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Illinois Hospitals Reduce Surgical Site Infections (SSI) Coronary Artery Bypass Graft Surgery (CABG)

Surgical Site Infections (SSI) Overview

Illinois hospitals have been reporting surgical site infection (SSI) data to the Illinois Department of Public Health (IDPH) using the CDC's National Healthcare Safety Network (NHSN) since April, 2010. SSIs are infections that occur in the wound created by an invasive surgical procedure and are one of the most important causes of healthcare-associated infections (HAI). The surgeries monitored for SSI in Illinois include coronary artery bypass surgery (CABG) procedures, and knee replacements (KPRO). This report and analysis reflects the July 1, 2012 to June 30, 2013 SSI data of Illinois hospitals that performs CABG.

The CDC describes three types of surgical site infections:

- **Superficial incisional SSI.** This infection occurs just in the area of the skin where the surgical incision was made.
- **Deep incisional SSI.** This infection occurs beneath the incision area in muscle tissue and in fascia, the tissue surrounding the muscles.
- **Organ or space SSI.** This type of infection can be in any area of the body other than skin, muscle, and fascia that was involved in the surgery, such as a body organ or a space between organs.

IDPH monitors inpatient procedures and Deep Incisional Primary and Organ/Space SSIs that were identified during admission or readmission to Illinois facilities as defined in the NHSN Manual.

Standardized Infection Ratio (SIR)

Facilities' surgical site infection results are compared using the standardized infection ratio (SIR). The SIR is a risk adjusted summary measure that accounts for the type of procedure and patient risk. It is the ratio of the observed to expected (or predicted) number of SSI ($\text{observed} / \text{predicted} = \text{SIR}$). The predicted number of infections is calculated based on national infection data and patient risk at each health facility. A hospital's SIR value is compared to the baseline U.S. experience (i.e. NHSN aggregate 2006-2008 data). If the SIR value is greater than 1.0, there are more infections than expected. If the SIR value is less than 1.0, then fewer infections occurred than expected. If the facility SIR is 1.0, then the number of observed infections is the same as or similar to the national infection rate. A statistical test (Poisson test) is used to determine if the difference is statistically significant.

The three categories summarizing how a hospital compares to the national infection data for procedures performed:

- Statistically fewer (Lower) infections than expected based on national infection data;
- Statistically similar (Similar) infections as expected based on the national infection data; or
- Statistically more (Higher) infections than expected based on national infection data.

For additional information on Standardized Infection Ratios (SIRs) and confidence intervals (CIs), see the methodology section of the Illinois Hospital Report Card website:

<http://www.healthcarereportcard.illinois.gov/methodology>

Table 1. Summary of CABG SSI Data, Year 2010 – 2012*

Reporting Year *	Number of Facilities Reporting	Total Number of CABG Performed	Number of Infections (SSI)		Standardized Infection Ratio (SIR)	95% Confidence Interval (SIR)		p-value	Statistical Interpretation
			Observed	Predicted		Lower Bound	Upper Bound		
2010	65	7545	66	97.52	0.68	0.53	0.86	< 0.001	Lower
2011	65	7120	53	94.25	0.56	0.43	0.73	< 0.001	Lower
2012	65	6846	44	91.13	0.48	0.36	0.64	< 0.001	Lower

*NOTE: Actual Reporting Period is July 1st – June 30th of the Reporting Year

Table 1 provides a snapshot summary of Coronary Artery Bypass Graft (CABG) surgery SSI in Illinois hospitals from 2010 – 2013. Each year shown on the table represents a reporting period from July 1 - June 30. For all years shown, the numbers of observed SSI compared to the predicted value have been declining, with all the SIR values being < 1.0. These are statistically significant compared to the national referent period noted above.

As shown in the following Tables and Figures, reductions in CABG SSIs have been observed since Illinois hospitals have started reporting CABG SSI in 2010. The reduction of CABG SSI by individual time frame: from 2010 to 2011 was approximately 18%, from 2011 to 2012 was 14%, and from 2010 to 2012 was 29%. However, these were not statistically significant reductions in SSI.

