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Health Care Associated Infections in Colorado

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EXECUTIVE SUMMARY

This report presents data on health care associated infections (HAI) reported by Colorado health facilities. HAI are infections that are not present or developing when a patient is admitted to a health care facility and include infections associated with surgeries, central lines and dialysis treatment. HAI can be devastating to patients and families causing a significant financial burden due to additional medications, treatments, procedures, lost wages, short- and long-term illnesses, as well as pain, suffering and death.[1] Recognizing the seriousness of HAI, Colorado passed the HAI Disclosure Law (House Bill 06-1045) in 2006. This statute requires acute care hospitals, rehabilitation hospitals, long term acute care hospitals, selected hospital units, ambulatory surgery centers (ASC) and outpatient dialysis treatment centers to report designated HAI data as a condition of their state licensure.

This report was written to fulfill reporting requirements set forth in the Disclosure Law and is the ninth annual report published by the Colorado Department of Public Health and Environment. It is submitted each year to the Colorado Legislature by January 15. The report presents information about HAI reporting requirements, processes and limitations; functions of implementing the Disclosure Law; and HAI data submitted by Colorado health care facilities on surgical site infections (SSI), central line associated bloodstream infections (CLABSI), *Clostridium difficile* infections (CDI), and dialysis-related infections.

Key findings described in this report include the following:

- Of reportable surgeries in Colorado, the three most common surgeries performed between August 1, 2013 and July 31, 2015 were knee replacements (n=15,178 in hospitals, 640 in ASC), breast procedures (n=10,966 in hospitals, 5,587 in ASC) and hip replacements (n=10,613 in hospitals, 362 in ASC).
- Most Colorado health facilities had HAI rates similar to national rates for most reportable HAI.
- After being better than national rates for the prior reporting periods, statewide aggregate SSI rates for coronary artery bypass surgeries were similar to national rates in this reporting period.
- Statewide aggregate SSI rates for colon surgeries, abdominal hysterectomies, and knee replacements done in hospitals were better than national rates in the last three reporting periods.
- Statewide aggregate SSI rates for hernia repairs performed in ASC have been better than national rates for the last three reporting periods.
- Statewide aggregate rates for breast surgeries performed in hospitals have been worse than national rates for the last three reporting periods.
- ASC traditionally report fewer infections than hospitals, which may be due in part to reduced opportunity to conduct post surgical follow-up with patients and surgeons.
- Statewide aggregate CLABSI rates in long-term acute care hospitals have been better than national rates for the past two reporting periods. CLABSI rates for adult critical care units, and rehabilitation hospitals remained steady and similar to national rates.
- After being similar to national rates for the prior two reporting periods, CLABSI rates in neonatal critical care units were worse than the national average in this last reporting period.
- Statewide, Colorado's aggregate dialysis access related bloodstream infection rate was similar to the national rate in the last reporting period.
- The statewide aggregate rate for CDI was worse than the national rate in the last reporting period.

Table 1: Healthcare Associated Infections Summary Table – Colorado, August 2014-July 2015

Health Care Associated Infection Type	**No. of Facilities Reporting Data**	**No. of Facilities Reporting Zero Infections**	**No. of Facilities *Better* than National Rate**	**No. of Facilities *Worse* than National Rate**	**Comparison: Colorado to National Rate**
Surgical Site Infections in Acute Care Hospitals Procedure Type					
Breast Surgery	61	15	1	4	Worse
Colon Surgery	57	4	4	2	Better
Coronary Artery Bypass	15	5	0	0	Same
Hip Replacement	58	11	0	2	Same
Knee Replacement	58	16	1	0	Better
Abdominal Hysterectomy	56	14	1	1	Better
Surgical Site Infections in Ambulatory Surgery Centers Procedure Type					
Breast Procedure	33	14	0	1	Same
Hernia Repair	30	18	0	0	Better
Hip Replacement	3	0	0	0	Same
Knee Replacement	8	4	0	0	Same
Vaginal Hysterectomy	4	4	0	0	Same
Central Line Associated Bloodstream Infections Unit Type					
Adult Critical Care Units	62	22	0	1	Same
Neonatal Critical Care Units	20	8	0	2	Worse
Long Term Acute Care Hospitals	9	3	0	0	Better
Inpatient Rehabilitation Hospitals or Wards	17	15	0	0	Same
Dialysis Related Infections Infection Type					
Access Related Bloodstream Infections	71	15	1	3	Same
Local Access Infections	71	8	National rate not yet available		
***Clostridium difficile* Infections in Acute Care Hospitals**					
Facility Wide-Lab Identified	60	8	4	9	Worse

While this report only includes information on a subset of HAI, the information provided can be used as an important indicator of health care 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.

The Colorado Department of Public Health and Environment will continue its work to reduce HAI in Colorado through various activities, including the tracking and publishing of HAI data, completion of HAI data validation studies, implementation of HAI prevention collaboratives, direct observation of facility practices, maintenance of communication vehicles for HAI related information and collaboration with internal and external partners committed to patient safety. It is hoped health care facilities will use the data in this report to target and improve infection prevention efforts and consumers will use the data to make informed health care choices.

Health Facility-Acquired Infections Report

Overview of HAI Reporting

INTRODUCTION

Health care associated infections (HAI) are infections that are not present or developing when a patient is admitted to a health care facility. They include infections associated with surgeries, central lines and dialysis treatment. HAI can be devastating to patients and families causing significant financial burden due to additional medications, treatments, procedures, lost wages, short- and long-term illnesses, as well as pain, suffering and death.[1] Colorado recognizes the seriousness of this public health threat and passed HAI reporting legislation in 2006. Colorado's HAI Disclosure Law (House Bill 06-1045) requires hospitals, including acute care, rehabilitation, and long term acute care hospitals, hospital units, ambulatory surgery centers and dialysis treatment centers to report designated HAI data as a condition of state licensure.

The Disclosure Law mandates that certain health care facilities report their HAI data through the National Health Care Safety Network (NHSN)[2], a national web-based surveillance and reporting system managed by the Centers for Disease Control and Prevention (CDC). The use of NHSN potentially 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 health care facilities and the public.

As consumer demand for HAI-related information has increased, policymakers nationwide have acknowledged the need for publishing HAI data in consumer-focused health care quality reports. This report is the ninth annual report published by the Colorado Department of Public Health and Environment's Health Facility Infection Surveillance Unit (formerly known as the Patient Safety Program) and is due to the Health and Human Services Committees of the Colorado Senate and House of Representatives on January 15, 2016.

The report presents information about HAI reporting requirements, processes and limitations; functions of implementing the Disclosure Law; and HAI data submitted by Colorado health care facilities on selected surgical site infections (SSI), central line associated bloodstream infections (CLABSI), *Clostridium difficile* infections (CDI) and dialysis-related infections. The SSI data presented in this report occurred in patients having surgeries between August 1, 2012 and July 31, 2015. The CLABSI and dialysis-related infections presented occurred in patients who received medical treatment between August 1, 2012 and July 31, 2015, and the CDI data presented occurred in patients who were hospitalized between January 1, 2013 and July 31, 2015.

HAI DISCLOSURE LAW IMPLEMENTATION

Implementing Colorado's HAI Disclosure Law involves four main functions, as described below:

1. Appointment and coordination of an HAI advisory committee;
2. Selection of clinical metrics;
3. Oversight and validation of data entered into NHSN, and;
4. Reporting results.

1: APPOINTMENT AND COORDINATION OF AN HAI ADVISORY COMMITTEE

Colorado's Disclosure Law requires the department's executive director to appoint an 11-member HAI advisory committee, the Colorado Health Facility-Acquired Infections Advisory Committee, with the following composition: one representative each from a public and private hospital; a representative of a health insurer; a consumer/purchaser of health insurance; a representative of a health consumer organization; four infection control practitioners (one from a stand-alone ambulatory surgery center (ASC) and three infection preventionists board certified in infection control and epidemiology); a board certified or board eligible physician who is licensed in Colorado, affiliated with a Colorado hospital or medical school, and an active member of a national organization specializing in health care epidemiology or infection control; and a Master or PhD level medical statistician or clinical microbiologist.

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

- Ensure all components of the Colorado Disclosure Law are implemented;
- Provide guidance in selecting HAI reporting metrics;
- Evaluate relevancy, 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 health care personnel, and;
- Promote safe health care for Colorado citizens.

Advisory Committee Members

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   Presbyterian/St Luke's Medical Center
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3. **Carole Hemmelgarn,** MS
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7. **Renee Peters**, RN
   Rose Surgical Center
8. **Allison Lee Sabel-Soteres,** MD, PhD
   Denver Health Medical Center
9. **Peggy SaBell,** RN, MS, CIC
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10. **Cindy Thistel,** RN, MSN, CIC
    Littleton Adventist Hospital
11. **Heather Young,** MD
    Denver Health Medical Center

2: SELECTION OF CLINICAL METRICS

The HAI reporting metrics selected include infections related to central lines, surgeries and outpatient dialysis treatment. 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 (i.e., 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. *Clostridium difficile* infections (CDI) continue to be a growing problem in health care, causing an estimated 14,000 deaths each year. Based on its high incidence and potential severity, Colorado's HAI Advisory Committee added CDI to state reporting requirements for acute care hospitals in 2014. Table 2 below depicts Colorado's selected reporting metrics. In selecting metrics, the following factors were considered:[3]

- 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 Health Care Associated Infection Reporting Metrics

Facility Type	Reported HAI	Reporting Hospital Unit(s)
Acute Care and Critical Access Hospitals	• Breast Surgical Site Infections (SSI) • Colon SSI • Coronary Bypass Graft SSI • Hip Replacement SSI • Knee Replacement SSI • Hysterectomy Abdominal SSI	Inpatient and Outpatient Surgical Wards
	• Central Line Associated Bloodstream Infections (CLABSI)	Adult Critical Care Units
		Neonatal Critical Care Units Level II/III and III
		Inpatient Rehabilitation Units
	• *Clostridium difficile* infections*	Facility Wide
Rehabilitation Hospitals and Long Term Acute Care Hospitals	• CLABSI	Facility Wide
Ambulatory Surgery Centers	• Breast SSI • Hernia Repair SSI • Hip and Knee Replacement SSI • Hysterectomy Abdominal SSI • Hysterectomy Vaginal SSI	Not Applicable
Outpatient Dialysis Centers	• Dialysis Events	Not Applicable

*Acute care hospitals only, excluding critical access hospital, which are defined in the glossary in Appendix C.

3: OVERSIGHT AND VALIDATION OF DATA ENTERED INTO NHSN

Colorado health facilities grant the Colorado Department of Public Health and Environment access to the data they enter into the NHSN so the department can monitor, analyze and produce public reports. The NHSN maintains stringent controls to ensure data security, integrity and confidentiality, and also has the capacity to enable facilities to share data in a timely manner with each other and with public health agencies.

Colorado's Disclosure Law requires health facilities to report HAI data within 30 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 CLABSI, SSI and dialysis-related infections 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 Disclosure Law also specifies requirements for health care facility employees who collect and report HAI data. These individuals must be certified in infection control and epidemiology[4] or become certified within six months of becoming eligible to take the certification exam. These certification requirements do not apply to staff in hospitals with 50 beds or less, dialysis centers or ASC. 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.

4: REPORTING RESULTS

The final function of implementation is the publication of annual public reports and semi-annual bulletins. The current report is the ninth annual report published by the department. Semi-annual bulletins provide additional data, research, and information applicable to HAI in Colorado. All HAI reports and bulletins can be found at https://www.colorado.gov/pacific/cdphe/health-care-facility-infection-data.

PARTICIPATING FACILITIES

This past year, 76 hospitals, 9 long term acute care hospitals (LTAC), 5 rehabilitation hospitals, 61 ASC and 71 dialysis treatment clinics reported HAI data into NHSN. Table 3 shows the number of hospitals that report CLABSI by type of critical care unit and Table 4 lists Colorado's reportable surgical procedures and the numbers of hospitals and ASC that report them.

Table 3: Number of Hospitals Reporting Central Line Associated Bloodstream Infections (CLABSI) by Type of Critical Care Unit – Colorado, August 2014-July 2015

Type of Critical Care Unit	Number of Hospitals
Medical	5
Surgical	1
Medical/Surgical	44
Medical Cardiac	1
Cardiothoracic surgery	3
Burn	1
Trauma	3
Neurosurgical	4
Level II/III Neonatal Critical Care	15
Level III Neonatal Critical Care	5
Long-term Acute Care Hospitals	9
Inpatient Rehabilitation Hospitals	5
Inpatient Rehabilitation Hospital Units	12

Table 4: Number of Hospitals and Ambulatory Surgery Centers Performing Reportable Procedures – Colorado, August 2014-July 2015

Procedure	Number of Hospitals	Number of Ambulatory Surgical Centers	Total Number of Facilities
Breast Surgery	61	33	94
Colon Surgery	57	NA[2]	57
Coronary Artery Bypass Graft	15	NA[2]	15
Hernia Repair	NA[1]	30	30
Hip Replacement	58	3	61
Knee Replacement	58	8	66
Hysterectomy Abdominal	56	NA[2]	56
Hysterectomy Vaginal	NA[1]	4	4

NA = Not applicable
[1] Hospitals no longer report hernia repairs and vaginal hysterectomies.
[2] Ambulatory Surgery Centers do not perform these procedures.

Health Facility-Acquired Infections Report

Infection Data

INFECTION DATA FORMAT AND CAUTIONS

Data presented in this report cover SSI in patients undergoing surgeries between August 1, 2012 and July 31, 2015; CLABSI and dialysis-related infections in patients receiving medical care between August 1, 2012 and July 31, 2015; and CDI in patients receiving medical care between January 1, 2013 and July 31, 2015. Two forms of 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 that facilities can readily identify areas in need of process improvements and target infection prevention efforts.

The following tables of data 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 SSI), patient line days (for CLABSI), patient months (for dialysis-related infections), and patient days (for CDI). 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 taking into account 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 expected number of infections based on the national average (as determined by historical data collected by the NHSN). A SIR of 1 means that a facility's observed number of infections is equal to the expected number of infections. If the SIR value is greater than 1, there are more infections than expected, and if the SIR is less than 1, there are fewer infections than expected.

In this report, the SIR is reported for all infection types except dialysis local access infections, because a national rate for this type of infection is not yet available.

National Comparison. For all types of infections in this report, a national comparison is shown for each facility, which compares the facility's observed number of infections to the expected number of infections based on the national rate, denominator size (i.e., number of procedures, number of patient months, etc.) and a statistical test of difference between numerical values. The statistical test, known as a Poisson test, calculates the magnitude of difference between a facility's observed and expected number of infections. If there is no significant difference between the facility's observed and expected number of infections, the facility's infection rate is designated as "**SAME.**" If the difference is statistically significant and the SIR is greater than 1, the facility has significantly more infections than expected and is designated as "**WORSE.**" If the difference is statistically significant and the SIR is less than 1, the facility has significantly fewer HAI than expected and is designated as "**BETTER.**" For a more detailed explanation of how the SIR is calculated, see Appendix B.

Cautions. The Colorado Department of Public Health and Environment 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), especially in severely ill patients with higher risks of infection.

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 ambulatory surgery centers (ASC) traditionally report lower numbers of SSI than hospitals, which may be due, in part, to reduced opportunity to conduct post surgical follow-up with patients and surgeons.

Finally, users of this report should note that the data presented are self-reported by each facility and that data validation studies have only been completed thus far for selected CLABSI, SSI and dialysis related infections. It is recommended that conclusions regarding health care quality be made in conjunction with other quality indicators and that consumers consult with doctors, health care facilities, health insurance carriers, health care 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. It is hoped that facilities will use the data in this report to target and improve infection prevention efforts and that consumers will use the data to make more informed health care decisions.

COLORADO AGGREGATE HEALTH CARE-ACQUIRED INFECTION DATA

AGGREGATE SURGICAL SITE INFECTION DATA

Surgical site infections (SSI) are infections directly related to a surgical procedure. Table 5 below shows the statewide aggregate number of SSI and SIRs for reportable procedures by three separate reporting periods from August 1, 2012 through July 31, 2015. SSI data are presented for both hospitals and ASC.

Colorado hospitals overall had better than national SSI rates for colon surgeries, knee replacements and abdominal hysterectomies for the last three reporting periods. The statewide aggregate SSI rate for breast surgeries in hospitals has been worse than national rates for the past three reporting periods.

Hospitals. Overall, Colorado hospitals had better than national SSI rates for colon surgeries, knee replacements and abdominal hysterectomies for the last three reporting periods. The statewide aggregate SSI rate for breast surgeries in hospitals has been worse than the national average for the past three reporting periods. The SSI rates for coronary artery bypass and hip replacement were the same as the national average for the latest reporting period.

Ambulatory surgery centers. In general, ASC reported lower rates of SSI than hospitals and as a whole, performed the same or better than national averages. Breast and hernia surgeries were the most common procedures reported by ASC, and the SSI rates for breast surgeries were the same as the national average. For hernia repairs in ASC, SSI rates were better than national averages for the last three reporting periods. While there were five SSI statewide for hip replacements in ASC, knee replacements and vaginal hysterectomies show zero SSI in the last three reporting periods.

Statewide SSI rates for hernia repairs in ASC have been better than national rates for the last three reporting periods.

Statewide, CLABSI rates in LTACs were better than national rates for the last two reporting periods.

AGGREGATE CLABSI DATA

Central line associated bloodstream infections (CLABSI) 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 CLABSI central line days, infection counts and SIRs for adult critical care units, neonatal critical care units, long-term acute care hospitals (LTAC), rehabilitation hospitals and rehabilitation wards in Colorado from August 1, 2012 through July 31, 2015.

Statewide, Colorado's CLABSI rates in hospital critical care units have been similar to national averages for the last three reporting periods. The statewide CLABSI rate for LTACs was better than the national rate for the last two periods and the statewide CLABSI rate for Neonatal Critical Care units (NCCU) was worse than the national rate in the latest reporting period.

In the latest reporting period, the statewide CLABSI rate for NCCU was worse than the national average.

AGGREGATE DIALYSIS INFECTION DATA

Table 7 shows statewide aggregate data for access-related bloodstream infections (ARB) and local access infections (LAI) in Colorado outpatient dialysis centers from August 1, 2012 through July 31, 2015. 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 the source of infection is reported 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 we used a more recent national ARB rate (from 2014 data) for comparison this year, Colorado's aggregate ARB rate was the same as the national average. While the statewide LAI rate showed a decline when compared to the two previous reporting periods, national LAI rates are not yet available to provide comparisons.

Colorado's dialysis access related bloodstream infection rate was the same as the national average. While the statewide local access infection rate showed a decline from the previous two reporting periods, national LAI rates are not yet available for comparisons.

AGGREGATE *CLOSTRIDIUM DIFFICILE* INFECTION DATA

Clostridium 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 even death. Table 8 shows statewide aggregate data for hospital onset *Clostridium difficile* infections (CDI) in Colorado acute care hospitals from January 1, 2013 through July 31, 2015 (CDI data were not available before January 1, 2013). In the most recent reporting period (August 2014 through July 2015), the statewide CDI rate was worse than the national average, compared to the previous reporting period (August 2013 through July 2014), where the state CDI rate was similar to the national average.

In the most recent reporting period, the statewide *Clostridium difficile* infection rate was worse than the national average, compared to the previous reporting period, where the state *Clostridium difficile* infection rate was similar to the national average.

