
Central Line-Associated Bloodstream Infections Overview

Background

Catheter-associated bloodstream infections (CLABSI) are bloodstream infections that are associated with the presence of a central line within the 48-hour period. 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. An example of a great vessel is the aorta or 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 \leq 30 days old). Central lines can be either permanent or temporary. Permanent lines are those that are tunneled, or more specifically, lines 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. Permanent lines are commonly used in long-term acute care hospitals patients and historically have had lower rates of infection than temporary lines. For pictures of central lines, refer to Appendix F.

All patients with a central line are at risk for a CLABSI. However, certain groups are at higher risk for infection: elderly, neonates, dialysis patients, those patients whose immune system is very weak or absent (e.g., cancer patients, transplant patients), diabetics, and those patients who have suffered a burn injury.

Like SSI, CLABSI have devastating impacts on patients' lives and are costly for patients, healthcare payers, health facilities and consumers. Additionally, they can be easily detected and prevented by following established prevention techniques.ⁱ CLABSI often lead to additional days in the hospital, which can be expensive for healthcare payers, healthcare organizations, and patients. An estimated 248,000 bloodstream infections occur in U.S. hospitals each yearⁱⁱ and a large proportion of these are associated with the presence of a central vascular catheter. Seventy-eight thousand (78,000) CLABSI are estimated to occur yearly in United States hospitals and dialysis units.ⁱⁱⁱ Additional costs range between \$7,288 to \$29,156 per episode of infection.^{iv} Evidence suggests that reporting of infections may lead to better adherence to preventive practices and decrease medical complications or death.

Reporting central line data by facility type, central line type, and critical care unit allows for fairer comparisons between health facilities as it takes into account how differences in care and patients' risk for infection lead to differences in infection rates.

Adult Critical Care Units

The facilities report CLABSI data by the following NHSN defined critical care units:

- **Medical/Surgical Critical Care:** unit for critically ill patients who are being treated for medical conditions, surgical conditions, or both.
- **Medical Cardiac Critical Care:** unit that specializes in care of patients with serious heart problems that do not require heart surgery
- **Surgical Cardiothoracic Critical Care:** unit that specializes in care of patients following cardiac and thoracic surgery (i.e., surgeries on the organs within the chest like the heart or lungs).
- **Medical Critical Care:** unit for patients who are being treated for non-surgical conditions
- **Surgical Critical Care:** unit for the evaluation and managements of patients with serious illness before and/or after surgery.

Most hospitals do not have all five critical care units. 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.

Results

Table 1 shows facility specific data for CLABSI attributed to the five CCU types discussed above. The tables contain data from August 1, 2010, through July 31, 2011.

Each table lists all the hospitals in Colorado with that type of critical care unit, the city where the hospital is located, the number of central line days in the unit, the number of infections in the unit, the infection rate for the unit, and comparison 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 for that CCU 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 E in the complete report for a description about using the Standardized Infection Ratio for the comparison to national infection rates.

