

Presentation Type:

Poster Presentation

Subject Category: CLABSI

Sustaining the Stewardship – Maintaining CLABSI Prevention Efforts Over the Long Run

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Background: Central line-associated bloodstream infections (CLABSI) are preventable infections associated with poor outcomes. Nationally, the CLABSI standardized infection ratio (SIR) decreased from 2018 to 2019, but those positive results were derailed by the COVID-19 pandemic. From FY21 to FY22, the CLABSI SIR in our facility’s medical intensive care unit (MICU) more than doubled. In March 2021, we created a multidisciplinary central venous access device (CVAD) rounding team to decrease CLABSI in the MICU. **Method:** We conducted a prospective pre-post quality improvement study in an academic, quaternary care hospital with a 30-bed MICU. The decision to implement a multidisciplinary CVAD rounding process was based on a review of published best practices. The study was approved by the UNC Institutional Review Board. Our team included MICU clinicians, registered nurses, an infection preventionist, a vascular access registered nurse and a “CVAD Liaison”. The CVAD liaison role is a registered nurse trained maintaining aseptic technique during CVAD insertions and educating staff on CVAD maintenance. Each teammate had assigned responsibilities (Fig. 1). The team rounded weekly on every MICU patient with a CVAD. Components of the rounding process were compliance audits of all CVADs; evaluation of line necessity; targeted education and process improvement. **Result:** This study evaluated the intervention’s impact on CLABSI, CVAD utilization, and maintenance bundle compliance rates. Data were collected for five fiscal years (FY19 to FY23). Following the intervention, the MICU experienced a 57% decrease in CLABSI rates between FY21 and FY22. This reduction was meaningful for patient care, although not statistically significant. Infection rates rose slightly in FY23 but remained lower than from FY19-21 (Table 1). There was no statistically significant difference in the CVAD utilization rate between FY21 and FY22. There was an improvement in the percentage of intact dressings (Fig. 2). **Conclusion:** Following the implementation of a multidisciplinary CVAD rounding team, there was a 57% decrease in the MICU’s FY22 CLABSI infection rate from the prior fiscal year. This decrease in CLABSI was sustained with a similar CLABSI rate in FY23. One potential explanation for the CLABSI reduction was increased awareness of the importance of maintaining CVAD dressings (Fig. 2). The primary

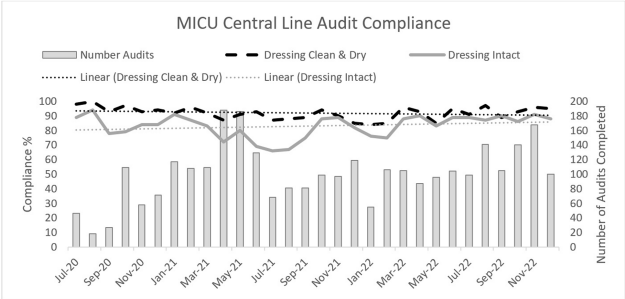


Fig. 2

Total number of CLABSI, CLABSI SIR, and CLABSI rate per 1000 central line days by location of attribution			
	MICU		
	Rate	SIR	Infections (n)
FY19	2.93	2.32	19
FY20	2.31	1.5	15
FY21	3.90	3.46	26
FY22	1.69	1.49	12
FY23	1.90	1.69	13

Table 1

challenge for this team has been sustaining staff availability. Staff shortages and burnout have made it challenging to find coverage for rounds. Our team began addressing staffing challenges by expanding the pool of interested staff. Sustained of rounding and CLABSI reduction will require continued monitoring and recruitment.

