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Background. Acinetobacter baumannii (AB) infections cause high mortality and morbidity in intensive care unit patients. There are limited data on the epidemiology of imipenem-resistant A. baumannii (IRAB) among pediatric ICU patients.

Methods. A retrospective chart review was performed in patients with AB bacteremia in a pediatric intensive care unit at a tertiary teaching hospital from January 2000 to December 2016. Antimicrobial susceptibility tests, multilocus sequence typing (MLST) and PCR for antimicrobial resistance genes were performed for stored isolates. In addition, antibiotic prescription days of therapy (DOT per 1,000 patient-days) of the pediatric department from January 2001 to December 2016 was analyzed.

Results. Bacteremia episodes occurred in 27 patients. Male patients were 11 (41%) and the median age at the onset of bacteremia was 5.2 years (range, 0–18.6 years). There was a clear shift in antibiotic use of AB during the study period. From 2000 to 2003, all isolates were imipenem-sensitive (ISAB, N = 6). From 2005 to 2008, both ISAB and RESAB (4) were isolated. However, since 2009, all the AB were IRAB (N = 12). In 33% (9/27) of patients, first AB was isolated from tracheal aspirate in patients with developed bacteremia later (median duration from AB positive tracheal culture to AB positive blood culture, 8 days [range 5–124]). The overall mortality of patients with AB bacteremia was 59.3% (16/27) within 28 days. There was no statistical difference in mortality between ISAB and IRAB groups (50% vs. 71%, P = 0.42). From MLST analysis of 10 available isolates, sequence type 138 was predominant (N = 7). All 10 isolates were positive for OXA-23-like and OXA-51-like carbapenemase. In 2001, carbapenem DOT per 1,000 patient-days was 15.3 and later stratified to 8.9 DOT per 1,000 patient-days was decreased to 5.1 in 2016.

Conclusion. IRAB bacteremia causes serious threat in high-risk pediatric patients in PICU. Proactive infection control measures and antimicrobial stewardship are crucial to manage serious IRAB infection in PICU.

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582. Impact of Central Line Bundle for Prevention of Umbilical Vein Catheter-Associated Bloodstream Infections in a Neonatal Intensive Care Unit
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Background. Umbilical vein catheters (UVC) are one of the most common types of vascular access device in the neonatal intensive care units. Central line-associated bloodstream infections were reported to be in the first place of healthcare-associated infections in preterm infants. In this study, we aimed to evaluate the effectiveness of the bundle applications in the prevention of umbilical vein catheter-associated bloodstream infections in neonates including premature infants.

Methods. This 40 months cross-sectional study included two periods, including pre-bundle period (from August 1, 2015 to March 31, 2017) and bundle period (April 1, 2017 to November 30, 2018). The umbilical vein catheter-related bloodstream infections (UVC-BSIs) and the rate when one patient-day was recorded and compared between the pre-bundle and bundle periods. Bundle steps were defined as education-training-asignment, evaluation of daily catheter indications, hand hygiene and aseptic technique while insertion, maximal sterile barrier precautions, closure of the catheter area with transparent semi-permeable membrane, using needless connectors in stead of 3-way stop-coks, and single-use prefilled saline syringes for flushing.

Results. During the whole study period total umbilical vein catheter days were 2,228 days. During the prebundle period there was 10 and in the bundle period there was 2 umbilical vein catheter-related bloodstream infections (Table 1). Despite the significant decrease in the pre-bundle period, and significantly decreased to 1.79 in the bundle period (P < 0.05). After the introduction of bundle applications, it was observed that the rate of infection decreased by 68% (P < 0.05).

Conclusion. Our study showed that implementation of central line bundle including needless connectors and single-use prefilled syringes for umbilical vein-related bloodstream infections were effective for the prevention of catheter-related bloodstream infections in neonatal intensive care units.

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583. Improving Catheter Scrub Technique and Compliance in a Level IV Neonatal ICU
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Background. Central line-associated bloodstream infections (CLABSIs) are challenging to prevent in the neonatal population due to the long-term necessity of central access for nutrition and medication. Neonates are a population at high risk for CLABSIs, and infections in this group are associated with prolonged hospitalization, greater healthcare costs, and increased mortality. Current bundles for CLABSI prevention include a friction scrub of the catheter hub prior to each use. Real-time audits of correct technique can be challenging. In July of 2018, our team developed a new strategy for auditing scrub technique in an attempt to reduce CLABSI rates.

Methods. This project took place in a NICU with 118 level 4 beds from July 2018 to February 2019. Our NICU is located in a large metropolitan area and serves as a referral center for complex neonates throughout the region. The intervention period encompassed 25,085 patient-days and 6,206 line days. Real-time friction scrub audits were performed for both dedicated line team staff as well as bedside nurses. In order to determine whether a healthcare worker’s (HCW) scrub technique was successful, a colorless luminescent product was applied to a practice catheter hub that adhered to the hub, but was not visible to the HCW. The HCW would then demonstrate a friction scrub on the practice catheter, and the hub was placed under a black light to show whether any residual product may be present. This process was repeated until the staff member was able to remove the product from the hub. Once the staff was successful, monthly real-time audits were continued to reinforce the correct technique.

