



Tennessee's Report on Healthcare Associated Infections:

January—December, 2008

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Executive Summary

Since January 2008, hospitals in Tennessee have monitored central line associated bloodstream infection (CLABSI) rates in the following types of intensive care units (ICU, also referred to as critical care units): pediatric, surgical, medical, major teaching medical surgical, non-major teaching medical-surgical, neurosurgical, coronary, and cardiothoracic-surgical units. For each ICU, hospitals collect the number of CLABSIs occurring and the number of central line days.

Central Line-Associated Bloodstream Infections (CLABSI) in Adult and Pediatric ICUs in 2008

Results:

CLABSI rates in 2008 were highest in pediatric ICUs (3.2 infections per 1,000 central line days), followed by: medical surgical units in major teaching hospitals (3.1), surgical (2.7), coronary (2.5), neurosurgical (2.5), medical (2.1), cardiothoracic-surgical (1.8), and non-major medical surgical units (1.7) (Table 1). Tennessee CLABSI rates were significantly higher than 2006-2007 national rates in major teaching medical surgical ICUs (3.1 vs 2.0 infections per 1,000 central line days). In 2008, overall CLABSI rates in ICUs were 20% times higher in Tennessee compared to the National Healthcare Safety Network [NHSN] data for 2006-2007. The overall standardized infection ratio [SIR] across all reporting adult and pediatric ICUs in Tennessee in 2008 compared to national NHSN 2006-2007 data was statistically significantly higher (SIR= 1.2 [1.1 to 1.3]).

CLABSI rates in 2008 varied across the three grand divisions of Tennessee (Table 2). CLABSI rates were significantly higher (compared to national 2006-7 rates) in West Tennessee among major teaching medical surgical ICUs [3.6 vs. 2.0; SIR: 1.8 (1.3-2.4), i.e., 80% higher than the national average for 2006-7)] and surgical cardiothoracic ICUs [2.3 vs 1.4; SIR: 1.6 (1.1-2.2) (i.e., 60% higher than the national average for 2006-7)]. CLABSI infection rates were significantly lower among neurosurgical ICUs in East Tennessee [0.3 vs. 2.5; SIR: 0.1 (0.0-0.8), i.e., 90% lower than the national average for 2006-7)]. The overall SIR in East Tennessee was 1.0 (0.9-1.3). The overall SIR was 1.2 (1.0-1.4) in Middle Tennessee and 1.3 (1.2-1.6) in West Tennessee. Overall CLABSI rates in ICUs in West Tennessee were 30% higher than national 2006-2007 rates.

Some hospitals' ICUs reported zero infections. However because of the low number of central line days, this result may not be statistically significant. We cannot conclude that if there were an increased number of central line days, they would continue to have zero infections. Table 5 lists the number of facilities and proportion of facilities that reported zero infection rates by ICU type.

The microorganisms identified in 495 CLABSIs among adult and pediatric ICU patients are listed in Table 4. The most common four pathogens were: coagulase negative staphylococci (24.1%), *Enterococcus* species (22.1%), *Candida* spp (17.9%) and *Staphylococcus aureus* (12.1%). Vancomycin resistant enterococci accounted for 8.8% and methicillin-resistant *S. aureus* [MRSA] for 7.1% of isolates.

BACKGROUND:

Healthcare-associated infections are a major public health problem. According to the Centers for Disease Control and Prevention (CDC), there were an estimated 1.7 million healthcare-associated infections and 99,000 deaths from those infections in 2002, making it one of the top ten leading causes of death (Klevens et al, 2007, Public Health Reports). A recent CDC report estimated the annual medical costs (adjusted to 2007 dollars.) of healthcare-associated infections to U.S. hospitals to between \$35.7 and \$45 billion (Scott, 2009 available at URL: http://www.cdc.gov/ncidod/dhqp/pdf/Scott_CostPaper.pdf). These monetary costs do not measure the effect of these infections on the patients, their family members, friends and colleagues. Their emotional, physical and personal costs are not quantifiable.

In June, 2006, the Tennessee Legislature passed Senate Bill 2978 and the Governor signed the Public Acts, Public Chapter 904 (PC904) requiring hospitals to report selected hospital-acquired infections (HAIs) to the Tennessee Department of Health (TDH or “the Department”). The legislation required use of CDC’s National Healthcare Safety Network (NHSN) for reporting, making Tennessee the fifth state to use this system. Currently, 19 states require reporting of HAI using NHSN and it has become the standard for state reporting.

The following report summarizes the 2008 TDH HAI reporting program activities; provides 2008 hospital-acquired infection rates by individual hospital, grand division and Tennessee totals for 2008; and compares these rates to the most recent available national data (2006-2007).

METHODS:

HAI reporting indicators for 2008

Central Line-Associated Bloodstream Infections (CLABSI) – A central line is a tube that is placed into a patient’s large vein, usually in the neck, chest, arm or groin. The line is used to give fluids and medication, withdraw blood, and monitor the patient’s condition. A bloodstream infection can occur when microorganisms (e.g., bacteria, fungi) are introduced, attach and multiply on the tubing or in fluid administered through the tubing and then enter the blood.

CLABSI are not frequently monitored throughout the hospital, but rather, in selected intensive care units (ICUs). ICUs are hospital units that provide intensive observation and treatment for patients either dealing with, or at risk of developing life threatening problems. ICUs are also referred to as critical care units. ICUs are described by the types of patients cared for. In Tennessee for 2008, the following ICU types were required to participate in the reporting program for CLABSI if their facility had an average daily census of 25+:

- Coronary ICUs
- Cardiothoracic Surgery ICUs
- Medical ICUs

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- Medical Surgical ICUs
- Surgical ICUs
- Neurosurgical ICUs
- Pediatric ICUs
- Neonatal ICUs [NICU] – level III and level II/III

Level 1 trauma ICUs and Burn ICUs were not required to report CLABSIs. Neonatal ICUs started reporting in July 2008 (and will be published in a separate report); all other ICUs started to report in January 2008.

Training of Infection Preventionists at Healthcare Facilities

Hospitals were required to review the NHSN patient safety protocol, and other training materials/archived webinars from CDC as per CDC/NHSN instructions. Three regional face-to-face training sessions were conducted throughout Tennessee in April 2007 and four in September 2007 to ensure full understanding of NHSN protocols and definitions. These sessions included didactic lectures on NHSN enrollment, CLABSI and Surgical Site Infections (SSI) definitions with ample time for questions and answers, case-studies, and a pop-quiz to re-enforce fine-print definition details. The support of the local Association for Professionals in Infection Control and Prevention (APIC) chapters and the Tennessee Hospital Association (THA) was essential to the success of this training; they provided venues, logistical support (e.g., registration) and copied training materials. Hospitals continue to participate in monthly NHSN conference calls on which definitions and protocols are clarified and case scenarios are discussed.

Timeliness and Completeness of Reporting

TDH staff monitored the timeliness, completeness and accuracy of hospital reports and conducted onsite audits to assure compliance with the statutory reporting requirements.

Data Validation

Data reported to the NHSN are validated using a number of methods:

Point of entry checks -The NHSN is a web-based data reporting and submission program that includes validation routines for many data elements, reducing common data entry errors. Hospitals can view, edit, and analyze their data at any time.

Monthly checks for internal consistency - Each month, TDH staff download the data from the NHSN and verified completeness with a computerized data validation program. Data that are missing, unusual, inconsistent, or duplicate are identified and investigated through email or telephone communication with hospital staff. Hospitals are given the opportunity to verify and/or correct the data.

On-site audits - Audits of a sample of medical records were conducted by the Department to assess compliance with reporting requirements. Onsite visits were conducted by HAI

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program staff in 14 reporting hospitals in 2009 and consisted of reviewing medical charts from adult and pediatric ICUs. The purposes of the audits were to:

- Enhance the reliability and consistency in applying the surveillance definitions;
- Evaluate the adequacy of surveillance methods to detect infections;
- Evaluate intervention strategies designed to reduce or eliminate specific infections; and
- Discuss identified inconsistencies and allow hospitals to modify records as needed.
- Ongoing monitoring, education and trainings are provided to ensure the integrity of the data.

Thresholds for Reporting Hospital-Specific Infection Rates

Only hospitals with an average daily census of at least 25 inpatients that provide ICU care were required to report CLABSIs in 2008. Hospital ICUs with very few patients with central lines will have infection rates that may fluctuate greatly over time. Even a few infections will yield a numerically high rate in the rate calculation when the denominator of central lines is small. To assure a fair and representative set of data, the Department adopted the NHSN minimum thresholds for reporting. The minimum thresholds are:

- For CLABSIs there must be a minimum of 50 central-line days over a 12 month period. Central line days are the total number of days central lines are used for each patient in an ICU over a given period of time.

Risk Adjustment

Risk adjustment is a statistical technique that accounts for the differences in patient populations in terms of severity of illness and other factors that may affect the risk of developing a hospital acquired infection and, thus allows hospitals to be more fairly 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. Therefore, before comparing the infection rates of hospitals, it is important to adjust for the number and proportion of high and low risk patients. Different risk adjustment methods are used for different types of HAI s (e.g., CLABSI, and surgical site infections [SSI]s).

Patient level data are not collected on adult or pediatric patients with central lines therefore, risk adjustment is limited to the type of intensive care unit and numbers of patients with a central line.

Tennessee State and National Comparisons

This report displays Tennessee rates calculated from 2008 data, however, the national data are from the National Healthcare Safety Network (NHSN), and the latest report available at the time of publication covered the period of 2006 through 2007 was used (available at <http://www.cdc.gov/nhsn/PDFs/dataStat/2008NHSNReport.pdf>). The CDC modified definitions as of January 1, 2008 and used the new definitions and methods of analysis for their

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2006/2007 report. The CDC definition of a CLABSI event no longer includes situations in which a single blood culture was positive for a normal skin contaminant even if antibiotic therapy was started. Therefore, although the time periods of the data differ, the analyses and methods used are consistent.

While national aggregate CLABSI data are published in the annual NHSN Reports, these rates must be stratified by types of locations to be risk-adjusted. This scientifically sound risk-adjustment strategy creates a practical challenge to summarizing this information nationally, regionally or even for an individual healthcare facility. For instance, when comparing CLABSI rates, there may be quite a number of different types of locations for which a CLABSI rates could be reported. This raises the need for a way to combine CLABSI rate data across location types that takes into account the varying risk of CLABSIs for different locations.

Tennessee rates were compared to national rates using the same statistical tests implemented in the NHSN for comparing hospital rates to national rates within risk categories. Central-line associated blood stream infection rates are based on the Poisson distribution. We used the standardized infection ratio [SIR] as a summary measure to compare pooled mean rates of CLABSI in adult and pediatric ICUs in Tennessee for 2008 to published national (NHSN) rates for 2006-7 for each ICU type. The SIR is identical in concept to a standardized mortality ratio and is an indirect standardization method for summarizing HAI experience across any number of stratified groups of data.

The SIR calculation is based on dividing the total number of observed CLABSI events by the predicted* number of CLABSIs, using the CLABSI rates from the standard population (in this case: NHSN for 2006-2007). This predicted number is calculated by multiplying the national CLABSI rate from the standard population by the observed number of central line-days (CLD) for each stratum which can also be understood as a projection. When the $SIR = 1$ the healthcare facility's ICUs had the same rate of CLABSIs as the national average rate. An $SIR > 1$ implies the facility is producing more CLABSIs than predicted; an $SIR < 1$ means less than predicted infections.

We calculated SIRs for each ICU type as well as an overall SIR for adult and pediatric ICUs in Tennessee compared to national NHSN data. We also calculated SIRs for the three Grand Divisions (West, Middle and East) of Tennessee, as well as SIRs by participation in the Tennessee Center for Patient Safety infection prevention collaborative for CLABSIs. Finally, an SIR for each facility was calculated. This allows a single risk adjusted summary measure for each hospital, although a facility may have multiple ICUs.

The following table illustrates the method of calculating a SIR across two risk strata (2 ICU types, coronary and med-surg) for which national data exist from NHSN. If the observed data represented a follow-up period such as 2009 one would state that an SIR of 0.77 implies that there was a 23% reduction in CLABSIs overall for the nation, region or facility.

* "Predicted" is used throughout the report as a synonym for the standard statistical term "expected".

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Risk Group Stratifier	Observed CLABSI Rates			NHSN CLABSI Rates for 2006-2007 (Standard Population)		
	Location Type	#CLABSI	#Central line-days	CLABSI rate*	#CLABSI	#Central line-days	CLABSI rate*
Coronary ICU	170	100,000	1.7	1260	600,000	2.1
Med-Surg ICU	58	58,000	1.0	600	400,000	1.5
$\text{SIR} = \frac{\text{observed}}{\text{expected}} = \frac{170 + 58}{100000 \times \left(\frac{2.1}{1000}\right) + 58,000 \times \left(\frac{1.5}{1000}\right)} = \frac{228}{210 + 87} = \frac{228}{297} = 0.77$						

In summary, to calculate the Standardized Infection Ratio (SIR) for a facility:

1. For each reporting ICU, multiply the number of central line days [CLD]s by the published infection rate for that ICU type, to estimate the number of infections predicted (expected) for that ICU if it were to produce CLABSIs at the same frequency as the national rate (CLD x national rate / 1000).
2. Within each hospital, calculate the sum of predicted (expected) infections and the sum of reported infections across all reporting ICUs.
3. Calculate SIR = (total reported infections/total predicted (expected) infections).¹

The SIR concept and calculation is based on the underlying CLABSI rate data that exist across a potentially large group of strata. Thus, the SIR provides a single metric for performing comparisons rather than the cumbersome task of attempting to perform multiple comparisons across many strata. Given the underlying CLABSI rate data, one retains the option to perform comparisons within a particular set of strata where observed rates may differ significantly from the standard populations. These types of more detailed comparisons can be very useful and necessary for identifying areas needing more focused prevention efforts.

Calculation of Exact Confidence Interval of SIR²

¹ Copyright 2010 by Consumers Union of United States, Inc., 101 Truman Ave., Yonkers, NY 10703, a nonprofit organization. This report was posted with permission for educational purposes only, from www.ConsumerReportsHealth.org. No downloading, transmission, photocopying, or commercial use permitted. www.ConsumerReportsHealth.org and www.ConsumerReports.org.[®]

² Rothman KJ, Boice JD Jr: Epidemiologic analysis with a programmable calculator. NIH Pub No. 79-1649. Bethesda, MD: National Institutes of Health, 1979;31-32.

Rationale:

Confidence intervals are frequently required in epidemiology, particularly in relation to standardized Infection ratios (SIRs). The SIR is the ratio of the observed number of infections, which is usually assumed to be the realization of a Poisson variate, to the predicted number of infections, which is assumed to be a constant because the referent mortality rates are usually based on a very large number of persons so that the variation in these rates can be ignored. For a larger number of observed infections NHSN, several approximate methods are available. When the number of infections is small, however, all of the approximate methods will be inadequate and exact confidence limits may be desirable.

Exact Test

Exact confidence limits for an SIR can be derived by setting limits for the numerator and assuming the expected number in the denominator to be a constant. The limits for 'a' with 100(1-α) percent confidence are the iterative solutions \underline{a} and \bar{a} .

Computing iterative solutions \underline{a} and \bar{a} are below.....

Fisher's exact test (see Rothman and Boice):

Lower bound:
$$\sum_{i=0}^a \frac{e^{-\underline{a}} \underline{a}^i}{i!} = 1 - \alpha/2$$

Upper bound:
$$\sum_{i=0}^a \frac{e^{-\bar{a}} \bar{a}^i}{i!} = \alpha/2$$

Therefore, the exact lower and upper limits for SIR equal to "a/λ" would be

$\frac{\underline{a}}{\lambda}$ and $\frac{\bar{a}}{\lambda}$, respectively.