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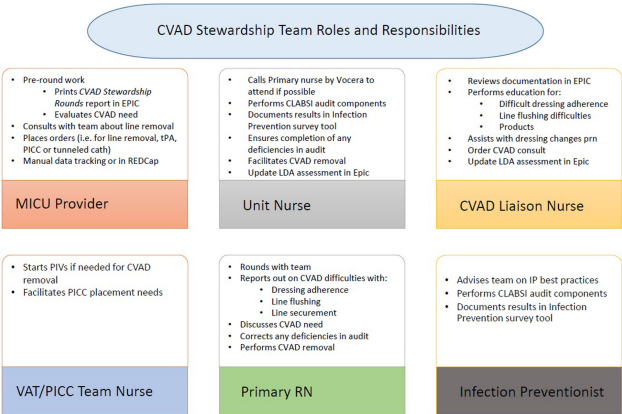
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Reducing Central Line Associated Bloodstream Infections via Improved Dressing Adherence in Patients with Coagulopathy

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Background: Patients with cirrhosis often experience coagulopathy, which can result in profound bleeding at intravenous insertion sites. This makes maintaining dry, intact central venous catheter (CVC) dressings particularly challenging. At our 2,247-bed acute care tertiary referral hospital, the Medical-Surgical Intensive Care Unit (MSICU) specializes in hepatic care. Upon completing a root cause analysis of our elevated central line associated blood stream infections (CLABSI), we found patients with coagulopathy had poor CVC dressing adherence. Our goal was to reduce CLABSI by improving dressing integrity through innovative strategies aimed at mitigation of bleeding and enhanced adhesion. **Method:** In November 2022 a review was completed of hemostatic and adhesion products to address bleeding at CVC insertion sites and improve dressing adherence to skin. In December 2022 we developed a tiered intervention program using three products tailored to the severity of bleeding at CVC insertion sites. We then selected an adhesive product to bond the perimeter of the dressing to the skin. We disseminated education to the nursing team on product use according to patient CVC dressing condition and manufacturer instructions for use. The tiered intervention program was evaluated by comparing pre-intervention (January 2021 to November 2022) CLABSI rates and standardized infection ratios (SIRs) to post-intervention (December 2022 to October 2024) outcomes. Data was obtained from



the National Healthcare Safety Network (NHSN), and analysis was completed using the NHSN statistics calculator. **Result:** Following implementation of the tiered intervention program, the CLABSI rate decreased from 1.67 to 0.62, a 62.9 percent decrease. The CLABSI SIR decreased from 1.481 to 0.553, a 62.7 percent decrease. The CLABSI SIR reduction was statistically significant (p-value of 0.0318; one tailed Z-test). **Conclusion:** Patients with coagulopathy issues pose unique challenges in infection prevention. Their abnormal clotting factors increase the risk of bleeding, making it difficult to maintain an intact and occlusive CVC dressing. Hemostatic and adhesive products are effective strategies for maintaining CVC dressing integrity and facilitating CLABSI reduction.

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Universal MRSA Decolonization of Critically Ill Patients: An Intervention to Decrease Central Line Associated Bloodstream Infections

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Background: Healthcare associated infections (HAIs) are important areas of concern as they increase length of hospital stay, increase hospital costs, and have high morbidity and mortality. For instance, central line associated bloodstream infections (CLABSIs) approximately increase length of stay by 13.4 days and increase hospital costs by \$43,975. Studies also suggest a 1.5-2.5x increase in mortality in patients who develop CLABSIs. In 2013, the REDUCE MRSA trial compared universal MRSA decolonization to targeted MRSA decolonization in the ICU and found superiority in reducing positive MRSA cultures and all cause bloodstream infections. We aim to decrease central line associated bloodstream infections at our institution by adopting the REDUCE MRSA trial protocol. **Methods and Outcomes:** All patients admitted to the medical/surgical ICU and cardiac ICU at St Francis Hospital starting in December of 2023 received daily intranasal mupirocin and chlorhexidine bathing regardless of their MRSA status. The primary outcome assessed was the CLABSI rate per month. The secondary outcomes were the standard infection ratio and CLABSI per central line day. We compared data from 2020-2023 to data after initiation of the protocol in 2024. We used unpaired t testing to assess the CLABSI rate per month and used a negative binomial regression model to calculate the standard infection ratio according to the NHSN 2015 national baseline. **Results and Discussion:** We had a total of 6 CLABSIs in the ICU this year after initiating universal MRSA decolonization. The number of CLABSIs per month decreased from 0.65 per month from 2020-2023 down to 0.50 per month in 2024. These results, while not statistically significant, are limited by the small sample size since the protocol was just initiated this year. One interesting finding was 5 of the 6 CLABSIs occurred during January through March, which brings up the question if introducing these new changes required time for nursing education and compliance to improve. **Conclusions:** Our results suggest that universal MRSA decolonization in the ICU may decrease the number of CLABSIs. We will continue to collect more data in the coming years to assess for statistical significance. We recommend further research to assess for potential benefits of universal MRSA decolonization in other areas of the hospital where MRSA infection rates are high like step down units.