Table 18: Adult Critical Care Unit CLABSI Rates, 2010 – 2011

Central Line Associated Bloodstream Infections (CLABSI) in Hospitals by Critical Care Unit. Reporting Period: August 1, 2010-July 31, 2011.							
Health Facility, Region, and Unit Type			Central Line Days	CLABSI	CLABSI Rate	National Rate	National Comparison
Arkansas Valley Regional Medical Center	La Junta	Medical/Surgical, ≤ 15 beds	175	0	0.0	1.1	Same
Aspen Valley Hospital	Aspen	Medical/Surgical, ≤ 15 beds	40	***	***	1.1	***
Boulder Community Hospital	Boulder	Medical/Surgical	1,814	1	0.6	1.0	Same
Boulder Community Hospital-Foothills	Boulder	Medical	234	0	0.0	1.3	Same
Centura Avista Adventist Hospital	Louisville	Medical/Surgical	408	0	0.0	1.0	Same
Centura Littleton Adventist Hospital	Littleton	Medical/Surgical	2,677	3	1.1	1.0	Same
Centura Penrose St. Francis Health	Colorado Springs	Medical/Surgical	2,986	3	1.0	1.0	Same
Centura Porter Adventist Hospital	Denver	Medical/Surgical	3,803	5	1.3	1.0	Same
Centura St. Anthony Hospital	Lakewood	Medical	1,884	1	0.5	1.3	Same
		Medical/Surgical	2,568	1	0.4	1.0	Same
		Surgical Cardiothoracic	1,669	3	1.8	0.9	Same
		Surgical	1,166	2	1.7	1.0	Same
Centura St. Anthony North Hospital	Westminster	Medical	2,544	6	2.4	1.3	Same
Centura St. Francis Medical Center	Colorado Springs	Medical/Surgical, ≤ 15 beds	425	1	2.4	1.1	Same
Centura St. Mary Corwin Medical Center	Pueblo	Medical/Surgical	2,263	3	1.3	1.0	Same
Centura St. Thomas More Hospital	Canon City	Medical/Surgical, ≤ 15 beds	205	0	0.0	1.1	Same
Colorado Plains Medical Center	Fort Morgan	Medical/Surgical, ≤ 15 beds	58	0	0.0	1.1	Same
Community Hospital	Grand Junction	Medical/Surgical, ≤ 15 beds	449	0	0.0	1.1	Same
Delta County Memorial Hospital	Delta	Medical/Surgical, ≤ 15 beds	438	0	0.0	1.1	Same
Denver Health Medical Center	Denver	Medical-Major teaching	2,762	1	0.4	1.8	Same
East Morgan County Hospital	Brush	Medical/Surgical, ≤ 15 beds	8	***	***	1.1	***
Exempla Good Samaritan Medical Center	Lafayette	Medical/Surgical	2,406	3	1.2	1.0	Same
Exempla Lutheran Medical Center	Wheat Ridge	Medical Cardiac	1,917	2	1.0	1.3	Same
		Medical/Surgical	3,530	4	1.1	1.0	Same

**Central Line Associated Bloodstream Infections (CLABSI) in Hospitals by Critical Care Unit.
Reporting Period: August 1, 2010-July 31, 2011.**

Health Facility, Region, and Unit Type			Central Line Days	CLABSI	CLABSI Rate	National Rate	National Comparison
Exempla St. Joseph Hospital	Denver	Medical/Surgical - Major teaching	4,757	1	0.2	1.4	Better
Gunnison Valley Hospital	Gunnison	Medical/Surgical, ≤ 15 beds	0	0	***	1.1	***
Heart of the Rockies Regional Medical Center	Salida	Medical/Surgical - Major teaching	21	***	***	1.4	***
Longmont United Hospital	Longmont	Medical/Surgical	3,078	0	0.0	1.0	Same
McKee Medical Center	Loveland	Medical/Surgical, ≤ 15 beds	705	0	0.0	1.1	Same
Medical Center of Aurora	Aurora	Medical/Surgical	5,034	8	1.6	1.0	Same
Medical Center of the Rockies-North Wing	Loveland	Medical/Surgical - Major teaching	1,757	0	0.0	1.4	Same
Medical Center of the Rockies-South Wing	Loveland	Medical/Surgical - Major teaching	1,674	0	0.0	1.4	Same
Memorial Hospital Central	Colorado Springs	Medical/Surgical	5,600	4	0.7	1.0	Same
Memorial Hospital North	Colorado Springs	Medical/Surgical, ≤ 15 beds	358	0	0.0	1.1	Same
Mercy Regional Medical Center	Durango	Medical/Surgical - Major teaching	1,227	0	0.0	1.4	Same
Montrose Memorial Hospital	Montrose	Medical/Surgical, ≤ 15 beds	336	0	0.0	1.1	Same
North Colorado Medical Center	Greeley	Medical Cardiac	1,017	0	0.0	1.3	Same
		Medical/Surgical	2,458	0	0.0	1.0	Same
North Suburban Medical Center	Thornton	Medical/Surgical	1,732	1	0.6	1.0	Same
Parker Adventist Hospital	Parker	Medical/Surgical	1,321	2	1.5	1.0	Same
Parkview Medical Center	Pueblo	Medical/Surgical - Major teaching	1,361	0	0.0	1.4	Same
Platte Valley Medical Center	Brighton	Medical	1,169	0	0.0	1.3	Same
Poudre Valley Hospital	Fort Collins	Medical/Surgical - Major teaching	1,792	0	0.0	1.4	Same
Presbyterian St. Luke's Medical Center	Denver	Medical/Surgical - Major teaching	2,350	0	0.0	1.4	Same
Rose Medical Center	Denver	Medical/Surgical - Major teaching	2,366	3	1.3	1.4	Same
San Luis Valley Regional Medical Center	Alamosa	Medical/Surgical, ≤ 15 beds	235	0	0.0	1.1	Same
Sky Ridge Medical Center	Lone Tree	Medical/Surgical	2,439	5	2.1	1.0	Same
Southwest Memorial Hospital	Cortez	Medical/Surgical, ≤ 15 beds	177	0	0.0	1.1	Same
St. Anthony Summit Medical Center	Frisco	Medical/Surgical, ≤ 15 beds	99	0	0.0	1.1	Same

