

Summary of changes to Surgical Site Infection Getting Started Kit (Updated September 2014)



1. Perioperative Antimicrobial Coverage

a) *Appropriate use of prophylactic antibiotics*

- Governing bodies recommend that the complete dose of prophylactic antibiotics be infused prior to inflation of a tourniquet¹⁻³. New SSI GSK recommendations indicate that a prophylactic antibiotic infusion be started and completed within 60 minutes prior to skin incision or tourniquet inflation or within 120 minutes for vancomycin and fluoroquinolones in order to maximize antibiotic efficacy⁸⁻⁹.
- Revisions to this GSK also recommend that prophylactic antibiotic administration should be started and completed within 60 minutes prior to first incision for c-sections instead of after cord clamping⁴⁻⁷.
- There is no data to support continuation of antibiotic prophylaxis after wound closure or until all indwelling drains and intravascular catheters have been removed.
- Antibiotic prophylaxis should only be repeated for surgeries lasting longer than two half-lives of the antibiotic (e.g. four hours for cefazolin) or if intra-operative blood loss exceeds 1.5L¹⁰

b) *Antiseptic Use*

- It is recommended patients should shower or bathe with either soap or an antiseptic agent on at least the night before the operative day¹¹⁻¹⁹.
- Intra-operative skin preparation should be performed with an alcohol-based antiseptic agent, unless contraindicated²⁰⁻²⁴
- To maximize its efficacy, the intra-operative antiseptic agent, such as two per cent (2%) CHG-seventy per cent (70%) alcohol, that will be covered by the surgical dressing should not be washed off at the end of surgery²⁵.
- In order to reduce the risk of fire, it is imperative that alcohol based antiseptic agent, such as CHG-alcohol, be allowed to air dry for at least three minutes before skin incision or longer if there is excessive hair at the surgical site²⁶⁻²⁷

c) *Decolonization*

- Mupirocin nasal ointment has the ability to nearly eradicate *S. aureus* from the nasal site²⁸⁻³⁰.
- Photodynamic Therapy (PDT) along with chlorhexidine gluconate wipes have also been shown to reduce the rate of SSIs³¹⁻³².

d) *Antiseptic Coated Suture*

- Sutures coated with antiseptic agents have been recommended to reduce the rate of SSIs. However, do not routinely use antiseptic-impregnated sutures as a strategy to prevent SSIs³³.

2. Appropriate Hair Removal

- Again this GSK recommends that as per WHO guidelines, no hair removal is optimal³⁴ and if necessary clippers may be used to improve visibility of the surgical area - razors are not recommended under any circumstances. New recommendations include:
- If hair removal is necessary, clippers should be used outside of the OR within 2 hours of surgery³⁴⁻³⁵
- No hair removal to be done prior to admission³⁵

3. Maintenance of Perioperative Glucose Control

- It is recommended that Perioperative blood glucose levels should be checked on all surgical patients who are diabetic or have risk factors for diabetes³⁶⁻³⁷
- Teams are encouraged to apply conventional glucose control (BG < 10-11 mmol/L) to surgical populations during surgery and the immediate post-op period. Strict perioperative glycemc control (4.1-6.0mmol/L) should be avoided to enhance patients' outcome. Blood glucose should not drop below 4.1mmol/L³⁸.

4. Perioperative Normothermia

- This version of the SSI continues to recommend that normothermia be maintained throughout the perioperative course for *all* surgical patients. The recommended range of core body temperature to be maintained among surgical patients is between 36.0°C and 38.0°C pre-operatively, intra-operatively, and in PACU⁴⁰⁻⁴¹.
- Active pre-warming and Intra-op warming is indicated when surgery is expected to last >30 minutes³⁹
- Fluid warmers should be used if an abdominal surgical procedure is planned to last more than one hour³⁹.
- The ambient room temperature in the OR should range between 20° to 23°C⁴².

Other Additions to SSI GSK

There are additional evidence-based topics within this guideline that were not discussed in the previous Getting Started Kit:

- SSI Health Economics
- Canadian Pediatric SSI Journey - B.C. Children's Hospital
- Enhanced Recovery After Surgery (ERAS)
- National Surgical Quality Improvement Program (NSQIP)
- SSI Individual Risk Factors
- SSI Impact on Patient's Perspective and Quality of Life
- OR Environment and SSI
- SSI Prevention Compliance