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Rethinking the Role of Non-Culture Based Microbiologic Testing Methods within CLABSI Surveillance

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Introduction: With the expanding use of non-culture based tests (NCTs), the CDC's National Healthcare Safety Network (NHSN) incorporated NCTs into the surveillance definition for central line-associated bloodstream infections (CLABSI) in 2016. However, there are limited data available on the impact of NCTs on CLABSI surveillance since that time. In this study, we aim to describe the test performance characteristics of a NCT which detects microbial cell-free DNA (Karius[®] Test [Redwood City, CA: Karius, Inc]) for bloodstream infection diagnosis and to determine the impact on CLABSI surveillance within a pediatric healthcare facility. **Method:** This study was performed at a 654-bed quaternary care pediatric healthcare facility in central Ohio from January through December 2024. All patients with Karius[®] Testing performed on or after hospital day 3 were included. Sensitivity, specificity, and positive predictive value (PPV) for Karius[®] Tests to diagnose bloodstream infections were determined from patients with paired blood cultures collected within 2 days of the Karius[®] Test. Patients with positive and negative Karius[®] Tests were compared using Fisher's exact test and Wilcoxin rank sum test. Analyses were completed using Stata version 18 (College Station, TX: StataCorp LLC). Viral data were excluded from the analysis. Single growth of common commensal organisms on blood culture were treated as contaminants. **Result:** Eighty-six patients with a total of 91 Karius[®] Test results were included in the analysis (Table; Figure). Patients with a positive Karius[®] Test were younger and more likely to have a positive blood culture (p Conclusion: In our cohort, the Karius[®] Test lacked specificity and PPV for the diagnosis of bloodstream infections. This was especially pronounced in afebrile patients in whom clinicians did not suspect bloodstream infection. Inclusion of NCT methods within the CLABSI definition may bias national surveillance rates by including patients with low post-test probability as well as impact diagnostic stewardship efforts to reduce inappropriate blood culture collection.

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Table:

	Positive Karius [®] Test (N = 42 Patients)	Negative Karius [®] Test (N = 44 Patients)	p-value
Patient Age - Years (median, IQR)	6 years (3-14 years)	11 years (7-17 years)	0.03
Gender	18 Male 24 Female	23 Male 21 Female	0.40
Days since admission (median, IQR)	7.5 days (4-14 days)	5 days (4-8 days)	0.09
Febrile > 38°C within 2 days before or 1 day after	32 (76%)	30 (68%)	0.48
Blood culture collected within 2 days before or 1 day after	33 (79%)	26 (59%)	0.06
Blood culture positive Matching organism with Karius [®] Contaminant	6 (14%) 4* 2*	0 (0%) N/A N/A	0.01
Presence of CVC	25 (60%)	16 (36%)	0.05
Non-MBI CLABSIs	2†	0	0.24
Additional Non-MBI CLABSIs had blood culture not been collected	7	0	0.01
Total Karius [®] Tests Performed Indication for Testing:	46	45	0.40
Pulmonary Nodules/Opacity	22 (48%)	15 (33%)	
Prolonged Fevers – Cultures Negative	14 (30%)	15 (33%)	
Suspected Musculoskeletal Infection	7 (17%)	8 (18%)	
Culture-Negative Endocarditis	2 (4%)	2 (4%)	
Suspected CNS Infection	1 (2%)	5 (11%)	

IQR, interquartile range; CVC, central venous catheter; MBI, mucosal barrier injury; CLABSI, central line-associated bloodstream infection

*Includes 2 patients with LCBI secondary to pneumonia, 1 patient with MBI-CLABSI, and 1 patient with BSI secondary to infective endocarditis

†Includes 1 patient with coagulase-negative *Staphylococcus* and 1 patient with *Streptococcus anginosus*

‡Both instances in patients without blood culture collected within 2 days of Karius[®] Test