TABLE 5: Number of Surgical Site Infections and Standardized Infection Ratios in Hospitals and Ambulatory Surgery Centers (ASCs) – Colorado, August 2012-July 2015

Facility Type and Procedure	August 2012- July 2013				August 2013- July 2014				August 2014- July 2015			
	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
Hospitals												
Breast Surgery	10,041	100	1.3	Worse	10,233	108	1.3	Worse	10,966	127	1.5	Worse
Colon Surgery	4,443	209	0.8	Better	4,634	188	0.7	Better	4,621	210	0.8	Better
Coronary Artery Bypass Graft	1,536	15	0.5	Better	1,620	16	0.5	Better	1,670	21	0.7	Same
Hip Replacement	8,968	90	0.8	Better	9,858	94	0.8	Better	10,613	119	0.9	Same
Knee Replacement	13,534	102	0.8	Better	14,746	91	0.6	Better	15,178	99	0.7	Better
Abdominal Hysterectomy	6,523	76	0.7	Better	6,863	73	0.6	Better	6,900	66	0.6	Better
ASCs												
Breast Surgery	5,826	12	0.4	Better	5,476	25	1.0	Same	5,587	19	0.7	Same
Hernia	5,598	9	0.3	Better	6,181	12	0.4	Better	5,570	9	0.3	Better
Hip Replacement	203	0	0	Same	278	0	0	Same	362	5	1.7	Same
Knee Replacement	471	0	0	Same	636	0	0	Same	640	0	0	Same
Vaginal Hysterectomy	44	0	0	Same	44	0	0	Same	46	0	0	Same

SIR=Standardized Infection Ratio, the ratio of observed to expected infections adjusted for procedure risk factors.

TABLE 6: Number of Central Line Associated Bloodstream Infections and Standardized Infection Ratios in Hospitals by Unit Type – Colorado, August 2012-July 2015

Unit Type	August 2012- July 2013				August 2013- July 2014				August 2014- July 2015			
	Central Line Days	No. of Infections	SIR	National Comparison	Central Line Days	No. of Infections	SIR	National Comparison	Central Line Days	No. of Infections	SIR	National Comparison
Adult Critical Care Unit	109,279	89	0.9	Same	110,824	99	0.9	Same	106,121	85	0.9	Same
Neonatal Critical Care Unit	19,237	20	1	Same	19,384	17	0.8	Same	19,429	33	1.6	Worse
Long-Term Acute Care Facility	38,465	35	1	Same	32,826	14	0.5	Better	33,464	15	0.5	Better
Inpatient Rehab Facility/Ward	10,143	2	0.7	Same	10,527	2	0.7	Same	9,468	2	0.7	Same

SIR=Standardized Infection Ratio, the ratio of observed to expected infections adjusted for procedure risk factors.

TABLE 7: Number of Dialysis Infections and Standardized Infection Ratios in Outpatient Dialysis Facilities by Infection Type – Colorado, August 2012-July 2015

Infection Type	August 2012- July 2013				August 2013- July 2014				August 2014- July 2015			
	Patient Months	No. of Infections	Rate	National Comparison	Patient Months	No. of Infections	Rate	National Comparison	Patient Months	No. of Infections	Rate	National Comparison
Access-Related Bloodstream (ARB)	39,725	228	0.6	Same	40,911	336	0.8	Worse	41,823	244	0.6	Same
Local Access Infection (LAI)	39,725	552	1.4	NA	40,911	532	1.3	NA	41,823	385	0.9	NA

Note: ARB infection= presence of a microorganism identified in a blood culture, and the source of infection is reported as the vascular access. LAI= presence of pus, redness or swelling of the vascular access site.

TABLE 8: Number of Hospital-Onset *Clostridium difficile* infections and Standardized Infection Ratios in Hospitals – Colorado, January 2013-July 2015

	January - July 2013				August 2013- July 2014				August 2014- July 2015			
	Patient Days	No. of Infections	SIR	National Comparison	Patient Days	No. of Infections	SIR	National Comparison	Patient Days	No. of Infections	SIR	National Comparison
***Clostridium difficile* infection**	941,236	750	1.1	Worse	1,631,563	1,176	1	Same	1,621,726	1,310	1.1	Worse

SIR=Standardized Infection Ratio, the ratio of observed to expected infections adjusted for patient and facility risk factors.

COLORADO FACILITY SPECIFIC HEALTH CARE-ACQUIRED INFECTION DATA - SURGICAL SITE INFECTION OVERVIEW

Surgical site infections (SSI) are infections directly related to a surgical procedure. It is estimated that more than 20 percent of HAI are attributed to SSI, equating to infections in approximately two percent of all surgical procedures nationally.[5] The impact from an SSI can be devastating, often leading to a longer hospital stay, additional treatment and higher costs.[6] The economic toll per patient occurrence is estimated to be between $3,000 and $25,500 depending on the procedure and pathogen(s) involved.[1,7] Overall in the United States, SSI can cost consumers and health care 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 SSI. The surgeries monitored for SSI in Colorado include cardiac procedures, hip and knee replacements, hernia repairs, hysterectomies (abdominal and vaginal), and breast and colon procedures. The NHSN manual defines reportable procedures for surveillance as those that occur in a single trip to an operating room where the incision is closed following the procedure.[2] 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, SSI 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).
- 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, its city, the number of procedures performed, number of infections, standardized infection ratio (SIR) and a comparison to national infection data. For a detailed explanation of how the SIR is calculated, see Appendix B. There are three categories that indicate how a facility's own infection rate compares to the national infection rate. These are:

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**).

CARDIAC PROCEDURES

BACKGROUND

A heart bypass, also known as a coronary artery bypass graft, 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 coronary artery bypass graft 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. The majority of cardiac operative procedures performed in Colorado hospitals are CBGB. Based on the small number of CBGC surgeries performed, most SSI data associated with CBGC had to be suppressed to protect confidential health information and therefore, CBGC data are not presented in this report.

RESULTS

Table 9 shows facility-specific data for SSI attributed to CBGB surgeries performed in hospitals from August 1, 2014 through July 31, 2015. Historical data for two previous reporting periods are also provided.

While statewide CBGB SSI rates in the previous two reporting periods were better than national rates, this year, the statewide CBGB SSI rate was similar to the national rate.

Fifteen hospitals reported a total of 1,670 **CBGB** surgeries this past year. Five hospitals reported zero SSI. All individual hospital's rates were the same as the national rate. While statewide CBGB SSI rates in the previous two reporting periods were better than national rates, this year, the statewide CBGB SSI rate was similar to the national rate.

TABLE 9: Number of Surgical Site Infections and Standardized Infection Ratios for Coronary Artery Bypass Grafts with Chest and Donor Site Incisions in Hospitals – Colorado, August 2012-July 2015

Surgical Site Infections in Coronary Artery Bypass Grafts With Chest And Donor Site Incisions: August 1, 2012 – July 31, 2015													
Health Facility and City		August 2012- July 2013				August 2013- July 2014				August 2014- July 2015			
		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	**Boulder**	54	0	0	Same	56	0	0	Same	9	***	***	***
Centura Penrose St Francis Health	**Colorado Springs**	183	3	1	Same	226	2	0.5	Same	211	2	0.6	Same
Centura Porter Adventist Hospital	**Denver**	96	1	0.7	Same	98	2	1.5	Same	90	2	1.5	Same
Centura St Anthony Hospital	**Lakewood**	64	0	0	Same	74	0	0	Same	74	0	0	Same
Exempla Lutheran MC	**Wheat Ridge**	89	0	0	Same	78	1	0.6	Same	70	0	0	Same
Exempla St Joseph Hospital	**Denver**	230	0	0	Better	213	0	0	Better	210	3	0.8	Same
MC of Aurora	**Aurora**	58	2	1.6	Same	80	0	0	Same	130	0	0	Same
MC of the Rockies	**Loveland**	169	0	0	Better	249	4	0.7	Same	227	3	0.6	Same
Memorial Hospital Central	**Colorado Springs**	168	2	0.8	Same	151	2	0.9	Same	154	5	2.2	Same
North Colorado MC	**Greeley**	54	2	2	Same	64	0	0	Same	63	1	0.9	Same
Parkview MC	**Pueblo**	56	0	0	Same	15	***	***	***	65	1	0.9	Same
Presbyterian St Luke's MC	**Denver**	15	***	***	***	11	***	***	***	0	***	***	***
Rose MC	**Denver**	15	***	***	***	15	***	***	***	25	1	2	Same
Sky Ridge MC	**Lone Tree**	22	0	0	Same	23	0	0	Same	0	***	***	***
St Mary's Hospital	**Grand Junction**	111	2	1.2	Same	110	1	0.6	Same	118	0	0	Same
Swedish MC	**Englewood**	56	1	1.1	Same	65	2	1.8	Same	87	0	0	Same
University of Colorado Hospital	**Aurora**	96	1	0.4	Same	92	2	0.8	Same	137	3	0.9	Same

Note: SIR=Standardized Infection Ratio, the ratio of observed to expected infections adjusted for procedure risk factors; MC=Medical Center.
National comparison based on the indirect adjustment of modeled risk factors for each procedure type.
Infections for facilities performing less than 20 procedures per year are suppressed to protect confidential health information. These facilities fulfilled reporting requirements.
*** Indicates value not shown due to suppression of infection data, no national or historical rate available, or an expected infection count of less than 1.
Source: National Health Care Safety Network (NHSN) Database.

ORTHOPEDIC PROCEDURES

BACKGROUND

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 (HR) 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 thighbone, and a metal stem to attach to the bone.

Statewide, the SSI rate for KR in Colorado hospitals has been better than the national rate for three consecutive years.

A total or partial knee replacement (KR) 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 10 and 11 show facility specific data for SSI attributed to **hip and knee surgeries** performed in hospitals (inpatient and outpatient) and ASC (outpatient only) from August 1, 2014 through July 31, 2015. Historical data for two previous reporting periods are also provided.

Fifty-eight hospitals reported 10,613 HR surgeries this past year, 11 of which reported zero HR SSI. Two hospitals had HR SSI rates worse than the national average.

Three ASC reported a total of 362 HR surgeries this past year with five reported SSI.

Fifty-eight hospitals reported 15,178 KR surgeries s this past year; 16 reported zero KR SSI. One hospital had KR SSI rates better than the national average, and all others had rates similar to the national average. Statewide, the aggregate SSI rate for KR performed in Colorado hospitals has been better than the national rate for three consecutive years.

Eight ASC reported 640 KR surgeries in the latest reporting period. For the past three periods, there were zero infections in knee replacements performed in ASC.

Eight ASC reported 640 knee replacements in the latest reporting period. For the past three periods, there were zero infections in knee replacements performed in ASC.

TABLE 10: Number of Surgical Site Infections and Standardized Infection Ratios for Hip Replacements (Total or Partial) in Hospitals and Ambulatory Surgery Centers (ASC) – Colorado, August 2012-July 2015

Surgical Site Infections in Hip Replacement Procedures in Hospitals and Ambulatory Surgery Centers: August 1, 2012 – July 31, 2015													
Health Facility and City		August 2012- July 2013				August 2013- July 2014				August 2014- July 2015			
		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	70	0	0	Same	118	0	0	Same	108	0	0	Same
Arkansas Valley Regional MC	La Junta	11	***	***	***	16	***	***	***	10	***	***	***
Aspen Valley Hospital	Aspen	51	0	0	Same	59	0	0	Same	47	0	0	Same
Boulder Community Hospital	Boulder	244	2	0.8	Same	325	2	0.6	Same	61	0	0	Same
Boulder Community Hospital-Foothills	Boulder	0	***	***	***	0	***	***	***	319	3	1	Same
Castle Rock Adventist Hospital	Castle Rock	Not yet operating				73	0	0	Same	37	0	0	Same
Centura Avista Adventist Hospital	Louisville	99	4	3.6	Same	94	3	2.8	Same	107	3	2.4	Same
Centura Littleton Adventist Hospital	Littleton	115	0	0	Same	149	1	0.5	Same	180	1	0.4	Same
Centura Penrose St Francis Health	Colorado Springs	480	1	0.2	Better	494	2	0.3	Same	543	5	0.8	Same
Centura Porter Adventist Hospital	Denver	620	5	0.8	Same	713	12	1.5	Same	766	12	1.4	Same
Centura St Anthony Hospital	Lakewood	150	3	1.1	Same	174	1	0.3	Same	152	2	0.7	Same
Centura St Anthony North Hospital	Westminster	103	3	2.3	Same	82	0	0	Same	53	1	1.4	Same
Centura St Francis MC	CO Springs	135	2	1.2	Same	194	2	0.8	Same	314	3	0.8	Same
Centura St Mary Corwin MC	Pueblo	124	1	0.6	Same	148	2	1	Same	190	2	0.8	Same
Centura St Thomas More Hospital	Canon City	39	1	2	Same	29	3	8.1	Worse	23	3	8.3	Worse
Colorado Plains MC	Fort Morgan	32	0	0	Same	29	0	0	Same	27	0	0	Same
Community Hospital	Grand Junction	62	1	1.2	Same	77	1	0.8	Same	97	1	0.9	Same
Delta County Memorial Hospital	Delta	54	1	1.4	Same	52	0	0	Same	75	1	1	Same
Denver Health MC	Denver	111	4	1.9	Same	90	0	0	Same	142	7	2.5	Worse
East Morgan County Hospital	Brush	0	***	***	***	8	***	***	***	0	***	***	***
Estes Park MC	Estes Park	10	***	***	***	10	***	***	***	16	***	***	***
Exempla Good Samaritan MC	Lafayette	302	5	1.2	Same	422	4	0.8	Same	471	7	1.3	Same
Exempla Lutheran MC	Wheat Ridge	161	6	2.1	Same	169	2	0.8	Same	163	1	0.5	Same
Exempla St Joseph Hospital	Denver	674	4	0.5	Same	838	4	0.4	Same	775	3	0.4	Same
Family Health West Hospital	Grand Junction	1	***	***	***	0	***	***	***	0	***	***	***

Surgical Site Infections in Hip Replacement Procedures in Hospitals and Ambulatory Surgery Centers: August 1, 2012 – July 31, 2015													
Health Facility and City		August 2012- July 2013				August 2013- July 2014				August 2014- July 2015			
		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
Grand River MC	Rifle	10	***	***	***	14	***	***	***	13	***	***	***
Gunnison Valley Hospital	Gunnison	6	***	***	***	9	***	***	***	6	***	***	***
Heart of the Rockies Regional MC	Salida	21	0	0	Same	41	0	0	Same	31	0	0	Same
Lincoln Surgery Center	Parker	0	***	***	***	0	***	***	***	55	0	0	Same
Longmont United Hospital	Longmont	133	1	0.5	Same	128	0	0	Same	158	1	0.5	Same
McKee MC	Loveland	150	1	0.6	Same	157	0	0	Same	160	1	0.6	Same
MC of Aurora	Aurora	260	4	1.2	Same	219	2	0.7	Same	204	2	0.8	Same
MC of the Rockies	Loveland	134	4	2.3	Same	131	4	2.1	Same	158	1	0.5	Same
Memorial Hospital Central	Colorado Springs	252	1	0.4	Same	225	4	1.2	Same	200	1	0.4	Same
Memorial Hospital North	Colorado Springs	131	1	0.7	Same	168	0	0	Same	140	3	1.9	Same
Mercy Regional MC	Durango	75	0	0	Same	92	0	0	Same	133	1	0.7	Same
Montrose Memorial Hospital	Montrose	68	0	0	Same	77	0	0	Same	70	0	0	Same
North Colorado MC	Greeley	186	0	0	Same	246	2	0.6	Same	223	3	0.9	Same
North Suburban MC	Thornton	89	1	0.8	Same	36	0	0	Same	53	0	0	Same
OrthoColorado Hospital at St. Anthony Medical Campus	Lakewood	455	1	0.2	Same	533	4	0.8	Same	564	3	0.6	Same
Orthopedic Center of the Rockies ASC	Ft Collins	203	0	0	Same	239	0	0	Same	308	2	0.8	Same
Pagosa Springs MC	Pagosa Springs	0	***	***	***	6	***	***	***	12	***	***	***
Parker Adventist Hospital	Parker	132	2	0.9	Same	155	1	0.5	Same	180	2	1.1	Same
Parkview MC	Pueblo	216	2	0.6	Same	183	0	0	Same	227	3	0.9	Same
Pikes Peak Regional Hospital	Woodland Park	4	***	***	***	6	***	***	***	12	***	***	***
Platte Valley MC	Brighton	14	***	***	***	33	0	0	Same	56	1	1.3	Same
Poudre Valley Hospital	Ft Collins	482	4	0.6	Same	511	6	0.9	Same	545	5	0.8	Same
Presbyterian St Luke's MC	Denver	366	2	0.4	Same	344	10	1.9	Same	222	7	1.9	Same
Rose MC	Denver	305	3	0.9	Same	325	2	0.6	Same	339	1	0.3	Same
San Luis Valley Regional MC	Alamosa	34	0	0	Same	32	2	3.8	Same	23	0	0	Same
Sky Ridge MC	Lone Tree	803	13	1.5	Same	764	6	0.7	Same	1,026	9	0.8	Same
Southwest Memorial Hospital	Cortez	15	***	***	***	12	***	***	***	10	***	***	***
St Anthony Summit MC	Frisco	1	***	***	***	0	***	***	***	0	***	***	***
St Mary's Hospital	Grand	275	1	0.3	Same	292	0	0	Same	324	2	0.5	Same

Surgical Site Infections in Hip Replacement Procedures in Hospitals and Ambulatory Surgery Centers: August 1, 2012 – July 31, 2015													
Health Facility and City		August 2012- July 2013				August 2013- July 2014				August 2014- July 2015			
		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
	Junction												
Sterling Regional MC	Sterling	30	2	4.6	Same	27	0	0	Same	35	0	0	Same
Surgical Center at Premier	CO Springs	0	***	***	***	39	0	0	Same	46	1	3.2	Same
Swedish MC	Englewood	275	1	0.3	Same	253	3	0.9	Same	292	4	1	Same
The Children's Hospital Colorado	Aurora	19	***	***	***	29	1	1.3	Same	15	***	***	***
The Memorial Hospital	Craig	1	***	***	***	4	***	***	***	2	***	***	***
University of Colorado Hospital	Aurora	262	3	0.6	Same	317	4	0.6	Same	343	5	0.9	Same
Vail Valley MC	Vail	7	***	***	***	1	***	***	***	5	***	***	***
Valley View Hospital	Glenwood Springs	41	0	0	Same	69	0	0	Same	85	3	3.1	Same
Wray Community Hospital	Wray	10	***	***	***	4	***	***	***	6	***	***	***
Yampa Valley MC	Steamboat Springs	58	0	0	Same	52	0	0	Same	65	0	0	Same

Note: SIR=Standardized Infection Ratio, the ratio of observed to expected infections adjusted for procedure risk factors; MC=Medical Center.
National comparison based on the indirect adjustment of modeled risk factors for each procedure type.
Infections for facilities performing less than 20 procedures per year are suppressed to protect confidential health information. These facilities fulfilled reporting requirements.
*** Indicates value not shown due to suppression of infection data, no national or historical rate available, or an expected infection count of less than 1.
Source: National Health Care Safety Network (NHSN) Database.

