estimated emissions reduction is 4.34 Kg of CO2. **Conclusions:** Diagnostic stewardship via a combined urinary antigen test can reduce waste from unnecessary testing without altering workflow. This institutional change is projected to reduce the plastic waste equivalent to 8480 water bottles and reduce emissions equivalent to using 11 gallons of gasoline or charging 340 smartphones. Our calculations are likely an underestimate of total emissions diverted since we only estimated emissions produced by waste in the landfill and did not account for other associated emissions such as those produced by transporting the waste. While the impact is modest, diagnostic stewardship applied broadly is a step towards a goal of net zero.

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CRE colonization on admission and acquisition among surgical intensive care unit patients in an Indian tertiary care hospital

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Introduction: Studies examining carbapenemase producing carbapenem resistant Enterobacterales (CP-CRE) transmission incorporating clinical and genomic data in Indian hospitals are lacking. We investigated the prevalence, risk factors for CP-CRE peri-rectal colonization on admission and acquisition during hospital stay and genomic epidemiology of CP-CRE isolates in an adult surgical intensive care unit (SICU) in a tertiary-care hospital in India. **Methods:** SICU patients admitted from July 31 to November 30, 2023 were prospectively enrolled. Peri-rectal swabs (PRS) were collected at SICU admission and discharge, and hospital discharge. Environmental sampling of sinks was performed. Swabs were plated on selective agar (CHROMagarTMmSuperCARBATM) for CP-CRE isolation. Whole genome sequencing of CP-CRE isolates was performed to investigate antimicrobial resistance gene (ARG) abundance, strain typing (ST), and relatedness classified by community-associated (CA), healthcare-associated (HCA), hospital-acquired (HA), and environmental isolates. **Results:** 56 (28%) of 203 enrolled patients were colonized with CP-CRE on SICU admission. Among 147 admission-negative patients,

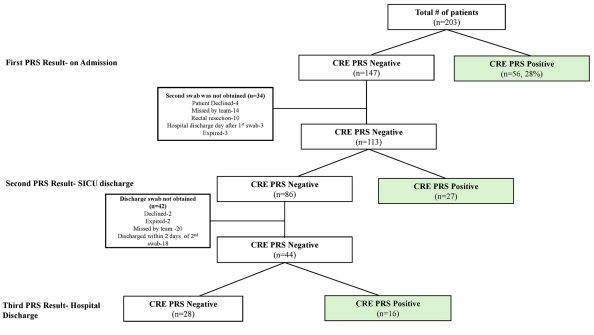

Figure 1: Carbapenemase producing carbapenem resistant *Enterobacterales* (CP-CRE) peri-rectal swab (PRS) status among surgical intensive care unit (SICU) patients in a tertiary care hospital, Kerala, India, July 31 – November 30, 2023

CP- CRE species	SICU Admission (N=56 patients)	SICU Discharge (N=27 patients)	Hospital Discharge (N=16 patients)	Hospital Acquisition (N=43 patients)
Escherichia coli (EC)	29 (52%)	8 (30%)	5 (33%)	13 (30%)
Klebsiella pneumoniae (KP)	9 (16%)	10 (37%)	6 (40%)	16 (37%)
Enterobacter cloacae (EBCLO)	2 (4%)	2 (7%)	0	2 (5%)
EC+KP	13 (23%)	7 (26%)	5 (20%)	12 (28%)
EC+EC	2 (4%)	0	0	0
EC+EBCLO	1 (2%)	0	0	0

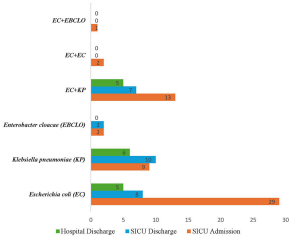

Figure 2: Organism distribution among carbapenemase producing carbapenem resistant *Enterobacterales* (CP-CRE) peri-rectal colonization patients on surgical intensive care unit (SICU) admission, SICU discharge and hospital discharge in a tertiary care hospital, Kerala, India, July 31 – November 30, 2023

