

**2011 CENTRAL LINE-ASSOCIATED
BLOODSTREAM INFECTIONS REPORT FOR
UTAH HOSPITALS**

Utah Department of Health
Division of Disease Control and Prevention
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Introduction

Central line-associated bloodstream infections (CLABSIs) continue to be among the most deadly and costly hospital-associated infections in the United States. Forty-eight percent of intensive care unit (ICU) patients have central lines. An estimated 82,000 central line-associated bloodstream infections and up to 28,000 attributable deaths occur in ICUs every year. The attributable cost for each bloodstream infection is estimated to be between \$3,700 and \$29,000.¹

Because of the concerns with these deadly and costly hospital-associated infections, the Utah Department of Health (UDOH) requires hospitals to report central line-associated bloodstream infection ICU rates for patients greater than one year of age. (Rule 386-705, Epidemiology, Healthcare-Associated Infection). These hospitals submit quarterly data to the UDOH on central line-associated bloodstream infection events and central line days (number of patients with central lines each day). Both the number of central line-associated bloodstream infection events and the number of central line days are then used to determine central line-associated bloodstream infection ICU hospital and state-specific rates.

Developed by the UDOH, in collaboration with a subgroup of the Utah Healthcare Infection Prevention Governance Committee,² this report compares central line-associated bloodstream infection rates among Utah licensed hospitals that have ICUs. This report does not identify the participating hospitals by name. The hospital identification is blinded in this year's report, but with the passing of Healthcare-Associated Infections House Bill 55 during the 2012 Legislative Session, hospitals will be identified in future reports. Hospitals reporting fewer than 50 central line days per year were not included in the ICU type analysis because conclusions based on such small numbers may not be reliable.

The 2011 central line-associated bloodstream infection data are displayed by grouping hospitals according to ICU type (Figure 1) and Peer Group (See Tables). ICU types include trauma, respiratory, cardiac, medical, burn, pediatric, surgical, and neurosurgical hospitals. Peer Groups are used to account for differences in the type of patients ICUs treat and adjust for several risk factors that have been found to be most associated with differences in infection rates. Additionally, this report compares the *actual* number of healthcare-associated infections to the *expected* number of healthcare-associated infections based on the baseline United States experience (e.g., standard population) for a specific group of patients. This is referred to as the Standardized Infection Ratio (SIR).

Results show that central line-associated bloodstream infections from 2008 to 2011 in Utah hospitals have decreased from a rate of 2.2 to 1.3 per 1,000 central line days (Figure 2). The information is pertinent, because it identifies the current trend for central line-associated bloodstream infections within ICUs in the state of Utah. Recognition of the infection burden is necessary to promote proven interventions and prevention strategies.

¹How-to-Guide: Prevent Central Line-Associated Bloodstream Infections. Cambridge, MA: Institute for Healthcare Improvement; 2012.

²The Utah Healthcare Infection Prevention Governance Committee (http://health.utah.gov/epi/HAI/governance_committee.html) is a multi-disciplinary panel of state leaders in patient safety, infectious diseases, and infection control. Membership is comprised from a broad base of care delivery groups across the State and organized under and staffed by the Utah Department of Health.

The top three pathogens in Utah associated with bloodstream infections are described below. These include Coagulase-negative staphylococci (CoNS), Staphylococcus aureus, and Candida non-albicans. While the number of Methicillin-resistant Staphylococcus aureus (MRSA) infections in Utah is low, MRSA infection is a common infection for hospitalized patients.

The most commonly reported bloodstream infection in Utah is Coagulase-negative staphylococci (CoNS). These bacteria are the most common cause of bloodstream infections related to the use intravenous (IV) catheters, and most of these infections are hospital-acquired. These bacteria are normally found on the skin.