TABLE 11: Number of Surgical Site Infections and Standardized Infection Ratios for Knee Replacements (Total or Partial) in Hospitals and Ambulatory Surgery Centers (ASC) – Colorado, August 2012-July 2015

Surgical Site Infections in Knee Replacement Procedures in Hospitals and ASCs: August 1, 2012 – July 31, 2015													
Health Facility and City		August 2012- July 2013				August 2013- July 2014				August 2014- July 2015			
		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**	128	0	0	Same	182	0	0	Same	149	1	0.7	Same
Arkansas Valley Regional MC	**La Junta**	21	0	0	Same	25	0	0	Same	21	0	0	Same
Aspen Valley Hospital	**Aspen**	66	1	1.9	Same	121	1	1.1	Same	105	1	1.3	Same
Boulder Community Hospital	**Boulder**	246	1	0.4	Same	381	4	1.3	Same	75	0	0	Same
Castle Rock Adventist Hospital	**Castle Rock**	Not yet operating				106	0	0	Same	84	0	0	Same
Centura Avista Adventist Hospital	**Louisville**	159	3	2.5	Same	167	0	0	Same	182	1	0.7	Same
Centura Littleton Adventist Hospital	**Littleton**	177	0	0	Same	194	1	0.5	Same	231	1	0.4	Same
Centura Penrose St Francis Health	**Colorado Springs**	455	2	0.5	Same	455	1	0.2	Same	442	1	0.2	Same
Centura Porter Adventist Hospital	**Denver**	1,082	7	0.7	Same	1,143	5	0.5	Same	1,297	5	0.4	Same
Centura St Anthony Hospital	**Lakewood**	132	0	0	Same	137	3	1.6	Same	105	2	1.3	Same
Centura St Anthony North Hospital	**Westminster**	90	2	2.5	Same	73	1	1.7	Same	65	1	1.5	Same
Centura St Francis MC	**Colorado Springs**	318	0	0	Same	448	4	0.9	Same	651	5	0.8	Same
Centura St Mary Corwin MC	**Pueblo**	222	2	1	Same	238	1	0.5	Same	322	1	0.4	Same
Centura St Thomas More Hospital	**Canon City**	73	0	0	Same	61	0	0	Same	61	0	0	Same
Colorado Plains MC	**Fort Morgan**	52	1	2.3	Same	44	0	0	Same	53	0	0	Same
Community Hospital	**Grand Junction**	118	0	0	Same	120	0	0	Same	144	0	0	Same
Delta County Memorial Hospital	**Delta**	77	0	0	Same	107	1	1.1	Same	100	0	0	Same
Denver Health MC	**Denver**	133	0	0	Same	173	1	0.5	Same	159	1	0.6	Same
East Morgan County Hospital	**Brush**	0	***	***	***	11	***	***	***	0	***	***	***
Estes Park MC	**Estes Park**	2	***	***	***	8	***	***	***	14	***	***	***
Exempla Good Samaritan MC	**Lafayette**	494	4	0.9	Same	713	3	0.5	Same	713	3	0.5	Same
Exempla Lutheran MC	**Wheat Ridge**	124	1	0.8	Same	146	2	1.6	Same	143	1	0.8	Same
Exempla St Joseph Hospital	**Denver**	904	3	0.3	Better	1,010	5	0.5	Same	950	7	0.8	Same

Surgical Site Infections in Knee Replacement Procedures in Hospitals and ASCs: August 1, 2012 – July 31, 2015													
Health Facility and City		August 2012- July 2013				August 2013- July 2014				August 2014- July 2015			
		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
Family Health West Hospital	Grand Junction	2	***	***	***	0	***	***	***	0	***	***	***
Grand River MC	Rifle	2	***	***	***	18	***	***	***	20	0	0	Same
Gunnison Valley Hospital	Gunnison	7	***	***	***	8	***	***	***	16	***	***	***
Harmony Ambulatory Surgery Center	Ft Collins	0	***	***	***	0	***	***	***	15	***	***	***
Heart of the Rockies Regional MC	Salida	50	0	0	Same	56	2	2.9	Same	45	0	0	Same
Lincoln Surgery Center	Parker	0	***	***	***	0	***	***	***	19	***	***	***
Longmont United Hospital	Longmont	248	0	0	Same	253	1	0.4	Same	291	1	0.4	Same
Loveland Surgery Center ASC	Loveland	0	***	***	***	1	***	***	***	1	***	***	***
McKee MC	Loveland	301	2	0.9	Same	305	2	0.9	Same	184	2	1.4	Same
MC of Aurora	Aurora	360	6	1.5	Same	291	4	1.2	Same	274	5	1.6	Same
MC of the Rockies	Loveland	151	4	2.2	Same	178	3	1.6	Same	264	4	1.6	Same
Memorial Hospital Central	Colorado Springs	359	4	1.2	Same	215	3	1.3	Same	152	1	0.7	Same
Memorial Hospital North	Colorado Springs	364	5	1.6	Same	444	1	0.2	Same	406	1	0.3	Same
Mercy Regional MC	Durango	164	1	0.8	Same	149	0	0	Same	153	1	0.8	Same
Montrose Memorial Hospital	Montrose	137	1	1	Same	115	1	1	Same	168	0	0	Same
North Colorado MC	Greeley	283	1	0.3	Same	326	3	0.8	Same	374	4	1	Same
North Suburban MC	Thornton	145	5	3.1	Same	86	1	1.4	Same	75	1	1.4	Same
Ortho Colorado Hospital at St. Anthony Medical Campus	Lakewood	1,049	11	1.4	Same	1,117	3	0.4	Same	1,176	9	1	Same
Orthopedic Center of the Rockies ASC	Ft Collins	409	0	***	***	446	0	***	***	491	0	***	***
Pagosa Springs MC	Pagosa Springs	0	***	***	***	7	***	***	***	14	***	***	***
Parker Adventist Hospital	Parker	200	2	0.7	Same	253	0	0	Same	269	3	1.3	Same
Parkview MC	Pueblo	335	2	0.5	Same	354	0	0	Better	367	4	0.9	Same
Pikes Peak Regional Hospital	Woodland Park	27	0	0	Same	26	0	0	Same	18	***	***	***
Platte Valley MC	Brighton	63	3	6	Worse	71	0	0	Same	126	0	0	Same
Poudre Valley Hospital	Ft Collins	988	7	0.7	Same	1,034	5	0.5	Same	985	8	0.9	Same
Presbyterian St Luke's MC	Denver	354	4	1	Same	370	5	0.9	Same	235	5	1.3	Same

Surgical Site Infections in Knee Replacement Procedures in Hospitals and ASCs: August 1, 2012 – July 31, 2015													
Health Facility and City		August 2012- July 2013				August 2013- July 2014				August 2014- July 2015			
		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
Rose MC	**Denver**	595	3	0.5	Same	551	2	0.4	Same	594	4	0.8	Same
Rose Surgical Center	**Denver**	0	***	***	***	18	***	***	***	26	0	0	Same
San Luis Valley Regional MC	**Alamosa**	38	1	2.7	Same	31	0	0	Same	39	0	0	Same
Sky Ridge MC	**Lone Tree**	741	6	0.8	Same	818	10	1.2	Same	1,149	5	0.4	Better
Skyline Surgery Center ASC	**Loveland**	0	***	***	***	9	***	***	***	1	***	***	***
Southwest Memorial Hospital	**Cortez**	25	1	5	Same	28	0	0	Same	27	0	0	Same
St Anthony Summit MC	**Frisco**	36	0	0	Same	47	0	0	Same	60	0	0	Same
St Mary's Hospital	**Grand Junction**	326	0	0	Same	381	0	0	Better	421	1	0.3	Same
Sterling Regional MC	**Sterling**	37	0	0	Same	32	0	0	Same	29	0	0	Same
Surgery Center At Lutheran ASC	**Wheat Ridge**	12	***	***	***	28	0	***	***	21	0	***	***
Surgical Center at Premier ASC	**Colorado Springs**	38	0	***	***	89	0	0	Same	66	0	0	Same
Swedish MC	**Englewood**	431	4	1	Same	406	4	1	Same	414	2	0.5	Same
The Children's Hospital Colorado	**Aurora**	5	***	***	***	2	***	***	***	2	***	***	***
The Memorial Hospital	**Craig**	9	***	***	***	8	***	***	***	9	***	***	***
University of Colorado Hospital	**Aurora**	294	2	0.5	Same	338	6	1.3	Same	391	2	0.5	Same
Vail Valley MC	**Vail**	141	0	0	Same	139	1	1	Same	104	0	0	Same
Valley View Hospital	**Glenwood Springs**	91	0	0	Same	105	0	0	Same	120	2	1.9	Same
Wray Community Hospital	**Wray**	19	***	***	***	9	***	***	***	12	***	***	***
Yampa Valley MC	**Steamboat Springs**	84	0	0	Same	112	0	0	Same	129	2	2	Same

Note: SIR=Standardized Infection Ratio, the ratio of observed to expected infections adjusted for procedure risk factors; MC=Medical Center.
National comparison based on the indirect adjustment of modeled risk factors for each procedure type.
*** Indicates value not shown due to suppression of infection data, no national or historical rate available, or an expected infection count of less than 1.
Infections for facilities performing less than 20 procedures per year are suppressed to protect confidential health information. These facilities fulfilled reporting requirements.
Source: National Health Care Safety Network (NHSN) Database.

ABDOMINAL PROCEDURES

BACKGROUND

The surgeries presented in this section are hernia repairs, colon surgeries and hysterectomies (abdominal and vaginal). These surgeries can be performed as inpatient or outpatient procedures.

A hernia procedure involves the repair of a hernia or 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.

In Colorado, hernia repairs were removed from mandatory reporting in acute care hospitals based on new national reporting requirements by the Centers for Medicare and Medicaid Services (CMS). To fulfill CMS reimbursement requirements, facilities nationwide began reporting certain colon procedures on January 1, 2013. Since facilities already were reporting colon surgeries to fulfill CMS requirements, Colorado removed the mandatory reporting of hernia repairs in hospitals, replacing it with colon surgeries. Hernia repair remains a reportable surgery for ASC and colon procedures only are reportable for hospitals.

Colon surgeries involve the excision of abnormal tissue in 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 are reported both by hospitals and ASC and involve the surgical removal of the uterus and occasionally, one or both fallopian tubes and/or ovaries. Indications for hysterectomy typically include 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.

Number of procedures, number of infections and SIRs for hernia repairs, colon surgeries and hysterectomies are presented in Tables 12-15 below.

HERNIA REPAIRS

Hernia procedures involve the repair of bulging 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. Since January 2013, hospitals no longer are required to report hernia repairs; therefore, hernia repairs are only reported for ambulatory surgery centers (ASC).

The statewide hernia SSI rate in ASC has been better than the national average for the last several reporting periods.

RESULTS

Table 12 shows facility specific data for SSI attributed to hernia repairs performed in ASC from August 1, 2014 through July 31, 2015, along with historical data for two previous reporting periods.

Thirty ASC reported 5,570 **hernia repairs** this past year; 18 ASC reported zero SSI. Individually, all ASC had hernia SSI rates similar to the national average. However, when examining all ASC combined (see Table 5), the statewide hernia SSI rate has been better than the national average for the last several reporting periods.

TABLE 12: Number of Surgical Site Infections and Standardized Infection Ratios for Hernia Repairs in Ambulatory Surgery Centers - Colorado, August 2012 – July 2015

Surgical Site Infections in Hernia Repairs in Ambulatory Surgery Centers (ASC): August 1, 2012 – July 31, 2015													
Health Facility and City		August 2012- July 2013				August 2013- July 2014				August 2014- July 2015			
		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
ASC Durango at Mercy MC	Durango	91	0	0	Same	90	0	0	Same	68	0	0	Same
Aberdeen Ambulatory Surgical Center	Pueblo	4	***	***	***	1	***	***	***	1	***	***	***
Arkansas Valley Surgery Center	Canon City	92	0	0	Same	90	0	0	Same	112	0	0	Same
Audubon Ambulatory Surgery Center	Colorado Springs	18	***	***	***	38	0	0	Same	16	***	***	***
Audubon Ambulatory Surgery Center at St. Francis	Colorado Springs	475	0	0	Same	552	1	0.4	Same	580	0	0	Same
Black Canyon Surgical Center	Montrose	37	0	0	Same	33	0	0	Same	41	0	0	Same
Centrum Surgical Center	Greenwood Village	13	***	***	***	20	0	0	Same	3	***	***	***
Children's North Surgery Center	Broomfield	73	0	0	Same	72	0	0	Same	56	0	0	Same
Clear Creek Surgery Center	Wheat Ridge	369	0	0	Same	311	0	0	Same	308	0	0	Same
Crown Point Surgery Center	Parker	312	0	0	Same	307	0	0	Same	318	0	0	Same
Denver Midtown Surgery Center	Denver	179	0	0	Same	215	0	0	Same	212	0	0	Same
First Choice Outpatient Surgery Center at Community Hospital	Grand Junction	78	1	2.8	Same	55	0	0	Same	0	***	***	***
Grand Valley Surgical Center	Grand Junction	182	0	0	Same	199	5	5.2	Worse	199	0	0	Same
Harmony Ambulatory Surgery Center	Ft Collins	486	2	0.9	Same	498	3	1.2	Same	445	1	0.5	Same
Kaiser Permanente Ambulatory Surgery Center	Denver	676	5	1.5	Same	708	1	0.3	Same	452	2	0.8	Same
Lincoln Surgery Center	Parker	55	0	0	Same	19	***	***	***	0	***	***	***
Longmont Surgery Center	Longmont	126	0	0	Same	104	1	2.1	Same	84	0	0	Same
North Suburban Surgery Center	Thornton	194	0	0	Same	181	0	0	Same	56	1	3.6	Same
Parkwest Surgery Center	Pueblo	11	***	***	***	9	***	***	***	4	***	***	***
Peak One Surgery Center	Frisco	60	0	0	Same	56	0	0	Same	62	0	0	Same
Pueblo Surgery Center	Pueblo	7	***	***	***	1	***	***	***	5	***	***	***
Red Rocks Surgery Center	Golden	254	0	0	Same	327	0	0	Same	301	0	0	Same
Renewal Surgery Center	Lone Tree	3	***	***	***	0	***	***	***	0	***	***	***

Surgical Site Infections in Hernia Repairs in Ambulatory Surgery Centers (ASC): August 1, 2012 – July 31, 2015													
Health Facility and City		August 2012- July 2013				August 2013- July 2014				August 2014- July 2015			
		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
Rocky Mountain Surgery Center	**Englewood**	279	0	0	Same	354	0	0	Same	325	2	1.3	Same
Rose Surgical Center	**Denver**	399	0	0	Same	456	0	0	Same	387	1	0.6	Same
Sky Ridge Surgical Center	**Lone Tree**	330	0	0	Same	506	0	0	Same	332	0	0	Same
Skyline Surgery Center	**Loveland**	128	0	0	Same	160	0	0	Same	172	0	0	Same
Southwest Colorado Surgical Center	**Cortez**	13	***	***	***	15	***	***	***	14	***	***	***
Summit View Surgery Center	**Littleton**	346	0	0	Same	323	1	0.7	Same	407	0	0	Same
Surgery Center At Lutheran	**Wheat Ridge**	5	***	***	***	1	***	***	***	0	***	***	***
Surgery Center Of Ft Collins	**Ft Collins**	13	***	***	***	10	***	***	***	10	***	***	***
Surgery Center of the Rockies	**Colorado Springs**	47	0	0	Same	68	0	0	Same	28	0	0	Same
Surgical Center at Premier	**Colorado Springs**	83	0	0	Same	74	0	0	Same	82	0	0	Same
UCH Memorial Surgery Center At Printers Park	**Colorado Springs**	132	1	1.6	Same	237	0	0	Same	225	0	0	Same

Note: SIR=Standardized Infection Ratio, the ratio of observed to expected infections adjusted for procedure risk factors; MC=Medical Center.
National comparison based on the indirect adjustment of modeled risk factors for each procedure type.
*** Indicates value not shown due to suppression of infection data, no national or historical rate available, or an expected infection count of less than 1.
Infections for facilities performing less than 20 procedures per year are suppressed to protect confidential health information. These facilities fulfilled reporting requirements.
Source: National Health Care Safety Network (NHSN) Database.

COLON SURGERIES

Colon surgeries involve the small and large intestines, muscular tubes that extend from the end of the stomach to the rectum. The intestines carry bacteria as part of the digestive process, and therefore have a high risk for contamination and infection. Facilities began reporting colon procedures on January 1, 2012, as part of the Centers for Medicare and Medicaid Services (CMS) reporting requirements.

RESULTS

Table 13 shows facility specific data for SSI attributed to colon surgeries performed from August 1, 2012 through July 31, 2015.

Fifty-seven hospitals reported 4,621 **colon surgeries** this past year and four hospitals reported zero SSI. Four hospitals had colon SSI rates better than the national average, and two hospitals had a rate worse than the national average; all others had rates similar to the national average. When combining data across all Colorado hospitals (Table 5), the statewide aggregate rate for colon SSI has been better than the national average since reporting of these surgeries began.

When combining data across all Colorado hospitals, the statewide aggregate rate for colon SSI has been better than the national average since reporting of these surgeries began.

TABLE 13: Number of Surgical Site Infections and Standardized Infection Ratios for Colon Surgeries in Hospitals - Colorado, August 2012 – July 2015

Surgical Site Infections in Colon Procedures in Hospitals: August 1, 2012 – July 31, 2015													
Health Facility and City		August 2012-July 2013				August 2013-July 2014				August 2014-July 2015			
		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 MC	La Junta	12	***	***	***	12	***	***	***	6	***	***	***
Aspen Valley Hospital	Aspen	6	***	***	***	6	***	***	***	6	***	***	***
Boulder Community Hospital	Boulder	75	4	0.9	Same	102	4	0.7	Same	15	***	***	***
Boulder Community Hospital-Foothills	Boulder	14	***	***	***	2	***	***	***	81	7	1.5	Same
Castle Rock Adventist Hospital	Castle Rock	Not yet operating				23	2	1.5	Same	23	0	0	Same
Centura Avista Adventist Hospital	Louisville	39	2	0.9	Same	32	1	0.5	Same	39	3	1.5	Same
Centura Littleton Adventist Hospital	Littleton	102	4	0.7	Same	83	4	0.8	Same	64	3	0.8	Same
Centura Penrose St Francis Health	CO Springs	214	8	0.7	Same	206	18	1.6	Same	226	22	1.7	Worse
Centura Porter Adventist Hospital	Denver	82	4	0.9	Same	67	3	0.8	Same	75	1	0.2	Same
Centura St Anthony Central Hospital	Denver	122	14	1.9	Worse	115	5	0.7	Same	113	5	0.7	Same
Centura St Anthony North Hospital	Westminster	75	4	1	Same	86	3	0.6	Same	57	4	1.2	Same
Centura St Francis MC	CO Springs	68	2	0.6	Same	90	2	0.4	Same	80	3	0.7	Same
Centura St Mary Corwin MC	Pueblo	52	3	1	Same	51	3	0.9	Same	67	1	0.2	Same
Centura St Thomas More Hospital	Canon City	44	4	1.7	Same	47	4	1.6	Same	35	2	1	Same
Colorado Plains MC	Fort Morgan	19	***	***	***	15	***	***	***	7	***	***	***
Community Hospital	Grand Junction	41	4	1.8	Same	52	2	0.7	Same	75	3	0.7	Same
Delta County Memorial Hospital	Delta	28	2	1.2	Same	35	2	1.1	Same	21	0	0	Same
Denver Health MC	Denver	147	18	1.6	Same	94	12	1.8	Same	87	13	2.2	Worse
East Morgan County Hospital	Brush	0	***	***	***	5	***	***	***	2	***	***	***
Exempla Good Samaritan MC	Lafayette	180	5	0.5	Same	165	9	0.9	Same	177	4	0.4	Same
Exempla Lutheran MC	Wheat Ridge	152	7	0.8	Same	172	9	0.8	Same	170	8	0.7	Same

