in Ambulatory Surgery Centers — Colorado, January 1, 2015 - December 31, 2017

Facility Name and City		2015			2016			2017		
		No. of Procedures	No. of Infections	Rate	No. of Procedures	No. of Infections	Rate	No. of Procedures	No. of Infections	Rate
Harvard Park Surgery Center	Denver	7	***	***	---	---	---	---	---	---
Peak One Surgery Center	Frisco	<5	***	***	---	---	---	---	---	---
Pueblo Surgery Center	Pueblo	---	---	---	<5	***	***	<5	***	***
Summit View Surgery Center	Littleton	---	---	---	<5	***	***	---	---	---
Surgery Center of Fort Collins	Fort Collins	57	0	0	77	0	0	33	0	0

Rates are per 100 procedures. NOTE: These rates are not adjusted for risk.
*** Indicates suppression of data, either because the predicted number of infections was less than one or the facility had fewer than 20 procedures of this type in this year. These facilities have met the National Healthcare Safety Network (NHSN) reporting requirements.
--- Indicates that the facility was not performing the procedure or reporting associated data in this year.
Data source: NHSN Database.

Prepared by: Colorado Healthcare-Associated Infections Program, Colorado Department of Public Health and Environment.

Breast surgeries

Overview

Breast surgeries involve at least one incision to the skin in either male or female patients. Hospitals and ambulatory surgery centers (ASCs) report surgical site infections (SSIs) following breast procedures. There are 36 types of breast procedures that are reportable into the National Healthcare Safety Network (NHSN) and can include an open biopsy of the breast, local excision of a lesion of the breast, insertion and removal of breast implants and radical mastectomies, among others.

The statewide infection rate for breast surgeries performed in hospitals was similar to the national rate in 2017.

Results

Tables 19 and **20** show facility-specific data for SSI following breast surgeries in hospitals and ASCs, respectively, performed during the 2015, 2016, and 2017 calendar years. Hospital data is shown for adults only. Only rates are presented for ASCs as SIRs and national comparisons are not available for outpatient surgeries; use caution when comparing rates among specific ASCs, since factors that can affect rates, such as patient acuity or few surgeries performed, are not taken into consideration.

Fifty-five hospitals reported 4,054 breast surgeries. Two hospitals had breast SSI rates worse than the national rate and one hospital had an SSI rate better than the national rate **(Table 19).** Statewide rates of breast surgeries in hospitals were the same as the national rate in 2017 **(Table 5A).**

Thirty-three ASCs reported 6,614 breast surgeries in 2017. Most facilities reported no infections **(Table 20)**.

Table 19: Surgical Site Infections for Breast Surgeries in Hospitals among Adults — Colorado, January 1, 2015 - December 31, 2017

Facility Name and City		2015				2016				2017			
		No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
Animas Surgical Hospital	Durango	17	***	***	***	26	0	***	***	20	0	***	***
Arkansas Valley Regional Medical Center	La Junta	<5	***	***	***	---	---	---	---	<5	***	***	***
Aspen Valley Hospital	Aspen	<5	***	***	***	<5	***	***	***	<5	***	***	***
Avista Adventist Hospital	Louisville	82	1	1.0	Same	117	1	0.7	Same	146	0	0	Same
Banner Fort Collins Medical Center	Fort Collins	<5	***	***	***	16	***	***	***	13	***	***	***
Boulder Community Hospital, Foothills	Boulder	118	2	1.4	Same	85	0	0	Same	51	1	***	***
Castle Rock Adventist Hospital	Castle Rock	53	1	***	***	54	0	***	***	81	0	0	Same
Children's Hospital Colorado	Aurora	<5	***	***	***	<5	***	***	***	---	---	---	---
Colorado Plains Medical Center	Fort Morgan	<5	***	***	***	<5	***	***	***	<5	***	***	***
Community Hospital	Grand Junction	60	0	***	***	72	0	0	Same	57	4	***	***
Delta County Memorial Hospital	Delta	9	***	***	***	---	---	---	---	<5	***	***	***
Denver Health Medical Center	Denver	9	***	***	***	52	3	2.0	Same	42	2	1.8	Same
East Morgan County Hospital	Brush	<5	***	***	***	<5	***	***	***	<5	***	***	***
Exempla Good Samaritan Medical Center	Lafayette	110	3	1.8	Same	120	0	0	Same	137	3	1.5	Same
Exempla Lutheran Medical Center	Wheat Ridge	129	2	0.9	Same	138	1	0.4	Same	136	2	0.8	Same
Exempla St. Joseph Hospital	Denver	435	7	0.9	Same	452	7	0.9	Same	360	4	0.7	Same
Grand River Medical Center	Rifle	10	***	***	***	7	***	***	***	6	***	***	***
Gunnison Valley Hospital	Gunnison	---	---	---	---	<5	***	***	***	---	---	---	---
Heart of the Rockies Regional Medical Center	Salida	14	***	***	***	<5	***	***	***	15	***	***	***
Littleton Adventist Hospital	Littleton	226	1	0.4	Same	228	2	0.7	Same	196	1	0.4	Same
Longmont United Hospital	Longmont	32	2	***	***	34	0	***	***	80	1	0.9	Same
Longs Peak Hospital	Longmont	---	---	---	---	---	---	---	---	<5	***	***	***
McKee Medical Center	Loveland	51	0	***	***	37	0	***	***	37	0	***	***
Medical Center of the Rockies	Loveland	18	***	***	***	80	3	2.2	Same	108	1	0.6	Same
Memorial Health System	Colorado Springs	<5	***	***	***	<5	***	***	***	10	***	***	***
Memorial Hospital North	Colorado Springs	12	***	***	***	15	***	***	***	181	2	0.8	Same
Mercy Regional Medical Center	Durango	72	0	0	Same	45	0	***	***	52	0	***	***

Facility Name and City		2015				2016				2017			
		No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
Montrose Memorial Hospital	Montrose	14	***	***	***	11	***	***	***	10	***	***	***
North Colorado Medical Center	Greeley	77	2	1.8	Same	73	2	***	***	78	0	0	Same
North Suburban Medical Center	Thornton	40	0	***	***	41	1	***	***	34	0	***	***
Pagosa Springs Medical Center	Pagosa Springs	<5	***	***	***	---	---	---	---	---	---	---	---
Parker Adventist Hospital	Parker	43	0	***	***	39	0	***	***	40	2	***	***
Parkview Medical Center	Pueblo	94	4	2.8	Same	100	2	1.3	Same	71	0	0	Same
Penrose St. Francis Health Services	Colorado Springs	94	0	0	Same	109	1	0.7	Same	172	0	0	Same
Pioneers Medical Center	Meeker	---	---	---	---	---	---	---	---	<5	***	***	***
Platte Valley Medical Center	Brighton	7	***	***	***	18	***	***	***	21	0	***	***
Porter Adventist Hospital	Denver	37	1	***	***	50	1	***	***	20	1	***	***
Poudre Valley Health System	Fort Collins	76	3	2.8	Same	117	0	0	Same	132	3	1.5	Same
Presbyterian St. Luke's Medical Center	Denver	103	1	0.6	Same	55	1	***	***	65	2	***	***
Rose Medical Center	Denver	490	2	0.3	Same	416	2	0.4	Same	457	1	0.2	Better
SCL Health Community Hospital, Westminster	Westminster	---	---	---	---	<5	***	***	***	---	---	---	---
San Luis Valley Regional Medical Center	Alamosa	<5	***	***	***	13	***	***	***	6	***	***	***
Sky Ridge Medical Center	Lone Tree	421	8	0.9	Same	373	4	0.6	Same	367	13	2.2	Worse
Southwest Memorial Hospital	Cortez	7	***	***	***	6	***	***	***	6	***	***	***
St. Anthony Hospital	Lakewood	98	3	1.9	Same	125	0	0	Same	161	1	0.4	Same
St. Anthony North Health Campus	Westminster	26	0	***	***	12	***	***	***	49	1	***	***
St. Anthony Summit Med Center	Frisco	---	---	---	---	---	---	---	---	8	***	***	***
St. Francis Medical Center	Colorado Springs	26	0	***	***	9	***	***	***	22	0	***	***
St. Mary Corwin Medical Center	Pueblo	41	1	***	***	37	1	***	***	55	2	***	***
St. Mary's Hospital	Grand Junction	91	2	1.5	Same	83	0	0	Same	89	1	0.7	Same
St. Thomas More Hospital	Canon City	<5	***	***	***	<5	***	***	***	<5	***	***	***
Sterling Regional Medical Center	Sterling	6	***	***	***	5	***	***	***	5	***	***	***
Swedish Medical Center	Englewood	63	0	0	Same	45	0	***	***	124	2	0.6	Same
The Medical Center of Aurora	Aurora	129	0	0	Same	110	0	0	Same	119	2	1.2	Same
UCHealth Yampa Valley Medical Center	Steamboat Springs	8	***	***	***	13	***	***	***	7	***	***	***

Facility Name and City		2015				2016				2017			
		No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison	No. of Procedures	No. of Infections	SIR	National Comparison
University of Colorado Hospital	Aurora	167	2	0.5	Same	215	7	1.3	Same	137	10	2.4	Worse
Vail Valley Medical Center	Vail	34	0	***	***	40	1	***	***	31	1	***	***
Valley View Hospital	Glenwood Springs	16	***	***	***	27	0	***	***	22	0	***	***
Wray Community District Hospital	Wray	<5	***	***	***	<5	***	***	***	<5	***	***	***

The standardized infection ratio (SIR) is the quotient of the numbers of observed and predicted infections.
National comparisons based on data collected and reported by facilities participating in the National Healthcare Safety Network (NHSN) from January-December, 2015.
Adults include patients >= 18 years of age.
*** Indicates suppression of data, either because the predicted number of infections was less than one or the facility had fewer than 20 procedures of this type in this year. These facilities have met the NHSN reporting requirements.
--- Indicates that the facility was not operating or reporting data in this year.
Data source: NHSN Database.
Prepared by: Colorado Healthcare-Associated Infections Program, Colorado Department of Public Health and Environment.

Table 20: Surgical Site Infections for Breast Surgeries in Ambulatory Surgery Centers — Colorado, January 1, 2015 - December 31, 2017

Facility Name and City		2015			2016			2017		
		No. of Procedures	No. of Infections	Rate	No. of Procedures	No. of Infections	Rate	No. of Procedures	No. of Infections	Rate
Aberdeen Ambulatory Surgical Center	Pueblo	351	0	0	356	0	0	322	0	0
Arkansas Valley Surgery Center	Canon City	<5	***	***	---	---	---	<5	***	***
Ascent Surgery Center	Colorado Springs	411	0	0	398	0	0	444	0	0
Audubon Ambulatory Surgery Center	Colorado Springs	9	***	***	51	0	0	66	0	0
Audubon Ambulatory Surgery Center at St. Francis	Colorado Springs	<5	***	***	<5	***	***	<5	***	***
Avista Surgery Center	Boulder	659	3	0.5	---	---	---	---	---	---
Black Canyon Surgical Center	Montrose	<5	***	***	7	***	***	6	***	***
Canyon View Surgery Center	Grand Junction	---	---	---	<5	***	***	18	***	***
Centrum Surgical Center	Greenwood Village	362	0	0	350	0	0	439	0	0
Clear Creek Surgery Center	Wheat Ridge	9	***	***	5	***	***	---	---	---
Colorado Springs Health Partners	Colorado Springs	150	1	0.7	235	0	0	80	0	0
Crown Point Surgery Center	Parker	293	0	0	261	0	0	241	0	0
Denver Midtown Surgical Center	Denver	42	0	0	90	0	0	145	0	0
Grand Valley Surgical Center	Grand Junction	283	0	0	279	0	0	339	1	0.3
Harmony Surgery Center	Fort Collins	391	0	0	562	0	0	605	1	0.2
Kaiser Permanente Ambulatory Surgery Center	Denver	246	2	0.8	421	2	0.5	529	4	0.8
Kaiser Permanente Ambulatory Surgery Center, Lone Tree	Lone Tree	117	4	3.4	183	2	1.1	160	0	0
Memorial Health System Outpatient Surgery at Printer Park	Colorado Springs	686	4	0.6	662	4	0.6	706	3	0.4
Midvalley Ambulatory Surgery Center	Basalt	<5	***	***	---	---	---	---	---	---
Mountain Vista Surgery Center	Greeley	---	---	---	6	***	***	9	***	***
Musculoskeletal Surgery Center	Thornton	80	0	0	80	0	0	174	0	0
North Suburban Surgery Center	Thornton	25	0	0	24	0	0	5	***	***
Northwest Regional Ambulatory Surgery Center	Westminster	53	0	0	73	0	0	41	0	0
Park Meadows Outpatinet Surgery	Lone Tree	421	1	0.2	395	2	0.5	497	1	0.2
Parkwest Surgery Center	Pueblo	6	***	***	<5	***	***	<5	***	***
Peak One Surgery Center	Frisco	<5	***	***	---	---	---	---	---	---
Physicians Surgery Center	Durango	14	***	***	<5	***	***	---	---	---