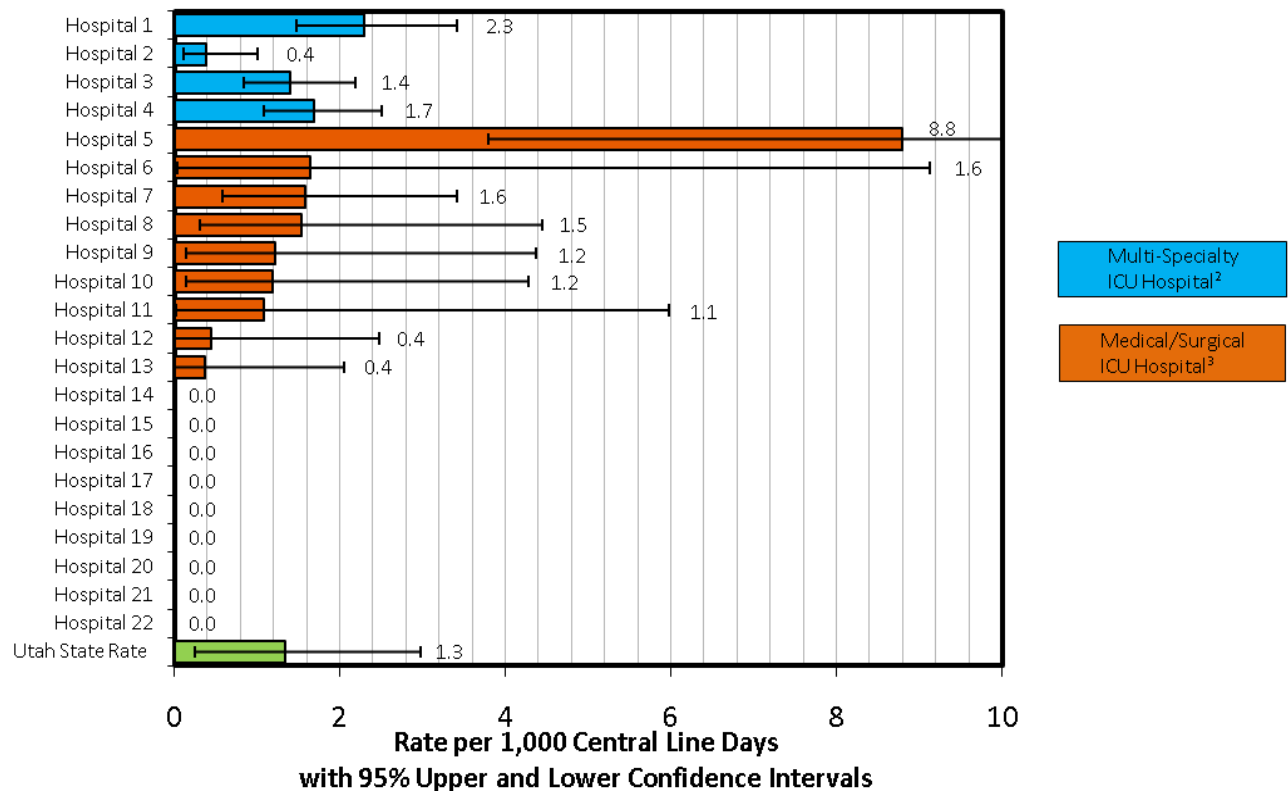
The second most reported bloodstream infection in Utah is Staphylococcus aureus (also referred to as staph). It is the most common cause of all bacterial staph infections. Hospitalized patients with chronic health problems are at increased risk of developing staph bloodstream infections. These bacteria are normally found in the nose and on the skin (less commonly in other locations) in 25%-30% of healthy adults.

The third most reported bloodstream infection in Utah is Candida non-albicans; a type of fungus identified as a cause of fungal bloodstream infections. Hospitalized patients who are critically ill and are in medical and surgical intensive care units are at greatest risk for developing fungal bloodstream infections. Candida fungus is normally found in the mouth, genitourinary and intestinal tract.

Methicillin-resistant Staphylococcus aureus (MRSA) is a type of staph infection that is resistant to a class of antibiotics related to penicillin-type drugs. It is one of most common bacteria resistant to antibiotics that cause infections in hospitalized patients. These bacteria can be present in the body without causing an infection. An infection with MRSA that occurs in the hospital does not always mean that the MRSA infection was caused by the hospital that diagnosed the infection. Methicillin-susceptible Staphylococcus aureus (MSSA) is the most frequently identified staph infection in facilities reporting bloodstream infections in Utah.