Surgical Site Infections in Colon Procedures in Hospitals: August 1, 2012 – July 31, 2015													
Health Facility and City		August 2012-July 2013				August 2013-July 2014				August 2014-July 2015			
		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
Exempla St Joseph Hospital	Denver	363	17	0.9	Same	337	11	0.6	Same	217	12	0.9	Same
Grand River MC	Rifle	4	***	***	***	0	***	***	***	8	***	***	***
Gunnison Valley Hospital	Gunnison	0	***	***	***	1	***	***	***	1	***	***	***
Heart of the Rockies Regional MC	Salida	16	***	***	***	14	***	***	***	11	***	***	***
Longmont United Hospital	Longmont	91	5	1	Same	99	5	0.9	Same	102	2	0.3	Same
McKee MC	Loveland	76	2	0.5	Same	81	5	1.2	Same	80	7	1.5	Same
MC of Aurora	Aurora	122	10	1.5	Same	108	3	0.5	Same	123	7	1.1	Same
Memorial Hospital Central	CO Springs	143	6	0.7	Same	211	9	0.7	Same	230	9	0.7	Same
Memorial Hospital North	CO Springs	56	0	0	Same	55	4	1.5	Same	62	3	1	Same
Mercy Regional MC	Durango	46	0	0	Same	40	0	0	Same	58	1	0.3	Same
Montrose Memorial Hospital	Montrose	41	2	0.8	Same	29	0	0	Same	41	4	1.8	Same
Mt San Rafael Hospital	Trinidad	1	***	***	***	2	***	***	***	6	***	***	***
North Colorado MC	Greeley	157	14	1.6	Same	163	9	0.9	Same	172	13	1.3	Same
North Suburban MC	Thornton	62	1	0.3	Same	73	1	0.2	Same	38	3	1.4	Same
Pagosa Springs MC	Pagosa Springs	1	***	***	***	1	***	***	***	4	***	***	***
Parker Adventist Hospital	Parker	128	5	0.7	Same	121	2	0.3	Same	111	3	0.5	Same
Parkview MC	Pueblo	109	6	1.1	Same	116	4	0.7	Same	155	12	1.5	Same
Pikes Peak Regional Hospital	Woodland Park	8	***	***	***	4	***	***	***	3	***	***	***
Platte Valley MC	Brighton	31	4	2.3	Same	23	3	2.5	Same	28	0	0	Same
Poudre Valley Hospital	Ft Collins	166	5	0.6	Same	161	8	1	Same	174	3	0.3	Better
Presbyterian St Lukes MC	Denver	131	2	0.3	Same	107	1	0.2	Better	127	4	0.6	Same
Prowers MC	Lamar	1	***	***	***	4	***	***	***	8	***	***	***
Rose MC	Denver	192	4	0.4	Same	228	2	0.2	Better	219	10	1	Same
San Luis Valley Regional MC	Alamosa	15	***	***	***	12	***	***	***	16	***	***	***
Sky Ridge MC	Lone Tree	150	9	1.2	Same	159	5	0.6	Same	199	3	0.3	Better
Southwest Memorial Hospital	Cortez	16	***	***	***	18	***	***	***	15	***	***	***
St Anthony Summit MC	Frisco	6	***	***	***	8	***	***	***	6	***	***	***
St Marys Hospital	Grand Junction	184	3	0.3	Same	199	3	0.3	Better	179	3	0.3	Better
Sterling Regional MC	Sterling	17	***	***	***	10	***	***	***	20	1	0.8	Same

Surgical Site Infections in Colon Procedures in Hospitals: August 1, 2012 – July 31, 2015													
Health Facility and City		August 2012-July 2013				August 2013-July 2014				August 2014-July 2015			
		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 MC	Englewood	294	14	0.9	Same	328	13	0.7	Same	317	18	1.1	Same
The Childrens Hospital	Aurora	74	1	0.2	Same	106	3	0.5	Same	85	1	0.2	Same
University of Colorado Hospital	Aurora	220	6	0.3	Better	292	4	0.2	Better	327	6	0.2	Better
Vail Valley MC	Vail	15	***	***	***	9	***	***	***	11	***	***	***
Valley View Hospital	Glenwood Springs	26	3	1.9	Same	46	3	1.1	Same	24	0	0	Same
Yampa Valley MC	Steamboat Springs	9	***	***	***	8	***	***	***	17	***	***	***
Yuma District Hospital	Yuma	0	***	***	***	1	***	***	***	1	***	***	***

Note: SIR=Standardized Infection Ratio, the ratio of observed to expected infections adjusted for procedure risk factors; MC=Medical Center.
National comparison based on the indirect adjustment of modeled risk factors for each procedure type.
Infections for facilities performing less than 20 procedures per year are suppressed to protect confidential health information. These facilities fulfilled reporting requirements.
*** Indicates value not shown due to suppression of infection data, no national or historical rate available, or an expected infection count of less than 1.
Source: National Health Care Safety Network (NHSN) Database.

HYSTERECTOMIES

Hysterectomies have traditionally been 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[8]. Based on these negative outcomes, surgeons began using less invasive techniques such as vaginal hysterectomies. In traditional 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[9]. This report presents SSI for both abdominal and vaginal hysterectomies.

RESULTS

Tables 14 and 15 show facility specific data for SSI attributed to abdominal and vaginal hysterectomies performed from August 1, 2012 through July 31, 2015.

When numbers for all facilities are combined, the state's AHYS SSI rate has been better than the national average for over three reporting periods.

This year, four ASC reported 46 vaginal hysterectomies and zero infections.

Fifty-six hospitals reported 6,900 **abdominal hysterectomies (AHYS)** in this reporting period. Of those facilities, 14 reported zero infections. One facility had an SSI rate better than the national average, another had a rate worse than the national average, and all others had SSI rates similar to the national average. However, when numbers for all facilities are combined (Table 5), the state's AHYS SSI rate has been better than the national average for over three reporting periods.

Beginning July 2014, hospitals were no longer required to report **vaginal hysterectomies (VHYS).** For this reporting period, four ASC reported 46 VHYS and zero VHYS SSI. The statewide VHYS SSI rate has been similar to the national average in the last three reporting periods.

Table 14: Number of Surgical Site Infections and Standardized Infection Ratios for Abdominal Hysterectomies in Hospitals – Colorado, August 2012 – July 2015

Surgical Site Infections in Abdominal Hysterectomies in Hospitals : August 1, 2012 – July 31, 2015													
Health Facility and City		August 2012- July 2013				August 2013- July 2014				August 2014- July 2015			
		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	13	***	***	***	8	***	***	***	7	***	***	***
Arkansas Valley Regional MC	La Junta	5	***	***	***	7	***	***	***	15	***	***	***
Aspen Valley Hospital	Aspen	6	***	***	***	10	***	***	***	9	***	***	***
Boulder Community Hospital	Boulder	37	2	2.6	Same	31	0	0	Same	13	***	***	***
Boulder Community Hospital-Foothills	Boulder	28	0	0	Same	4	***	***	***	63	1	0.9	Same
Castle Rock Adventist Hospital	Castle Rock	Not yet operating				15	***	***	***	33	0	0	Same
Centura Avista Adventist Hospital	Louisville	49	3	2.8	Same	84	0	0	Same	107	2	1	Same
Centura Littleton Adventist Hospital	Littleton	155	1	0.4	Same	109	0	0	Same	189	0	0	Same
Centura Penrose St Francis Health	CO Springs	235	3	0.6	Same	329	6	1	Same	304	4	0.7	Same
Centura Porter Adventist Hospital	Denver	111	1	0.5	Same	104	0	0	Same	107	1	0.4	Same
Centura St Anthony Central Hospital	Denver	27	0	0	Same	26	1	2.3	Same	29	0	0	Same
Centura St Anthony North Hospital	Westminster	13	***	***	***	12	***	***	***	53	0	0	Same
Centura St Francis MC	CO Springs	325	3	0.6	Same	357	6	1.1	Same	362	2	0.4	Same
Centura St Mary Corwin MC	Pueblo	146	1	0.4	Same	139	2	0.8	Same	91	0	0	Same
Centura St Thomas More Hospital	Canon City	13	***	***	***	33	0	0	Same	38	2	2.6	Same
Colorado Plains MC	Fort Morgan	38	1	1.6	Same	19	***	***	***	22	0	0	Same
Community Hospital	Grand Junction	13	***	***	***	26	1	2.2	Same	61	1	0.9	Same
Delta County Memorial Hospital	Delta	58	0	0	Same	51	1	1	Same	41	0	0	Same
Denver Health MC	Denver	70	1	0.6	Same	77	4	2.2	Same	76	2	1	Same
Estes Park MC	Estes Park	2	***	***	***	1	***	***	***	0	***	***	***
Exempla Good	Lafayette	180	0	0	Same	219	4	1.2	Same	255	1	0.2	Same

Surgical Site Infections in Abdominal Hysterectomies in Hospitals : August 1, 2012 – July 31, 2015													
Health Facility and City		August 2012- July 2013				August 2013- July 2014				August 2014- July 2015			
		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
Samaritan MC													
Exempla Lutheran MC	Wheat Ridge	320	4	0.9	Same	342	2	0.4	Same	316	6	1.2	Same
Exempla St Joseph Hospital	Denver	455	11	1.1	Same	480	4	0.4	Better	432	9	0.9	Same
Grand River MC	Rifle	6	***	***	***	7	***	***	***	0	***	***	***
Gunnison Valley Hospital	Gunnison	5	***	***	***	14	***	***	***	6	***	***	***
Heart of the Rockies Regional MC	Salida	1	***	***	***	0	***	***	***	2	***	***	***
Longmont United Hospital	Longmont	150	3	1.2	Same	204	4	1.4	Same	200	1	0.3	Same
McKee MC	Loveland	233	0	0	Same	187	1	0.3	Same	249	4	1	Same
MC of Aurora	Aurora	97	1	0.7	Same	93	0	0	Same	65	1	1	Same
MC of the Rockies	Loveland	45	0	0	Same	79	1	0.7	Same	49	0	0	Same
Melissa Memorial	Holyoke	1	***	***	***	0	***	***	***	0	***	***	***
Memorial Hospital Central	CO Springs	272	4	0.9	Same	224	2	0.6	Same	207	0	0	Same
Memorial Hospital North	CO Springs	132	0	0	Same	107	1	0.7	Same	113	1	0.6	Same
Mercy Regional MC	Durango	106	1	0.8	Same	75	0	0	Same	72	0	0	Same
Montrose Memorial Hospital	Montrose	120	2	1.3	Same	100	2	1.4	Same	84	2	2.2	Same
Mt San Rafael Hospital	Trinidad	6	***	***	***	6	***	***	***	4	***	***	***
North Colorado MC	Greeley	221	1	0.3	Same	192	2	0.7	Same	198	2	0.6	Same
North Suburban MC	Thornton	149	0	0	Same	184	0	0	Same	186	0	0	Same
Pagosa Springs MC	Pagosa Springs	0	***	***	***	2	***	***	***	2	***	***	***
Parker Adventist Hospital	Parker	131	1	0.5	Same	145	1	0.4	Same	195	1	0.3	Same
Parkview MC	Pueblo	126	0	0	Same	145	0	0	Same	152	1	0.4	Same
Pioneers MC	Meeker	0	***	***	***	1	***	***	***	0	***	***	***
Platte Valley MC	Brighton	26	1	2.3	Same	33	2	3.4	Same	50	4	6.6	Worse
Poudre Valley Hospital	Ft Collins	264	1	0.2	Same	276	2	0.5	Same	297	3	0.6	Same
Presbyterian St Lukes MC	Denver	64	2	1.6	Same	84	0	0	Same	114	2	1	Same
Prowers MC	Lamar	12	***	***	***	15	***	***	***	10	***	***	***
Rose MC	Denver	491	5	0.7	Same	497	5	0.7	Same	397	2	0.3	Same

Surgical Site Infections in Abdominal Hysterectomies in Hospitals : August 1, 2012 – July 31, 2015													
Health Facility and City		August 2012- July 2013				August 2013- July 2014				August 2014- July 2015			
		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
San Luis Valley Regional MC	Alamosa	11	***	***	***	19	***	***	***	16	***	***	***
Sky Ridge MC	Lone Tree	409	6	0.8	Same	454	3	0.4	Same	421	1	0.2	Better
Southwest Memorial Hospital	Cortez	15	***	***	***	24	1	2.3	Same	20	0	0	Same
St Anthony Summit MC	Frisco	16	***	***	***	13	***	***	***	14	***	***	***
St Marys Hospital	Grand Junction	299	1	0.2	Same	207	3	0.8	Same	180	0	0	Same
Sterling Regional MC	Sterling	1	***	***	***	3	***	***	***	7	***	***	***
Swedish MC	Englewood	541	7	0.8	Same	582	6	0.7	Same	524	3	0.3	Same
The Memorial Hospital	Craig	0	***	***	***	3	***	***	***	2	***	***	***
University of Colorado Hospital	Aurora	225	4	0.6	Same	316	4	0.5	Same	331	5	0.7	Same
Vail Valley MC	Vail	12	***	***	***	25	0	0	Same	13	***	***	***
Valley View Hospital	Glenwood Springs	13	***	***	***	35	1	1.3	Same	44	1	1.7	Same
Yampa Valley MC	Steamboat Springs	24	0	0	Same	27	0	0	Same	51	0	0	Same
Yuma District Hospital	Yuma	0	***	***	***	2	***	***	***	2	***	***	***

Note: SIR=Standardized Infection Ratio, the ratio of observed to expected infections adjusted for procedure risk factors; MC=Medical Center.
National comparison based on the indirect adjustment of modeled risk factors for each procedure type.
*** Indicates value not shown due to suppression of infection data, no national or historical rate available, or an expected infection count of less than 1.
Infections for facilities performing less than 20 procedures per year are suppressed to protect confidential health information. These facilities fulfilled reporting requirements.
Source: National Health Care Safety Network (NHSN) Database.

TABLE 15: Number of Surgical Site Infections and Standardized Infection Ratios for Vaginal Hysterectomies in Ambulatory Surgery Centers - Colorado, August 2012 – July 2015

Surgical Site Infections in Vaginal Hysterectomies in Ambulatory Surgery Centers (ASC; In- and Outpatient Combined): August 1, 2012 – July 31, 2015													
Health Facility and City		August 2012- July 2013				August 2013- July 2014				August 2014- July 2015			
		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
Audubon Ambulatory Surgery Center ASC	CO Springs	1	***	***	***	0	***	***	***	0	***	***	***
Crown Point Surgery	Parker	0	***	***	***	8	***	***	***	2	***	***	***
Harvard Park Surgery	Denver	0	***	***	***	0	***	***	***	6	***	***	***
Peak One Surgery Center ASC	Frisco	16	***	***	***	2	***	***	***	0	***	***	***
Pueblo Surgery Center	Pueblo	4	***	***	***	0	***	***	***	0	***	***	***
Surgery Center At Lutheran	Wheat Ridge	8	***	***	***	2	***	***	***	0	***	***	***
Surgery Center Of Ft Collins	Ft Collins	15	***	***	***	28	0	0	Same	36	0	0	Same
UCH Memorial Outpatient Surgery Center At Printers Park	CO Springs	0	***	***	***	4	***	***	***	2	***	***	***

Note: SIR=Standardized Infection Ratio, the ratio of observed to expected infections adjusted for procedure risk factors.
National comparison based on the indirect adjustment of modeled risk factors for each procedure type.
*** Indicates value not shown due to suppression of infection data, no national or historical rate available, or an expected infection count of less than 1.
Infections for facilities performing less than 20 procedures per year are suppressed to protect confidential health information. These facilities fulfilled reporting requirements.
Source: National Health Care Safety Network (NHSN) Database.

BREAST PROCEDURES

BACKGROUND

Breast procedures for purposes of surveillance and reporting into NHSN involve those procedures with at least one incision to the skin in either male or female patients performed in either inpatient or outpatient surgery locations. There are 36 types breast procedures that qualify in this category 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 to name a few.

Four hospitals had breast SSI rates worse than the national average; one hospital had a breast SSI rate better than the national average; all others had SSI rates similar to the national average.

RESULTS

Tables 16 and 17, show facility-specific data for SSI attributed to **breast procedures** in hospitals and ASC, respectively, performed from August 1, 2012 through July 31, 2015.

In this past reporting period, 61 hospitals reported 10,966 breast surgeries; 15 hospitals reported zero infections. Four hospitals (same as last year) had breast SSI rates worse than the national average; one hospital had a breast SSI rate better than the national average; all other hospitals had SSI rates similar to the national average. When numbers from all hospitals were combined (Table 5), the statewide breast SSI rate has been worse than the national average for the last 3 reporting periods.

Fourteen ASC reported zero SSI. One ASC had a breast SSI rate worse than the national average and all others' breast SSI rates were similar to the national average.

Thirty-three ASC reported 5,587 breast surgeries. Fourteen ASC reported zero SSI. One ASC had a breast SSI rate worse than the national average and all others' breast SSI rates were similar to the national average.

TABLE 16: Number of Surgical Site Infections and Standardized Infection Ratios for Breast Surgeries in Hospitals – Colorado, August 1, 2012 – July 31, 2015

Surgical Site Infections in Breast Procedures in Hospitals (In- and Outpatient Combined): August 1, 2012 – July 31, 2015													
Health Facility and City		August 2012 – July 2013				August 2013 – July 2014				August 2014 – July 2015			
		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	159	0	0	Same	154	0	0	Same	192	0	0	Same
Arkansas Valley Regional MC	La Junta	7	***	***	***	4	***	***	***	6	***	***	***
Aspen Valley Hospital	Aspen	20	0	0	Same	10	***	***	***	15	***	***	***
Boulder Community Hospital	Boulder	111	0	0	Same	248	5	1.8	Same	39	0	0	Same
Boulder Community Hospital-Foothills	Boulder	234	0	0	Same	11	***	***	***	190	2	1	Same
Castle Rock Adventist Hospital	Castle Rock	Not yet operating				56	0	0	Same	138	1	0.6	Same
Centura Avista Adventist Hospital	Louisville	154	4	2.5	Same	227	1	0.5	Same	240	1	0.5	Same
Centura Littleton Adventist Hospital	Littleton	307	4	2.7	Same	301	1	0.7	Same	327	3	1.8	Same
Centura Penrose St Francis Health	CO Springs	158	0	0	Same	380	0	0	Same	384	4	2.4	Same
Centura Porter Adventist Hospital	Denver	348	6	3	Worse	116	2	2.6	Same	149	2	2.5	Same
Centura St Anthony Central Hospital	Denver	234	7	5.3	Worse	342	0	0	Same	284	5	3.5	Worse
Centura St Anthony North Hospital	Westminster	44	1	1.7	Same	41	1	1.4	Same	42	0	0	Same
Centura St Francis MC	CO Springs	317	1	0.3	Same	147	0	0	Same	199	0	0	Same
Centura St Mary Corwin MC	Pueblo	149	2	1.2	Same	172	1	0.6	Same	127	3	2.1	Same
Centura St Thomas More Hospital	Canon City	14	***	***	***	20	0	0	Same	13	***	***	***
Colorado Plains MC	Fort Morgan	10	***	***	***	12	***	***	***	14	***	***	***
Community Hospital	Grand Junction	97	1	0.9	Same	79	1	1.2	Same	171	1	0.6	Same
Delta County Memorial Hospital	Delta	45	0	0	Same	50	0	0	Same	52	0	0	Same
Denver Health MC	Denver	167	3	1	Same	144	3	1.1	Same	143	1	0.4	Same
East Morgan County Hospital	Brush	19	***	***	***	12	***	***	***	2	***	***	***