	CP- CRE positive (N=56)	CP-CRE negative (N=147)	Univariate analysis* P-value	Multivariable analysis** (aOR; 95% CI)
Age (Median, IQR)	58(47-68)	58(46-68)	0.927	-
Gender (Males,%)	32 (57)	85 (58)	0.930	-
Hospital LOS in days prior to ICU admission (Median, IQR)	2 (1-3)	2 (1-2)	0.162	-
Transfer from outside hospital	17 (30)	41 (28)	0.728	-
Hospital stay < 1 year	30 (54)	64 (44)	0.201	-
Outside hospital stay <1 year	10 (18)	36 (25)	0.315	-
Study hospital stay <1 year	20 (34)	28 (19)	**0.010**	2.48 [1.23- 4.98]
Hospitalization without ICU stay <1 year	22 (39)	42 (27)	0.114	-
Hospitalization with ICU stay <1 year	8 (14)	21 (14)	1.000	-
Study hospital ICU stay <1year	8 (14)	9 (6)	0.068	-
Long term hemodialysis	0	4 (3)	0.577	-
Antibiotic exposure prior to SICU admission	23 (41)	35 (24)	**0.012**	0.75 [0.13-4.24]
Exposure to 2 or more antibiotics prior to SICU admission	11 (20)	12 (8)	**0.024**	2.77 [1.12-6.82]
Anaerobic agent exposure prior to SICU admission	21 (38)	29 (20)	**0.010**	1.58 [0.66-3.77]
Duration of antibiotics>3days prior to SICU admission	8 (14)	11 (8)	0.143	-
Presence of invasive devices <30 days of ICU admission	0 (0)	5 (3)	0.325	-
Invasive procedures or surgeries < 30 days of ICU admission	17 (30)	43 (29)	0.877	-
Surgeries within 30 days of ICU admission	0	6 (4)	0.190	-
Procedures within 30 days of ICU admission	17 (30)	37 (25)	0.455	
Upper GI Endoscopy	3 (6)	14 (10)	0.345	-
Colonoscopy	6 (11)	12 (8)	0.569	-
Others	8 (14)	11 (8)	0.143	-
Prior CRE clinical culture <14 days of ICU admission	2 (4)	1 (1)	0.141	-

*Univariate analysis was performed using Chi-square test and Fisher-exact test; Kruskal-Wallis non-parametric test was used to compare median values
**Multivariable logistic regression analysis was performed on variables with P<0.05 in univariate analysis using backward selection with likelihood ratios.
aOR- adjusted Odds Ratio; CI- confidence interval; ICU- intensive care unit; IQR: Interquartile range; SICU-surgical ICU

Figure 3: Univariate and multivariable analysis of the risk factors associated with carbapenemase producing carbapenem resistant *Enterobacterales* (CP-CRE) peri-rectal colonization on admission to surgical intensive care unit in a tertiary care hospital, Kerala, India, July 31 – November 30, 2023

	CP-CRE acquisition N=43 (%)	CP-CRE non-acquisition N= 94 (%)	Univariable analysis* P-value	Cox regression** HR (95% CI)
Age, median (IQR)	58 (46-68)	57 (45-67)	0.588	
Female	20 (46)	37 (39)	0.431	
Outside transfer before SICU admission	12 (28)	27 (29)	0.922	
Outside hospital stay <1 year	12 (28)	24 (26)	0.770	
Study hospital stay <1 year	11 (26)	15 (16)	0.186	
Hospitalization with ICU stay in last one year	11 (26)	10 (11)	**0.028**	1.67 [0.84-3.44]
Hospitalization without ICU stay in last one year	11 (26)	30 (32)	0.453	
Study hospital ICU stay <1 year	6 (14)	4 (4)	**0.055**	1.60 [0.76-3.34]
Type of surgery				
Hepatobiliary surgery	12 (28)	29 (31)	0.727	
Colorectal surgery	12 (28)	32 (34)	0.476	
Upper Gastrointestinal & Small intestine surgery	10 (23)	21 (22)	0.905	
Other surgery	8 (19)	10 (11)	0.205	
Device exposure				
Urinary catheter	40 (93)	82 (87)	0.321	
Central venous catheter	30 (70)	63 (67)	0.749	
Arterial line	26 (61)	59 (63)	0.797	
Mechanical ventilator	12 (28)	35 (37)	0.288	
3 or more devices	21 (49)	39 (42)	0.422	
New procedures/surgeries after initial surgery	9 (21)	12 (13)	0.223	
Antibiotic exposure from SICU admission to hospital discharge				
Any antibiotic exposure+	24 (56)	39 (42)	0.120	0.66 [0.36-1.28]
Two or more antibiotics exposure	10 (23)	16 (17)	0.390	
Meropenem exposure	2 (5)	7 (7)	0.544	
Anaerobic agent exposure	21 (49)	35 (37)	0.201	

