



Healthcare Quality Reporting Program

CENTRAL LINE-ASSOCIATED BLOODSTREAM INFECTIONS (CLABSI)

Methods

The CLABSI rates are [reported on the Department of Health's \(HEALTH's\) Web site](#) as part of the public reporting program's hospital reporting work. The information on this page provides additional details about the results presented, including their data source, how they are calculated, and why the information is important.

Measure Information ([adapted from the National Healthcare Safety Network](#))

Topic	Why is this information important?
Central Line Associated Bloodstream Infections (CLABSI)	CLABSI are primary bloodstream infections in patients that had a central line in place within 48 hours before the development of the infection. Central line infections are important because they are the most common bloodstream infections and can harm patients. CLABSI are also considered reasonably preventable with proper care of patients' central lines.

Definitions

Word or Phrase	What does this mean?
Bloodstream infection	A bloodstream infection occurs when bacteria enter patients' blood, for example through their central line.
Central line	A "central line" is a special kind of IV or flexible tube that connects directly to a patient's heart or a major blood vessel. It can be used to draw blood or give patients medication or nutrition.
Intensive Care Unit (ICU)	A hospital unit that cares for critically-ill patients.
Rate	A score that reflects new (hospital-acquired) infections over a period of time; for the CLABSI infection rates, this timeframe is three months. <i>Lower</i> rates are better for CLABSI.

Data Source

Rhode Island hospitals collect information about their CLABSI rates for each ICU and share it with the Department of Health for reporting. Many Rhode Island hospitals have been collecting this information for several years as part of Rhode Island's ICU Collaborative. The rates are based on bloodstream infections that occur in the intensive care unit (ICU). For CLABSI rates, *lower* numbers are better.

Measure Calculation

The information in this section is for people who want details about the data calculations. For each hospital, two numbers are calculated: (1) **CLABSI incidence**, and (2) a **Standardized Incidence Ratio (SIR)**. Incidence is needed to calculate each hospital's SIR, and the diamonds presented in the public report are based on the SIR.

1. **CLABSI incidence** is calculated as follows:

$$\text{Rate} = \frac{(\text{number of line infections})}{(\text{number of central line days})}$$

The number of line infections is the **numerator**. The number of central line days (the number of days when patients could have developed an infection) is the **denominator**. The **incidence rate** is the numerator divided by the denominator multiplied by 1,000. Each hospital’s rate is compared to the rates of other ICUs nationally that provide similar care using SIRs.

2. If there is a national comparison for a hospital ICU type, incidence rates are used to calculate **SIRs**, which are:

$$\text{SIR} = \frac{(\text{observed cases})}{(\text{expected cases})}$$

The **observed cases** are the actual number of line infections (incidence rate numerator) and the **expected cases** are the number we expect to see if the average national CLABSI incidence rate for that ICU type were applied to each hospital ICU’s patient population (the incidence rate’s denominator). Lower scores are better. An SIR score less than 1.0 means the incidence is better than expected.

For hospitals with SIRs calculated, each hospital’s SIR is included in the public report and helps to determine its diamond category (see “Diamond Categories”).

Diamond Categories

The diamond categories help you understand how each hospital’s incidence compares to its expected incidence (or “expected cases,” determined based on the average performance of ICUs nationally that provide similar care):

- ◆ Worse than expected
- ◆◆ About the same as expected
- ◆◆◆ Better than expected

These categories are determined mathematically to ensure that the differences are meaningful. In detailed terms, this means that hospitals with either one diamond (◆) or three diamonds (◆◆◆) have CLABSI incidence rates that are “statistically significantly different” from their expected rates.

If there is no national comparison for a hospital ICU type, then neither an SIR nor diamonds are calculated.