Facility Name and City		2015			2016			2017		
		No. of Procedures	No. of Infections	Rate	No. of Procedures	No. of Infections	Rate	No. of Procedures	No. of Infections	Rate
Pueblo Surgery Center	Pueblo	---	---	---	<5	***	***	---	---	---
Red Rocks Surgery Center	Golden	97	0	0	113	0	0	80	0	0
Renewal Surgery Lone Tree	Lone Tree	528	0	0	469	0	0	479	0	0
Rocky Mountain Surgery Center	Englewood	<5	***	***	<5	***	***	---	---	---
Rose Surgical Center	Denver	161	0	0	145	0	0	185	1	0.5
Sky Ridge Surgical Center	Lone Tree	---	---	---	12	***	***	165	0	0
Skyline Surgery Center	Loveland	273	0	0	344	0	0	319	0	0
Southwest Colorado Surgical Center	Cortez	<5	***	***	---	---	---	---	---	---
Summit View Surgery Center	Littleton	106	0	0	123	0	0	90	0	0
Surgery Center of Fort Collins	Fort Collins	93	0	0	<5	***	***	---	---	---
Surgery Center of the Rockies	Aurora	92	0	0	92	1	1.1	124	0	0
Surgical Center at Premier	Colorado Springs	95	1	1.1	---	---	---	---	---	---
Surgical Center of the Rockies	Colorado Springs	270	4	1.5	240	0	0	210	1	0.5
The Surgery Center at Lutheran	Wheat Ridge	89	0	0	15	***	***	---	---	---
UCHealth Longs Peak Surgery Center	Longmont	60	0	0	55	0	0	34	0	0
University of Colorado Hospital, Lone Tree Surgery Center	Lone Tree	77	0	0	116	0	0	88	0	0
Vail Valley Surgery	Edwards	24	0	0	22	0	0	10	***	***

Rates are per 100 procedures. NOTE: These rates are not adjusted for risk.
*** Indicates suppression of data, either because the predicted number of infections was less than one or the facility had fewer than 20 procedures of this type in this year. These facilities have met the National Healthcare Safety Network (NHSN) reporting requirements.
--- Indicates that the facility was not performing the procedure or reporting associated data in this year.
Data source: NHSN Database.
Prepared by: Colorado Healthcare-Associated Infections Program, Colorado Department of Public Health and Environment.

Central line-associated bloodstream infections

Overview

Central line-associated bloodstream infections (CLABSIs) are infections in the blood associated with specific intravascular catheters or central lines that must be in place at the time of, or within 48 hours before the onset of the infection. A central line is an intravascular catheter (tube in a vein or artery) that terminates at or close to the heart or in one of the great vessels (e.g., aorta, superior vena cava). A peripheral line is a similar tube in a vein or artery that does not enter a great vessel, is a smaller diameter tube, and is typically used for shorter periods of intravenous access. Both central lines and peripheral lines can be used to infuse fluids or medications, withdraw blood or monitor fluid volume in patients. However, central lines are typically placed when intravenous access is needed for longer time periods, larger volumes of fluids, or access for dialysis is needed. An umbilical catheter (a tube placed in the umbilical cord) is a central vascular catheter inserted through the umbilical artery or vein in a neonate (infant ≤ 30 days old). Central lines can be either permanent or temporary. Permanent lines are those that are tunneled under the skin before entering a great vessel. These can include certain dialysis lines and implanted catheters such as a port. Temporary lines are those that are not tunneled.

All patients with central lines are at risk for CLABSIs. However, certain groups are at higher risk for infection: elderly, neonates, dialysis patients, patients with weak immune systems (e.g., cancer patients, transplant patients), diabetics and patients with burn injuries.[9-11]

Colorado requires that all adult critical care units; neonatal critical care units Level II/III, III, and IV; long- term acute care hospitals (LTACHs); and inpatient rehabilitation facilities (IRFs) and rehabilitation wards in hospitals report CLABSI data into NHSN.

Tables 21, **22**, **23**, and **24** list reporting facilities, cities, number of central line days per year, number of CLABSI infections, standardized infection ratios (SIRs), and comparisons to national infection rates. The number of central line-days is the total number of days a central line was in place for patients in the unit during the reporting period (for example, if three patients each had a central line for 10 days, the number of central line-days is 30). The three categories summarizing how a Colorado facility compares to the national infection rate for that unit are:

1. Statistically lower infection rate than the national rate (better);
2. Statistically similar infection rate as the national rate (same); or
3. Statistically higher infection rate than the national rate (worse).

Adult critical care units

Adult critical care units (CCUs) report central line data by facility type, central line type and unit type. This differentiation enables fairer comparisons between healthcare facilities by accounting for differences in care and patients' risk for infection that affect infection rates. Hospitals classify their CCUs by the type of patients cared for in the unit.[3]

The statewide CLABSI rate in Colorado in adult critical care units has been better than the national rate for the last two years.

Results

Table 21 shows facility-specific data for central line-associated bloodstream infections (CLABSIs) attributed to adult critical care units during the 2015, 2016, and 2017 calendar years.

Sixty-four adult CCUs in 47 Colorado hospitals reported 104,943 central line days in 2017. In 2017, two hospital units had CLABSI rates worse than the national rate, two hospitals units had rates better than the national rate and all others had rates similar to the national rate.

Table 21: Central Line-Associated Bloodstream Infections in Adult Critical Care Units — Colorado, January 1, 2015-December 31, 2017

Facility Name, City, Unit Type			2015				2016				2017			
			No. of Central Line Days	No. of Infections	SIR	National Comparison	No. of Central Line Days	No. of Infections	SIR	National Comparison	No. of Central Line Days	No. of Infections	SIR	National Comparison
Avista Adventist Hospital	Louisville	MICU/SICU	489	0	***	***	393	0	***	***	388	0	***	***
Boulder Community Hospital, Foothills	Boulder	MICU/SICU	2,006	2	1.3	Same	2,315	0	0	Same	2,043	1	0.7	Same
Castle Rock Adventist Hospital	Castle Rock	MICU/SICU	469	1	***	***	585	2	***	***	375	1	***	***
Colorado Plains Medical Center	Fort Morgan	MICU/SICU	21	***	***	***	20	***	***	***	14	***	***	***
Community Hospital	Grand Junction	MICU	290	0	***	***	595	1	***	***	476	0	***	***
Delta County Memorial Hospital	Delta	MICU/SICU	270	0	***	***	232	0	***	***	259	0	***	***
Denver Health Medical Center	Denver	MICU	2,772	4	1.3	Same	2,867	4	1.2	Same	1,870	2	0.9	Same
		PED MICU/SICU	103	0	***	***	121	0	***	***	138	0	***	***
		TRAUMA ICU	2,015	9	2.9	Worse	1,606	5	2.0	Same	1,465	4	1.8	Same
Exempla Good Samaritan Medical Center	Lafayette	MICU/SICU	1,593	0	0	Same	1,339	3	3.0	Same	1,441	3	2.8	Same
Exempla Lutheran Medical Center	Wheat Ridge	MICU/SICU	2,835	1	0.4	Same	3,050	0	0	Same	3,043	2	0.8	Same
		NEURO SURG	773	0	***	***	689	0	***	***	731	0	***	***
Exempla St. Joseph Hospital	Denver	MICU/SICU	3,323	1	0.3	Same	3,444	2	0.5	Same	3,727	1	0.2	Same
Littleton Adventist Hospital	Littleton	MICU/SICU	2,609	2	0.9	Same	2,363	0	0	Same	2,305	3	1.5	Same
Longmont United Hospital	Longmont	MICU/SICU	2,807	1	0.5	Same	2,547	0	0	Same	2,606	1	0.5	Same
Longs Peak Hospital	Longmont	MICU/SICU	---	---	---	---	---	---	---	---	128	0	***	***
McKee Medical Center	Loveland	MICU/SICU	646	0	***	***	775	1	***	***	478	0	***	***
Medical Center of the Rockies	Loveland	MICU/SICU	4,158	3	1.0	Same	4,012	2	0.6	Same	4,013	0	0	Better
Memorial Health System	Colorado Springs	CCU	134	0	***	***	201	0	***	***	---	---	---	---
		MICU/SICU	4,614	0	0	Better	5,361	1	0.2	Same	5,586	3	0.6	Same
		PED MICU/SICU	229	0	***	***	235	0	***	***	379	0	***	***
Memorial Hospital North	Colorado Springs	MICU/SICU	444	0	***	***	726	1	***	***	517	0	***	***
Mercy Regional Medical Center	Durango	MICU/SICU	1,039	1	***	***	1,073	1	***	***	1,025	1	***	***
Montrose Memorial Hospital	Montrose	MICU/SICU	348	1	***	***	322	0	***	***	275	0	***	***

Facility Name, City, Unit Type			2015				2016				2017			
			No. of Central Line Days	No. of Infections	SIR	National Comparison	No. of Central Line Days	No. of Infections	SIR	National Comparison	No. of Central Line Days	No. of Infections	SIR	National Comparison
North Colorado Medical Center	Greeley	BURN	---	---	---	---	---	---	---	---	152	0	***	***
		MICU/SICU	2,316	5	2.5	Same	1,904	1	0.6	Same	2,156	2	1.1	Same
North Suburban Medical Center	Thornton	MICU/SICU	1,865	3	2.1	Same	1,694	0	0	Same	1,218	1	***	***
Parker Adventist Hospital	Parker	MICU/SICU	1,642	0	0	Same	1,868	1	0.7	Same	1,571	1	0.8	Same
Parkview Medical Center	Pueblo	MICU/SICU	2,462	1	0.4	Same	2,805	1	0.3	Same	2,520	9	3.2	Worse
		NEURO SURG	1,133	1	0.8	Same	1,180	4	3.0	Same	950	2	1.9	Same
Penrose St. Francis Health Services	Colorado Springs	CSICU	488	0	***	***	529	0	***	***	535	0	***	***
		MICU/SICU	3,490	4	1.3	Same	3,227	1	0.3	Same	3,549	2	0.6	Same
Platte Valley Medical Center	Brighton	CCU	816	0	***	***	1,131	0	***	***	1,157	0	***	***
		MICU	141	0	***	***	---	---	---	---	---	---	---	---
Porter Adventist Hospital	Denver	MICU/SICU	3,592	0	0	Better	3,906	0	0	Better	4,623	0	0	Better
Poudre Valley Health System	Fort Collins	MICU/SICU	1,513	0	0	Same	1,491	0	0	Same	1,596	0	0	Same
Presbyterian St. Luke's Medical Center	Denver	MICU/SICU	1,766	4	2.2	Same	2,617	2	0.7	Same	2,369	0	0	Same
		PED MICU/SICU	2,737	3	0.9	Same	2,637	2	0.5	Same	2,030	4	1.4	Same
Rose Medical Center	Denver	MICU/SICU	1,945	1	0.5	Same	1,372	4	2.6	Same	1,823	4	1.9	Same
San Luis Valley Regional Medical Center	Alamosa	MICU/SICU	186	0	***	***	134	0	***	***	177	0	***	***
Sky Ridge Medical Center	Lone Tree	MICU/SICU	2,076	1	0.4	Same	2,123	0	0	Same	2,049	1	0.4	Same
St. Anthony Hospital	Lakewood	CSICU	1,596	1	0.7	Same	1,569	0	0	Same	1,795	0	0	Same
		MICU	1,875	1	0.6	Same	1,990	3	1.7	Same	286	1	***	***
		MICU/SICU	1,689	2	1.4	Same	1,139	1	***	***	1,528	2	1.5	Same
		NEURO SURG	1,930	4	2.4	Same	1,637	1	0.7	Same	2,609	0	0	Same
		TRAUMA ICU	1,718	1	0.5	Same	1,435	0	0	Same	983	0	0	Same
St. Anthony North Health Campus	Westminster	MICU/SICU	1,569	1	0.7	Same	1,621	0	0	Same	1,311	0	0	Same
St. Anthony Summit Medical Center	Frisco	MICU/SICU	33	***	***	***	14	***	***	***	---	---	---	---
St. Francis Medical Center	Colorado Springs	MICU/SICU	539	0	***	***	554	0	***	***	754	0	***	***
St. Mary Corwin Medical Center	Pueblo	MICU/SICU	1,430	0	0	Same	1,841	2	1.2	Same	1,979	6	3.5	Worse
St. Mary's Hospital	Grand	CSICU	2,940	2	0.7	Same	2,234	1	0.4	Same	1,831	0	0	Same