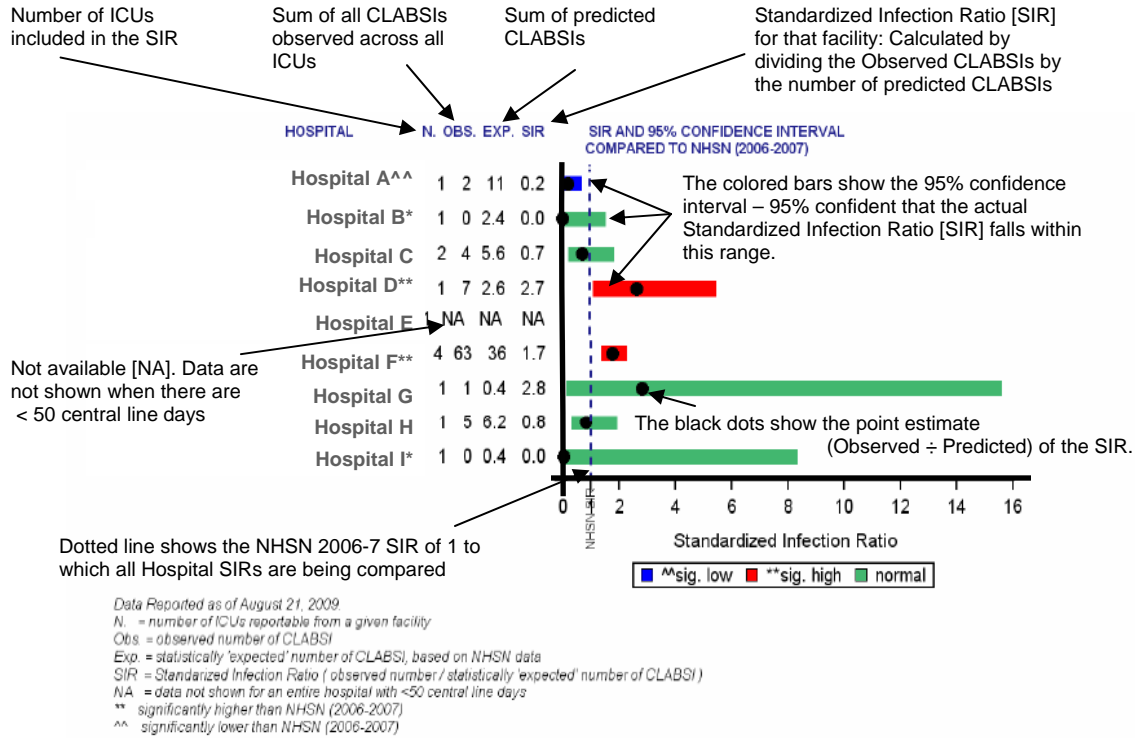
The notation for the formulae is:

a = the observed number of infections

λ = the expected number of infections

Figures 1 and 2 provide examples how the figures in this report on facility specific Standardized Infection Ratios and Infection Rates should be interpreted.

Figure 1. How to Read Hospital Specific Standardized Infection Ratio Figures

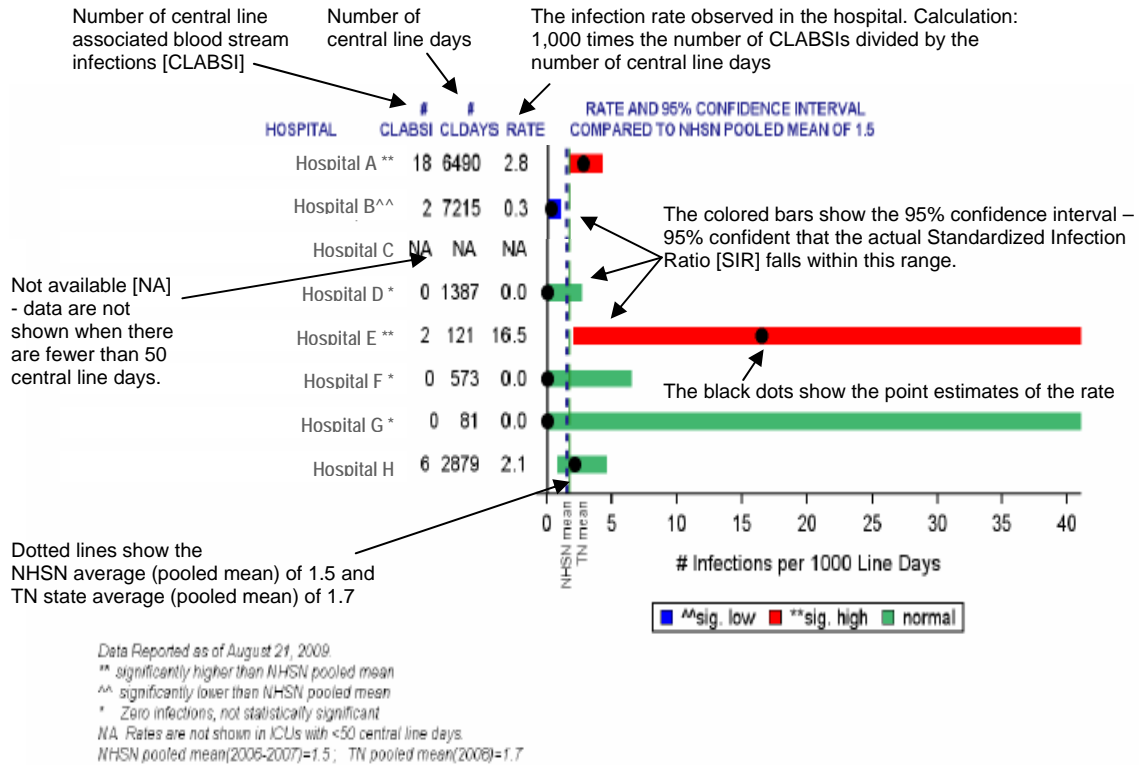


- Hospital A reported CLABSIs from one (1) ICU [N]. They had a total of two (2) CLABSIs in 2008 [OBS]. Statistically, 11 CLABSIs were predicted [EXP] during that time, based on the number of central line days in Hospital A's ICU and the national NHSN rate for that type (e.g., med-surg, coronary) of ICU. The standardized infection ratio [SIR] is 0.2. That means that the number of infections observed was 1/5 of what was predicted (or 80% lower than the national pooled mean (average)). This was statistically significant as the blue bar did not cross the dotted line (or 1, the NHSN 2006/7 SIR). The 95% confidence interval is indicated by the width of the blue bar. For hospital A it is narrow, probably due to a large number of central line days.
- Hospital B reported CLABSIs from one (1) ICU [N]. They totaled zero (0) CLABSIs in 2008 [OBS]. Statistically, two (2) CLABSIs were predicted [EXP] during that time based on the number of central line days in that ICU and the national NHSN rate for that type of ICU. The standardized infection ratio [SIR] is zero (0), but the green bar indicates that the 95% confidence interval has crossed the dotted line, (1, the NHSN 2006/7 SIR), this is not statistically significantly lower than the prediction based on national rates. All hospitals reporting zero observed infections (and consequently, have an SIR of zero) are noted with a star (*) because they deserve acknowledgement for achieving zero infections.

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- Hospital C has two (2) ICUs and reported four (4) infections (5.6 were predicted). Their SIR point estimate was 0.7, meaning they were 30% below the national average. However, the green bar crosses the dotted line (national SIR of 1) and indicates the point estimate was not lower than predicted based on national data.
- Hospital D has one (1) ICU and observed seven (7) CLABSIs (only 2.6 were predicted). The SIR was 2.7 and the red bar was above the dotted line. The CLABSI rates in Hospital D were 2.7 times (170%) higher than national rates. The red bar shows a wider confidence interval than Hospitals A, B and C; this indicates that the SIR is not very stable (it could be as low as 1.5 and as high as 5.5). Hospital D probably has a low number of central line days.
- Hospital E reported less than 50 central line days therefore the data are not shown because with such a small denominator, the ratio is not stable.
- Hospital F has four (4) ICUs, and observed 63 CLABSIs across the ICUs in 2008. The NHSN SIR predicted 36 CLABSIs. The SIR was 1.7; meaning Hospital F had 70% higher infection rate than the national average. The red bar does not cross the dotted line, it is significantly higher than the national average. The confidence interval is very narrow. This tells us the ratio is stable and we can be more confident in its measurement.
- Hospital G reported one (1) CLABSI from one (1) ICU. There were 0.4 infections predicted, and the SIR was 2.8, 180% higher than the national average — the highest of any of the hospitals in this figure. But, the green bar crosses the dotted line and is very wide, so we cannot be very confident in the accuracy of the SIR. Therefore, Hospital G's CLABSI rates are not significantly higher than the national rates.
- Hospital H reported zero (0) CLABSI infections from its one (1) ICU; there were 0.4 infections predicted, therefore the SIR was zero. However, the green bar crosses the dotted line. This means we cannot be certain this hospital would have continued to have zero infections if there were more central line days. All hospitals observing zero infections (and consequently, have an SIR of zero) receive a star (*) because they deserve acknowledgement for achieving zero infections.

Figure 2. How to Read Hospital Specific Infection Rate Figures



- Hospital A had a central line associated blood stream infection rate of 2.8 per 1,000 central line days. This infection rate is significantly higher than the national pooled mean (average); graphically represented by the red bar falling entirely above the dotted line, which represents the national NHSN pooled mean of 1.5 per 1,000 central line days. The 95% confidence interval is narrow because there were a large number of central line days (6,490). Narrow confidence intervals imply the rate is stable and we can be more confident in the measurement.
- Hospital B had a rate of 0.3 infections per 1,000 central line days which is significantly lower than the national NHSN pooled mean because the blue bar is entirely below the dotted line representing the national NHSN pooled mean of 1.5 per 1,000 central line days. The 95% confidence interval is very narrow because of a large number of central line days (7,215). Narrow confidence intervals in relation to the rate suggest stability and we can be more confident in the measurement.
- Hospital C data are not shown because there were less than 50 central line days and therefore the rates are not stable.
- Hospital D had zero infections, but was not considered statistically lower than the national pooled mean because the green bar crosses the dotted line. The hospital had 1,387 central line days, but we cannot be certain the hospital would have seen zero infections if they had more central line days. All hospitals observing zero infections

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- receive a star (*), because they deserve acknowledgement for achieving zero infections.
- Hospital E had the highest infection rate (16.5 per 1,000 central line days) and was statistically higher than the national pooled mean because the red bar falls entirely above the dotted line. The confidence interval is wide because there were so few central line days (121).
 - Hospital F had zero infections, but was not statistically lower than the national pooled mean because the green bar crosses the dotted line. The hospital had 573 central line days, and we cannot be certain the hospital would have seen zero infections if they had more central line days. All hospitals observing zero infections receive a star (*), because they deserve acknowledgement for achieving zero infections.
 - Hospital G had zero infections, but this was not considered statistically lower than the national pooled mean because the green bar crosses the dotted line. The hospital only had 81 central line days, and we cannot be certain the hospital would have seen zero infections if they had more central line days. The 95% confidence interval is extremely wide because there were so few central line days (81). All hospitals observing zero infections receive a star (*), because they deserve acknowledgement for achieving zero infections.
 - Hospital H had the third highest infection rate (2.1 per 1,000 central line days), but was not considered statistically higher than the national pooled mean because the green bar crosses the dotted line. The 95% confidence interval is narrow because there were a large number of central line days (2,879). Narrow confidence intervals in relation to the rate tell us the rate is stable and we can be more confident in the measurement.

RESULTS:

CLABSIs in Adult/Pediatric ICUs –Tennessee and National Comparisons (Table 1, Figures 3 and 4)

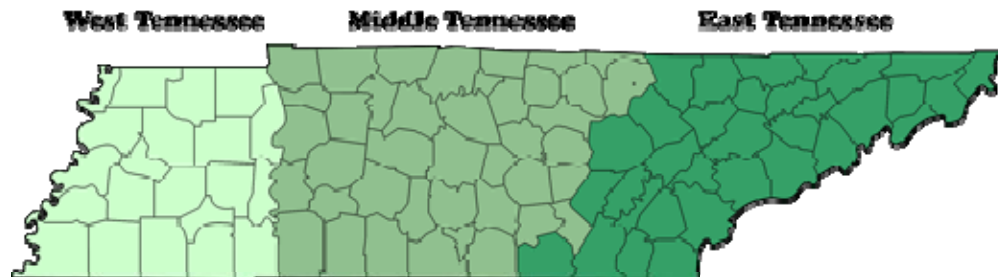
- The following list summarizes the CLABSI rates per 1,000 central line days in Tennessee for 2008. CLABSI rates were highest in pediatric ICUs, and lowest among medical surgical units in non-major teaching hospitals:
 - pediatric (3.2),
 - major teaching medical surgical (3.1),
 - surgical (2.7),
 - coronary (2.5),
 - neurosurgical (2.5),
 - medical (2.1),
 - cardiothoracic-surgical (1.8),
 - non-major teaching medical surgical (1.7)

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- Tennessee CLABSI rates were significantly higher than 2006-2007 national rates in major teaching medical surgical ICUs (3.1 vs. 2.0 infections per 1,000 central line days). The SIR for medical surgical ICUs in major teaching hospitals in Tennessee was 1.5 (95% CI: 1.2- 1.9). This means in 2008, CLABSI infection rates in medical surgical ICUs in major teaching hospitals in Tennessee were 50% higher than published national rates. As of the date of this report, national rates are only available for 2006-2007.
- The overall SIR across all 124 reporting adult and pediatric ICUs in Tennessee in 2008 compared to national NHSN 2006-2007 data was statistically significantly higher (SIR= 1.2 [95% CI : 1.1 - 1.3]). This means that in 2008, overall CLABSI rates in ICUs were 20% higher in Tennessee compared to national rates. Again, national rates are only available for 2006-2007.
- The median rate of CLABSIs across 124 reporting ICUs was 1.6 infections per 1,000 central line days.

CLABSI Rates in Adult/Pediatric ICUs – Across the Three Grand Divisions in Tennessee: (Table 2, Figure 5)

The following map depicts the three grand divisions in Tennessee:



- CLABSI rates varied across the three grand divisions of Tennessee within ICU settings.
- CLABSI infection rates were significantly lower among neurosurgical ICUs in East Tennessee [0.3 vs. 2.5; SIR: 0.1 (0.0-0.8)] compared to national 2006-7 rates.
- CLABSI rates were significantly higher in:
 - West Tennessee among major teaching medical surgical ICUs [3.6 vs. 2.0; SIR: 1.8 (1.3-2.4), i.e., 80% higher than national 2006-7 rates],
 - West Tennessee among cardiothoracic surgical ICUs [2.3 vs. 1.8; SIR: 1.6 (1.1-2.2) i.e., 130% higher than national 2006-7 rates)].
- The overall SIRs by Grand Division are as follows:
 - East Tennessee: 1.0 (0.9-1.2).
 - Middle Tennessee: 1.2 (1.0-1.4)
 - West Tennessee: 1.3 (1.2-1.6)

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- Overall CLABSI rates among adult and pediatric ICUs in West Tennessee were significantly higher (30% higher) than national 2006-2007 rates.

CLABSI Rates in Adult and Pediatric ICUs Among Facilities that participated in the Tennessee Center for Patient Safety (TCPS) Infection Prevention Collaborative. (Table 3, Figure 6)

- No individual hospital participating in the TCPS Infection Prevention Collaborative reported significantly higher rates of CLABSI infection than the national 2006-2007 rates.
- The overall SIR for hospitals NOT participating in the TCPS Infection Prevention Collaborative was significantly higher than national 2006-2007 rates, SIR:1.4 (1.2-1.7), (i.e., 40% higher)
- Individually, hospitals NOT participating in the TCPS Infection Prevention Collaborative CLABSI rates were higher in:
 - Major Teaching Medical-Surgical ICUs [5.6 vs. 2.0; SIR:2.8 (1.7-4.2) i.e., 180% higher than national 2006-7 rates
 - Non-Major Teaching Medical-Surgical ICUs [2.3 vs. 1.5; SIR: 1.6 (1.2-2.1), i.e., 130% higher than national 2006-7 rates.

Microorganisms Associated with CLABSIs in Adult and Pediatric ICUs (Table 4, Figure 7)

- The most common microorganisms identified in adult/pediatric ICU-related CLABSIs were coagulase negative staphylococci (24%), enterococci (22%), *Candida* species and yeasts (18%), and *Staphylococcus aureus* (12%). MRSA was the 4th most common organism, accounting for 7% of organisms identified from CLABSIs.

Hospital-Specific CLABSI Rates in Adult and Pediatric ICUs – Figures 6 – 15, Tables 5 - 12

- The hospital-specific CLABSI rates are displayed by type of ICU. If CLABSI rates are statistically lower than the national NHSN pooled mean (for 2006-2007), the bar (representing the confidence interval) is blue and if statistically higher, the bar is red. Some hospitals have reported zero (0) CLABSIs in specific ICUs although the rate may not be statistically significant due to the lower number of patients and days with a central line. The following number and percent of ICUs reported zero (0) infections:
 - 0 of 9 Coronary ICUs – 0%
 - 3 of 14 Cardiothoracic ICUs – 21%
 - 4 of 19 Medical ICUs – 21%
 - 0 of 10 Major Teaching Medical-Surgical ICUs – 0%
 - 24 of 49 Non-Major Teaching Medical-Surgical ICUs – 43%
 - 1 of 9 Surgical ICUs – 11%
 - 2 of 7 Neurosurgical ICUs – 29%
 - 0 of 7 Pediatric ICUs – 0%

Definitions

Unless a reader works in the healthcare field or understands statistics, he/she may not be familiar with some of the words or labels mentioned in the Tennessee Healthcare Associated Infections [HAI] Report. On this page, we've tried to explain what some of them mean. Don't worry if it seems like too much to absorb at once. A reader doesn't need to know all the terms to understand the reports.

