

Comprehensive Quality Improvement Project Significantly Reduces Orthopedic Surgical Site Infections

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Background

Surgical site infections (SSIs) are hospital-acquired infections that contribute to increased morbidity and mortality and to an extended length of stay (LOS).¹ The most recent National Healthcare Safety Network Report² stated that the incidence of orthopedic SSIs ranged from 0.72 (low-risk spinal fusion) to 9.88 (high-risk spinal resection) and averaged 2.24. One systematic literature review found that the mean attributable cost related to SSIs is \$25,546 per case.³

Given the deleterious outcomes associated with SSIs, many preventive efforts have been implemented, ranging from Centers for Disease Control and Prevention (CDC) guidance to Institute for Healthcare Improvement (IHI) bundles of care. One of the many CDC recommendations¹ is as follows: "Require a patient to shower or bathe with an antiseptic agent at least the night before the operative day; category IB."

An Infection Prevention & Control Professional and her Team noted that the majority of SSIs were related to total joint procedures and began a quality improvement (QI) project to ensure that effective preventive efforts were in place to prevent orthopedic SSIs. The Team implemented a QI project spanning from April 2006 through December 2006.⁴ Because of the positive outcomes associated with the QI project, the ongoing results of the QI project through March 2009 are presented in this poster.

Methods

In 2006, the Team ensured that all SSI prevention protocols were updated and then revised the preoperative skin preparation protocol to ensure that all patients undergoing total joint replacements would receive site-specific treatment with 2% chlorhexidine gluconate (CHG) no-rinse cloths* the night before surgery and again in the holding area prior to the standard preoperative skin preparation protocol for surgery. Ongoing education about the importance of preventing SSIs was provided to caregivers to ensure appropriate adherence to all SSI prevention guidelines and to the facility-approved protocol.

The historical SSI baseline was based on 3 quarters prior to the intervention, and the initial QI intervention lasted for 3 quarters in 2006. The same protocol and educational interventions were continued through 2009, and the data analysis extended through the end of March 2009. Outcomes of interest were total joint SSI rates, protocol compliance, complications associated with the protocol, and LOS.

* Sage® 2% Chlorhexidine Gluconate Patient Preoperative Skin Preparation Cloths (Sage Products Inc., Cary, IL)

