

Table 1. Summary of Central Line-associated Bloodstream Infection (CLABSIs) Data by Type of Intensive Care Unit (ICU), 2013

ICU Type	Number of Units Reporting	Number of Infections		Standardized Infection Ratio (SIR)	95% Confidence Interval (SIR)		Statistical Interpretation (compared to National baseline)
		Observed	Predicted		Lower	Upper	
All ICUs combined	250	327	741	0.441	0.395	0.491	Lower
Adult ICUs*	190	245	532	0.461	0.406	0.521	Lower
NICUs**	40	55	134	0.412	0.313	0.532	Lower
PICUs***	20	27	76	0.355	0.239	0.509	Lower

* Adult ICU (all settings combined)

**Neonatal ICU

***Pediatric ICU

Table 1 provides a snapshot summary of central line-associated bloodstream infections (CLABSIs) in Illinois intensive care units (ICUs) during 2013. Illinois hospitals have been reporting CLABSI data from adult ICUs to the Illinois Department of Public Health using the CDC's National Healthcare Safety Network since October, 2008. Reporting of CLABSI data from both PICUs and NICUs commenced in October, 2009. CLABSI data are summarized using the standardized infection ratio(SIR), a summary statistic used to measure relative difference in CLABSI occurrence during a reporting period, in this case 2013, compared to a common referent period (national data collected during 2006-2008). For additional information on Standardized Infection Ratios (SIRs), and confidence intervals (CIs), see the methodology section of the Illinois Hospital Report Card website.

For all ICU combined, 327 CLABSIs were reported compared to 741 predicted, for an SIR of 0.441 (95% CI 0.395, 0.491). This translates to a 56% reduction compared to the national referent period noted above. This statistically significant reduction in CLABSIs was achieved in all three intensive care settings – adult ICUs (AICU), neonatal ICUs (NICU) and pediatric ICUs (PICU). The reduction of CLABSIs was 54% in adult ICUs, 59% in NICUs, and 65% in PICUs, as shown on Table 1.

Table 2. Changes in Standardized Infections Ratios (SIRs) in Illinois ICUs from 2009 - 2013, CLABSI

Year	2009	2010	2011	2012	2013
All ICUs Combined	0.861	0.669	0.582	0.544	0.458
Adult ICUs	0.865	0.645	0.604	0.606	0.485
NICUs	0.772	0.659	0.481	0.414	0.412
PICUs	0.949	0.849	0.657	0.343	0.355

Figure 1. SIR of CLABSIs in Adult ICU, Neonatal ICU, and Pediatric ICU from 2009 - 2013

