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Status Report on the Health Facility-Acquired Infections Disclosure Initiative

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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. The occurrence of HAI remains a concern among health care consumers and providers. This concern has driven 34 states and the District of Columbia to pass laws pertaining to HAI reporting since 2003.[1] Colorado's HAI Disclosure Act (House Bill 06-1045; henceforth called the Disclosure Law) was passed in May 2006. The Colorado Disclosure Law designated the Colorado Department of Public Health and Environment (CDPHE) as the lead state agency responsible for its implementation and for providing oversight of HAI reporting. This report was written to fulfill reporting requirements set forth in the Disclosure Law and is the sixth annual report published by CDPHE's Health and Safety Information Services Program (formerly known as the Patient Safety Program). It is submitted each year to the Colorado Legislature by January 15.

Colorado's Disclosure Law mandates that health facilities report their infection 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 reporting of data into NHSN enables each facility's HAI numbers and rates to be compared to national HAI rates for specific surgical procedures or devices (i.e., central lines or dialysis access types) and through statistical analysis, determine whether each facility's HAI incidence is better, worse or the same as national HAI rates.

Surgical site infection data are reported by hospitals and ambulatory surgery centers for the following surgeries: coronary artery bypass grafts, hip prostheses (total and partial), knee prostheses (total and partial), hernia repairs, abdominal and vaginal hysterectomies, and breast and colon procedures.

Central line-associated bloodstream infections (CLABSI) are reported for all adult critical care units (CCU), neonatal critical care units (NCCU: Level II/III and III), rehabilitation hospitals, rehabilitation inpatient units, and long-term acute care hospitals (LTACH).

Dialysis treatment centers report dialysis-related infections including local access infections and vascular bloodstream infections from the following access types: fistulas, grafts, temporary and permanent central lines.

The U.S. Department of Health and Human Services (HHS) National Action Plan has stipulated a 50 percent reduction of CLABSI in intensive care units and inpatient wards by 2013 and a 25 percent reduction in admissions and readmissions for surgical site infections by 2013.[3] The Health and Safety Information Services Program will continue work to meet those goals through various activities, including the tracking and publishing of HAI data, completion of HAI data validation studies, implementation of HAI prevention collaboratives, maintenance of communication vehicles for HAI related information, and collaboration with internal and external partners committed to patient safety.

It is hoped that health care 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 choices.

HEALTH CARE ASSOCIATED INFECTION REPORTING & LEGISLATION

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 burdens due to additional medications, treatments, procedures, lost wages, short- and long-term illnesses, as well as pain, suffering and death. Colorado recognizes the seriousness of this public health threat and passed HAI reporting legislation in 2006. Colorado's HAI Disclosure Act (House Bill 06-1045; henceforth called the Disclosure Law) requires hospitals, including acute care, rehabilitation, and long term acute care hospitals (LTACH), hospital units, ambulatory surgery centers (ASC) and dialysis treatment centers (DTC) to report designated HAI data as a condition of their state licensure. The Disclosure Law also requires facilities to use the National Health care Safety Network (NHSN) to report their HAI data. The use of NHSN potentially improves the validity of reported HAI data because facilities must use standard definitions and reporting rules. Doing so improves reporting consistency and allows facility HAI data to be compared to national rates, and be more easily understood by the public and health care facilities.

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 sixth annual report published CDPHE's Health and Safety Information Services Program (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, 2013. 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), and dialysis-related infections. The SSI data presented in this report are from patients having surgeries from August 1, 2010 through July 31, 2012. The CLABSI and dialysis related infections presented in the report occurred in patients who received medical treatment from August 1, 2011 through July 31, 2012.

HAI DISCLOSURE LAW IMPLEMENTATION

Implementing Colorado's 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 ASC and three infection preventionists who are 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 is an active member of a national organization specializing in health care epidemiology or infection control, and; a Master or Ph.D. level medical statistician or clinical microbiologist. Current committee members and relevant information are presented in Table 1.

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

- Ensure that all components of Colorado's Disclosure Law are implemented;
- Provide guidance in the selection of HAI reporting metrics;
- Evaluate the relevancy and accuracy of reporting requirements;
- Establish priorities for completion of HAI data validation studies;
- Provide input on outreach activities and research projects such as prevention collaboratives, rural outreach programs, surveillance studies and other HAI-related projects as needed;
- Provide guidance regarding the Annual Report due January 15 of each year and other reports developed for consumers and health care personnel, and;
- Promote safe health care for Colorado citizens with regard to HAI.

TABLE 1: COLORADO HEALTH FACILITIES-ACQUIRED INFECTIONS ADVISORY COMMITTEE MEMBERS

Name	Committee Role	Position Title	Facility	Serving Since
Linda J. Burton, RN, BSN, CIC	Representative from a public hospital	Infection Preventionist	University of Colorado Hospital, Aurora	December 2009
Paul J. Poduska , BS, M (ASCP), CIC	Representative from a private hospital	Infection Control Coordinator	Poudre Valley Health System, Fort Collins	January 2008
Peggy SaBell, RN, MS, CIC	Representative of a health insurer	Regional Infection Control Director	Kaiser Foundation Health Plan of Colorado, Denver	January 2008
Kerry O'Connell	Consumer	Construction Executive	Stapleton Infrastructure, Denver	August 2007
Denise de Percin, BA	Representative of health consumer organization	Executive Director	Colorado Consumer Health Initiative, Denver	March 2007
Deborah Teetzel, RN, MS	Infection control practitioner; ambulatory surgery center	Administrator	Rocky Mountain Surgery Center, Englewood	May 2008
Cindy Thistel, RN, MSN, CIC	Certified infection control practitioner	Infection Preventionist	Littleton Hospital, Littleton	November 2010
Colleen Casaceli, BSN, MPH, CIC	Certified infection control practitioner	Patient Safety Manager	Platte Valley Medical Center, Brighton	February 2012
Dawn Bedham, RN, BSN, CIC	Certified infection control practitioner	Infection Preventionist, Employee Health	East Morgan County Hospital, Brush	February 2012
Connie S. Price, MD	Board certified physician	Chief, Division of Infectious Diseases and Medical Director of Infection Control and Prevention	Denver Health Medical Center, Denver	March 2007
Allison Lee Sabel-Soteres, MD, PhD	Medical statistician	Director of Medical Biostatistics	Denver Health Medical Center, Denver	March 2007

2: SELECTION OF CLINICAL METRICS

The HAI reporting metrics selected include infections related to central lines, surgeries, and outpatient dialysis treatment. CLABSI are bloodstream infections 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, withdraw blood, or monitor fluid volume in patients. The surgeries for which 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.

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

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

Table 2 below depicts Colorado's selected reporting metrics and year of implementation.

TABLE 2: REQUIRED REPORTING METRICS AND YEAR OF IMPLEMENTATION

2007	2008	2009	2010	2011	2012
Central lines in **select** critical care units (adult and neonatal) August 2007	All 2007 metrics	All 2007 and 2008 metrics	All 2007 – 2009 metrics	All 2007 – 2010 metrics	All 2007-2011 metrics minus hernia repairs in hospitals
Hip replacements August 2007	Central lines in long-term acute care hospitals August 2008	Abdominal hysterectomies August 2009	Dialysis centers March 2010	Central lines in **all** adult critical care units August 2011	Colon procedures in hospitals January 2012
Knee replacements August 2007	Hernia repairs October 2008	Vaginal hysterectomies August 2009		Breast procedures August 2011	Central lines in rehabilitation hospitals and inpatient rehabilitation units January 2012
Coronary artery bypass grafts August 2007	Ambulatory Surgery Centers October 2008				

3: OVERSIGHT AND VALIDATION OF DATA ENTERED INTO NHSN

Colorado health facilities grant CDPHE access to their data so the department can monitor, analyze and produce public reports. The NHSN maintains stringent controls to ensure data security, integrity and confidentiality, and 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 CDPHE provides guidance and technical assistance to ensure the timely and accurate reporting of data. CDPHE also performs systematic monitoring and validation of the HAI data submitted, which allows for the identification and correction of incomplete and incorrectly entered data. CPDHE has completed data validation studies for CLABSI, SSI and dialysis related infections (DRI) 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 staff that collects and reports HAI data. These individuals must be certified in infection control and epidemiology[5] 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 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 sixth annual report published by CDPHE. In addition, 10 semi-annual bulletins, which provide additional data, research and information applicable to HAI in Colorado, have been published. All reports are available for viewing at http://www.colorado.gov/cs/Satellite/CDPHE-HF/CBON/1251590617766 .

PARTICIPATING FACILITIES

There are currently 279 hospitals, hospital units, ASC and outpatient dialysis treatment clinics targeted for infection reporting. Of those, 74 hospitals, 9 LTACH, 4 rehabilitation hospitals, 48 ASC, and 65 dialysis treatment clinics have reported infection data. Certain hospitals and ASC do not report HAI to CDPHE because they do not perform reportable procedures. 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 CLABSI BY TYPE OF CRITICAL CARE UNIT

Critical Care Unit	Number of facilities
Medical	7
Surgical	1
Medical/Surgical	42
Medical Cardiac	1
Cardiothoracic surgery	2
Burn	1
Trauma	3
Prenatal	1
Neurosurgical	4
Level II/III Neonatal Critical Care	13
Level III Neonatal Critical Care	5
Long-term Acute Care Hospitals	9
Inpatient Rehabilitation Hospitals/hospital units	4/10

TABLE 4: NUMBER OF HOSPITALS AND AMBULATORY SURGERY CENTERS PERFORMING REPORTABLE PROCEDURES

Procedure	Hospitals	Ambulatory Surgical Center	Total
Hip replacement	58	2	60
Knee replacement	58	8	66
Coronary artery bypass graft	18	0	18
Hernia repair	66	40	106
Abdominal hysterectomy	56	0	56
Vaginal hysterectomy	55	8	63
Breast	67	34	101
Colon	57	NA*	57

*Ambulatory Surgery Centers do not report 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 from August1, 2010 through July 31, 2011; and for CLABSI and DRI, patients receiving medical care from August 1, 2011 through July 31, 2012. Two forms of HAI data are presented: infection rates that are combined over all Colorado facilities (aggregate data) and infection rates for each individual facility (facility specific data). The report also 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 each facility's name and infection count, and depending on the type of infection presented, the number of surgeries (for SSI), patient line days (for CLABSI), or patient months (for DRI). In addition, the CLABSI and dialysis tables show infection rates, which are based on the number of infections observed and the denominator, either central line days for CLABSI or patient months for DRI. SSI tables show a standardized infection ratio (SIR), which is a summary measure that describes a facility's performance, while taking into account the risk of the facility'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). An SIR of 1.0 means that a facility's observed number of infections is equal to the expected number of infections. If the SIR value is greater than 1.0, there are more infections than expected, and if the SIR is less than 1.0, there are fewer infections than expected.

Regardless of type of infection, each facility shows a National Comparison, which represents how the facility's observed number of infections compares 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 HAI count and the expected count, 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. CDPHE and the Advisory Committee recommend that 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.

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 DRI. 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; see Appendix C for a list of Consumer Health care Resources), 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 CLABSI DATA

The table below shows aggregate CLABSI central line days, infection counts, and rates for adult critical care units, neonatal critical care units, long-term acute care hospitals (LTACH), and rehabilitation hospitals and wards in Colorado from August 1, 2011 through July 31, 2012.

TABLE 5: COLORADO AGGREGATE CLABSI DATA BY LOCATION TYPE

Unit Type	August 2011- July 2012			
	Central Line Days	CLABSI	CLABSI Rate	National Comparison
Total	180,767	171	0.9	Better
Adult Critical Care Unit	109,516	112	1	Better
Neonatal Critical Care Unit	19,907	19	0.9	Same
Long Term Acute Care Facility	44,205	38	0.9	Better
Inpatient Rehabilitation Hospital/Ward	7,139	2	0.3	Same

Facility CLABSI rates are per 1,000 central line-days.
National comparison based on data collected and reported by NHSN-participating hospitals from January-December, 2010
See "National Health care Safety Network (NHSN) Report, Data Summary for 2010", Division of Health care Quality Promotion, Centers for Disease Control and Prevention
Source: National Health care Safety Network (NHSN) Database.
Prepared By: Colorado Health & Safety Information Services Program, Colorado Department of Public Health and Environment

AGGREGATE SURGICAL SITE INFECTION DATA

The table below shows aggregate SSI infection counts and SIRs for reportable procedures by two separate reporting years from August 1, 2010 through July 31, 2012.

TABLE 6: COLORADO AGGREGATE SSI DATA BY HOSPITAL AND AMBULATORY SURGERY CENTER

Health Facility and Region	August 2010- July 2011				August 2011- July 2012			
	Procedure Count	Infection Count	Standardized Infection Ratio (SIR)	National Comparison	Procedure Count	Infection Count	Standardized Infection Ratio (SIR)	National Comparison
Procedure Type (hospital):								
Breast Surgery	NA	NA	NA	NA	9,209	89	1.1	Same
Coronary Artery Bypass Grafts with Chest and Donor Site Infections (CBGB)	1,598	39	1.3	Same	1,516	25	0.9	Same
Colon Surgery	NA	NA	NA	NA	2,576	97	0.7	Better
Hernia	18,485	107	0.8	Better	8,001	56	1	Same
Hip Replacement (HPRO)	7,783	87	1	Same	8,712	80	0.8	Same
Abdominal Hysterectomy	4,802	67	0.8	Same	5,264	58	0.6	Better
Knee Replacement (KPRO)	12,969	117	1	Same	13,029	93	0.7	Better
Vaginal Hysterectomy	4,681	47	1.2	Same	4,359	44	1.2	Same
Procedure Type (ASC):								
Breast Surgery	**NA**	NA	NA	NA	5,299	19	0.7	Same
Hip Replacement (HPRO)	143	0	0	Same	169	0	0	Same
Knee Replacement (KPRO)	363	0	0	Same	366	0	0	Same
Vaginal Hysterectomy	34	0	***	***	36	0	***	***

The standardized infection ratio (SIR) is the ratio of observed to expected infections, and is adjusted for procedure risk factors.
National comparison is based on the indirect adjustment of modeled risk factors for each procedure type.
See "Improving Risk-Adjusted Measures of Surgical Site Infection for the National Health care Safety Network" (Inf Control and Hosp Epi, October 2011, Vol 32, No 10, pp. 970-986).
*** Indicates value not shown because there currently is no national or historical rate for comparison to facility rates.
Infections data for ASCs with fewer than 20 procedures performed in a 12 month period are suppressed to protect confidential health information. These ASCs have met the reporting requirements.
Source: National Health care Safety Network
Prepared By: Colorado Health & Safety Information Services Program, Colorado Department of Public Health and Environment.

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

Surgical site infections (SSI) are infections directly related to an operative procedure. Surgical procedures selected for SSI reporting are (1) performed at a high volume, (2) performed at a variety of facilities, and (3) associated with a high risk for health facility-acquired infections. 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 in- or outpatient procedures. An NHSN inpatient is one whose date of admission to the health care facility and date of discharge are different calendar days. An NHSN outpatient is one whose date of admission and date of discharge are the same calendar day.

Reportable infections occur within 30 days of the procedure or within one year if an implant was placed during the procedure. 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 location of the infection.

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

It is estimated that more than 20 percent of HAI are SSI, equating to infections in approximately 2 percent of all surgical procedures nationally.[6] The impact from an SSI can be devastating often leading to longer hospital stays, additional treatment and higher costs.[7] The economic toll per patient occurrence is estimated between $3,000 to $25,500 depending on the surgical procedure and pathogen(s) involved.[1,8] Overall in the United States, SSI cost consumers and health care payors $3.45-$10 billion dollars each year.[1]

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 such as the internal mammary artery (thoracic) or saphenous vein (leg) 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 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. Based on this, CBGC data are not presented in this report.

RESULTS

Table 7 shows facility specific data for SSI attributed to CBGB surgeries performed in hospitals from August 1, 2010 through July 31, 2011 and August 1, 2011 through July 31, 2012.

Each table lists all Colorado hospitals that performed CBGB, their cities, numbers of procedures performed, infection counts, standardized infection ratios (SIR) based on the national infection data, and comparisons to the national infection data. For a more detailed explanation of how the SIR is calculated, see Appendix B. The three categories summarizing how a Colorado hospital compares to the national infection data for the procedure performed are:

1. Statistically fewer (**better**) infections than expected based on national infection data;
2. Statistically similar (**same)** infections as expected based on the national infection data; or
3. Statistically more (**worse**) infections than expected based on national infection data.

