

Illinois Hospitals Reduce Surgical Site Infections (SSI) Knee Arthroplasty (KPRO)

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 replacement (KPRO) surgery. This report and analysis reflects SSI data of Illinois hospitals that perform KPRO from 2011 through 2014.

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 (observed / predicted = 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 (ie. 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. And 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 procedure performed are highlighted below:

- 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 KPRO SSI in Illinois hospitals from 2011 to 2014

Reporting Year	Number of Facilities Reporting	Total Number of KPRO Performed	Number of Infections (SSI)		Standardized Infection Ratio (SIR)	95% Confidence Interval (SIR)		p-value	Statistical Interpretation
			Observed	Predicted		Lower Bound	Upper Bound		
2011	134	26646	108	171.29	0.63	0.520	0.758	< 0.001	Lower
2012	137	27620	109	178.89	0.61	0.503	0.732	< 0.001	Lower
2013	141	28275	84	179.52	0.47	0.376	0.576	< 0.001	Lower
2014	140	29208	90	186.42	0.48	0.390	0.591	< 0.001	Lower

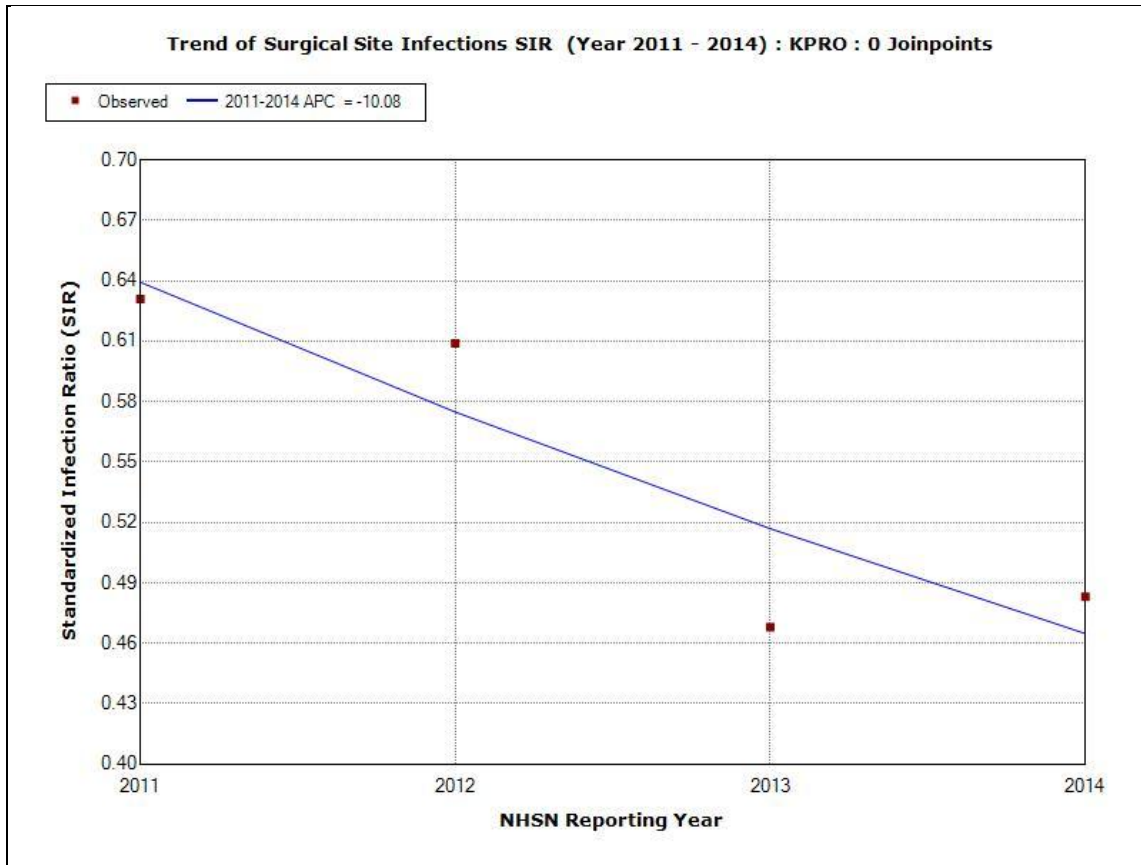
Table 1 is a summary of Knee Arthroplasty (KPRO) SSI in Illinois hospitals from 2011 to 2014. Each year shown on the table represents a reporting period from January 1st to December 31st. For all years shown, the numbers of observed SSI compared to the number of predicted SSI have been declining, with all the SIR values being less than 1.0. All Illinois SSI SIR values are significantly lower than the national referent period noted in the SIR overview.

As shown in Table 2 and Figure 1, reductions in KPRO SSIs have been observed since Illinois hospitals have started reporting in April, 2010. The average annual percent change (AAPC) of KPRO SSI from 2011 to 2014 was approximately 10%, however, this percent change is not statistically significant.

Table 2. Changes in Standardized Infections Ratios (SIRs) in Illinois KPRO SSI from 2011 – 2014

SSI Procedure Type	Reporting Year Range	Average Annual Percent Change (AAPC)	95% Confidence Interval (SIR)		p-value	Statistical Interpretation
			Lower Bound	Upper Bound		
KPRO	2011 - 2014	-10.082	-23.323	5.445	0.1030	% Change is Not Significant

Figure 1. Trend of KPRO SSI SIR in Illinois Hospitals from 2011 - 2014



Summary

The KPRO SSI trend analysis indicates a steady decrease of 10% per year of KPRO SSIs reported in Illinois hospitals between 2011 and 2014. Furthermore, when compared to the national KPRO SSI baseline for each individual year as outlined in Table 1, the SIR for Illinois hospitals are significantly lower for every year reported.