Facility Name, City, Unit Type			2015				2016				2017			
			No. of Central Line Days	No. of Infections	SIR	National Comparison	No. of Central Line Days	No. of Infections	SIR	National Comparison	No. of Central Line Days	No. of Infections	SIR	National Comparison
	Junction	MICU/SICU	3,386	3	0.9	Same	2,508	1	0.4	Same	1,905	0	0	Same
St. Thomas More Hospital	Canon City	MICU/SICU	57	0	***	***	71	1	***	***	152	0	***	***
Sterling Regional Medical Center	Sterling	MICU/SICU	79	0	***	***	93	0	***	***	81	0	***	***
Swedish Medical Center	Englewood	BURN	303	0	***	***	703	3	1.3	Same	713	0	0	Same
		MICU/SICU	6,231	6	1.1	Same	4,251	8	1.7	Same	2,606	3	1.0	Same
		NEURO SURG	---	---	---	---	26	***	***	***	740	0	***	***
		PED MICU/SICU	248	1	***	***	124	0	***	***	48	***	***	***
The Medical Center of Aurora	Aurora	MICU/SICU	4,314	0	0	Better	4,127	1	0.2	Same	4,293	2	0.5	Same
UCHealth Yampa Valley Medical Center	Steamboat Springs	MICU/SICU	48	***	***	***	42	***	***	***	35	***	***	***
University of Colorado Hospital	Aurora	BURN	406	2	1.5	Same	---	---	---	---	---	---	---	---
		CCU	1,946	2	0.9	Same	2,097	4	1.7	Same	1,656	3	1.6	Same
		CSICU	3,961	7	1.6	Same	3,941	4	0.9	Same	4,060	4	0.9	Same
		MICU	4,616	4	0.8	Same	4,328	4	0.8	Same	4,633	3	0.6	Same
		NEURO SURG	4,554	4	0.8	Same	3,822	5	1.2	Same	5,197	3	0.5	Same
		SICU	2,425	3	1.1	Same	2,716	3	1.0	Same	3,603	2	0.5	Same
Vail Valley Medical Center	Vail	MICU/SICU	98	0	***	***	95	0	***	***	104	0	***	***
Valley View Hospital	Glenwood Springs	MICU/SICU	463	0	***	***	282	0	***	***	284	0	***	***

The standardized infection ratio (SIR) is the ratio of the numbers of observed and predicted infections.
National comparisons based on data collected and reported by facilities participating in the National Healthcare Safety Network (NHSN) from January-December, 2015.
Abbreviations: BURN=burn critical care; CCU=medical cardiac critical care; CSICU=surgical cardiothoracic critical care; MICU=medical critical care; MICU/SICU=medical/surgical critical care; NEURO SURG=neurosurgical critical care; PED MICU/SICU=pediatric medical/surgical critical care; SICU=surgical critical care; TRAUMA ICU=trauma critical care.
*** Indicates suppression of data, either because the predicted number of infections was less than one or the facility/unit combination had fewer than 50 central-line days in this year. These facilities have met the NHSN reporting requirements.
--- Indicates that the facility was not operating or reporting data in this year.
Data source: NHSN Database.
Prepared by: Colorado Healthcare-Associated Infections Program, Colorado Department of Public Health and Environment.

Long-term acute care hospitals

A long-term acute care hospital (LTACH) is a specialty care hospital that cares for patients with complex medical conditions requiring intense, specialized treatment for at least 25 days. These patients often transfer from critical care units in traditional hospitals. Patients in these facilities have a higher severity of illness often with multi-system complications posing a challenge for infection control.

LTACHs report infection data for patients with either permanent or temporary central lines. As previously noted, permanent lines are those that are tunneled and can include certain dialysis lines and implanted catheters such as a port. Temporary lines are those that are not tunneled. Permanent lines are commonly used in LTACH patients and historically have had lower rates of infection than temporary lines.

For three consecutive reporting years, the statewide CLABSI rate in long-term acute care hospitals was better than the national rate.

Results

Table 22 shows facility specific data for central line-associated bloodstream infections (CLABSIs) in LTACHs during the 2015, 2016, and 2017 calendar years.

Eight LTACHs reported 27,155 central line days in 2017. All LTACHs for which data was not suppressed had rates similar to national rates in 2017. For all three reporting years (2015-2017), the statewide CLABSI rate in LTACHs was better than the national rate.

Table 22: Central Line-Associated Bloodstream Infections in Long-Term Acute Care Hospitals — Colorado, January 1, 2015 - December 31, 2017

Facility Name and City		2015				2016				2017			
		No. of Central Line Days	No. of Infections	SIR	National Comparison	No. of Central Line Days	No. of Infections	SIR	National Comparison	No. of Central Line Days	No. of Infections	SIR	National Comparison
Advanced Care Hospital of Northern Colorado	Johnstown	3,356	3	1.1	Same	4,614	3	0.8	Same	3,966	3	0.9	Same
Colorado Acute Long-Term Hospital	Denver	6,563	3	0.4	Same	7,894	6	0.8	Same	7,467	6	0.6	Same
Craig Hospital	Englewood	2,476	1	0.7	Same	2,224	0	0	Same	1,621	1	***	***
Kindred Hospital Aurora	Aurora	2,409	2	0.7	Same	2,346	1	0.4	Same	2,526	3	1.1	Same
Kindred Hospital Colorado Springs	Colorado Springs	3,875	2	0.5	Same	2,731	4	1.5	Same	1,449	1	0.7	Same
Kindred Hospital Denver	Denver	5,278	7	0.8	Same	5,509	4	0.5	Same	5,678	3	0.4	Same
Kindred Hospital Denver South	Denver	2,886	1	0.3	Same	1,595	1	0.7	Same	2,032	1	0.5	Same
Select Specialty Hospital, Denver	Denver	1,741	1	0.7	Same	---	---	---	---	---	---	---	---
Vibra Hospital	Thornton	5,514	5	0.7	Same	4,096	1	0.2	Better	2,416	2	0.6	Same

The standardized infection ratio (SIR) is the ratio of the numbers of observed and predicted infections.
National comparisons based on data collected and reported by facilities participating in the National Healthcare Safety Network (NHSN) from January-December, 2015.
*** Indicates suppression of data, either because the predicted number of infections was less than one or the facility had fewer than 50 central-line days in this year. These facilities have met the NHSN reporting requirements.
--- Indicates that the facility was not operating or reporting data in this year.
Data source: NHSN Database.
Prepared by: Colorado Healthcare-Associated Infections Program, Colorado Department of Public Health and Environment.

Inpatient rehabilitation facilities and inpatient rehabilitation wards in hospitals

Inpatient rehabilitation facilities (IRFs) and inpatient rehabilitation wards in hospitals care for patients who have lost function due to acute or chronic pain, musculoskeletal problems, stroke, brain or spinal cord dysfunction, catastrophic events resulting in complete or partial paralysis or need rehabilitation for other reasons. The goal for these areas is to evaluate, treat and restore optimal functioning of the patients physically and mentally.

Rehabilitation hospitals and wards report infection data for patients with either permanent or temporary central lines. Permanent lines are those that are tunneled under the skin before entering a great vessel. These can include certain dialysis lines and implanted catheters such as a port. Temporary lines are those that are not tunneled, and their infection rates can be higher than permanent lines.

The statewide infection rate for rehabilitation hospitals and inpatient rehabilitation wards was similar to the national rate in 2017.

Results

Table 23 shows facility specific data for central line-associated bloodstream infections (CLABSIs) in IRFs and inpatient rehabilitation wards in hospitals during the 2015, 2016, and 2017 calendar years.

Four IRFs and 13 inpatient rehabilitation wards in hospitals reported 8,396 central line days in 2017; only one facility reported a CLABSI. No infection rates could be calculated for any of the facilities due to data suppression criteria. The statewide infection rate was similar to the national rate in 2017.

Table 23: Central Line-Associated Bloodstream Infections in Inpatient Rehabilitation Facilities and Wards — Colorado, January 1, 2015-December 31, 2017

Facility Name and City		2015				2016				2017			
		No. of Central Line Days	No. of Infections	SIR	National Comparison	No. of Central Line Days	No. of Infections	SIR	National Comparison	No. of Central Line Days	No. of Infections	SIR	National Comparison
Boulder Community Hospital	Boulder	290	0	***	***	336	0	***	***	199	0	***	***
Denver Health Medical Center	Denver	158	0	***	***	110	0	***	***	217	0	***	***
HealthSouth Rehabilitation Hospital of Colorado Springs	Colorado Springs	724	0	***	***	637	0	***	***	679	0	***	***
HealthSouth Rehabilitation Hospital of Littleton	Littleton	513	0	***	***	386	0	***	***	555	0	***	***
Littleton Adventist Hospital	Littleton	623	0	***	***	369	0	***	***	302	0	***	***
Memorial Health System	Colorado Springs	695	0	***	***	494	0	***	***	494	0	***	***
Montrose Memorial Hospital	Montrose	118	0	***	***	121	0	***	***	129	0	***	***
Northern Colorado Rehabilitation Hospital	Johnstown	968	0	***	***	1,270	0	***	***	981	0	***	***
Parkview Medical Center	Pueblo	182	0	***	***	79	0	***	***	102	0	***	***
Penrose St. Francis Health Services	Colorado Springs	451	0	***	***	628	0	***	***	373	0	***	***
Porter Adventist Hospital	Denver	608	0	***	***	402	0	***	***	425	1	***	***
Spalding Rehabilitation Hospital	Aurora	886	0	***	***	631	0	***	***	699	0	***	***
St. Anthony Hospital	Lakewood	520	1	***	***	490	0	***	***	400	0	***	***
St. Mary Corwin Medical Center	Pueblo	157	0	***	***	153	0	***	***	55	0	***	***
St. Mary's Hospital	Grand Junction	112	1	***	***	193	0	***	***	538	0	***	***
Swedish Medical Center	Englewood	469	0	***	***	411	0	***	***	295	0	***	***
University of Colorado Hospital	Aurora	1,308	0	0	Same	904	1	***	***	917	0	***	***

The standardized infection ratio (SIR) is the ratio of the numbers of observed and predicted infections.
National comparisons based on data collected and reported by facilities participating in the National Healthcare Safety Network (NHSN) from January-December, 2015.
*** Indicates suppression of data, either because the predicted number of infections was less than one or the facility had fewer than 50 central-line days in this year. These facilities have met the NHSN reporting requirements.
--- Indicates that the facility was not operating or reporting data in this year.
Data source: NHSN Database.
Prepared by: Colorado Healthcare-Associated Infections Program, Colorado Department of Public Health and Environment.