Definition of Terms - HAI Public Report

Central line: A flexible tube that is inserted near a patient's heart or into one of the large blood vessels near the heart. A central line can be used to give fluids, antibiotics, medical treatments such as chemotherapy, and liquid food if a patient is unable to eat or digest food normally. If a central line is inserted incorrectly or not cared for properly, it can cause dangerous bloodstream infections. Central lines are also sometimes called central venous lines or central venous catheters.

Central Line-Associated Bloodstream Infection [CLABSI]: When a patient develops a bloodstream infection at least 48 hours after having a central line put in (or, in the case of a newborn, an umbilical catheter) it is considered a CLABSI. According to the Centers for Disease Control and Prevention (CDC), an estimated 200,000 CLABSIs occur in U.S. hospitals each year. These bloodstream infections often lead to longer hospital stays, higher costs, and an increased risk of dying. CLABSIs can be prevented through proper insertion and care of the central line ([see Patient guide to CLABSI](#)). Every time a patient gets an infection that meets the definition of a CLABSI, hospitals must report it to the National Healthcare Safety Network (NHSN), defined below.

Central line days: This is the total number of days a central line is in place for patients in surgical, intensive care, and certain other hospital units. The count is performed at the same time each day. Each patient with one or more central lines at the time the count is performed is counted as one central line day.

For example: Five patients on the first day of the month had one or more central lines in place. Similarly, five patients on day 2, two patients on day 3, five patients on day 4, three patients on day 5, four patients on day 6,; and four patients on day 7 had central lines in place. Adding the number of patients with central lines on days 1 to 7 we would have $5 + 5 + 2 + 5 + 3 + 4 + 4 = 28$ central line days for the first week. The number of central line days for the month is simply the sum of the daily counts.

CLABSI Infection Rate: To get this rate, we divide the total number of central line-associated bloodstream infections by the number of central line days. That result is then multiplied by 1,000.

Central Line Utilization Ratio: This ratio comes from dividing the number of central line-days by the number of patient days. It is also referred to as the device utilization [DU] ratio

Confidence Intervals: Confidence intervals tell us about the reliability of information. If TDH states a confidence interval of 95 percent, it means that the TDH is 95 percent confident that the hospital's precise infection rate falls within the range given.

For TDH reports, the confidence interval is based on the specific number of infections observed in a hospital during the time period in question and on the number of patient-days involving a central line that preceded infections.

If two hospitals have different infection rates, but the confidence intervals for the two rates overlap, then it is reasonably possible that the REAL rates are the same. ([Discussion of confidence intervals](#)) (pdf)

Hospital Acquired Infection (HAI): For an infection to qualify as an HAI, there must be no evidence that it was present or incubating at the time of hospital admission. An HAI may be confined to one area of the body (localized) or be spread throughout (systemic). It is the body's adverse reaction to the presence of an infectious agent(s) or its toxin(s).

Infection control / prevention processes: These are routine measures to prevent infections that can be used in all healthcare settings. These steps or principles can be expanded to meet the needs of specialized types of hospitals. Some hospitals make the processes mandatory. Examples include:

- Diligent hand cleaning
- Use of personal protective equipment such as gloves, gowns, and/or masks when caring for patients in selected situations to prevent the spread of infections.
- Use of an infection prevention checklist when putting in central lines. The list reminds healthcare workers to clean their hands thoroughly; clean the patient's skin before insertion with the right type of soap; wear the recommended sterile gown, gloves and mask; and place sterile barriers around the insertion site, etc.
- Monitoring to ensure that staff are following the proper infection prevention procedures.

Infection Preventionists (IP): These health professionals have special training in infection prevention and monitoring.

Intensive Care Unit (ICU) (also known as Critical Care Unit): ICU's are hospital units that provide intensive observation and treatment for patients either dealing with, or at risk of developing, life threatening problems. Smaller hospitals typically care for both medical and surgical patients in a combined medical/surgical ICU. Larger hospitals typically have separate ICUs for medical patients and surgical patients.

National Healthcare Safety Network [NHSN]: This is the data reporting system that Tennessee hospitals must use to report HAI to the Tennessee Department of Health. NHSN is a secure, internet-based surveillance (monitoring and reporting) system. Among other features, the network offers integrated patient and healthcare worker safety surveillance

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systems. The NHSN is managed by the CDC's Division of Healthcare Quality Promotion. Hospitals submit specific infection and other information (e.g, number of central line days, procedural information) to NHSN that is needed to calculate CLABSI infection rates for each critical care unit and surgical site infection rates for coronary artery bypass graft surgical procedures. Hospitals must assign rights to the TDH to collect the data from NHSN so that the information can be reported to the public.

NHSN Patient Safety Protocol Manual: This contains standardized surveillance definitions and data collection methods that are essential for fairly reporting hospital infection rates.

Standardized Infection Ratio (SIR) Methodology: This is a summary measure used to compare surgical site infections (SSIs) among a group of reported procedures to that of a "standard population." For HAI reports, the standard population comes from data reported from the hundreds of U.S. hospitals that use the NHSN system.

The SIR is the *observed* number of infections divided by the *predicted (or statistically expected)* number of infections. The predicted number is based on the national average and the number of central line days.

Standardized Infection Ratio (SIR) Statistical Method: This indirect standardization method accounts for differences in the risk of central line associated blood stream infections among different critical care units.

A SIR is the number of observed infections divided by the number of predicted infections. The predicted number is based on the national average (or pooled mean) and the number of central line days and is calculated by multiplying the number of central line days (at each hospital) by the NHSN Pooled Mean Rate. The result is divided by 1000 (rates).

- A SIR of 1.0 means the observed number of infections is equal to the number of expected infections.
- A SIR above 1.0 means that the infection rate is higher than that found in the "standard population." For HAI reports, the standard population comes from data reported by the hundreds of U.S. hospitals that use the NHSN system. The difference above 1.0 is the percentage by which the infection rate exceeds that of the standard population.
- A SIR below 1.0 means the infection rate is lower than that of the standard population. The difference below 1.0 is the percentage by which the infection rate is lower than that experienced by the standard population.

Surveillance: The process of finding and documenting infections.

- Active Surveillance: This includes, but is not limited to, active, patient-based, prospective surveillance by a trained infection control professional (IP). The IP seeks out infections during a patient's stay by screening a variety of data sources. The sources may include laboratory, pharmacy, admission/discharge/transfer,

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radiology/imaging, and pathology databases; and patient charts, including history and physical exams notes, nurses/physician notes, and temperature charts. The complete definition for surveillance, including how to capture denominator data to calculate infection rates, is found in each module of the patient safety component of NHSN <http://www.cdc.gov/nhsn/psc.html>

- Post discharge surveillance: This is the process IPs use to seek out infections after patients have been discharged from the hospital. It includes screening a variety of data sources, including re-admissions and emergency department visits.

Validation: In Tennessee, validation is the process of making sure the HAI data reported to NHSN are complete and accurate. HAIs, the total numbers of surgical procedures performed, central line days, and patient information to assign risk scores must all be validated. The purpose of the validation visits are to:

- Assess the accuracy and quality of the data submitted to the NHSN
 - Provide hospitals with information to help them use the data system.
 - Provide education to the IPs and other hospital staff (or Anesthesia and IT) if necessary to improve data accuracy and quality
 - Teach the IPs how to validate the written or electronic data they receive from other departments such as the Operating Room.
 - Look for unreported HAIs
 - Assess selected infection control processes
 - Make recommendations for improvements if data accuracy and/or quality issues are discovered
-

Key Abbreviations Found in the HAI Public Report

APIC – Association for Professionals in Infection Control and Epidemiology

CABG – Coronary Artery Bypass Graft Surgery

CBGB – Coronary Artery Bypass Graft Surgery: Both Chest and Leg and/or Arm

CBGC – Coronary Artery Bypass Graft Surgery: Chest Only

CCU – Critical Care Unit (used interchangeably with Intensive Care Unit (ICU))

CDC – Centers for Disease Control and Prevention

CI – Confidence Intervals

CL – days- Central Line days

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CLABSI – Central Line-Associated Bloodstream Infection

CMS – Centers for Medicare and Medicaid Services

CNS – coagulase negative *Staphylococcus*

DHHS – Department of Health and Human Services (U.S.)

DU – Device utilization ratio

HAI – Hospital Acquired Infection

HICPAC – Healthcare Infection Control Practices Advisory Committee

IT – Information Technology

IP – Infection preventionist (new term for ICP)

ICP – Infection control professional (now called IP)

ICU – Intensive Care Unit (use interchangeably with Critical Care Unit (CCU))

MDRO – Multidrug-Resistant Organism

MRSA – Methicillin-Resistant *Staphylococcus aureus*

NHSN – National Healthcare Safety Network

No. – Number

NQF – National Quality Forum

POA – Present on Admission

QIO – Quality Improvement Organization

SCIP – Surgical Care Improvement Project

SHEA – Society for Healthcare Epidemiologists of America

SIR – Standardized Infection Ratio

SSI – Surgical Site Infection

TCPS – Tennessee Center for Patient Safety

TDH – Tennessee Department of Health

THA – Tennessee Hospital Association

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TN – Tennessee

VAP – Ventilator-Associated Pneumonia

VRE – Vancomycin resistant enterococcus

CLABSI Rate Tables – Adult/Pediatric Critical Care Units

Figure 3: Central Line Associated Blood Stream Infection [CLABSI] Incidence Density Rate per 1,000 Central Line-Days (Pooled Means): Tennessee 2008 vs. National Healthcare Safety Network [NHSN] 2006-7

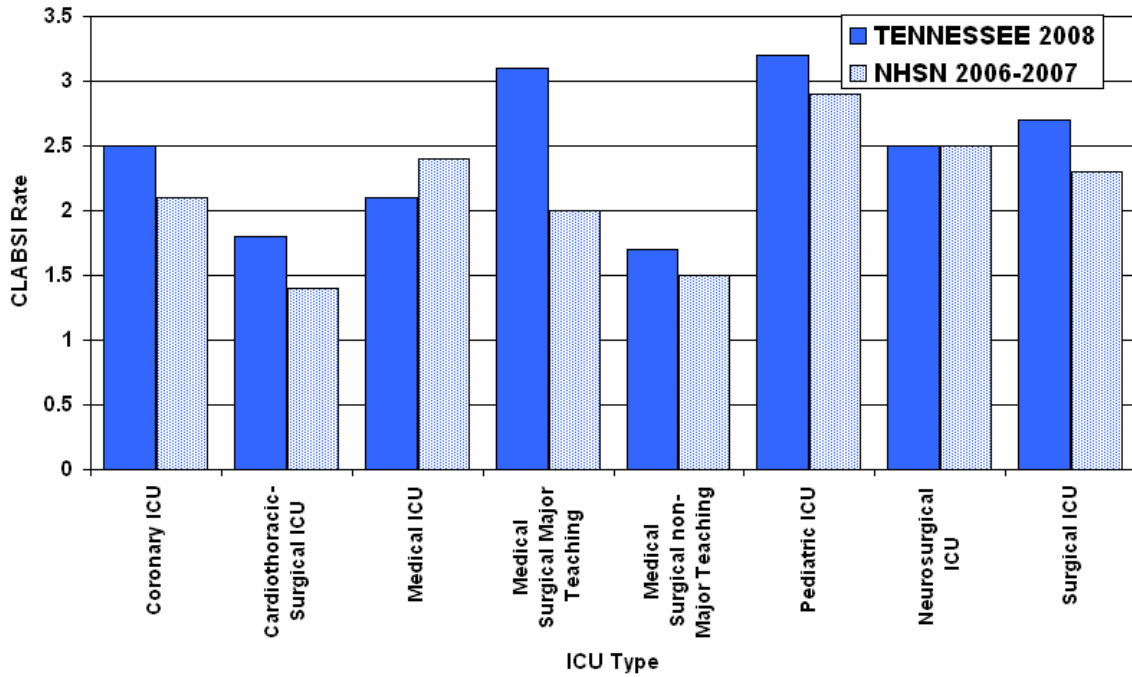


Figure 4: Standardized Infection Ratios [SIR] of Central Line Associated Blood Stream Infection [CLABSI] by Intensive Care Unit [ICU] Type: Tennessee, 2008. [Reference standard: National Healthcare Safety Network [NHSN]: 2006-7]

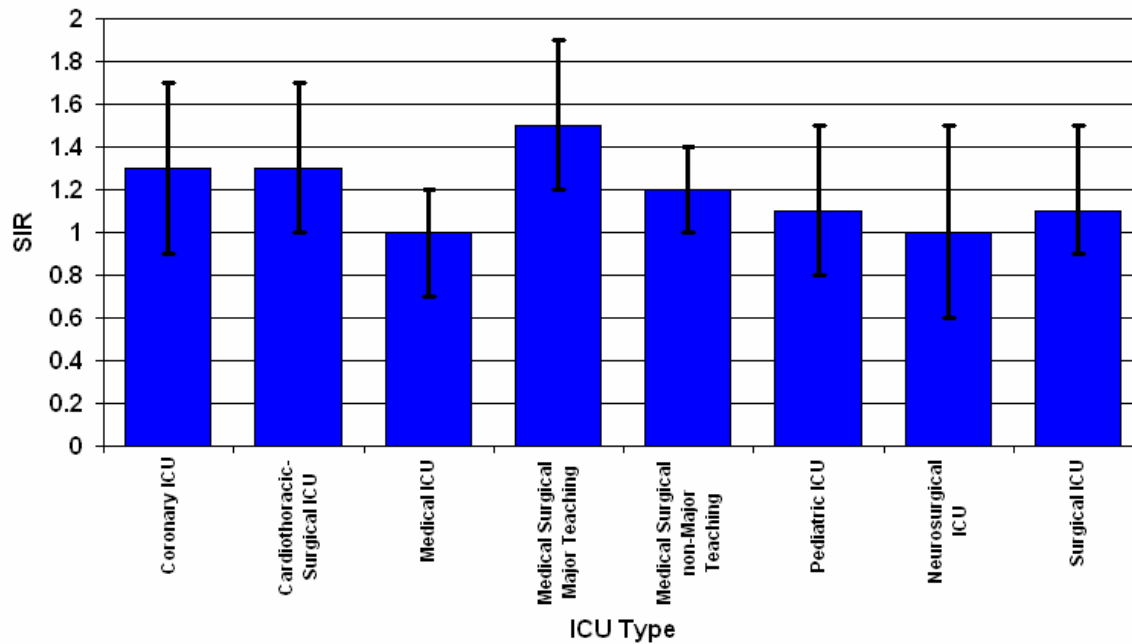


Figure 5: Standardized Infection Ratio [SIR] for Central Line Associated Blood Stream Infections [CLABSI] by ICU Type and Grand Division, Tennessee, 2008
 Reference standard: National Healthcare Safety Network [NHSN]: 2006-7