The specific patient risk factors used to calculate the expected number of infections include:

- Patient age
- Patient gender
- American Society of Anesthesiologists (ASA) Score (given by the anesthesiologist, as an indicator of patient health and risk for surgical complications)
- Facility bed size

TABLE 7: CORONARY ARTERY BYPASS GRAFTS WITH CHEST AND DONOR SITE INCISIONS, INPATIENT PROCEDURES FOR HOSPITALS, AUGUST 2010 – JULY 2012

Surgical Site Infections (SSI) in Cardiac Procedures in Hospitals (Inpatient). Reporting Period: August 2010 – July 2012									
Health Facility and Region		2010-2011				2011-2012			
		Procedure Count	Infection Count	Standardized Infection Ratio (SIR)	National Comparison	Procedure Count	Infection Count	Standardized Infection Ratio (SIR)	National Comparison
Boulder Community Hospital	Boulder	51	0	0	Same	65	1	0.8	Same
Centura Penrose St Francis Health	Colorado Springs	186	7	2.2	Same	219	4	1.1	Same
Centura Porter Adventist Hospital	Denver	94	6	3.7	Worse	110	4	2.4	Same
Centura St Anthony Central Hospital	Denver	66	0	0	Same	70	0	0	Same
Exempla Lutheran Medical Center	Wheat Ridge	64	1	0.8	Same	89	0	0	Same
Exempla St Joseph Hospital	Denver	135	1	0.4	Same	152	1	0.4	Same
Longmont United Hospital	Longmont	31	1	1.2	Same	15	***	***	***
Medical Center of Aurora	Aurora	85	1	0.6	Same	65	0	0	Same
Medical Center of the Rockies	Loveland	151	3	0.8	Same	150	4	1.1	Same
Memorial Hospital Central	Colorado Springs	262	6	1.5	Same	151	0	0	Same
North Colorado Medical Center	Greeley	76	2	1.4	Same	67	3	2.4	Same
Parkview Medical Center	Pueblo	54	1	1	Same	60	3	2.6	Same
Presbyterian St Lukes Medical Center	Denver	23	0	0	Same	13	***	***	***
Sky Ridge Medical Center	Lone Tree	36	2	2.7	Same	16	***	***	***
St Marys Hospital	Grand Junction	135	1	0.5	Same	123	1	0.5	Same
Swedish Medical Center	Englewood	75	3	2.6	Same	54	2	2.4	Same
University of Colorado Hospital	Aurora	60	3	2.7	Same	78	1	0.6	Same

The standardized infection ratio (SIR) is the ratio of observed to expected infections, and is adjusted for procedure risk factors
National comparison is based on the indirect adjustment of modeled risk factors for each procedure type.
See "Improving Risk-Adjusted Measures of Surgical Site Infection for the National Health care Safety Network" (Inf Control and Hosp Epi, October 2011, Vol 32, No 10, pp. 970-986).
Facilities performing fewer than 20 procedures during both reporting periods are excluded from this table: Rose Medical Center.
*** Indicates value not shown due to suppression of infections data, or no National or historical rate, or an expected count of zero, to which to compare facility rate.
Source: National Health care Safety Network. Prepared By: Colorado Health & Safety Information Services Program, Colorado Department of Public Health and Environment.

ORTHOPEDIC PROCEDURES

BACKGROUND

The orthopedic procedures reported are hip replacements (total or partial) and knee replacements (total or partial). These procedures can be performed either as in- or outpatient procedures.

A total or partial hip replacement is a surgery for people with severe hip damage or pain related to chronic osteoarthritis, rheumatoid arthritis or other degenerative processes involving the hip joint. The surgical procedure for a hip replacement involves removing damaged cartilage and bone from the hip joint and replacing them with artificial devices. In this procedure, the hip socket is replaced with a cup, which is typically plastic, ceramic or metal; the head of the thighbone is replaced with a metal or ceramic ball, and the devices are attached to bone with a metal stem.

A total or partial knee replacement is a surgery (arthroplasty) 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 artificial devices. 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 8 and 9 show facility specific data for SSI attributed to hip and knee procedures performed in hospitals (inpatient and outpatient) and ASC (outpatient only) during two reporting periods; August 1, 2010 through July 31, 2011 and August 1, 2011 through July 31, 2012.

Each table lists all Colorado facilities that performed the procedure, their cities, procedure and infection counts, standardized infection ratios (SIR) based on the national infection data, and comparisons to national infection data. For a more detailed explanation of how the SIR is calculated, see Appendix B.

The three categories summarizing how a Colorado hospital compares to national infection data for the procedure performed are:

1. Statistically fewer (**better**) infections than expected based on national infection data;
2. Statistically similar (**same)** infections as expected based on the national infection data; or
3. Statistically more (**worse**) infections than expected based on national infection data.

The specific patient risk factors used to calculate the expected number of infections for **hospitals** include:

- Patient age
- Patient gender (for knee replacement only)
- Whether or not patient received general anesthesia
- American Society of Anesthesiologists (ASA) Score (given by the anesthesiologist, as an indicator of patient health and risk for surgical complications)

- Length of the procedure
- Type of knee (revision or primary) or hip (total primary, partial primary, or total revision/partial) replacement surgery
- Facility bed size
- Whether or not the procedure was related to trauma

The specific patient risk factors used to calculate the expected number of infections for **ASC** include:

- Length of the procedure
- Wound classification (clean, clean contaminated, contaminated, dirty, or unknown)
- ASA Score

TABLE 8: HIP REPLACEMENT (TOTAL OR PARTIAL), INPATIENT AND OUTPATIENT PROCEDURES FOR HOSPITALS, AUGUST 2010 – JULY 2012

Surgical Site Infections (SSI) in Hip Replacement Procedures in Hospitals (In- and Outpatient Combined). Reporting Period: August 2010 – July 2012									
Health Facility and Region		2010-2011				2011-2012			
		Procedure Count	Infection Count	Standardized Infection Ratio (SIR)	National Comparison	Procedure Count	Infection Count	Standardized Infection Ratio (SIR)	National Comparison
Animas Surgical Hospital	Durango	47	0	0	Same	44	0	0	Same
Boulder Community Hospital	Boulder	350	2	0.6	Same	321	4	1.3	Same
Centura Avista Adventist Hospital	Louisville	126	3	2.6	Same	113	1	1	Same
Centura Littleton Adventist Hospital	Littleton	141	3	1.7	Same	104	1	0.7	Same
Centura Penrose St Francis Health	Colorado Springs	414	8	1.7	Same	522	3	0.5	Same
Centura Porter Adventist Hospital	Denver	514	11	2.1	Worse	574	7	1.3	Same
Centura St Anthony Central Hospital	Denver	203	1	0.4	Same	145	4	1.9	Same
Centura St Anthony North Hospital	Westminster	61	0	0	Same	66	1	1.2	Same
Centura St Francis Medical Center	Colorado Springs	125	1	0.7	Same	117	2	1.3	Same
Centura St Mary Corwin Medical Center	Pueblo	103	2	1.5	Same	144	3	1.5	Same
Centura St Thomas More Hospital	Canon City	62	4	5.2	Worse	41	2	4.3	Same
Colorado Plains Medical Center	Fort Morgan	12	***	***	***	25	0	0	Same
Community Hospital	Grand Junction	78	3	2.6	Same	79	0	0	Same
Delta County Memorial Hospital	Delta	**57**	**0**	**0**	**Same**	**62**	**2**	**2.6**	**Same**
Denver Health Medical Center	Denver	**99**	**1**	**0.8**	**Same**	**108**	**2**	**1.4**	**Same**
Exempla Good Samaritan Medical Center	Lafayette	**240**	**0**	**0**	**Same**	**307**	**0**	**0**	**Better**
Exempla Lutheran Medical Center	Wheat Ridge	224	5	2.1	Same	170	4	1.6	Same
Exempla St Joseph Hospital	Denver	498	4	0.7	Same	683	4	0.5	Same
Longmont United Hospital	Longmont	105	1	0.6	Same	121	0	0	Same
McKee Medical Center	Loveland	134	0	0	Same	161	2	1.2	Same
Medical Center of Aurora	Aurora	173	3	1.5	Same	179	3	1.3	Same
Medical Center of the Rockies	Loveland	84	1	1	Same	107	0	0	Same
Memorial Hospital Central	Colorado Springs	383	3	0.7	Same	308	1	0.3	Same
Memorial Hospital North	Colorado Springs	**97**	**1**	**0.9**	**Same**	**135**	**1**	**0.8**	**Same**
Mercy Regional Medical Center	Durango	**83**	**2**	**2.1**	**Same**	**94**	**0**	**0**	**Same**
Montrose Memorial Hospital	Montrose	**54**	**1**	**1.4**	**Same**	**67**	**0**	**0**	**Same**

Surgical Site Infections (SSI) in Hip Replacement Procedures in Hospitals (In- and Outpatient Combined). Reporting Period: August 2010 – July 2012									
Health Facility and Region		2010-2011				2011-2012			
		Procedure Count	Infection Count	Standardized Infection Ratio (SIR)	National Comparison	Procedure Count	Infection Count	Standardized Infection Ratio (SIR)	National Comparison
North Colorado Medical Center	**Greeley**	**150**	**1**	**0.4**	**Same**	**146**	**3**	**1.6**	**Same**
North Suburban Medical Center	**Thornton**	**62**	**0**	**0**	**Same**	**64**	**0**	**0**	**Same**
OrthoColorado Hospital at St. Anthony Medical Campus	**Lakewood**	286	2	0.9	Same	387	4	1.2	Same
Orthopaedic Center of the Rockies+	**Ft Collins**	142	0	0	Same	169	0	0	Same
Parker Adventist Hospital	**Parker**	62	1	1.2	Same	103	2	1.6	Same
Parkview Medical Center	**Pueblo**	202	1	0.4	Same	208	4	1.4	Same
Poudre Valley Hospital	**Ft Collins**	497	2	0.4	Same	561	1	0.2	Better
Presbyterian St Lukes Medical Center	**Denver**	249	1	0.3	Same	321	1	0.3	Same
Rose Medical Center	**Denver**	332	0	0	Same	342	3	0.8	Same
San Luis Valley Regional Medical Center	**Alamosa**	21	0	0	Same	26	1	2.9	Same
Sky Ridge Medical Center	**Lone Tree**	442	7	1.4	Same	636	7	1.1	Same
Southwest Memorial Hospital	**Cortez**	36	0	0	Same	22	1	3.7	Same
St Marys Hospital	**Grand Junction**	259	3	1.1	Same	263	0	0	Same
Sterling Regional Medical Center	**Sterling**	40	0	0	Same	36	0	0	Same
Swedish Medical Center	**Englewood**	224	2	0.7	Same	280	5	1.4	Same
The Children's Hospital	**Aurora**	9	***	***	***	33	0	0	Same
University of Colorado Hospital	**Aurora**	206	6	2.8	Worse	252	1	0.3	Same
Vail Valley Medical Center	**Vail**	37	0	0	Same	11	***	***	***
Valley View Hospital	**Glenwood Springs**	73	0	0	Same	58	0	0	Same
Yampa Valley Medical Center	**Steamboat Springs**	47	0	0	Same	74	0	0	Same

The standardized infection ratio (SIR) is the ratio of observed to expected infections, and is adjusted for procedure risk factors
National comparison is based on the indirect adjustment of modeled risk factors for each procedure type.
See "Improving Risk-Adjusted Measures of Surgical Site Infection for the National Healthcare Safety Network" (Inf Control and Hosp Epi, October 2011, Vol 32, No 10, pp. 970-986).
+ See "National Healthcare Safety Network (NHSN) Report, Data Summary for 2006-2008, Issued December 2009" (Am J Infect Control 2009;37:783-805).
Facilities performing fewer than 20 procedures during both reporting periods are excluded from this table: Arkansas Valley Regional Medical Center, Aspen Valley Hospital, East Morgan County Hospital, Estes Park Medical Center, Family Health West Hospital, Grand River Medical Center, Gunnison Valley Hospital, Heart of the Rockies Regional Medical Center, Pikes Peak Regional Hospital, Platte Valley Medical Center, Rocky Mountain Surgery Center, St Anthony Summit Medical Center, The Memorial Hospital, Wray Community Hospital,
Facilities performing fewer than 20 procedures during only one reporting period have their infection data suppressed to protect confidential health information.
*** Indicates value not shown due to suppression of infections data, or no National or historical rate, or an expected count of zero, to which to compare facility rate.
Source: National Healthcare Safety Network. Prepared By: Colorado Health & Safety Information Services Program, Colorado Department of Public Health and Environment.

TABLE 9: KNEE REPLACEMENT (TOTAL OR PARTIAL), INPATIENT AND OUTPATIENT PROCEDURES FOR HOSPITALS, AUGUST 2010 – JULY 2012

Surgical Site Infections (SSI) in Knee Replacement Procedures in Hospitals (In- and Outpatient Combined). Reporting Period: August 2010 – July 2012									
Health Facility and Region		2010-2011				2011-2012			
		Procedure Count	Infection Count	Standardized Infection Ratio (SIR)	National Comparison	Procedure Count	Infection Count	Standardized Infection Ratio (SIR)	National Comparison
Animas Surgical Hospital	Durango	81	0	0	Same	102	0	0	Same
Arkansas Valley Regional Medical Center	La Junta	44	0	0	Same	36	0	0	Same
Aspen Valley Hospital	Aspen	28	0	0	Same	27	0	0	Same
Boulder Community Hospital	Boulder	256	2	0.8	Same	265	5	2	Same
Centura Avista Adventist Hospital	Louisville	156	1	0.8	Same	168	1	0.8	Same
Centura Littleton Adventist Hospital	Littleton	146	0	0	Same	141	1	0.6	Same
Centura Penrose St Francis Health	Colorado Springs	447	3	0.7	Same	477	5	1.1	Same
Centura Porter Adventist Hospital	Denver	979	7	0.8	Same	972	6	0.7	Same
Centura St Anthony Central Hospital	Denver	285	0	0	Same	138	3	2	Same
Centura St Anthony North Hospital	Westminster	80	2	2.8	Same	77	1	1.3	Same
Centura St Francis Medical Center	Colorado Springs	295	3	1.1	Same	243	6	2.4	Same
Centura St Mary Corwin Medical Center	Pueblo	214	3	1.4	Same	210	1	0.5	Same
Centura St Thomas More Hospital	Canon City	79	1	1.6	Same	72	1	1.7	Same
Colorado Plains Medical Center	Fort Morgan	31	0	0	Same	56	0	0	Same
Community Hospital	Grand Junction	124	2	1.6	Same	131	1	0.7	Same
Delta County Memorial Hospital	Delta	101	2	2.4	Same	112	0	0	Same
Denver Health Medical Center	Denver	126	5	3.9	Worse	130	1	0.7	Same
Exempla Good Samaritan Medical Center	Lafayette	444	1	0.3	Same	507	3	0.7	Same
Exempla Lutheran Medical Center	Wheat Ridge	323	3	1	Same	116	2	1.6	Same
Exempla St Joseph Hospital	Denver	635	5	0.9	Same	707	3	0.5	Same
Heart of the Rockies Regional Medical Center	Salida	40	2	5.6	Same	15	***	***	***
Longmont United Hospital	Longmont	218	0	0	Same	243	2	0.9	Same
McKee Medical Center	Loveland	290	1	0.4	Same	285	3	1.4	Same
Medical Center of Aurora	Aurora	341	8	2.2	Same	296	1	0.3	Same
Medical Center of the Rockies	Loveland	87	0	0	Same	116	1	0.6	Same
Memorial Hospital Central	Colorado Springs	638	1	0.1	Better	487	1	0.2	Same

Surgical Site Infections (SSI) in Knee Replacement Procedures in Hospitals (In- and Outpatient Combined). Reporting Period: August 2010 – July 2012									
Health Facility and Region		2010-2011				2011-2012			
		Procedure Count	Infection Count	Standardized Infection Ratio (SIR)	National Comparison	Procedure Count	Infection Count	Standardized Infection Ratio (SIR)	National Comparison
Memorial Hospital North	Colorado Springs	328	4	1.4	Same	393	3	0.9	Same
Mercy Regional Medical Center	Durango	114	0	0	Same	149	0	0	Same
Montrose Memorial Hospital	Montrose	141	0	0	Same	140	0	0	Same
North Colorado Medical Center	Greeley	286	3	0.9	Same	306	5	1.4	Same
North Suburban Medical Center	Thornton	174	2	1.3	Same	151	1	0.7	Same
OrthoColorado Hospital at St. Anthony Medical Campus	Lakewood	604	3	0.7	Same	885	2	0.3	Same
Orthopaedic Center of the Rockies+	Ft Collins	329	0	***	***	349	0	***	***
Parker Adventist Hospital	Parker	163	3	2.1	Same	167	0	0	Same
Parkview Medical Center	Pueblo	361	6	1.5	Same	364	7	1.8	Same
Pikes Peak Regional Hospital	Woodland Park	32	0	0	Same	44	0	0	Same
Platte Valley Medical Center	Brighton	48	0	0	Same	66	2	3.9	Same
Poudre Valley Hospital	Ft Collins	991	5	0.5	Same	977	4	0.4	Same
Presbyterian St Lukes Medical Center	Denver	373	4	1	Same	360	1	0.3	Same
Rose Medical Center	Denver	532	4	0.9	Same	555	4	0.8	Same
San Luis Valley Regional Medical Center	Alamosa	42	1	2.7	Same	25	0	0	Same
Sky Ridge Medical Center	Lone Tree	806	15	1.9	Worse	715	4	0.6	Same
Southwest Memorial Hospital	Cortez	48	0	0	Same	55	0	0	Same
St Anthony Summit Medical Center	Frisco	40	1	3.5	Same	65	0	0	Same
St Marys Hospital	Grand Junction	301	1	0.3	Same	332	1	0.3	Same
Sterling Regional Medical Center	Sterling	29	0	0	Same	45	0	0	Same
Swedish Medical Center	Englewood	305	2	0.7	Same	324	2	0.6	Same
The Memorial Hospital	Craig	2	***	***	***	29	0	0	Same
University of Colorado Hospital	Aurora	299	6	1.9	Same	327	7	1.6	Same
Vail Valley Medical Center	Vail	204	1	0.6	Same	132	0	0	Same
Valley View Hospital	Glenwood Springs	123	1	1	Same	115	1	1	Same
Yampa Valley Medical Center	Steamboat Springs	90	0	0	Same	110	1	1	Same

The standardized infection ratio (SIR) is the ratio of observed to expected infections, and is adjusted for procedure risk factors
National comparison is based on the indirect adjustment of modeled risk factors for each procedure type.
See "Improving Risk-Adjusted Measures of Surgical Site Infection for the National Healthcare Safety Network" (Inf Control and Hosp Epi, October 2011, Vol 32, No 10, pp. 970-986).
+ See "National Healthcare Safety Network (NHSN) Report, Data Summary for 2006-2008, Issued December 2009" (Am J Infect Control 2009;37:783-805).