Neonatal critical care units

Neonatal critical care units (NCCUs) provide intensive medical care for premature and ill newborn babies. Neonatal care is classified into four levels of care, levels I-IV. Level I and II units care for healthy newborns; they are not required to report healthcare-associated infections (HAIs). Colorado requires level II/III combined, level III, and level IV units to report central line-associated bloodstream infection (CLABSI) data. The designation between level III and level II/III is defined by the National Healthcare Safety Network (NHSN) reporting guidelines.[3] If a hospital unit does not separate infants receiving level II care from those receiving level III care, that NCCU is reported as a level II/III. Level III NCCU provides personnel and equipment to ensure continuous life support and comprehensive care for extremely high-risk newborns with complex critical conditions. In this report, level IV NCCUs are included within level III or level II/III, as per NHSN location mapping.

NCCU infants may have a central line inserted for several reasons: 1) their stay in the critical care unit can be prolonged; 2) they require intravenous nutrition and fluid replacement until their gastrointestinal system has matured or they can tolerate feedings by mouth; 3) their peripheral veins (those in the arms and legs) and scalp veins are small and unable to be used for fluids and medications for long periods of time; and 4) changing peripheral lines frequently can cause additional pain and stress for the infant and does not promote health. An umbilical catheter (a tube placed in the umbilical cord) is often inserted at birth to provide nutrition while monitoring fluid balance. These catheters are a type of central line inserted through the umbilical artery or vein in a neonate (infant ≤ 30 days old).

In 2017, the statewide CLABSI rate in neonatal critical care units was better than the national rate, improving from previous years.

Results

Table 24 shows the results of CLABSI data collected in each NCCU during the 2015, 2016, and 2017 calendar years.

Eighteen hospitals with a total of 18 NCCU, including five level III and 13 level II/III NCCUs, reported 16,964 central line days in 2017; eleven of these hospitals reported zero CLABSIs. One NCCU had a CLABSI rate better than the national rate, and all others had rates similar to the national rate. Each year since 2015, the statewide NCCU CLABSI rate has improved from worse than the national rate in 2015 to better than the national rate in 2017.

Table 24: Central Line-Associated Bloodstream Infections in Neonatal Critical Care Units — Colorado, January 1, 2015 - December 31, 2017

Facility Name, City, NCCU Type/Level			2015				2016				2017			
			No. of Central Line Days	No. of Infections	SIR	National Comparison	No. of Central Line Days	No. of Infections	SIR	National Comparison	No. of Central Line Days	No. of Infections	SIR	National Comparison
Avista Adventist Hospital	Louisville	II/III	65	0	***	***	85	0	***	***	42	***	***	***
Castle Rock Adventist Hospital	Castle Rock	II/III	1	***	***	***	6	***	***	***	0	***	***	***
Children's Hospital Colorado	Aurora	III	5,450	16	3.0	Worse	5,771	14	2.5	Worse	4,428	1	0.2	Same
Children's Hospital of Colorado, Memorial Campus	Highlands Ranch	II/III	788	1	1.0	Same	---	---	---	---	---	---	---	---
Denver Health Medical Center	Denver	II/III	1,385	7	5.1	Worse	1,043	3	***	***	714	0	***	***
Exempla Good Samaritan Medical Center	Lafayette	II/III	36	***	***	***	---	---	---	---	---	---	---	---
Exempla Lutheran Medical Center	Wheat Ridge	II/III	123	1	***	***	151	1	***	***	142	0	***	***
Exempla St. Joseph Hospital	Denver	II/III	1,254	1	0.6	Same	1,069	1	0.6	Same	1,458	1	0.4	Same
Littleton Adventist Hospital	Littleton	III	61	0	***	***	137	1	***	***	88	0	***	***
Memorial Health System	Colorado Springs	III	885	0	0	Same	1,965	2	0.7	Same	2,277	2	0.6	Same
Parker Adventist Hospital	Parker	II/III	38	***	***	***	27	***	***	***	107	0	***	***
Poudre Valley Health System	Fort Collins	II/III	880	0	***	***	653	0	***	***	793	0	***	***
Presbyterian St. Luke's Medical Center	Denver	III	4,151	7	1.2	Same	3,738	2	0.4	Same	3,241	0	0	Better
Rose Medical Center	Denver	II/III	199	0	***	***	175	0	***	***	224	0	***	***
Sky Ridge Medical Center	Lone Tree	II/III	252	2	***	***	80	0	***	***	134	0	***	***
St. Francis Medical Center	Colorado Springs	II/III	1,413	1	0.5	Same	1,441	1	0.5	Same	1,100	0	0	Same
St. Mary's Hospital	Grand Junction	III	469	1	***	***	455	1	***	***	486	1	***	***
Swedish Medical Center	Englewood	II/III	262	0	***	***	151	0	***	***	109	0	***	***
The Medical Center of Aurora	Aurora	II/III	31	***	***	***	29	***	***	***	33	***	***	***
University of Colorado Hospital	Aurora	II/III	1,418	0	0	Same	1,736	1	0.4	Same	1,588	0	0	Same

The standardized infection ratio (SIR) is the ratio of the numbers of observed and predicted infections.
National comparisons based on data collected and reported by facilities participating in the National Healthcare Safety Network (NHSN) from January-December, 2015.
Abbreviations: NCCU=neonatal critical care unit; II/III=neonatal critical care (level II/III); III=neonatal critical care (level III).
*** Indicates suppression of data, either because the predicted number of infections was less than one or the facility had fewer than 50 central-line days in this year. These facilities have met the NHSN reporting requirements.
--- Indicates that the facility was not operating or reporting data in this year.
Data source: NHSN Database.
Prepared by: Colorado Healthcare-Associated Infections Program, Colorado Department of Public Health and Environment.

Dialysis-related infections

Overview

According to the National Institute of Diabetes and Digestive and Kidney Diseases, approximately 14 percent of the general population has chronic kidney disease in the United States. According to a 2015 report, 468,000 patients in the United States receive chronic dialysis treatment.[12]

Surveillance for dialysis-related infections in Colorado occurs within outpatient dialysis facilities only and excludes peritoneal and home dialysis. The outpatient dialysis facilities monitored may be dedicated stand-alone facilities, hospital-based, or affiliated units. The reporting of dialysis-related infections began in March 2010.

Dialysis facilities in Colorado monitor patients for three specific events that must be reported: 1) an outpatient start of an intravenous antibiotic, 2) a positive blood culture, or 3) pus, redness or increased swelling at the vascular access site. Data from these events are used to classify two types of dialysis-related infections: access-related bloodstream infections (ARB) and local access infections (LAI). An ARB, which poses more serious health implications and requires higher levels of care, is determined by the presence of a microorganism identified in a blood culture and identification of the source of infection as the vascular access site. An LAI is defined as the presence of pus, redness or swelling of the vascular access site without the presence of an ARB. Although an LAI is not as severe as an ARB, antibiotics typically are given in either case.

Each table below lists the dialysis facility's name, city, number of dialysis patients per month (patient-months), numbers and rates of ARB and LAI, and comparisons to the national rate. The infection rate used is the number of infections per 100 patient-months. The three categories that indicate how a Colorado dialysis center's infection rates compare to national infection rates are:

- If the p-value is greater than or equal to 0.05, the difference between the facility's rate and the NHSN aggregate rate is not statistically significant, and the facility's infection rate is designated as "SAME."
- If the p-value is less than 0.05 and the percentile is low, the difference between the facility's rate and the NHSN aggregate rate is statistically significant, and the facility's infection rate is designated as "BETTER."
- If the p-value is less than 0.05 and the percentile is high, the difference between the facility's rate and the NHSN aggregate rate is statistically significant, and the facility's infection rate is designated as "WORSE."

For three consecutive years, the statewide rate of access-related bloodstream infections has remained the same as the national rate.

Results

Tables 25 and **26** show the numbers and rates of ARBs and LAIs, respectively, for each outpatient dialysis facility in Colorado during the 2015, 2016, and 2017 calendar years. In 2017, Colorado's aggregate ARB rate was similar to the national rate.

> The statewide rates of local access infections have been worse than the national rate for three consecutive years.

Seventy-three dialysis facilities submitted dialysis infection data into NHSN in 2017. Similar to the past two years, this year's statewide ARB rate was the same as the national rate. In 2017 for ARBs, five facilities had rates worse than the national rate, one center had a rate better than the national rate, and all others were similar to the national rate **(Table 25).** For LAIs in 2017, three centers presented infection rates better than the national rate whereas eleven facilities had rates worse than the national rate **(Table 26).** The statewide LAI rates were worse than the national rate for all three reporting years (**Table 7**).

Table 25: Access-Related Bloodstream Infections in Outpatient Dialysis Facilities — Colorado, January 1, 2015 - December 31, 2017

Facility Name and City		2015				2016				2017			
		No. of Patient-months	No. of Infections	Rate	National Comparison	No. of Patient-months	No. of Infections	Rate	National Comparison	No. of Patient-months	No. of Infections	Rate	National Comparison
American Renal Kidney Center of Arvada	Arvada	1,143	1	0.1	Better	1,047	0	0	Better	1,090	7	0.6	Same
Boulder Dialysis Center	Boulder	269	1	0.4	Same	253	1	0.4	Same	282	2	0.7	Same
Brighton Dialysis	Brighton	652	3	0.5	Same	676	0	0	Better	696	9	1.3	Worse
Children's Hosptial Colorado Kidney Center	Aurora	57	1	1.8	Same	73	3	4.1	Worse	88	2	2.3	Same
Cortez Dialysis Center	Cortez	653	0	0	Same	658	1	0.2	Same	629	3	0.5	Same
DCI, Montrose	Montrose	389	0	0	Same	382	0	0	Same	384	1	0.3	Same
DSI, Pueblo	Pueblo	534	4	0.7	Same	620	0	0	Same	659	4	0.6	Same
Davita, Alamosa	Alamosa	589	5	0.8	Same	591	3	0.5	Same	629	3	0.5	Same
Davita, Arvada	Arvada	257	1	0.4	Same	234	0	0	Same	284	0	0	Same
Davita, Aurora	Aurora	1,460	9	0.6	Same	1,545	11	0.7	Same	1,580	9	0.6	Same
Davita, Belcaro	Denver	564	12	2.1	Worse	591	7	1.2	Worse	581	4	0.7	Same
Davita, Black Canyon	Montrose	336	0	0	Same	322	0	0	Same	327	1	0.3	Same
Davita, Commerce City	Commerce City	452	3	0.7	Same	515	1	0.2	Same	598	6	1.0	Same
Davita, Denver	Denver	746	5	0.7	Same	695	4	0.6	Same	729	3	0.4	Same
Davita, Durango	Denver	377	7	1.9	Worse	380	3	0.8	Same	333	0	0	Same
Davita, East Aurora	Aurora	993	2	0.2	Same	1,097	11	1.0	Worse	1,191	5	0.4	Same
Davita, Englewood	Englewood	547	0	0	Same	444	4	0.9	Same	453	0	0	Same
Davita, Fountain	Fountain	197	0	0	Same	---	---	---	---	---	---	---	---
Davita, Greeley	Greeley	204	2	1.0	Same	328	1	0.3	Same	423	3	0.7	Same
Davita, Lakewood	Lakewood	1,086	6	0.6	Same	974	3	0.3	Same	948	4	0.4	Same
Davita, Lakewood Crossing	Lakewood	1,030	6	0.6	Same	1,008	5	0.5	Same	841	0	0	Better
Davita, Littleton	Littleton	680	2	0.3	Same	657	4	0.6	Same	684	4	0.6	Same
Davita, Lonetree	Englewood	340	0	0	Same	325	2	0.6	Same	298	2	0.7	Same
Davita, Longmont	Longmont	259	0	0	Same	216	0	0	Same	200	4	2.0	Worse
Davita, Loveland Central	Loveland	226	1	0.4	Same	256	1	0.4	Same	254	4	1.6	Worse
Davita, Lowry	Denver	1,000	8	0.8	Same	1,034	5	0.5	Same	1,008	2	0.2	Same
Davita, North Colorado Springs	Colorado Springs	326	1	0.3	Same	367	4	1.1	Same	326	2	0.6	Same
Davita, North Metro	Westminster	493	1	0.2	Same	583	4	0.7	Same	563	0	0	Same

