

Transition From Targeted Decolonization to Universal Decontamination: Effect on Postoperative S. aureus Infection Rate in a Single Institution

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Background

- Colonization with *S. aureus* is a risk factor for surgical site infection (SSI) following total joint arthroplasty¹
- Universal decontamination (UD) protocols are non-inferior to targeted decolonization (TD) in reducing *S. aureus* SSI²⁻⁴
- UD protocols are cost-effective and practical for implementation
- Studies are needed to investigate institutional transitions from TD to UD to understand its effects on postoperative SSI and *S. aureus* SSI in clinical practice

Objective

Evaluate the transition from a TD protocol to a UD protocol at an orthopaedic specialty hospital by analyzing *S. aureus* SSI incidence over time

Methods

Retrospective cohort study

Inclusion criteria:

- Primary or revision TKA or THA between 6/3/2024 and 12/31/2025

Exclusion Criteria:

- Any documented SSI prior to the analysis period
- A month transition period immediately following implementation was excluded from analysis

Exposure periods:

- Targeted:** Preop mupirocin for 5 days for colonized patients
- Universal 5%:** Intranasal 5% povidone-iodine solution prior to surgery, beginning January 27th, 2025
- Universal 10%:** Intranasal 10% povidone-iodine solution prior to surgery, beginning October 1st, 2025

Primary outcome:

- Postoperative *S. aureus* surgical site infection, defined by NHSN criteria

Analysis

- Cumulative Sum (CUSUM) analysis with a target performance set to the pre-transition infection rate of 0.32%
- Multivariate logistic regression

Patient Demographics

- 7768** who underwent primary or revision TKA or THA were included
 - There were **3427** procedures in the TD period and 4341 in the UD period
 - A total of 16 cases of postoperative *S. aureus* SSI were documented during the study period, 2 before the transition period and 14 after (p=0.022)
- CUSUM analysis demonstrated an initial incline in infection rate, exceeding the acceptable performance target by March 2025
- Infection risk remained elevated during the 5% period
- Following the 10% transition, infection rate corrected
- Multivariate logistic regression analysis show that a UD protocol conferred a significantly higher odds of infection (OR 5.38, 95% CI: 1.48 – 34.5)

Table IIIA: MV logistic regression analysis for SSI, inclusive of entire study period

Variable	OR (95% CI)	P-value
Protocol (UD vs. TD)	5.38 (1.48 - 34.52)	0.027
Age (years)	0.94 (0.90 - 0.99)	0.012
Charlson Comorbidity Index	0.84 (0.51 - 1.22)	0.421
Procedure Time	1.00 (1.00 - 1.01)	0.264
Alcohol Use Disorder	3.63 (0.55 - 13.95)	0.101
BMI	1.03 (0.96 - 1.09)	0.398
Revision	10.28 (3.08 - 34.77)	<0.001

Table IIIB: MV logistic regression analysis for SSI, 5% iodine period excluded

Variable	OR (95% CI)	P-value
Protocol (10% UD vs TD)	0.83 (0.39 - 1.51)	0.577
Age (years)	0.99 (0.94 - 1.05)	0.643
Charlson Comorbidity Index	0.76 (0.44 - 1.15)	0.257
Procedure Time	1.01 (1.00 - 1.02)	0.003
Alcohol Use Disorder	2.23 (0.11 - 12.93)	0.470
BMI	1.05 (0.99 - 1.10)	0.043
Revision	0.95 (0.14 - 4.68)	0.958