Please refer to Patient Safety Metrics for the current list of SSI Measures

<https://psmetrics.utoronto.ca/metrics/WorksheetPreview.aspx>

References

1. NICE. National Collaborating Centre for Women's and Children's Health - NHS/NICE Guideline. Surgical site infection: Prevention and treatment of surgical site infection. In: NICE; 2008.
2. Kaimal A, Zlatnik M, Cheng Y, et al. Effect of a change in policy regarding the timing of prophylactic antibiotics on the rate of postcesarean delivery surgical-site infections. *American Journal of Obstetrics and Gynecology* 2008;199:310.e1-.e5.
3. Scottish Intercollegiate Guidelines Network. Antibiotic Prophylaxis in Surgery: A National Clinical Guideline. Edinburgh: Scottish Intercollegiate Guideline Network; 2008.
4. Tita A, Rouse D, Blackwell S, Saade G, Spong C, Andrews W. Emerging concepts in antibiotic prophylaxis for cesarean delivery: A systematic review. *Obstetrics & Gynecology* 2009;113:675-82
5. Costantine M, Mahbubur R, Ghulmiyah L, et al. Timing of perioperative antibiotics for caesarean delivery: A metaanalysis. *American Journal of Obstetrics & Gynecology* 2008;199:e1-e6.
6. Sullivan S, Smith T, Chang E, Hulsey T, Vandorsten P, Soper D. Administration of cefazolin prior to skin incision is superior to cefazolin at cord clamping in preventing postcesarean infectious morbidity: a randomized, controlled trial. *American Journal of Obstetrics & Gynecology*; 2007:e1-e5.
7. Thigpen B, Hood W, Chauhan S, et al. Timing of prophylactic antibiotic administration in the uninfected laboring gravida: A randomized clinical trial. *American Journal of Obstetrics & Gynecology* 2005;192:1864-71.
8. Surveillance of Surgical Site Infections in European Hospitals - HAISSI Protocol. European Centre for Disease Prevention and Control version 10.2 2012; 1-39.
9. Bratzler DW, Dellinger P, Olsen KM, et al. Clinical practice guidelines for antimicrobial prophylaxis in surgery. *Am J Health-Syst Pharm.* 2013;70:195-283.
10. Cataife G, Weinberg DA, Wong HH, et al. The effect of Surgical Care Improvement Project (SCIP) compliance on surgical site infection (SSI). *Med Care* 2014;52(suppl1):S66-73.
11. Webster J, Osborne S. Preoperative bathing or showering with skin antiseptics to prevent surgical site infection. *Cochrane Database of Systematic Reviews.* 2007(2):CD004985.
12. Byrne DJ NA, Cuschieri A. The value of whole body disinfection in the prevention of postoperative wound infection in clean and potentially contaminated surgery. A prospective, randomised, double-blind placebo-controlled clinical trial. *Surgical Research Communications.*1992;12(1):43-52.
13. Earnshaw JJ, Berridge DC, Slack RC, Makin GS, Hopkinson BR. Do preoperative chlorhexidine baths reduce the risk of infection after vascular reconstruction? *European journal of vascular surgery.* Aug 1989;3(4):323-326.
14. Hayek LJ, Emerson JM, Gardner AM. A placebo-controlled trial of the effect of two preoperative baths or showers with chlorhexidine detergent on postoperative wound infection rates. *The Journal of hospital infection.* Sep 1987;10(2):165-172.
15. Randall PE, Ganguli L, Marcuson RW. Wound infection following vasectomy. *British journal of urology.* Oct 1983;55(5):564-567.
16. Rotter ML, Larsen SO, Cooke EM, et al. A comparison of the effects of preoperative whole-body bathing with detergent alone and with detergent containing chlorhexidine gluconate on the

frequency of wound infections after clean surgery. *Journal of Hospital Infection*. May 1988;11(4):310-320.

17. Veiga DF, Damasceno CA, Veiga-Filho J, et al. Randomized controlled trial of the effectiveness of chlorhexidine showers before elective plastic surgical procedures. *Infection Control and Hospital Epidemiology: the Official Journal of the Society of Hospital Epidemiologists of America*. Jan 2009;30(1):77-79.

18. Wihlborg O. The effect of washing with chlorhexidine soap on wound infection rate in general surgery. A controlled clinical study. *Annales chirurgiae et gynaecologiae*. 1987;76(5):263-265.

19. Veiga DF, Damasceno CA, Veiga Filho J, et al. Influence of povidone-iodine preoperative showers on skin colonization in elective plastic surgery procedures. *Plast Reconstr Surg*. Jan 2008;121(1):115-118; discussion 119-120.