Facility Name and City		2015				2016				2017			
		No. of Patient-months	No. of Infections	Rate	National Comparison	No. of Patient-months	No. of Infections	Rate	National Comparison	No. of Patient-months	No. of Infections	Rate	National Comparison
Davita, Northeastern Colorado	Sterling	422	2	0.5	Same	422	0	0	Same	448	4	0.9	Same
Davita, Parker	Parker	522	0	0	Same	589	1	0.2	Same	597	5	0.8	Same
Davita, Pikes Peak	Colorado Springs	1,057	6	0.6	Same	1,070	9	0.8	Same	1,084	5	0.5	Same
Davita, Printers Place	Colorado Springs	381	0	0	Same	489	6	1.2	Worse	572	9	1.6	Worse
Davita, Red Hawk	Castle Rock	245	3	1.2	Same	259	0	0	Same	253	1	0.4	Same
Davita, Sable	Aurora	1,091	4	0.4	Same	1,082	5	0.5	Same	1,170	9	0.8	Same
Davita, South Denver	Denver	468	7	1.5	Worse	440	6	1.4	Worse	455	4	0.9	Same
Davita, Southwest Denver	Littleton	395	1	0.3	Same	380	1	0.3	Same	381	3	0.8	Same
Davita, Thornton	Thornton	902	5	0.6	Same	826	2	0.2	Same	637	5	0.8	Same
Davita, West Lakewood	Lakewood	200	1	0.5	Same	308	4	1.3	Same	403	4	1.0	Same
Davita, Westminster	Westminster	351	5	1.4	Worse	338	2	0.6	Same	444	3	0.7	Same
Denver Reception and Diagnostic Center	Denver	287	0	0	Same	237	0	0	Same	234	0	0	Same
Dialysis Clinic Inc.	Grand Junction	336	1	0.3	Same	348	0	0	Same	360	1	0.3	Same
Fresenius Medical Care, Canon City	Canon City	467	2	0.4	Same	400	2	0.5	Same	379	0	0	Same
Fresenius Medical Care, Denver Central	Denver	740	3	0.4	Same	588	2	0.3	Same	498	2	0.4	Same
Fresenius Medical Care, East Denver	Aurora	1,170	3	0.3	Same	1,190	6	0.5	Same	1,253	13	1.0	Worse
Fresenius Medical Care, Fort Collins	Fort Collins	702	4	0.6	Same	886	2	0.2	Same	966	3	0.3	Same
Fresenius Medical Care, Greeley	Greeley	1,013	5	0.5	Same	1,010	3	0.3	Same	1,012	3	0.3	Same
Fresenius Medical Care, La Junta	La Junta	373	2	0.5	Same	437	2	0.5	Same	472	0	0	Same
Fresenius Medical Care, Lamar	Lamar	252	1	0.4	Same	268	1	0.4	Same	297	0	0	Same
Fresenius Medical Care, Loveland	Loveland	531	3	0.6	Same	473	2	0.4	Same	486	3	0.6	Same
Fresenius Medical Care, North Greeley	Greeley	451	0	0	Same	511	2	0.4	Same	511	0	0	Same
Fresenius Medical Care, Pavilion	Denver	873	2	0.2	Same	929	3	0.3	Same	1,049	6	0.6	Same
Fresenius Medical Care, Pueblo	Pueblo	690	4	0.6	Same	693	2	0.3	Same	642	2	0.3	Same
Fresenius Medical Care, Pueblo South	Pueblo	991	6	0.6	Same	991	3	0.3	Same	1,032	6	0.6	Same
Fresenius Medical Care, Pueblo West	Pueblo	276	0	0	Same	294	0	0	Same	329	1	0.3	Same
Fresenius Medical Care, Rocky Mountain	Denver	845	1	0.1	Same	828	3	0.4	Same	792	3	0.4	Same

Facility Name and City		2015				2016				2017			
		No. of Patient-months	No. of Infections	Rate	National Comparison	No. of Patient-months	No. of Infections	Rate	National Comparison	No. of Patient-months	No. of Infections	Rate	National Comparison
Fresenius Medical Care, South Denver	Denver	134	0	0	Same	244	1	0.4	Same	346	4	1.2	Same
Fresenius Medical Care, Stapleton	Denver	572	3	0.5	Same	636	3	0.5	Same	630	1	0.2	Same
Fresenius Medical Care, Walsenburg	Walsenburg	221	2	0.9	Same	212	2	0.9	Same	222	1	0.5	Same
Fresenius Medical Care, West Hampden	Englewood	120	0	0	Same	170	0	0	Same	233	0	0	Same
Grand Junction Dialysis Center	Grand Junction	744	1	0.1	Same	651	5	0.8	Same	752	4	0.5	Same
Kidney Center of Bear Creek	Lakewood	450	0	0	Same	440	3	0.7	Same	480	3	0.6	Same
Kidney Center of Lafayette	Lafayette	622	5	0.8	Same	692	3	0.4	Same	672	3	0.4	Same
Kidney Center of Lakewood	Lakewood	880	9	1.0	Worse	806	5	0.6	Same	436	1	0.2	Same
Kidney Center of Longmont	Longmont	941	6	0.6	Same	891	8	0.9	Same	824	3	0.4	Same
Kidney Center of Northridge	Westminster	274	1	0.4	Same	270	0	0	Same	350	2	0.6	Same
Kidney Center of Westminster	Westminster	1,352	5	0.4	Same	1,423	5	0.4	Same	1,429	5	0.3	Same
Kidney Center of Wheat Ridge	Wheat Ridge	76	0	0	Same	338	0	0	Same	531	4	0.8	Same
Kidney Center on Main	Longmont	333	0	0	Same	321	1	0.3	Same	263	1	0.4	Same
Liberty Dialysis Castle Rock, LLC	Castle Rock	28	***	***	***	---	---	---	---	---	---	---	---
Liberty Dialysis, Colorado Springs Central	Colorado Springs	1,145	2	0.2	Same	1,112	4	0.4	Same	1,100	3	0.3	Same
Liberty Dialysis, Colorado Springs North	Colorado Springs	678	6	0.9	Same	827	1	0.1	Same	863	1	0.1	Same
Liberty Dialysis, Colorado Springs South	Colorado Springs	943	7	0.7	Same	1,000	7	0.7	Same	1,015	2	0.2	Same
Mesa County Dialysis	Grand Junction	269	2	0.7	Same	237	1	0.4	Same	266	1	0.4	Same
Parker Kidney Center	Parker	335	4	1.2	Same	375	1	0.3	Same	458	0	0	Same
Thornton Kidney Center	Thornton	582	8	1.4	Worse	590	5	0.8	Same	623	5	0.8	Same

Rates are per 100 patient-months. NOTE: These rates are not adjusted for risk.
National comparisons based on data collected and reported by facilities participating in the National Healthcare Safety Network (NHSN) from January-December, 2015.
Data include all access types.
*** Indicates suppression of data, either because the predicted number of infections was less than one or the facility had fewer than 50 patient-months in this year. These facilities have met the NHSN reporting requirements.
--- Indicates that the facility was not operating or reporting data in this year.
Data source: NHSN Database.
Prepared by: Colorado Healthcare-Associated Infections Program, Colorado Department of Public Health and Environment.

Table 26: Local Vascular Access Infections in Outpatient Dialysis Facilities — Colorado, January 1, 2015 - December 31, 2017

Facility Name and City		2015				2016				2017			
		No. of Patient-months	No. of Infections	Rate	National Comparison	No. of Patient-months	No. of Infections	Rate	National Comparison	No. of Patient-months	No. of Infections	Rate	National Comparison
American Renal Kidney Center of Arvada	Arvada	1,143	12	1.0	Same	1,047	10	1.0	Same	1,090	11	1.0	Same
Boulder Dialysis Center	Boulder	269	1	0.4	Same	253	1	0.4	Same	282	6	2.1	Worse
Brighton Dialysis	Brighton	652	9	1.4	Worse	676	12	1.8	Worse	696	7	1.0	Same
Children's Hosptial Colorado Kidney Center	Aurora	57	3	5.3	Worse	73	3	4.1	Worse	88	0	0	Same
Cortez Dialysis Center	Cortez	653	2	0.3	Same	658	3	0.5	Same	629	6	1.0	Same
DCI, Montrose	Montrose	389	2	0.5	Same	382	7	1.8	Worse	384	6	1.6	Worse
DSI, Pueblo	Pueblo	534	1	0.2	Same	620	5	0.8	Same	659	1	0.2	Same
Davita, Alamosa	Alamosa	589	10	1.7	Worse	591	5	0.8	Same	629	1	0.2	Same
Davita, Arvada	Arvada	257	3	1.2	Same	234	1	0.4	Same	284	0	0	Same
Davita, Aurora	Aurora	1,460	7	0.5	Same	1,545	17	1.1	Worse	1,580	14	0.9	Same
Davita, Belcaro	Denver	564	3	0.5	Same	591	3	0.5	Same	581	2	0.3	Same
Davita, Black Canyon	Montrose	336	0	0	Same	322	1	0.3	Same	327	2	0.6	Same
Davita, Commerce City	Commerce City	452	4	0.9	Same	515	0	0	Better	598	0	0	Better
Davita, Denver	Denver	746	16	2.1	Worse	695	8	1.2	Same	729	8	1.1	Same
Davita, Durango	Denver	377	1	0.3	Same	380	2	0.5	Same	333	1	0.3	Same
Davita, East Aurora	Aurora	993	7	0.7	Same	1,097	17	1.5	Worse	1,191	8	0.7	Same
Davita, Englewood	Englewood	547	0	0	Better	444	0	0	Same	453	4	0.9	Same
Davita, Fountain	Fountain	197	1	0.5	Same	---	---	---	---	---	---	---	---
Davita, Greeley	Greeley	204	2	1.0	Same	328	5	1.5	Same	423	3	0.7	Same
Davita, Lakewood	Lakewood	1,086	21	1.9	Worse	974	6	0.6	Same	948	17	1.8	Worse
Davita, Lakewood Crossing	Lakewood	1,030	9	0.9	Same	1,008	18	1.8	Worse	841	13	1.5	Worse
Davita, Littleton	Littleton	680	5	0.7	Same	657	1	0.2	Same	684	3	0.4	Same
Davita, Lonetree	Englewood	340	4	1.2	Same	325	4	1.2	Same	298	1	0.3	Same
Davita, Longmont	Longmont	259	3	1.2	Same	216	2	0.9	Same	200	1	0.5	Same
Davita, Loveland Central	Loveland	226	3	1.3	Same	256	1	0.4	Same	254	4	1.6	Same
Davita, Lowry	Denver	1,000	2	0.2	Same	1,034	4	0.4	Same	1,008	6	0.6	Same
Davita, North Colorado Springs	Colorado Springs	326	4	1.2	Same	367	3	0.8	Same	326	0	0	Same
Davita, North Metro	Westminster	493	4	0.8	Same	583	4	0.7	Same	563	8	1.4	Worse
Davita, Northeastern Colorado	Sterling	422	8	1.9	Worse	422	8	1.9	Worse	448	5	1.1	Same