Surgical Site Infections in Breast Procedures in Hospitals (In- and Outpatient Combined): August 1, 2012 – July 31, 2015													
Health Facility and City		August 2012 – July 2013				August 2013 – July 2014				August 2014 – July 2015			
		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
Estes Park MC	Estes Park	1	***	***	***	2	***	***	***	7	***	***	***
Exempla Good Samaritan MC	Lafayette	503	4	1.4	Same	506	5	1.9	Same	370	4	2.4	Same
Exempla Lutheran MC	Wheat Ridge	430	4	1.9	Same	443	9	4.1	Worse	408	10	4.3	Worse
Exempla St Joseph Hospital	Denver	923	8	1.4	Same	1,029	15	1.9	Worse	1,034	13	1.8	Same
Family Health West Hospital	Grand Junction	54	0	0	Same	25	0	0	Same	2	***	***	***
Grand River MC	Rifle	20	0	0	Same	40	0	0	Same	55	0	0	Same
Heart of the Rockies Regional MC	Salida	18	***	***	***	31	0	0	Same	23	0	0	Same
Kit Carson Memorial Hospital	Burlington	1	***	***	***	1	***	***	***	1	***	***	***
Longmont United Hospital	Longmont	93	2	2.1	Same	70	1	1.6	Same	57	2	3.7	Same
McKee MC	Loveland	143	1	0.8	Same	139	0	0	Same	136	1	0.7	Same
MC of Aurora	Aurora	283	3	2.6	Same	259	3	2.8	Same	228	0	0	Same
MC of the Rockies	Loveland	266	3	0.9	Same	242	2	0.6	Same	201	1	0.4	Same
Memorial Hospital Central	CO Springs	27	0	0	Same	39	2	9	Worse	50	1	4.1	Same
Memorial Hospital North	CO Springs	288	2	0.7	Same	255	2	0.7	Same	334	5	1.3	Same
Mercy Regional MC	Durango	132	0	0	Same	116	0	0	Same	157	3	1.7	Same
Montrose Memorial Hospital	Montrose	80	1	1.2	Same	82	2	2.4	Same	53	2	4	Same
Mt San Rafael Hospital	Trinidad	2	***	***	***	***	***	***	***	1	***	***	***
North Colorado MC	Greeley	135	0	0	Same	179	3	3.6	Same	178	1	1.3	Same
North Suburban MC	Thornton	50	0	0	Same	58	0	0	Same	65	0	0	Same
Pagosa Springs MC	Pagosa Springs	1	***	***	***	3	***	***	***	3	***	***	***
Parker Adventist Hospital	Parker	47	1	1.2	Same	75	4	3.8	Worse	88	1	0.8	Same
Parkview MC	Pueblo	230	2	2.2	Same	186	0	0	Same	179	5	6.7	Worse
Pioneers MC	Meeker	0	***	***	***	3	***	***	***	0	***	***	***
Platte Valley MC	Brighton	69	1	1.7	Same	61	0	0	Same	67	0	0	Same
Poudre Valley Hospital	Ft Collins	193	3	2.1	Same	240	4	2.4	Same	263	5	3.2	Worse
Presbyterian St Luke's MC	Denver	480	2	1.1	Same	533	0	0	Same	479	3	1.4	Same

Surgical Site Infections in Breast Procedures in Hospitals (In- and Outpatient Combined): August 1, 2012 – July 31, 2015													
Health Facility and City		August 2012 – July 2013				August 2013 – July 2014				August 2014 – July 2015			
		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
Prowers MC	**Lamar**	0	***	***	***	5	***	***	***	1	***	***	***
Rose MC	**Denver**	1,413	9	1.4	Same	1,537	3	0.4	Same	1,862	3	0.3	Better
San Luis Valley Regional MC	**Alamosa**	30	0	0	Same	42	0	0	Same	26	0	0	Same
Sky Ridge MC	**Lone Tree**	496	4	1.2	Same	562	6	1.1	Same	695	13	1.8	Same
Southeast Colorado Hospital	**Springfield**	0	***	***	***	1	***	***	***	0	***	***	***
Southwest Memorial Hospital	**Cortez**	29	1	3.4	Same	35	0	0	Same	26	0	0	Same
Spanish Peaks Regional Health Center	**Walsenburg**	0	***	***	***	3	***	***	***	0	***	***	***
St Anthony Summit MC	**Frisco**	4	***	***	***	1	***	***	***	4	***	***	***
St Marys Hospital	**Grand Junction**	186	1	1.1	Same	145	1	1.4	Same	225	1	0.9	Same
Sterling Regional MC	**Sterling**	20	2	6.7	Same	13	***	***	***	18	***	***	***
Swedish MC	**Englewood**	104	0	0	Same	98	0	0	Same	78	0	0	Same
The Childrens Hospital	**Aurora**	7	***	***	***	16	***	***	***	21	1	9.8	Same
The Memorial Hospital	**Craig**	0	***	***	***	0	***	***	***	2	***	***	***
University of Colorado Hospital	**Aurora**	415	2	0.2	Better	435	2	0.2	Better	614	5	0.5	Same
Vail Valley MC	**Vail**	102	3	2.7	Same	91	2	2.1	Same	119	3	2.7	Same
Valley View Hospital	**Glenwood Springs**	138	0	0	Same	73	0	0	Same	64	0	0	Same
Wray Community Hospital	**Wray**	2	***	***	***	1	***	***	***	0	***	***	***
Yampa Valley MC	**Steamboat Springs**	28	0	0	Same	28	0	0	Same	42	0	0	Same
Yuma District Hospital	**Yuma**	4	***	***	***	4	***	***	***	3	***	***	***

Note: SIR=Standardized Infection Ratio, the ratio of observed to expected infections adjusted for procedure risk factors; MC=Medical Center.
National comparison based on the indirect adjustment of modeled risk factors for each procedure type.
*** Indicates value not shown due to suppression of infection data, no national or historical rate available, or an expected infection count of less than 1.
Infections for facilities performing less than 20 procedures per year are suppressed to protect confidential health information. These facilities fulfilled reporting requirements.
Source: National Health Care Safety Network (NHSN) Database.

Table 17: Number of Surgical Site Infections and Standardized Infection Ratios Breast Surgeries in Ambulatory Surgery Centers – Colorado, August 2012 –July 2015

Surgical Site Infections in Breast Procedures in ASCs (Outpatient): August 1, 2012 – July 31, 2015													
Health Facility and City		August 2012 – July 2013				August 2013 – July 2014				August 2014 – July 2015			
		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
ASC Durango at Mercy MC	Durango	15	***	***	***	15	***	***	***	13	***	***	***
Aberdeen Ambulatory Surgical Center	Pueblo	354	0	0	Same	310	0	0	Same	339	0	0	Same
Arkansas Valley Surgery Center	Canon City	8	***	***	***	4	***	***	***	2	***	***	***
Audubon Ambulatory Surgery Center	CO Springs	83	0	0	Same	5	***	***	***	1	***	***	***
Audubon Ambulatory Surgery Center at St. Francis	CO Springs	12	***	***	***	6	***	***	***	4	***	***	***
Avista Surgery Center	Boulder	455	1	0.5	Same	491	6	2.9	Worse	565	3	1.7	Same
Black Canyon Surgical Center	Montrose	0	***	***	***	2	***	***	***	2	***	***	***
Centrum Surgical Center	Greenwood Village	504	0	0	Same	456	2	1.2	Same	381	0	0	Same
Clear Creek Surgery Center	Wheat Ridge	13	***	***	***	16	***	***	***	5	***	***	***
Colorado Springs Surgery Center	CO Springs	110	1	1.9	Same	161	1	1.3	Same	128	1	1.7	Same
Crown Point Surgery Center	Parker	126	0	0	Same	228	1	0.9	Same	239	1	0.8	Same
Denver Midtown Surgery Center	Denver	33	0	0	Same	22	0	0	Same	27	0	0	Same
1st Choice Outpatient Surgery Center at Comm. Hosp.	Grand Junction	129	0	0	Same	65	0	0	Same	0	***	***	***
Grand Valley Surgical Center	Grand Junction	233	1	1	Same	300	4	2.5	Same	249	0	0	Same
Harmony Ambulatory Surgery Center	Ft Collins	372	3	1.2	Same	340	0	0	Same	359	0	0	Same
Kaiser Permanente Ambulatory Surgery Center	Denver	215	0	0	Same	202	1	0.9	Same	160	2	2.3	Same
Longmont Surgery Center	Longmont	115	0	0	Same	105	0	0	Same	78	0	0	Same
North Suburban Surgery Center	Thornton	31	0	0	Same	35	0	0	Same	9	***	***	***
Park Meadows Cosmetic Surgery	Lone Tree	213	1	0.8	Same	218	0	0	Same	243	1	0.8	Same
Parkwest Surgery Center	Pueblo	6	***	***	***	4	***	***	***	3	***	***	***
Peak One Surgery Center	Frisco	0	***	***	***	0	***	***	***	4	***	***	***
Pueblo Surgery Center	Pueblo	14	***	***	***	27	0	0	Same	0	***	***	***
Red Rocks Surgery Center	Golden	133	0	0	Same	66	0	0	Same	95	0	0	Same

Surgical Site Infections in Breast Procedures in ASCs (Outpatient): August 1, 2012 – July 31, 2015													
Health Facility and City		August 2012 – July 2013				August 2013 – July 2014				August 2014 – July 2015			
		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
Renewal Surgery Center	**Lone Tree**	205	0	0	Same	2	***	***	***	39	0	0	Same
Rocky Mountain Surgery Center	**Englewood**	3	***	***	***	4	***	***	***	2	***	***	***
Rose Surgical Center	**Denver**	171	0	0	Same	151	0	0	Same	182	0	0	Same
Sky Ridge Surgical Center	**Lone Tree**	1	***	***	***	1	***	***	***	0	***	***	***
Skyline Surgery Center	**Loveland**	131	0	0	Same	171	0	0	Same	279	0	0	Same
Southwest Colorado Surgical Center	**Cortez**	4	***	***	***	1	***	***	***	3	***	***	***
Summit View Surgery Center	**Littleton**	68	0	0	Same	123	1	1.8	Same	127	0	0	Same
Surgery Center At Lutheran	**Wheat Ridge**	133	2	3.5	Same	81	0	0	Same	88	0	0	Same
Surgery Center Of Ft Collins	**Ft Collins**	162	2	1.6	Same	129	1	1	Same	109	0	0	Same
Surgery Center of the Rockies	**Aurora**	67	1	3.9	Same	118	0	0	Same	94	0	0	Same
Surgical Center At Premier	**CO Springs**	611	0	0	Same	357	0	0	Same	145	2	7.3	Worse
Surgical Center of the Rockies	**CO Springs**	0	***	***	***	142	4	5.9	Worse	273	2	1.5	Same
UCH Memorial Surgery Center At Printers Park	**CO Springs**	590	4	1.2	Same	619	11	3.4	Worse	684	4	1.7	Same

The standardized infection ratio (SIR) is the ratio of observed to expected infections adjusted for procedure risk factors.
National comparison based on the indirect adjustment of modeled risk factors for each procedure type.
*** Indicates value not shown due to suppression of infection data, no national or historical rate available, or an expected infection count of less than 1.
Infections for facilities performing less than 20 procedures per year are suppressed to protect confidential health information. These facilities fulfilled reporting requirements.
Source: National Health Care Safety Network (NHSN) Database.

CENTRAL LINE-ASSOCIATED BLOODSTREAM INFECTIONS OVERVIEW

BACKGROUND

Central line associated bloodstream infections (CLABSI) are 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 (i.e., 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 CLABSI. 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[10-12].

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

Every CLABSI data table below lists all Colorado hospitals and hospital unit(s) reporting central line use, their cities, number of central line days per year, number of infections, 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 (CCU) report central line data by facility type, central line type and unit type. This differentiation enables fairer comparisons between health facilities by accounting for differences in care and patients' risk for infection that impact infection rates.

Hospitals identify their CCU by counting the type of patients cared for in the unit. For instance, if a medical CCU serves non-surgical patients and the majority of their critical care patients are non-surgical, that facility would have a medical CCU according to the NHSN definitions.

This year, all but one hospital had CLABSI rates similar to national rates. No hospital had rates better than the national average, compared to one hospital last year and two the year before.

RESULTS

Table 18 shows facility specific data for **CLABSI** attributed to adult critical care units from August 1, 2012 through July 31, 2015.

Sixty-two adult critical care units in 48 Colorado hospitals reported 106,121 central line days in the last reporting periods. Of the 62 hospital units, 22 reported zero CLABSI. This year, one hospital had CLABSI rates worse than the national average and all others had rates similar to national rates. No hospital had rates better than the national average, compared to one hospital last year and two the year before.

TABLE 18: Number of Central Line-Associated Bloodstream Infections in Adult Critical Care Units – Colorado, August 2012 – July 2015

Central Line-Associated Blood Stream Infections (CLABSI): August 1, 2012 – July 31, 2015														
Health Facility, City, Unit Type			August 2012 – July 2013				August 2013 – July 2014				August 2014 – July 2015			
			No. of CL Days	No. of Infections	SIR	National Comparison	No. of CL Days	No. of Infections	SIR	National Comparison	No. of CL Days	No. of Infections	SIR	National Comparison
Arkansas Valley Regional MC	La Junta	MICU/SICU	61	0	0	Same	198	0	0	Same	92	***	***	***
Aspen Valley Hospital	Aspen	MICU/SICU	54	0	0	Same	28	***	***	***	9	***	***	***
Boulder Community Hospital	Boulder	MICU/SICU	1,933	0	0	Same	1,926	0	0	Same	296	0	0	Same
Castle Rock Adventist	Castle Rock	MICU/SICU	Not yet operating				296	0	0	Same	389	0	0	Same
Centura Avista Adventist Hospital	Louisville	MICU/SICU	613	0	0	Same	401	0	0	Same	480	0	0	Same
Centura Littleton Adventist Hospital	Littleton	MICU/SICU	2,787	2	0.9	Same	3,291	3	1.1	Same	2,879	3	1.3	Same
Centura Penrose St Francis Health	CO Springs	MICU/SICU	3,763	5	1.7	Same	3,922	2	0.6	Same	3,640	3	1	Same
Centura Porter Adventist Hospital	Denver	MICU/SICU	3,661	2	0.7	Same	4,043	0	0	Same	3,991	0	0	Same
Centura St Anthony Central Hospital	Denver	MICU/SICU	1,737	3	2.2	Same	1,895	2	1.3	Same	1,605	1	0.8	Same
		MICU	2,073	0	0	Same	2,401	1	0.4	Same	1,838	1	0.5	Same
		NEURO ICU	1,753	2	1.3	Same	1,931	2	1.2	Same	1,902	6	3.5	Worse
		CSICU	2,074	0	0	Same	1,839	0	0	Same	1,444	1	0.9	Same
		Trauma ICU	1,744	1	0.4	Same	1,572	4	1.8	Same	1,515	1	0.5	Same
Centura St Anthony North Hospital	Westminster	MICU/SICU	2,335	1	0.4	Same	1,668	2	1.1	Same	1,651	0	0	Same
		MICU	499	1	1.7	Same	0	***	***	***	0	***	***	***
Centura St Francis MC	CO Springs	MICU/SICU	415	1	3	Same	431	0	0	Same	535	0	0	Same
Centura St Mary Corwin MC	Pueblo	MICU/SICU	1,658	2	1.5	Same	1,591	1	0.8	Same	1,519	3	2.5	Same
Centura St Thomas More Hospital	Canon City	MICU/SICU	106	0	0	Same	117	1	10.7	Same	48	***	***	***
Colorado Plains MC	Fort Morgan	MICU/SICU	36	***	***	***	19	***	***	***	9	***	***	***
Community Hospital	Grand Junction	MICU/SICU	69	0	0	Same	0	***	***	***	0	***	***	***
		MICU	268	0	0	Same	271	0	0	Same	261	0	0	Same
Delta County Memorial Hospital	Delta	MICU/SICU	372	0	0	Same	416	0	0	Same	297	0	0	Same
Denver Health MC	Denver	MICU/SICU	3,196	5	1.3	Same	3,335	3	0.7	Same	2,898	4	1.2	Same
		Trauma CCU	2,794	0	0	Better	2,352	4	1.2	Same	2,009	5	1.8	Same
Exempla Good Samaritan MC	Lafayette	MICU/SICU	2,010	0	0	Same	1,562	1	0.8	Same	1,662	1	0.8	Same
Exempla Lutheran MC	Wheat Ridge	MICU/SICU	4,821	1	0.3	Same	3,691	0	0	Same	2,860	2	0.9	Same

Central Line-Associated Blood Stream Infections (CLABSI): August 1, 2012 – July 31, 2015														
Health Facility, City, Unit Type			August 2012 – July 2013				August 2013 – July 2014				August 2014 – July 2015			
			No. of CL Days	No. of Infections	SIR	National Comparison	No. of CL Days	No. of Infections	SIR	National Comparison	No. of CL Days	No. of Infections	SIR	National Comparison
Exempla St Joseph Hospital	**Denver**	**MICU/SICU**	3,698	0	0	Better	3,303	0	0	Same	3,321	0	0	Same
Heart of the Rockies Regional MC	**Salida**	**MICU/SICU**	23	***	***	***	25	***	***	***	34	***	***	***
Longmont United Hospital	**Longmont**	**MICU/SICU**	2,429	0	0	Same	2,671	0	0	Same	2,950	0	0	Same
McKee MC	**Loveland**	**MICU/SICU**	817	0	0	Same	714	0	0	Same	721	0	0	Same
MC of Aurora	**Aurora**	**MICU/SICU**	4,793	5	1.3	Same	5,012	8	2	Same	4,576	2	0.5	Same
MC of the Rockies-South Wing	**Loveland**	**MICU/SICU**	4,021	0	0	Same	4,028	2	1.3	Same	4,305	1	0.5	Same
Memorial Hospital Central	**CO Springs**	**MICU/SICU**	4,963	3	0.8	Same	4,759	3	0.8	Same	4,879	3	0.8	Same
Memorial Hospital North	**CO Springs**	**MICU/SICU**	268	0	0	Same	309	0	0	Same	360	0	0	Same
Mercy Regional MC	**Durango**	**MICU/SICU**	1,019	0	0	Same	1,052	0	0	Same	1,071	1	0.8	Same
Montrose Memorial Hospital	**Montrose**	**MICU/SICU**	345	0	0	Same	341	0	0	Same	436	1	2.9	Same
North Colorado MC	**Greeley**	**MICU/SICU**	2,338	0	0	Same	2,506	0	0	Same	2,339	4	2.1	Same
North Suburban MC	**Thornton**	**MICU/SICU**	2,382	4	2.1	Same	2,191	0	0	Same	2,072	3	1.8	Same
Parker Adventist Hospital	**Parker**	**MICU/SICU**	1,475	1	0.8	Same	1,401	0	0	Same	1,458	0	0	Same
Parkview MC	**Pueblo**	**MICU/SICU**	1,579	3	1.7	Same	1,634	4	2.2	Same	2,457	2	0.9	Same
		Neuro ICU	1,147	1	1	Same	1,246	0	0	Same	1,030	1	1.1	Same
Platte Valley MC	**Brighton**	**MICU/SICU**	Not yet operating				Not yet operating				389	0	0	Same
		MICU	444	0	0	Same	313	0	0	Same	363	0	0	Same
Poudre Valley Hospital	**Fort Collins**	**MICU/SICU**	1,365	0	0	Same	1,446	0	0	Same	1,540	0	0	Same
Presbyterian St Lukes MC	**Denver**	**MICU/SICU**	2,215	2	0.8	Same	2,051	1	0.4	Same	1,767	1	0.5	Same
Rose MC	**Denver**	**MICU/SICU**	2,004	0	0	Same	1,851	1	0.5	Same	1,695	1	0.5	Same
San Luis Valley Regional MC	**Alamosa**	**MICU/SICU**	156	0	0	Same	235	0	0	Same	224	0	0	Same
Sky Ridge MC	**Lone Tree**	**MICU/SICU**	2,593	1	0.4	Same	2,302	0	0	Same	2,143	1	0.4	Same
Southwest Memorial Hospital	**Cortez**	**MICU/SICU**	119	0	0	Same	132	0	0	Same	61	0	0	Same
St Anthony Summit MC	**Frisco**	**MICU/SICU**	41	***	***	***	34	***	***	***	55	0	0	Same
St Marys Hospital	**Grand**	**CSICU**	5,869	1	0.2	Same	5,573	5	1.1	Same	6,471	2	0.4	Same

