



Central Line-Associated Bloodstream Infections (CLABSI) in Rhode Island

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Central Line-Associated Bloodstream Infections (CLABSIs) are primary bloodstream infections in patients who had a central line in place within 48 hours before the development of the infection. Central line infections are the most common bloodstream infections and are reasonably preventable with proper care.

METHODOLOGY

Rhode Island hospitals collect and report data on CLABSI rates in hospital **Intensive Care Units (ICUs)** to the Department of Health as part of the Health Care Quality Performance Program's public reporting mandate. Rates are based on CLABSIs that occur in the hospital ICU. Many hospitals have been collecting this information for several years as part of Rhode Island's ICU Collaborative. The CLABSI incidence rate is calculated as the number of line infections divided by the number of central line days multiplied by 1,000. Each hospital's rate is compared to the rates of other ICUs nationally that provide similar care using a **standardized incidence ratio (SIR)**. The SIR is calculated based on the observed cases (the actual number of line infections) divided by the expected cases, which is based on the average national CLABSI incidence rate for that ICU type. For hospitals with SIRs calculated, each hospital's SIR is included in the public report and helps to determine its diamond category as described in the results section. Diamonds are assigned based on how different each ICU's performance is from the average performance of similar ICUs across the country.

Diamond categories are based on hospitals' SIRs. A SIR less than 1.0 means the hospital's rate is lower or better than the national average; a SIR greater than 1.0 is higher or worse than the national average. The margin of error, or 90% confidence interval, determines whether each SIR is meaningfully different from 1.0. If there is no national comparison for a hospital ICU type, then neither a SIR nor diamonds are calculated.

Diamonds are assigned as follows:

- One diamond (*): If the SIR falls above 1.0 (*is worse than expected*) AND its margin of error, or "90% confidence interval," does not include 1.0, then the hospital has one diamond.
- Two diamonds (**): If the 90% confidence interval for the score includes the Rhode Island average, then the hospital's score is not accurate enough

to categorize it as better or worse than other hospitals (*is about the same as expected*). The hospital has two diamonds.

- Three diamonds (***): If the SIR falls below 1.0 (*is better than expected*) AND its margin of error, or "90% confidence interval," does not include 1.0, then the hospital has three diamonds. **Note:** The exception is when the hospital does not have any infections (where 0 is the best performance). When this occurs, a hospital is automatically given three diamonds.

RESULTS

Table 1 shows the number of CLABSI infections, number of central-line days, the CLABSI rate per 1,000 central-line days, the SIR based on the national benchmark, 90% confidence interval range, and diamond ratings by ICU type and hospital. There are twelve ICU types including: adult step-down units, coronary care units, medical intensive care units, medical/surgical critical care units at major teaching hospitals and all other hospitals, **Women & Infants Hospital's (WIH) Level III neonatal intensive care units (NICU)** by birth weight and umbilical catheter-associated infections at WIH Level III NICU by birth weight, neurosurgical intensive care units, pediatric medical/surgical intensive care units, surgical intensive care units, surgical cardiothoracic critical care units and trauma intensive care units.

During January-March 2010, there were no CLABSI infections at the adult step down units, coronary care units, surgical cardiothoracic critical care units, and trauma intensive care units, and there were no umbilical catheter-associated infections at the NICU. Among the remaining ICU types, the number of CLABSI infections ranged from 1 to 3 and the rate per 1,000 central line days ranged from 1.49 to 21.74. Among the four medical/surgical critical care units at major teaching hospitals, three received three stars and one received two stars. Among the six medical/surgical critical care units at non-teaching hospitals, three received three stars, two received two stars and one received one star.

DISCUSSION

Hospitals vary in the types of patients, and infection rates may be higher among those facilities that treat a high number of severely ill patients.