Figure 1

2011 ICU Central Line-Associated Bloodstream Infection Rates for Patients >1 Year of Age, 22 Utah Hospitals, by ICU Type¹

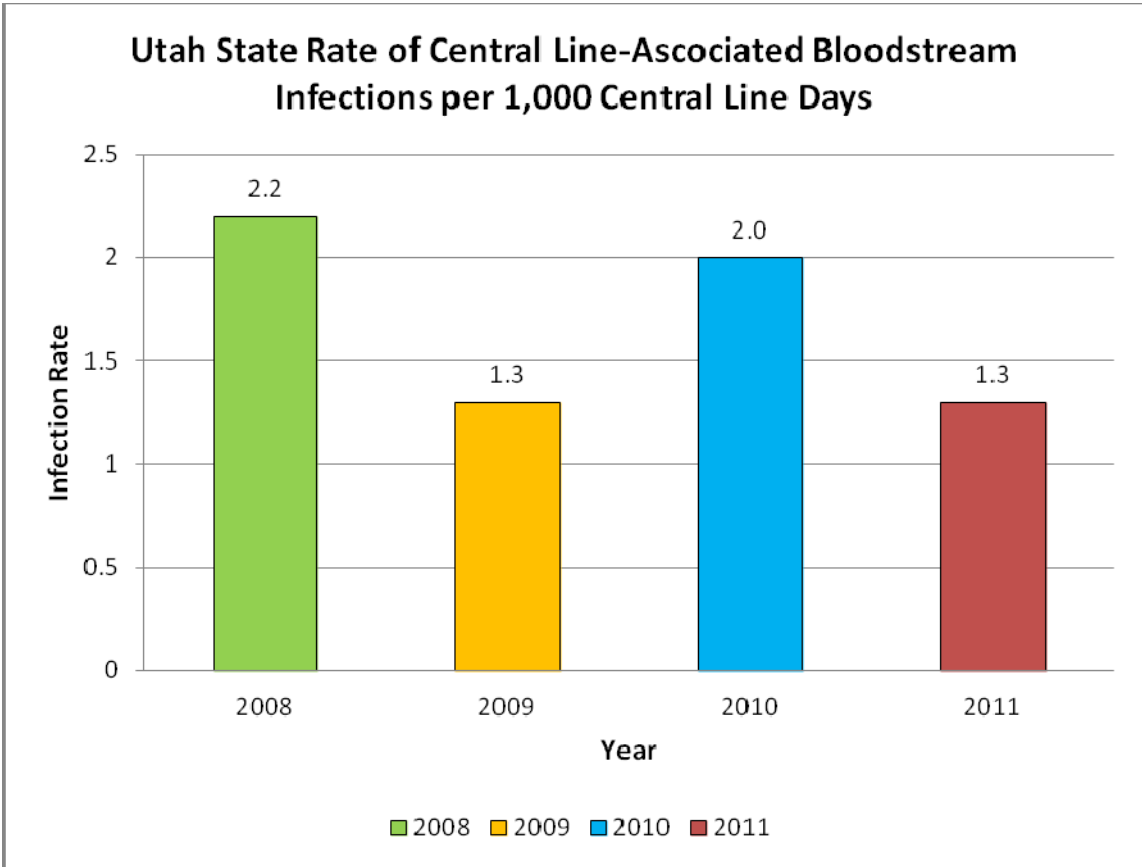


¹Only hospitals with more than 50 central line days included. Large confidence intervals result from institutions with few central line days accompanied by few central line-associated bloodstream infections.

²Includes hospitals with specialized ICU types, including thoracic, trauma, respiratory, cardiac, medical, burn, pediatric, surgical and neurosurgical.

³Hospitals with one large ICU combining medical and surgical care.

Figure 2



Definitions

The following definitions are used in this report.