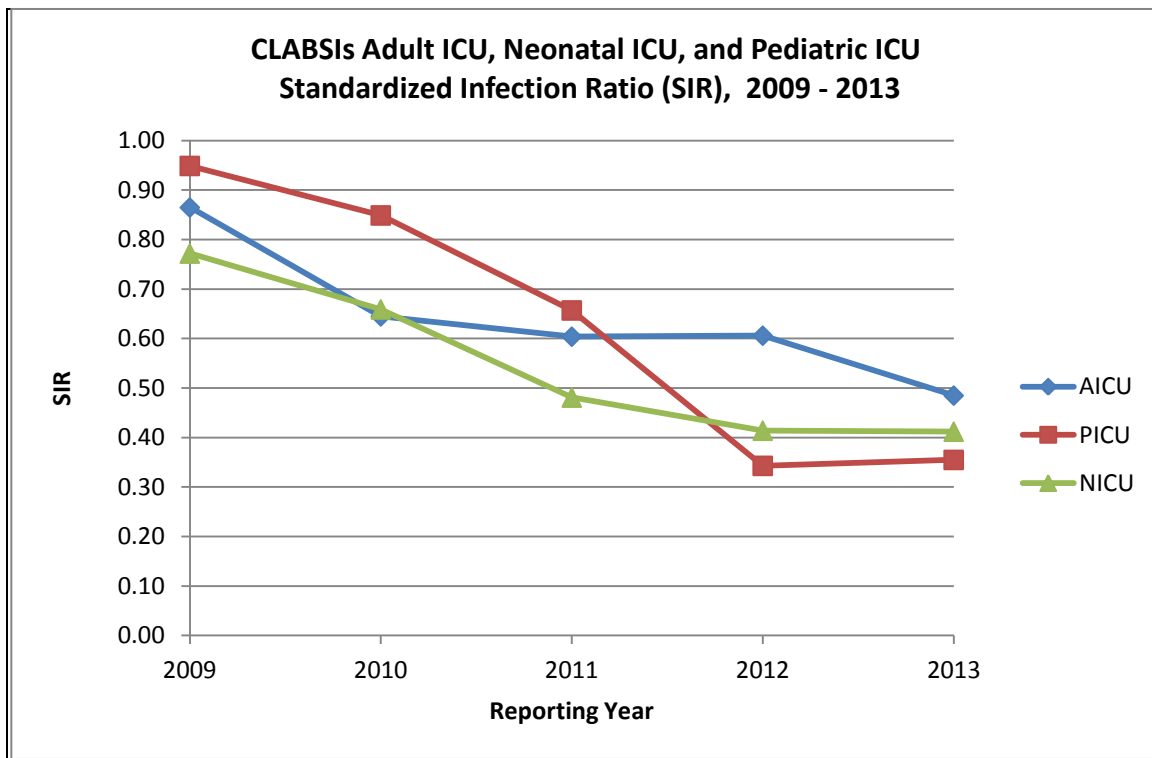
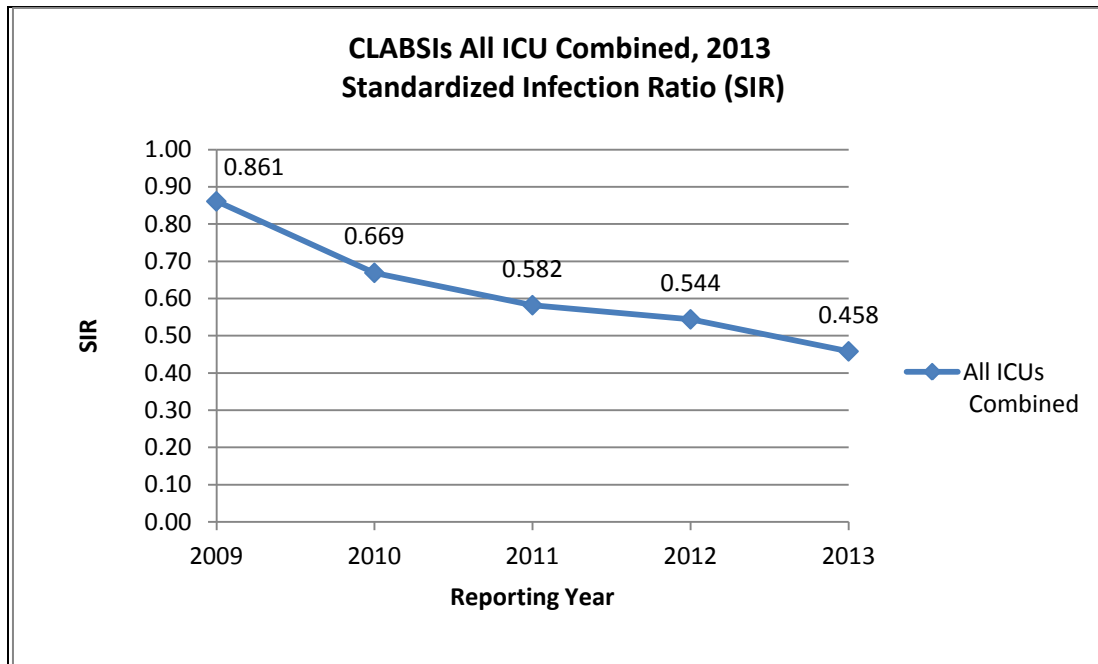


Figure 2. SIR of CLABSIs in ICUs combined from 2009 – 2013



Joinpoint Trend Analysis:

New to this year reporting, trends in CLABSI SIR in Illinois Acute Care Hospitals were analyzed using Joinpoint regression version 4.1. Joinpoint regression program is a trend analysis software developed by the US National Cancer Institute for the analysis of data from the Surveillance Epidemiology and End Results Program.¹ The joinpoint program is used to find the best-fit line through several years of data. This method describes changes in data trends by connecting several different line segments on a log-scale at “joinpoints.”

