

# Preoperative Skin Preparation Protocol Results in Reduced SSI Rates

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## Keywords:

- ♦ Surgical Site Infections (SSIs)
- ♦ Nosocomial Infections
- ♦ Preoperative Skin Preparation
- ♦ 2% Chlorhexidine Gluconate (CHG)
- ♦ Preoperative Holding Area Intervention
- ♦ Cost Savings

## Objective of the Intervention

The aim of this intervention was to improve effectiveness of the preoperative skin preparation protocol, reduce the incidents of SSIs a minimum of 50%, and measure economic savings, by utilizing prewarmed 2% no-rinse CHG cloths for preoperative skin antisepsis.

## Inspiration Behind the Intervention

Prince William Hospital participates in the Surgical Care Improvement Project (SCIP) and sought to determine if the hospital's pre-existing SSI rate of 3% could be reduced to meet the IHI/SCIP goal of 0%. The primary outcome sought was the rate of SSIs using a 2% chlorhexidine gluconate (CHG) no-rinse cloth (Sage® 2% CHG Cloth, Sage Products Inc, Cary, IL) compared to the historical SSI rate.

## Background

### Surgical Site Infections

- ❖ The 5-Million Lives initiative of the Institute for Healthcare Improvement and Surgical Care Improvement Project (SCIP) seeks to use education and intervention to reduce medical harm from SSI, infection with methicillin-resistant *Staphylococcus aureus* (MRSA), and surgical complications.<sup>1</sup>
- ❖ Postoperative SSIs are the most common healthcare-associated infection in surgical patients,<sup>2</sup> occurring in up to 5% surgical patients.<sup>3</sup>
- ❖ Costs associated with SSIs are high, with a mean SSI cost of \$25,546.<sup>4</sup> Infection with a MRSA SSI is associated with median hospital charges of \$92,363.<sup>5</sup>
- ❖ The Center for Medicare and Medicaid services has adopted payment rules for 2008 that will deny reimbursement for conditions that are reasonably preventable with evidence-based measures. Mediastinitis from cardiac surgery, has already been selected for 2008.<sup>6</sup> Other SSIs and infection with MRSA are earmarked for 2009.<sup>6</sup>

### MRSA as an increasing medical problem

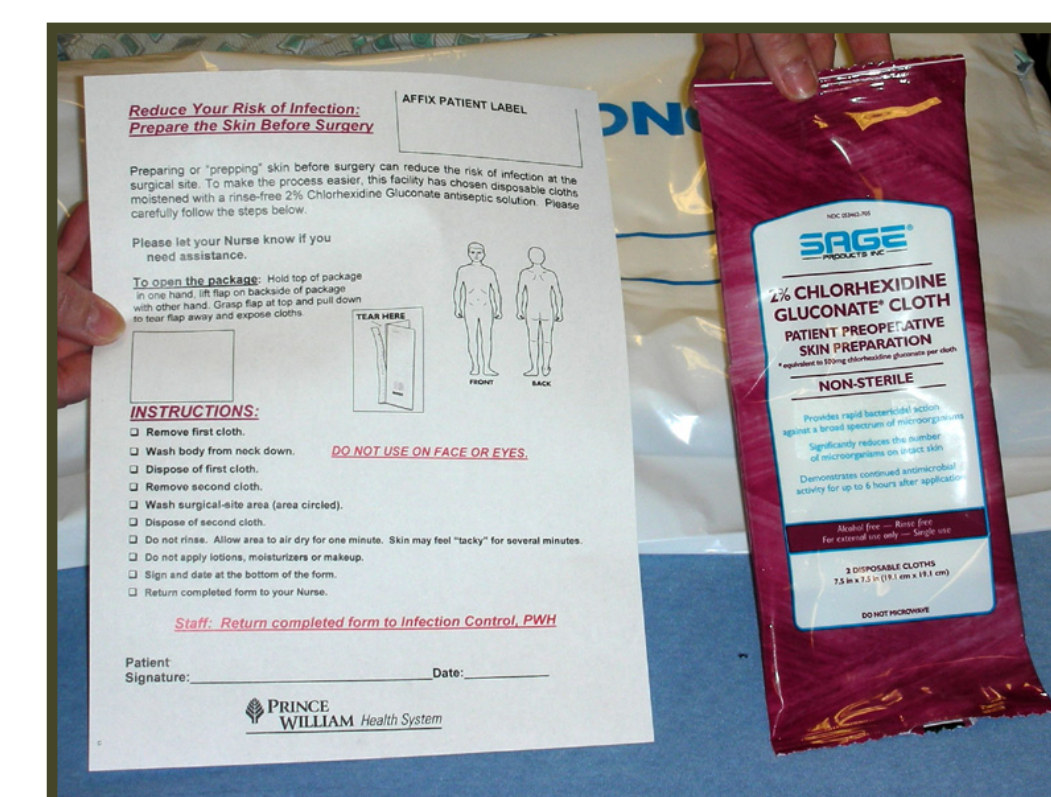
- ❖ In orthopedic surgery patients in a community hospital, *Staphylococcus aureus* was the most common SSI (responsible for 25.8% of SSIs) and the rates of MRSA (4.5%) were comparable to rates reported at large academic centers.<sup>7</sup>
- ❖ In a recent study of periprosthetic surgery infection, gram-positive cocci caused 92% of infections and gram-negatives caused 8%. MRSA rates increased from 13% of periprosthetic infections in 1999 to 30% in 2005.<sup>8</sup>

