

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**).

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.

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 infection⁸. 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 infections⁹. 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.