

Table 1. Implementation barriers to SSI Prevention Bundle reported by hospitals within SHEA Research Network*

Implementation barrier	Successfully mitigated	Persistent
Clinicians' low adherence to all bundle elements	41	35
Clinicians' lack of knowledge about bundle elements	35	24
Clinicians' skepticism regarding bundle effectiveness	31	31
Inadequate audit and feedback regarding bundle adherence	35	30
Patients' low adherence to bundle elements within their control	22	24
Patients' lack of knowledge about bundle elements within their control	19	12
Supplies and equipment needed not easily available	22	6
Clinical supervision insufficient to ensure bundle compliance	12	18
Inadequate executive leadership support for SSI prevention	22	16
Institutional culture generally resistant to change	20	37

*Numbers reported as percent of total N = 49 hospitals participating in the survey

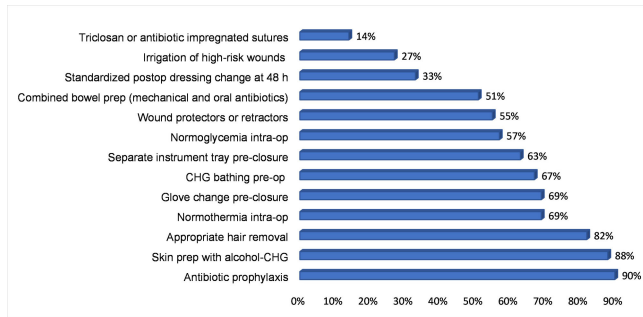


Figure 1. SSI Prevention Bundle Elements Implemented by Hospitals in SHEA Research Network

complex bundles in the real-world clinical setting. **Methods:** A survey was distributed to the SHEA Research Network (SRN) hospitals during November 2022 – December 2023, to assess processes related to the implementation of SSI prevention bundles in colorectal surgery. **Results:** Of the 93 US and international hospitals within SRN, 49 completed the survey (53% response rate). The mean volume of colorectal surgeries per year was 377 (median 400). Figure 1 shows the individual elements of SSI prevention bundle reported as consistently used in most surgeries. There were no significant differences between hospitals with high vs. low volume (cut-off 400 surgeries), except for wound protectors or retractors, more likely to be used in high-volume hospitals ($P = 0.047$). A formal process for auditing adherence was reported by 71% of respondents for antibiotic prophylaxis, and 51% for skin prep, with the remaining elements audited < 50% of the time. Feedback of audited adherence to surgeons occurred < 50% of the time for all bundle elements, except antibiotic prophylaxis (59%). Table 1 shows the most common barriers reported as either successfully mitigated or still persistent at the time of the survey. High-volume hospitals were more likely to report persistent clinicians' low bundle adherence ($P = 0.016$) and inadequate bundle adherence audit and feedback ($P = 0.0016$). **Conclusion:** Implementation of guideline-recommended colorectal SSI Prevention bundles remains highly variable. Further research aiming to develop strategies that optimize implementation and adherence is needed.

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Concordance with Preoperative Intravenous Antibiotics Guidelines and Risk of Surgical Site Infection (SSI)

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Background: Administration of antimicrobial prophylaxis close to incision time is recommended as an essential practice to prevent surgical site infections (SSI). Despite guideline recommendations, adherence to preoperative intravenous antibiotic guidelines is variable. We aim to assess perioperative factors associated with guideline concordant (GC), guideline second line (GSL) and non-guideline concordant (NGC) antibiotic choice and timing and impact on odds of SSI. **Methods:** 3173 patients at 9 hospitals with National Health Safety Network (NHSN) procedure codes for colon surgery and abdominal hysterectomy between January 1, 2023, and

Table 1: Clinical Characteristics of Patients with Colon Surgery and Abdominal Hysterectomy Between January 1, 2023, and October 31, 2023

	Total Patients (n=3173)
Procedure	
Colon	877 (28%)
Hysterectomy	2296 (72%)
Patient Classification	
Emergency	24 (1%)
Inpatient	269 (8%)
Surgery Admit	743 (23%)
Surgery Outpatient	2137 (67%)
History of MRSA in Past Year	43 (1%)
Beta Lactam Allergy	589 (19%)
Antibiotic Choice	
GC	2982 (94%)
GSL	98 (3%)
NGC	93 (3%)
Antibiotic timing	
GC	2995 (94%)
NGC	178 (6%)
GC Combined Choice and Timing	2910 (92%)

Table 2: Characteristics of Colon and Abdominal Hysterectomy Patients with Guideline Concordant (GC), Guideline Second Line (GSL) and Non-Guideline Concordant (NGC) Antibiotic Choice

	NGC (n=93)	GSL (n=98)	GC (n=2982)	P value
Surgery				<0.001
Colon	51 (55%)	87 (89%)	739 (25%)	
Abdominal Hysterectomy	42 (45%)	11 (11%)	2243 (75%)	
Patient Classification				<0.001
Emergency	3 (3%)	5 (5%)	16 (1%)	
Inpatient	18 (19%)	72 (74%)	179 (6%)	
Surgery Admit	34 (37%)	14 (14%)	695 (23%)	
Surgery Outpatient	41 (41%)	7 (7%)	2092 (70%)	
Urgent/Emergent Case	21 (23%)	79 (81%)	196 (7%)	<0.001
Beta Lactam Allergy	53 (57%)	14 (14%)	522 (18%)	<0.001
MRSA History in Past Year	7 (8%)	3 (3%)	33 (1%)	<0.001
GC Antibiotic Timing	34 (37%)	50 (51%)	2911 (98%)	<0.001
SSI	2 (2%)	11 (11%)	65 (2%)	<0.001

