



## Facts about the Surgical Site Infections Project

*In a 2002 study of U.S. hospitals, the estimated number of healthcare-associated infections (HAIs) was approximately 1.7 million. Surgical site infections (SSIs) were the second most common HAI, accounting for 22 percent of all HAIs among hospital patients. The estimated deaths associated with HAIs were 98,987, of which 8,205 (8 percent) were associated with SSIs.\**

The SSI project began in August 2010 and was launched in collaboration with the American College of Surgeons (ACS) and seven participating organizations. The project uses SSI outcomes data derived from ACS's National Surgical Quality Improvement Program (NSQIP) to guide the improvement effort. NSQIP data on outcomes of surgery are highly regarded by physicians as clinically valid, using detailed medical information on severity of illness and comorbidity to produce data on risk-adjusted outcomes.

Colorectal surgery was identified as the focus of the project because it is a common procedure across different types of hospitals, can have significant complications, presents substantial opportunities for improvement, and has high variability in performance across hospitals. Project participants studied the potential factors that contribute to colorectal SSIs. There are three types of colorectal SSIs:

- Superficial incisional SSI – the infection involves only skin or subcutaneous tissue of the incision
- Deep incisional SSI – the infection appears to be related to the operation and involves deep soft tissues (for example, fascial and muscle layers) of the incision
- Organ/space SSI – the infection appears to be related to the operation and involves any part of the anatomy other than the incision (for example, organs or spaces), which was opened or manipulated during an operation

The project teams went beyond regular data collection requirements to compile meaningful data for this project – they collected data on colorectal surgical patients, whether the patient had an infection or not. Through this proactive measurement strategy, the project teams could detect significant risk points and identify if the surgical care provided to patients: 1) deviated from the intended practice, which was defined by the organization's policy, protocol, or evidence-based recommendations; 2) indicated the absence of a process step considered to be critical in delivering intended care; or 3) showed significant variation in care delivery and inconsistency in the care approach by different care providers.

The project participants identified 34 unique correlating variables for risk of colorectal SSIs that may be related to patient characteristics; the surgical procedure; antibiotic administration; preoperative, intra-operative and postoperative processes; and measurement challenges. Correlating variables are factors or attributes that are strongly associated with an outcome. For this project, the participating hospitals analyzed and validated a number of variables that significantly influence the occurrence of colorectal SSIs within their organizations.

### Project results

In November 2012, the Joint Commission Center for Transforming Healthcare announced solutions and findings for its fourth improvement project on reducing the risk of colorectal SSIs. Working together, the participating hospitals reduced superficial incisional colorectal SSIs by 45 percent and all types of colorectal SSIs by 32 percent. They attained an estimated cost savings of more than \$3.7 million for the 135 estimated colorectal SSIs that were avoided. They also decreased the average length of stay for hospital patients with any type of colorectal SSI from 15 days to 13 days. In comparison, patients with no colorectal SSI had an average length of stay of eight days.

Examples of some of the targeted solutions to reduce superficial incisional colorectal SSIs include standardizing the preoperative instruction to patients and caregivers for applying the preoperative skin cleaning product; and establishing specific criteria for the correct management of specific types of

wounds, which promotes healing and helps decrease the risk of developing colorectal SSIs. Examples of some of the targeted solutions to reduce all types of colorectal SSIs include warming interventions to ensure that the patient's temperature is consistently maintained at the recommended range for optimal wound healing and infection prevention; and establishing solutions such as a weight-based antibiotic dosing protocol in order to address the inadequate administration of antibiotics.

The Joint Commission Center for Transforming Healthcare uses Robust Process Improvement® (RPI®) methods and tools in the development of its solutions. RPI® is a fact-based, systematic, and data-driven problem-solving methodology. It incorporates Lean Six Sigma and change management methodologies. Using RPI®, project teams measure the magnitude of the problem, pinpoint the contributing causes, develop specific solutions that are targeted to each cause, and thoroughly test the solutions in real life situations.

### **Unique challenges of the project and next steps**

This project presented a number of challenges. There were significant barriers to obtaining meaningful and accessible data to guide improvement efforts, making it difficult for each participating hospital to have a clear systematic view of its surgical performance. This was complicated by a lack of coordinated data collection efforts and sharing of data; a lack of “best practices” in colorectal surgical care; limited SSI data to provide insight into the care of colorectal surgical patients; and a significant lag time in the availability of SSI data for analyses. Over the course of the project, it became apparent that the “one size fits all” approach in measuring and reducing the different types of colorectal SSIs would not work to achieve the same success for all types of colorectal SSIs, especially organ/space SSIs. These particularly challenging colorectal SSIs require more in-depth investigation, especially in surgical techniques and protocols. Further work is being conducted by pilot organizations to validate measurement tools to identify significant correlating variables that can be improved upon to reduce these more severe types of colorectal SSIs.

The targeted solutions for colorectal SSIs will be added to the Targeted Solutions Tool® (TST®) after the learning and tools from this project have been pilot tested in other health care organizations. The TST® provides a step-by-step process to assist Joint Commission accredited health care organizations in measuring performance, identifying barriers to excellent performance, and implementing the Center's proven solutions that are customized to address specific barriers.

### **Project team**

Cedars-Sinai Medical Center, California  
Cleveland Clinic, Ohio  
Mayo Clinic-Rochester Methodist Hospital, Minnesota  
North Shore-Long Island Jewish Health System, New York  
Northwestern Memorial Hospital, Illinois  
OSF Saint Francis Medical Center, Illinois  
Stanford Hospital & Clinics, California  
*In collaboration with the American College of Surgeons*

For more information on this project, its results, or the project participants visit the [project detail](#) page or the Center [website](#).

\*Sources of data:

- Klevens RM, Edwards JR, et al: Estimating health care-associated infections and deaths in U.S. hospitals, 2002, *Public Health Reports* 2007;122:160-166
- Emori TG, Gaynes RP: An overview of nosocomial infections, including the role of the microbiology laboratory, *Clinical Microbiology Reviews*, 1993;6(4):428-42