Facilities with fewer than 20 reported procedures in both reporting periods are not included in table: ASC Durango at Mercy Medical Center, East Morgan County Hospital, Estes Park Medical Center, Family Health West Hospital, Grand River Medical Center, Gunnison Valley Hospital, Longmont Surgery Center, Loveland Surgery Center, Rocky Mountain Surgery Center , Skyline Surgery Center, Surgery Center At Lutheran, Surgical Center at Premier, The Children's Hospital, Wray Community Hospital

Facilities performing fewer than 20 procedures during only one reporting period have their infection data suppressed to protect confidential health information. These facilities have met reporting requirements.

*** Indicates value not shown due to suppression of infections data, or no National or historical rate, or an expected count of zero, to which to compare facility rate.

Source: National Healthcare Safety Network. Prepared By: Colorado Health & Safety Information Services Program, Colorado Department of Public Health and Environment.

ABDOMINAL PROCEDURES

BACKGROUND

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

A herniorrhaphy is the repair of a hernia or bulging of internal organs or tissues which protrude through an abnormal opening in the muscle wall. Reportable NHSN hernia procedures include inguinal, femoral, umbilical or anterior abdominal wall repairs. In Colorado these procedures were removed from mandatory reporting and surveillance in hospitals due to the addition of reporting for colon procedures in acute care hospitals effective January 1, 2012.

A hysterectomy is the surgical removal of the uterus typically performed by a gynecologist. A hysterectomy may be total (removing the body, fundus, and cervix of the uterus; often called "complete") or partial (removal of the uterine body while leaving the cervix intact; also called "supracervical"). The two types of hysterectomies are abdominal and vaginal.

In abdominal hysterectomies, the uterus is removed through an abdominal incision. Vaginal hysterectomies, where the uterus is removed through the vaginal canal, have fewer complications than abdominal hysterectomies, as well as shorter hospital stays and healing times.

Colon surgeries involve the small and large intestines, which are muscular tubes that extend from the end of the stomach to the rectum where stool is passed. The intestines carry food and products of digestion. They also carry bacteria as part of the digestive process, and therefore have a high risk for contamination and infection. Colon surgeries frequently involve the use of an endoscope to look inside the colon and excise abnormal tissue, and can involve removal of only part or all of the colon.
To fulfill reimbursement requirements of the Centers for Medicare and Medicaid Services (CMS), facilities nationwide began reporting certain colon procedures on January 1, 2012. Since facilities were already reporting colon surgeries to fulfill CMS requirements, Colorado decided to include this metric as a reportable procedure to reduce burden on reporting facilities. Thirty-seven (37) colon procedures meet criteria for NHSN reporting.

RESULTS

Tables 10 through 14 show facility-specific data for SSI attributed to herniorrhaphies, hysterectomies and colon procedures as described above. The tables present data from surgeries performed from August 1, 2010 through July 31, 2012 for herniorraphies and hysterectomies and January 1, 2012 to July 31, 2012 for colon procedures.

Each table lists all Colorado facilities that performed the procedure, their cities, procedure and infection counts, standardized infection ratios (SIR) based on national infection data, and comparisons

to national infection data. For a more detailed explanation of how the SIR is calculated, see Appendix B. The three categories summarizing how a Colorado hospital compares to national infection data for the procedure performed are:

1. Statistically fewer (**better**) infections than expected based on national infection data;
2. Statistically similar (**same)** infections as expected based on the national infection data; or
3. Statistically more (**worse**) infections than expected based on national infection data.

The specific patient risk factors used to calculate the expected number of infections for **herniorrhaphies** include:

- Patient age
- Patient gender
- American Society of Anesthesiologists (ASA) Score (given by the anesthesiologist, as an indicator of patient health and risk for surgical complications)
- Length of the procedure
- Whether surgery was performed as an outpatient or inpatient

The specific patient risk factors used to calculate the expected number of infections for **abdominal hysterectomies** include:

- Patient age
- Whether or not patient received general anesthesia
- ASA score
- Length of the procedure
- Use of an endoscope
- Facility bed size

The specific patient risk factors used to calculate the expected number of infections for **vaginal hysterectomies** include:

- Patient age
- ASA score
- Length of the procedure
- Facility's medical school affiliation

Note: Abdominal and vaginal hysterectomy procedures performed at ASC are not included in facility-specific tables below, because no national risk adjustment data are available.

The specific patient risk factors used to calculate the expected number of infections for **colon procedures** include:

- Patient age
- Whether patient had general anesthesia
- ASA score
- Length of the procedure
- Use of an endoscope
- Facility's medical school affiliation
- Hospital bed size
- Wound classification (clean, clean contaminated, contaminated, dirty and unknown)

TABLE 10: HERNIA REPAIR PROCEDURES, INPATIENT AND OUTPATIENT PROCEDURES FOR HOSPITALS, AUGUST 2010 – JULY 2012

Surgical Site Infections (SSI) in Hernia Procedures in Hospitals (In- and Outpatient Combined). Reporting Period: August 2010 – July 2012									
Health Facility and Region		2010-2011				2011-2012			
		Procedure Count	Infection Count	Standardized Infection Ratio (SIR)	National Comparison	Procedure Count	Infection Count	Standardized Infection Ratio (SIR)	National Comparison
Arkansas Valley Regional Medical Center	La Junta	44	0	0	Same	27	0	0	Same
Aspen Valley Hospital	Aspen	57	0	0	Same	35	0	0	Same
Boulder Community Hospital	Boulder	318	1	0.5	Same	149	0	0	Same
Boulder Community Hospital-Foothills	Boulder	180	2	1.5	Same	82	1	2.3	Same
Centura Avista Adventist Hospital	Louisville	192	2	1.5	Same	94	0	0	Same
Centura Littleton Adventist Hospital	Littleton	188	2	1.2	Same	87	1	1.4	Same
Centura Penrose St Francis Health	Colorado Springs	395	9	2.4	Worse	152	1	0.8	Same
Centura Porter Adventist Hospital	Denver	216	0	0	Same	114	3	3	Same
Centura St Anthony Central Hospital	Denver	338	3	0.9	Same	171	2	1.5	Same
Centura St Anthony North Hospital	Westminster	204	0	0	Same	81	1	1.3	Same
Centura St Francis Medical Center	Colorado Springs	72	3	3.2	Same	34	1	3.2	Same
Centura St Mary Corwin Medical Center	Pueblo	253	2	0.9	Same	119	1	1	Same
Centura St Thomas More Hospital	Canon City	122	0	0	Same	55	0	0	Same
Colorado Plains Medical Center	Fort Morgan	62	0	0	Same	25	4	13.3	Worse
Community Hospital	Grand Junction	255	2	0.8	Same	74	1	1.5	Same
Delta County Memorial Hospital	Delta	110	0	0	Same	40	0	0	Same
Denver Health Medical Center	Denver	367	4	1.2	Same	154	1	0.7	Same
East Morgan County Hospital	Brush	43	0	0	Same	14	***	***	***
Estes Park Medical Center	Estes Park	21	0	0	Same	11	***	***	***
Exempla Good Samaritan Medical Center	Lafayette	665	2	0.4	Same	279	3	1.7	Same
Exempla Lutheran Medical Center	Wheat Ridge	454	2	0.5	Same	167	1	0.6	Same
Exempla St Joseph Hospital	Denver	428	2	0.4	Same	209	1	0.4	Same
Grand River Medical Center	Rifle	90	0	0	Same	26	0	0	Same
Gunnison Valley Hospital	Gunnison	43	1	5.5	Same	15	***	***	***
Heart of the Rockies Regional Medical Center	Salida	79	1	1.5	Same	27	0	0	Same
Longmont United Hospital	Longmont	149	3	2	Same	81	0	0	Same
McKee Medical Center	Loveland	158	2	0.9	Same	76	0	0	Same

Surgical Site Infections (SSI) in Hernia Procedures in Hospitals (In- and Outpatient Combined). Reporting Period: August 2010 – July 2012									
Health Facility and Region		2010-2011				2011-2012			
		Procedure Count	Infection Count	Standardized Infection Ratio (SIR)	National Comparison	Procedure Count	Infection Count	Standardized Infection Ratio (SIR)	National Comparison
Medical Center of Aurora	Aurora	484	9	2.7	Worse	210	0	0	Same
Medical Center of the Rockies	Loveland	366	2	0.5	Same	138	1	0.6	Same
Memorial Hospital Central	Colorado Springs	863	8	1	Same	315	5	1.9	Same
Memorial Hospital North	Colorado Springs	200	1	0.7	Same	83	0	0	Same
Mercy Regional Medical Center	Durango	61	0	0	Same	21	0	0	Same
Montrose Memorial Hospital	Montrose	249	4	2.5	Same	65	0	0	Same
North Colorado Medical Center	Greeley	324	4	1.1	Same	148	4	2.4	Same
North Suburban Medical Center	Thornton	138	1	0.7	Same	47	0	0	Same
Parker Adventist Hospital	Parker	356	1	0.3	Same	146	0	0	Same
Parkview Medical Center	Pueblo	333	1	0.4	Same	147	2	1.4	Same
Pikes Peak Regional Hospital	Woodland Park	40	0	0	Same	18	***	***	***
Platte Valley Medical Center	Brighton	176	0	0	Same	81	1	2	Same
Poudre Valley Hospital	Ft Collins	287	1	0.3	Same	117	2	1.2	Same
Presbyterian St Luke's Medical Center	Denver	641	1	0.3	Same	306	2	1.2	Same
Prowers Medical Center	Lamar	45	1	1.7	Same	13	***	***	***
Rose Medical Center	Denver	282	3	0.8	Same	132	0	0	Same
Sky Ridge Medical Center	Lone Tree	390	1	0.3	Same	212	4	2.6	Same
Southwest Memorial Hospital	Cortez	69	0	0	Same	35	2	8.5	Worse
St Anthony Summit Medical Center	Frisco	28	0	0	Same	14	***	***	***
St Mary's Hospital	Grand Junction	207	1	0.4	Same	69	0	0	Same
Sterling Regional Medical Center	Sterling	79	0	0	Same	24	0	0	Same
Swedish Medical Center	Englewood	291	3	0.6	Same	119	2	1.2	Same
The Children's Hospital	Aurora	670	2	0.6	Same	251	0	0	Same
University of Colorado Hospital	Aurora	334	5	1.4	Same	143	4	2.3	Same
Vail Valley Medical Center	Vail	109	0	0	Same	49	0	0	Same
Valley View Hospital	Glenwood Springs	238	1	0.8	Same	88	1	2	Same
Wray Community Hospital	Wray	39	0	0	Same	10	***	***	***
Yampa Valley Medical Center	Steamboat Springs	98	0	0	Same	46	0	0	Same

The standardized infection ratio (SIR) is the ratio of observed to expected infections, and is adjusted for procedure risk factors
National comparison is based on the indirect adjustment of modeled risk factors for each procedure type.
See "Improving Risk-Adjusted Measures of Surgical Site Infection for the National Healthcare Safety Network" (Inf Control and Hosp Epi, October 2011, Vol 32, No 10, pp. 970-986).

Facilities with fewer than 20 reported procedures during both reporting periods are not included in table: Family Health West Hospital, Kit Carson Memorial, Kremmling Memorial, Lincoln Community Hospital, Melissa Memorial, Sedgwick County Memorial Hospital, Southeast Colorado Hospital, Spanish Peaks Regional Health Center, St Vincent General Hospital District, The Memorial Hospital, Yuma District Hospital.

Facilities performing fewer than 20 procedures during only one reporting period have their infection data suppressed to protect confidential health information. These facilities have met reporting requirements.

*** Indicates value not shown due to suppression of infections data, or no National or historical rate, or an expected count of zero, to which to compare facility rate.

Source: National Healthcare Safety Network. Prepared By: Colorado Health & Safety Information Services Program, Colorado Department of Public Health and Environment.

TABLE 11: HERNIA REPAIR PROCEDURES, INPATIENT AND OUTPATIENT PROCEDURES FOR AMBULATORY SURGERY CENTERS, AUGUST 2010 – JULY 2012

Surgical Site Infections (SSI) in Hernia Procedures in ASC (In- and Outpatient Combined). Reporting Period: August 2010 – July 2012									
Health Facility and Region		2010-2011				2011-2012			
		Procedure Count	Infection Count	Standardized Infection Ratio (SIR)	National Comparison	Procedure Count	Infection Count	Standardized Infection Ratio (SIR)	National Comparison
ASC Durango at Mercy Medical Center	Durango	56	0	0	Same	63	0	0	Same
Arkansas Valley Surgery Center	Canon City	84	0	0	Same	40	0	0	Same
Audubon Ambulatory Surgery Center at St. Francis	Colorado Springs	522	3	1.3	Same	264	3	2.6	Same
Aurora Surgery Center	Aurora	26	0	0	Same	***	***	***	***
Black Canyon Surgical Center	Montrose	36	0	0	Same	19	***	***	***
Boulder Medical Center	Boulder	68	0	0	Same	32	0	0	Same
Children's North Surgery Center	Broomfield	24	0	0	Same	17	***	***	***
Clear Creek Surgery Center	Wheat Ridge	383	1	0.7	Same	160	0	0	Same
Crown Point Surgery Center	Parker	310	1	0.8	Same	116	0	0	Same
Denver Midtown Surgery Center	Denver	225	0	0	Same	129	0	0	Same
First Choice Outpatient Surgery Center at Community Hospital	Grand Junction	121	1	1.7	Same	37	0	0	Same
Grand Valley Surgical Center	Grand Junction	221	1	1.1	Same	97	0	0	Same
Harmony Ambulatory Surgery Center	Ft Collins	490	1	0.5	Same	242	0	0	Same
Kaiser Permanente Ambulatory Surgery Center	Denver	770	5	1.3	Same	300	0	0	Same
Lincoln Surgery Center	Parker	73	0	0	Same	25	0	0	Same
Longmont Surgery Center	Longmont	165	0	0	Same	62	0	0	Same
North Suburban Surgery Center	Thornton	108	0	0	Same	73	0	0	Same
Peak One Surgery Center	Frisco	41	0	0	Same	39	1	9.6	Same
Red Rocks Surgery Center	Golden	***	***	***	***	30	0	0	Same
Rocky Mountain Surgery Center	Englewood	362	1	1	Same	153	0	0	Same
Rose Surgical Center	Denver	459	0	0	Same	195	0	0	Same
Sky Ridge Surgical Center	Lone Tree	239	0	0	Same	100	0	0	Same
Skyline Surgery Center	Loveland	142	0	0	Same	68	0	0	Same
Summit View Surgery Center	Littleton	286	0	0	Same	135	0	0	Same
Surgery Center At Lutheran	Wheat Ridge	130	0	0	Same	26	0	0	Same
Surgery Center At Printers Park	Colorado Springs	28	0	0	Same	4	***	***	***
Surgical Center At Premier	Colorado Springs	62	0	0	Same	***	***	***	***
Surgical Center at Premier	Colorado Springs	***	***	***	***	24	0	0	Same

The standardized infection ratio (SIR) is the ratio of observed to expected infections, and is adjusted for procedure risk factors
National comparison is based on the indirect adjustment of modeled risk factors for each procedure type.
See "Improving Risk-Adjusted Measures of Surgical Site Infection for the National Healthcare Safety Network" (Inf Control and Hosp Epi, October 2011, Vol 32, No 10, pp. 970-986).
Facilities with fewer than 20 reported procedures during both reporting periods are not included in table: Aberdeen Ambulatory Surgical Center, Audubon Ambulatory Surgery Center, Centrum Surgical Center, Colorado Springs Surgery Center, MCR Surgery Center, Midvalley Ambulatory Surgery Center LLC, Minimally Invasive Spinal Institute, Parkwest Surgery Center, Pueblo Surgery Center , Renewal Surgery Center , Southwest Colorado Surgical Center , Surgery Center Of Ft Collins .
Facilities performing fewer than 20 procedures during only one reporting period have their infection data suppressed to protect confidential health information. These facilities have met reporting requirements.
*** Indicates value not shown due to suppression of infections data, or no National or historical rate, or an expected count of zero, to which to compare facility rate.
Source: National Healthcare Safety Network. Prepared By: Colorado Health & Safety Information Services Program, Colorado Department of Public Health and Environment.