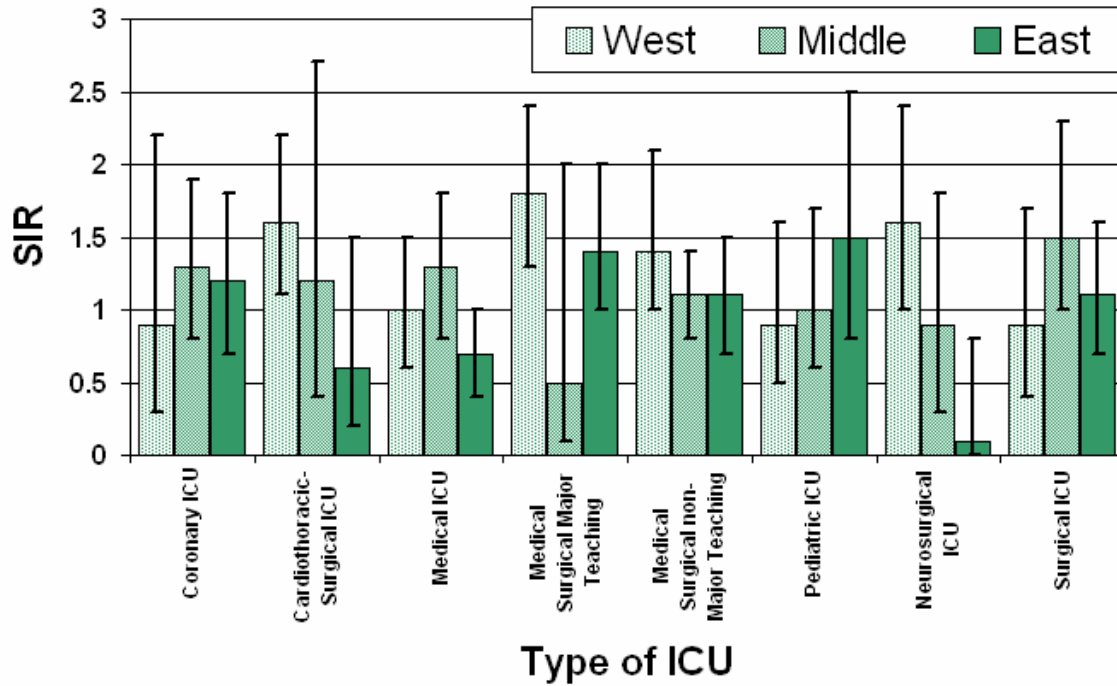


Figure 6: Standardized Infection Ratio [SIR] by Intensive Care Unit [ICU] Type and Participation Status with the Tennessee Center for Patient Safety [TCPS] Prevention Collaborative, Tennessee, 2008. [Reference standard: National Healthcare Safety Network [NHSN]: 2006-7]

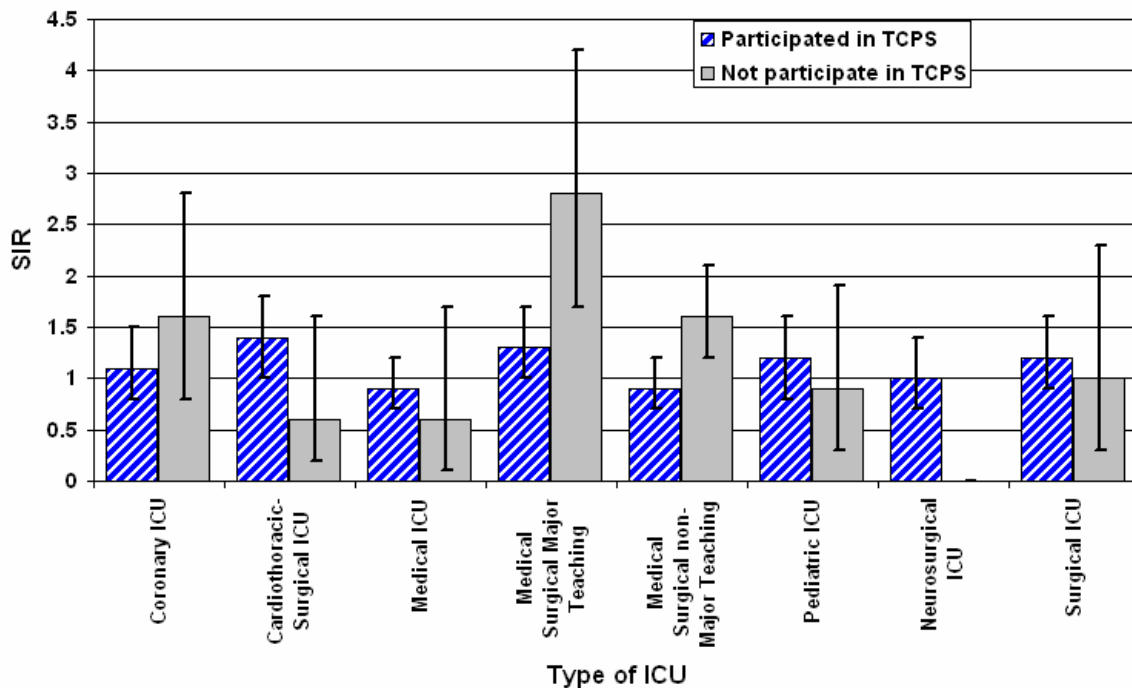
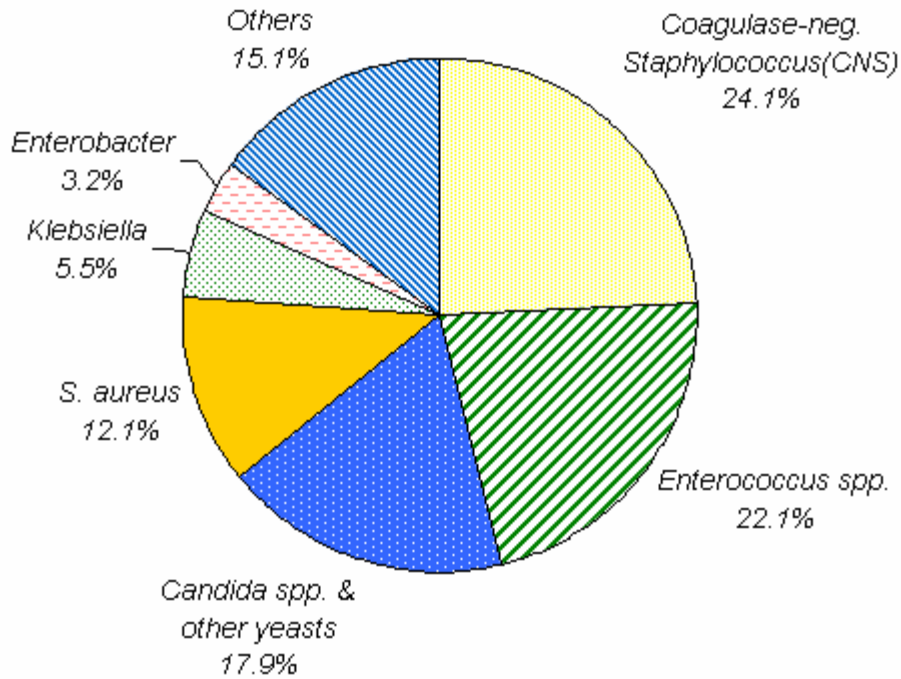


Figure 7: Organisms isolated from Central Line Associated Blood-Stream Infections [CLABSI] in Adult and Pediatric Intensive Care Units, Tennessee, 2008
[Number of organisms = 560; Number of events: 495]



**Table 1: Comparison of Tennessee and National Healthcare Safety Network [NHSN]
Central Line Associated Blood Stream Infection [CLABSI] Rates by Type of Critical Care Unit [CCU]
(Reportable period: 01/01/2008 - 12/31/2008)**

CCU TYPE	TENNESSEE 2008					NHSN 2006-2007				SIR AND 95% CONFIDENCE INTERVAL		
	No.	CLABSI	CL DAYS	POOLED MEAN	MEDIAN RATE	CLABSI	CL DAYS	POOLED MEAN	MEDIAN RATE	SIR	LOWER LIMIT	UPPER LIMIT
Medical Cardiac Critical Care	9	49	19873	2.5	2.3	373	181079	2.1	1.3	1.2	0.9	1.6
Surgical Cardiothoracic Critical Care	14	49	27091	1.8	1.4	397	275194	1.4	1.2	1.3	0.9	1.7
Medical Critical Care	19	69	32094	2.1	1.2	1073	454839	2.4	1.9	0.9	0.7	1.2
Medical-Surgical Critical Care Major Teaching	10	86	27780	3.1 *H	2.4	692	342214	2.0	1.5	1.5 *H	1.2	1.9
Medical-Surgical Critical Care non-Major Teaching	49	110	65031	1.7	0.3	972	662489	1.5	0.6	1.2	0.9	1.4
Pediatric Medical-Surgical Critical Care	7	43	13402	3.2	3.0	404	140848	2.9	2.1	1.1	0.8	1.5
Neurosurgical Critical Care	7	29	11517	2.5	2.2	173	68550	2.5	1.9	1.0	0.7	1.4
Surgical Critical Care	9	55	20168	2.7	2.3	881	383126	2.3	1.7	1.2	0.9	1.5
TOTAL	.	.	.	.	1.6	.	.	.	.	1.2 *H	1.1	1.3

Data reported as of August 24, 2009

No. number of facilities

CLDays Central Line Days

SIR Standardized Infection Ratio (observed number/ statistically 'expected' number of CLABSI)

NA not available in NHSN and TN due to limited number of ICU reporting

***H** indicates Tennessee rate for 2008 is significantly **higher** than National 2006-2007 rates

**Table 2: Central Line Associated Blood Stream Infection [CLABSI] Rates by Grand Division
Tennessee (Reportable period: 01/01/2008 - 12/31/2008)**

CCU TYPE	EAST							MIDDLE							WEST						
	No.	CLABSI	CL DAYS	POOLED MEAN	SIR	Lower Limit	Upper Limit	No.	CLABSI	CL DAYS	POOLED MEAN	SIR	Lower Limit	Upper Limit	No.	CLABSI	CL DAYS	POOLED MEAN	SIR	Lower Limit	Upper Limit
Medical Cardiac CC	5	20	8265	2.4	1.2	0.7	1.8	3	24	9026	2.7	1.3	0.8	1.9	1	5	2582	1.9	0.9	0.3	2.2
Surgical Cardio-thoracic CC	6	7	7951	0.9	0.6	0.2	1.3	3	6	3416	1.8	1.2	0.4	2.7	5	36	15724	2.3 *H	1.6 *H	1.1	2.2
Medical CC	11	22	14070	1.6	0.7	0.4	1.0	4	26	8809	3.0	1.3	0.8	1.8	4	21	9215	2.3	1.0	0.6	1.5
Medical-Surgical CC Major Teaching	4	40	13747	2.9	1.4	1.0	2.0	1	2	1799	1.1	0.5	0.1	2.0	5	44	12234	3.6 *H	1.8 *H	1.3	2.4
Medical-Surgical CC non-Major Teaching	21	30	19420	1.5	1.1	0.7	1.5	19	51	31809	1.6	1.1	0.8	1.4	9	29	13802	2.1	1.4	1.0	2.1
Pediatric Medical-Surgical Critical Care	4	14	3255	4.3	1.5	0.8	2.5	1	16	5328	3.0	1.0	0.6	1.7	2	13	4819	2.7	0.9	0.5	1.6
Neurosurgical Critical Care	2	1	2921	0.3 *L	0.1 *L	0.0	0.8	2	7	3251	2.2	0.9	0.3	1.8	3	21	5345	3.9	1.6	1.0	2.4
Surgical CC	5	23	9133	2.5	1.1	0.7	1.6	2	22	6230	3.5	1.5	1.0	2.3	2	10	4805	2.1	0.9	0.4	1.7
TOTAL	.	.	.	.	1.0	0.9	1.2	.	.	.	.	1.2	1.0	1.4	.	.	.	.	1.3 *H	1.2	1.6

Data reported as of August 24, 2009

No. number of facilities CC= critical care

CL Days Central Line Days

SIR Standardized Infection Ratio (observed number/ statistically 'expected' number of CLABSI)

. Not available

***H** indicates rate for 2008 is significantly **higher** than National 2006-2007 rates

***L** indicates rate for 2008 is significantly **lower** than National 2006-2007 rates

Table 3: Central Line Associated Blood Stream Infection [CLABSI] Rates and Standardized Infection Ratio, by Participation in TN Center for Patient Safety (TCPS) Hospital Collaborative on Reducing Hospital-Acquired Infections Tennessee (Reportable period: 01/01/2008 - 12/31/2008)

CCU TYPE	Participating in TCPS								Not participating in TCPS							
	No.	CLABSI	CL DAYS	POOLED MEAN	SIR	Lower Limit	Upper Limit	MEDIAN	No.	CLABSI	CL DAYS	POOLED MEAN	SIR	Lower Limit	Upper Limit	MEDIAN
Medical Cardiac Critical Care	7	38	16500	2.3	1.1	0.8	1.5	1.9	2	11	3373	3.3	1.6	0.8	2.8	4.1
Surgical Cardiothoracic Critical Care	11	45	22706	2.0	1.4	1.0	1.8	1.6	3	4	4385	0.9	0.6	0.2	1.6	0.8
Medical Critical Care	15	66	29970	2.2	0.9	0.7	1.2	1.6	4	3	2124	1.4	0.6	0.1	1.7	0.0
Medical-Surgical Critical Care Major Teaching	9	64	23853	2.7	1.3	1.0	1.7	2.3	1	22	3927	5.6	2.8 *H	1.7	4.2	.
Medical-Surgical Critical Care non-Major Teaching	29	54	40897	1.3	0.9	0.7	1.2	0.4	20	56	24134	2.3	1.6 *H	1.2	2.1	0.0
Pediatric Medical-Surgical Critical Care	5	37	11049	3.3	1.2	0.8	1.6	3.0	2	6	2353	2.5	0.9	0.3	1.9	2.8
Neurosurgical Critical Care	7	29	11517	2.5	1.0	0.7	1.4	2.2	.	.	.	.	.	.	.	.
Surgical Critical Care	7	45	16291	2.8	1.2	0.9	1.6	2.3	2	10	3877	2.6	1.1	0.5	2.1	2.6
TOTAL	.	.	.	.	1.1	1.0	1.2	.	.	.	.	.	1.4 *H	1.2	1.7	.

Data reported as of August 24, 2009

No. number of facilities

CL Days Central Line Days

. Not available

SIR Standardized Infection Ratio (observed number/ statistically 'expected' number of CLABSI)

***H** indicates rate for 2008 is significantly higher than National 2006-2007 rates

Table 4: Microorganism Identified in Central Line Associated Blood Stream Infections [CLABSI] in Adult and Pediatric Critical Care Units Tennessee (Reportable period: 01/01/2008 - 12/31/2008) [Number of organisms = 560; Number of events: 495]

Microorganism	Number Isolates	Percent
Coagulase negative <i>Staphylococcus</i> species	135	24.1
<i>Enterococcus</i> species (includes VRE)	124	22.1
Vancomycin resistant <i>enterococcus</i> [VRE] only- (% of total positive isolates)	49	(8.8)
<i>Candida</i> species and other yeasts	100	17.9
<i>Candida albicans</i> only (% of total positive isolates)	52	(9.3)
<i>Staphylococcus aureus</i> (includes MRSA)	68	12.1
Methicillin-resistant <i>S. aureus</i> [MRSA] only- (% of total positive isolates)	40	(7.1)
<i>Klebsiella</i> species	30	5.5
<i>Enterobacter</i> species	18	3.2
<i>Pseudomonas aeruginosa</i>	16	2.9
<i>Acinetobacter baumannii</i>	12	2.1
<i>Escherichia coli</i>	10	1.8
<i>Streptococcus</i> species	10	1.8
<i>Proteus</i> species	8	1.4
<i>Serratia</i> species	7	1.3
Other: pathogens (less than 1% each)	18	3.2
Other: skin contaminants	3	0.5

Data reported as of August 24, 2009

Total number of isolates 560; total number of CLABSI events 495;

Other: skin contaminants (*Bacillus cereus* 1, *Bacillus* species unspecified 2)