Facility Name and City		2015				2016				2017			
		No. of Patient-months	No. of Infections	Rate	National Comparison	No. of Patient-months	No. of Infections	Rate	National Comparison	No. of Patient-months	No. of Infections	Rate	National Comparison
Davita, Parker	Parker	522	9	1.7	Worse	589	10	1.7	Worse	597	4	0.7	Same
Davita, Pikes Peak	Colorado Springs	1,057	7	0.7	Same	1,070	8	0.7	Same	1,084	4	0.4	Same
Davita, Printers Place	Colorado Springs	381	4	1.0	Same	489	3	0.6	Same	572	4	0.7	Same
Davita, Red Hawk	Castle Rock	245	4	1.6	Same	259	4	1.5	Same	253	7	2.8	Worse
Davita, Sable	Aurora	1,091	7	0.6	Same	1,082	15	1.4	Worse	1,170	7	0.6	Same
Davita, South Denver	Denver	468	3	0.6	Same	440	2	0.5	Same	455	4	0.9	Same
Davita, Southwest Denver	Littleton	395	5	1.3	Same	380	3	0.8	Same	381	4	1.0	Same
Davita, Thornton	Thornton	902	4	0.4	Same	826	8	1.0	Same	637	8	1.3	Same
Davita, West Lakewood	Lakewood	200	0	0	Same	308	7	2.3	Worse	403	6	1.5	Same
Davita, Westminster	Westminster	351	2	0.6	Same	338	1	0.3	Same	444	2	0.5	Same
Denver Reception and Diagnostic Center	Denver	287	0	0	Same	237	0	0	Same	234	0	0	Same
Dialysis Clinic Inc.	Grand Junction	336	4	1.2	Same	348	1	0.3	Same	360	4	1.1	Same
Fresenius Medical Care, Canon City	Canon City	467	4	0.9	Same	400	0	0	Same	379	1	0.3	Same
Fresenius Medical Care, Denver Central	Denver	740	3	0.4	Same	588	5	0.9	Same	498	1	0.2	Same
Fresenius Medical Care, East Denver	Aurora	1,170	11	0.9	Same	1,190	6	0.5	Same	1,253	4	0.3	Same
Fresenius Medical Care, Fort Collins	Fort Collins	702	3	0.4	Same	886	2	0.2	Same	966	13	1.3	Worse
Fresenius Medical Care, Greeley	Greeley	1,013	2	0.2	Same	1,010	0	0	Better	1,012	3	0.3	Same
Fresenius Medical Care, La Junta	La Junta	373	0	0	Same	437	0	0	Same	472	2	0.4	Same
Fresenius Medical Care, Lamar	Lamar	252	4	1.6	Same	268	0	0	Same	297	1	0.3	Same
Fresenius Medical Care, Loveland	Loveland	531	6	1.1	Same	473	0	0	Same	486	2	0.4	Same
Fresenius Medical Care, North Greeley	Greeley	451	1	0.2	Same	511	1	0.2	Same	511	1	0.2	Same
Fresenius Medical Care, Pavilion	Denver	873	6	0.7	Same	929	0	0	Better	1,049	5	0.5	Same
Fresenius Medical Care, Pueblo	Pueblo	690	1	0.1	Same	693	0	0	Better	642	1	0.2	Same
Fresenius Medical Care, Pueblo South	Pueblo	991	6	0.6	Same	991	4	0.4	Same	1,032	6	0.6	Same
Fresenius Medical Care, Pueblo West	Pueblo	276	0	0	Same	294	1	0.3	Same	329	1	0.3	Same
Fresenius Medical Care, Rocky Mountain	Denver	845	6	0.7	Same	828	2	0.2	Same	792	0	0	Better
Fresenius Medical Care, South Denver	Denver	134	3	2.2	Same	244	2	0.8	Same	346	7	2.0	Worse

Facility Name and City		2015				2016				2017			
		No. of Patient-months	No. of Infections	Rate	National Comparison	No. of Patient-months	No. of Infections	Rate	National Comparison	No. of Patient-months	No. of Infections	Rate	National Comparison
Fresenius Medical Care, Stapleton	Denver	572	3	0.5	Same	636	0	0	Better	630	3	0.5	Same
Fresenius Medical Care, Walsenburg	Walsenburg	221	0	0	Same	212	3	1.4	Same	222	1	0.5	Same
Fresenius Medical Care, West Hampden	Englewood	120	0	0	Same	170	1	0.6	Same	233	4	1.7	Same
Grand Junction Dialysis Center	Grand Junction	744	4	0.5	Same	651	5	0.8	Same	752	7	0.9	Same
Kidney Center of Bear Creek	Lakewood	450	7	1.6	Worse	440	6	1.4	Same	480	5	1.0	Same
Kidney Center of Lafayette	Lafayette	622	1	0.2	Same	692	1	0.1	Same	672	2	0.3	Same
Kidney Center of Lakewood	Lakewood	880	9	1.0	Same	806	3	0.4	Same	436	6	1.4	Same
Kidney Center of Longmont	Longmont	941	12	1.3	Worse	891	12	1.3	Worse	824	5	0.6	Same
Kidney Center of Northridge	Westminster	274	3	1.1	Same	270	1	0.4	Same	350	2	0.6	Same
Kidney Center of Westminster	Westminster	1,352	10	0.7	Same	1,423	8	0.6	Same	1,429	19	1.3	Worse
Kidney Center of Wheat Ridge	Wheat Ridge	76	3	3.9	Worse	338	2	0.6	Same	531	7	1.3	Same
Kidney Center on Main	Longmont	333	6	1.8	Worse	321	2	0.6	Same	263	5	1.9	Worse
Liberty Dialysis Castle Rock, LLC	Castle Rock	28	***	***	***	---	---	---	---	---	---	---	---
Liberty Dialysis, Colorado Springs Central	Colorado Springs	1,145	5	0.4	Same	1,112	0	0	Better	1,100	5	0.5	Same
Liberty Dialysis, Colorado Springs North	Colorado Springs	678	4	0.6	Same	827	3	0.4	Same	863	0	0	Better
Liberty Dialysis, Colorado Springs South	Colorado Springs	943	10	1.1	Same	1,000	15	1.5	Worse	1,015	3	0.3	Same
Mesa County Dialysis	Grand Junction	269	2	0.7	Same	237	4	1.7	Same	266	0	0	Same
Parker Kidney Center	Parker	335	6	1.8	Worse	375	8	2.1	Worse	458	6	1.3	Same
Thornton Kidney Center	Thornton	582	12	2.1	Worse	590	4	0.7	Same	623	11	1.8	Worse

Rates are per 100 patient-months. NOTE: These rates are not adjusted for risk.
National comparisons based on data collected and reported by facilities participating in the National Healthcare Safety Network (NHSN) from January-December, 2015.
Data include all access types.
*** Indicates suppression of data, either because the predicted number of infections was less than one or the facility had fewer than 50 patient-months in this year. These facilities have met the NHSN reporting requirements.
--- Indicates that the facility was not operating or reporting data in this year.
Data source: NHSN Database.
Prepared by: Colorado Healthcare-Associated Infections Program, Colorado Department of Public Health and Environment.

Clostridium difficile

Overview

Clostridium difficile (*C.difficile*) infections are a growing problem in healthcare and community settings. *C. difficile* is a spore-forming bacteria that can cause symptoms ranging from bloating, diarrhea, fever, and abdominal pain to life-threatening colon inflammation, sepsis and death. Risk factors for *C. difficile* infections include antibiotic exposure, proton pump inhibitors, gastrointestinal surgery/manipulation, advanced age, long length of stay in healthcare settings, immunocompromising conditions, and serious underlying diseases.[13] *C. difficile* also may be acquired outside of hospitals in the community, and exposures to other types of healthcare are also risk factors.[14] Although 94 percent of *C. difficile* infections are related to healthcare exposures, 75 percent of healthcare-associated *C. difficile* infections first show signs outside of hospitals.[15]

Based on the high incidence and potential severity of *C. difficile* infections, Colorado's HAI Advisory Committee added *C. difficile* to Colorado reporting requirements for acute care hospitals in 2015 for data collected since 2013. Hospital-reported *C. difficile* data are classified as hospital-onset, community-onset, and community-onset healthcare facility-associated. Hospital-onset cases are laboratory-positive specimens collected more than three days after admission to the facility (i.e., on or after day four). Community-onset includes laboratory-identified specimens collected in an outpatient location or an inpatient location on days one, two or three after admission to the hospital. Community-onset healthcare facility-associated cases include specimens collected from patients discharged from the facility four or fewer weeks prior to the current date of stool specimen collection. Data from outpatient locations are not included in this definition. Only laboratory-identified hospital-onset cases are presented in this report.

In 2017, the statewide *C. difficile* rate in hospitals was better than the national rate, improving from previous years.

Results

Table 27 presents laboratory-identified hospital-onset *C. difficile* cases reported by acute care hospitals during the 2015, 2016, and 2017 calendar years.

Fifty-two acute care hospitals submitted *C. difficile* data into NHSN in 2017 for 1,543,917 patient days. Eleven acute care hospitals had CDI rates better than the national rate and four had rates that were worse, an improvement from last year. Each year since 2015, the statewide *C. difficile* rate has improved from worse than the national rate in 2015 to better than the national rate in 2017.

Table 27: *Clostridium difficile* in Acute Care Hospitals — Colorado, January 1, 2015 - December 31, 2017

Facility Name and City		2015				2016				2017			
		No. of Patient Days	No. of Infections	SIR	National Comparison	No. of Patient Days	No. of Infections	SIR	National Comparison	No. of Patient Days	No. of Infections	SIR	National Comparison
Animas Surgical Hospital	Durango	0	***	***	***	0	***	***	***	0	***	***	***
Avista Adventist Hospital	Louisville	11,652	0	0	Better	10,172	3	0.6	Same	11,654	1	0.1	Better
Banner Fort Collins Medical Center	Fort Collins	1,448	0	***	***	2,791	0	0	Same	3,324	0	***	***
Boulder Community Hospital	Boulder	7,973	0	0	Same	6,154	0	0	Same	4,761	0	0	Same
Boulder Community Hospital, Foothills	Boulder	28,253	27	1.6	Worse	27,819	19	1.1	Same	20,959	17	1.1	Same
Castle Rock Adventist Hospital	Castle Rock	7,990	4	0.9	Same	9,441	4	0.8	Same	8,317	2	0.4	Same
Colorado Plains Medical Center	Fort Morgan	3,333	0	0	Same	3,012	1	0.5	Same	2,833	0	0	Same
Community Hospital	Grand Junction	7,790	5	1.2	Same	9,158	10	1.6	Same	8,401	7	1.2	Same
Delta County Memorial Hospital	Delta	2,102	2	1.6	Same	1,089	2	***	***	4,850	2	0.7	Same
Denver Health Medical Center	Denver	100,757	91	1.2	Same	95,481	90	1.2	Same	98,519	64	0.8	Same
Exempla Good Samaritan Medical Center	Lafayette	53,792	37	0.9	Same	51,791	36	1.0	Same	48,632	21	0.7	Same
Exempla Lutheran Medical Center	Wheat Ridge	46,344	60	1.6	Worse	46,532	45	1.3	Same	47,445	19	0.6	Better
Exempla St. Joseph Hospital	Denver	78,054	82	1.4	Worse	80,710	74	1.1	Same	80,276	48	0.6	Better
Littleton Adventist Hospital	Littleton	34,446	22	0.8	Same	35,284	27	1.0	Same	35,003	23	1.0	Same
Longmont United Hospital	Longmont	25,731	9	0.6	Same	23,536	12	0.7	Same	21,941	8	0.5	Same
Longs Peak Hospital	Longmont	---	---	---	---	---	---	---	---	2,197	3	2.2	Same
McKee Medical Center	Loveland	14,474	9	1.4	Same	13,064	3	0.4	Same	12,774	0	0	Better
Medical Center of the Rockies	Loveland	39,625	26	0.9	Same	40,984	50	1.4	Worse	43,620	40	1.2	Same
Memorial Health System	Colorado Springs	64,777	55	1.2	Same	69,144	56	0.8	Same	77,185	43	0.7	Better
Memorial Hospital North	Colorado Springs	13,157	3	0.4	Same	15,248	6	0.6	Same	15,980	3	0.3	Better
Mercy Regional Medical Center	Durango	13,200	10	1.4	Same	13,690	10	1.2	Same	15,260	12	1.3	Same
Montrose Memorial Hospital	Montrose	7,895	2	0.6	Same	7,896	3	0.6	Same	7,455	10	1.6	Same
North Colorado Medical Center	Greeley	50,562	23	0.7	Same	49,297	23	0.7	Same	53,434	11	0.4	Better
North Suburban Medical Center	Thornton	26,318	22	1.4	Same	27,236	27	1.2	Same	26,398	7	0.5	Better