Table 2. Changes in SIR in Illinois SSI, 2010 compared to 2011: CABG

Year *	2010	2011	Percent Change	Significant Change	p-value
SIR	0.68	0.56	-17.65%	No	0.3165

Table 3. Changes in SIR in Illinois SSI, 2011 compared to 2012: CABG

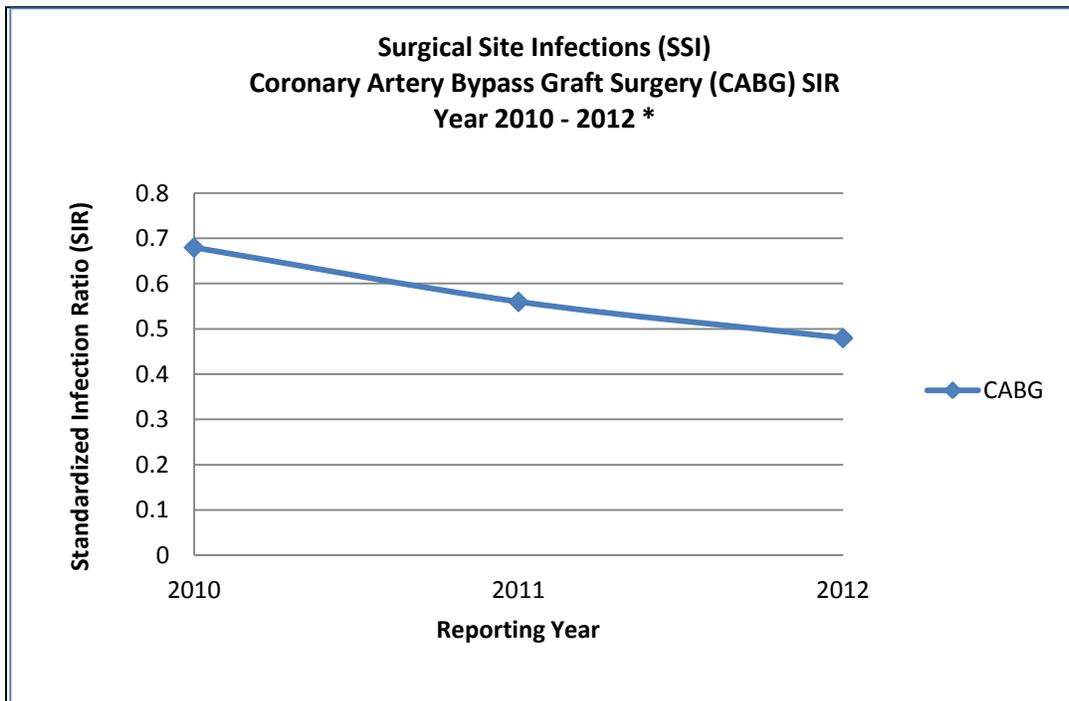
Year *	2011	2012	Percent Change	Significant Change	p-value
SIR	0.56	0.48	-14.29%	No	0.457

Table 4. Changes in SIR in Illinois SSI, 2010 compared to 2012: CABG

Year *	2010	2012	Percent Change	Significant Change	p-value
SIR	0.68	0.48	-29.41%	No	0.0818

The Illinois SIR values for CABG SSIs are trended over time in Figures 1 below.

Figure 1. SIR of CABG SSI in Illinois Hospitals from 2010 - 2012



Summary

CABG SSI trend analysis indicates consistent decreases in the number of CABG SSIs reported in all Illinois hospitals combined between 2010 and 2012, as reflected in the decreased SIR. This yearly decrease is not statistically significant. However, the number of CABG SSIs reported in all Illinois hospitals combined is statistically significant when compared to the national infection rate for each year reported as outlined earlier in Table 1.