

The Military Health System's

PARTNERSHIP FOR PATIENTS CAMPAIGN

SAFE CARE SAVES LIVES



Implementation Guide for Surgical Site Infection

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Contents

1. Introduction.....	3
2. Surgical Site Infection Prevention Evidence-Based Practices.....	3
2.1 Background Information	3
2.2 Risk Factors	4
2.3 Evidence-Based Practice Guidelines.....	4
2.4 MHS SSI Performance Measures	6
3. References	7



1. Introduction

This implementation guide was created to support the Partnership for Patients, a national initiative sponsored by the Department of Health and Human Services to reduce harm in health care facilities. Military Health System leadership has pledged its support to the PFP, and has made a commitment to specific, identified aims. Improving the quality and safety of health care in all Department of Defense facilities will only be possible with universal support at every level in the MHS.

This guide is one of 10 harm-specific guides designed to assist you as you implement identified evidence-based practices to improve patient care. Common to all guides are resources that support efforts to educate the health care team by providing MHS-selected EBPs and quality improvement strategies.

In addition, implementation strategies and tools relevant to all harm categories are included in a guide titled “Practical Applications for Process Improvement and Change Management.” This guide supports efforts to equip the health care team with rapid-cycle process improvement methods and engage the health care team through the use of change management strategies.

2. Surgical Site Infection Prevention Evidence-Based Practices

2.1 Background Information

According to the Centers for Disease Control and Prevention (CDC), a surgical site infection (SSI) represents a significant proportion of health care-acquired infections, patient morbidity and mortality, and health care costs.¹ A SSI is defined as an infection that develops within 30 days after an operation or within one year if an implant was placed and the infection appears to be related to the surgery. The infection can be classified as:

- Superficial Incisional (limited to skin or subcutaneous tissue)
- Deep Incisional (limited to fascia and/or muscular layers)
- Organ/space

Despite advances in infection prevention/control practices and surveillance, there remains work to be done to improve patient outcomes. The National Healthcare Safety Network surveillance definition can be found in [Chapter 17 of the NHSN Manual: Patient Safety Component Protocol](#).

¹ Kleven R.M., Edwards J.R., Richards C.L. Jr., et al. (2007) Estimating health care-associated infections and deaths in U.S. hospitals, 2002. *Public HealthRep.* 2007;122(22):160-166.



SSI Burden of Illness

SSIs:

- Represent 20 percent of all health care-associated infections reported to the National Nosocomial Infections Surveillance System (NNIS) in 2002.
- Result in more than 8,000 deaths a year and occur in up to 25 percent of patients following major surgical procedures.
- Extend average length of stay by 9.7 days while increasing cost by \$20,842 per admission.
- Are preventable in an estimated 40 to 60 percent of cases.

Sources:

1. Klevens R.M., Edwards JR, Richards CL Jr., et al. (2007) Estimating health care-associated infections and deaths in U.S. hospitals, 2002. *Public Health Rep.* 2007;122(2):160-166.
2. de Lissovoy G, Fraeman K, Hutchins V, et al. (2009) Surgical site infection: incidence and impact on hospital utilization and treatment costs. *Am J Infect Control.* 2009;37(5):387-397.
3. Five Million Lives Campaign. (2008) Getting Started Kit: Prevent Surgical Site Infections How-to Guide. Cambridge, MA: Institute for Healthcare Improvement; 2008.

2.2 Risk Factors

There are a number of factors that can put a patient at risk for a surgical site infection. The CDC's Healthcare Infection Control Practices Advisory Committee (HICPAC) has identified important modifiable risk factors, of which the following are measured via SCIP:²

- Antibiotic prophylaxis
- Glucose control
- Preoperative hair removal
- Normothermia

2.3 Evidence-Based Practice Guidelines

To reduce surgical site infection risk, the Institute for Healthcare Improvement developed [How-to Guide: Prevent Surgical Site Infections](#). The guide provides hospitals with a comprehensive list of evidence-based care components for preventing surgical site infections, and describes how to implement these interventions. The MHS has endorsed these components for implementation at Military Treatment Facilities:

² Mangram A.J., Horan T.C., Pearson M.L., Silver L.C., Jarvis W.R. (1999) Guideline for Prevention of Surgical Site Infection. Centers for Disease Control and Prevention Hospital Infection Control Practices Advisory Committee. *Am J Infect Control* 1999;27(2):97-132. http://www.cdc.gov/hicpac/pdf/guidelines/SSI_1999.pdf Accessed 7/11/12.