- 1. Central Line** - A catheter (tube) placed in a large vein in the neck, chest, or groin that terminates at or close to the heart to give medication or fluids, collect blood for medical tests or monitor blood flow.
- 2. Central Line Days** - A count of the number of patients with a central line in place. Central line days are calculated by recording the number of patients who have a central line for each day of the month at the same time each day for a specific care location. At the end of the month, the sum of all days is recorded. For purposes of this report, the total is recorded as the sum of all days in a year.
- 3. Central Line-Associated Bloodstream Infection (CLABSI)** - A serious infection that occurs when germs (usually bacteria or viruses) that are not related to another infection enter the bloodstream through the central line.
- 4. Confidence Interval** - A confidence interval represents a possible range of values in which there is a 95 percent probability that the true value is within this range.
- 5. Healthcare-Associated Infection (HAI)** - An infection that develops in a person who is cared for in any setting where healthcare is delivered (e.g., acute care hospital, skilled nursing facility, dialysis center, etc.) that was not developing or present at the time of admission to that healthcare setting.
- 6. Intensive Care Unit (ICU)** - An area in the hospital where severely ill patients are closely monitored and receive advanced life support.
- 7. Hospital Facility Types:**
 - Multi-Specialty Hospitals** - Hospitals with specialized ICUs, such as thoracic, trauma, respiratory, cardiac, medical, burn, pediatric, surgical, and neurosurgical.
 - Medical/Surgical Hospitals** - Hospitals that have an ICU combining medical and surgical care.
- 8. Pathogen** - An agent that causes disease, such as a bacterium, virus or fungus.
- 9. Peer Group** - A risk-adjusted peer group determined by the type and complexity of patients cared for in the hospital or ICU.
- 10. Standardized Infection Ratio (SIR)** - A summary measure used to calculate and track the incidence of HAIs. The SIR is determined by comparing the actual number of HAIs to the expected number of HAIs for a specific group of patients. This expected number is based upon national HAI benchmarks.

Overview - State of Utah

Licensed Hospitals*	
Number of licensed hospitals in Utah:	60
Number of licensed hospitals with ICUs:	25
Number of licensed hospitals with ICUs that reported:	25
Number of licensed hospitals with ICUs with less than 50 central line days:	6
Number of central line-associated bloodstream infection events:¹	96
Number of expected central line-associated bloodstream infection events:²	153.0
State rate for central line-associated bloodstream infections:³	1.3
<p>¹Utah licensed hospitals include: acute care, long-term acute care, critical access, rehabilitation, psychiatric, government and children's hospitals.</p> <p>²Number of expected central line-associated bloodstream infection events: the total number of central line-associated bloodstream infections reported per year.</p> <p>³State rate for central line-associated bloodstream infections: the total number of central line-associated bloodstream infections in Utah that occurred per 1,000 central line days.</p>	

Peer Group 1						
	Number of Central Line Days ¹	Number of CLABSI Events ²	Expected Number of CLABSI Events ³	CLABSI Rate per 1,000 Central Line Days ⁴	Standardized Infection Ratio ⁵	95% Confidence Interval ⁶
Utah	71,567	96	153.0	1.3	0.63	0.51 - 0.77
Hospital 1	14,215	24	32.2	1.7	0.75	0.48 - 1.11
Hospital 2	13,585	19	39.3	1.4	0.48	0.29 - 0.76

Peer Group 2						
	Number of Central Line Days ¹	Number of CLABSI Events ²	Expected Number of CLABSI Events ³	CLABSI Rate per 1,000 Central Line Days ⁴	Standardized Infection Ratio ⁵	95% Confidence Interval ⁶
Utah	71,567	96	153.0	1.3	0.63	0.51 - 0.77
Hospital 1	3,816	6	6.7	1.6	0.90	0.33 - 1.96
Hospital 2	1,689	2	2.5	1.2	0.79	0.10 - 2.85
Hospital 3	3,036	0	4.9	0	0	0 - 0.75
Hospital 4	10,249	4	18.9	0.39	0.21	0.06 - 0.54

Peer Group 3						
	Number of Central Line Days ¹	Number of CLABSI Events ²	Expected Number of CLABSI Events ³	CLABSI Rate per 1,000 Central Line Days ⁴	Standardized Infection Ratio ⁵	95% Confidence Interval ⁶
Utah	71,567	96	153.0	1.3	0.63	0.51 - 0.77
Hospital 1	910	8	1.6	8.79	4.99	2.16 - 9.84
Hospital 2	1,970	3	2.8	1.52	1.08	0.22 - 3.17
Hospital 3	1,652	2	3.5	1.21	0.58	0.07 - 2.08
Hospital 4	610	1	0.9	1.64	N/A	N/A
Hospital 5	223	0	0.3	0	N/A	N/A
Hospital 6	2,254	1	3.7	0.44	0.27	0.01 - 1.49

¹Number of central line days: the total number of days that a patient has a central line.