Results

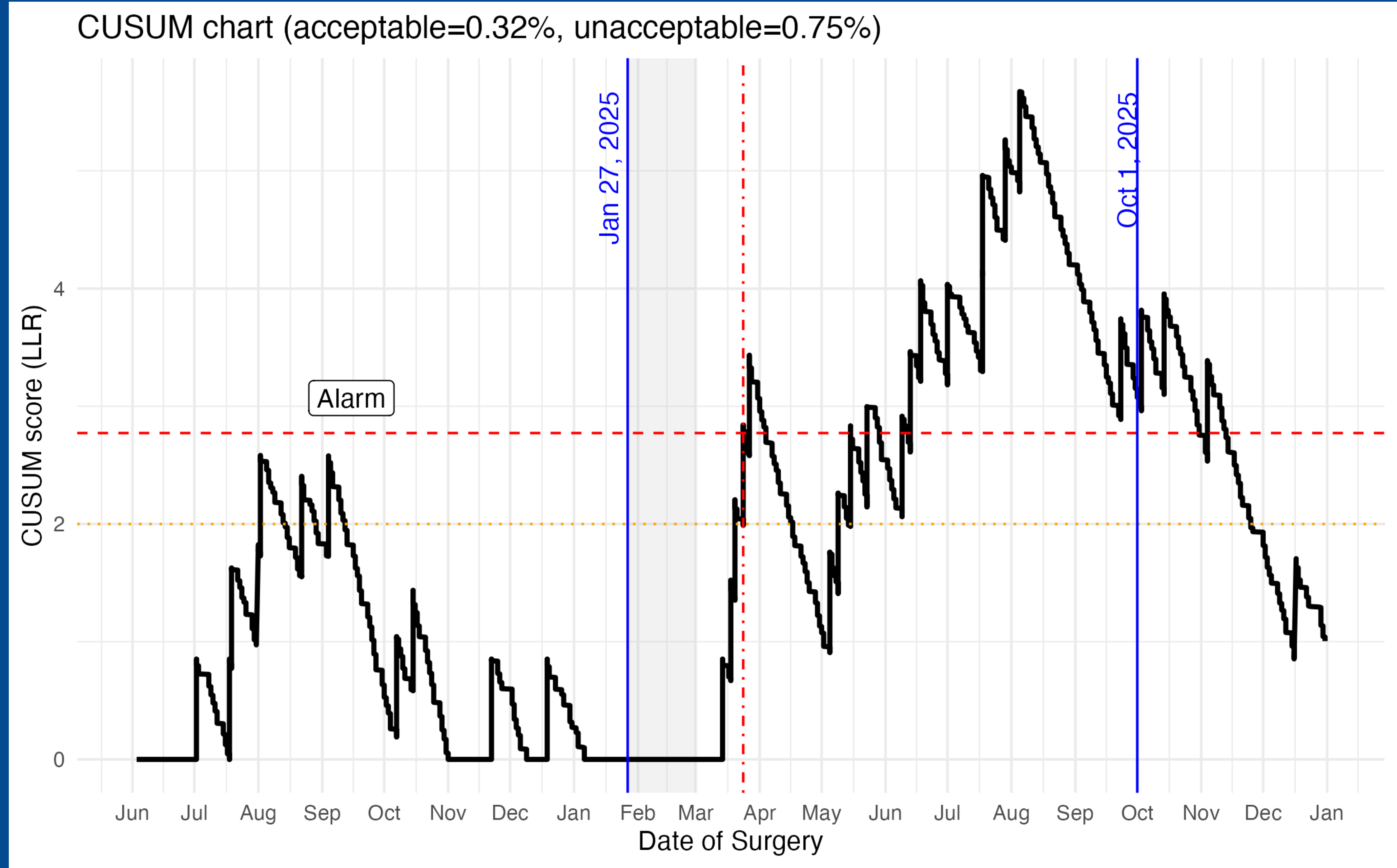
Table I: Univariate analysis comparing Targeted Decolonization and Universal Decontamination (5% and 10%) groups

		Targeted	Universal	P-value
n		3427	4341	
Age (mean (SD))		69.22 (9.26)	69.40 (9.56)	0.402
Sex (%)	Male	1397 (40.8)	1763 (40.6)	0.666
	Female	2016 (58.8)	2570 (59.2)	
	Other	14 (0.4%)	8 (0.2%)	
ASA (mean (SD))		2.54 (0.52)	2.59 (0.51)	<0.001
CCI (mean (SD))		3.57 (1.76)	3.74 (1.85)	<0.001
BMI (mean (SD))		30.88 (6.75)	30.69 (6.46)	0.214
Revision (%)		240 (7.0)	357 (8.2)	0.05
Procedure Time (mean (SD))		141.41 (37.44)	146.20 (42.73)	<0.001
Diabetes (%)		515 (15.0)	715 (16.5)	0.089
Tobacco Use (%)		361 (10.5)	598 (13.8)	<0.001
Alcohol Use Disorder (%)		92 (2.7)	149 (3.4)	0.069
Liver Disease (%)		206 (6.0)	344 (7.9)	0.001
CKD (%)		325 (9.5)	511 (11.8)	0.001
CHF (%)		189 (5.5)	300 (6.9)	0.014
Dyslipidemia (%)		1938 (56.6)	2916 (67.2)	<0.001
HTN (%)		2182 (63.7)	2878 (66.3)	0.017
Infection (%) S. aureus		11 (0.3)	22 (0.5)	0.283
Infection (%)		2 (0.1)	14 (0.3)	0.022

Table II: Univariate analysis comparing Targeted Decolonization and 10% Universal Decontamination groups

		Targeted	10% Iodine	P-value
n		3427	1288	
Age (mean (SD))		69.22 (9.26)	69.36 (9.29)	0.641
Sex (%)	Male	1397 (40.8)	600 (46.6)	0.003
	Female	2016 (58.8)	685 (53.2)	
	Other	14 (0.4%)	2 (0.2%)	
ASA (mean (SD))		2.54 (0.52)	2.57 (0.51)	0.097
CCI (mean (SD))		3.57 (1.76)	3.78 (1.84)	<0.001
BMI (mean (SD))		30.88 (6.75)	30.28 (6.06)	0.007
Revision (%)		240 (7.0)	111 (8.6)	0.069
Procedure Time (mean (SD))		141.41 (37.44)	148.42 (44.81)	<0.001
Diabetes (%)		515 (15.0)	211 (16.4)	0.27
Tobacco_Use (%)		361 (10.5)	180 (14.0)	0.001
Alcohol Use Disorder (%)		92 (2.7)	46 (3.6)	0.13
Liver Disease (%)		206 (6.0)	103 (8.0)	0.017
CKD (%)		325 (9.5)	150 (11.6)	0.032
CHF (%)		189 (5.5)	88 (6.8)	0.1
Dyslipidemia (%)		1938 (56.6)	893 (69.3)	<0.001
HTN (%)		2182 (63.7)	847 (65.8)	0.194
Infection (%)		11 (0.3)	3 (0.2)	0.846
S. aureus Infection (%)		2 (0.1)	2 (0.2)	0.647

Cumulative Sum Analysis



Conclusions

A universal decontamination protocol with 10% intranasal iodine demonstrated comparable *S. aureus* SSI outcomes to targeted, and both targeted and universal were superior to 5% intranasal iodine

References

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