

The 10 SHN interventions

- AMI - Acute Myocardial Infarction
- CLI - Central-line associated Bloodstream Infections
- Falls - Falls Collaborative in Long-term care
- MedRec - Medication Reconciliation (Acute-care)
- MedRec - Medication Reconciliation (Long-term care)
- MRSA - Antibiotic-resistant organisms (AROs)/Methicillin-resistant *Staphylococcus aureus*
- RRT - Rapid Response Teams
- SSI - Surgical Site Infections
- VAP - Ventilator-associated Pneumonia
- VTE - Venous thromboembolism

Goal

Prevent surgical site infection (SSI) and deaths by reliably implementing ideal perioperative care for all surgical patients.

Background

- Surgical site infections are the second most common type of adverse events occurring in hospitalized patients in the United States.¹ In 2002, researchers conducted a point prevalence survey of nosocomial infections among 6,745 patients in 29 Canadian acute care hospitals across nine provinces. Canadian Surgical site infection rates were found to account for 21% of five types of infections surveyed; ranking 3rd most common is nosocomial infection.¹
- Surgical site infections can increase mortality, readmission rate, length of stay and cost for patients who incur them.²
- While the US rate of surgical site infection averages between two to three percent for clean cases, an estimated 40 to 60% of these infections are preventable.³
- In a large American medical record review, a significant opportunity to improve surgical site infection prevention was demonstrated. Appropriate antibiotic selection occurred in 92.6% of cases. Antibiotics were given within one hour of incision time to 55.7% of patients. Prophylactic antibiotics were discontinued within 24 hours of surgery end time for only 40.7% of patients.⁴
- An estimated 47 to 84% of SSIs occur after discharge; most of these are managed entirely in the outpatient setting. These patients required significantly more outpatient visits, emergency room visits, radiology services, readmissions, and home health aide services than did controls.⁵

Intervention

Four key components of reliable perioperative care

- Appropriate use of prophylactic antibiotics (Including appropriate selection, timing and discontinuation).⁶
- Appropriate hair removal.⁷
- Maintaining post-operative glucose control for major cardiac surgery patients cared for in an ICU.^{8*}
- Post-operative normothermia for all open abdominal surgery patients.^{9**}

*Glucose Control: Review of medical literature shows that the degree of hyperglycemia in the postoperative period correlates with the rate of SSI in patients undergoing major cardiac surgery. Although glucose control may benefit other surgical populations, for the SHN Campaign, this measure will only apply to the cardiac surgery population for the purposes of national measurement.

**Normothermia: Medical literature suggests that patients have a decreased risk of surgical site infection if they are not allowed to become hypothermic during the perioperative period. Although temperature control may benefit other surgical populations, for the SHN Campaign, this measure will only apply to the colorectal or open abdominal surgical population for the purposes of national measurement.

¹ Brennan. N Engl J Med. 1991;324:370-376

² CIHI Healthcare in Canada, 2004. Unpublished data from D. Gravel, the Point Prevalence Working Group, the Canadian Nosocomial Infection Surveillance System, the Canadian Hospital Epidemiology Committee, *Point Prevalence Survey of Nosocomial Infections Within Selected Canadian Health Care Institutions* (2004).

³ Kirkland. Infect Control Hosp Epidemiol. 1999; 20:725.

⁴ Bratzler. Arch Surg. 2005; 140:174-182.

⁵ Perencevich, et al Emerging Infectious Diseases • Vol. 9, No. 2, February 2003

⁶ Buckley, Hughes, Snodgrass, & Hunchcroft. Can J Surg. 1990; 33(2):122-7 D'Angelo, G.L, Ogilvie-Harris, D. J. Arthroscopy. 1988; 4(1):10-4; Eason, E.L. Wells, G. A., Garber, G. E., Hopkins, M. L. J Obstet Gynaecol Can. 2004; 26(12): 1067-72.; Labbe, A.C, Demers, A. M., Rodrigues, R., Arlet, V., Tanguay, K., Moore, D.L. Infect Control Hosp Epidemiol. 2003; 24(8): 591-5.; Zoutman, D., Chau, L., Watterson, J., Mackenzie, T., Djurfeldt, M. Infect Control Hosp Epidemiol. 1999; 20(11): 752-5.

⁷ Seropian. Am J Surg. 1971;121:25; Cruse, P. Rev Infect Dis. 1981; 3(4): 734-7. Small, S. P. J. Clin Nurs. 1996; 5(2): 79-84.

⁸ Latham. Inf Contr Hosp Epidemiol. 2001; 22:607; Dellinger. Inf Contr Hosp Epidemiol. 2001; 22:604; Van den Berghe. NEJM. 2001;345:1359.

⁹ Melling. Lancet. 2001; 358:876

Intervention Measures

1. % surgical patients with “on time” prophylactic antibiotic administration

Target: 95% antibiotic administration within 60 minutes prior to surgical incision

2. % surgical patients with appropriate prophylactic antibiotic discontinuation - within 24 hours after surgery end time.

Target: 95% [For cardiothoracic surgery, recent evidence suggests antibiotics could be discontinued 48 hours after surgery]

3. % of clean surgery patients with surgical infection

Target: Decrease baseline by 50%

4. % surgical patients with appropriate hair removal

Target: 95% no hair removal or clipping

5. % major cardiac surgical patients with controlled post operative serum glucose

Target: 95% of patients with glucose level of <11.1 mmol/L

6. % colorectal or open abdominal surgical patients with normothermia in post anesthesia care unit

Target: 95% of patients with temperature between 36.0 - 38.0° C

7. % surgical patients with appropriate selection of prophylactic antibiotic

Target: 95% or higher

Other Resources

- Blondel-Hill E, Fryters, S. Canadian Bugs and Drugs 2006 Antimicrobial Reference at: <http://www.bugsanddrugs.ca/>
- The Medical Letter Vol.4 (Issue 52) Dec. 2006.
- American Society of Health-System Pharmacists (SAHP) Therapeutic Guidelines.
- Centers for Disease Control and Prevention, Guideline for the Prevention of Surgical Site Infection, 1999 http://www.cdc.gov/ncidod/dhqp/gl_surgicalsite.html
- Bratzler, D. W. & Houck, P, for the Surgical Infection Prevention Guidelines Writers Workgroup. “Antimicrobial Prophylaxis for Surgery: An Advisory Statement for the National Surgical Infection Prevention Project”. Oklahoma Foundation for Medical Quality, Oklahoma City, Oklahoma; and Centers for Medicare and Medicaid Services, Seattle, Washington.
- NNIS Surgical Wound Classification -Taken from the Guideline for Prevention of SSI [National Nosocomial Infections Surveillance System (NNIS)] Garner, J. S. and Simmons, B. P. <http://www.cdc.gov/ncidod/dhqp/nnis.html>

Success Stories

- Over two years, five surgical teams in the Vancouver Island Health Authority (VIHA) reduced SSIs rates by over 50 percent in the pilot orthopaedic population. Improvements in process measures included: antibiotic timing (3 to 100 %); appropriate antibiotic (maintained at 100%);
- Hamilton Health Sciences determined surgical site infection to be a priority patient safety initiative in 2005. Strongly committed multidisciplinary teams have been reviewing and revising processes to improve temperature management, administration of prophylactic antibiotics and glucose control within a pilot population. Interventions have resulted in 100% of patients arriving in PACU with a temperature of greater than 36o C, 71% of patients now receiving antibiotics within 15-60 minutes of incision, and 100% of patients (subset of pilot population) receiving the correct antibiotics. The team is awaiting outcome data for glucose control interventions.