²Number of central line-associated bloodstream infection events: the total number of central line-associated bloodstream infections reported per year.

³Expected number of central line-associated bloodstream infection events: the number of central line-associated bloodstream infection events anticipated to occur in an ICU per year based on the baseline United States experience.

⁴Central line-associated bloodstream infection rate: the total number of central line-associated bloodstream infections that occurred per 1,000 central line days.

⁵Standardized Infection Ratio: compares the total number of central line-associated bloodstream infection events in a hospital's ICU to a national benchmark. Rates are adjusted based on the type and size of a hospital or ICU.

⁶Confidence Interval: a possible range of values in which there is a 95% probability that the true value is within this range.

Peer Group 4						
	Number of Central Line Days ¹	Number of CLABSI Events ²	Expected Number of CLABSI Events ³	CLABSI Rate per 1,000 Central Line Days ⁴	Standardized Infection Ratio ⁵	95% Confidence Interval ⁶
Utah	71,567	96	153.0	1.3	0.63	0.51 - 0.77
Hospital 1	369	0	0.6	0	N/A	N/A
Hospital 2	933	1	1.4	1.07	0.72	0.02 - 3.98
Hospital 3	153	0	0.2	0	N/A	N/A
Hospital 4	1,845	0	2.4	0	0	0 - 1.52

Peer Group 5						
	Number of Central Line Days ¹	Number of CLABSI Events ²	Expected Number of CLABSI Events ³	CLABSI Rate per 1,000 Central Line Days ⁴	Standardized Infection Ratio ⁵	95% Confidence Interval ⁶
Utah	71,567	96	153.0	1.3	0.63	0.51 - 0.77
Hospital 1	25	0	0.04	0	N/A	N/A
Hospital 2	34	0	0.05	0	N/A	N/A
Hospital 3	2716	1	4.3	0.37	0.23	0.01 - 1.30
Hospital 4	423	0	0.79	0	N/A	N/A
Hospital 5	235	0	0.45	0	N/A	N/A

Peer Group 6						
	Number of Central Line Days ¹	Number of CLABSI Events ²	Expected Number of CLABSI Events ³	CLABSI Rate per 1,000 Central Line Days ⁴	Standardized Infection Ratio ⁵	95% Confidence Interval ⁶
Utah	71,567	96	153.0	1.3	0.63	0.51 - 0.77
Hospital 1	89	0	0.17	0	N/A	N/A
Hospital 2	61	0	0.09	0	N/A	N/A

Peer Group 7						
	Number of Central Line Days ¹	Number of CLABSI Events ²	Expected Number of CLABSI Events ³	CLABSI Rate per 1,000 Central Line Days ⁴	Standardized Infection Ratio ⁵	95% Confidence Interval ⁶
Utah	71,567	96	153.0	1.3	0.63	0.51 - 0.77
Hospital 1	10	0	0.02	0	N/A	N/A
Hospital 2	10,465	24	25.3	2.3	0.95	0.61 - 1.41

¹Number of central line days: the total number of days that a patient has a central line.

²Number of central line-associated bloodstream infection events: the total number of central line-associated bloodstream infections reported per year.

³Expected number of central line-associated bloodstream infection events: the number of central line-associated bloodstream infection events anticipated to occur in an ICU per year.

⁴Central line-associated bloodstream infection rate: the total number of central line-associated bloodstream infections that occurred per 1,000 central line days.

⁵Standardized Infection Ratio: compares the total number of central line-associated bloodstream infection events in a hospital's ICU to a national benchmark. Rates are adjusted based on the type and size of a hospital or ICU.

⁶Confidence Interval: a possible range of values in which there is a 95% probability that the true value is within this range.

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