Results

Figure 1. Total Joint SSI Rate Pre- and Post-Intervention

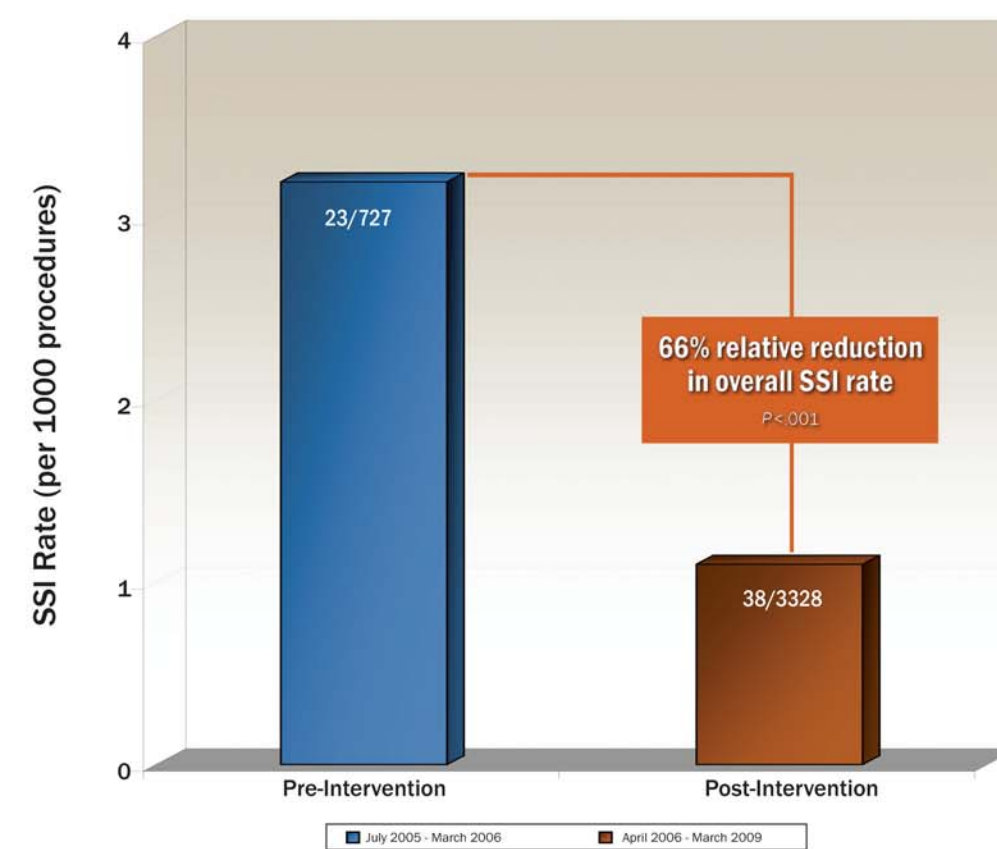
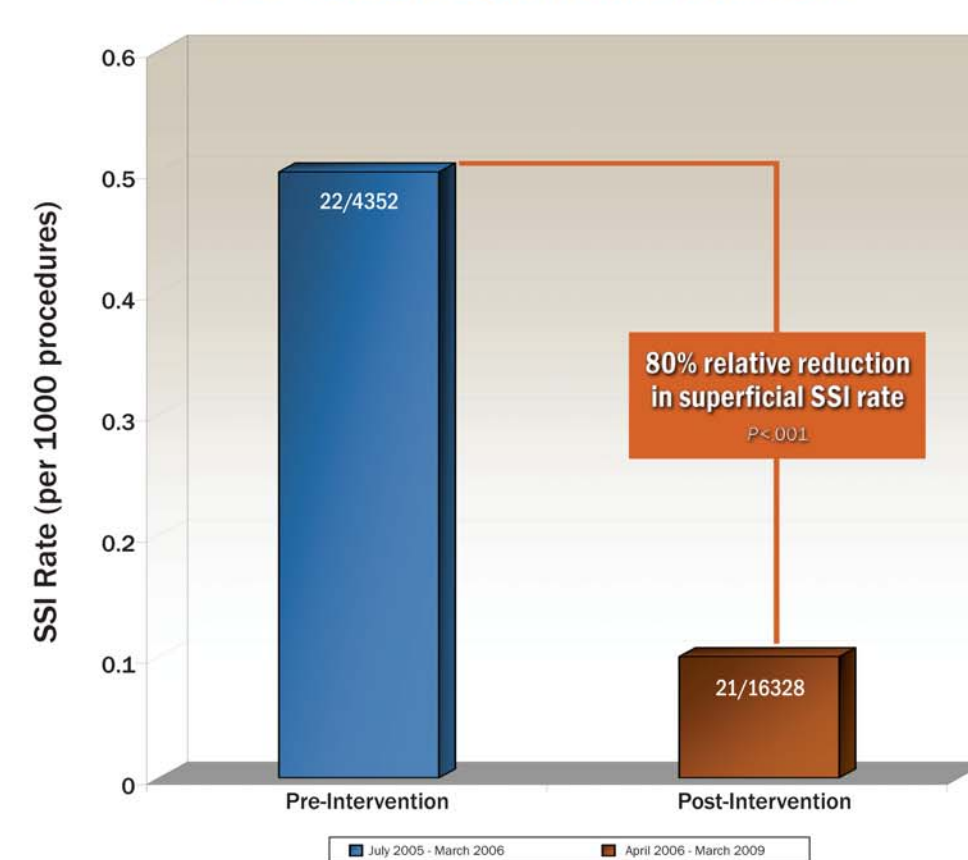


Figure 2. Superficial SSI Rate Pre- and Post-Intervention



Total Joint SSI rates

Hypothesis: The primary hypothesis was that total joint SSI rates would decrease after the intervention. The pre-intervention period was from July 2005 through March 2006. The post-intervention period was from April 2006 through March 2009.

Sample Size: With data from over 4000 procedures both before and after intervention, there was adequate statistical power to detect an absolute difference as small as 1.5% as statistically significant with an alpha level of 5% and a beta level of 20%.

Statistical Methods: A chi-square test was used to assess the change in the incidence rate over time. The rates were reported as counts and percentages. In addition, the test statistic and *P* values were reported. A *P* value < .05 was considered statistically significant.

Results: The data revealed a statistically significant reduction in the overall total joint SSI rate. The rate decreased from 3.2 (23/727) to 1.1 (38/3328) for a **relative reduction of 66%** (chi-square test statistic = 16.5, *P* < .001) (Figure 1).

Compliance

Compliance was monitored by reviewing the completed standing orders in our preoperative holding area. Compliance with activities in the preoperative holding area activities was 90-100% throughout the duration of the QI study. Compliance with at-home skin preparation by patients was more difficult to document; however, patient activities at home were reported to the preoperative holding area and documented, and the number of 2% CHG no-rinse cloths* distributed per surgical case was recorded.

Length of stay

LOS was documented throughout this QI study and did not change significantly. More variability in complications and in LOS was observed with total hip replacements than with total knee replacements, as shown in Figure 2.

Clinical Implications

- QI projects require implementation of best practices and an extensive research review prior to initiation.
- Change management is an ongoing challenge in any QI initiative, and communication and education must be consistent and ongoing.
- The combination of standardization of preoperative skin preparation with 2% CHG no-rinse cloths* the night before surgery and the day of surgery in the preoperative holding area, usual preoperative skin antisepsis, and caregiver and patient education has resulted in a significant decrease in total joint-related SSIs.


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References

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