Central Line-Associated Blood Stream Infections (CLABSI): August 1, 2012 – July 31, 2015														
Health Facility, City, Unit Type			August 2012 – July 2013				August 2013 – July 2014				August 2014 – July 2015			
			No. of CL Days	No. of Infections	SIR	National Comparison	No. of CL Days	No. of Infections	SIR	National Comparison	No. of CL Days	No. of Infections	SIR	National Comparison
	Junction													
Sterling Regional MC	Sterling	MICU/SICU	197	0	0	Same	120	0	0	Same	107	0	0	Same
Swedish MC	Englewood	MICU/SICU	4,657	7	1.9	Same	4,185	6	1.8	Same	5,489	6	3.5	Same
		NEURO ICU	2,165	3	1.5	Same	2,746	1	0.4	Same	992	2	2.2	Same
		Trauma CCU	720	2	2	Same	995	3	2.2	Same	427	1	1.7	Same
University of Colorado Hospital	Aurora	Burn ICU	1,263	5	1.4	Same	1,532	10	2.3	Worse	1,104	3	0.9	Same
		MICU/SICU	1,352	4	3	Same	1,575	3	1.9	Same	1,921	2	1	Same
		MICU	3,771	10	2.2	Worse	4,562	11	2	Worse	4,407	8	1.5	Same
		Neuro ICU	3,410	3	1	Same	4,643	9	2.2	Same	4,564	2	0.5	Same
		CSICU	Not yet operating				3,137	0	0	Same	4,082	6	1.8	Same
		SICU	4,445	8	1.6	Same	2,517	6	2.2	Same	1,965	1	0.5	Same
Vail Valley MC	Vail	MICU/SICU	87	0	0	Same	173	0	0	Same	128	0	0	Same
Valley View Hospital	Glenwood Springs	MICU/SICU	255	0	0	Same	295	0	0	Same	363	0	0	Same
Yampa Valley MC	Steamboat Springs	MICU/SICU	22	***	***	***	19	***	***	***	26	***	***	***

Note: CL=Central Line; SIR=standardized infection ratio, the ratio of observed to expected infections adjusted for procedure risk factors.
Note: MICU=Medical intensive care unit; SICU=Surgical intensive care unit; ICU= intensive care unit; CCU=Critical care unit; CSICU=Cardiothoracic surgical intensive care unit.
*** Indicates value not shown due to suppression of infection data, no national or historical rate available, or an expected infection count of less than 1.
Infections for facilities with fewer than 50 central line days per year are suppressed to protect confidential health information. These facilities fulfilled reporting requirements.
National comparison based on data collected and reported by NHSN-participating hospitals from January-December, 2013.
Source: National Health Care Safety Network (NHSN) Database.

LONG-TERM ACUTE CARE HOSPITALS

A long-term acute care hospital (LTAC) 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.

LTAC 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 LTAC patients and historically have had lower rates of infection than temporary lines.

With all LTAC combined, the statewide CLABSI rate was better than the national average for the last two reporting years.

RESULTS

Table 19 shows facility specific data for CLABSI in LTAC. The table contains data from August 1, 2012 through July 31, 2015.

In Colorado this past year, nine LTAC reported 33,464 central line days; three LTAC reported zero CLABSI and all LTACs had rates similar to national rates. With all LTAC combined, the statewide CLABSI rate was better than the national average for the last two reporting years.

TABLE 19: Number of Central Line-Associated Bloodstream Infections in Long-Term Acute Care Hospitals – Colorado, August 2012 – July 2015

Central Line Associated Blood Stream Infections (CLABSI) in Long-Term Acute Care Hospitals: August 1, 2012 – July 31, 2015													
Health Facility and City		August 2012 – July 2013				August 2013 – July 2014				August 2014 – July 2015			
		No. of CL Days	No. of Infections	SIR	National Comparison	No. of CL Days	No. of Infections	SIR	National Comparison	No. of CL Days	No. of Infections	SIR	National Comparison
Advanced Care Hospital of Northern Colorado	**Johnstown**	2,840	3	1.4	Same	3,295	0	0	Same	3,478	3	1.1	Same
Colorado Acute Long Term Hospital	**Denver**	5,902	7	1.3	Same	6,012	5	0.9	Same	6,593	2	0.3	Same
Craig Hospital	**Englewood**	3,283	3	1	Same	2,033	1	0.5	Same	2,062	2	1.1	Same
Kindred Hospital	**Denver**	5,540	10	2	Same	4,177	2	0.5	Same	4,129	2	0.5	Same
Select Long Term Care Hospital	**CO Springs**	4,070	0	0	Same	3,944	1	0.3	Same	3,953	0	0	Same
Select Specialty Hospital South Campus	**Denver**	2,641	1	0.4	Same	2,495	0	0	Same	2,990	0	0	Same
Select Specialty Hospital	**Denver**	3,278	0	0	Same	2,456	0	0	Same	2,626	0	0	Same
Triumph Acute Long Term Care Hospital of Aurora	**Aurora**	4,067	1	0.4	Same	3,458	1	0.3	Same	2,976	1	0.4	Same
Vibra Long Term Acute Care Hospital	**Thornton**	6,249	10	1.8	Same	4,956	4	0.9	Same	4,657	5	1.2	Same

Note: CL=Central Line; SIR=standardized infection ratio, the ratio of observed to expected infections adjusted for procedure risk factors.
*** Indicates value not shown due to suppression of infection data, no national or historical rate available, or an expected infection count of less than 1.
Infections for facilities with fewer than 50 central line days per year are suppressed to protect confidential health information. These facilities fulfilled reporting requirements.
National comparison based on data collected and reported by NHSN-participating hospitals from January-December, 2013.
Source: National Health Care Safety Network (NHSN) Database.

REHABILITATION HOSPITALS AND INPATIENT REHABILITATION WARDS

Rehabilitation hospitals and inpatient rehabilitation wards 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 are higher than permanent lines.

RESULTS

Table 20 shows facility specific data for CLABSI in rehab hospitals and wards. The table contains data from January 1, 2012 through July 31, 2015.

Five rehabilitation hospitals and 12 rehab wards reported 9,468 central line days this past year. All but two facilities reported zero infections and all facilities' rates were similar to the national average.

All but two inpatient rehab facilities reported zero infections and all had CLABI rates similar to the national average.

Table 20: Number of Central Line Associated Bloodstream Infections in Inpatient Rehabilitation Hospitals and Wards – Colorado, January 2012 – July 2015

Central Line Associated Blood Stream Infections (CLABSI) in Inpatient Rehabilitation Hospitals and Wards: January 1, 2012 – July 31, 2015													
Health Facility and City		January 2012 – July 2013				August 2013 – July 2014				August 2014 – July 2015			
		No. of CL Days	No. of Infections	SIR	National Comparison	No. of CL Days	No. of Infections	SIR	National Comparison	No. of CL Days	No. of Infections	SIR	National Comparison
Boulder Community Hospital	**Boulder**	656	0	0	Same	506	0	0	Same	335	0	0	Same
Centura Penrose St Francis Health	**CO Springs**	697	0	0	Same	816	0	0	Same	630	0	0	Same
Centura Porter Adventist Hospital	**Denver**	679	0	0	Same	728	0	0	Same	673	0	0	Same
Centura St Anthony Hospital	**Lakewood**	633	2	16	Worse	475	0	0	Same	545	1	9.2	Same
Centura St Mary Corwin MC	**Pueblo**	202	0	0	Same	101	0	0	Same	159	0	0	Same
Denver Health MC	**Denver**	294	0	0	Same	270	1	19	Same	228	0	0	Same
HealthSouth Rehabilitation Hospital of Colorado Springs	**CO Springs**	662	0	0	Same	701	0	0	Same	724	0	0	Same
HealthSouth Rehabilitation Hospital of Denver	**Denver**	59	0	0	Same	445	0	0	Same	457	0	0	Same
Memorial Hospital Central	**CO Springs**	726	0	0	Same	1,027	0	0	Same	761	0	0	Same
Montrose Memorial Hospital	**Montrose**	136	0	0	Same	148	0	0	Same	167	0	0	Same
Northern Colorado Rehabilitation Hospital	**Johnstown**	911	0	0	Same	972	0	0	Same	957	0	0	Same
Parkview Medical Center	**Pueblo**	235	0	0	Same	350	0	0	Same	188	0	0	Same
Spalding Rehabilitation Hospital	**Aurora**	1,370	0	0	Same	932	0	0	Same	1,082	0	0	Same
Spalding at PSL	**Denver**	871	0	0	Same	1,146	0	0	Same	932	0	0	Same
St Mary's Hospital	**Grand Junction**	312	0	0	Same	46	***	***	***	104	0	0	Same
Swedish MC	**Englewood**	502	0	0	Same	515	0	0	Same	387	0	0	Same
University of Colorado Hospital	**Aurora**	1,169	0	0	Same	1,349	1	3.7	Same	1,139	1	.4	Same

Note: CL=Central Line; SIR=standardized infection ratio, the ratio of observed to expected infections adjusted for procedure risk factors.
Infections for facilities with fewer than 50 central line days per year are suppressed to protect confidential health information. These facilities fulfilled reporting requirements.
*** Indicates value not shown due to suppression of infection data, no national or historical rate available, or an expected infection count of less than 1.
National comparison based on data collected and reported by NHSN-participating hospitals from January-December, 2013.
Source: National Health Care Safety Network (NHSN) Database.

NEONATAL CRITICAL CARE UNITS

Neonatal critical care units (NCCU) provide intensive medical care for premature and ill newborn babies. Neonatal care is classified into four levels of care, and since Level 1 and II units care for healthy newborns, they are not required to report HAI. Colorado requires only level III and level II/III units to report CLABSI data. Level III NCCU provide personnel and equipment to ensure continuous life support and comprehensive care for extremely high-risk newborns with complex critical conditions. The designation between Level III and Level II/III is defined by the NHSN reporting guidelines. 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.

NCCU infants will often 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. See above CLABSI section for descriptions of central lines versus peripheral lines. An umbilical catheter (i.e., a tube placed in the umbilical cord) is often inserted at birth as a means 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 general, catheters have been associated with higher infection rates than any other central lines.

RESULTS

Two NCCUs had CLABSI rates worse than the national average, and all others' rates were similar to national rates. This past year, the statewide NCCU CLABSI rate was worse than the national average.

Table 21 shows the results of data collected in each NCCU from Aug. 1, 2012 through July 31, 2015.

Twenty hospitals, including five Level III and 15 Level II/III NCCU, reported 19,429 central line days this past year. Of the 20 hospitals, eight reported zero CLABSI. Two NCCUs had CLABSI rates worse than the national average, and all others had rates similar to national rates. This past year, the statewide NCCU CLABSI rate was worse than the national average.

TABLE 21: Number of Central Line Associated Bloodstream Infections in Neonatal Critical Care Units – Colorado, August 1, 2012 – July 31, 2015

Central Line Associated Blood Stream Infections (CLABSI) in Neonatal Critical Care Units: August 1, 2012 – July 31, 2015														
Health Facility, City, NCCU Type/Level			August 2012 – July 2013				August 2013 – July 2014				August 2014 – July 2015			
			No. of CL Days	No. of Infections	SIR	National Comparison	No. of CL Days	No. of Infections	SIR	National Comparison	No. of CL Days	No. of Infections	SIR	National Comparison
Castle Rock Adventist	Castle Rock	II/III	Not yet operating				3	***	***	***	2	***	***	***
Centura Avista Adventist Hospital	Louisville	II/III	165	0	0	Same	110	0	0	Same	197	0	0	Same
Centura Littleton Adventist Hospital	Littleton	III	156	0	0	Same	169	0	0	Same	61	0	0	Same
Centura St Francis MC	CO Springs	II/III	1,496	1	0.6	Same	1,431	1	0.6	Same	1,511	1	0.5	Same
Children's Hospital Colorado	Aurora	III	4,430	5	1.2	Same	4,894	4	0.9	Same	4,863	11	2.5	Worse
Children's Hospital Memorial	CO Springs	II/III	751	3	3.1	Same	2,216	1	0.4	Same	1,421	1	0.6	Same
Denver Health MC	Denver	II/III	896	0	0	Same	1,036	4	4.8	Worse	1,297	6	5.1	Worse
Exempla Good Samaritan MC	Lafayette	II/III	NCCU not yet operating				NCCU not yet operating				36	***	***	***
Exempla Lutheran MC	Wheat Ridge	II/III	227	0	0	Same	226	0	0	Same	144	1	7.9	Same
Exempla St Joseph	Denver	II/III	585	0	0	Same	1,126	3	2.1	Same	1,243	1	0.7	Same
MC of Aurora	Aurora	II/III	75	0	0	Same	58	0	0	Same	47	***	***	***
Memorial Hospital Central	CO Springs	III	1,405	2	1.3	Same	***	***	***	***	319	0	0	Same
Parker Adventist Hospital	Parker	II/III	133	0	0	Same	85	0	0	Same	74	0	0	Same
Poudre Valley Hospital	Fort Collins	II/III	963	0	0	Same	755	0	0	Same	859	0	0	Same
Presbyterian St Luke's MC	Denver	III	4,434	4	0.8	Same	4,311	3	0.6	Same	4,439	8	1.6	Same
Rose MC	Denver	II/III	351	0	0	Same	269	1	3	Same	242	0	0	Same
Sky Ridge MC	Lone Tree	II/III	115	0	0	Same	188	0	0	Same	195	0	0	Same
St Mary's Hospital	Grand Junction	III	828	2	2.1	Same	622	0	0	Same	592	1	2	Same
Swedish MC	Englewood	II/III	296	0	0	Same	107	0	0	Same	291	0	0	Same
University of Colorado Hospital	Aurora	II/III	1,931	3	1.2	Same	1,778	0	0	Same	1,596	3	1.4	Same

Note: CL=Central Line; SIR=standardized infection ratio, the ratio of observed to expected infections adjusted for procedure risk factors.
Infections for facilities with fewer than 50 central line days per year are suppressed to protect confidential health information. These facilities fulfilled reporting requirements.
*** Indicates value not shown due to suppression of infection data, no national or historical rate available, or an expected infection count of less than 1.
National comparison based on data collected and reported by NHSN-participating hospitals from January-December, 2013.
Source: National Health Care Safety Network (NHSN) Database.

DIALYSIS RELATED-INFECTION OVERVIEW

BACKGROUND

According to the National Institute of Diabetes and Digestive and Kidney Diseases 2012 figures, more than 20 million people aged 20 and older have chronic kidney disease in the United States. In 2009, more than 871,000 patients in the United States received chronic dialysis treatment [13].

Surveillance for dialysis-related infections in Colorado occurs within outpatient dialysis centers only and excludes peritoneal and home dialysis. The outpatient facilities monitored may be dedicated, stand-alone facilities, hospital-based or affiliated units that primarily serve this patient population. The reporting of dialysis related infections began in March 2010, and currently there are 71 dialysis centers reporting to NHSN.

Dialysis centers in Colorado monitor patients for any of 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. This report depicts counts and rates for two types of dialysis related infections: access-related blood stream 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 the source of infection is reported 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 center's name, city, number of dialysis patients per month (patient months), numbers and rates of ARB and LAI, and comparisons to the national average (for ARB only). Currently, no national averages have been established for LAI. 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:

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**).

RESULTS

Tables 22 and 23 show the number and rates of ARB and LAI for each outpatient dialysis treatment center in Colorado. The reporting period is August 1, 2012 through July 31, 2015. This year, while we used a more recent national ARB rate (from 2014 data) for the national comparison, Colorado's aggregate ARB rate was similar to the national average.

While the statewide ARB rate was similar to the national average this past year, there were more facilities having zero ARB infections (15 this year versus 10 last year).

Seventy one dialysis treatment centers submitted dialysis infection data into NHSN this past year. While the statewide ARB rate was similar to the national average this past year, there were more facilities having zero ARB infections (15 this year versus 10 last year). Three centers

had ARB rates worse than the national average (compared to six last year) and one had a better rate. The facility-specific LAI counts and rates presented in Table 22 below show eight facilities with zero LAI (compared to six last year). While the statewide LAI rate is 0.9 per 100 patient months, national LAI rates are not yet available to provide comparisons.

TABLE 22: Number and Rates of Dialysis Access-Related Bloodstream Infections in Outpatient Dialysis Centers – Colorado, August 2012 – July 2015

Dialysis Access-Related Bloodstream infections: August 1, 2012 – July 31, 2015													
Dialysis Center and Region		August 2012- July 2013				August 2013-July 2014				August 2014- July 2015			
		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
AR Kidney Ctr Of Arvada	Arvada	1,059	4	0.4	Same	1,101	10	0.9	Same	1,162	0	0	Better
AR Kidney Ctr Of Bear Creek	Lakewood	310	1	0.3	Same	366	2	0.5	Same	428	1	0.2	Same
AR Kidney Ctr Of Lafayette	Lafayette	543	1	0.2	Same	548	3	0.5	Same	607	4	0.7	Same
AR Kidney Ctr Of Lakewood	Lakewood	639	1	0.2	Same	910	4	0.4	Same	904	8	0.9	Same
AR Kidney Ctr Of Longmont	Longmont	897	7	0.8	Same	980	5	0.5	Same	963	7	0.7	Same
AR Kidney Ctr Of Northridge	Westminster	Not yet operating				80	2	2.5	Same	243	0	0	Same
AR Kidney Ctr Of Parker	Parker	Not yet operating				101	0	0	Same	281	2	0.7	Same
AR Kidney Ctr On Main	Longmont	341	2	0.6	Same	363	0	0	Same	358	2	0.6	Same
AR Kidney Ctr Westminster	Westminster	1,340	5	0.4	Same	1,368	4	0.3	Same	1,361	3	0.2	Same
AR Thornton Kidney Ctr	Thornton	435	2	0.5	Same	535	4	0.7	Same	573	10	1.7	Same
Children's Hospital Colorado	Denver	194	4	2.1	Same	114	3	2.6	Same	87	0	0	Same
Davita Alamosa	Alamosa	678	4	0.6	Same	567	3	0.5	Same	569	8	1.4	Same
Davita Arvada	Arvada	376	3	0.8	Same	406	6	1.5	Worse	289	4	1.4	Same
Davita Aurora	Aurora	1,549	20	1.3	Worse	1,456	18	1.2	Worse	1,437	12	0.8	Same
Davita Belcaro	Denver	644	4	0.6	Same	596	9	1.5	Worse	581	12	2.1	Worse
Davita Black Canyon	Montrose	258	1	0.4	Same	277	3	1.1	Same	316	3	0.9	Same
Davita Boulder	Boulder	280	0	0	Same	287	1	0.3	Same	271	4	1.5	Same
Davita Brighton	Brighton	519	3	0.6	Same	587	11	1.9	Worse	650	5	0.8	Same
Davita Castle Rock (Red Hawk)	Castle Rock	77	1	1.3	Same	86	0	0	Same	197	2	1	Same
Davita Commerce City	Commerce City	627	5	0.8	Same	458	5	1.1	Same	472	7	1.5	Worse
Davita Cortez	Cortez	697	2	0.3	Same	671	2	0.3	Same	658	0	0	Same
Davita Denver	Denver	813	2	0.2	Same	806	6	0.7	Same	777	6	0.8	Same
Davita Durango	Durango	373	1	0.3	Same	390	4	1	Same	350	5	1.4	Same
Davita East Aurora	Aurora	1,149	4	0.3	Same	1,068	7	0.7	Same	990	4	0.4	Same
Davita Englewood	Englewood	535	5	0.9	Same	545	3	0.6	Same	584	0	0	Same