TABLE 12: ABDOMINAL HYSTERECTOMIES, INPATIENT AND OUTPATIENT PROCEDURES FOR HOSPITALS, AUGUST 2010 – JULY 2012

Surgical Site Infections (SSI) in Abdominal Hysterectomy Procedures in Hospitals (In- and Outpatient Combined). Reporting Period: August 2010 – July 2012									
Health Facility and Region		2010-2011				2011-2012			
		Procedure Count	Infection Count	Standardized Infection Ratio (SIR)	National Comparison	Procedure Count	Infection Count	Standardized Infection Ratio (SIR)	National Comparison
Animas Surgical Hospital	Durango	20	0	0	Same	17	***	***	***
Boulder Community Hospital-Foothills	Boulder	32	1	1.7	Same	36	0	0	Same
Centura Avista Adventist Hospital	Louisville	45	1	1.2	Same	67	0	0	Same
Centura Littleton Adventist Hospital	Littleton	76	0	0	Same	77	0	0	Same
Centura Penrose St Francis Health	Colorado Springs	153	5	1.5	Same	189	8	2	Same
Centura Porter Adventist Hospital	Denver	123	1	0.6	Same	165	0	0	Same
Centura St Anthony Central Hospital	Denver	58	1	1	Same	18	***	***	***
Centura St Anthony North Hospital	Westminster	22	0	0	Same	13	***	***	***
Centura St Francis Medical Center	Colorado Springs	202	3	0.8	Same	224	2	0.5	Same
Centura St Mary Corwin Medical Center	Pueblo	44	0	0	Same	93	0	0	Same
Centura St Thomas More Hospital	Canon City	25	0	0	Same	15	***	***	***
Colorado Plains Medical Center	Fort Morgan	25	0	0	Same	40	0	0	Same
Delta County Memorial Hospital	Delta	22	0	0	Same	14	***	***	***
Denver Health Medical Center	Denver	52	0	0	Same	59	2	1.9	Same
Exempla Good Samaritan Medical Center	Lafayette	139	1	0.4	Same	174	2	0.8	Same
Exempla Lutheran Medical Center	Wheat Ridge	287	4	1	Same	302	7	1.6	Same
Exempla St Joseph Hospital	Denver	234	5	1.1	Same	276	5	0.9	Same
Longmont United Hospital	Longmont	59	1	1.1	Same	29	0	0	Same
McKee Medical Center	Loveland	47	1	1.4	Same	162	0	0	Same
Medical Center of Aurora	Aurora	82	1	0.7	Same	109	0	0	Same
Medical Center of the Rockies	Loveland	73	1	0.9	Same	61	0	0	Same
Memorial Hospital Central	Colorado Springs	220	10	3.2	Worse	162	3	1.2	Same
Memorial Hospital North	Colorado Springs	216	1	0.4	Same	138	4	2.2	Same
Mercy Regional Medical Center	Durango	104	1	0.9	Same	103	0	0	Same

Surgical Site Infections (SSI) in Abdominal Hysterectomy Procedures in Hospitals (In- and Outpatient Combined). Reporting Period: August 2010 – July 2012									
Health Facility and Region		2010-2011				2011-2012			
		Procedure Count	Infection Count	Standardized Infection Ratio (SIR)	National Comparison	Procedure Count	Infection Count	Standardized Infection Ratio (SIR)	National Comparison
Montrose Memorial Hospital	**Montrose**	69	0	0	Same	119	0	0	Same
North Colorado Medical Center	**Greeley**	120	1	0.5	Same	167	2	0.9	Same
North Suburban Medical Center	**Thornton**	121	1	0.5	Same	154	2	0.8	Same
Parker Adventist Hospital	**Parker**	92	3	1.8	Same	121	1	0.5	Same
Parkview Medical Center	**Pueblo**	116	3	1.8	Same	120	1	0.7	Same
Platte Valley Medical Center	**Brighton**	26	2	5.2	Same	22	1	3.2	Same
Poudre Valley Hospital	**Ft Collins**	267	3	0.8	Same	252	2	0.5	Same
Presbyterian St Lukes Medical Center	**Denver**	50	0	0	Same	59	1	0.8	Same
Prowers Medical Center	**Lamar**	20	0	0	Same	31	0	0	Same
Rose Medical Center	**Denver**	409	1	0.1	Better	392	4	0.6	Same
Sky Ridge Medical Center	**Lone Tree**	193	2	0.6	Same	216	5	1.2	Same
St Anthony Summit Medical Center	**Frisco**	36	0	0	Same	24	0	0	Same
St Marys Hospital	**Grand Junction**	174	1	0.3	Same	265	1	0.2	Same
Swedish Medical Center	**Englewood**	460	6	0.8	Same	448	4	0.5	Same
University of Colorado Hospital	**Aurora**	152	3	0.6	Same	197	0	0	Better
Valley View Hospital	**Glenwood Springs**	30	1	2	Same	14	***	***	***

The standardized infection ratio (SIR) is the ratio of observed to expected infections, and is adjusted for procedure risk factors

National comparison is based on the indirect adjustment of modeled risk factors for each procedure type.

See "Improving Risk-Adjusted Measures of Surgical Site Infection for the National Healthcare Safety Network" (Inf Control and Hosp Epi, October 2011, Vol 32, No 10, pp. 970-986).

Facilities with fewer than 20 reported procedures during both reporting periods are not included in table: Arkansas Valley Regional Medical Center, Aspen Valley Hospital, Boulder Community Hospital,

Community Hospital, Estes Park Medical Center, Grand River Medical Center, Gunnison Valley Hospital, Heart of the Rockies Regional Medical Center, Mt San Rafael Hospital, Pikes Peak Regional Hospital, San Luis Valley Regional Medical Center, Southwest Memorial Hospital, Sterling Regional Medical Center, The Memorial Hospital, Vail Valley Medical Center, Yampa Valley Medical Center

Facilities performing fewer than 20 procedures during only one reporting period have their infection data suppressed to protect confidential health information. These facilities have met reporting requirements.

*** Indicates value not shown due to suppression of infections data, or no National or historical rate, or an expected count of zero, to which to compare facility rate.

Source: National Healthcare Safety Network. Prepared By: Colorado Health & Safety Information Services Program, Colorado Department of Public Health and Environment.

TABLE 13: VAGINAL HYSTERECTOMIES, INPATIENT AND OUTPATIENT PROCEDURES FOR HOSPITALS, AUGUST 2010 – JULY 2012

Surgical Site Infections (SSI) in Vaginal Hysterectomies Procedures in Hospitals (In- and Outpatient Combined). Reporting Period: August 2010 – July 2012									
Health Facility and Region		2010-2011				2011-2012			
		Procedure Count	Infection Count	Standardized Infection Ratio (SIR)	National Comparison	Procedure Count	Infection Count	Standardized Infection Ratio (SIR)	National Comparison
Animas Surgical Hospital	Durango	49	0	0	Same	25	0	0	Same
Boulder Community Hospital	Boulder	63	1	2.8	Same	35	1	4.7	Same
Centura Avista Adventist Hospital	Louisville	43	3	10.8	Worse	34	1	4.7	Same
Centura Littleton Adventist Hospital	Littleton	181	2	2	Same	150	0	0	Same
Centura Penrose St Francis Health	Colorado Springs	58	1	3.7	Same	78	2	5.2	Same
Centura Porter Adventist Hospital	Denver	131	0	0	Same	121	2	3	Same
Centura St Anthony North Hospital	Westminster	79	0	0	Same	62	0	0	Same
Centura St Francis Medical Center	Colorado Springs	183	5	5.5	Worse	303	3	1.8	Same
Centura St Mary Corwin Medical Center	Pueblo	57	0	0	Same	62	0	0	Same
Centura St Thomas More Hospital	Canon City	22	1	7.5	Same	13	***	***	***
Colorado Plains Medical Center	Fort Morgan	13	***	***	***	22	0	0	Same
Community Hospital	Grand Junction	82	2	5.4	Same	80	1	2.5	Same
Delta County Memorial Hospital	Delta	29	1	6.7	Same	22	0	0	Same
Denver Health Medical Center	Denver	60	0	0	Same	59	3	3.9	Same
Exempla Good Samaritan Medical Center	Lafayette	131	1	1.6	Same	138	2	2.7	Same
Exempla Lutheran Medical Center	Wheat Ridge	173	0	0	Same	188	3	2.9	Same
Exempla St Joseph Hospital	Denver	327	0	0	Better	311	1	0.2	Same
Longmont United Hospital	Longmont	87	1	2.2	Same	82	1	2.1	Same
McKee Medical Center	Loveland	238	3	2	Same	119	1	1.4	Same
Medical Center of Aurora	Aurora	116	1	1.5	Same	88	0	0	Same
Memorial Hospital Central	Colorado Springs	340	6	3.3	Worse	205	1	0.9	Same
Memorial Hospital North	Colorado Springs	209	5	4.1	Worse	195	2	2	Same
Mercy Regional Medical Center	Durango	22	0	0	Same	27	0	0	Same
Montrose Memorial Hospital	Montrose	44	1	4.1	Same	33	0	0	Same
North Colorado Medical Center	Greeley	178	0	0	Same	154	1	1.2	Same

Surgical Site Infections (SSI) in Vaginal Hysterectomies Procedures in Hospitals (In- and Outpatient Combined). Reporting Period: August 2010 – July 2012									
Health Facility and Region		2010-2011				2011-2012			
		Procedure Count	Infection Count	Standardized Infection Ratio (SIR)	National Comparison	Procedure Count	Infection Count	Standardized Infection Ratio (SIR)	National Comparison
North Suburban Medical Center	**Thornton**	46	0	0	Same	69	0	0	Same
Parker Adventist Hospital	**Parker**	59	0	0	Same	67	3	7.6	Worse
Parkview Medical Center	**Pueblo**	202	1	0.4	Same	200	0	0	Same
Platte Valley Medical Center	**Brighton**	18	***	***	***	31	0	0	Same
Poudre Valley Hospital	**Ft Collins**	139	1	0.6	Same	141	5	2.7	Same
Presbyterian St Lukes Medical Center	**Denver**	26	0	0	Same	37	1	2.1	Same
Rose Medical Center	**Denver**	183	0	0	Same	173	1	0.4	Same
San Luis Valley Regional Medical Center	**Alamosa**	31	0	0	Same	34	0	0	Same
Sky Ridge Medical Center	**Lone Tree**	292	2	1.2	Same	320	4	2.1	Same
St Marys Hospital	**Grand Junction**	215	4	1.4	Same	130	0	0	Same
Swedish Medical Center	**Englewood**	224	0	0	Same	210	0	0	Same
University of Colorado Hospital	**Aurora**	130	3	1.5	Same	140	2	0.9	Same
Vail Valley Medical Center	**Vail**	31	0	0	Same	17	***	***	***
Valley View Hospital	**Glenwood Springs**	38	2	8.6	Worse	56	1	2.9	Same
Yampa Valley Medical Center	**Steamboat Springs**	32	0	0	Same	31	0	0	Same

The standardized infection ratio (SIR) is the ratio of observed to expected infections, and is adjusted for procedure risk factors

National comparison is based on the indirect adjustment of modeled risk factors for each procedure type.

See "Improving Risk-Adjusted Measures of Surgical Site Infection for the National Healthcare Safety Network" (Inf Control and Hosp Epi, October 2011, Vol 32, No 10, pp. 970-986).

Facilities with fewer than 20 reported procedures during both reporting periods are not included in table: Aspen Valley Hospital, Centura St. Anthony Central, Estes Park Medical Center, Grand River Medical Center, Heart of the Rockies Regional Medical Center, Medical Center of the Rockies, Mt San Rafael Hospital, Pikes Peak Regional Hospital, Prowers Medical Center, Southwest Memorial Hospital, Sterling Regional Medical Center, The Memorial Hospital, Wray Community Hospital.

Facilities performing fewer than 20 procedures during only one reporting period have their infection data suppressed to protect confidential health information. These facilities have met reporting requirements.

*** Indicates value not shown due to suppression of infections data, or no National or historical rate, or an expected count of zero, to which to compare facility rate.

Source: National Healthcare Safety Network. Prepared By: Colorado Health & Safety Information Services Program, Colorado Department of Public Health and Environment.

TABLE 14: COLON PROCEDURES, INPATIENT AND OUTPATIENT PROCEDURES FOR HOSPITALS, JANUARY 2012 – JULY 2012

Surgical Site Infections (SSI) in Colon Procedures in Hospitals (In- and Outpatient Combined). Reporting Period: January 2012 – July 2012					
Health Facility and Region		January 1, 2012 – July 31, 2012			
		Procedure Count	Infection Count	Standardized Infection Ratio (SIR)	National Comparison
Boulder Community Hospital	Boulder	39	1	0.5	Same
Centura Littleton Adventist Hospital	Littleton	60	0	0	Same
Centura Penrose St Francis Health	Colorado Springs	145	5	0.6	Same
Centura Porter Adventist Hospital	Denver	58	4	1.1	Same
Centura St Anthony Central Hospital	Denver	62	2	0.5	Same
Centura St Anthony North Hospital	Westminster	39	3	1.3	Same
Centura St Francis Medical Center	Colorado Springs	40	1	0.5	Same
Centura St Mary Corwin Medical Center	Pueblo	41	0	0	Same
Centura St Thomas More Hospital	Canon City	25	0	0	Same
Community Hospital	Grand Junction	21	0	0	Same
Delta County Memorial Hospital	Delta	23	0	0	Same
Denver Health Medical Center	Denver	58	6	2.1	Same
Exempla Good Samaritan Medical Center	Lafayette	120	6	0.9	Same
Exempla Lutheran Medical Center	Wheat Ridge	110	4	0.6	Same
Exempla St Joseph Hospital	Denver	171	3	0.3	Better
Longmont United Hospital	Longmont	69	6	1.7	Same
McKee Medical Center	Loveland	28	3	2.1	Same
Medical Center of Aurora	Aurora	60	2	0.6	Same
Medical Center of the Rockies	Loveland	66	3	0.8	Same
Memorial Hospital Central	Colorado Springs	65	2	0.5	Same
Memorial Hospital North	Colorado Springs	35	3	1.8	Same
Mercy Regional Medical Center	Durango	24	0	0	Same
Montrose Memorial Hospital	Montrose	21	0	0	Same
North Colorado Medical Center	Greeley	105	5	0.8	Same
North Suburban Medical Center	Thornton	33	1	0.5	Same
Parker Adventist Hospital	Parker	73	1	0.2	Same
Parkview Medical Center	Pueblo	89	3	0.7	Same
Poudre Valley Hospital	Ft Collins	106	5	0.9	Same
Presbyterian St Lukes Medical Center	Denver	69	1	0.3	Same
Rose Medical Center	Denver	93	4	0.9	Same
Sky Ridge Medical Center	Lone Tree	81	4	0.9	Same
St Marys Hospital	Grand Junction	69	2	0.6	Same
Swedish Medical Center	Englewood	172	12	1.5	Same
The Childrens Hospital	Aurora	25	0	0	Same

Surgical Site Infections (SSI) in Colon Procedures in Hospitals (In- and Outpatient Combined). Reporting Period: January 2012 – July 2012					
Health Facility and Region		January 1, 2012 – July 31, 2012			
		Procedure Count	Infection Count	Standardized Infection	National Comparison
University of Colorado Hospital	Aurora	112	1	0.1	Better

The standardized infection ratio (SIR) is the ratio of observed to expected infections, and is adjusted for procedure risk factors
National comparison is based on the indirect adjustment of modeled risk factors for each procedure type.
See "Improving Risk-Adjusted Measures of Surgical Site Infection for the National Healthcare Safety Network" (Inf Control and Hosp Epi, October 2011, Vol 32, No 10, pp. 970-986).
Facilities performing fewer than 20 procedures during the reporting period are not included in this table: Arkansas Valley Regional Medical Center, Aspen Valley Hospital, Centura Avista Adventist Hospital, Colorado Plains Medical Center, East Morgan County Hospital, Estes Park Medical Center, Grand River Medical Center, Gunnison Valley Hospital, Heart of the Rockies Regional Medical Center, Mt San Rafael Hospital, Pikes Peak Regional Hospital, Platte Valley Medical Center, Prowers Medical Center, San Luis Valley Regional Medical Center, Southwest Memorial Hospital, St Anthony Summit Medical Center, Sterling Regional Medical Center, Vail Valley Medical Center, Valley View Hospital, Wray Community Hospital, Yampa Valley Medical Center.
Source: National Healthcare Safety Network.
Prepared By: Colorado Health & Safety Information Services Program, Colorado Department of Public Health and Environment.

BREAST PROCEDURES

BACKGROUND

Reportable breast procedures involve those procedures with at least one incision to the skin in either male or female patients in either inpatient or outpatient surgery locations. There are 36 breast procedures that qualify in this category and include open biopsies of the breast, local excisions of breast lesions, insertion and removal of breast implants and radical mastectomies, to name a few.

RESULTS

Tables 15 and 16 show facility specific data for SSI attributed to breast procedures as described above. The tables present data from surgeries performed from August 1, 2011 through July 31, 2012.

Each table lists all Colorado health care that performed breast procedures, their cities, procedure and infection counts, standardized infection ratios (SIR) based on national infection data, and comparisons to national infection data. For a more detailed explanation of how the SIR is calculated, see Appendix B. The three categories summarizing how a Colorado health care facility compares to the national infection data for the procedure performed are:

1. Statistically fewer (**better**) infections than expected based on national infection data;
2. Statistically similar (**same)** infections as expected based on the national infection data; or
3. Statistically more (**worse**) infections than expected based on national infection data.