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Health Facility, Region, and Unit Type			Central Line Days	CLABSI	CLABSI Rate	National Rate	National Comparison
St. Mary's Hospital	Grand Junction	Surgical Cardiothoracic	4,313	1	0.2	0.9	Same
Sterling Regional Medical Center	Sterling	Medical/Surgical, ≤ 15 beds	159	0	0.0	1.1	Same
Swedish Medical Center	Englewood	Medical/Surgical - Major teaching	7,925	9	1.1	1.4	Same
University of Colorado Hospital	Aurora	Medical Cardiac	1,142	1	0.9	1.3	Same
		Medical	3,712	8	2.2	1.8	Same
		Surgical	3,299	6	1.8	1.4	Same
Vail Valley Medical Center	Vail	Medical/Surgical, ≤ 15 beds	235	0	0.0	1.1	Same
Valley View Hospital	Glenwood Springs	Medical/Surgical, ≤ 15 beds	204	0	0.0	1.1	Same
Yampa Valley Medical Center	Steamboat Springs	Medical/Surgical, ≤ 15 beds	36	***	***	1.1	***

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.

*** Indicates value not shown due to suppression of infections data.

Infections data for hospitals with fewer than 50 central line-days in a twelve-month period are suppressed to protect confidential health information. These hospitals have met the reporting requirements.

Source: National Healthcare Safety Network (NHSN) Database.

Prepared By: Colorado Patient Safety Program, Colorado Department of Public Health and Environment.

ⁱ O'Grady, N.P., et al. (2011). Guidelines for the Prevention of Intravascular Catheter-Related Infections. Retrieved at <http://www.cdc.gov/hicpac/bsi/bsi-guidelines-2011.html>

ⁱⁱ "National Healthcare Safety Network." Central Line-Associated Bloodstream Infection (CLABSI) Event. <http://www.cdc.gov/nhsn/PDFs/pscManual/4PSC_CLABScurrent.pdf>.

ⁱⁱⁱ Srinivasan A, Wise M, Bell M, Cardo D, Edwards J, Fridkin S, Jernigan J, Kallen A, McDonald LC, Patel PR, and Pollock D. "Vital Signs: Central Line-Associated Blood Stream Infections — United States, 2001, 2008, and 2009." MMWR (2011): 243-248.

^{iv} Centers for Disease Control and Prevention. "Healthcare-associated infections ." 2009. The Direct Medical Costs of Healthcare-Associated Infections in U.S. Hospitals. <http://www.cdc.gov/HAI/pdfs/hai/Scott_CostPaper.pdf>.