Diamond Calculation

The information in this section is for people who want statistical details about the diamond calculations. The diamond categories are determined based on hospitals’ SIRs (see “Measure Calculation”). An SIR less than 1.0 means the hospital’s rate is lower (better) than expected; an SIR greater than 1.0 is higher (worse) than expected. The margin of error, or “90% confidence interval,” determines whether each SIR is meaningfully different from 1.0. 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 national average, then the hospital’s score is not accurate enough to categorize it as better or worse than other hospitals. 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 zero is the best performance). When this occurs, a hospital is automatically given three diamonds.

Data Table, April 2012-June 2012

The data table below provides additional details which are not presented in the Data Report, including:

- Number of CLABSI infections
- Number of central line days
- CLABSI rate per 1,000 central line days
- SIR, based on the [national benchmark](#)
- 90% CI range

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	
Coronary Critical Care Units (CCUs)							
The Miriam Hospital	0	113	0.00	0.00	-	-	◆◆◆
Rhode Island Hospital	0	195	0.00	0.00	-	-	◆◆◆
Medical Intensive Care Units (MICUs)							
Rhode Island Hospital	1	747	1.34	0.61	0.02	2.88	◆◆
Medical/Surgical Critical Care Units (ICUs) at Major Teaching Hospitals							
Kent Hospital	1	687	1.46	0.86	0.03	4.05	◆◆
Memorial Hospital	0	253	0.00	0.00	-	-	◆◆◆
The Miriam Hospital	0	744	0.00	0.00	-	-	◆◆◆
Providence VA Medical Center	0	75	0.00	0.00	-	-	◆◆◆
Roger Williams Medical Center	0	318	0.00	0.00	-	-	◆◆◆
Medical/Surgical Critical Care Units (ICUs) at All Other (Non-Teaching) Hospitals							
Landmark Medical Center	0	455	0.00	0.00	-	-	◆◆◆
Newport Hospital	0	115	0.00	0.00	-	-	◆◆◆
Our Lady of Fatima Hospital	1	231	4.33	3.33	0.13	15.75	◆◆
South County Hospital	0	144	0.00	0.00	-	-	◆◆◆
Westerly Hospital	0	152	0.00	0.00	-	-	◆◆◆

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	
Women & Infants Hospital's Level III Neonatal Intensive Care Units (NICU), by Birthweight							
<750 grams	3	155	19.35	5.69	1.54	14.70	◆
751-1,000 grams	0	193	0.00	0.00	-	-	◆◆◆
1,001-1,500 grams	1	80	12.50	6.58	0.26	31.11	◆◆
1,501-2,500 grams	0	166	0.00	0.00	-	-	◆◆◆
>2,500 grams	0	112	0.00	0.00	-	-	◆◆◆
Umbilical Catheter-Associated Infections at Women & Infants Hospital's Level III NICU, by Birthweight							
<750 grams	0	59	0.00	0.00	-	-	◆◆◆
751-1,000 grams	0	95	0.00	0.00	-	-	◆◆◆
1,001-1,500 grams	0	97	0.00	0.00	-	-	◆◆◆
1,501-2,500 grams	0	40	0.00	0.00	-	-	◆◆◆
>2,500 grams	0	47	0.00	0.00	-	-	◆◆◆
Neurosurgical Intensive Care Units (INCs)							
Rhode Island Hospital	3	563	5.33	3.55	0.96	9.17	◆◆
Pediatric Medical/Surgical Intensive Care Units (PICUs)							
Rhode Island Hospital	0	280	0.00	0.00	-	-	◆◆◆
Surgical Intensive Care Units (SICUs)							
Rhode Island Hospital	1	364	2.75	1.53	0.06	7.22	◆◆
Surgical Cardiothoracic Critical Care Units							
Rhode Island Hospital CTIC	0	665	0.00	0.00	-	-	◆◆◆
Trauma Intensive Care Units (TICUs)							
Rhode Island Hospital	3	406	7.39	2.84	0.77	7.34	◆◆

- Confidence intervals are not applicable when the SIR equals 0.00.

* N/A: No national comparison is available, so SIR and diamonds cannot be calculated.