*Univariate analysis was performed using Chi-square test and Fisher-exact test; Kruskal-Wallis non-parametric test was used to compare median values
** Cox regression analysis was performed on variables with P<0.1 in univariate analysis using backward selection with likelihood ratios. +We forced the antibiotic exposure variable into the model.
CP-CRE: carbapenemase producing carbapenem resistant *Enterobacterales* (CP-CRE); CI- confidence interval; HR- Hazard Ratio: ICU-intensive care unit; IQR: Interquartile range; SICU- surgical ICU

Figure 4: Survival analysis examining risk factors associated with carbapenemase producing carbapenem resistant *Enterobacterales* (CP-CRE) acquisition among surgical intensive care unit patients (SICU) during hospital stay in a tertiary care hospital, Kerala, India, July 31 – November 30, 2023

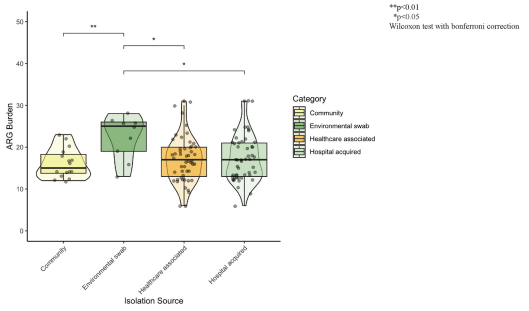

Figure 5: Antimicrobial resistance gene (ARG) burden among carbapenemase producing carbapenem resistant *Enterobacterales* isolates obtained from peri-rectal swab samples (classified as community associated, healthcare associated, hospital acquired) and environmental swabs in a surgical intensive care unit in a tertiary care hospital, Kerala, India, July 31 – November 30, 2023

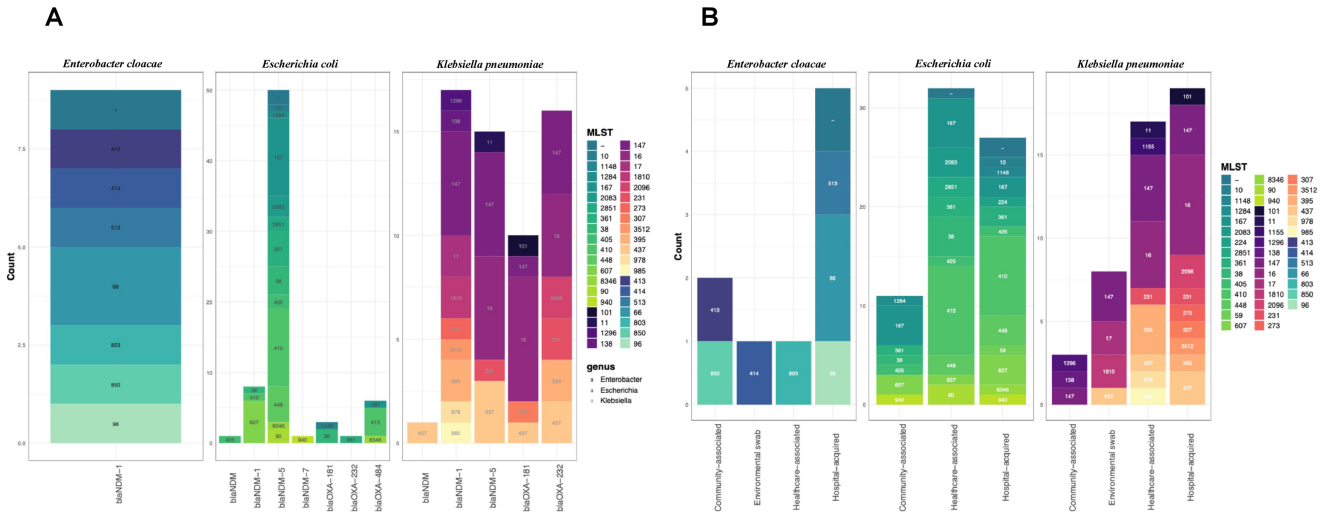

Figure 6A: Carbapenemase genes and strain typing among carbapenem resistant *Enterobacterales* (CRE) isolates; Figure 6B: Strain typing of CRE isolates by source (environment and patients classified as community associated, healthcare associated, hospital acquired) in a surgical intensive care unit in a tertiary care hospital, Kerala, India, July 31 – November 30, 2023