20. Paocharoen V, Mingmalairak C, Apisarnthanarak A. Comparison of surgical wound infection after pre-operative skin preparation with/ 4% CHG & povidone Iodine. *J Med Assoc Thai* 2009;92:898-902.

21. Saltzman M, Nuber G, Gryzlo S, Maracek G, Koh J. Efficacy of surgical preparation solutions in shoulder surgery. *J Bone Joint Surg Am* 2009;91:1949-53.

22. Darouiche R, Wall M, Itani K, et al. Chlorhexidine-alcohol versus povidone-iodine for surgical-site antisepsis. *The New England Journal of Medicine* 2010;362:18-26.

23. Adams D, Quayum M, Worthington T, Lambert P, Elliott T. Evaluation of a 2% chlorhexidine gluconate in 70% isopropyl alcohol skin disinfectant. *Journal of Hospital Infection* 2005;61:287-90.

24. Fletcher N, Sofianos D, Berkes M, Obremskey W. Prevention of perioperative infection. *J Bone Joint Surg Am* 2007;89:1605-18.

25. Yokoe D, Mermel L, Anderson D, et al. A compendium of strategies to prevent healthcare-associated infections in acute care hospitals. *Infection Control and Hospital Epidemiology* 2008;29:S12-S21.

26. NICE. National Collaborating Centre for Women's and Children's Health - NHS/NICE Guideline. Surgical site infection: Prevention and treatment of surgical site infection. In: NICE; 2008.

27. AORN. Recommended practices for perioperative patient skin antisepsis. Denver, CO: AORN; 2013.

28. Bode LG, Kluytmans JA, Wertheim HF, et al. Preventing surgical-site infections in nasal carriers of *Staphylococcus aureus*. *N Engl J Med* 2010;362:9-17.

29. Kallen AJ, Wilson CT, Larson RJ. Perioperative intranasal mupirocin for the prevention of surgical-site infections: systematic review of the literature and meta-analysis. *Infect Control Hosp Epidemiol* 2005;26:916-22.

30. Rao N, Cannella B, Crossett LS, Yates AJ Jr, McGough R 3rd. A preoperative decolonization protocol for staphylococcus aureus prevents orthopaedic infections. *Clin Orthop Relat Res*. 2008; 466: 1343-8.

31. Street CN, Pedigo L, Gibbs A, Loebel NG. Antimicrobial photodynamic therapy for the decolonization of methicillin-resistant *Staphylococcus aureus* from the anterior nares. *Proc SPIE*. 2009; 7380.

32. Bryce E, Wong T, Roscoe D. Immediate Pre-operative Decolonization Therapy Reduces Surgical Site Infections. British Columbia Quality Forum. Vancouver, March 2013 [presentation].
33. Anderson DJ1, Podgorny K, Berríos-Torres SI, Bratzler DW, Dellinger EP, Greene L, Nyquist AC, Saiman L, Yokoe DS, Maragakis LL, Kaye KS. Strategies to prevent surgical site infections in acute care hospitals: 2014 update. *Infect Control Hosp Epidemiol*. 2014 Jun;35(6):605-27.
34. WHO. The WHO Guidelines for Safe Surgery. In: WHO, ed. 1st ed. Geneva: WHO; 2008.
35. AORN. Recommended practices for perioperative patient skin antisepsis. Denver, CO: AORN; 2013.
36. Presutti E, Millo J. Controlling blood glucose levels to reduce infection. *Crit Care Nurs Q* 2006;29:123-31.
37. Umpierrez G, Isaacs S, Bazargan H, You X, Thaler L, Kitabchi A. Hyperglycemia: an independent marker of in-hospital mortality in patients with undiagnosed diabetes. *J Clin Endocrinol Metab* 2002;87:978-82.
38. Moghissi E, Korytkowski M, DiNardo M, et al. American association of clinical endocrinologists and American diabetes association consensus statement on inpatient glycemic control. *Endocrine Practice* 2009;15:1-17.
39. Forbes SS1, Eskicioglu C, Nathens AB, Fenech DS, Laflamme C, McLean RF, McLeod RS. Evidence based guidelines for prevention of perioperative hypothermia. *J Am Coll Surg*. 2009 Oct;209(4):492-503.
40. Young V, Watson M. Prevention of Perioperative Hypothermia in Plastic Surgery. *Aesthetic Surgery Journal*. 2006;551-571.
41. Kurtz A, Sessler DI, Lenhardt R. 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 May 9;334(19):1209-15.
42. Standards, Guidelines and Position Statements for Perioperative Registered Nursing Practice. www.ornac.ca/standards. ORNAC, 10th Edition 2011;1-33.