The specific patient risk factors used to calculate the expected number of infections for **breast procedures** include:

- Length of the procedure
- American Society of Anesthesiologists (ASA) Score (given by the anesthesiologist, as an indicator of patient health and risk for surgical complications)
- Hospital bed size

TABLE 15: BREAST PROCEDURES, INPATIENT AND OUTPATIENT PROCEDURES FOR HOSPITALS, AUGUST 2011 – JULY 2012

Surgical Site Infections (SSI) in Breast Procedures in Hospitals (In- and Outpatient Combined). Reporting Period: August 2011 – July 2012					
Health Facility and Region		2011-2012			
		Procedure Count	Infection Count	Standardized Infection Ratio (SIR)	National Comparison
Animas Surgical Hospital	Durango	110	0	0	Same
Aspen Valley Hospital	Aspen	25	0	0	Same
Boulder Community Hospital	Boulder	170	1	0.7	Same
Boulder Community Hospital-Foothills	Boulder	350	3	1	Same
Centura Avista Adventist Hospital	Louisville	160	1	0.7	Same
Centura Littleton Adventist Hospital	Littleton	282	5	3.8	Worse
Centura Penrose St Francis Health	Colorado Springs	101	0	0	Same
Centura Porter Adventist Hospital	Denver	560	2	0.9	Same
Centura St Anthony Central Hospital	Denver	167	5	5.5	Worse
Centura St Anthony North Hospital	Westminster	49	2	2.8	Same
Centura St Francis Medical Center	Colorado Springs	134	0	0	Same
Centura St Mary Corwin Medical Center	Pueblo	128	1	1.8	Same
Centura St Thomas More Hospital	Canon City	36	0	0	Same
Community Hospital	Grand Junction	80	1	1.2	Same
Delta County Memorial Hospital	Delta	47	2	4	Same
Denver Health Medical Center	Denver	142	2	2.3	Same
Exempla Good Samaritan Medical Center	Lafayette	467	6	2.8	Worse
Exempla Lutheran Medical Center	Wheat Ridge	464	4	1.7	Same
Exempla St Joseph Hospital	Denver	592	4	1.1	Same
Longmont United Hospital	Longmont	54	0	0	Same
McKee Medical Center	Loveland	159	0	0	Same
Medical Center of Aurora	Aurora	322	1	0.8	Same
Medical Center of the Rockies	Loveland	244	1	0.3	Same
Memorial Hospital Central	Colorado Springs	43	0	0	Same
Memorial Hospital North	Colorado Springs	190	4	1.7	Same
Mercy Regional Medical Center	Durango	96	1	1	Same
Montrose Memorial Hospital	Montrose	53	0	0	Same
North Colorado Medical Center	Greeley	154	0	0	Same
North Suburban Medical Center	Thornton	37	0	0	Same
Parker Adventist Hospital	Parker	76	0	0	Same
Parkview Medical Center	Pueblo	222	1	1.2	Same
Platte Valley Medical Center	Brighton	96	1	1.2	Same

Surgical Site Infections (SSI) in Breast Procedures in Hospitals (In- and Outpatient Combined). Reporting Period: August 2011 – July 2012					
Health Facility and Region		2011-2012			
		Procedure Count	Infection Count	Standardized Infection Ratio (SIR)	National Comparison
Poudre Valley Hospital	**Ft Collins**	137	2	2	Same
Presbyterian St Lukes Medical Center	**Denver**	434	0	0	Same
Rose Medical Center	**Denver**	1,519	7	0.4	Better
San Luis Valley Regional Medical Center	**Alamosa**	36	0	0	Same
Sky Ridge Medical Center	**Lone Tree**	313	4	0.5	Same
Southwest Memorial Hospital	**Cortez**	25	1	5.2	Same
St Marys Hospital	**Grand Junction**	177	1	1	Same
Swedish Medical Center	**Englewood**	49	1	1.1	Same
University of Colorado Hospital	**Aurora**	298	7	2.7	Worse
Vail Valley Medical Center	**Vail**	141	0	0	Same
Valley View Hospital	**Glenwood Springs**	140	0	0	Same

The standardized infection ratio (SIR) is the ratio of observed to expected infections, and is adjusted for procedure risk factors
National comparison is based on the indirect adjustment of modeled risk factors for each procedure type.
See "Improving Risk-Adjusted Measures of Surgical Site Infection for the National Healthcare Safety Network" (Inf Control and Hosp Epi, October 2011, Vol 32, No 10, pp. 970-986).
Facilities with fewer than 20 reported procedures during a reporting period not included in table: Arkansas Valley Regional Medical Center, Avista Surgery Center, Centrum Surgical Center, Colorado Plains Medical Center, East Morgan County Hospital, Family Health West Hospital, Grand River Medical Center, Grand Valley Surgical Center, Gunnison Valley Hospital, Harmony Ambulatory Surgery Center, Heart of the Rockies Regional Medical Center, Kaiser Permanente Ambulatory Surgery Center, Mt San Rafael Hospital, Prowers Medical Center, Spanish Peaks Regional Health Center, St Anthony Summit Medical Center, Sterling Regional Medical Center, Summit View Surgery Center, Surgery Center at Printers Park, The Childrens Hospital, The Memorial Hospital, Wray Community Hospital, Yampa Valley Medical Center, Yuma District Hospital
Source: National Healthcare Safety Network
Prepared By: Colorado Health & Safety Information Services Program, Colorado Department of Public Health and Environment.

TABLE 16: BREAST PROCEDURES, OUTPATIENT PROCEDURES FOR ASC, 2011 – 2012

Surgical Site Infections (SSI) in Breast Procedures in ASCs (Outpatient). Reporting Period: August 2011 – July 2012					
Health Facility and Region		2011-2012			
		Procedure Count	Infection Count	Standardized Infection Ratio (SIR)	National Comparison
ASC Durango at Mercy Medical Center	Durango	50	0	0	Same
Aberdeen Ambulatory Surgical Center	Pueblo	343	0	0	Same
Audubon Ambulatory Surgery Center	Colorado Springs	247	0	0	Same
Avista Surgery Center	Boulder	432	1	0.5	Same
Boulder Medical Center	Boulder	30	0	0	Same
Centrum Surgical Center	Greenwood Village	515	1	0.4	Same
Clear Creek Surgery Center	Wheat Ridge	22	0	0	Same
Colorado Springs Surgery Center	Colorado Springs	132	0	0	Same
Crown Point Surgery Center	Parker	58	0	0	Same
Denver Midtown Surgery Center	Denver	69	0	0	Same
First Choice Outpatient Surgery Center at Community Hospital	Grand Junction	168	0	0	Same
Grand Valley Surgical Center	Grand Junction	253	2	1.6	Same
Harmony Ambulatory Surgery Center	Ft Collins	349	1	0.5	Same
Kaiser Permanente Ambulatory Surgery Center	Denver	258	3	2	Same
Longmont Surgery Center	Longmont	114	0	0	Same
North Suburban Surgery Center	Thornton	52	0	0	Same
Red Rocks Surgery Center	Golden	112	0	0	Same
Renewal Surgery Center	Lone Tree	200	0	0	Same
Rose Surgical Center	Denver	205	0	0	Same
Skyline Surgery Center	Loveland	26	0	0	Same
Summit View Surgery Center	Littleton	48	1	5.2	Same
Surgery Center At Lutheran	Wheat Ridge	91	0	0	Same
Surgery Center At Printers Park	Colorado Springs	498	9	3.4	Worse
Surgery Center Of Ft Collins	Ft Collins	111	0	0	Same
Surgical Center At Premier	Colorado Springs	586	0	0	Same

The standardized infection ratio (SIR) is the ratio of observed to expected infections, and is adjusted for procedure risk factors
National comparison is based on the indirect adjustment of modeled risk factors for each procedure type.
See "National Healthcare Safety Network (NHSN) Report, Data Summary for 2006-2008, Issued December 2009" (Am J Infect Control 2009;37:783-805).
Facilities with fewer than 20 reported procedures during a reporting period not included in table: Arkansas Valley Surgery Center, Audubon Ambulatory Surgery Center at St. Francis, Black Canyon Surgical Center, Parkwest Surgery Center, Peak One Surgery Center, Pueblo Surgery Center, Rocky Mountain Surgery Center, Sky Ridge Surgical Center, Southwest Colorado Surgical Center.
Source: National Healthcare Safety Network
Prepared By: Colorado Health & Safety Information Services Program, Colorado Department of Public Health and Environment.

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, 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 specified by NHSN. Two examples of a great vessel are the aorta and superior vena cava. A central line can be used to infuse fluids, withdraw blood or monitor fluid volume in patients. 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. For pictures of central lines, refer to Appendix D.

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 who have suffered burns.

Evidence-based practices such as adherence to sterile technique during insertion of central lines and optimal line care and maintenance are critical to preventing CLABSI. Toolkits and checklists have contributed greatly to the prevention of these infections. A typical central line checklist includes the following:

- Proper hand hygiene before placement of a central line
- Maximal barrier precautions for provider and assistants (i.e., large drape, caps, sterile gowns, sterile gloves, masks)
- Chlorhexidine skin antisepsis (cleaning) per manufacturer's recommendations
- Optimal catheter site selection with the subclavian vein as the preferred site and avoidance of the femoral site (in adults)
- Daily review of line necessity and prompt removal of unnecessary lines

Colorado requires that all adult critical care units, neonatal critical care units Level II/III and III, and long term acute care hospitals (LTACH) report CLABSI data into NHSN. Two additional locations were added to CLABSI surveillance and reporting as of January, 2012: rehabilitation hospitals and inpatient rehabilitation wards.

Adult Critical Care Units

These units report central line data by facility type, central line type and critical care unit type. Doing so allows for fairer comparisons between health facilities by accounting for differences in care and patients' risk for infection that impact infection rates.

Hospitals decide which type of CCU they have by measuring the type of patients that are cared for in that area. For instance, the medical CCU serves non-surgical patients, so if a facility finds that the majority of their critical care patients are non-surgical, that facility would have a medical CCU according to the NHSN definitions.

Long Term Acute Care Hospitals (LTACH)

Please see page 45 for a description of these locations.

Rehabilitation Hospitals and Inpatient Hospital Wards

Please see page 47 for a description of these locations.

Neonatal Intensive Care Units

Please see page 49 for a description of these locations.

RESULTS

Table 17 shows facility specific data for CLABSI attributed to the adult critical care unit types. The tables contain data from August 1, 2011 through July 31, 2012.

Each table lists all Colorado hospitals who report CLABSI data, the critical care unit(s) for which they report, their cities, their number of central line days, infection counts, infection rates, and comparisons to the national infection rate. The number of central line days is the total number of days a central line was used in the CCU during the reporting period. The CLABSI rate is the number of infections per 1,000 central line days. The three categories summarizing how a Colorado hospital compares to the national infection rate based on CCU type are:

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

See Appendix B for a description about using the Standardized Infection Ratio for the comparison to national infection rates.

TABLE 17: ADULT CRITICAL CARE UNIT CLABSI RATES, AUGUST 2011 – JULY 2012

Central Line Associated Blood Stream Infections (CLABSI) in Adult Critical Care Units. Reporting Period: August 2011 – July 2012						
Health Facility, City, and Unit Type			Central Line Days	CLABSI Count	CLABSI Rate	National Comparison
Arkansas Valley Regional Medical Center	La Junta	Medical/Surgical Critical Care	128	0	0	Same
Boulder Community Hospital	Boulder	Medical/Surgical Critical Care	1,756	0	0	Same
Boulder Community Hospital-Foothills	Boulder	Medical Critical Care	206	0	0	Same
Centura Avista Adventist Hospital	Louisville	Medical/Surgical Critical Care	481	1	2.1	Same
Centura Littleton Adventist Hospital	Littleton	Medical/Surgical Critical Care	2,699	2	0.7	Same
Centura Penrose St Francis Health	Colorado Springs	Medical/Surgical Critical Care	3,428	5	1.5	Same
Centura Porter Adventist Hospital	Denver	Medical/Surgical Critical Care	4,167	5	1.2	Same
Centura St Anthony Central Hospital	Denver	Medical Critical Care	2,281	4	1.8	Same
		Medical/Surgical Critical Care	1,442	0	0	Same
		Neurosurgical Critical Care	2,205	2	0.9	Same
		Surgical Cardiothoracic Critical Care	2,136	4	1.9	Same
		Trauma Critical Care	2,205	2	0.9	Same
Centura St Anthony North Hospital	Westminster	Medical Critical Care	2,445	2	0.8	Same
Centura St Francis Medical Center	Colorado Springs	Medical/Surgical Critical Care	337	0	0	Same
Centura St Mary Corwin Medical Center	Pueblo	Medical/Surgical Critical Care	2,154	3	1.4	Same
Centura St Thomas More Hospital	Canon City	Medical/Surgical Critical Care	129	0	0	Same
Colorado Plains Medical Center	Fort Morgan	Medical/Surgical Critical Care	60	0	0	Same
Community Hospital	Grand Junction	Medical Critical Care	358	0	0	Same
Delta County Memorial Hospital	Delta	Medical/Surgical Critical Care	436	0	0	Same
Denver Health Medical Center	Denver	Medical Critical Care	3,415	0	0	Better
		Trauma Critical Care	2,447	1	0.4	Same
Exempla Good Samaritan Medical Center	Lafayette	Medical/Surgical Critical Care	2,228	0	0	Same
Exempla Lutheran Medical Center	Wheat Ridge	Medical/Surgical Critical Care	4,864	6	1.2	Same
Exempla St Joseph Hospital	Denver	Medical/Surgical Critical Care	4,399	2	0.5	Same
Longmont United Hospital	Longmont	Medical/Surgical Critical Care	3,130	1	0.3	Same
McKee Medical Center	Loveland	Medical/Surgical Critical Care	710	0	0	Same
Medical Center of Aurora	Aurora	Medical/Surgical Critical Care	4,715	2	0.4	Same
Medical Center of the Rockies-North Wing	Loveland	Medical/Surgical Critical Care	1,960	0	0	Same
Medical Center of the Rockies-South Wing	Loveland	Medical/Surgical Critical Care	1,707	2	1.2	Same
Memorial Hospital Central	Colorado Springs	Medical/Surgical Critical Care	5,179	1	0.2	Same
Memorial Hospital North	Colorado Springs	Medical/Surgical Critical Care	285	0	0	Same
Mercy Regional Medical Center	Durango	Medical/Surgical Critical Care	1,135	2	1.8	Same
Montrose Memorial Hospital	Montrose	Medical/Surgical Critical Care	252	0	0	Same
North Colorado Medical Center	Greeley	Medical/Surgical Critical Care	1,889	3	1.6	Same
North Suburban Medical Center	Thornton	Medical/Surgical Critical Care	2,900	2	0.7	Same
Parker Adventist Hospital	Parker	Medical/Surgical Critical Care	1,688	1	0.6	Same

Central Line Associated Blood Stream Infections (CLABSI) in Adult Critical Care Units. Reporting Period: August 2011 – July 2012						
Health Facility, City, and Unit Type			Central Line Days	CLABSI Count	CLABSI Rate	National Comparison
Parkview Medical Center	Pueblo	Medical/Surgical Critical Care	1,470	12	8.2	Worse
		Neurosurgical Critical Care	1,157	3	2.6	Same
Platte Valley Medical Center	Brighton	Medical Critical Care	893	0	0	Same
Poudre Valley Hospital	Fort Collins	Medical/Surgical Critical Care	1,553	1	0.6	Same
Presbyterian St Lukes Medical Center	Denver	Medical/Surgical Critical Care	2,475	0	0	Same
Rose Medical Center	Denver	Medical/Surgical Critical Care	2,068	0	0	Same
San Luis Valley Regional Medical Center	Alamosa	Medical/Surgical Critical Care	249	0	0	Same
Sky Ridge Medical Center	Lone Tree	Medical/Surgical Critical Care	2,601	2	0.8	Same
Southwest Memorial Hospital	Cortez	Medical/Surgical Critical Care	180	0	0	Same
St Anthony Summit Medical Center	Frisco	Medical/Surgical Critical Care	79	0	0	Same
St Marys Hospital	Grand Junction	Surgical Cardiothoracic Critical Care	5,025	4	0.8	Same
Sterling Regional Medical Center	Sterling	Medical/Surgical Critical Care	191	0	0	Same
Swedish Medical Center	Englewood	Medical/Surgical Critical Care	4,565	10	4.4	Same
		Neurosurgical Critical Care	1,245	0	0	Same
		Trauma Critical Care	430	0	0	Same
University of Colorado Hospital	Aurora	Burn Critical Care	1,538	5	3.3	Same
		Medical Cardiac Critical Care	1,152	1	0.9	Same
		Medical Critical Care	3,703	7	1.9	Same
		Neurosurgical Critical Care	2,755	8	2.9	Same
		Prenatal Critical Care	77	0	0	***
		Surgical Critical Care	3,720	6	1.6	Same
Vail Valley Medical Center	Vail	Medical/Surgical Critical Care	213	0	0	Same
Valley View Hospital	Glenwood Springs	Medical/Surgical Critical Care	221	0	0	Same

Facility CLABSI rates are per 1,000 central line-days.

National comparison based on data collected and reported by NHSN-participating hospitals from January-December, 2010

See "National Healthcare Safety Network (NHSN) Report, Data Summary for 2010", Division of Healthcare Quality Promotion, Centers for Disease Control and Prevention

Facilities with fewer than 50 central line days during a reporting period not included in table: Aspen Valley Hospital, Gunnison Valley Hospital, Heart of the Rockies Regional Medical Center, Yampa Valley Medical Center.

Source: National Healthcare Safety Network (NHSN) Database. Prepared By: Colorado Health & Safety Information Services Program, Colorado Department of Public Health and Environment.

LONG-TERM ACUTE CARE HOSPITALS

BACKGROUND

A long-term acute care hospital (LTACH) is a specialty care hospital that cares for patients with complex medical conditions requiring intense, specialized treatment for a long period of time. The average length of stay for an LTACH patient is 25 days. These patients often transfer from critical care units in traditional hospitals. The higher severity of illness and multi-system complications typical of LTACH patients pose a challenge for infection control.

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

RESULTS

Table 18 shows facility specific data for CLABSI in LTACH. The table contains data from August 1, 2011 through July 31, 2012.

Each table lists all LTACH in Colorado, their cities, the number of central line days, infection counts, infection rates, and comparisons to national infection rates. The number of central line days is the total number of days central lines were used in the LTACH during the reporting period. The CLABSI rate is the number of infections per 1,000 central line days.

The three categories summarizing how a Colorado hospital compares to the national infection rate for that LTACH facility are:

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

TABLE 18: LONG-TERM ACUTE CARE HOSPITAL CLABSI RATES, AUGUST 2011 – JULY 2012

Central Line Associated Blood Stream Infections (CLABSI) in Long-Term Acute Care Hospitals. Reporting Period: August 2011 – July 2012					
Health Facility and City		**Central Line Days**	**CLABSI Count**	**CLABSI Rate**	**National Comparison**
Colorado Acute Long Term Hospital	**Denver**	6,656	5	0.8	Same
Craig Hospital	**Englewood**	3,748	3	0.8	Same
Kindred Hospital	**Denver**	6,015	10	1.7	Same
Northern Colorado Long Term Acute Hospital	**Johnstown**	4,018	7	1.7	Same
Select Long Term Care Hospital	**Colorado Springs**	4,991	1	0.2	Better
Select Speciality Hospital South Campus	**Denver**	3,550	0	0	Better
Select Specialty Hospital	**Denver**	4,744	0	0	Better
Triumph Acute Long Term Care Hospital of Aurora	**Aurora**	4,398	9	2	Same
Vibra Long Term Acute Care Hospital	**Thornton**	6,085	3	0.5	Same

Facility CLABSI rates are per 1,000 central line-days.
National comparison based on data collected and reported by NHSN-participating hospitals from January-December, 2010
See "National Healthcare Safety Network (NHSN) Report, Data Summary for 2010", Division of Healthcare Quality Promotion, Centers for Disease Control and Prevention
Source: National Healthcare Safety Network (NHSN) Database. Prepared By: Colorado Health & Safety Information Services Program, Colorado Department of Public Health and Environment

INPATIENT REHABILITATION HOSPITALS AND WARDS

BACKGROUND

Rehabilitation (rehab) hospitals and wards care for patients who have lost function due to acute or chronic pain, musculoskeletal problems, stroke, brain or spinal cord dysfunction, or catastrophic events resulting in complete or partial paralysis. The goal of these areas is to evaluate, treat and restore optimal functioning to patients in their physical and mental health.