The Military Health System's PARTNERSHIP FOR PATIENTS CAMPAIGN



Evidence-Based Practice Guidelines for Surgical Site Infection Prevention

Four components of care include:

1. Appropriate use of prophylactic antibiotics
 - Prophylactic antibiotic received within one hour prior to surgical incision
 - Prophylactic antibiotic selection for surgical patients consistent with national guidelines
 - Prophylactic antibiotics discontinued within 24 hours after surgery end time (48 hours for cardiac patients)
2. Appropriate hair removal (if deemed necessary, remove using clippers or depilatory)
3. Controlled postoperative serum glucose in cardiac surgery
 - Glucose control is defined as serum glucose levels below 200 mg/dl, collected at or closest to 6:00 a.m. on each of the first two postoperative days
 - Tight glucose control (using an insulin drip) is often performed in an intensive care setting
4. Immediate postoperative normothermia in colorectal surgery

Additional SCIP changes in care:

- Beta blockade for patients on beta blockers prior to admission should be continued postoperatively
- Venous thromboembolism prophylaxis
- Ventilator-associated pneumonia prevention

Source:

[Institute for Healthcare Improvement, How-to Guide: Prevent Surgical Site Infections. \(2012\)
http://www.ihl.org/explore/SSI/Pages/default.aspx](http://www.ihl.org/explore/SSI/Pages/default.aspx) Accessed 7/11/12.



The Military Health System's PARTNERSHIP FOR PATIENTS CAMPAIGN



2.4 MHS SSI Performance Measures

The MHS has selected the following indicators to measure performance:

Description	Data Source	Metric
TJC SCIP Infection-1: Prophylactic antibiotic received within 1 hour prior to surgical incision (overall rate): N: Number of surgical patients with prophylactic antibiotics initiated within one hour prior to surgical incision D: All selected surgical patients with no evidence of prior infection	TJC ORYX	Process Measure
TJC SCIP-Infection-2: Prophylactic antibiotic selection for surgical patients (overall rate): N: Number of surgical patients who received prophylactic antibiotics recommended for their specific surgical procedure D: All selected surgical patients with no evidence of prior infection	TJC ORYX	Process Measure
TJC SCIP-Infection-3: Prophylactic antibiotics discontinued within 24 hours after surgery end (48 hours for CABG/other cardiac surgery) (overall rate): N: Number of surgical patients whose prophylactic antibiotics were discontinued within 24 hours after Anesthesia End Time D: All selected surgical patients with no evidence of prior infection	TJC ORYX	Process Measure
TJC SCIP-Infection-4: Cardiac Surgery Patients With Controlled 6 A.M. Postoperative Blood Glucose: N: Surgery patients with controlled 6 A.M. blood glucose (less than or equal to □200 mg/dL) on POD 1 and POD 2. D: Cardiac surgery patients with no evidence of prior infection	TJC ORYX	Process Measure
TJC SCIP-Inf-6: Surgery Patients with Appropriate Hair Removal: N: Surgery patients with surgical site hair removal with clippers or depilatory or with no surgical site hair removal. D: All selected surgery patients.	TJC ORYX	Process Measure
TJC SCIP Infection 10: Surgery Patients with Perioperative Temperature Management N: Surgery patients for whom either active warming was used intraoperatively for the purpose of maintaining normothermia or who had at least one body temperature equal to or greater than 96.8° Fahrenheit/36° Celsius recorded within the 30 minutes immediately prior to or the	TJC ORYX	Process Measure



fifteen minutes immediately after Anesthesia End Time.		
D: All patients, regardless of age undergoing surgical procedures under general or neuraxial anesthesia of greater than or equal to 60 minutes duration.		
SSI rate from NSQIP MTF sites weighed by MTF surgical case volume	NSQIP	Outcome Measure

3. References

Centers for Disease Control and Prevention. (2009). FAQs about Surgical Site Infections.
http://www.cdc.gov/HAI/pdfs/ssi/SSI_tagged.pdf Accessed 7/11/12.

de Lissoyoy G., Fraeman K., Hutchins V., et al. (2009) Surgical site infection: incidence and impact on hospital utilization and treatment costs. Am J infect Control. 2009;37(5):387-397.

Five Million Lives Campaign. Getting Started Kit: (2008) Prevent Surgical Site Infections How-to Guide. Cambridge, MA:Institute for Healthcare Improvement; 2008.

Institute for Healthcare Improvement. (2012). How-to Guide: Prevent Surgical Site Infections. Cambridge, MA.
<http://www.ihl.org/knowledge/Pages/Tools/HowtoGuidePreventSurgicalSiteInfection.aspx> Accessed 7/11/12.

Kirkland K.B., Briggs J.P., Trivette S.L., Wilkinson W.E., et al. (1999) The impact of surgical-site infections in the 1990s: attributable mortality, excess length of hospitalization and extra costs. Infect Control Hosp Epidemiology. 1999;20:725.

Klebens R.M., Edwards J.R., Richards C.L. Jr., et al. (2007) Estimating health care-associated infections and deaths in U.S. hospitals, 2002. Public HealthRep. 2007;122(2):160-166.

Kurz A., Sessler D.I., Lenhardt R., (1996) Perioperative normothermia to reduce the incidence of surgical-wound infection and shorten hospitalization. Study of Wound Infection and Temperature Group. N. Engl J. Med. 1996; 334(19): 1209-1215.

Stulberg, J.J., Delaney, C.P., Neuhauser, D.V., Aron, D.C., et al., Adherence to Surgical Care Improvement Project Measures and the Association With Postoperative Infections JAMA. 2010;303(24):2479-2485

Tanner J., Woodings D., Moncaster K., Preoperative hair removal to reduce surgical site infection. Cochrane Database of Systematic Reviews 2006, Issue 3. Art. No: CD004122.DOI: 10.1002/14651858.CD004122.pub