Dialysis Access-Related Bloodstream infections: August 1, 2012 – July 31, 2015													
Dialysis Center and Region		August 2012- July 2013				August 2013-July 2014				August 2014- July 2015			
		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 Grand Junction	Grand Junction	745	5	0.7	Same	753	4	0.5	Same	751	4	0.5	Same
Davita Lakewood	Lakewood	1,025	10	1	Same	994	14	1.4	Worse	1,087	10	0.9	Same
Davita Lakewood Crossing	Lakewood	1,071	6	0.6	Same	1,070	12	1.1	Worse	984	15	1.5	Worse
Davita Littleton	Littleton	718	2	0.3	Same	698	1	0.1	Same	664	1	0.2	Same
Davita Lonetree	Lonetree	350	1	0.3	Same	338	3	0.9	Same	334	2	0.6	Same
Davita Longmont	Longmont	256	2	0.8	Same	242	4	1.7	Worse	258	1	0.4	Same
Davita Loveland Central	Loveland	36	***	***	***	162	11	6.8	Worse	206	3	1.5	Same
Davita Lowry	Denver	1,023	6	0.6	Same	1,018	5	0.5	Same	1,000	7	0.7	Same
Davita Mesa County	Grand Junction	328	2	0.6	Same	256	2	0.8	Same	256	3	1.2	Same
Davita North CO Springs	CO Springs	142	0	0	Same	219	1	0.5	Same	293	1	0.3	Same
Davita North Metro	Westminster	383	2	0.5	Same	489	6	1.2	Same	482	1	0.2	Same
Davita Northeastern CO	Sterling	412	3	0.7	Same	379	5	1.3	Same	401	2	0.5	Same
Davita Parker	Parker	398	3	0.8	Same	429	6	1.4	Same	507	1	0.2	Same
Davita Pikes Peak	CO Springs	1,013	11	1.1	Same	965	6	0.6	Same	980	7	0.7	Same
Davita Printers Place	CO Springs	193	1	0.5	Same	199	3	1.5	Same	319	0	0	Same
Davita Sable	Aurora	423	5	1.2	Same	810	10	1.2	Same	1,035	2	0.2	Same
Davita South Denver	Denver	618	2	0.3	Same	536	8	1.5	Worse	463	6	1.3	Same
Davita Southwest Denver	Denver	268	1	0.4	Same	364	2	0.5	Same	392	2	0.5	Same
Davita Thornton	Thornton	855	2	0.2	Same	856	13	1.5	Worse	865	4	0.5	Same
Davita West Lakewood	Lakewood	Not yet operating				51	1	2	Same	171	1	0.6	Same
Davita Westminster	Westminster	527	1	0.2	Same	439	3	0.7	Same	341	5	1.5	Same
Denver Women's Correctional Facility	Denver	269	0	0	Same	290	0	0	Same	288	0	0	Same
Dialysis Clinic Inc Grand Junction	Grand Junction	252	0	0	Same	321	0	0	Same	330	0	0	Same
Dialysis Clinic Inc Montrose	Montrose	399	1	0.3	Same	422	2	0.5	Same	390	0	0	Same
DSI Renal Pueblo	Pueblo	500	3	0.6	Same	489	2	0.4	Same	496	1	0.2	Same
FMC Canon City	Canon city	430	3	0.7	Same	442	1	0.2	Same	442	2	0.5	Same
FMC Denver Central	Denver	1,156	7	0.6	Same	959	3	0.3	Same	821	2	0.2	Same
FMC East Denver	Denver	1,200	4	0.3	Same	1,273	16	1.3	Same	1,168	5	0.4	Same
FMC Fort Collins	Ft Collins	893	6	0.7	Same	783	5	0.6	Same	702	2	0.3	Same
FMC Greeley	Greeley	1,405	2	0.1	Better	1,422	2	0.1	Better	1,173	5	0.4	Same

Dialysis Access-Related Bloodstream infections: August 1, 2012 – July 31, 2015													
Dialysis Center and Region		August 2012- July 2013				August 2013-July 2014				August 2014- July 2015			
		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
FMC La Junta	**La junta**	453	3	0.7	Same	423	0	0	Same	353	4	1.1	Same
FMC Lamar	**Lamar**	280	2	0.7	Same	291	1	0.3	Same	252	0	0	Same
FMC Loveland	**Loveland**	653	4	0.6	Same	585	7	1.2	Same	519	4	0.8	Same
FMC North Greeley	**Greeley**	Not yet operating				Not yet operating				366	0	0	Same
FMC Pavillion	**Denver**	184	1	0.5	Same	578	11	1.9	Worse	864	4	0.5	Same
FMC Pueblo	**Pueblo**	709	2	0.3	Same	701	6	0.9	Same	699	7	1	Same
FMC Pueblo South	**Pueblo**	1,012	15	1.5	Same	1,049	9	0.9	Same	985	8	0.8	Same
FMC Pueblo West	**Pueblo**	277	1	0.4	Same	291	0	0	Same	294	0	0	Same
FMC Rocky Mountain	**Denver**	1,010	10	1	Same	886	5	0.6	Same	827	1	0.1	Same
FMC South Denver	**Denver**	Not yet operating				4	***	***	***	87	0	0	Same
FMC Stapleton	**Denver**	522	3	0.6	Same	546	8	1.5	Same	551	0	0	Same
FMC Walsenburg	**Walsenburg**	158	3	1.9	Same	251	1	0.4	Same	214	1	0.5	Same
FMC West Hampden	**Denver**	26	***	***	***	52	0	0	Same	94	0	0	Same
Liberty Colorado Springs Central	**CO Springs**	1,120	7	0.6	Same	1,113	8	0.7	Same	1,130	3	0.3	Same
Liberty Colorado Springs North	**CO Springs**	457	2	0.4	Same	495	1	0.2	Same	560	2	0.4	Same
Liberty Colorado Springs South	**CO Springs**	677	1	0.1	Same	790	12	1.5	Same	895	6	0.7	Same

Note: AR=American Renal, FMC=Fresenius Medical Care. Facility dialysis-related infection rates are per 100 patient months.
Data are limited to the following access types: fistula, graft, tunneled central line, and non-tunneled central line.
National comparison based on data collected and reported by NHSN-participating hospitals from January-December, 2014.
Infection data for dialysis centers with fewer than 50 patients in a 12-month period are suppressed to protect confidential health information. These dialysis centers have met the reporting requirements.
*** Indicates value not shown due to suppression of infection data.
Source: National Healthcare Safety Network (NHSN) Database.

TABLE 23: Number and Rates of Dialysis Local Access Infections in Outpatient Dialysis Centers - Colorado, August 2012 – July 2015

Dialysis-Related Infections: Local Access Infections: August 1, 2012 – July 31, 2015										
Dialysis Center and City		August 2012- July 2013			August 2013-July 2014			August 2014- July 2015		
		No. of Patient Months	No. of Infections	Rate	No. of Patient Months	No. of Infections	Rate	No. of Patient Months	No. of Infections	Rate
AR Kidney Ctr Of Arvada	Arvada	1,059	16	1.5	1,101	28	2.5	1,162	14	1.2
AR Kidney Ctr Of Bear Creek	Lakewood	310	9	2.9	366	11	3	428	6	1.4
AR Kidney Ctr Of Lafayette	Lafayette	543	1	0.2	548	0	0	607	1	0.2
AR Kidney Ctr Of Lakewood	Lakewood	639	11	1.7	910	27	3	904	8	0.9
AR Kidney Ctr Of Longmont	Longmont	897	4	0.4	980	5	0.5	963	11	1.1
AR Kidney Ctr Of Northridge	Westminster	Not yet operating			80	1	1.3	243	2	0.8
AR Kidney Ctr Of Parker	Parker	Not yet operating			101	2	2	281	7	2.5
AR Kidney Ctr On Main	Longmont	341	7	2.1	363	7	1.9	358	6	1.7
AR Kidney Ctr Westminster	Westminster	1,340	17	1.3	1,368	26	1.9	1,361	19	1.4
AR Thornton Kidney Ctr	Thornton	435	2	0.5	535	14	2.6	573	8	1.4
Children's Hospital Colorado	Denver	194	0	0	114	2	1.8	87	5	5.7
Davita Alamosa	Alamosa	678	12	1.8	567	6	1.1	569	8	1.4
Davita Arvada	Arvada	376	8	2.1	406	9	2.2	289	5	1.7
Davita Aurora	Aurora	1,549	17	1.1	1,456	12	0.8	1,437	8	0.6
Davita Belcaro	Denver	644	16	2.5	596	1	0.2	581	2	0.3
Davita Black Canyon	Montrose	258	6	2.3	277	6	2.2	316	1	0.3
Davita Boulder	Boulder	280	4	1.4	287	7	2.4	271	0	0
Davita Brighton	Brighton	519	10	1.9	587	12	2	650	12	1.8
Davita Castle Rock (Red Hawk)	Castle Rock	77	2	2.6	86	2	2.3	197	2	1
Davita Commerce City	Commerce City	627	8	1.3	458	4	0.9	472	4	0.8
Davita Cortez	Cortez	697	5	0.7	671	11	1.6	658	1	0.2
Davita Denver	Denver	813	29	3.6	806	25	3.1	777	16	2.1
Davita Durango	Durango	373	15	4	390	6	1.5	350	2	0.6
Davita East Aurora	Aurora	1,149	18	1.6	1,068	12	1.1	990	7	0.7
Davita Englewood	Englewood	535	11	2.1	545	4	0.7	584	3	0.5
Davita Grand Junction	Grand Junction	745	18	2.4	753	13	1.7	751	8	1.1
Davita Lakewood	Lakewood	1,025	24	2.3	994	26	2.6	1,087	28	2.6

Dialysis-Related Infections: Local Access Infections: August 1, 2012 – July 31, 2015										
Dialysis Center and City		August 2012- July 2013			August 2013-July 2014			August 2014- July 2015		
		No. of Patient Months	No. of Infections	Rate	No. of Patient Months	No. of Infections	Rate	No. of Patient Months	No. of Infections	Rate
Davita Lakewood Crossing	Lakewood	1,071	21	2	1,070	15	1.4	984	18	1.8
Davita Littleton	Littleton	718	10	1.4	698	4	0.6	664	8	1.2
Davita Lonetree	Lonetree	350	2	0.6	338	5	1.5	334	1	0.3
Davita Longmont	Longmont	256	4	1.6	242	5	2.1	258	1	0.4
Davita Loveland Central	Loveland	36	***	***	162	1	0.6	206	0	0
Davita Lowry	Denver	1,023	11	1.1	1,018	15	1.5	1,000	7	0.7
Davita Mesa County	Grand Junction	328	6	1.8	256	14	5.5	256	4	1.6
Davita North CO Springs	CO Springs	142	0	0	219	2	0.9	293	0	0
Davita North Metro	Westminster	383	7	1.8	489	13	2.7	482	5	1
Davita Northeastern CO	Sterling	412	7	1.7	379	2	0.5	401	5	1.2
Davita Parker	Parker	398	13	3.3	429	12	2.8	507	9	1.8
Davita Pikes Peak	CO Springs	1,013	10	1	965	8	0.8	980	6	0.6
Davita Printers Place	CO Springs	193	2	1	199	0	0	319	2	0.6
Davita Sable	Aurora	423	9	2.1	810	21	2.6	1,035	10	1
Davita South Denver	Denver	618	11	1.8	536	12	2.2	463	2	0.4
Davita Southwest Denver	Denver	268	6	2.2	364	7	1.9	392	5	1.3
Davita Thornton	Thornton	855	9	1.1	856	11	1.3	865	3	0.3
Davita West Lakewood	Lakewood	Not yet operating			51	0	0	171	0	0
Davita Westminster	Westminster	527	11	2.1	439	4	0.9	341	1	0.3
Denver Women's Correctional Facility	Denver	269	0	0	290	0	0	288	0	0
Dialysis Clinic Inc Grand Junction	Grand Junction	252	1	0.4	321	2	0.6	330	3	0.9
Dialysis Clinic Inc Montrose	Montrose	399	7	1.8	422	6	1.4	390	5	1.3
DSI Renal Pueblo	Pueblo	500	5	1	489	3	0.6	496	1	0.2
FMC Canon City	Canon city	430	2	0.5	442	1	0.2	442	4	0.9
FMC Denver Central	Denver	1,156	18	1.6	959	13	1.4	821	5	0.6

Dialysis-Related Infections: Local Access Infections: August 1, 2012 – July 31, 2015										
Dialysis Center and City		August 2012- July 2013			August 2013-July 2014			August 2014- July 2015		
		No. of Patient Months	No. of Infections	Rate	No. of Patient Months	No. of Infections	Rate	No. of Patient Months	No. of Infections	Rate
FMC East Denver	**Denver**	1,200	7	0.6	1,273	11	0.9	1,168	16	1.4
FMC Fort Collins	**Ft Collins**	893	17	1.9	783	8	1	702	4	0.6
FMC Greeley	**Greeley**	1,405	12	0.9	1,422	4	0.3	1,173	1	0.1
FMC La Junta	**La junta**	453	3	0.7	423	0	0	353	0	0
FMC Lamar	**Lamar**	280	0	0	291	1	0.3	252	2	0.8
FMC Loveland	**Loveland**	653	10	1.5	585	1	0.2	519	6	1.2
FMC North Greeley	**Greeley**	Not yet operating			Not yet operating			366	1	0.3
FMC Pavillion	**Denver**	184	1	0.5	578	5	0.9	864	6	0.7
FMC Pueblo	**Pueblo**	709	11	1.6	701	3	0.4	699	2	0.3
FMC Pueblo South	**Pueblo**	1,012	7	0.7	1,049	5	0.5	985	5	0.5
FMC Pueblo West	**Pueblo**	277	2	0.7	291	0	0	294	0	0
FMC Rocky Mountain	**Denver**	1,010	11	1.1	886	7	0.8	827	10	1.2
FMC South Denver	**Denver**	Not yet operating			4	***	***	87	3	3.4
FMC Stapleton	**Denver**	522	3	0.6	546	3	0.5	551	4	0.7
FMC Walsenburg	**Walsenburg**	158	2	1.3	251	4	1.6	214	1	0.5
FMC West Hampden	**Denver**	26	***	***	52	0	0	94	0	0
Liberty Colorado Springs Central	**CO Springs**	1,120	15	1.3	1,113	18	1.6	1,130	10	0.9
Liberty Colorado Springs North	**CO Springs**	457	0	0	495	0	0	560	4	0.7
Liberty Colorado Springs South	**CO Springs**	677	0	0	790	5	0.6	895	10	1.1

Note: AR=American Renal, FMC=Fresenius Medical Care. Facility dialysis-related infection rates are per 100 patient months.
Data are limited to the following access types: fistula, graft, tunneled central line, and non-tunneled central line.
Infection data for dialysis centers with fewer than 50 patients in a 12-month period are suppressed to protect confidential health information. These dialysis centers have met the reporting requirements.
*** Indicates value not shown due to suppression of infection data.
Source: National Healthcare Safety Network (NHSN) Database.

CLOSTRIDIUM DIFFICILE INFECTION

Clostridium difficile infections (CDI) are a growing problem in health care. *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 even death. Between 2000 to 2009, the discharge diagnosis of CDI in hospitalized patients increased from approximately 139,000 to 336,000[14] and is estimated to cause 14,000 deaths per year[15]. Risk factors for CDI include antibiotic administration, increasing age, duration of hospital stay, and severity of underlying diseases[16]. CDI also may be acquired outside of hospitals in the community, and exposures to other types of health care are also a risk factor. Although 94% of CDI are related to health care exposures, 75% of health-care associated CDI have their onset outside of hospitals[17].

Based on the high incidence and potential severity of CDI, Colorado's HAI Advisory Committee added CDI to state reporting requirements for acute care hospitals last year. CDI data became available January 1, 2013, and therefore the first report year's data is a partial year (January 1, 2013 through July 31, 2013). Hospital reported CDI data are classified as hospital-onset (HO), community-onset (CO), and community-onset health care facility associated (CO-HCFA). HO cases are laboratory positive specimens collected >3 days after admission to the facility (i.e., on or after day 4). CO include laboratory identified specimens collected in an outpatient location or an inpatient location ≤3 days after admission to the facility (i.e., days 1, 2, or 3 of admission). CO-HCFA cases include specimens collected from patients discharged from the facility ≤4 weeks prior to current date of stool specimen collection. Data from outpatient locations (e.g., outpatient encounters) are not included in this definition. Only laboratory-identified hospital-onset cases are presented in this report.

This past year, nine acute care hospitals had CDI rates worse than the national average and four had better rates. The statewide CDI rate for all Colorado acute care hospitals combined was worse than the national average.

RESULTS

Table 24 presents laboratory identified hospital onset *C. difficile* cases reported by acute care hospitals from January 2013 through July 2015.

Sixty acute care hospitals submitted CDI data into NHSN this past year. Eight hospitals reported zero CDI. Nine acute care hospitals had CDI rates worse than the national average and four had better rates. This past year, the statewide CDI rate for all Colorado acute care hospitals combined was worse than the national average.