### Prevention of SSI

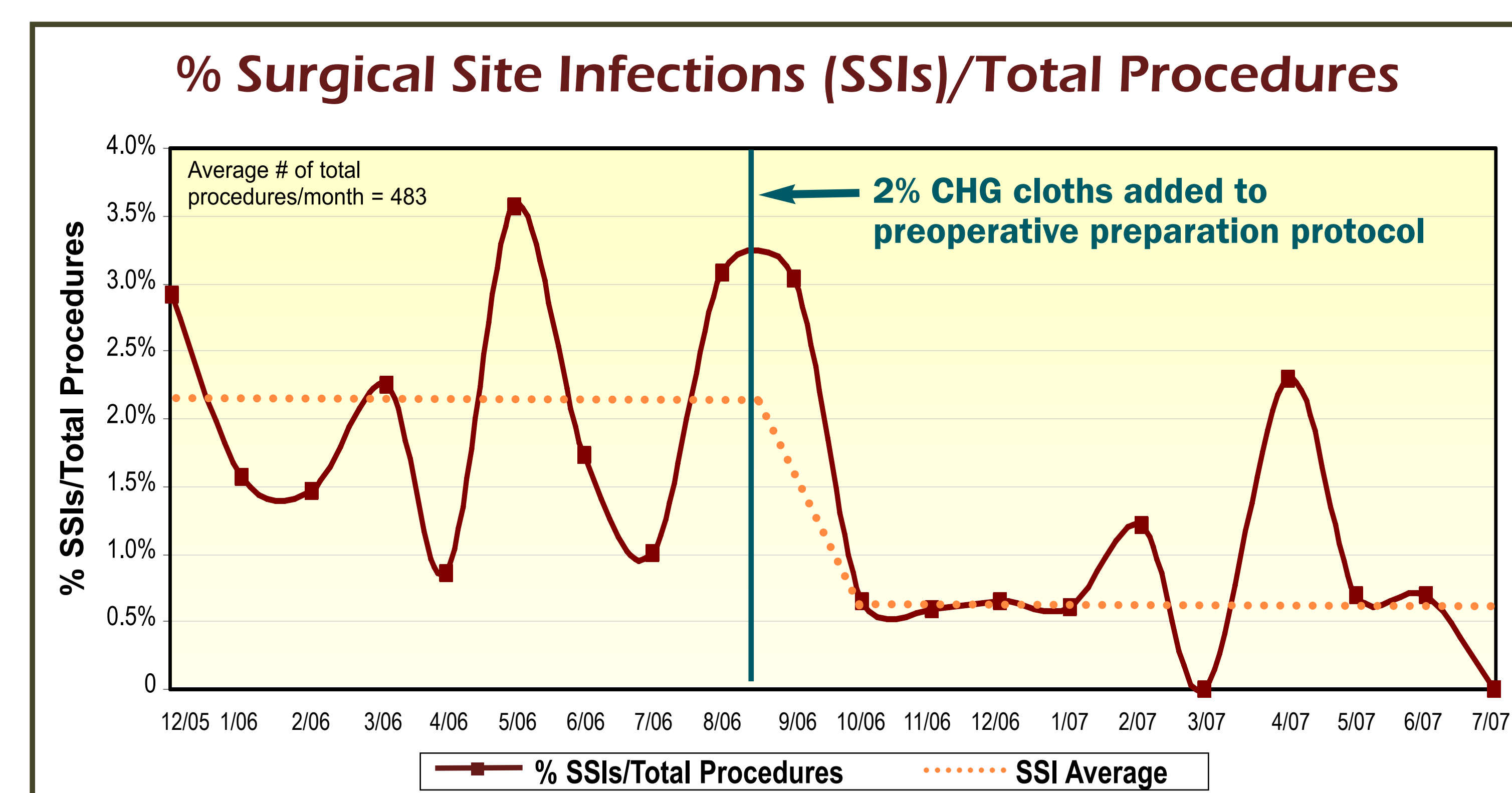
- ❖ The 1999 CDC SSI Prevention Guidelines recommend surgical masks, sterile gloves, hand antisepsis for surgical personnel, and instrument sterilization as category 1B recommendations and these have become routine and the standard of care.<sup>2</sup> However, the recommendation that patients shower or bathe with an antiseptic agent on at least the night before the operative day is often overlooked. This may be due to any of several reasons, including patient compliance issues, lack of consensus on whether the surgeon's office or the hospital should provide preoperative antisepsis, and inconsistent methods of antisepsis.
- ❖ Cleansing patients' skin with 2% CHG cloths reduces vancomycin-resistant *Enterococcus* (VRE) contamination on patients' skin, the environment, and healthcare workers' hands. Compared to soap and water, use of 2% CHG resulted in fewer colonies of VRE on patients' skin and less VRE contamination of health care workers' hands (risk ratio [RR],0.6) and environmental surfaces (RR,0.3).<sup>9</sup>
- ❖ Use of 2% CHG-impregnated cloths also reduces the rate of primary blood stream infections in patients in the MICU, with a reported reduction from 10.4 infections to 4.1 infections per 1000 patient days reported with the 2% CHG cloth use.<sup>10</sup>
- ❖ Preoperative skin antisepsis with 2% CHG cloths offers the benefits of potential reduction in SSIs and infection with antibiotic-resistant bacteria, persistent residual antiseptic,<sup>11</sup> ease of use for patients and staff, and the potential for dramatic cost avoidance.