Rehab 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. For pictures of central lines, refer to Appendix D.

RESULTS

Table 19 shows facility specific data for CLABSI in rehab hospitals and wards. The table contains data from January 1, 2012 through July 31, 2012.

Each table lists all Colorado rehab hospitals and wards, their cities, number of central line days, infection counts, infection rates, and comparisons to national infection rates. The number of central line days is the total number of days a central line was used in the rehab hospital or ward during the reporting period. The CLABSI rate is the number of infections per 1,000 central line days.

The three categories summarizing how a Colorado hospital compares to the national infection rate for rehab hospitals and wards are:

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

TABLE 19: INPATIENT REHABILITAION HOSPITAL AND WARD CLABSI RATES, JANUARY 2012 – JULY 2012.

Central Line Associated Blood Stream Infections (CLABSI) in Inpatient Rehabilitation Hospitals and Wards. Reporting Period: August 2011 – July 2012					
Health Facility and City		Central Line Days	CLABSI Count	CLABSI Rate	National Comparison
Boulder Community Hospital	Boulder	283	0	0	Same
Centura Penrose St Francis Health	Colorado Springs	284	0	0	Same
Centura Porter Adventist Hospital	Denver	490	1	2	Same
Centura St Anthony Central Hospital	Denver	252	0	0	Same
Centura St Mary Corwin Medical Center	Pueblo	142	0	0	Same
HealthSouth Rehabilitation Hospital of Colorado Springs	Colorado Springs	255	0	0	Same
Memorial Hospital Central	Colorado Springs	478	0	0	Same
Northern Colorado Rehabilitation Hospital	Johnstown	951	1	1.1	Same
Poudre Valley Hospital	Fort Collins	125	0	0	Same
Spalding Rehabilitation Hospital (Aurora)	Aurora	1,898	0	0	Same
Spalding at PSL	Denver	403	0	0	Same
St Marys Hospital	Grand Junction	371	0	0	Same
Swedish Medical Center	Englewood	284	0	0	Same
University of Colorado Hospital	Aurora	923	0	0	Same

Facility CLABSI rates are per 1,000 central line-days.

National comparison based on data collected and reported by NHSN-participating hospitals from January-December, 2010

See "National Healthcare Safety Network (NHSN) Report, Data Summary for 2010", Division of Healthcare Quality Promotion, Centers for Disease Control and Prevention

Source: National Healthcare Safety Network (NHSN) Database. Prepared By: Colorado Health & Safety Information Services Program, Colorado Department of Public Health and Environment

NEONATAL CRITICAL CARE UNITS

BACKGROUND

Level III NCCU provide care to the sickest newborn infants while Level I units care for healthy newborn infants. Level III NCCU provide personnel and equipment to ensure continuous life support and comprehensive care for extremely high-risk newborn infants and those with complex critical illness. A neonatologist, which is a pediatrician with additional training in treating newborns needing special care, must be on duty at all times. The designation between Level III and Level II/III is defined by the NHSN reporting guidelines. If a hospital does not separate infants in the unit that are receiving Level II care and those receiving Level III care, that hospital reports data as a Level II/III combined NCCU.

NCCU infants have central lines inserted for several reasons: 1) their stay in the critical care unit can be several days to months; 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 sugar solutions and medications for long periods of time; and 4) changing peripheral lines frequently can cause additional pain and stress for the infant and does not promote health. An umbilical catheter (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). Another type of central line used frequently in this age group is a peripherally inserted central catheter (PICC) placed in an arm.

****NHSN removed the reporting requirement that separated out umbilical catheters from other central line catheters in the NCCU population effective January 2012.**

SPECIAL CAUTIONS

There are some cautions consumers should be made aware when interpreting the data for NCCU patients. Some medical conditions in newborn infants predispose them to bloodstream infections whether they have a catheter in place or not. This means that the catheter may not be the reason the blood became infected. For example, bloodstream infections in newborns with major intestinal problems are common because bacteria in the intestine can access the bloodstream very easily. The clinical picture must be looked at in its entirety to determine whether the bloodstream infection was primary or secondary to another source site.

RESULTS

Table 20 shows the results of data collected in each NCCU. The reporting period is from August 1, 2011 through July 31, 2012. The rates are risk stratified by the following birth weight categories:

1. Less than or equal to 1.65 pounds (≤ 750 grams)
2. 1.66 to 2.2 pounds (751-1,000 grams)
3. 2.3 to 3.3 pounds (1,001-1,500 grams)
4. 3.4 to 5.5 pounds (1,501-2500 grams)
5. Greater than 5.5 pounds (>2,500 grams)

The weight is that of the infant at the time of birth and does not reflect changes during the hospital stay. For example, if a newborn infant weighs 1.66 pounds at birth but remains in the NCCU for two months and has a body weight of 3.3 pounds when an infection develops, the recorded birth weight still would be 1.66 pounds.

Each table lists the hospital name, NCCU level, the city of location, the number of catheter line days, number of infections, infection rate, and the comparison to the national infection rate. The number of catheter days is the total number of days a catheter was used in the NCCU during the reporting period. The infection rate is the number of infections per 1,000 catheter days. The three categories summarizing how a Colorado hospital compares to the national infection rate for that NCCU are:

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

National rates for NCCU BSI (number of infections/1000 catheter days)

Birth weight	Level II/III	Level III
≤ 750g	2.9	2.6
751-1,000g	2.3	2.2
1,001-1,500g	1.4	1.0
1,501-2,500g	1.0	1.0
≥ 2,501g	0.7	0.8

TABLE 20: NEONATAL CRITICAL CARE UNIT CLABSI RATES, AUGUST 2011 – JULY 2012

Central Line Associated Blood Stream Infections (CLABSI) in Neonatal Critical Care Units. Reporting Period: August 2011 – July 2012						
Health Facility and Region			Central Line Days	CLABSI	CLABSI Rate	National Comparison
Centura Avista Adventist Hospital	Louisville	Neonatal Critical Care II/III (Combined)	128	0	0	Same
Centura Littleton Adventist Hospital	Littleton	Neonatal Critical Care III	265	0	0	Same
Centura St Francis Medical Center	Colorado Springs	Neonatal Critical Care II/III (Combined)	1,487	1	0.7	Same
Denver Health Medical Center	Denver	Neonatal Critical Care II/III (Combined)	734	0	0	Same
Exempla Lutheran Medical Center	Wheat Ridge	Neonatal Critical Care II/III (Combined)	390	0	0	Same
Exempla St Joseph Hospital	Denver	Neonatal Critical Care II/III (Combined)	926	3	3.2	Same
Medical Center of Aurora	Aurora	Neonatal Critical Care II/III (Combined)	100	1	10	Same
Memorial Hospital Central	Colorado Springs	Neonatal Critical Care III	2,294	5	2.2	Same
Parker Adventist Hospital	Parker	Neonatal Critical Care II/III (Combined)	222	0	0	Same
Poudre Valley Hospital	Fort Collins	Neonatal Critical Care II/III (Combined)	1,032	1	1	Same
Presbyterian St Lukes Medical Center	Denver	Neonatal Critical Care II/III (Combined)	1,254	1	0.8	Same
		Neonatal Critical Care III	3,870	0	0	Better
Rose Medical Center	Denver	Neonatal Critical Care II/III (Combined)	375	0	0	Same
Sky Ridge Medical Center	Lone Tree	Neonatal Critical Care II/III (Combined)	113	0	0	Same
St Marys Hospital	Grand Junction	Neonatal Critical Care III	745	0	0	Same
Swedish Medical Center	Englewood	Neonatal Critical Care II/III (Combined)	235	0	0	Same
The Childrens Hospital	Aurora	Neonatal Critical Care III	4,153	6	1.4	Same
University of Colorado Hospital	Aurora	Neonatal Critical Care II/III (Combined)	1,584	1	0.6	Same

Facility CLABSI rates are per 1,000 central line-days.
National comparison based on data collected and reported by NHSN-participating hospitals from January-December, 2010
See "National Healthcare Safety Network (NHSN) Report, Data Summary for 2010", Division of Healthcare Quality Promotion, Centers for Disease Control and Prevention
Source: National Healthcare Safety Network (NHSN) Database.
Prepared By: Colorado Health & Safety Information Services Program, Colorado Department of Public Health and Environment

DIALYSIS RELATED-INFECTION OVERVIEW

BACKGROUND

This section focuses on dialysis-related infections (DRI) acquired in outpatient dialysis treatment centers (DTC), as required by Colorado's Disclosure Law. Colorado was the first state in the nation to implement mandatory reporting of DRI, and the first state to use NHSN to formally report DRI.

According to the National Institute of Diabetes and Digestive and Kidney Diseases 2010 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. [9] To receive dialysis treatment, a patient requires a vascular access to remove and replace blood. There are four basic types of vascular access and they differ in their risk for infection. Described below and listed in order from lowest to highest risk of infection, vascular access types include the following:

- fistulas use patients' own blood vessels to surgically create a connection between two vessels that normally do not connect;
- grafts use synthetic materials to surgically connect two blood vessels that normally do not connect;
- permanent (tunneled) central lines are tubes which are tunneled under the patient's skin before entering a vein;
- temporary (non-tunneled) central lines are tubes that insert directly into a vein without being tunneled under the skin.

See Appendix D for a visual depiction of a fistula and graft.

Surveillance for DRI 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 DRI began in March 2010, and currently, there are 65 dialysis centers reporting to NHSN.

Dialysis centers in Colorado monitor patients for any of the three specific events that must be reported: 1) an outpatient start of an antibiotic in a vein, 2) a positive blood culture, or 3) pus, redness or increased swelling at the vascular access site. More than one type of event may be recorded on a single patient's record. This report depicts counts and rates of vascular access infections for each DTC and includes two types of dialysis-related infections: local access infections (LAI) and access-related blood stream infections (ARB). An LAI is defined as the presence of pus, redness, or swelling of the vascular access site without the presence of an ARB. 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. Although an LAI is not as severe as an ARB, antibiotics are typically administered in either case.

RESULTS

Table 21 shows the number and rates of ARB and LAI for each DTC in Colorado. The reporting period is August 1, 2011 through July 31, 2012. Each table lists the facility name, city of location, number of dialysis patients, numbers and rates of ARB and LAI, and comparisons to the national ARB and LAI rates. The infection rate used is the number of infections per 100 patient months.

The three categories below summarize how a Colorado DTC's infection rates compare to national infection rates:

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

National dialysis-related infection rates by access type and infection type (number of infections/100 patient months)

Access type	Access-related bloodstream infection	Local access infection
Fistula	0.2	0.2
Graft	0.4	0.4
Permanent (tunneled) central line	3.1	1.7
Temporary (non-tunneled) central line	17.8	5.1

TABLE 21: DIALYSIS-RELATED INFECTIONS, AUGUST, 2011 – JULY, 2012

Dialysis Center and Region		Number of Patients	Access-Related Bacteremia (ARB)			Local Access Infection (LAI)		
			Infection Count	Rate	National Comparison	Infection Count	Rate	National Comparison
AR Kidney Center Of Arvada	**Arvada**	930	2	0.2	Same	23	2.5	Worse
AR Kidney Center Of Bear Creek Llc	**Lakewood**	240	1	0.4	Same	8	3.3	Worse
AR Kidney Center Of Lafayette	**Lafayette**	547	2	0.4	Same	0	0	Same
AR Kidney Center Of Lakewood	**Lakewood**	781	3	0.4	Same	10	1.3	Worse
AR Kidney Center Of Longmont	**Longmont**	1,001	12	1.2	Same	9	0.9	Same
AR Kidney Center Of Westminster	**Westminster**	1,358	6	0.4	Same	17	1.3	Worse
AR Kidney Center On Main	**Longmont**	74	0	0	Same	2	2.7	Same
AR Thornton Kidney Center	**Thornton**	202	1	0.5	Same	3	1.5	Same
Denver Reception & Diagnostic Center Dialysis	**Denver**	285	0	0	Same	0	0	Same
DCI Grand Junction	**Grand Junction**	175	1	0.6	Same	2	1.1	Same
DCI Montrose	**Montrose**	381	1	0.3	Same	1	0.3	Same
DV Alamosa Dialysis	**Alamosa**	541	0	0	Same	2	0.4	Same
DV Arvada Dialysis Center	**Arvada**	366	2	0.5	Same	1	0.3	Same
DV Aurora Dialysis Center	**Aurora**	1,478	21	1.4	Worse	5	0.3	Same
DV Belcaro Dialysis Center	**Denver**	698	5	0.7	Same	4	0.6	Same
DV Black Canyon Dialysis	**Montrose**	**191**	**2**	**1**	**Same**	**1**	**0.5**	**Same**
DV Boulder Dialysis Center	**Boulder**	**280**	**0**	**0**	**Same**	**1**	**0.4**	**Same**
DV Brighton Dialysis	**Brighton**	**562**	**0**	**0**	**Better**	**0**	**0**	**Same**
DV Commerce City Dialysis	**Commerce City**	**627**	**2**	**0.3**	**Same**	**4**	**0.6**	**Same**
DV Cortez Dialysis Center	**Cortez**	**737**	**1**	**0.1**	**Same**	**3**	**0.4**	**Same**
DV Denver Dialysis Center	**Denver**	825	3	0.4	Same	7	0.8	Same
DV Durango Dialysis Center	**Durango**	342	1	0.3	Same	6	1.8	Worse
DV East Aurora Dialysis	**Aurora**	1,280	12	0.9	Same	13	1	Worse
DV Englewood Dialysis Center	**Englewood**	590	4	0.7	Same	0	0	Same
DV Fountain Dialysis	**Fountain**	407	1	0.2	Same	3	0.7	Same
DV Grand Junction Dialysis Center	**Grand Junction**	715	2	0.3	Same	14	2	Worse
DV Lakewood Crossing Dialysis Center	**Lakewood**	1,225	11	0.9	Same	10	0.8	Worse
DV Lakewood Dialysis Center	**Lakewood**	1,051	5	0.5	Same	8	0.8	Same
DV Littleton Dialysis Center	**Littleton**	883	0	0	Better	3	0.3	Same
DV Lonetree Dialysis Center	**Englewood**	471	0	0	Same	3	0.6	Same
DV Longmont Dialysis Center	**Longmont**	314	1	0.3	Same	7	2.2	Worse
DV Lowry Dialysis Center	**Denver**	1,066	13	1.2	Worse	1	0.1	Same
DV Mesa County Dialysis	**Grand Junction**	225	3	1.3	Same	0	0	Same
DV North Colorado Springs Dialysis	**Colorado Springs**	140	2	1.4	Same	3	2.1	Same

Dialysis Center and Region		Number of Patients	Access-Related Bacteremia (ARB)			Local Access Infection (LAI)		
			Infection Count	Rate	National Comparison	Infection Count	Rate	National Comparison
DV North Metro Dialysis Center	**Westminster**	400	2	0.5	Same	4	1	Same
DV Northeastern Colorado Dialysis	**Sterling**	368	2	0.5	Same	0	0	Same
DV Parker Dialysis Center	**Parker**	325	2	0.6	Same	0	0	Same
DV Pikes Peak Dialysis Center	**Colorado Springs**	1,022	4	0.4	Same	6	0.6	Same
DV Printers Place Dialysis Center	**Colorado Springs**	196	0	0	Same	1	0.5	Same
DV South Denver Dialysis Center	**Denver**	746	2	0.3	Same	2	0.3	Same
DV Southwest Denver Dialysis	**Littleton**	84	1	1.2	Same	2	2.4	Same
DV Thornton Dialysis Center	**Thornton**	982	6	0.6	Same	5	0.5	Same
Davita Westminster Dialysis Center	**Westminster**	700	1	0.1	Same	2	0.3	Same
FMC Canon City Dialysis	**Canon City**	409	7	1.7	Same	1	0.2	Same
FMC Denver Central Dialysis	**Denver**	1,246	12	1	Same	34	2.7	Worse
FMC East Denver Dialysis	**Aurora**	1,241	2	0.2	Better	16	1.3	Worse
FMC Ft Collins Dialysis	**Fort Collins**	973	0	0	Better	21	2.2	Worse
FMC Greeley Dialysis	**Greeley**	1,365	0	0	Better	3	0.2	Same
FMC La Junta Dialysis	**La Junta**	427	1	0.2	Better	1	0.2	Same
FMC Lamar Dialysis	**Lamar**	**271**	**4**	**1.5**	**Same**	**6**	**2.2**	**Worse**
FMC Loveland Dialysis	**Loveland**	**719**	**8**	**1.1**	**Same**	**16**	**2.2**	**Worse**
FMC Pueblo Dialysis	**Pueblo**	**734**	**0**	**0**	**Better**	**0**	**0**	**Better**
FMC Pueblo South Dialysis	**Pueblo**	**923**	**5**	**0.5**	**Same**	**12**	**1.3**	**Worse**
FMC Pueblo West Dialysis	**Pueblo West**	**289**	**1**	**0.3**	**Same**	**1**	**0.3**	**Same**
FMC Rocky Mountain Dialysis	**Denver**	1,085	11	1	Same	26	2.4	Worse
FMC Stapleton Dialysis	**Denver**	527	3	0.6	Same	3	0.6	Same
FMC Walsenburg Dialysis	**Walsenburg**	147	3	2	Same	0	0	Same
Liberty Dialysis - Castle Rock Llc	**Castle Rock**	132	0	0	Same	0	0	Same
Liberty Dialysis - Colorado Springs Central	**Colorado Springs**	1,132	6	0.5	Same	2	0.2	Same
Liberty Dialysis - Colorado Springs North	**Colorado Springs**	**460**	**1**	**0.2**	**Same**	**1**	**0.2**	**Same**
Liberty Dialysis - Colorado Springs South	**Colorado Springs**	**570**	**3**	**0.5**	**Same**	**0**	**0**	**Same**
Liberty Dialysis - Pueblo Llc	**Pueblo**	**536**	**3**	**0.6**	**Same**	**4**	**0.7**	**Same**
Reliant Renal Care Colorado Springs	**Colorado Springs**	**170**	**1**	**0.6**	**Same**	**5**	**2.9**	**Worse**
Reliant Renal Care Trinidad	**Trinidad**	156	0	0	Same	0	0	Same
University Of Colorado Hospital Dialysis Services	**Denver**	389	4	1	Same	1	0.3	Same

Note: AR=American Renal; DCI=Dialysis Clinic Incorporated; DV=Davita; FMC=Fresenius Medical Care.
Facility dialysis-related infections (DRI) are per 100 patients. 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, 2006.
See "Dialysis Surveillance Report: National Healthcare Safety Network (NHSN) - Data Summary for 2006", Division of Healthcare Quality Promotion, Centers for Disease Control and Prevention.
Source: National Healthcare Safety Network (NHSN) Database. Prepared By: Colorado Health & Safety Information Services Program, Colorado Department of Public Health and Environment.