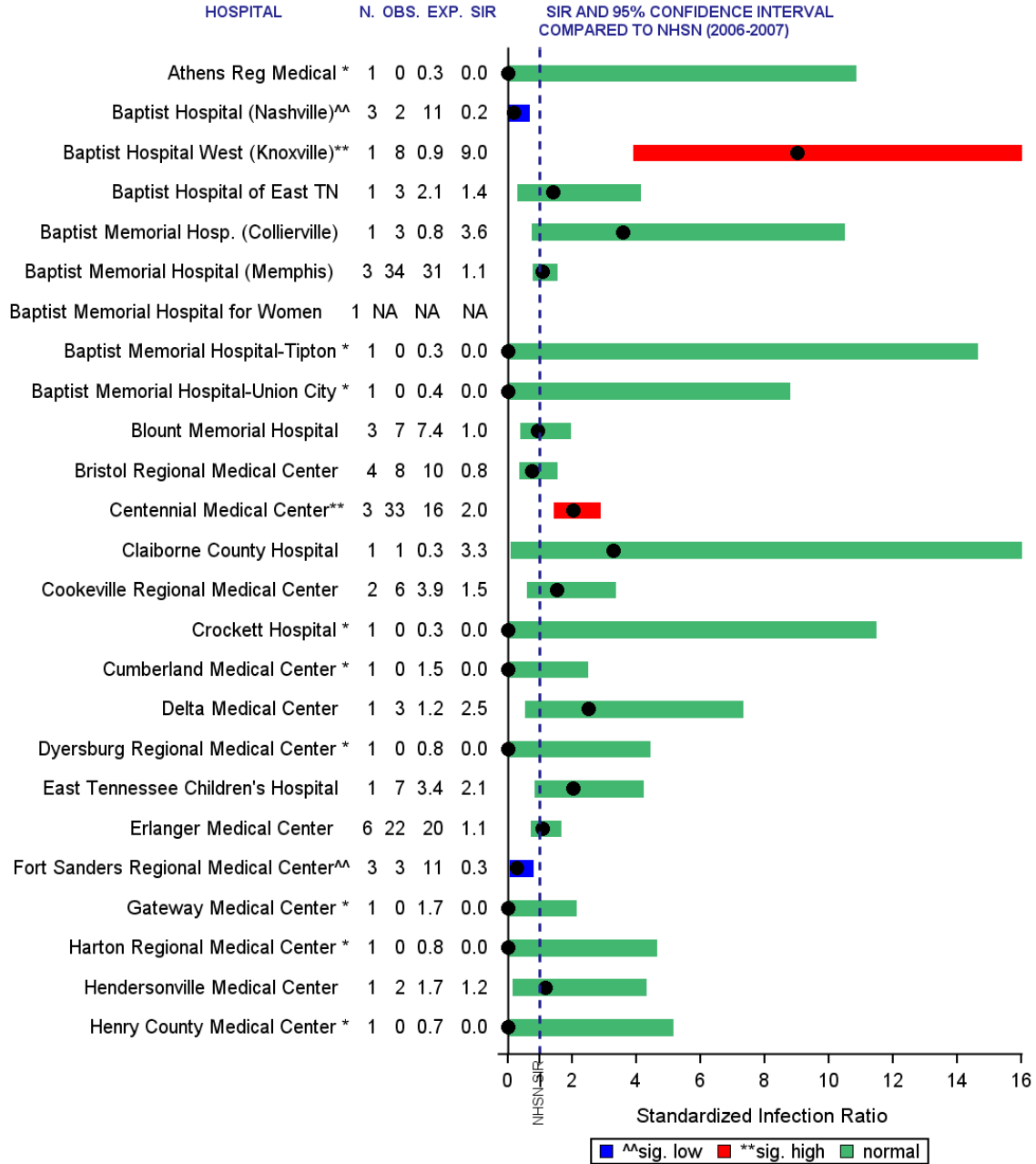
Other: pathogens (*Citrobacter diversus* 1, *Citrobacter koseri* 2, *Gemella morbillorum (anaerobic)* 1, *Pantoea agglomerans* 1, *Prevotella melaninogenica* 1, *Providencia stuartii* 1, *Pseudomonas fluorescens* 1, *Pseudomonas* species unspecified 1, *Rhodotorula* 2, *Staphylococcus coagulase positive* 1, *Staphylococcus intermedius* 1, *Stenotrophomonas maltophilia* 2)

VRE = vancomycin-resistant enterococci

MRSA = methicillin-resistant *Staphylococcus aureus*

**Figure 6. Summary Measure for CLABSIs in Adult & Pediatric Critical Care Units
One Standardized Infection Ratio [SIR] per Facility. Tennessee, 2008**

Central Line-Associated Blood Stream Infection [CLABSI] Standardized Infection Ratio [SIR]
Tennessee (Reportable period: 01/01/2008 - 12/31/2008)

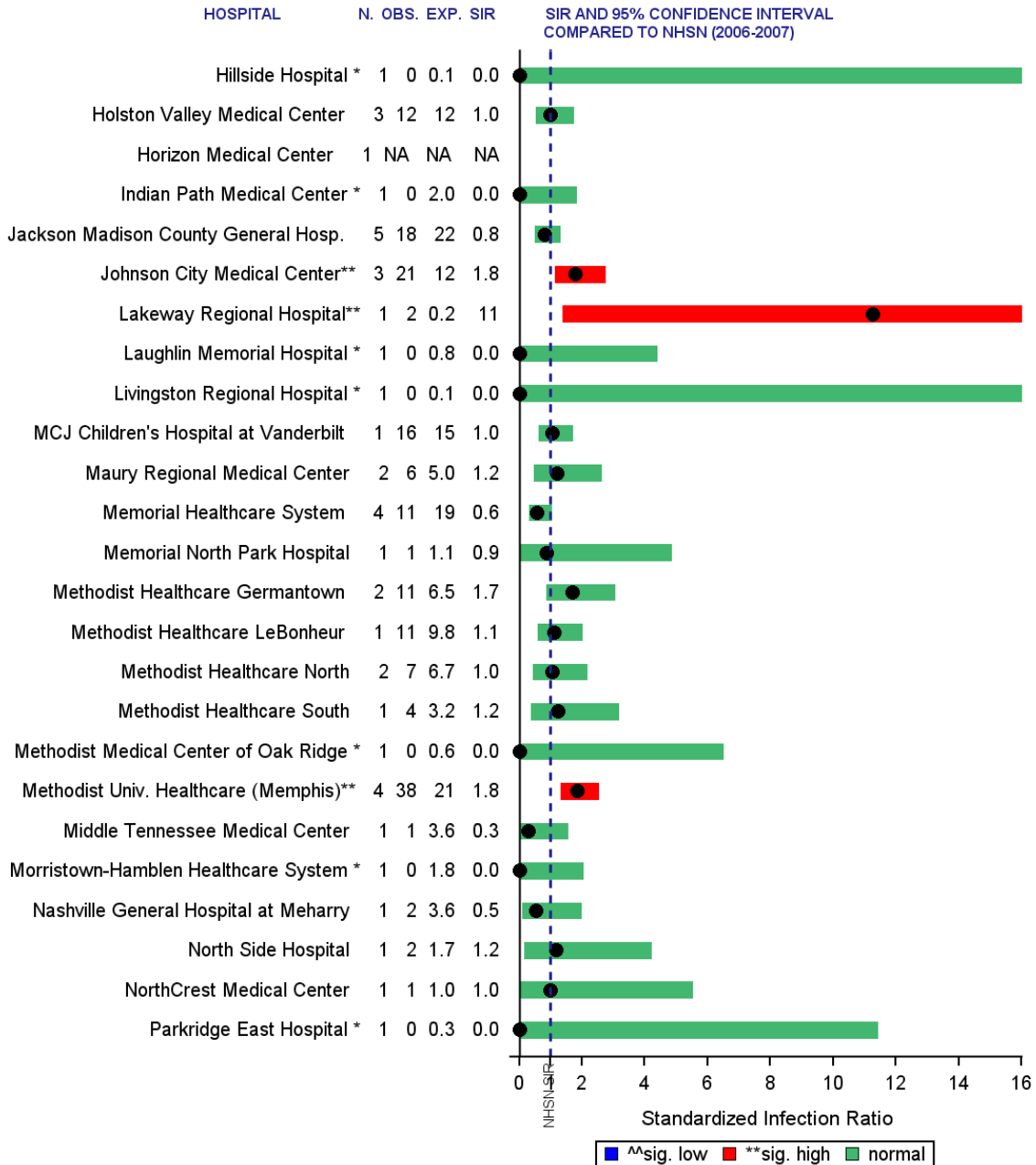


Data Reported as of August 24, 2009.
 N. = number of types of critical care units reportable from a given facility
 Obs. = observed number of CLABSI
 Exp. = statistically 'expected' number of CLABSI, based on NHSN data
 SIR = Standardized Infection Ratio (observed number / statistically 'expected' number of CLABSI)
 NA = data not shown for an entire hospital with <50 central line days
 ** significantly higher than NHSN (2006-2007)
 ^ significantly lower than NHSN (2006-2007)
 * Zero infection, but not statistically significant

Figure 6 (cont'd)

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Central Line-Associated Blood Stream Infection [CLABSI] Standardized Infection Ratio [SIR]
 Tennessee (Reportable period: 01/01/2008 - 12/31/2008)

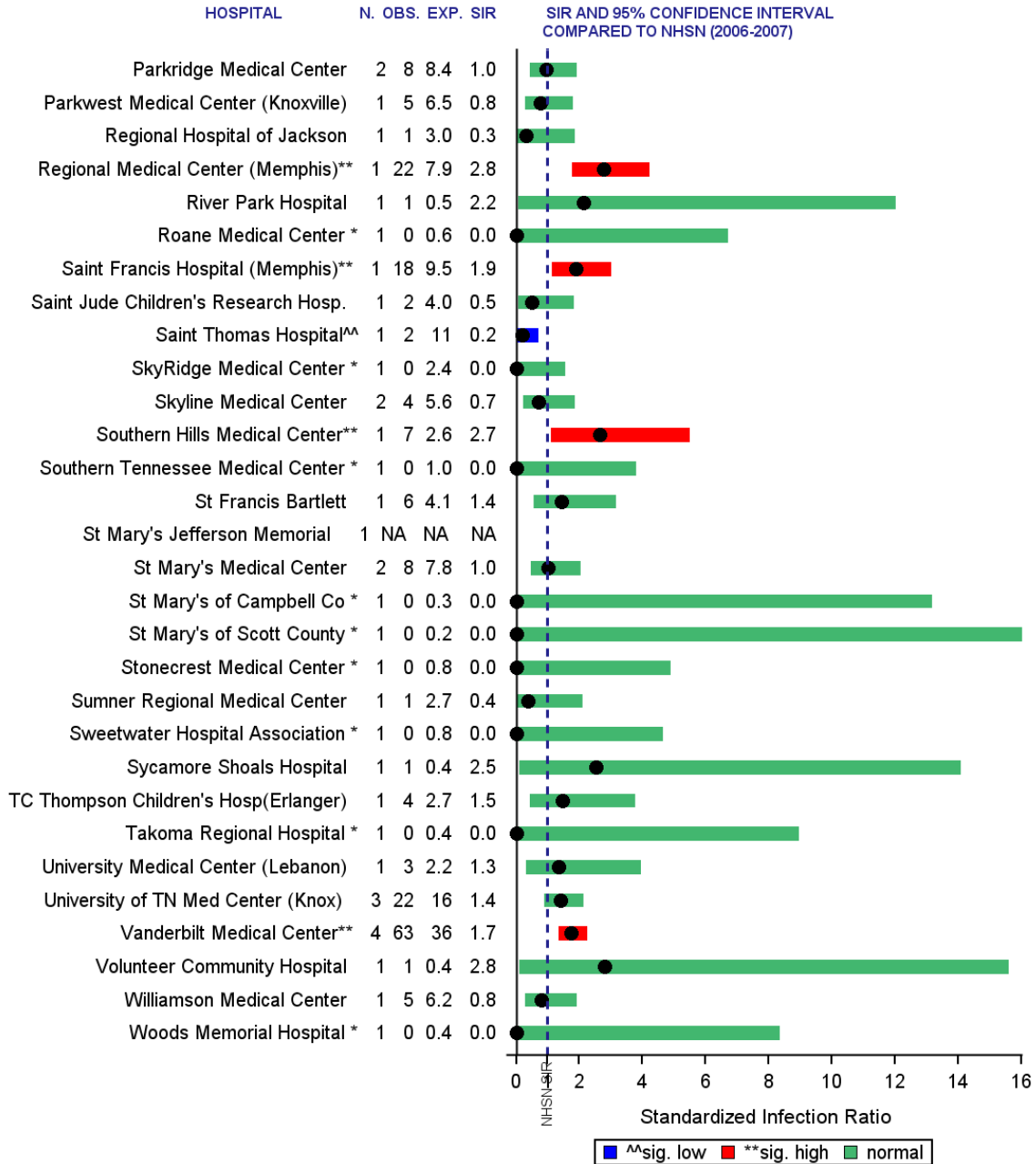


Data Reported as of August 24, 2009.
 N. = number of types of critical care units reportable from a given facility
 Obs. = observed number of CLABSI
 Exp. = statistically 'expected' number of CLABSI, based on NHSN data
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 NA = data not shown for an entire hospital with <50 central line days
 ** significantly higher than NHSN (2006-2007)
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 * Zero infection, but not statistically significant

Figure 6 (cont'd)

Tennessee's Report on Healthcare Associated Infections: Jan-Dec 2008

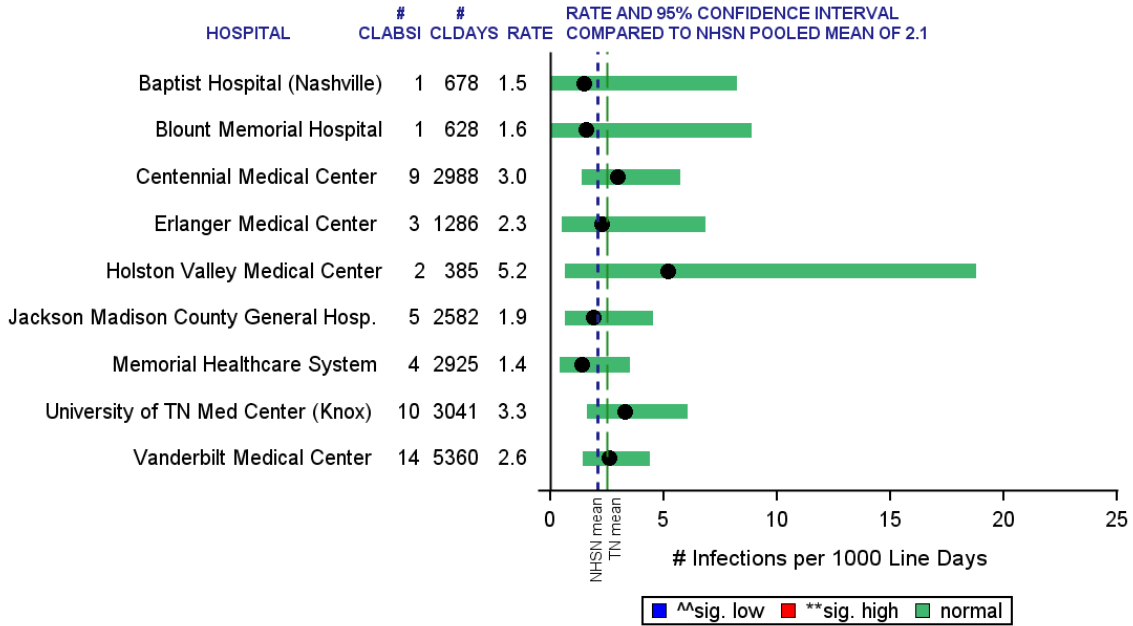
Central Line-Associated Blood Stream Infection [CLABSI] Standardized Infection Ratio [SIR]
Tennessee (Reportable period: 01/01/2008 - 12/31/2008)



Data Reported as of August 24, 2009.
 N. = number of types of critical care units reportable from a given facility
 Obs. = observed number of CLABSI
 Exp. = statistically 'expected' number of CLABSI, based on NHSN data
 SIR = Standardized Infection Ratio (observed number / statistically 'expected' number of CLABSI)
 NA = data not shown for an entire hospital with <50 central line days
 ** significantly higher than NHSN (2006-2007)
 ^^ significantly lower than NHSN (2006-2007)
 * Zero infection, but not statistically significant

Figure 7: Central Line Associated Blood Stream Infection Rates (per 1,000 Central Line Days) in Tennessee, 2008: Medical Cardiac Critical Care Units