## Intervention methods

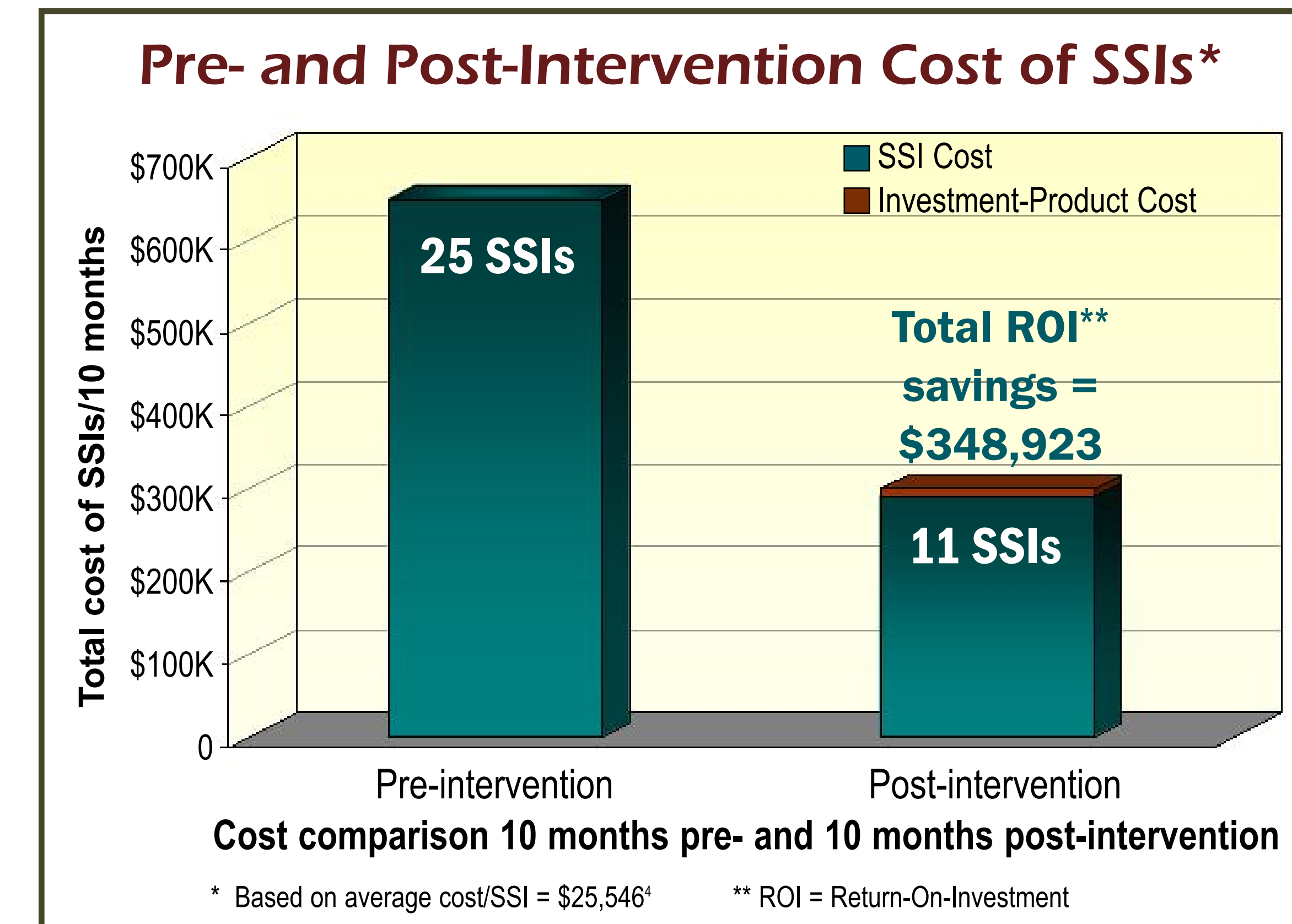
- ♦ The historical rates of SSIs were based on an observation period from December 2005 through September 2006. The new preoperative protocol was instituted in August of 2006 for same-day and outpatient surgery, and in January 2007 for inpatient surgery. The SSI rate associated with the new preoperative protocol was monitored from October 2006 through July 2007.
- ♦ Upon arrival at the hospital, patients were educated on the use of CHG cloth with an instruction sheet. Patients then washed themselves as instructed. Nursing assistance was provided as needed if requested by the patient. Patients were instructed not to shave the operative site and were required to sign the instruction form to verify that they read the instructions and used the cloths according to the instructions.
- ♦ The cloths were supplied in prepackaged units and after January 2007, these were warmed prior to use to decrease the risk of hypothermia.
- ♦ The patient was instructed to allow the area to air-dry after prepping. The cloths were used to prep the entire body from the jaw bone down to the toes. Each cloth was used for approximately 30-seconds and was disposed of after use. The patient was instructed not to apply lotion, moisturizers, or makeup. Upon completion of these steps, the patient signed the form and returned it to the nurse. Completed forms were forwarded to Infection Control for review and data collection.
- ♦ The primary outcome measure was the rate of SSIs using the CHG 2% no-rinse cloth protocol. No other SSI prevention measures were implemented during this time.