113 had repeat PRS testing > = 1 times during their stay; 43 (29%; 43/147) acquired CP-CRE (Figure 1). The predominant organism in admission and acquisition cases was Escherichia coli (52%) and Klebsiella pneumoniae (37%), respectively (Figure 2). Previous hospitalization = 2 antibiotics (aOR 2.77; 95%CI 1.12-6.82) were associated with admission CP-CRE colonization (Figure 3). In Cox regression analysis hospital stay before SICU admission was associated with CP-CRE acquisition in the SICU, but no risk factor was associated with acquisition during the entire hospital stay (Figure 4). Abundance of ARGs was lower in CA CP-CRE isolates compared to HCA, HA and environmental isolates (Figure 5). blaNDM and blaOXA genes were present in 79% (99/126) and 29% (36/126) of isolates, respectively; blaNDM-5 was the most common carbapenemase [65 (52%) of 126 isolates] (Figure 6A). E. coli ST410, which was associated with HA and HCA classifications was the most frequent ST (n=17) and 70% (12/17) carried NDM (Figure 6B). Twenty-seven E. coli and 17 K. pneumoniae isolates were separated by 20 or fewer core genome single-nucleotide polymorphisms, indicating potential relatedness amongst CP-CRE (Figure 7). **Conclusion:** More than 25% of SICU patients were colonized with CP-CRE on admission and also acquired CP-CRE during hospital stay. Healthcare-related CP-CRE isolates carried more resistances genes with NDM being the most commonly detected resistance gene in this cohort. Small sample size limited our understanding of risk factors associated with CP-CRE acquisition in hospital.

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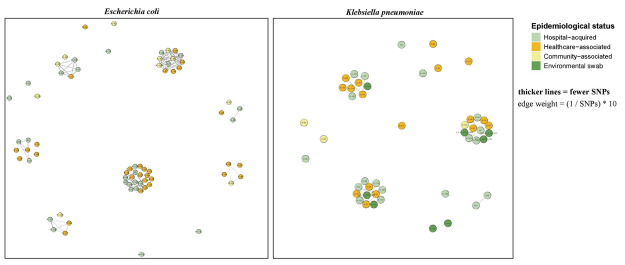

Figure 7: Relatedness among carbapenemase producing *Escherichia coli* and *Klebsiella pneumoniae* isolates obtained from peri-rectal swab samples (classified as community associated, healthcare associated, hospital acquired) and environmental swabs in a surgical intensive care unit in a tertiary care hospital, Kerala, India, July 31 – November 30, 2023

Presentation Type:
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Alcohol-Based Nasal Sanitizer Provides Superior Protection Against MRSA Bacteremia Compared to Mupirocin in Burn Patients

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Background: Burn injuries pose a significant risk for infections. Nasal decolonization with mupirocin nasal ointment (MNO) is an established method to prevent infections with Methicillin-resistant Staphylococcus aureus (MRSA). We compared the effectiveness of an alcohol-based nasal sanitizer (ABNS) to MNO against MRSA bacteremia in burn patients. **Methods:** This was a retrospective before/after study comparing the impact of an MNO (study arm 1; Bactroban 2%, GlaxoSmithKline, NC; application: twice daily for five days after admission) and an ABNS (study arm 2; Nozin, Bethesda, MD; application: twice daily for entire stay on Burn unit) on Healthcare Associated (HA-) MRSA bacteremia events in burn patients. The Burn unit consists of eight intensive care beds for burn care and 15 regular beds in an 885 bed, tertiary care, academic hospital. Inclusion criteria were all burn patients 18 years of age and older admitted under the burn service for more than four consecutive days. No mandatory MRSA screening was performed. Outcome measure was HA-MRSA bacteremia acquired > four days after admission. Patient characteristics included demographics, BMI, intensive care need, MRSA colonization at admission, type and degree of burn, inhalation injury, total burn surface area, Baux score, inpatient mortality, length of stay by total, burn mixed acuity and burn ICU were documented. Daily compliance with treatments was extracted from patient records (EPIC, Verona, WI). Continuous patient characteristics were compared using t-tests or Wilcoxon signed-rank test (for factors with skewed distributions), and chi-square tests for categorical factors. Product-limit time-to-event analysis and log-rank test were used to compare the outcome measure between groups. **Results:** From 08/01/2021 to 07/31/2024 a total of 920 patients were enrolled (MNO arm: 448; ABNS arm: 462) with 239 and 217 meeting inclusion criteria. No differences in patient characteristics were detected between the two groups at all patients and >80% treatment compliance levels (MNO: 121 encounters; ABNS: 98 encounters). Patients in the MNO arm encountered 14 events compared