

SCIP-Inf-1: Prophylactic antibiotic received within 1 hour prior to surgical incision

NQF# 0527

Developer: Centers for Medicare Medicaid Services/The Joint Commission

Data Source: CMS Hospital Compare

Description: Assesses the percentage of surgical patients who received prophylactic antibiotics within 1 hour prior to surgical incision. Patients receiving vancomycin or a fluoroquinolone should have the antibiotics initiated within two hours prior to surgery due to the longer infusion time required.

Rationale: A goal of prophylaxis with antibiotics is to establish bactericidal tissue and serum levels at the time of skin incision. Studies performed in the 1960's and 1970's demonstrated that a common reason for failure of prophylaxis was delay of antibiotic administration until after the operation. In a study of 2,847 surgery patients at Latter-Day Saints (LDS) Hospital in Salt Lake City, it was found that the lowest incidence of post-operative infection was associated with antibiotic administration during the one hour prior to surgery. The risk of infection increased progressively with greater time intervals between administration and skin incision. The relationship was observed whether antibiotics preceded or followed skin incision. Opportunities to improve care have been demonstrated and timely administration has been recommended. For example, at LDS Hospital, administration of the first antibiotic dose "on call" to the operating room was frequently associated with timing errors. Altering the system there resulted in an increase in appropriate timing from 40% of cases in 1985 to 99% of cases in 1998.

Evidence for Rationale:

- [Specifications manual](#) for national hospital inpatient quality measures, version 3.1a. Centers for Medicare & Medicaid Services, The Joint Commission; 2010 April 1. Various p.

Numerator: # of surgical patients who received prophylactic antibiotics within 1 hour prior to surgical incision (2 hours if receiving vancomycin or a fluoroquinolone)

Denominator: All selected surgical patients with no evidence of prior infection

Impact:

- Affects large numbers, frequently performed procedure
- There are over 30 million surgeries performed in the U.S. each year. Surgical site infections (SSIs) are the second most common cause of healthcare associated infections. SSIs account for 14-16% of all hospital-acquired infections and are among the most common complications of care, occurring in 2-5% of patients after clean extra-abdominal operations and up to 20% of intra-abdominal procedures. Among surgical patients, SSIs account for 40% of all such hospital-acquired infections. By reducing SSIs, hospitals on average could recognize a reduction in extended length of stay by seven days on each patient developing an infection.

Evidence of High Impact:

- Delgado-Rodriguez M, Sillero-Arenas M, Medina-Cuadros M, Martinez-Gallego G. Nonsocial infections in surgical patients: comparison of two measures of intrinsic patient risk. *Infect Control Hosp Epidemiol* 1997; 18:19-23.
- Polk HC, Christmas AB. Prophylactic antibiotics in surgery and surgical wound infections. *Am Surg* 200; 66:105-11.
- Zhan C, Miller MR. Excess length of stay, charges and mortality attributable to medical injuries during hospitalization. *JAMA* 2003; 290: 1868-1874.

Opportunity:

- Opportunity for improvement exists, as demonstrated by the coefficient of variation for the measure.

Evidence:

- The measure focus is supported by the evidence. Evidence-based guideline randomized controlled trial, expert opinion
- Category IA: Strongly recommended for implementation and supported by well-designed experimental, clinical or epidemiological studies.
- TAP members recommended this measure because of the strength of the data on the relationship between the use of prophylactic antibiotics and SSIs. There have been no studies that contradict the guidelines for surgical site infection prevention.

Citations for Evidence:

- Bratzler DW, Houck PM: For the surgical infection prevention guideline writers workgroup. Antimicrobial prophylaxis for surgery: an advisory statement from the National Surgical Infection Prevention Project. *Am J Surg* 2005, 189: 395-404.
- Burke JP. Maximizing appropriate antibiotic prophylaxis for surgical patients: an update from LDS Hospital, Salt Lake City. *Clin Infect Dis* 2001; 33 (Suppl 2): S78-83.
- Garey KW, Dao T, Chen H, Amrutkar P, Kumar N, Reiter M Gentry LO: Timing of vancomycin prophylaxis for cardiac surgery patients and the risk of surgical site infections. *J Antimicrob Chemother* 2006, 58: 645-650.
- Trick WE, Scheckler WE, Tokars JL, et al. Modifiable risk factors associated with deep sternal site infection after coronary artery bypass grafting. *J Thorac Cardiovasc Surg* 2000; 119:108-14.
- VanKasteren MEE Mannien J, Ott A, Kullberg BJ, DeBoer AS, Gyssens IC: Antibiotic prophylaxis and the risk of surgical site infections following total hip arthroplasty: Timely administration is the most important factor. *Clin Infect Dis* 2007, 44:921-927.

<http://www.qualityforum.org/Projects/s-z/Surgery/0527.aspx>

<http://www.qualityforum.org/.../MeetingSummary0803042011.aspx>

<http://www.premierinc.com/quality/tools-services/safety/topics/guidelines/downloads/NQF-HAI.pdf>

<http://qualitymeasures.ahrq.gov/content.aspx?id=27411&search=prophylaxis+and+surgical+antibiotics>