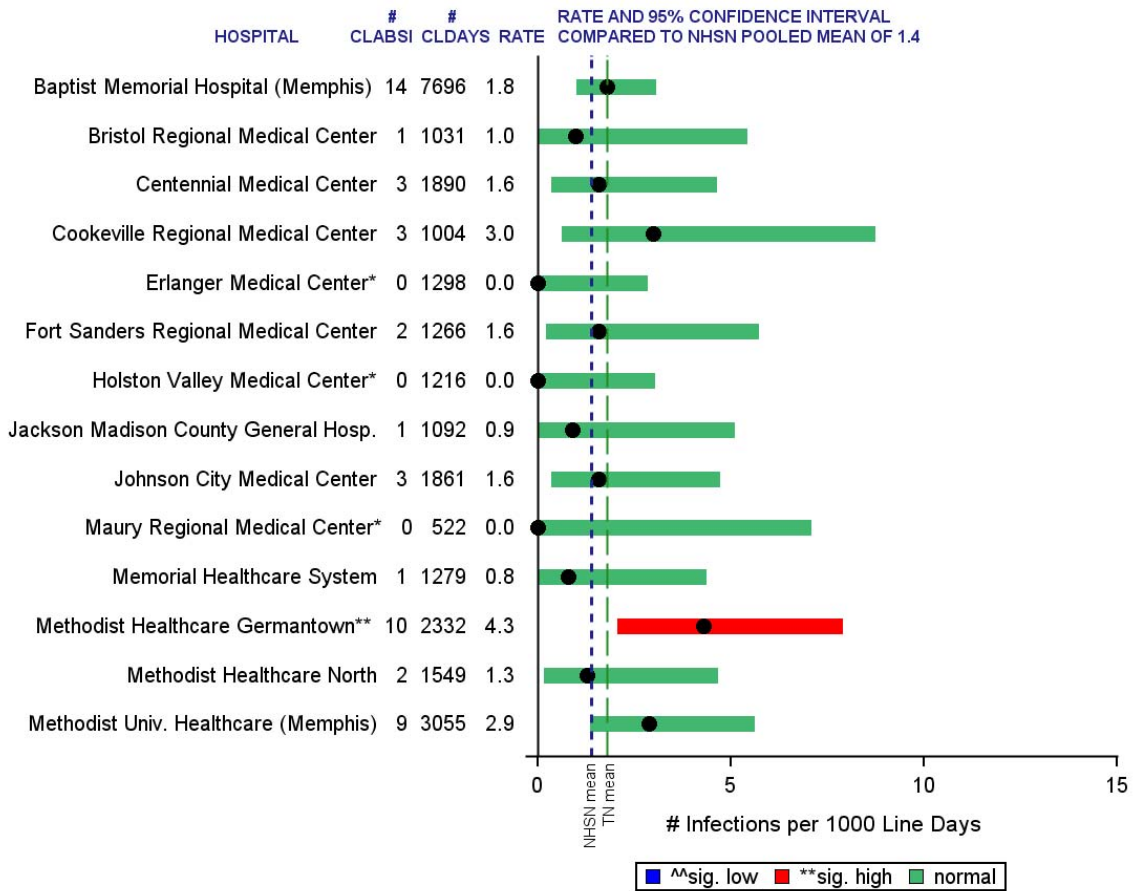
Central Line-Associated Blood Stream Infection [CLABSI] Rates (per 1000 central line days)
 Tennessee (Reportable period: 01/01/2008 - 12/31/2008)
 Medical Cardiac Critical Care



Data Reported as of August 24, 2009.
 ** significantly higher than NHCN pooled mean
 ^^ significantly lower than NHCN pooled mean
 * Zero infections, not statistically significant
 NA Rates are not shown in critical care units with <50 central line days.
 NHCN pooled mean (2006-2007)=2.1; TN pooled mean (2008)=2.5

Figure 8: Central Line Associated Blood Stream Infection Rates (per 1,000 Central Line Days) in Tennessee, 2008: Surgical Cardiothoracic Critical Care Units

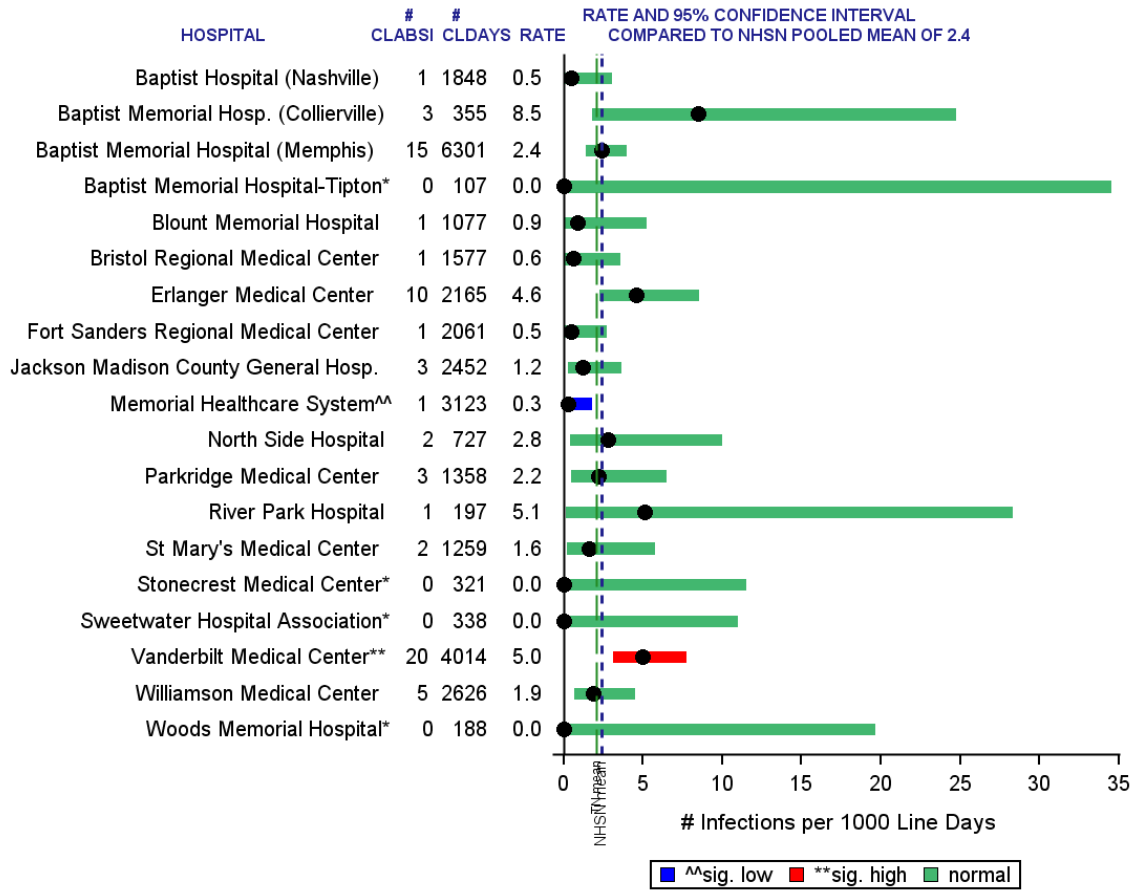
Central Line-Associated Blood Stream Infection [CLABSI] Rates (per 1000 central line days)
 Tennessee (Reportable period: 01/01/2008 - 12/31/2008)
 Surgical Cardiothoracic Critical Care



Data Reported as of August 24, 2009.
 ** significantly higher than NHSN pooled mean
 ^^ significantly lower than NHSN pooled mean
 * Zero infections, not statistically significant
 NA Rates are not shown in critical care units with <50 central line days.
 NHSN pooled mean(2006-2007)=1.4; TN pooled mean(2008)=1.8

Figure 9: Central Line Associated Blood Stream Infection Rates (per 1,000 Central Line Days) in Tennessee, 2008: Medical Critical Care Units

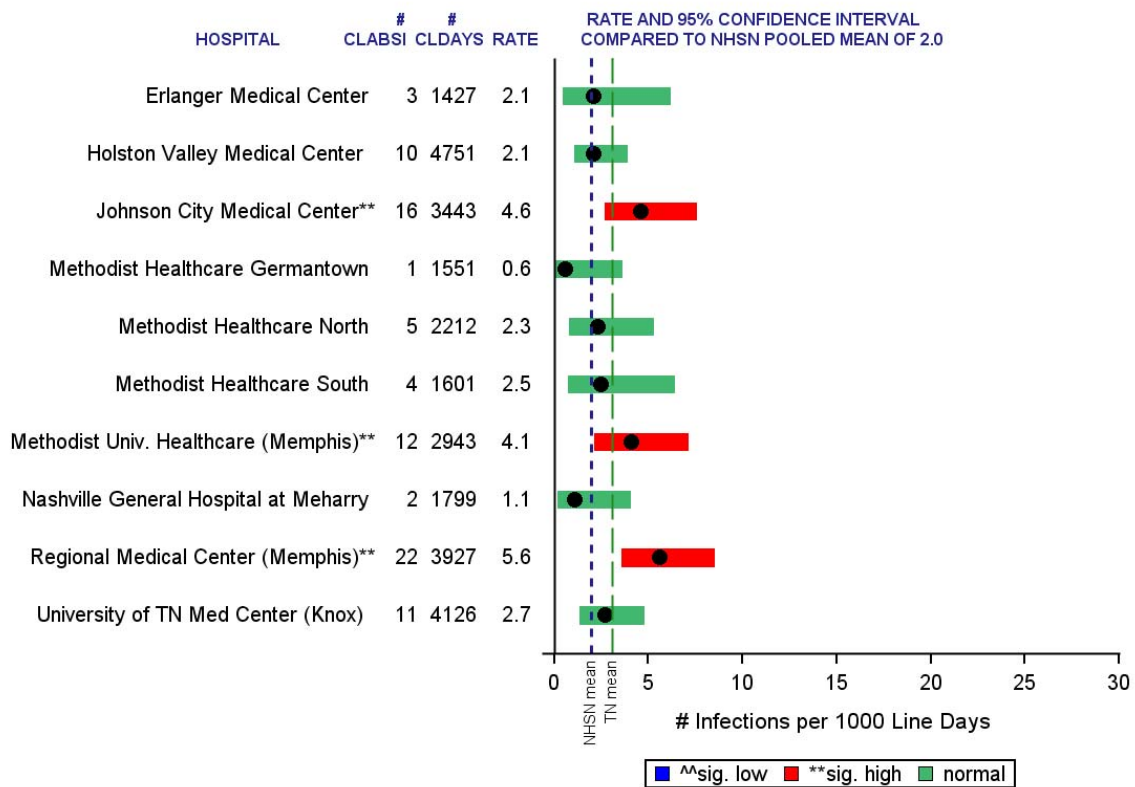
Central Line-Associated Blood Stream Infection [CLABSI] Rates (per 1000 central line days)
 Tennessee (Reportable period: 01/01/2008 - 12/31/2008)
 Medical Critical Care



Data Reported as of August 24, 2009.
 ** significantly higher than NHSN pooled mean
 ^^ significantly lower than NHSN pooled mean
 * Zero infections, not statistically significant
 NA Rates are not shown in critical care units with <50 central line days.
 NHSN pooled mean(2006-2007)=2.4 ; TN pooled mean(2008)=2.1

Figure 10: Central Line Associated Blood Stream Infection Rates (per 1,000 Central Line Days) in Tennessee, 2008: Medical-Surgical Critical Care Units in Major Teaching Hospitals

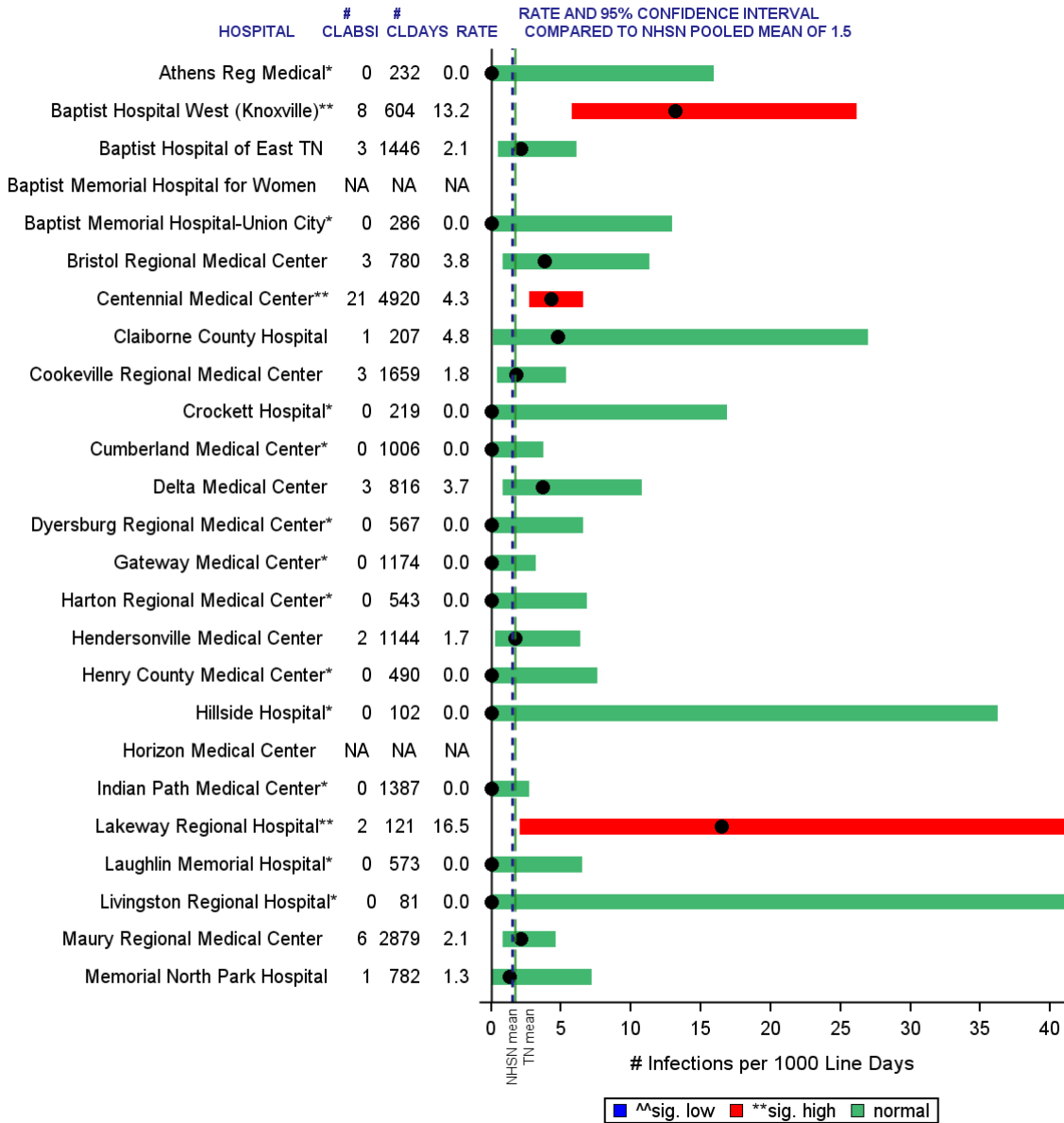
Central Line-Associated Blood Stream Infection [CLABSI] Rates (per 1000 central line days)
 Tennessee (Reportable period: 01/01/2008 - 12/31/2008)
 Medical-Surgical Critical Care Major Teaching Hospitals



Data Reported as of August 24, 2009.
 ** significantly higher than NHSN pooled mean
 ^^ significantly lower than NHSN pooled mean
 * Zero infections, not statistically significant
 NA Rates are not shown in critical care units with <50 central line days.
 NHSN pooled mean(2006-2007)=2.0; TN pooled mean(2008)=3.1

Figure 11: Central Line Associated Blood Stream Infection Rates (per 1,000 Central Line Days) in Tennessee, 2008: Medical-Surgical ICUs in Non-Major Teaching Hospitals