Facility Name and City		2015				2016				2017			
		No. of Patient Days	No. of Infections	SIR	National Comparison	No. of Patient Days	No. of Infections	SIR	National Comparison	No. of Patient Days	No. of Infections	SIR	National Comparison
Parker Adventist Hospital	Parker	26,684	22	1.7	Worse	28,410	22	1.3	Same	26,517	32	1.7	Worse
Parkview Medical Center	Pueblo	80,757	42	0.8	Same	72,678	59	1.0	Same	66,801	48	1.0	Same
Penrose St. Francis Health Services	Colorado Springs	52,169	44	1.6	Worse	50,906	45	1.5	Worse	52,963	35	1.0	Same
Platte Valley Medical Center	Brighton	8,620	3	1.0	Same	10,023	3	0.8	Same	11,081	3	0.6	Same
Porter Adventist Hospital	Denver	36,272	29	1.0	Same	33,553	23	0.9	Same	35,522	23	1.1	Same
Presbyterian St. Luke's Medical Center	Denver	54,733	72	1.6	Worse	58,233	70	1.7	Worse	57,907	64	1.5	Worse
Rangely District Hospital	Rangely	---	---	---	---	37	***	***	***	131	0	***	***
Rose Medical Center	Denver	38,636	39	1.2	Same	35,457	26	1.1	Same	36,857	21	0.8	Same
SCL Health Community Hospital, North Glenn	Denver	---	---	---	---	---	---	---	---	56	0	***	***
SCL Health Community Hospital, Southwest	Littleton	---	---	---	---	2	***	***	***	47	***	***	***
SCL Health Community Hospital, Westminster	Westminster	9	***	***	***	101	0	***	***	145	0	***	***
San Luis Valley Regional Medical Center	Alamosa	5,877	4	1.3	Same	5,495	5	1.0	Same	6,368	4	1.1	Same
Sky Ridge Medical Center	Lone Tree	49,179	61	1.3	Worse	50,551	41	1.0	Same	53,323	32	0.7	Better
St. Anthony Hospital	Lakewood	61,231	64	1.3	Worse	59,885	49	1.1	Same	53,989	57	1.6	Worse
St. Anthony North Health Campus	Westminster	19,641	18	1.7	Worse	20,996	14	0.8	Same	18,676	14	0.9	Same
St. Anthony Summit Medical Center	Frisco	2,765	0	0	Same	3,141	0	0	Same	3,430	0	0	Same
St. Francis Medical Center	Colorado Springs	34,149	8	0.5	Better	27,393	7	0.5	Better	29,811	8	0.4	Better
St. Mary Corwin Medical Center	Pueblo	22,113	20	1.6	Worse	23,641	14	1.0	Same	25,725	17	1.0	Same
St. Mary's Hospital	Grand Junction	58,865	30	0.7	Same	60,456	66	1.5	Worse	53,527	24	0.6	Better
St. Thomas More Hospital	Canon City	5,695	2	1.7	Same	5,741	2	1.6	Same	5,221	1	0.6	Same
Sterling Regional Medical Center	Sterling	4,297	0	0	Same	3,972	4	2.8	Same	4,046	2	2.0	Same
Swedish Medical Center	Englewood	87,753	74	1.1	Same	89,995	84	1.1	Same	92,433	74	1.0	Same
The Medical Center of Aurora	Aurora	70,070	96	1.1	Same	57,793	43	0.7	Better	60,656	50	0.9	Same
UCHealth Broomfield Hospital	Broomfield	---	---	---	---	221	0	***	***	279	0	***	***
UCHealth Yampa Valley Medical Center	Steamboat Springs	4,670	6	2.0	Same	4,679	6	1.7	Same	4,177	2	1.0	Same

Facility Name and City		2015				2016				2017			
		No. of Patient Days	No. of Infections	SIR	National Comparison	No. of Patient Days	No. of Infections	SIR	National Comparison	No. of Patient Days	No. of Infections	SIR	National Comparison
University of Colorado Hospital	Aurora	156,449	161	1.0	Same	162,469	188	1.0	Same	173,893	256	1.3	Worse
Vail Valley Medical Center	Vail	5,096	3	1.9	Same	6,245	4	2.0	Same	7,643	3	1.5	Same
Valley View Hospital	Glenwood Springs	12,108	3	0.3	Better	12,077	10	1.2	Same	11,475	5	0.5	Same

The standardized infection ratio (SIR) is the ratio of the numbers of observed and predicted infections.
National comparisons based on data collected and reported by facilities participating in the National Healthcare Safety Network (NHSN) from January-December, 2015.
*** Indicates suppression of data, either because the predicted number of infections was less than one or the facility had fewer than 50 patient days in this year. These facilities have met the NHSN reporting requirements.
--- Indicates that the facility was not operating or reporting data in this year.
Data source: NHSN Database.
Prepared by: Colorado Healthcare-Associated Infections Program, Colorado Department of Public Health and Environment.

Conclusions

Colorado healthcare facilities were required to report healthcare-associated infections (HAIs) starting in 2006. The Department oversees the reporting and dissemination of Colorado HAI data. This is the eleventh report submitted to the Colorado General Assembly and the public. Public reporting of HAI data can motivate healthcare facilities to enhance prevention of HAIs and can inform consumers. Ongoing success in reducing these serious infections will require continued effort from multiple stakeholders including patients and their families, care providers, administrators, and public health departments.

There were several updates to this report compared to previous years. Infection rates in this report were calculated using National Healthcare Safety Network's (NHSN) 2015 updated baseline data. At the time of this report submission, standardized infection ratio (SIR) calculations using the 2015 updated baseline were unavailable for outpatient procedures; only inpatient procedures are presented for hospital surgical site infections (SSIs), and only rates are presented for ambulatory surgery centers (ASCs). In addition, SSI data were separated into adult and pediatric (patients <18 years of age) procedures due to updated analyses in NHSN.

Key findings described in this report include the following:

- In 2017, the statewide SSI rates for coronary artery bypass surgeries and abdominal hysterectomies performed in hospitals for adult patients were better than the national rates; rates for all other SSIs were the same as the national rates.
- For pediatric patients, procedure volume and infections counts were low for reported conditions, resulting in data suppression for SSIs in most facilities.
- National comparisons were not available this year for SSIs in ASCs.
- In 2017, the statewide CLABSI rates in long-term acute care hospitals, hospital adult critical care units, and neonatal critical care units were better than the national rate, with the neonatal critical care unit CLABSI rates improving over three years from worse than the national rate in 2015, to the same in 2016 and better in 2017.
- Of reportable surgeries in Colorado, the most common surgeries performed include knee replacements and hip replacements in hospitals, and breast surgeries and hernia repairs in ASCs.
- For the last three years, Colorado local access infection rates in dialysis facilities have been worse than the national rates, while the access-related bloodstream infection rates have been the same.
- The statewide *Clostridium difficile* (*C. difficile*) rate has improved over three years, with Colorado hospitals performing worse than the national rate in 2015, the same in 2016, and better in 2017.
- Most Colorado healthcare facilities had HAI rates similar to national rates for most reportable HAIs.

While this report only includes information on a subset of HAIs, the information is one important indicator of healthcare quality and infection prevention efforts in Colorado facilities. Beyond the

number and rate of HAI for each facility, consumers can see the volume of procedures performed at each facility, which can be an indicator of experience and practice.

Report users should note that the data presented are self-reported by each facility and that data validation studies have been completed thus far only for selected CLABSIs, selected SSIs, dialysis-related infections, and *C. difficile*. (See **Appendix A**.) It is recommended that conclusions regarding healthcare quality be made in conjunction with other quality indicators and that consumers consult with doctors, healthcare facilities, health insurance carriers, healthcare websites from reputable sources (e.g., Hospital Compare, Colorado Hospital Report Card, or Leap Frog), and their families and friends before deciding where to receive care.

The Department will continue its work to monitor HAIs in Colorado through various activities, including tracking and publishing HAI data, completing HAI data validation studies, directly observing facility practices, maintaining communication vehicles for HAI-related information, and collaborating with internal and external partners committed to patient safety.

We hope facilities will use the data in this report to target and improve infection prevention efforts, and consumers will use these data to make more informed healthcare decisions.

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Appendix A

Healthcare-associated infections data validation

As part of a comprehensive reform to address healthcare-associated infections (HAIs), many states, including Colorado, have mandated reporting to create greater transparency between healthcare facilities and the public while supporting greater accountability. Inter-facility comparisons of the data are only valid when the methods of surveillance are uniform and reliable across institutions.[16] The Department's HAI Program has conducted validation for selected conditions as in table below.

Condition Validated	Year Validation Occurred
Central Line-Associated Bloodstream Infections	2012
Dialysis Events	2012
Hip and Knee Surgeries	2012
Hernia Surgeries	2012
Colon Surgeries	2015
Breast Surgeries in Ambulatory Surgery Centers	2015/2016
Breast Surgeries in Hospital Outpatient Day Surgery Centers	2016
Clostridium difficile	2016
Abdominal Hysterectomies	2017

Central line-associated bloodstream infections (CLABSIs)

During this validation, a wide variation in surveillance practices and in the application of definitions and criteria also was noted. A follow-up validation completed in July 2014 found only 2 percent of cases were not reported. This improvement was noted along with observed improvement in infection preventionists' knowledge of surveillance definitions and practices.

Dialysis infections

In 2013, a validation study to assess reporting accuracy of dialysis event data was conducted. Of 65 operating dialysis facilities in Colorado, 25 were visited to perform patient medical record reviews to identify non- and over-reported events. Of 467 medical records reviewed in 25 facilities, 29 percent of events were found to be unreported while 13 percent of events were over-reported.

In 2014, a follow-up validation study was conducted in 24 dialysis facilities. Of 377 medical records reviewed, 23 percent of events were non-reported and 4 percent of events were over-reported. In summary, from 2013 to 2014, the number of non-reported and over-reported events declined, and appeared to be related to observed improvements in facility administrators' knowledge and application of surveillance methods and definitions.

Hip and knee surgeries: Surgical site infections

Twenty-five facilities participated in this study, including 21 facilities that reported at least one SSI during the study period. For each facility, all reported surgical site infections (SSIs) plus an additional 10 randomly selected patient medical records (without SSIs) were reviewed. A

questionnaire was administered to infection preventionists to assess the adequacy of National Healthcare Safety Network (NHSN)-recommended surveillance methods and definitions. An exit interview was completed at the end of each site visit providing another opportunity for on-site education and clarification. The audit found no over or under reported SSI and a solid level of understanding and application of NHSN surveillance methods and definitions by infection preventionists. However, several facilities showed errors in classifying SSI depth (superficial versus deep), which may have been based on incomplete information available in the medical records, and lack of time and resources for additional review or update of SSIs once entered in NHSN.

Hernia surgery surgical site infections

An SSI data validation study was completed in 2012. The objectives were to learn how facilities conduct post-discharge surveillance following surgery, assess the accuracy of data reported for risk adjustment, and assess accuracy in which facility staff applied NHSN definitions and criteria. Forty-one facilities were visited (31 hospitals and 10 ambulatory surgery centers) to perform medical record reviews of hernia surgeries and SSIs reported through NHSN from January through June 2010. Of 438 medical records reviewed, two non-reported events were found and eight events were over-reported.