It is anticipated that public reporting CLABSI rates among

Table 1. CLABSI Rates by Hospital ICU Type

Hospital (Alphabetical by ICU type)	Number of CLABSI Infections	Number of Central Line Days	CLABSI Rate per 1,000 Central Line Days	SIR	90% CI*		Diamonds
					Lower Limit	Upper Limit	
Adult Step-Down Units (Post-Critical Care)							
Miriam Hospital CVTI*	0	121	0.00	0.00	-	-	***
Rhode Island Hospital ISCU*	0	473	0.00	0.00	-	-	***
Rhode Island Hospital ICCU*	0	98	0.00	0.00	-	-	***
Rhode Island Hospital ICTU*	0	272	0.00	0.00	-	-	***
Coronary Critical Care Units (CCUs)							
Miriam Hospital	0	115	0.00	0.00	-	-	***
Rhode Island Hospital	0	215	0.00	0.00	-	-	***
Medical Intensive Care Units (CCUs)							
Rhode Island Hospital	3	924	3.25	1.35	0.365	3.493	**
Medical/Surgical Critical Care Units (ICUs) at Major Teaching Hospitals							
Memorial Hospital	0	487	0.00	0.00	-	-	***
Miriam Hospital	0	909	0.00	0.00	-	-	***
Providence VA Medical Center	2	235	0.00	8.51	0.734	13.372	**
Roger Williams Medical Center	0	287	0.00	0.00	-	-	***
Medical/Surgical Critical Care Units (ICUs) at All Other (Non-Teaching) Hospitals							
Kent County Hospital	1	668	1.50	1.00	0.039	4.719	**
Landmark Medical Center	1	670	1.49	1.00	0.039	4.705	**
Newport Hospital	0	196	0.00	0.00	-	-	***
Our Lady of Fatima Hospital	0	379	0.00	0.00	-	-	***
South County Hospital	0	97	0.00	0.00	-	-	***
Westerly Hospital	3	138	21.74	14.49	3.914	37.415	*
Women and Infants Hospital's Level III Neonatal Intensive Care Units (NICU), by Birthweight							
<750 grams	1	52	19.23	5.20	0.205	24.58	**
751-1,000 grams	0	158	0.00	0.00	-	-	***
1,001-1,500 grams	0	155	0.00	0.00	-	-	***
1,501- 2,500 grams	0	11	0.00	0.00	-	-	***
>2,500 grams	1	156	6.41	3.21	0.127	15.155	**
Umbilical Catheter-Associated Infections at Women and Infants Hospital's Level III NICU, by Birthweight							
<750 grams	0	70	0.00	0.00	-	-	***
751-1,000 grams	0	55	0.00	0.00	-	-	***
1,001-1,500 grams	0	100	0.00	0.00	-	-	***
1,501- 2,500 grams	0	6	0.00	0.00	-	-	***
>2,500 grams	0	57	0.00	0.00	-	-	***
Neurosurgical Intensive Care Units (INCs)							
Rhode Island Hospital	1	550	1.82	0.73	0.029	3.439	**
Pediatric Medical/Surgical Intensive Care Units (PICUs)							
Rhode Island Hospital	1	301	3.32	1.15	0.045	5.417	**
Surgical Intensive Care Units (SICUs)							
Rhode Island Hospital	1	499	2.00	0.87	0.034	4.120	**
Surgical Cardiothoracic Critical Care Units							
Miriam Hospital CVTS*	0	274	0.00	0.00	-	-	***
Rhode Island Hospital CTIC*	0	521	0.00	0.00	-	-	***
Trauma Intensive Care Units (TICUs)							
Rhode Island Hospital	0	488	0.00	0.00	-	-	***

*Notes: Confidence intervals are not applicable when SIR equals 0.000.

CVTI: Cardiovascular Thoracic Intermediate Care Unit

ISCU: Surgical Care Unit

ICCU: Intermediate Coronary Care Unit

ICTU: Intermediate Cardiothoracic Unit

hospitals will help these facilities to identify areas for improvement and ultimately result in a reduction of central line related infections in the future. Tracking CLABSI rates will provide the opportunity for hospitals to measure and determine their progress in the prevention and reduction of CLABSIs in their facilities.

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Disclosure of Financial Interests

The authors and/or significant others have no financial interests to disclose.