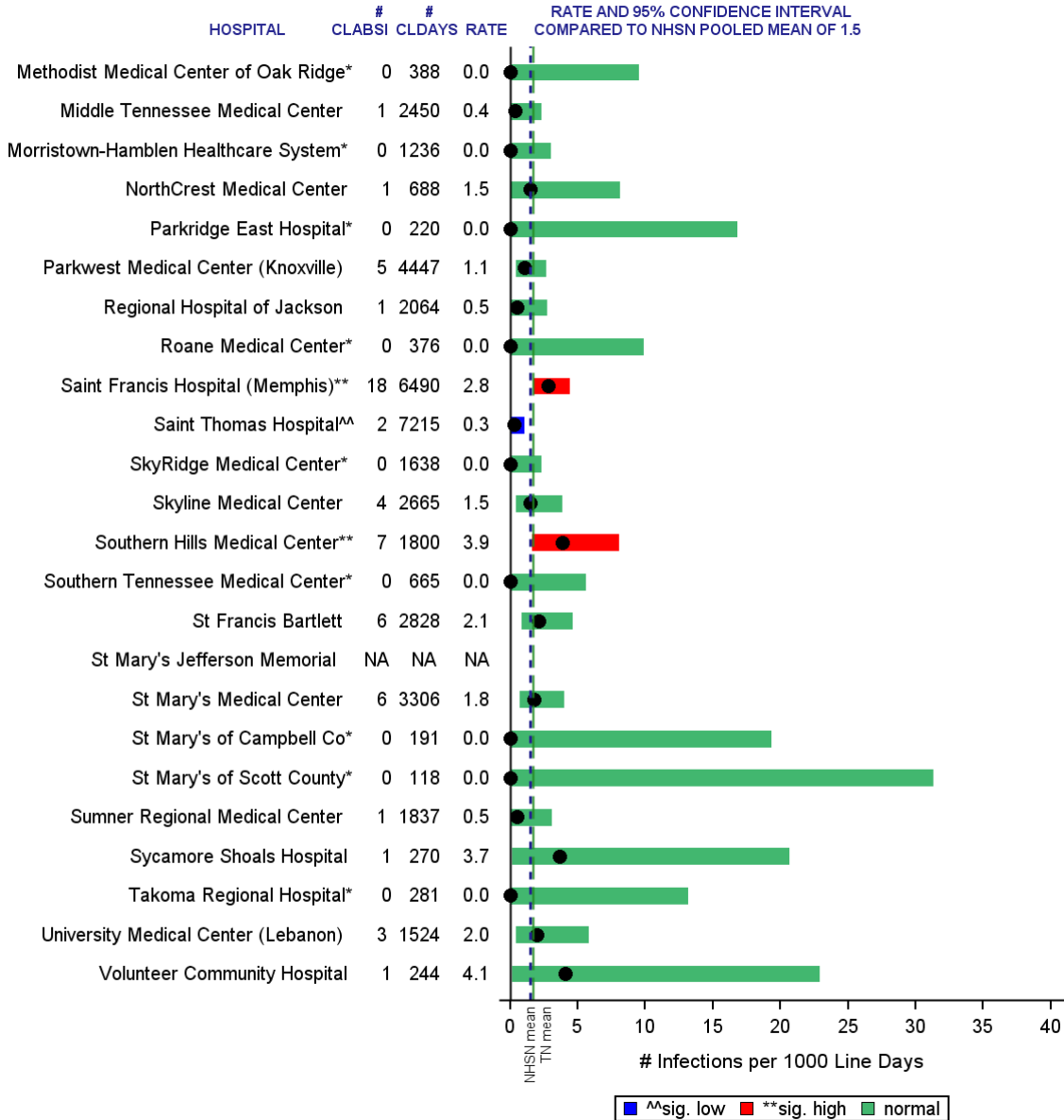
Central Line-Associated Blood Stream Infection [CLABSI] Rates (per 1000 central line days)
Tennessee (Reportable period: 01/01/2008 - 12/31/2008)
Medical-Surgical Critical Care non-Major Teaching Hospitals



Data Reported as of August 24, 2009.
 ** significantly higher than NHSN pooled mean
 ^^ significantly lower than NHSN pooled mean
 * Zero infections, not statistically significant
 NA Rates are not shown in critical care units with <50 central line days.
 NHSN pooled mean(2006-2007)=1.5; TN pooled mean(2008)=1.7

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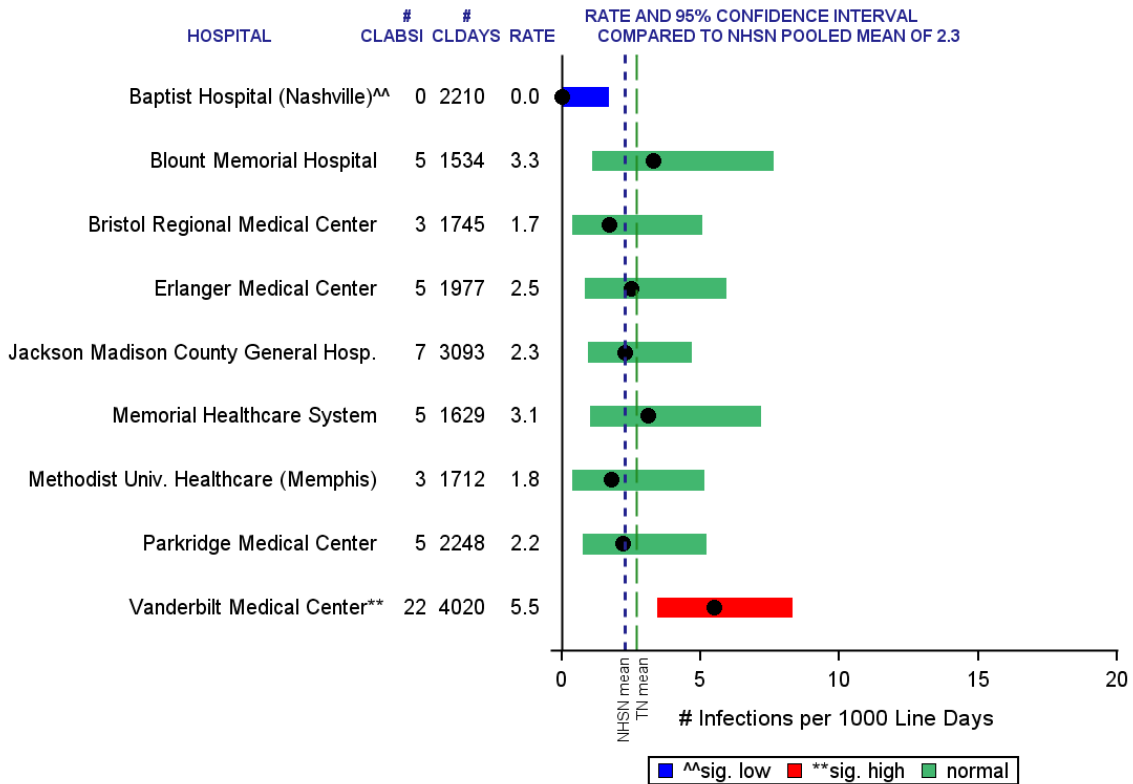
Central Line-Associated Blood Stream Infection [CLABSI] Rates (per 1000 central line days)
 Tennessee (Reportable period: 01/01/2008 - 12/31/2008)
 Medical-Surgical Critical Care non-Major Teaching Hospitals (continued)



Data Reported as of August 24, 2009.
 ** significantly higher than NHSN pooled mean
[^] significantly lower than NHSN pooled mean
 * Zero infections, not statistically significant
 NA Rates are not shown in critical care units with <50 central line days.
 NHSN pooled mean(2006-2007)=1.5; TN pooled mean(2008)=1.7

Figure 12: Central Line Associated Blood Stream Infection Rates (per 1,000 Central Line Days) in Tennessee, 2008: Surgical Critical Care Units

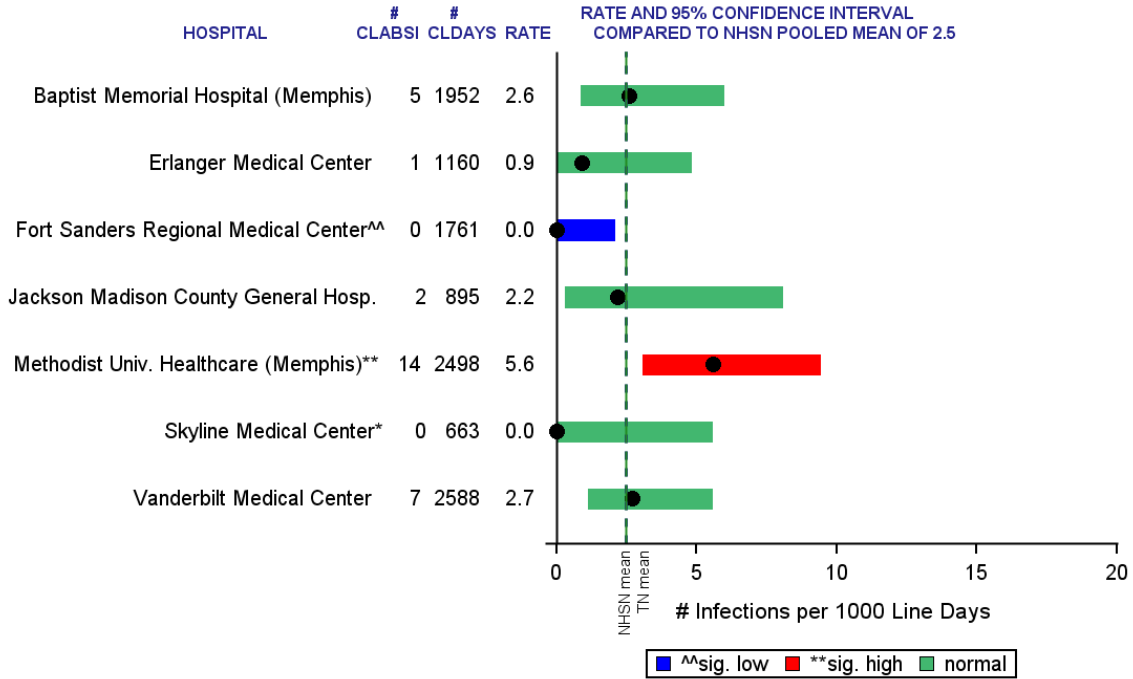
Central Line-Associated Blood Stream Infection [CLABSI] Rates (per 1000 central line days)
 Tennessee (Reportable period: 01/01/2008 - 12/31/2008)
 Surgical Critical Care



Data Reported as of August 24, 2009.
^{**} significantly higher than NHSN pooled mean
^{^^} significantly lower than NHSN pooled mean
^{*} Zero infections, not statistically significant
 NA Rates are not shown in critical care units with <50 central line days.
 NHSN pooled mean(2006-2007)=2.3; TN pooled mean(2008)=2.7

Figure 14: Central Line Associated Blood Stream Infection Rates (per 1,000 Central Line Days) in Tennessee, 2008: Neurosurgical Critical Care Units

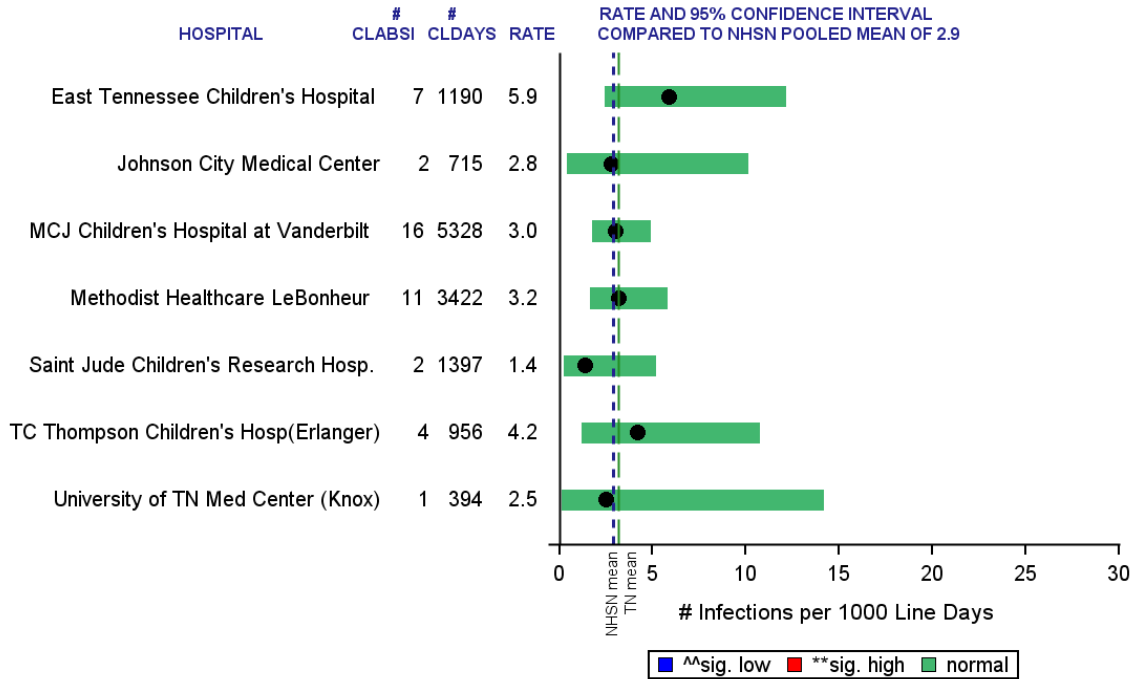
Central Line-Associated Blood Stream Infection [CLABSI] Rates (per 1000 central line days)
 Tennessee (Reportable period: 01/01/2008 - 12/31/2008)
 Neurosurgical Critical Care



Data Reported as of August 24, 2009.
^{**} significantly higher than NHSN pooled mean
^{^^} significantly lower than NHSN pooled mean
^{*} Zero infections, not statistically significant
 NA Rates are not shown in critical care units with <50 central line days.
 NHSN pooled mean(2006-2007)=2.5; TN pooled mean(2008)=2.5

Figure 15: Central Line Associated Blood Stream Infection Rates (per 1,000 Central Line Days) in Tennessee, 2008: Pediatric Medical-Surgical Critical Care Units

Central Line-Associated Blood Stream Infection [CLABSI] Rates (per 1000 central line days)
 Tennessee (Reportable period: 01/01/2008 - 12/31/2008)
 Pediatric Medical-Surgical Critical Care



Data Reported as of August 24, 2009.
 ** significantly higher than NHSN pooled mean
 ^^ significantly lower than NHSN pooled mean
 * Zero infections, not statistically significant
 NA Rates are not shown in critical care units with <50 central line days.
 NHSN pooled mean(2006-2007)=2.9; TN pooled mean(2008)=3.2

**Table 5: Measures of Central Line Associated Blood Stream Infection [CLABSI] by
Type of Critical Care Unit
Tennessee (Reportable period: 01/01/2008 - 12/31/2008)**

Location = Medical Cardiac Critical Care

Hospital	INCIDENCE DENSITY RATE (LINE DAYS)					DEVICE UTILIZATION			INCIDENCE DENSITY RATE (INPATIENT DAYS)	
	RATE*	Lower Limit	Upper limit	TN %ile	NHSN %ile	DU(%)	TN %ile	NHSN %ile	INPATIENT DAYS	RATE**
Baptist Hospital (Nashville)	1.5	0.0	8.2	22	53	25	11	34	2667	0.4
Blount Memorial Hospital	1.6	0.0	8.9	33	55	39	22	56	1608	0.6
Centennial Medical Center	3.0	1.4	5.7	78	76	47	44	75	6395	1.4
Erlanger Medical Center	2.3	0.5	6.8	56	67	54	67	75	2402	1.2
Holston Valley Medical Center	5.2	0.6	18.8	100	89	40	33	56	957	2.1
Jackson Madison County General Hosp.	1.9	0.6	4.5	44	60	66	89	93	3932	1.3
Memorial Healthcare System	1.4	0.4	3.5	11	52	52	56	75	5588	0.7
University of TN Med Center (Knox)	3.3	1.6	6.0	89	78	56	78	89	5420	1.8
Vanderbilt Medical Center	2.6	1.4	4.4	67	72	67	100	93	8013	1.7

Data reported as of August 24, 2009

** per 1000 central line days*

*** per 1000 inpatient days*

TN%ile percentile in TN (2008)

NHSN%ile percentile in NHSN (2006-2007)

DU(%) device utilization(%)

Bolded: 75th percentile or above within NHSN (2006-2007)

**Table 6: Measures of Central Line Associated Blood Stream Infection [CLABSI]
by Type of Critical Care Unit
Tennessee (Reportable period: 01/01/2008 - 12/31/2008)**

Location = Surgical Cardiothoracic Critical Care

Hospital	INCIDENCE DENSITY RATE (LINE DAYS)					DEVICE UTILIZATION			INCIDENCE DENSITY RATE (INPATIENT DAYS)	
	RATE*	Lower Limit	Upper limit	TN %ile	NHSN %ile	DU(%)	TN %ile	NHSN %ile	INPATIENT DAYS	RATE**
Baptist Memorial Hospital (Memphis)	1.8	1.0	3.1	75	48	73	70	60	10590	1.3
Bristol Regional Medical Center	1.0	0.0	5.4	33	46	46	10	13	2231	0.4
Centennial Medical Center	1.6	0.3	4.6	58	64	99	100	92	1911	1.6
Cookeville Regional Medical Center	3.0	0.6	8.7	92	86	62	50	25	1618	1.9
Erlanger Medical Center	0.0	0.0	2.8	8	25	61	40	25	2122	0.0
Fort Sanders Regional Medical Center	1.6	0.2	5.7	50	64	73	70	42	1743	1.1
Holston Valley Medical Center	0.0	0.0	3.0	8	25	86	90	81	1421	0.0
Jackson Madison County General Hosp.	0.9	0.0	5.1	25	44	74	80	42	1479	0.7
Johnson City Medical Center	1.6	0.3	4.7	67	64	46	10	13	4052	0.7
Maury Regional Medical Center	0.0	0.0	7.1	8	25	62	50	25	841	0.0
Memorial Healthcare System	0.8	0.0	4.4	17	42	55	30	13	2345	0.4
Methodist Healthcare Germantown	4.3	2.1	7.9	100	77	50	20	13	4670	2.1
Methodist Healthcare North	1.3	0.2	4.7	42	54	55	30	13	2827	0.7
Methodist Univ. Healthcare (Memphis)	2.9	1.3	5.6	83	64	64	60	13	4744	1.9