Table 3: Risk of Surgical Site Infection

	Unadjusted OR SSI	95% CI	P value
Facility			0.8
Procedure			
Colon surgery	Reference	n/a	n/a
Hysterectomy	0.3	0.2-0.5	<0.001
Patient Class			< 0.001
Emergency	Reference	n/a	
Inpatient	0.6	0.2-2.2	
Surgery Admit	0.2	0.1-0.8	
Surgery Outpatient	0.1	0-0.4	
Urgent/Emergent	4.6	2.8-7.6	<0.001
Admission to ICU, Transfer from another facility and/or history of MRSA > 1 year prior	2.0	0.8-5.0	0.2
MRSA in past year	8.4	3.6-19.5	<0.001
Beta Lactam Allergy	10.5	0.6-1.9	0.9
Antibiotic choice			<0.001
GC	Reference		
GSL	5.7	2.9-11.1	
NGC	1.0	0.2-4.1	
GC Antibiotic Timing	0.5	0.2-1.1	0.08
Combined GC Antibiotic Choice and Timing	0.4	0.2-0.7	<0.001

October 31, 2023, were identified from the electronic medical record. Data on preoperative intravenous antibiotic choice and timing, history of allergy and methicillin resistant staphylococcus aureus (MRSA) history was collated. SSI were identified using NHSN definitions by trained infection preventionists. SSI identified as present at the time of surgery were excluded. Antibiotic choice and timing were compared to institutional guidelines and patients were categorized as having received GC, GSL or NGC antibiotic choice, and GC or NGC antibiotic timing. Descriptive statistics were used to describe clinical data for patient population and subgroups who received GC, GSL and NGC antibiotics. Univariate logistic regression was performed to assess the association of procedural and clinical factors with the likelihood of an SSI. **Results:** GC was high overall for both antibiotic choice (94%) and timing (94%). (Table 1) NGC and GSL antibiotic choice were more common in colon surgery, urgent/emergent cases, patients with beta lactam allergies and those with a recent history of MRSA. GSL antibiotic choice was more frequent in inpatients. (Table 2). GC antibiotic timing was more common with GC antibiotic choice (98%) than with NGC (37%) or GSL (51%) antibiotic choice. Odds of SSI were lower in patients who were GC for both antibiotic choice and timing (OR 0.4, $p < 0.001$) and increased in patients who received GSL antibiotic choice (OR 5.7 compared to GC, $p < 0.001$), underwent urgent/emergent surgeries (OR 4.6, $p < 0.001$) or had a history of MRSA in the past year (OR 8.4, $p < 0.001$). We found a non-significant trend toward lower infections in patients with GC antibiotic timing (OR 0.5, $p = 0.08$). (Table 3) **Conclusion:** Combined GC for antibiotic choice and timing was high and associated with lower odds of SSI. NGC and GSL antibiotic choice were associated with patient level factors such as history of MRSA and emergent procedures which may also impact risk of SSI.

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Sustainability of Surgical Site Infection (SSI) Prevention Bundle for Pediatric Cardiothoracic Surgery Patients

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Background: Frequent use of delayed sternal closure and prolonged stays in critical care units contribute to surgical site infections among pediatric patients undergoing cardiothoracic (CT) procedures. Bundled interventions to prevent or reduce surgical site infections (SSIs) have shown prior success, but limited data exist on sustainability of these efforts especially during the Coronavirus Disease 2019 (COVID-19) pandemic. Here, we re-examine the SSI rates for pediatric CT procedures after the onset of the pandemic. **Methods:** In a single academic center providing regional quaternary care, we created a multidisciplinary CT-surgery SSI Prevention workgroup in response to rising CT SSI rates. Bundle elements focused on daily chlorhexidine bathing, environmental cleaning, monthly room changes, linen management, antimicrobial prophylaxis, and sterile techniques for bedside and operating room procedures. CDC surveillance definitions were used to identify superficial, deep or organ space SSIs. To assess the bundle's sustainability, we compared SSI rates during years impacted by the COVID-19 pandemic (2021–2023, period 2) to pre-pandemic rates (2017–2019, period 1). Data from 2020 were excluded to account for bundle implementation, pandemic restrictions, and a minor decrease in surgical volumes. Rates were calculated as surgical site infection cases per 100 procedures. Mean rates across both periods were compared using paired t-tests (Stata/SE version 14.2). **Results:** Excluding the year 2020, the average SSI rate per 100 CT procedures increased from 1.07 in period 1 to 1.56 in period 2 ($p=0.55$). Concurrently, the average SSI rate per 100 CT procedures with delayed closures increased from 1.49 in period 1 to 1.97 in period 2 ($p=0.67$). Figure 1 shows SSI rates and procedure counts for 2017–2023. Coagulase negative Staphylococci most frequently caused SSIs in period 1 while methicillin-susceptible Staphylococcus aureus (MSSA) was most frequently identified in period 2. During period 2, the estimated compliance with SSI prevention bundle remained stable and reached 95% for pre-operative chlorhexidine baths and use of appropriate antimicrobial prophylaxis. Monthly room changes with dedicated environmental cleaning reached 100% compliance. **Conclusion:** Despite staffing shortages and resource limitations (e.g., discontinuation of contact isolation for MRSA colonization) during the COVID-19 pandemic, SSI rates for pediatric CT surgeries showed a slight, but non-statistically significant, increase in post-pandemic years as compared to pre-pandemic years. implementation of bundled interventions and improved surveillance



Figure 1 Summary of Pediatric Cardiothoracic Procedure Counts and Surgical Site Infection (SSI) rates from 2017 – 2023 in a Single Pediatric Center.
*Year 2020 rates were excluded from comparative analyses to account for bundle implementation