Colon surgery surgical site infections

In a 2015 colon SSI validation study, 924 medical records at 20 facilities were reviewed. Fifty-two (6 percent) non-reported events and 10 (1 percent) over-reported charts were identified. SSI-organ space events were the most non-reported events identified. This was, in part, due to criteria misinterpretation from infection preventionists who thought a positive blood culture was required to meet criteria for an organ space SSI. One noteworthy finding was the inclusion of 70 ineligible surgeries (procedures with ICD9 codes not listed in the NHSN operative category for colon surgeries). Moreover, common discrepancies occurred with the wound class and scope variables.

Breast surgery surgical site infections in ambulatory surgery centers

Starting in late 2015, staff conducted chart reviews for patients having breast surgeries in 18 Colorado ambulatory surgery centers (ASCs). Selected ASCs had performed at least 100 breast surgeries in 2014 and were located in the Denver metro area and along the Front Range (within 100 miles of Denver). A total of 715 medical records were examined (701 females and 14 male) to identify under- and over-reported events and data discrepancies and omissions in events and procedures. No under-reported events were found and one over-reported event was identified because the case did not meet all NHSN criteria for superficial SSIs. Fifty-three non-eligible procedures (procedures with International Classification of Diseases [ICD]-9 codes not listed in the NHSN operative category for breast surgeries) were identified. All but one facility reported procedure duration incorrectly, because they were still using outdated protocol definitions. Five facilities failed to enter two denominator forms in NHSN for bilateral procedures, which could artificially elevate their SSIs rates. Common discrepancies occurred with wound class, anesthesia class, and type of anesthesia variables.

Breast surgery surgical site infections in hospital outpatient day surgery centers
A comparative study, similar to the one conducted in ASCs, for breast surgeries was implemented for hospital outpatient day surgery centers (HOPDs). Medical records (n=509) were reviewed at twelve HOPD and yielded two non-reported events, two over-reported events and 25 non-eligible procedures. As predicted, there was more post-surgery documentation available for the reviewer at the HOPD than the ASC, which helped identify reporting errors. Moreover, HOPD had electronic health records which contributed to a noticeable difference in discrepant variables reported into NHSN when compared to discrepant variables found with ASCs.

***Clostridium difficile* laboratory-identified events**
Sixteen facilities were enrolled in a validation study to assess quality and completeness of data entered into NHSN for *Clostridium difficile* (*C. difficile*) laboratory-identified (LabID) events for the 2015 reporting year. Medical records were reviewed (n=359) and yielded 15 non-reported and zero over-reported events. Facilities with data mining surveillance software and policies restricting frequency of testing had few reporting errors. Several facilities had effective staff education programs in addition to frequent surveillance data audits at the corporate level, resulting into strong C. *difficile* surveillance outcomes (i.e., few to zero non-reported events).

Abdominal hysterectomy surgery surgical site infections
The 2017 validation study on abdominal hysterectomy surgeries included both numerator (number of SSIs) and denominator (number of surgeries performed) data assessments. Medical records (n=710) from 17 acute care hospitals were reviewed and identified 4 non-reported and 2 over-reported events. All non-reported events were superficial SSIs and from the same facility, with an electronic surveillance system not connected to data from surgeons' offices. The denominator assessment revealed that coding errors might result in vaginal hysterectomies being misclassified as abdominal hysterectomies in NHSN, resulting in an increase in the denominator and a lower standardized infection ratio (SIR). A common reporting error was the wrong application of HAI site-specific definitions for organ-space SSI.

Appendix B
Standardized infection ratio

The standardized infection ratio (SIR) is a risk-adjusted summary measure used throughout this report. The SIR describes a facility's performance, taking into account individual facility's patient population risk. The SIR is the number of infections reported by the facility divided by the predicted number of infections. The predicted number of infections is determined by historical data collected by the NHSN as well as an individual facility's patient population, and is set by the Centers for Disease Control and Prevention.

Interpretation of the SIR is done by comparing a facility's value to one (observed and predicted number of SSI are the same). In other words, the number of infections is what was predicted based on the national rate. If the SIR value is greater than one, there are more infections than predicted, and if the SIR value is less than one, there are fewer infections than predicted.

The statistical significance of the difference between the observed and predicted SSI based on the national rate is tested using a Poisson test. A p-value is computed from the test and helps determine if the difference in the HAI rate is due to chance alone. If the p-value is greater than or equal to 0.05, then there is no significant difference (same) between the facility's HAI count and the predicted count based on the national rate. If the p-value is less than 0.05, then the difference is statistically significant, and the value of the SIR determines whether the facility is better than or worse than the national rate. If the SIR is greater than one, then the facility has significantly more CLABSI than were predicted based on the national rate (worse). The converse also applies where if the SIR is less than one, the hospital has significantly fewer CLABSI than were predicted (better).

Appendix C

Glossary of terms and abbreviations

Access-related bloodstream infection (ARB): The presence of bacteria in the blood verified by culture with the source identified as the vascular access site or is unknown.

Ambulatory Surgery Center (ASC): A facility which operates exclusively for the purpose of providing surgical services to patients not requiring hospitalization.

Bloodstream infection (BSI): An infection of the blood.

Central line (CL): A flexible tube (intravascular catheter) that terminates at or close to the heart or in one of the great vessels.

Central line-associated bloodstream infection (CLABSI): A primary bloodstream infection (BSI) in a patient that had a central line within the 48-hour period before the development of the BSI.

Central line-associated bloodstream infection (CLABSI) rate: The total number of central line-associated bloodstream infections divided by the number of central line days multiplied by 1,000.

Central line days (device days): A daily count of patients with a central line in place is performed at the same time each day.

Coronary artery bypass graft surgery (CABG): A surgical treatment for heart disease in which a vein or artery from another part of the body is used to create an alternate path for blood to flow to the heart bypassing a blocked artery.

Critical care unit (CCU): A nursing care area that provides intensive observation, diagnosis, and therapeutic procedures for adults and/or children who are critically ill.

Critical access hospital (CAH): A designation given to certain rural hospitals by the Centers for Medicare and Medicaid Services to reduce financial vulnerability and improve access to healthcare by keeping essential services in rural communities. A CAH must have 25 or fewer acute care inpatient beds, be more than 35 miles from another hospital, maintain an average length of stay of 96 hours or less for acute care patients, and provide 24/7 emergency care services.

Dialysis event (DE): An event for a dialysis patient involving any one of three possible scenarios: 1) hospitalization; 2) intravenous (IV) antimicrobial start; or 3) a positive blood culture. Dialysis event reporting involves *outpatient* facilities only.

Fascia: A thin layer of connective tissue covering, supporting, or connecting the muscles or inner organs of the body.

Great vessel: Based on NHSN criteria for reporting central line BSI, the following are considered great vessels: aorta, pulmonary artery, superior vena cava, inferior vena cava, brachiocephalic veins, internal jugular veins, subclavian veins, external iliac veins, common iliac veins, common femoral veins, and in neonates, the umbilical artery and vein.

Healthcare-associated infection (HAI): An infection of a patient that occurs in a healthcare setting which was not present or incubating at the time of admission and is not related to a previous admission.

Hip replacement surgery: An elective procedure for people with severe hip damage or pain related to chronic osteoarthritis, rheumatoid arthritis or other degenerative processes involving the hip joint.

Implant: A nonhuman-derived object, material, or tissue that is permanently placed in a patient during an operation. Examples include: heart valves, metal rods, mesh, wires, screws, cements, hip replacements and other devices.

Infection: An invasion of the body tissues by an infectious agent.

Infection preventionist (IP): A health professional that has special training in infection prevention.

Inpatient: A patient whose date of admission to a healthcare facility and the date of discharge are different calendar days.

Inpatient rehabilitation facility (IRF): Inpatient rehabilitation facilities and inpatient rehabilitation wards in hospitals care for patients who have lost function due to an injury or medical condition.

IV antimicrobial start: The first dose of a medication given intravenously to kill microscopic infectious organisms such as bacteria and viruses in the body.

Knee replacement surgery (arthroplasty): An elective procedure for people with severe knee damage and pain related to osteoarthritis, rheumatoid arthritis, and traumatic arthritis.

Local access infection (LAI): Pus, redness, or swelling of the vascular access site without the presence of access-associated bacteremia, patient hospitalization, or initiation of IV antimicrobials.

Location of attribution: The inpatient location where the patient was assigned on the date of the bloodstream infection (BSI) event, which is further defined as the date when the first clinical evidence appeared or the date the specimen used to meet the BSI criteria was collected, whichever came first.

Long-term acute care hospital (LTACH): A specialty care hospital that cares for patients with serious medical conditions that require intense, special treatment for long periods of time (an average length of stay is 25 days).

Metric: A measurement for calculating health outcomes. There are both process metrics that measure adherence to standard healthcare quality processes, and outcome metrics that measure the number of patients affected by specific medical treatments.

National Healthcare Safety Network (NHSN): NHSN is a secure, internet-based surveillance (monitoring and reporting) system managed by the Centers for Disease Control and Prevention (CDC) Division of Healthcare Quality Promotion.

NHSN operative procedure: A procedure that meets the following criteria: 1) performed on a patient who is a NHSN inpatient or outpatient; 2) takes place during an operation; and 3) included in the NHSN operative procedure categories.

Neonate: An infant less than or up to 30 days of age.

Neonatal critical care unit (NCCU): Patient care area providing care to most critically ill infants.

Outpatient: Patient whose date of admission to the facility and date of discharge are the same day (definition for the National Healthcare Safety Network reporting purposes).

Patient-days: The total number of inpatients for a particular unit determined at the same time each day for every day of the month recorded as a total sum for the month.

Permanent central line: A catheter that is tunneled under the skin on the chest wall and includes certain dialysis catheters (e.g., Hickman, Groshong, and Broviac) and implantable venous access ports (e.g., Port-a-Cath). Some dialysis patients may still have a port used for dialysis; however, most do not use this type of access due to the increased risk of infection.

Population: The total number of inhabitants of a geographic area or the total number of persons in a particular group (e.g., the number of persons engaged in a certain occupation).

Prevalence: The number or proportion of cases, events or attributes among a given population.

Rate: An expression of the relative frequency with which an event occurs among a defined population and specific time period calculated as the number of new cases or deaths during a specified period divided by either person-time or the average (mid-interval) population.

Risk: The probability that an adverse event will occur (e.g., that a person will be affected by, or die from, an illness, injury, or other health condition within a specified time or age span).

Risk adjustment: Accounts for differences in patient populations, enabling hospital comparisons.

Risk-adjusted rate: For surgical site infections, the risk-adjusted rate is based on a comparison of the actual (observed) rate and the predicted rate if nationwide the patients had the same

distribution of risk factors as the hospital. For CLABSI, the adjusted rate is a comparison of the actual rate and the predicted rate based on national rates for each ICU or within birth weight categories for neonates.

Risk factor: An aspect of personal behavior/lifestyle, environmental exposure, or hereditary characteristic associated with an increased occurrence of a disease, injury, or other health condition.

Standardized infection ratio (SIR): A risk-adjusted summary measure that accounts for the type of procedure and risk category. The SIR provides an overall score for a procedure at each health facility based on the predicted number of infections after adjusting for the risk category.

Surgical site infection (SSI): Infections that are directly related to an operative procedure. Some SSI are minor and only involve the skin or subcutaneous tissue. Other SSI may be deeper and more serious.

Surgical site infection rate: Surgical site infection rates per 100 operative procedures are found by dividing the number of SSI by the total number of specific operative procedures within a given reporting period. The results are then multiplied by 100. These calculations are performed separately for each type of surgical procedure. They are listed by risk level.

Symptom: Any indication of disease noticed or felt by a patient.

Temporary central line: A central line that is not tunneled.

Trend: Movement or change in frequency over time, usually upwards or downwards**.**

Validation: A method of assessing the completeness and accuracy of reported HAI data.

Vascular access infection: An infection that is either a local access infection or access-related bloodstream infection.

Wound class: An assessment of the likelihood and degree of contamination of a surgical wound at the time of the operation. The four classes are clean, clean-contaminated, contaminated, and dirty.