

## Reducing SSIs through Appropriate Antibiotic Prophylaxis

**Define:** SSIs are a common and costly problem, prolonging length of stay and increasing readmission, reoperation, and death.<sup>1,2</sup> The correct timing, selection, and re-dosage (if necessary) of antibiotics for patients undergoing surgery is critical for SSI prevention. Gentamicin (5 mg/kg) and clindamycin is recommended as SSI prophylaxis for penicillin-allergic patients. However, gentamicin is frequently under-dosed or not given.

**Goal/Aim:** Improve the proportion of portion of penicillin-allergic patients receiving correct dosage of gentamicin from less than 40% to 95% by May 30, 2016

**Scope:** All adult penicillin-allergic patients at The Johns Hopkins Hospital undergoing colorectal procedures

**Benefit:** Improved patient care to include:

- Reduced risk of experiencing superficial or organ space SSI
- Reduced length of stay
- Increase satisfaction with patient care experience

**Team members:**

- See Team Options from doc on JH Box here: <https://jh.box.com/s/k6nx0ovacy52g3qu4aqtn1gqb9w0v6qj>

**Key Metric (Process):** The % of adult penicillin-allergic surgical patients at The Johns Hopkins Hospital undergoing colorectal procedures that receive the correct dosage of gentamicin (5 mg/kg) for their BMI

**Key Metric (Outcome):** Cases of SSI (any type) per 100 colorectal procedures.

**Numerator (NHSN definition):**

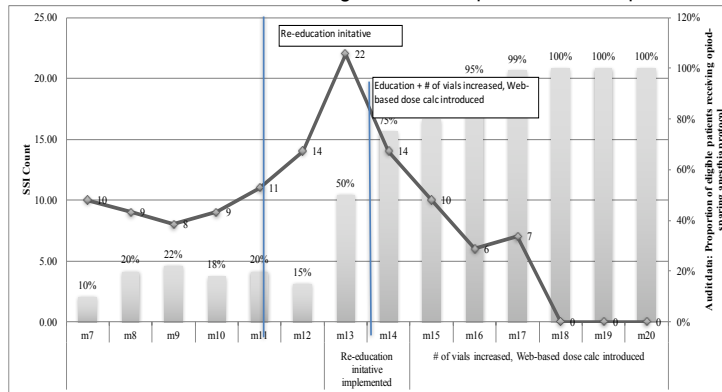
- Infection occurs within 30 or 90 days of the colorectal procedure **AND**
- Involves skin and subcutaneous tissue **OR** deep soft tissue at incision **OR** deep body parts opened or manipulated during the procedure **AND**
- Patient has *one* of the following:
  - Purulent drainage from the incision
  - Organisms identified from an aseptically-obtained specimen
  - Diagnosis of superficial incisional SSI
  - Incision that spontaneously dehisces or is deliberately opened or aspirated **AND** patient experiences *one* of the following: fever (>38°C), localized pain or tenderness; localized swelling; erythema; or heat.
  - Abscess or other evidence of infection

**Analyze:** Retrospective chart reviews of cases that met SSI (any type) criteria and interviews with providers identified the following:

1. Patients frequently under-dosed or not given gentamicin (2.5 mg/kg) because of nephrotoxicity concerns.
2. Appropriate gentamicin dose was frequently unavailable in the operating room (OR) medication dispenser

**Measure:**

- Compliance with appropriate gentamicin dosing was 33% at baseline
- Overall SSI rate was 27.3% during the baseline pre-intervention period



**Interventions:**

- Hospital epidemiology and infection control service educated providers through grand rounds lectures and Web presentations and addressed concerns
- Increased the number of gentamicin vials in the operating room medication dispenser
- Install a Web-based calculator in the anesthesia electronic documentation system to facilitate appropriate dosing based on the patient's ideal body weight

**Improve:**

- Compliance with appropriate gentamicin dosing was 92% (79 of 86 patients) after implementation, an increase of 59%
- Overall SSI rate was 18.2% post-intervention, an improvement of 9.1%
  - Superficial SSI decreased 3.3%
  - Organ space infections decreased 5.0%

Variable	Pre-intervention		Post-intervention	
	n	%	n	%
Total operations	278		324	
Overall SSI	76	27.3	59*	18.2
Superficial SSI	47	16.9	44	13.6
Deep SSI	4	1.4	2	0.6
Organ Space	25	9	13	4

\*p < 0.0001 by chi-square test  
SSI= Surgical site infections

**Control:** To consistently achieve our target we must:

- Audit compliance monthly with appropriate gentamicin dosing monthly by selecting 6 cases with documented penicillin allergies randomly from all general surgery cases in a month
- You and your team post the audit data in the resident room and you decide to share this data with the department patient safety officer who ensures that it is shared at the monthly department with patient safety committee meeting.
- Continue to reinforce a culture of safety that allows staff to speak up and ask questions and offer friendly reminders when we are not following best practice (e.g., you nominate a pre-op nurse that spoke up to remind the anesthesia attending and surgeon about a patient's allergy for the hospital's "Safety Star" award)
- You and your team develop a system to check and ensure an adequate amount of gentamicin vials are stocked in the medication dispenser regularly.