CONCLUSIONS

Colorado mandated reporting of HAI in 2006. To date, five annual reports have been submitted to the legislature and public demonstrating a commitment by CDPHE and infection prevention professionals in health care facilities to track, monitor, and report infection 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.

The U.S. Department of Health and Human Services (HHS) National Action Plan has stipulated a 50 percent reduction of CLABSI in intensive care units and inpatient wards by 2013 and a 25 percent reduction in admissions and readmissions for SSI by 2013.[3] The Health and Safety Information Services (HASIS) Program at CDPHE is committed to meeting these goals through various methods.

First, HAI data will continue to be monitored, tracked and published in semi-annual bulletins and in this ongoing annual report. Second, through American Recovery and Reinvestment Act (ARRA) and American Care Act (ACA) funding, Program staff have been able to continue the important work of data quality assurance activities. Additional hiring of staff has allowed the Program to complete validation studies with CLABSI, SSI in hernia surgeries, and dialysis related infections. Individual facility reports of validation findings were completed and sent to the infection prevention staff at each participating facility to share with upper management staff. The HASIS Program will begin a validation study of infection data related to hip and knee surgeries in January 2013. It is hoped that validation studies will continue for remaining procedures pending available resources. Refer to Appendix A for details on the validation studies.

Third, three infection prevention collaboratives focusing on the reduction of SSI, *Clostridium difficile* and dialysis related infections were completed within the last year. Please see Appendix A for specific findings, results and lessons learned in these prevention collaboratives. A fourth collaborative focusing on infection prevention education for dialysis patients is underway and will continue until July 31, 2013.

Fourth, communication venues for infection prevention staff have been maintained. In 2012, quarterly newsletters were distributed, receiving favorable feedback from recipients, and both semi-annual bulletins were completed and are available on the Program's website.

Fifth, Program staff will continue to collaborate with infection prevention staff in facilities, CDPHE's Communicable Disease Epidemiology Program and other Colorado organizations that share an interest in patient safety. These organizations include, but are not limited, to the following: Colorado Hospital Association, Colorado Foundation for Medical Care, Colorado Rural Health Center, Council of State and Territorial Epidemiologists, Denver Health, Intermountain End-Stage Renal Disease (ESRD) Network 15, and the U.S. Department of Health and Human Services (HHS) Region 8.

Additional funding for 2013 and beyond through grants is pending.

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Health Facility-Acquired Infections Report

APPENDICES

APPENDIX A: HAI DATA VALIDATION STUDIES & 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[10], inter-facility comparisons of the data are only valid when the methods of surveillance are uniform and reliable across institutions. The Patient Safety Program has conducted three validation studies to date: CLABSI, hernia, and dialysis events. A fourth validation study for hip/knee procedures is currently underway.

Central Line Associated Bloodstream Infection (CLABSI)
A CLABSI Data Validation Study was completed in May, 2011. Two trained reviewers conducted interviews with infection preventionists and performed retrospective medical record reviews in 43 hospitals. The medical records were randomly chosen from patients with positive blood cultures who received treatment during January 1, 2010 – March 31, 2010, in one or more of the reporting locations (adult and neonatal critical care, long term acute care hospital), and who either had a central line at the time of the infection or had a central line removed within 48 hours of the onset of the infection. The results demonstrated a need for education of the infection preventionists to clarify surveillance definitions and rules as well as surveillance practices.

Hernia Surgery Infections
A 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 review of hernia procedures and infections reported through NHSN from the time period January through June 2010.

Dialysis Infections
In 2012, a validation study to assess underreporting of dialysis event data was conducted. Of 65 operating dialysis treatment centers (DTC) 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 not reportable.

PREVENTION COLLABORATIVES

Surgical Site Infections and *Clostridium difficile* Infections
During 2010-2011, the CDPHE 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 2010 by ≥ 10 percent.
- Most facilities showed a decline in SSI of at least 15 percent in 2011

Dialysis Infections

In 2011-2012 CDPHE 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. Preliminary data 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

For 2012-2013 CDPHE received federal funding to implement a Dialysis Patient Education Collaborative that will develop 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***.

The Patient Safety Program partnered with Disease Control and Environmental Epidemiology of CDPHE along with the 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.[11-14]

These materials are available at the following website: http://www.colorado.gov/cs/Satellite/CDPHE-DCEED/CBON/1251632252097.

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), SSI(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 1.0 (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 1.0, there are fewer infections than expected.

The statistical significance of is the observed SSI compared to its 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 facilty'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**).

CLABSI- ADULT CCU AND LONG-TERM ACUTE CARE HOSPITAL

Risk category:	# of CLABSI	# of central line days	Hospital CLABSI Rate (CLABSI per 1000 central line days)	NHSN Rate (CLABSI per 1000 central line days)	Expected # of CLABSI
Medical CCU	2	1300	1.54	1.3	1.69

An example for calculating the CLABSI rate for a medical CCU, expected number for the unit, and total expected CLABSI is shown below:

Observed CLABSI rate for Medical CCU = $\frac{\text{2 CLABSI}}{\text{1300 central line days}}$ * 1000 = 1.54 CLABSI/1000 central line days

Expected CLABSI Medical CCU = # of central line days * NHSN rate = 1300 * 1.3/1000 = 1.69

The SIR is the ratio of the observed to expected CLABSI:

SIR = $\frac{\text{observed CLABSI}}{\text{expected CLABSI}} = \frac{2}{1.69} = 1.18$

CLABSI - NEONATAL CRITICAL CARE UNIT

CLABSI

Birth weight categories	# of CLABSI	# of central line days	Hospital CLABSI Rate (CLABSI per 1000 central line days)	NHSN Rate (CLABSI per 1000 central line days)	Expected # of CLABSI
≤ 1.65 lbs	1	1000	1.0	4.9	4.9
1.66 – 2.2lbs	2	1350	1.5	3.2	4.3
2.3 – 3.3lbs	3	1250	2.4	2.0	2.5
3.4 – 5.5lbs	2	1500	4.0	1.5	2.3
≥ 5.5lbs	1	1400	2.5	1.2	1.3
TOTAL	9	6500	--	--	15.3

An example for calculating the CLABSI rate for birth weight category 1, expected number of CLABSI for birth weight category 1, and total expected CLABSI is shown below:

Observed CLABSI rate for birth weight category 1 = $\frac{\text{1 CLABSI}}{\text{100 central line days}}$ * 100 = 1.0

Expected CLABSI for birth weight category 1 = (# of central line days * NHSN rate)/1000 = 1000 * 4.9/1000 = 4.9

Expected CLABSI overall = sum expected CLABSI = 4.9 + 4.3 + 2.5 + 2.3 + 1.3 = 15.3

NCCU expected number of infections = CLABSI sum = 15.3 + 12 = 27.3

NCCU observed number of infections = CLABSI sum = 9 + 9 = 18

The SIR is the ratio of the observed number of bloodstream infections (BSI) to the expected number of BSI collapsed overall risk categories (birth weight):

$$SIR = \frac{\text{observed BSI}}{\text{expected BSI}} = \frac{18}{27.3} = 0.66$$

SSI – HOSPITAL (ALL PROCEDURES) AND AMBULATORY SURGERY CENTER (HERNIA REPAIR PROCEDURES ONLY)

Step 1: Assign a risk estimate to each patient

NHSN risk parameters	Example patient (have parameter or no)	Probability of SSI
Age, >44	Yes	0.006
ASA, >2	No	0.0
Duration, >100 minutes	Yes	0.003
Medical school affiliation	No	0.0
Sum		0.009

Patient 1 has a 0.009 probability of acquiring an infection based on the risk factors.

Step 2: Determine the risk estimate for the patient population at Facility A

Patient	Age	ASA	Duration (min)	Med School Affiliation	Probability of SSI	SSI (yes/no)
1	52	2	100	Yes	0.005	No
2	36	3	25	Yes	0.009	No
3	26	1	36	Yes	0.001	Yes
-	-	-	-	-	-	-
-	-	-	-	-	-	-
50	23	4	96	Yes	0.05	Yes
					2.4	2.0

Facility A is expected to have 2.4 SSI based on the patients who had surgery.

The SIR is the ratio of the observed to expected SSI:

$$SIR = \frac{\text{observed SSI}}{\text{expected SSI}} = \frac{2.0}{2.4} = 0.8$$

SSI – AMBULATORY SURGERY CENTER: ORTHOPEDIC AND HYSTERECTOMY PROCEDURES

Risk category	# of SSI	# of hip prosthesis procedures	Facility SSI Rate (SSIs per 100	NHSN Rate (SSIs per 100	Expected # of SSI

			procedures)	procedures)	
0	1	100	1.0	0.86	0.86
1	2	60	3.3	1.65	0.99
2,3	2	30	6.7	2.52	0.76
TOTAL	5	190	--	--	2.61

An example for calculating the SSI rate for risk category 1, expected number of SSI for risk category 1, and total expected SSI is shown below:

$$\text{SSI rate for risk category 1} = \frac{2\ \text{SSI}}{60\ \text{procedures}} * 100 = 3.3$$

Expected SSI for risk category 1 = # procedures * NHSN rate/100 = 60 * 1.65/100 = 0.99

Expected SSI overall = Sum of expected SSI = 0.86 + .99 + 0.76 = 2.61

The SIR is the ratio of the observed number of SSI to the expected number of SSI collapsed overall risk categories, i.e. after standardizing for the patient categories.

$$\text{SIR} = \frac{\text{observed SSI}}{\text{expected SSI}} = \frac{5}{2.61} = 1.92$$

DRI IN DIALYSIS CLINICS

Access type	# of DRI	# of patients	Facility DRI Rate (DRI per 100 patients)	NHSN Rate (DRI per 100 patients)	Expected # of DRI
Graft	2	52	3.8	0.4	0.2
Fistula	4	42	9.5	0.2	0.08
Temporary central line	0	29	0.0	5.1	1.5
Permanent central line	5	36	13.9	1.7	0.6
TOTAL	11	159	--	--	2.4

An example for calculating the DRI rate for a graft, expected number of DRI for a graft, and total expected DRI for the facility is shown below:

$$\text{DRI rate for graft} = \frac{2\ \text{DRI}}{52\ \text{patients}} * 100 = 3.8$$

Expected DRI for graft = # patients * NHSN rate/100 = 52 * 0.4/100 = 0.2
Expected DRI overall = Sum of expected DRI = 0.2 + 0.08 + 1.5 + 0.6 = 2.4

The SIR is the ratio of the observed number of DRI to the expected number of DRI collapsed over all access types:

$$\text{SIR} = \frac{\text{observed DRI}}{\text{expected SSI}} = \frac{11}{2.4} = 4.6$$

APPENDIX C: CONSUMER RESOURCES

HOSPITAL AND SURGICAL PATIENTS

Every day patients receiving medical treatment acquire infections in health care facilities. Spending time in a hospital or getting surgery puts patients at risk for health care-associated infections (HAI), such as blood, surgical site, or urinary tract infections. These infections can have devastating physical, emotional and financial results. However, there are actions that health care consumers and providers can take to reduce HAI. The following ten steps, published by the Centers for Disease Control and Prevention[15], are simple activities that patients and their health care providers can follow to reduce the likelihood of acquiring HAI and improve health care safety in general:

1. Speak up: Tell your doctor about any worries you have about your safety and ask them what they are doing to protect you.
2. Keep hands clean: If you do not see your providers clean their hands, ask them to do so. Also, remind your loved ones and visitors. Washing hands can prevent the spread of germs.
3. Ask if you still need a central line or urinary catheter: A central line catheter is a tube inserted into a central vein for giving fluids and medicines and for obtaining diagnostic information to assess your condition and guide your treatment. A urinary catheter is a tube placed in the urethra to drain urine from the bladder into an attached bag or container. Leaving any catheter in place too long increases the chances of getting an infection.
4. Ask your health care provider: "will there be a new needle, new syringe, and a new vial for this procedure or injection?" Health care providers should never reuse needles or syringes.
5. Be careful with medications: Avoid taking too much medicine by following package directions. Also, to avoid harmful drug interactions, tell your doctor about all medicines you are taking.
6. Get smart about antibiotics: Help prevent antibiotic resistance by taking all your antibiotics as prescribed, and not sharing your antibiotics with other people. Remember that antibiotics don't work against viruses like the ones that cause the common cold.
7. Watch out for *Clostridium difficile: C. difficile* is a bacterium that can cause severe diarrhea. Tell your doctor if you have diarrhea, especially if you are also taking an antibiotic.
8. Know the signs and symptoms of infection: Some skin infections, like Methicillin-resistant *Staphylococcus aureus* (MRSA), appear as redness, pain, or drainage at an intravenous catheter site or surgical incision site. A fever may or may not be present. Tell your doctor if you have these symptoms.
9. Get your flu shot: Protect yourself against the flu and other complications by getting vaccinated.
10. Prepare for surgery: Ask your doctor what you should do to prepare for surgery and tell him/her about any medical conditions you have.

The following list, published by the U.S. Department of Health and Human Services, Agency for Healthcare Research and Quality, includes suggested questions to ask your surgeon and other members of your surgical team to help you prepare for surgery. Additional information can be found on their website at http://www.ahrq.gov.

- ✓ Why do I need surgery?
- ✓ What kind of surgery do I need?

- ✓ What will you be doing?
- ✓ Have you done this surgery before? How many times?
- ✓ How successful is this surgery?
- ✓ Will I need anesthesia?
- ✓ How long will the surgery take?
- ✓ What will happen after the surgery?
- ✓ What kind of pain can I expect?
- ✓ How long will I be in the hospital?
- ✓ How long will it take me to recover?
- ✓ What are the benefits and risks of having this surgery?
- ✓ What are the possible complications?
- ✓ What are the alternatives to surgery?
- ✓ How much will the surgery cost?
- ✓ Will my insurance cover the surgery?
- ✓ Why is your hospital best for this surgery?

These and other sets of guidelines for preventing such HAI as central line and urinary catheter associated infections, as well as *C. difficile* and MRSA infections can be found on CDC's website, www.cdc.gov.

DIALYSIS PATIENTS

In addition to hospital and surgical patients, chronic dialysis patients are at high risk for HAI. Their heightened risk is, in part, due to the nature of the dialysis process. This process requires vascular access (generally through insertion of a large catheter into a graft or fistula in the arm or other body site) for prolonged periods, thus increasing the risk of infection through contaminated medical equipment, supplies, environmental surfaces, and hands of health care personnel. Dialysis patients also have weakened immune systems that increase their susceptibility to infections, and they are more likely to require hospitalizations and surgeries which further increase exposure to HAI. The following steps, published by the National Institutes of Health, National Institute of Diabetes, Digestive and Kidney Diseases, can help dialysis patients protect their vascular access site and reduce risk of infection.

- ✓ Make sure your nurse or technician checks your access site before each treatment.
- ✓ Keep your access site clean at all times.
- ✓ Use your access site only for dialysis.
- ✓ Be careful not to bump or cut your access.
- ✓ Don't let anyone put a blood pressure cuff on your access arm.
- ✓ Don't wear jewelry or tight clothes over your access site.
- ✓ Don't sleep with your access arm under your head or body.
- ✓ Don't lift heavy objects or put pressure on your access arm.
- ✓ Check the pulse in your access every day.