Data reported as of August 24, 2009

** per 1000 central line days*

*** per 1000 inpatient days*

TN%ile percentile in TN (2008)

NHSN%ile percentile in NHSN (2006-2007)

DU(%) device utilization(%)

Bolded: 75th percentile or above within NHSN (2006-2007)

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**Table 7: Measures of Central Line Associated Blood Stream Infection [CLABSI]
by Type of Critical Care Unit
Tennessee (Reportable period: 01/01/2008 - 12/31/2008)**

Location = Medical Critical Care

Hospital	INCIDENCE DENSITY RATE (LINE DAYS)					DEVICE UTILIZATION			INCIDENCE DENSITY RATE (INPATIENT DAYS)	
	RATE*	Lower Limit	Upper limit	TN %ile	NHSN %ile	DU(%)	TN %ile	NHSN %ile	INPATIENT DAYS	RATE**
Baptist Hospital (Nashville)	0.5	0.0	3.0	25	23	44	50	23	4216	0.2
Baptist Memorial Hosp. (Collierville)	8.5	1.7	24.7	100	100	33	33	30	1077	2.8
Baptist Memorial Hospital (Memphis)	2.4	1.3	3.9	69	57	73	89	78	8623	1.7
Baptist Memorial Hospital-Tipton	0.0	0.0	34.5	6	10	27	28	13	395	0.0
Blount Memorial Hospital	0.9	0.0	5.2	38	31	55	72	58	1957	0.5
Bristol Regional Medical Center	0.6	0.0	3.5	31	25	51	61	39	3098	0.3
Erlanger Medical Center	4.6	2.2	8.5	81	84	57	78	58	3805	2.6
Fort Sanders Regional Medical Center	0.5	0.0	2.7	19	23	80	100	91	2579	0.4
Jackson Madison County General Hosp.	1.2	0.3	3.6	44	37	74	94	78	3323	0.9
Memorial Healthcare System	0.3	0.0	1.8	13	18	65	83	78	4773	0.2
North Side Hospital	2.8	0.3	9.9	75	63	35	39	13	2095	1.0
Parkridge Medical Center	2.2	0.5	6.5	63	54	44	50	23	3107	1.0
River Park Hospital	5.1	0.1	28.3	94	88	1	6	0	15466	0.1
St Mary's Medical Center	1.6	0.2	5.7	50	33	38	44	39	3281	0.6
Stonecrest Medical Center	0.0	0.0	11.5	6	10	16	11	7	2029	0.0
Sweetwater Hospital Association	0.0	0.0	10.9	6	10	23	22	7	1465	0.0
Vanderbilt Medical Center	5.0	3.0	7.7	88	87	49	56	39	8171	2.4
Williamson Medical Center	1.9	0.6	4.4	56	57	53	67	39	4931	1.0
Woods Memorial Hospital	0.0	0.0	19.6	6	10	17	17	7	1113	0.0

Data reported as of August 24, 2009

** per 1000 central line days*

*** per 1000 inpatient days*

TN%ile percentile in TN (2008)

NHSN%ile percentile in NHSN (2006-2007)

DU(%) device utilization(%)

Bolded: 75th percentile or above within NHSN (2006-2007)

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**Table 8: Measures of Central Line Associated Blood Stream Infection [CLABSI]
by Type of Critical Care Unit
Tennessee (Reportable period: 01/01/2008 - 12/31/2008)**

Location = Medical-Surgical Critical Care Major Teaching

Hospital	INCIDENCE DENSITY RATE (LINE DAYS)					DEVICE UTILIZATION			INCIDENCE DENSITY RATE (INPATIENT DAYS)	
	RATE*	Lower Limit	Upper limit	TN %ile	NHSN %ile	DU(%)	TN %ile	NHSN %ile	INPATIENT DAYS	RATE**
Erlanger Medical Center	2.1	0.4	6.1	30	60	58	44	54	2444	1.2
Holston Valley Medical Center	2.1	1.0	3.9	40	65	69	89	54	6874	1.5
Johnson City Medical Center	4.6	2.7	7.5	90	72	56	33	54	6113	2.6
Methodist Healthcare Germantown	0.6	0.0	3.6	10	28	61	67	54	2555	0.4
Methodist Healthcare North	2.3	0.7	5.3	50	63	56	33	54	3954	1.3
Methodist Healthcare South	2.5	0.7	6.4	60	67	49	11	33	3280	1.2
Methodist Univ. Healthcare (Memphis)	4.1	2.1	7.1	80	67	63	78	54	4690	2.6
Nashville General Hospital at Meharry	1.1	0.1	4.0	20	40	50	22	33	3609	0.6
Regional Medical Center (Memphis)	5.6	3.5	8.5	100	94	74	100	73	5308	4.1
University of TN Med Center (Knox)	2.7	1.3	4.8	70	70	60	56	54	6837	1.6

Data reported as of August 24, 2009

** per 1000 central line days*

*** per 1000 inpatient days*

TN%ile percentile in TN (2008)

NHSN%ile percentile in NHSN (2006-2007)

DU(%) device utilization(%)

Bolded: 75th percentile or above within NHSN (2006-2007)

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**Table 9: Measures of Central Line Associated Blood Stream Infection [CLABSI]
by Type of Critical Care Unit
Tennessee (Reportable period: 01/01/2008 - 12/31/2008)**

Location = Medical-Surgical Critical Care non-Major Teaching

Hospital	INCIDENCE DENSITY RATE (LINE DAYS)					DEVICE UTILIZATION			INCIDENCE DENSITY RATE (INPATIENT DAYS)	
	RATE*	Lower Limit	Upper limit	TN %ile	NHSN %ile	DU(%)	TN %ile	NHSN %ile	INPATIENT DAYS	RATE**
Athens Reg Medical	0.0	0.0	15.9	4	25	24	34	17	957	0.0
Baptist Hospital West (Knoxville)	13.2	5.7	26.1	96	100	33	50	30	1806	4.4
Baptist Hospital of East TN	2.1	0.4	6.1	54	76	67	95	91	2160	1.4
Baptist Memorial Hospital for Women	NA	NA	NA	NA	NA	12	13	7	139	0.0
Baptist Memorial Hospital-Union City	0.0	0.0	12.9	4	25	20	26	17	1445	0.0
Bristol Regional Medical Center	3.8	0.8	11.2	77	91	45	68	47	1750	1.7
Centennial Medical Center	4.3	2.6	6.5	88	92	51	76	64	9695	2.2
Claiborne County Hospital	4.8	0.1	26.9	92	94	17	18	17	1233	0.8
Cookeville Regional Medical Center	1.8	0.4	5.3	42	71	36	55	47	4657	0.6
Crockett Hospital	0.0	0.0	16.8	4	25	23	32	17	934	0.0
Cumberland Medical Center	0.0	0.0	3.7	4	25	34	53	30	2932	0.0
Delta Medical Center	3.7	0.8	10.7	69	90	60	87	80	1371	2.2
Dyersburg Regional Medical Center	0.0	0.0	6.5	4	25	28	45	30	2047	0.0
Gateway Medical Center	0.0	0.0	3.1	4	25	32	47	30	3672	0.0
Harton Regional Medical Center	0.0	0.0	6.8	4	25	25	37	17	2186	0.0
Hendersonville Medical Center	1.7	0.2	6.3	38	70	42	66	47	2694	0.7
Henry County Medical Center	0.0	0.0	7.5	4	25	27	42	30	1848	0.0
Hillside Hospital	0.0	0.0	36.2	4	25	8	8	7	1202	0.0
Horizon Medical Center	NA	NA	NA	NA	NA	4	3	0	327	0.0
Indian Path Medical Center	0.0	0.0	2.7	4	25	51	76	64	2706	0.0
Lakeway Regional Hospital	16.5	2.0	59.7	100	100	11	11	7	1104	1.8
Laughlin Memorial Hospital	0.0	0.0	6.4	4	25	28	45	30	2060	0.0
Livingston Regional Hospital	0.0	0.0	45.5	4	25	40	61	47	205	0.0
Maury Regional Medical Center	2.1	0.8	4.5	58	75	54	79	64	5284	1.1
Memorial North Park Hospital	1.3	0.0	7.1	27	63	46	71	64	1703	0.6
Methodist Medical Center of Oak Ridge	0.0	0.0	9.5	4	25	73	97	91	535	0.0
Middle Tennessee Medical Center	0.4	0.0	2.3	12	42	37	58	47	6589	0.2
Morristown-Hamblen Healthcare System	0.0	0.0	3.0	4	25	22	29	17	5627	0.0

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Hospital	INCIDENCE DENSITY RATE (LINE DAYS)					DEVICE UTILIZATION			INCIDENCE DENSITY RATE (INPATIENT DAYS)	
	RATE*	Lower Limit	Upper limit	TN %ile	NHSN %ile	DU(%)	TN %ile	NHSN %ile	INPATIENT DAYS	RATE**
NorthCrest Medical Center	1.5	0.0	8.1	31	66	26	39	30	2681	0.4
Parkridge East Hospital	0.0	0.0	16.8	4	25	17	18	17	1297	0.0
Parkwest Medical Center (Knoxville)	1.1	0.4	2.6	23	59	63	92	80	7028	0.7
Regional Hospital of Jackson	0.5	0.0	2.7	15	46	50	74	64	4163	0.2
Roane Medical Center	0.0	0.0	9.8	4	25	28	45	30	1332	0.0
Saint Francis Hospital (Memphis)	2.8	1.6	4.4	65	50	63	92	80	10336	1.7
Saint Thomas Hospital	0.3	0.0	1.0	8	46	81	100	93	8921	0.2
SkyRidge Medical Center	0.0	0.0	2.3	4	25	40	61	47	4058	0.0
Skyline Medical Center	1.5	0.4	3.8	35	66	42	66	47	6314	0.6
Southern Hills Medical Center	3.9	1.6	8.0	81	91	41	63	47	4360	1.6
Southern Tennessee Medical Center	0.0	0.0	5.5	4	25	25	37	30	2642	0.0
St Francis Bartlett	2.1	0.8	4.6	62	76	62	89	80	4574	1.3
St Mary's Jefferson Memorial	NA	NA	NA	NA	NA	5	5	7	817	0.0
St Mary's Medical Center	1.8	0.7	4.0	46	71	55	82	80	6004	1.0
St Mary's of Campbell Co	0.0	0.0	19.3	4	25	15	16	7	1294	0.0
St Mary's of Scott County	0.0	0.0	31.3	4	25	25	37	17	473	0.0
Sumner Regional Medical Center	0.5	0.0	3.0	19	25	58	84	64	3175	0.3
Sycamore Shoals Hospital	3.7	0.1	20.6	73	90	18	21	17	1497	0.7
Takoma Regional Hospital	0.0	0.0	13.1	4	25	22	29	17	1296	0.0
University Medical Center (Lebanon)	2.0	0.4	5.8	50	75	55	82	64	2771	1.1
Volunteer Community Hospital	4.1	0.1	22.8	85	92	19	24	17	1265	0.8

Data reported as of August 24, 2009

** per 1000 central line days*

*** per 1000 inpatient days*

TN%ile percentile in TN (2008)

NHSN%ile percentile in NHSN (2006-2007)

DU(%) device utilization(%)

NA not reported due to central line days <50

Bolded: 75th percentile or above within NHSN (2006-2007)

**Table 10: Measures of Central Line Associated Blood Stream Infection [CLABSI]
by Type of Critical Care Unit
Tennessee (Reportable period: 01/01/2008 - 12/31/2008)**

Location = Neurosurgical Critical Care

Hospital	INCIDENCE DENSITY RATE (LINE DAYS)					DEVICE UTILIZATION			INCIDENCE DENSITY RATE (INPATIENT DAYS)	
	RATE*	Lower Limit	Upper limit	TN %ile	NHSN %ile	DU(%)	TN %ile	NHSN %ile	INPATIENT DAYS	RATE**
Baptist Memorial Hospital (Memphis)	2.6	0.8	6.0	67	.	60	67	.	3255	1.5
Erlanger Medical Center	0.9	0.0	4.8	33	37	44	33	35	2622	0.4
Fort Sanders Regional Medical Center	0.0	0.0	2.1	17	25	71	100	90	2490	0.0
Jackson Madison County General Hosp.	2.2	0.3	8.1	50	54	61	83	75	1476	1.4
Methodist Univ. Healthcare (Memphis)	5.6	3.1	9.4	100	94	49	50	57	5148	2.7
Skyline Medical Center	0.0	0.0	5.6	17	25	36	17	35	1822	0.0
Vanderbilt Medical Center	2.7	1.1	5.6	83	61	36	17	35	7265	1.0

Data reported as of August 24, 2009

** per 1000 central line days*

*** per 1000 inpatient days*

TN%ile percentile in TN (2008)

NHSN%ile percentile in NHSN (2006-2007)

DU(%) device utilization(%)

. missing in NHSN

Bolded: 75th percentile or above within NHSN (2006-2007)

**Table 11: Measures of Central Line Associated Blood Stream Infection [CLABSI]
by Type of Critical Care Unit
Tennessee (Reportable period: 01/01/2008 - 12/31/2008)**

Location = Pediatric Medical-Surgical Critical Care

Hospital	INCIDENCE DENSITY RATE (LINE DAYS)					DEVICE UTILIZATION			INCIDENCE DENSITY RATE (INPATIENT DAYS)	
	RATE*	Lower Limit	Upper limit	TN %ile	NHSN %ile	DU(%)	TN %ile	NHSN %ile	INPATIENT DAYS	RATE**
East Tennessee Children's Hospital	5.9	2.4	12.1	100	89	48	29	71	2489	2.8
Johnson City Medical Center	2.8	0.3	10.1	43	60	33	14	25	2187	0.9
MCJ Children's Hospital at Vanderbilt	3.0	1.7	4.9	57	63	60	71	88	8828	1.8
Methodist Healthcare LeBonheur	3.2	1.6	5.8	71	66	64	86	88	5332	2.1
Saint Jude Children's Research Hosp.	1.4	0.2	5.2	14	42	92	100	99	1516	1.3
TC Thompson Children's Hosp(Erlanger)	4.2	1.1	10.7	86	78	53	57	71	1819	2.2
University of TN Med Center (Knox)	2.5	0.1	14.1	29	56	51	43	71	778	1.3

Data reported as of August 24, 2009

** per 1000 central line days*

*** per 1000 inpatient days*

TN%ile percentile in TN (2008)

NHSN%ile percentile in NHSN (2006-2007)

DU(%) device utilization(%)

Bolded: 75th percentile or above within NHSN (2006-2007)

**Table 12: Measures of Central Line Associated Blood Stream Infection [CLABSI]
by Type of Critical Care Unit
Tennessee (Reportable period: 01/01/2008 - 12/31/2008)**

Location = Surgical Critical Care

Hospital	INCIDENCE DENSITY RATE (LINE DAYS)					DEVICE UTILIZATION			INCIDENCE DENSITY RATE (INPATIENT DAYS)	
	RATE*	Lower Limit	Upper limit	TN %ile	NHSN %ile	DU(%)	TN %ile	NHSN %ile	INPATIENT DAYS	RATE**
Baptist Hospital (Nashville)	0.0	0.0	1.7	11	10	52	14	25	4274	0.0
Blount Memorial Hospital	3.3	1.1	7.6	89	77	63	57	46	2418	2.1
Bristol Regional Medical Center	1.7	0.4	5.0	22	50	56	29	46	3113	1.0
Erlanger Medical Center	2.5	0.8	5.9	67	64	60	43	46	3270	1.5
Jackson Madison County General Hosp.	2.3	0.9	4.7	56	61	68	86	77	4533	1.5
Memorial Healthcare System	3.1	1.0	7.2	78	75	66	71	77	2472	2.0
Methodist Univ. Healthcare (Memphis)	1.8	0.4	5.1	33	55	69	100	77	2488	1.2
Parkridge Medical Center	2.2	0.7	5.2	44	59	69	100	77	3244	1.5
Vanderbilt Medical Center	5.5	3.4	8.3	100	91	63	57	46	6357	3.5

Data reported as of August 24, 2009

** per 1000 central line days*

*** per 1000 inpatient days*

TN%ile percentile in TN (2008)

NHSN%ile percentile in NHSN (2006-2007)

DU(%) device utilization(%)

Bolded: 75th percentile or above within NHSN (2006-2007)