- ♦ Secondary outcome measures were the rate of SSIs compared to historical rates (total procedures/SSIs 10 months pre-intervention compared with total procedures/SSIs 10 months post-intervention) and cost calculations based on an average cost per SSI of \$25,546.00.<sup>4</sup>



## Results



- ♦ There were a total of 25 SSIs in the 10 months prior to institution of the protocol and 11 SSIs during the 10 months after institution of the protocol.
- ♦ SSI rate went from the historical rate of 2.1% in the 10 months pre-implementation to 0.7% in the 10 months post-implementation. Thus, the result of this intervention was a 66% decrease in SSI rates in the 10 months following implementation.
- ♦ Despite higher skin antisepsis product cost, the decreased number of SSIs resulted in cost savings of \$348,923 in the 10 months post-intervention (based on average SSI costing \$25,546.00).



## Lessons Learned

- ❖ The consistent use of 2% CHG cloths for preoperative skin antisepsis reduces SSI rates.
- ❖ Maintaining normothermia by prewarming the 2% CHG cloths may reduce promotion of surgical wound infection due to mild perioperative hypothermia.
- ❖ Comprehensive and concise patient instructions for self-application of 2% CHG cloths help ensure consistent and appropriate use as part of the preoperative skin preparation protocol.
- ❖ Reduction of SSI rates results in substantial cost-savings.
- ❖ Higher costs of a product which reduces SSI rates may be justified by calculating a return-on-investment achieved as a result of indirect economic savings related to decreased incidence of SSIs and decreased re-admission rates.
- ❖ This protocol was instituted August 2006 in the preoperative holding and in January 2007 for inpatient cases. The facility now utilizes the 2% CHG cloths for preoperative skin antisepsis housewide.

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