Table 24: Number of *Clostridium difficile* Infections and Standardized Infection Ratios in Hospitals – Colorado, January 2013-July 2015

***Clostridium difficile* Infections in Hospitals (facility wide): January 1, 2013 – July 31, 2015**													
Health Facility and City		**January- July 2013**				**August 2013- July 2014**				**August 2014- July 2015**			
		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**	679	0	0	Same	581	0	0	Same	256	0	0	Same
Arkansas Valley Regional MC	**La Junta**	2,555	4	2.3	Same	4,057	0	0	Same	3,782	0	0	Same
Aspen Valley Hospital	**Aspen**	0	***	***	***	0	***	***	***	1,317	1	1.3	Same
Boulder Community Hospital	**Boulder**	16,578	17	1.5	Same	28,197	18	1	Same	11,602	3	0.4	Same
Boulder Community Hospital-Foothills	**Boulder**	3,926	8	3.3	Worse	6,602	4	1	Same	24,475	19	1.2	Same
Castle Rock Adventist Hospital	**Castle Rock**	Not yet operating				7,232	2	0.4	Same	8,626	6	1	Same
Centura Avista Adventist Hospital	**Louisville**	5,184	3	1	Same	10,704	4	0.6	Same	11,132	0	0	Better
Centura Littleton Adventist Hospital	**Littleton**	21,665	12	1	Same	40,718	35	1.4	Same	37,100	38	1.4	Same
Centura Penrose St Francis Health	**Colorado Springs**	29,658	16	0.9	Same	61,866	34	0.9	Same	57,890	53	1.5	Worse
Centura Porter Adventist Hospital	**Denver**	30,449	9	0.4	Better	51,440	24	0.7	Same	44,185	30	1	Same
Centura St Anthony Central Hospital	**Denver**	34,003	31	2	Worse	61,048	39	1.1	Same	62,015	60	1.4	Worse
Centura St Anthony North Hospital	**Westminster**	13,561	19	2.3	Worse	23,492	17	1.2	Same	15,310	20	2	Worse
Centura St Francis MC	**Colorado Springs**	17,846	1	0.1	Better	31,303	11	0.7	Same	34,142	11	0.6	Same
Centura St Mary Corwin MC	**Pueblo**	14,978	11	1.3	Same	25,750	5	0.4	Better	24,169	20	1.5	Same
Centura St Thomas More Hospital	**Canon City**	3,503	2	1.2	Same	5,535	2	0.8	Same	5,984	3	1	Same
Colorado Plains MC	**Fort Morgan**	4,100	4	1.6	Same	6,436	2	0.5	Same	5,047	0	0	Same
Community Hospital	**Grand Junction**	3,023	2	1.1	Same	6,336	5	1.2	Same	7,587	4	0.9	Same
Delta County Memorial Hospital	**Delta**	3,230	0	0	Same	5,332	2	0.8	Same	4,280	3	1.4	Same
Denver Health MC	**Denver**	57,261	39	0.8	Same	98,350	70	0.8	Same	106,394	81	0.8	Same
East Morgan County Hospital	**Brush**	1,248	0	0	Same	2,213	0	0	Same	2,204	2	1.3	Same
Exempla Good Samaritan MC	**Lafayette**	28,721	16	1.2	Same	51,371	47	1.7	Worse	52,822	40	1.5	Worse

Clostridium difficile Infections in Hospitals (facility wide): January 1, 2013 – July 31, 2015													
Health Facility and City		January- July 2013				August 2013- July 2014				August 2014- July 2015			
		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
Exempla Lutheran MC	Wheat Ridge	45,599	41	1.6	Worse	65,362	35	0.8	Same	47,702	49	1.2	Same
Exempla St Joseph Hospital	Denver	49,951	31	1	Same	76,381	61	1	Same	77,609	68	0.9	Same
Grand River MC	Rifle	0	***	***	***	0	***	***	***	814	0	0	Same
Kit Carson Memorial Hospital	Burlington	0	***	***	***	128	1	21	Same	0	***	***	***
Kremmling Memorial Hospital	Kremmling	0	***	***	***	445	0	0	Same	0	***	***	***
Longmont United Hospital	Longmont	17,854	12	0.9	Same	28,667	16	0.7	Same	22,533	10	0.7	Same
McKee Medical Center	Loveland	8,986	3	0.5	Same	14,328	5	0.5	Same	14,996	7	0.7	Same
Medical Center of Aurora	Aurora	41,864	50	1.5	Worse	73,096	85	1.7	Worse	71,661	98	1.6	Worse
Medical Center of the Rockies	Loveland	22,805	26	1.5	Same	41,109	45	1.8	Worse	40,404	31	1.6	Worse
Memorial Hospital Central	Colorado Springs	40,349	7	0.3	Better	59,427	18	0.5	Better	64,445	40	0.8	Same
Memorial Hospital North	Colorado Springs	6,277	2	0.7	Same	14,739	1	0.1	Better	12,843	4	0.5	Same
Mercy Regional MC	Durango	7,853	5	1.3	Same	12,882	16	2.5	Worse	13,088	12	1.7	Same
Montrose Memorial Hospital	Montrose	3,537	0	0	Same	8,672	4	0.8	Same	8,207	2	0.5	Same
Mt San Rafael Hospital	Trinidad	0	***	***	***	0	***	***	***	1,098	3	3.8	Same
North Colorado MC	Greeley	32,267	16	0.8	Same	52,850	26	0.8	Same	52,187	33	1	Same
North Suburban MC	Thornton	15,139	14	1.3	Same	24,481	17	1	Same	26,629	13	0.7	Same
OrthoColorado Hospital St Anthony	Lakewood	2,710	0	0	Same	4,293	0	0	Same	4,436	0	0	Same
Pagosa Springs MC	Pagosa Springs	0	***	***	***	636	0	0	Same	1,263	3	4.4	Same
Parker Adventist Hospital	Parker	12,868	12	2	Worse	24,407	14	1	Same	26,172	24	1.7	Worse
Parkview MC	Pueblo	44,994	26	0.6	Better	83,433	38	0.5	Better	87,896	27	0.3	Better
Pikes Peak Regional Hospital	Woodland Park	1,299	1	1.5	Same	2,063	0	0	Same	1,087	1	3.7	Same
Platte Valley MC	Brighton	5,474	3	1.1	Same	9,464	2	0.4	Same	8,926	6	1.3	Same
Poudre Valley Hospital	Ft Collins	23,635	43	2.4	Worse	39,518	32	1.3	Same	44,105	25	1	Same

Clostridium difficile Infections in Hospitals (facility wide): January 1, 2013 – July 31, 2015													
Health Facility and City		January- July 2013				August 2013- July 2014				August 2014- July 2015			
		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
Presbyterian St Lukes MC	Denver	33,414	40	1.3	Same	54,745	56	1.4	Worse	56,387	71	1.5	Worse
Rose Medical Center	Denver	27,264	21	0.8	Same	43,311	26	0.8	Same	42,017	35	1.1	Same
San Luis Valley l MC	Alamosa	2,623	0	0	Same	5,410	4	1.4	Same	6,084	3	0.8	Same
Sky Ridge MC	Lone Tree	26,794	20	0.8	Same	44,209	45	1	Same	47,789	62	1.2	Same
Southeast Colorado Hospital	Springfield	0	***	***	***	0	***	***	***	184	0	0	Same
Southwest Memorial Hospital	Cortez	2,172	1	0.7	Same	3,665	0	0	Same	3,271	1	0.8	Same
Spanish Peaks Health Center	Walsenburg	0	***	***	***	0	***	***	***	340	0	***	***
St Anthony Summit MC	Frisco	1,610	0	0	Same	2,329	1	0.8	Same	2,350	1	0.7	Same
St Marys Hospital	Grand Junction	31,836	16	0.6	Same	56,822	28	0.6	Better	59,037	34	0.7	Better
Sterling Regional MC	Sterling	2,557	1	0.7	Same	3,778	1	0.4	Same	4,506	1	0.4	Same
Swedish Medical Center	Englewood	53,003	74	1.7	Worse	93,468	108	1.6	Worse	90,032	111	1.6	Worse
University of Colorado Hospital	Aurora	76,937	89	1.2	Worse	146,838	164	1.3	Worse	150,959	145	1	Same
Vail Valley MC	Vail	3,635	1	0.4	Same	5,610	2	0.5	Same	5,475	2	0.5	Same
Valley View Hospital	Glenwood Springs	5,978	2	0.5	Same	10,103	4	0.6	Same	11,383	3	0.3	Better
Wray Community Hospital	Wray	0	***	***	***	0	***	***	***	732	1	5.5	Same
Yampa Valley MC	Steamboat Springs	2,503	1	0.7	Same	5,481	1	0.4	Same	4,611	2	0.7	Same

Note: SIR=standardized infection ratio, the ratio of observed to expected infection adjusted for facility risk factors. National comparisons are based on the indirect adjustment of modeled risk factors applied to total patient days. See "Risk Adjustment for Healthcare Facility-Onset *C. difficile* and MRSA Bacteremia Laboratory-identified Event Reporting in NHSN" (CDC).
*** Indicates value not shown due to suppression of infection data, or no National or historical rate, or an expected count of zero, to which to compare facility rate.
Source: National Healthcare Safety Network (NHSN) Database.

CONCLUSIONS

Colorado mandated reporting of HAI in 2006. To date, eight annual reports have been submitted to the legislature and public demonstrating a commitment by the Colorado Department of Public Health and Environment and infection prevention professionals to track, monitor and report HAI data. Constant attention is needed to ensure patient safety in all types of health care facilities. Any success in reducing these serious infections will require continued effort from multiple stakeholders including patients and their families, care providers, administrators and state health departments.

Key findings described in this report include the following:

- Of reportable surgeries in Colorado, the three most common surgeries performed between August 1, 2013 and July 31, 2015 were knee replacements (n=15,178 in hospitals, 640 in ASC), breast procedures (n=10,966 in hospitals, 5,587 in ASC) and hip replacements (n=10,613 in hospitals, 362 in ASC).
- Most Colorado health facilities had HAI rates similar to national rates for most reportable HAI.
- After being better than national rates for the prior reporting periods, statewide aggregate SSI rates for coronary artery bypass surgeries were similar to national rates in this reporting period.
- Statewide aggregate SSI rates for colon surgeries, abdominal hysterectomies, and knee replacement surgeries performed in hospitals have been better than national rates for the last three reporting periods.
- Statewide aggregate SSI rates for hernia repairs performed in ASC have been better than national rates for the last three reporting periods.
- Statewide aggregate rates for breast surgeries performed in hospitals have been worse than national rates for the last three reporting periods.
- ASC traditionally report fewer infections than hospitals, which may be due in part to reduced opportunity to conduct post surgical follow-up with patients and surgeons.
- Statewide aggregate CLABSI rates in long-term acute care hospitals have been better than national rates for the past two reporting periods. CLABSI rates for adult critical care units, and rehabilitation hospitals remained steady and similar to national rates.
- After being similar to national rates for the prior two reporting periods, CLABSI rates in neonatal critical care units were worse than the national average in this last reporting period.
- Statewide, Colorado's aggregate dialysis access related bloodstream infection rate was similar to the national rate in the last reporting period.
- The statewide aggregate rate for CDI was worse than the national rate in the last reporting period.

While this report only includes information on a subset of HAIs, the information provided can be used as an important indicator of health care 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.

Users of this report should note that the data presented are self-reported by each facility and that data validation studies only have been completed thus far for selected CLABSI, SSI and dialysis-related infections (see Appendix A). It is recommended that conclusions regarding health care quality be made in conjunction with other quality indicators and that consumers consult with doctors, health care facilities, health insurance carriers, health care 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 reduce HAI in Colorado through various activities, including the tracking and publishing of HAI data, completion of HAI data validation studies, implementation of HAI prevention collaboratives, direct observation of facility practices, maintenance of communication vehicles for HAI related information and collaboration with internal and external partners committed to patient safety.

It is hoped that facilities will use the data in this report to target and improve infection prevention efforts and that consumers will use these data to make more informed health care decisions.

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Health Facility-Acquired Infections Report

APPENDICES

APPENDIX A: HAI DATA VALIDATION STUDIES AND INFECTION PREVENTION PROJECTS

DATA VALIDATION STUDIES

As part of a comprehensive reform to address HAI, many states, including Colorado, have mandated reporting to create greater transparency between health care facilities and the public while supporting greater accountability. According to Lin[18], inter-facility comparisons of the data are only valid when the methods of surveillance are uniform and reliable across institutions. The Health Facility Infection Surveillance Unit has conducted several validation studies including follow-up validation studies as in table below.

Study Description	Initial Study Year	Follow-up Study Year
CLABSI	2012	2014
Dialysis Events	2012	2014
Hip and Knee Surgeries	2012	n/a
Hernia Surgeries	2012	n/a
Colon Surgeries	2015	n/a
Breast Surgeries in ASC	2015	n/a

Central Line Associated Bloodstream Infection (CLABSI)

A CLABSI data validation study completed in May 2012 and published in the American Journal of Infection Control in 2013 found that 33 percent of cases identified by trained reviewers were not reported. A wide variation in surveillance practices and in the application of definitions and criteria was also noted. A follow-up validation completed in July 2014 found that only two percent of cases were not reported. This improvement was noted along with observed improvement in infection preventionists' knowledge of surveillance definitions and practices.

Hernia Surgery SSI

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 chart reviews of hernia procedures and infections reported through NHSN from January through June 2010. Of 438 charts reviewed, two non-reported events were found and eight events were over-reported.

Hip and Knee Surgery SSI

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 SSI plus an additional ten randomly selected patient charts (without SSI) were reviewed. A questionnaire was administered to infection preventionists to assess the adequacy of 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 SSI once entered in NHSN.

Colon Surgery SSI

In a 2015 Colon SSI validation study, 812 charts at 19 facilities were examined. 52 (6%) non-reported events and 10 (1%) over-reported charts were identified. One noteworthy findings with the inclusion of 70 ineligible surgeries. Moreover, common discrepancies occurred with the wound class and procedure duration variables.

Breast Surgery SSI in ASC

Also in 2015, staff conducted chart reviews for patients having breast surgeries in 18 Colorado ambulatory surgery centers (ASC). Selected ASC 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; see Table 1). A total of 715 charts were examined (701 female 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 SSI. All but one facility reported procedure duration incorrectly, because they were still using outdated protocol definitions and five facilities failed to enter two denominator forms in NHSN for bilateral procedures, which could artificially elevate their SSI rates.

Dialysis Infections

In 2012, a validation study to assess reporting accuracy of dialysis event data was conducted. Of 65 operating dialysis treatment centers in Colorado, 25 were visited to perform patient chart reviews to identify non- and over-reported events. Of 467 charts reviewed in 25 facilities, 29 percent of events were found to be unreported while 13 percent of reported events were over-reported.

In 2014, a follow-up validation study was conducted in 24 dialysis facilities. Of 377 charts reviewed, 23 percent of events were non-reported and 4 percent of events were over-reported. In summary, from 2012 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.

PREVENTION COLLABORATIVES

Surgical Site Infections and *Clostridium difficile* Infections

During 2011-2012, the Colorado Department of Public Health and Environment partnered with the Colorado Hospital Association (CHA) and Denver Health Medical Center to implement two HAI prevention collaboratives for surgical site infections (SSI) and *Clostridium difficile* infection (CDI). Seventeen and 16 facilities, respectively, participated in the SSI and CDI collaboratives. Participants piloted and implemented new HAI prevention strategies, engaged additional hospital staff (i.e., physicians, environmental services) and shared data—all in the effort to achieve the following HAI reduction goals:

- ≥ 15 percent reduction in the SSI rate from baseline
- ≥ 15 percent reduction in CDI rates from baseline
- ≥ 90-95 percent adherence rates to process measures (dependent upon metric)

The following targets were achieved:

- Most hospitals maintained at least 90 percent adherence to CDI process measures
- CDI Hospital Onset (HO) rates declined by 14 percent,
- Community Onset-Hospital Associated (CO-HA) CDI rates declined by 24 percent
- Combined HO/CO-HA CDI rates reduced by 17 percent
- Most facilities remained at 95 percent adherence to SSI process measures
- Some facilities for certain surgeries reduced their SIR from 2009 to 2012 by ≥ 10 percent
- Most facilities showed a decline in SSI of at least 15 percent in 2012

Dialysis Infections

In 2012-2013, the Colorado Department of Public Health and Environment partnered with the Intermountain End Stage Renal Disease Network to implement a Dialysis Infection Prevention Collaborative. Representatives from 30 outpatient dialysis treatment centers (DTC) across Colorado implemented interventions to improve hand hygiene (HH), conducted observations of HH practices, submitted results of HH audits and continued to submit dialysis event data into NHSN. Results showed declines in access-related bloodstream infections for both collaborative and non-collaborative facilities, and a decline in local access infections for collaborative facilities only.

Dialysis Patient Education

In 2013-2014, the department received federal funding to implement a Dialysis Patient Education Collaborative that developed a standardized curriculum of education that includes key steps in infection prevention, vascular access and general patient care. The education is intended to engage patients in their own care by teaching observation and communication methods that empower them to observe staff technique, ask questions and provide feedback.

SPECIAL PROJECTS

Hand Hygiene Partnership

According to the Centers for Disease Control and Prevention (CDC), hand hygiene is the most important measure to prevent the transmission of harmful germs. Studies show that health care workers follow hand hygiene guidelines only about 40 percent of the time[19].

The Colorado Department of Public Health and Environment partnered with Telligen (formerly, Colorado Foundation for Medical Care) and the Colorado Hospital Association to develop and distribute a new hand hygiene improvement toolkit for providers in a variety of health care settings including nursing homes, hospitals, ambulatory surgery centers, home health, physician offices and clinics[20-22].

Emerging Infections Program (EIP)

Colorado is one of 10 states that is part of the Centers for Disease Control and Prevention Emerging Infections Program (EIP). The 10-state network comprises a catchment area of approximately 44 million people, and is roughly representative of the U.S. population on the basis of demographic characteristics such as age, gender, race, and urban residence, as well as health indicators such as population density and percent at or below the poverty level. The EIP network is a national resource

for surveillance, prevention, and control of emerging infectious diseases. EIP activities go beyond routine functions of health departments by:

- Addressing the most important issues in infectious diseases and selecting projects that the EIP network is particularly suited to investigate
- Maintaining sufficient flexibility for emergency response and addressing new problems as they arise
- Developing and evaluating public health interventions and ultimately transferring what is learned to public health agencies
- Incorporating training as a key function of EIP activities
- Giving high priority to projects that lead directly to the prevention of disease

Colorado EIP HAI projects include a survey to identify the prevalence of HAIs, population-based active surveillance of pathogens of interest including *Clostridium difficile* (Denver metropolitan area), carbapenem-resistant *Enterobacteriaceae* (statewide) and *Acinetobacter* (Denver metropolitan area), and other HAI projects.

Dialysis Infection Prevention

In March 2015, the CDPHE hired a Dialysis Infection Preventionist to work with dialysis treatment centers to improve infection reporting and prevention. Part of the intervention included the distribution of quarterly feedback reports to each facility that allowed them to see their facility's rates of access-related bloodstream infections (ARB) and local access infections (LAI) compared to every other Colorado dialysis facility and the statewide aggregate rate. In addition, site visits to assess infection reporting and prevention practices and provide education and resources were conducted for selected facilities. Selected facilities were those having ARB rates of at least 2.0 or at least six ARB during the six-month timeframe examined. By December 2015, 41 (of 71) facilities received on-site visits including 12 facilities that had either high ARB rates or counts during July-December 2014; nine facilities that reported zero infections from July-December 2014, and; twenty additional facilities located in close geographic proximity to the aforementioned units. The focus of the visits was to:

-Engage leadership from large, small and independent dialysis facilities

- Assess ability to access NHSN and knowledge and competency in event surveillance and reporting

-Train staff on the use of NHSN analysis features and report generation

-Assess use of CDC interventions to reduce infections and provide training on CDC interventions

-Provide additional infection prevention educational resources as needed (e.g., information regarding CDI, HCV, and use of appropriate PPE).

Preliminary results demonstrate declines in ARB and LAI from before to after the intervention began.

APPENDIX B: STANDARDIZED INFECTION RATIO OVERVIEW

The Standardized Infection Ratio (SIR) is a risk adjusted summary measure used for central line associated bloodstream infection (CLABSI) data, umbilical catheter associated infection (UCABI – Neonatal Critical Care Units only), Surgical Site Infection (SSI) data and dialysis-related infection (DRI) data. 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 expected number of infections. The expected number of infections is determined by historical data collected by the NHSN as well as an individual facility's patient population. See example calculations below.

CLABSI in adult critical care units and long-term acute care hospitals
CLABSI in neonatal critical care units
SSI in hospitals and ambulatory surgery centers (hernia procedures only)
SSI in ambulatory surgery centers (hip and knee replacement procedures)
DRI in dialysis centers

Interpretation of the SIR is done by comparing a facility's value to 1 (observed and expected number of SSI are the same). In other words, the number of infections is what was expected based on the national average. If the SIR value is greater than 1.0, there are more infections than expected, and if the SIR value is less than 1, there are fewer infections than expected.

The statistical significance of the difference between the observed and expected SSI based on the national average is tested using a Poisson test. A p-value is computed from the test and helps to 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 expected 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 average. If the SIR is greater than 1, then the facility has significantly more CLABSI than were expected based on the national average (**WORSE**). The converse also applies where if the SIR is less than 1, the hospital has significantly fewer CLABSI than were expected (**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 (CBGB): 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.

Health Facility Acquired Infection or Health Care-Associated Infection (HAI): An infection of a patient that occurs in a health care 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 health care facility and the date of discharge are different calendar days.

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 (LTAC): 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 health care quality processes, and outcome metrics that measure the number of patients affected by specific medical treatments.

National Health Care 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 Health care 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.

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 expected 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 expected 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 expected number of infections after adjusting for the risk category.

Surgical Site Infections (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.