

## Surgical Site Infections (SSI) from Colon Surgery

**NQF #:** 0752

**Developer:** American College of Surgeons (ACS); Centers for Disease Control and Prevention (CDC)

**Data Source:** Leapfrog Hospital Survey; CMS

**Description:** Standardized Infection Ratio (SIR) of deep incisional and organ/space Surgical Site Infections (SSI) during the 30-day postoperative period at the primary incision site among adult patients aged  $\geq 18$  years who have undergone colon surgery.

**Rationale:** SSIs are estimated to account for 20% of all HAIs. It is estimated that there are 290,485 estimated SSIs per year. There are an estimated 8,205 deaths associated with SSIs each year. An estimated 11% of all deaths occurring in intensive care units are associated with SSIs. The medical cost to manage each SSI is \$34,670, resulting in a total of over \$10 billion attributable to SSIs in U.S. each year.

It is envisioned that the use of this measure will promote SSI prevention activities which will lead to improved patient outcomes including reduction of avoidable medical costs, and patient morbidity and mortality. Prevention activities include but are not limited to, appropriate ordering, administration and discontinuation of preoperative prophylactic antibiotics, proper surgical site preparation, optimal glucose control in certain surgical patients, maintenance of patient normothermia during surgery and SSI surveillance with feedback of surgeon-specific SSI data to surgeons.

SSI SIRs are relevant to the patient populations because SSIs are a recognized complication of surgery and prevention recommendations have been published to reduce their incidence. A high SIR indicates an opportunity for improvement.

### Evidence for Rationale:

- Klevens RM, Edwards JR, et al. Estimating healthcare-associated infection and deaths in U.S. hospitals, 2002. Public Health Reports. 2007; 122:160- 166.
- Scott, RD. The Direct Medical Costs of Healthcare-Associated Infections in U.S. Hospitals and the Benefits of Prevention. [http://www.cdc.gov/ncidod/dhqp/pdf/Scott\\_CostPaper.pdf](http://www.cdc.gov/ncidod/dhqp/pdf/Scott_CostPaper.pdf) accessed April 12, 2010.

**Numerator:** Total number of deep incisional primary (DIP) and organ/space SSIs during the 30-day postoperative period among patients  $\geq 18$  years of age, who undergo inpatient colon surgeries. SSIs are identified before discharge from the hospital, upon readmission to the same hospital, or during outpatient care or admission to another hospital (post-discharge surveillance).

**Denominator:** Total number of expected SSIs, calculated using the number of procedures and a multivariable logistic regression model generated from nationally aggregated 2015 data, which is risk adjusted for patient gender, diabetes status, age, BMI, ASA Score, type of surgical closure, and facility type.

### Denominator Exclusions:

Persons under the age of 18, those having a procedure performed on an outpatient basis, those with ASA Class VI (6) are excluded. In the NHSN, patients without primary closure of the surgical incision are not considered eligible cases and are excluded.

**Impact:**

- Estimated to account for 20% of all HAIs
- 290,485 estimated SSIs/yr
- Estimated 8,205 deaths associated with SSIs each year
- Estimated 11% of all deaths occurring in intensive care units are associated with SSIs
- \$34,670 medical cost/SSI
- Total >\$10 billion attributable to SSI in U.S. each year

**Evidence of High Impact:**

- Klevens RM, Edwards JR, et al. Estimating healthcare-associated infection and deaths in U.S. hospitals, 2002. Public Health Reports; 2007; 122:160-166.
- Scott, RD. The Direct Medical Costs of Healthcare-Associated Infections in U.S. Hospitals and the Benefits of Prevention. [http://www.cdc.gov/ncidod/dhqp/pdf/Scott\\_CostPaper.pdf](http://www.cdc.gov/ncidod/dhqp/pdf/Scott_CostPaper.pdf) accessed April 12, 2010.

**Opportunity:** It is envisioned that the use of this measure will promote SSI prevention activities which will lead to improved patient outcomes including reduction of avoidable medical costs, and patient morbidity and mortality. Prevention activities include but are not limited to: appropriate ordering, administration and discontinuation of preoperative prophylactic antibiotics, proper surgical site preparation, optimal glucose control in certain surgical patients, maintenance of patient normothermia during surgery and SSI surveillance with feedback of surgeon-specific SSI data to surgeons.

**Evidence:**

Two guidelines address the prevention of SSI:

- Anderson D, et al., Strategies to prevent surgical site infections in acute care hospitals. Infection control and hospital epidemiology, 2008. 29:551-561.
- Mangram A., et al., Guideline for prevention of surgical site infection. American Journal of Infection Control, 1999. 27:97-134.

The Guideline for Prevention of Surgical Site Infection, 1999, provides recommendations concerning reduction of surgical site infection risk. Each recommendation was categorized on the basis of existing scientific data, theoretical rationale, and applicability.

Both of these publications cite multiple studies (over 500 in the HICPAC guideline), scientific evidence, and recommendations of other prevention organizations which show that actions taken before, and at the time of, surgery can decrease the rate of SSI. The publications provide recommendations for healthcare practitioners and infection preventionists that can be implemented in efforts to reduce the incidence of SSIs. These utilized guidelines are published by two internationally recognized organizations, Centers for Disease Control and Prevention and Society for Healthcare Epidemiology of America.

The SSI data used in this measure have been endorsed by NQF in a previous measure set. The SMR, upon which the SIR is based, is a widely accepted method for summarizing mortality experience. Therefore, we conclude the SIR measure has inherent face validity.

**Citations for Evidence:**

- Arrowsmith, V.A., et al., Removal of nail polish and finger rings to prevent surgical infection. Cochrane Database Syst Rev, 2001(4): p. CD003325.
- Auerbach, A.D., Chapter 20. Prevention of Surgical Site Infections. Making Health Care Safer: A Critical Analysis of Patient Safety Practices.
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