These steps and other useful information can be found on the National Kidney and Urologic diseases Information Clearing house website.[16]

Another useful internet tool for dialysis patients is Medicare's Dialysis Facility Compare (DFC). This website provides information about kidney disease, the dialysis process, and Medicare-approved dialysis facilities nationwide. It presents facility contact information and characteristics such as types of dialysis offered (in-center dialysis, peritoneal dialysis, and home dialysis training), number of treatment stations, number of shifts starting 5:00 PM or later, initial date of Medicare certification, and ownership type (profit or non-profit). It also allows consumers to compare selected facilities in terms of characteristics, services, and health care quality indicators. This information can help dialysis patients select dialysis facilities that best meet their needs, and patients already receiving dialysis can review their facility's information and discuss it with their dialysis caregivers. DFC also provides a kidney disease dictionary, a list of dialysis patient rights and responsibilities, frequently asked questions, and links to national kidney disease and transplant organizations that provide valuable educational materials.[17]

HEALTH CARE CONSUMER RESOURCES

Health care quality means that patients get the right medicine, treatments, and medical tests at the right times for their condition. Facilities vary in the quality of care they provide, but there are many resources available to inform decisions about where to receive health care. Valuable information for health care related decisions can be found on the websites listed below. The first three websites listed enable facility comparisons on various quality indicators, and include two Centers for Medicare and Medicaid Services (CMS) websites that compare CMS approved facilities nationwide and a Colorado Hospital Association website that compares hospitals in Colorado only.

- Medicare Hospital Compare website: www.hospitalcompare.hhs.gov or www.medicare.gov
- Medicare Dialysis Facility Compare website: www.medicare.gov/dialysis/home.asp
- Colorado Hospital Report Card website: www.cohospitalquality.org
- Centers for Disease Control: www.cdc.gov
- The Leap Frog Group: www.leapfroggroup.org
- Institute for Healthcare Improvement: www.ihi.org/ihi
- Colorado Hospital Association: www.cha.com
- Colorado Foundation for Medical Care: www.cfmc.org

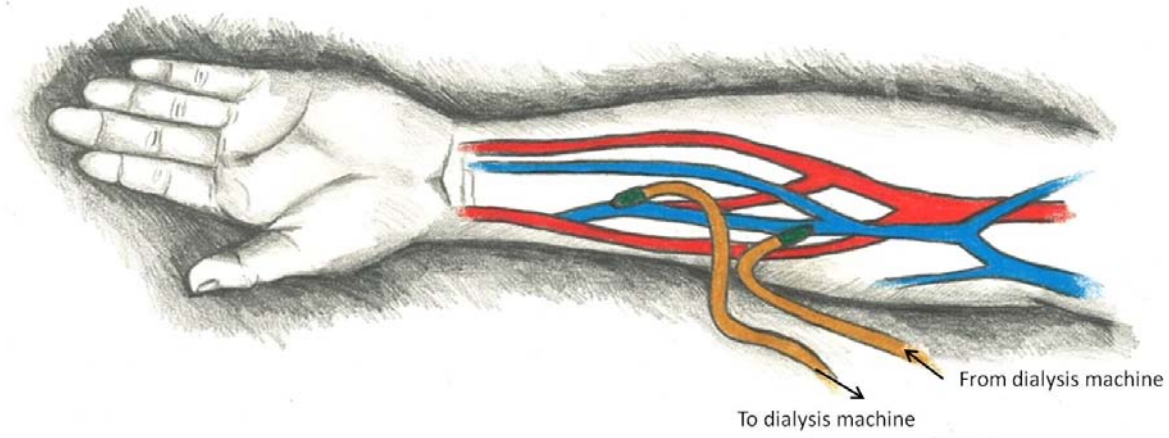
The practice of posting health care facility information on websites encourages accountability and continuous improvement in the quality of care provided. Beyond website resources, there are several national and international associations focused on safe health care that can also provide useful information on HAI and health care quality, in general:

- Agency for Healthcare Research and Quality: www.ahrq.gov
- American Hospital Association (AHA): www.aha.org
- Association for Professionals in Infection Control and Epidemiology, Inc (APIC): www.apic.org
- Centers for Medicare & Medicaid Services (CMS): www.cms.gov
- Consumers Union: www.consumersunion.org

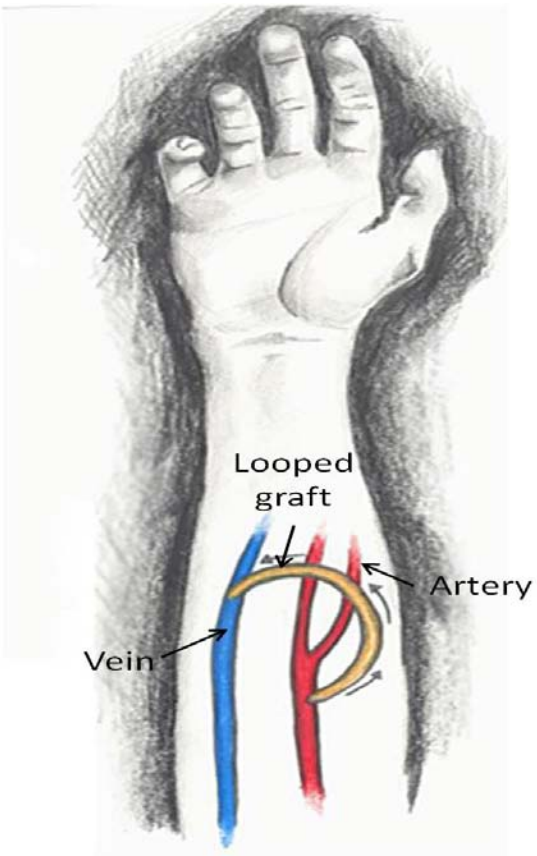
- Council of State and Territorial Epidemiologists (CSTE): www.cste.org
- Department of Health and Human Services (HHS): www.hhs.gov
- Food and Drug Administration (FDA): www.fda.gov
- Infectious Diseases Society of America (IDSA): www.idsociety.org
- The Joint Commission (TJC): www.jointcommission.org
- Safe Care Campaign: www.safecarecampaign.org
- One and Only Campaign: www.oneandonlycampaign.org
- Society for Healthcare Epidemiology of America (SHEA): www.shea-online.org

To get the best use of the resources presented above, consumers should also always consult with their doctors, hospitals, families and friends before deciding where to receive care. In doing so, they should consider the experience of the facility, staff and other quality indicators in addition to the infection data presented in this report. This report should be used as one of many quality indicators and cannot, on its own, provide a complete picture of health care quality in Colorado facilities.

APPENDIX D: VASCULAR ACCESS TYPES

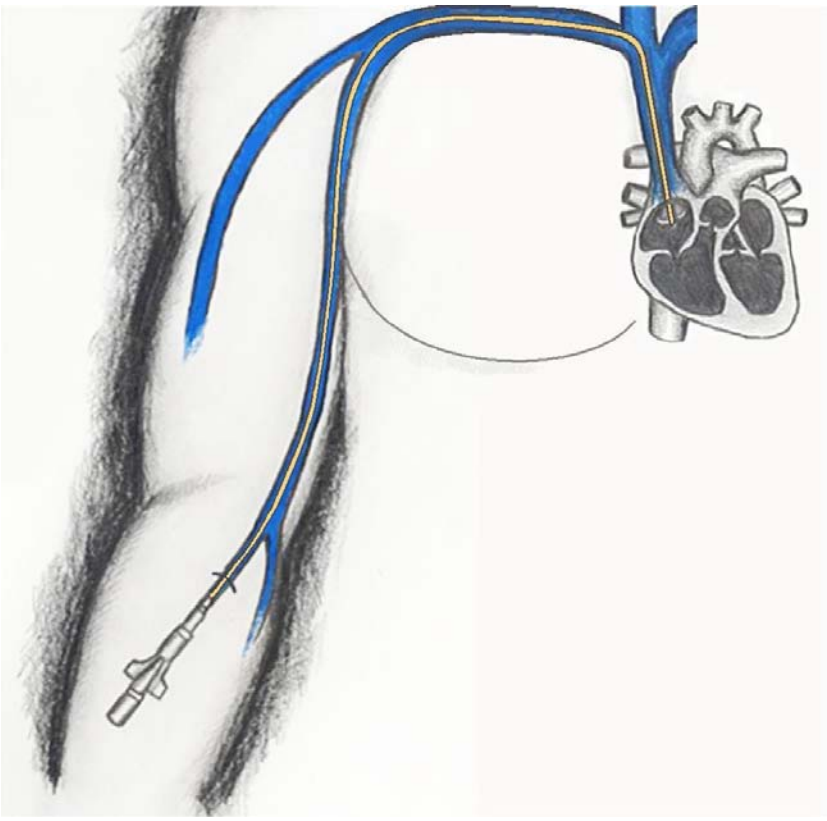


Fistula

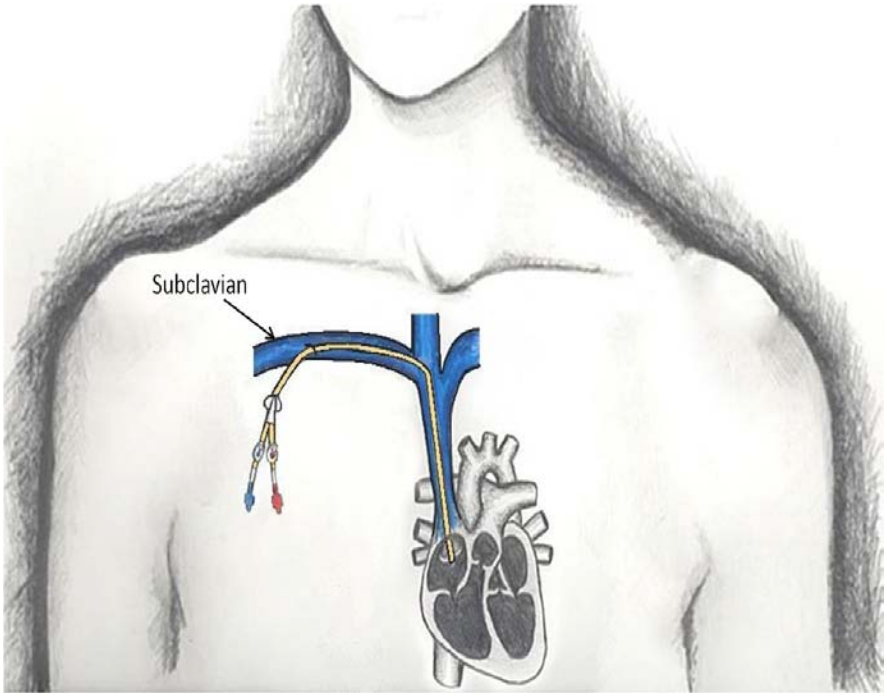


Graft

Pictures provided by Rachel Yarbrough



Peripherally inserted central catheter (PICC)



Subclavian Catheter (Tunneled)

Pictures provided by Rachel Yarbrough

APPENDIX E: GLOSSARY OF TERMS AND ABBREVIATIONS

Term	Definition
Access-related Bacteremia	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	A facility which operates exclusively for the purpose of providing surgical services to patients not requiring hospitalization.
Arteriovenous (AV) Fistula	A surgically created connection between an artery and a vein usually in the forearm for the purpose of vascular access during dialysis treatments. The vein portion grows larger allowing easier access during dialysis. Patients must have another means of access for dialysis until the fistula matures (usually weeks to months). A fistula can last several years and has the lowest complication rate of dialysis access types.
Arteriovenous (AV) Graft	A surgically implanted synthetic tube or graft under the skin in the arm connecting an artery to a vein for the purpose of vascular access during dialysis. Usually performed when a patient's veins are too small to develop properly into a fistula. A graft can last several years.
Birth weight Categories	The weight of an infant at the time of birth. Infants remain in their birth weight category even if they gain weight. Birth weight category is important because the lower the birth weight, the higher the risk of developing an infection.
Bloodstream Infection (BSI)	An infection of the blood.
Central line	A flexible tube (intravascular catheter) that terminates at or close to the heart or in one of the great vessels. A central line provides access to a large vein that can be used to give fluids, measure the amount of fluid in the body, or to give medication.
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. If the BSI develops within 48-hours of discharge from a location, it is associated with the discharging location.
Central Line 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. Lower rates are better.

Central Line Days (Device Days)	The total number of days a central line is used for patients in a CCU or a NCCU. A daily count of patients with a central line in place is performed at the same time each day. Each patient with one or more central lines at the time the daily count is performed is counted as one central line day.
Certification Board of Infection Control and Applied Epidemiology (CBIC)	The Certification Board of Infection Control and Epidemiology, Inc., is an organization that certifies infection preventionists based on their educational background and professional experience, in conjunction with testing their knowledge base through a standardized exam. The credential awarded is CIC, Certification in Infection Control and Epidemiology. One must have two years of infection control experience in order to sit for the boards. Certification must be renewed every five years.
Coronary Artery Bypass Graft Surgery	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. In Colorado certain intensive care units designated as such by the facility are required by law to report central line-associated bloodstream infections. These include: medical-surgical critical care (MSCCU), medical critical care (MCCU), surgical critical care (SCCU), cardiothoracic critical care (CTCCU), cardiac critical care (CCCU), and neonatal critical care (NCCU) levels II/III and III.
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.

Heart bypass or coronary artery bypass graft	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.
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. Hip replacement surgery involves removing damaged cartilage and bone from the hip joint and replacing them with new, man-made parts.
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 and monitoring.
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) is an elective procedure for people with severe knee damage and pain related to osteoarthritis, rheumatoid arthritis, and traumatic arthritis. A total knee replacement involves removing the damaged cartilage and bone from the surface of the knee joint and replacing them with a man-made surface of metal and plastic. A partial knee replacement involves replacing only part of the knee joint.
Local Access Infection	Pus, redness, or swelling of the vascular access site without the presence of access-associated bacteremia, patient hospitalization, or initiation of an IV antimicrobial agent.
Location	The specific patient care area to which a patient is assigned while receiving care in the health care facility.
Location of Attribution	The inpatient location where the patient was assigned on the date of the bloodstream infection (BSI) event, which is further defined as the date when the first clinical evidence appeared or the date the specimen used to meet the BSI criteria was collected, whichever came first.

Long-Term Acute Care Hospital (LTACH)	A specialty care hospital that cares for patients with serious medical conditions that require intense, special treatment for long periods of time (an average length of stay is 25 days).
Metric	A measurement for calculating health outcomes. There are both process metrics that measure adherence to standard health care quality processes, and outcome metrics that measure the number of patients affected by specific medical treatments.
Morbidity	Disease
Mortality	Death
National Healthcare Safety Network (NHSN)	A standardized data reporting system that Colorado health care facilities must use to identify and report select HAI and enter required data on their patients. NHSN is a secure, internet-based surveillance (monitoring and reporting) system managed by the Centers for Disease Control and Prevention (CDC) Division of Healthcare Quality Promotion
NHSN Operative Procedure	A procedure that meets the following criteria: 1) performed on a patient who is a NHSN inpatient or outpatient; 2) takes place during an operation; and 3) included in the NHSN operative procedure categories.
Neonate	An infant less than or up to 30 days of age.
Neonatal Critical Care Unit	A patient care area that provides care to the most critically ill infants.
Operative Procedure	An operation that takes place during a single trip to the operating room (OR) where a surgeon makes at least one incision (cut) through the skin or mucous membrane, and stitches or staples the incision before the patient leaves the OR.
Outpatient	A patient whose date of admission to the health care facility and the 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. 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 dialysis patients do not use this type of access due to the increased risk of infection. Ports are frequently used for administration of chemotherapeutic agents.

PICC Line	A peripherally inserted central catheter placed in the arm of the patient. By NHSN definition it is a temporary central line.
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. In epidemiology, it is often used in reference to proportions that are not truly rates (e.g., attack rate or case-fatality rate).
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	Risk adjustment accounts for differences in patient populations and allows for hospitals to be compared. A hospital that performs a large number of complex procedures on very sick patients would be expected to have a higher infection rate than a hospital that performs more routine procedures on healthier patients.
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 or lifestyle, an environmental exposure, or a hereditary characteristic that is associated with an increase in the occurrence of a particular disease, injury, or other health condition.
Standardized Infection Ratio (SIR)	The Standardized Infection Ratio (SIR) is 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. It is the ratio of the observed to expected number of SSI. The SIR can be used as a comparison measure between facilities.

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.
The Department	The Colorado Department of Public Health and Environment (CDPHE).
Trend	Movement or change in frequency over time, usually upwards or downwards**.**
Umbilical Catheter	A tube that is inserted through an umbilical blood vessel (artery or vein) in a neonate.
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-associated bacteremia.
Wound Class	An assessment of the likelihood and degree of contamination of a surgical wound at the time of the operation. Wounds are divided into four classes: Clean: An uninfected operation body site is encountered and the respiratory, digestive, genital, or uninfected urinary tracts are not entered Clean-Contaminated: Operation body sites in which the respiratory, digestive, genital or urinary tracts are entered under controlled conditions and without unusual contamination. Contaminated: Operation body sites that have recently undergone trauma, operations with major breaks in sterile technique (e.g., open cardiac massage) or gross spillage from the gastrointestinal tract. Dirty or Infected: Includes old traumatic wounds with retained dead tissue and those that involve existing infection or perforated intestines

APPENDIX F: ABBREVIATIONS

ARB	Access-Related Bacteremia
ASC	Ambulatory Surgery Center
BRST	Breast procedure
BSI	Bloodstream Infection
CABG	Coronary Artery Bypass Graft
CCU	Critical Care Unit
CDC	Centers for Disease Control and Prevention
CDPHE	Colorado Department of Public Health and Environment
CIC	Certification in Infection Control and Epidemiology
CLABSI	Central Line-Associated Bloodstream Infection
COLO	Colon procedure
DE	Dialysis Event
DRI	Dialysis-related Infection
DTC	Dialysis Treatment Center
HAI	Healthcare-Associated Infection or Hospital-Acquired Infection
HER	Hernia repair procedure
HPRO	Hip prosthesis (total or partial) procedure
KPRO	Knee prosthesis (total or partial) procedure
LAI	Local access Infection
LTACH	Long-term Acute Care Hospital
NCCU	Neonatal Critical Care Unit
NHSN	National Healthcare Safety Network
PICC	Peripherally inserted central catheter
SIR	Standardized Infection Ratio
SSI	Surgical Site Infection