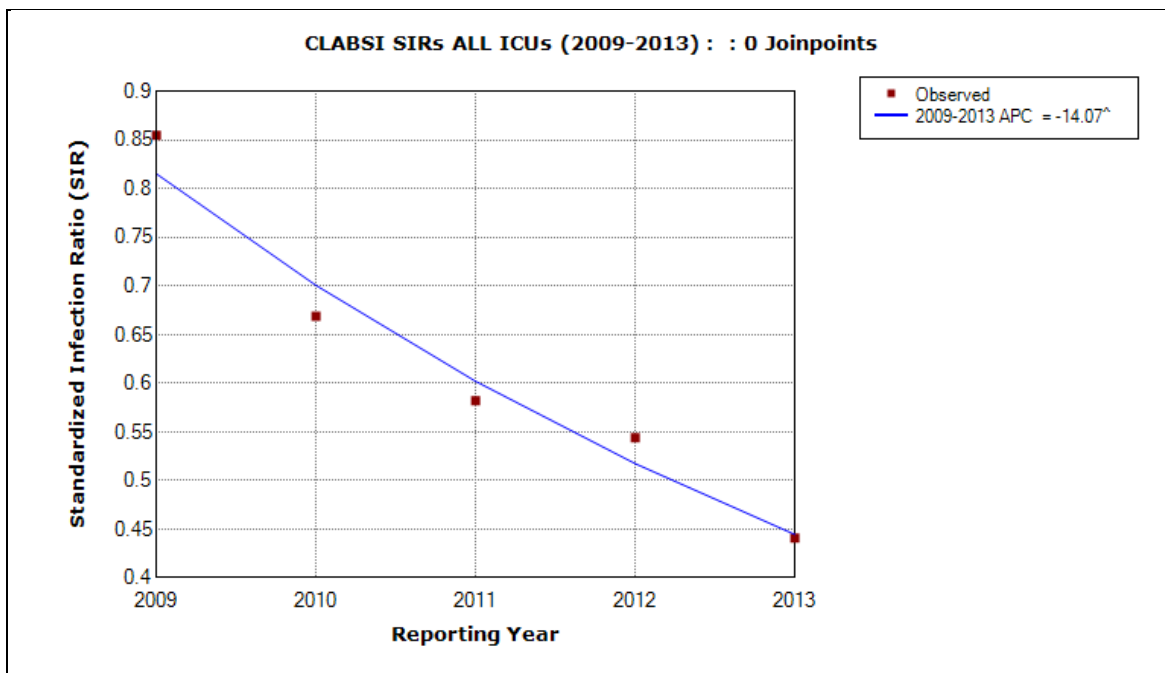
Analysis starts with the minimum number of joinpoints (i.e., 0 joinpoint, representing a straight line) and tests whether more joinpoints are statistically significant and must be added to the model. Tests of significance use a Monte Carlo permutation method with each joinpoint denoting a statistically significant (P = .05) change in trend (refer to Table 3 and Figure 3 for the Joinpoint result for all ICUs from 2009 – 2013).¹

In addition, an annual percent change (APC) in SIR values for each line segment and the corresponding 95% confidence interval were estimated. The APC is tested to determine whether a difference exists from the null hypothesis of no change (0%).¹ Refer to Table 3 for the APC and AAPC for all ICU types.

Table 3. Annual and Average Annual Percent Change in SIR in Illinois ICUs, 2009 - 2013

ICU Type	Average Annual Percent Change	Significant Change	p-value (AAPC)
All ICUs Combined	14.1%	Decrease	0.0033
Adult ICUs	12.1%	Decrease	0.023557
NICUs	16.2%	Decrease	0.013979
PICUs	25.8%	Decrease	0.014215

Figure 3. Joinpoint Ouput SIR of CLABSIs in All ICUs combined from 2009 – 2013



Summary

The overall decrease in the number of CLABSIs reported in all ICUs combined and adult ICU, Pediatric ICU, and Neonatal ICU, separately, are statistically significant since 2009. The SIR for CLABSIs in AICU, PICU, and NICU are trended over time in Figures 1 through 3. According to the results of the joinpoint analysis, it was determined that Illinois SIRs for all CLABSIs have been steadily decreasing on average by 14.1% per year for the 5-year period of 2009 through 2013 (Figure 3). The SIRs for Adult ICU, NICU and PICU have also seen the steady decrease per year for this same time period (Table 3). Since there was no significant change point in the data a straight line is displayed, indicating that the 2009-2013 trend for CLABSIs as consistently decreasing throughout the 5-year period reported.

References:

¹ Kim HJ, Fay MP, Feuer EJ, Midthune DN. Permutation tests for joinpoint regression with applications to cancer rates. Stat Med 2000;19:335–51.