Results. Between July 2018 and February 2019, compliance with scrub technique and ability to clear product from catheter hubs increased by 50%. The CLABSI rate in the first 9 months after intervention was 0.806 per 1000 line days as compared with 2.170 per 1000 line days in the previous fiscal year.

Conclusion. The number of CLABSI’s during the intervention period was 63% less when compared with the previous fiscal year. This process, in conjunction with our other CLABSI prevention practices, has significantly decreased both our CLABSI rate and overall numbers. This project emphasizes the importance of focusing on the basics of infection prevention practices and continual auditing to prevent practice creep.

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584. Use of Multi-Disciplinary Prevention Rounds to Reduce Central Line-Associated Bloodstream Infections in a Neonatal Intensive Care Unit
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Background. Despite successful implementation of evidence-based prevention bundles, central line-associated bloodstream infections (CLABSIs) continue to occur in neonatal intensive care units (NICUs). We hypothesized that multi-disciplinary prevention rounds may be able to further reduce CLABSI rates.

Methods. We implemented ultrasound rounds in a 39-bed tertiary NICU in November 2018 with the focus of reducing CLABSIs. Standardized rounds for all patients with a central venous line (CVL) occurred 2-3 times/week on weekdays during either the day or evening shifts. Rounds included NICU nursing leadership, the Hospital Epidemiologist and the patient’s nurse. Questions focused on the CVL
maintenance bundle, reducing line access, and patient-specific CLABSI risk factors. Best practices were reinforced and solutions for identified risk factors were developed. Recommendations were communicated to the physician, as appropriate. Prevention rounds data were collected. Nurses and providers in the NICU were surveyed about their perceptions of the rounds. CLABSI were identified by Infection Prevention using standard definitions.

**Results.** The average daily NICU census was 35.6, with an average of 14 patients with CVLs/day. The average duration of rounds was 45 minutes. Recommendations to physicians, such as changing medications from intravenous to oral or line removal, were accepted 85% of the time. 74.5% of nurses and 87.5% of providers thought that prevention rounds had at least some impact on CLABSI prevention. Nurse and provider responses to the perceived impact of CLABSI prevention rounds are in Tables 1 and 2, respectively. In the 12 months prior to starting prevention rounds, the CLABSI rate was 1.53 /1000 line days and the CLABSI rate for the 6 months after starting rounds was 0.99/1,000 line days, a 65% decrease.

**Conclusion.** CLABSI prevention rounds helped reinforce evidence-based prevention practices, identified patient-specific risk factors and improved physician-nurse communication. CLABSIs in NICU were reduced.

**Disclosures.** All authors: No reported disclosures.

### Table 1. Nurse Responses to How CLABSI Prevention Rounds Have Impacted CLABSI Prevention Efforts

| Responses | n | Percent |
|-----------|---|---------|
| No impact on CLABSI prevention efforts | 6 | 13% |
| Improved communication between nurses and physicians | 20 | 36% |
| Improved my awareness of CLABSI risk factors | 26 | 47% |
| Improved my knowledge of CLABSI prevention strategies | 19 | 34.5% |
| Identified patient-specific risk factors | 39 | 54.3% |
| Identified patient-specific prevention strategies | 18 | 33% |
| Empowered me to play a role in preventing CLABSI in my patients | 26 | 47% |

CLABSI is central line associated bloodstream infections. n is number. Total of 55 responses out of 135 nurses (41%). Only 5% of responses were from weekend nurses as rounds did not occur on weekends. Nurses could mark all responses that applied.

### Table 2. Provider Responses to How CLABSI Prevention Rounds Have Impacted CLABSI Prevention Efforts

| Responses | n | Percent |
|-----------|---|---------|
| No impact on CLABSI prevention efforts | 1 | 12.5% |
| Improved communication between nurses and providers | 6 | 75% |
| Improved my awareness of CLABSI risk factors | 4 | 50% |
| Improved my knowledge of CLABSI prevention strategies | 3 | 37.5% |
| Identifed patient-specific risk factors | 4 | 50% |
| Identified patient-specific prevention strategies | 6 | 75% |

CLABSI is central line associated bloodstream infections. n is number. Providers included 4 physicians and 7 advanced practice providers. There were responses from 8 providers (4 physicians, 4 advanced practice providers). Response rate 72%. Providers could mark all responses that applied.

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585. Shifting Focus Toward Healthcare-Associated Bloodstream Infections: Need for More NICU-Specific NHSN Definitions

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**Background.** Healthcare-associated bloodstream infections (HABSIs) are a significant cause of mortality and morbidity in the neonatal intensive care unit (NICU) population. Our objectives were to review the epidemiology of HABSIs in our NICU and to examine the applicability of National Healthcare Safety Network (NHSN) definitions to the NICU population.

**Methods.** We performed a retrospective review of all neonates admitted to the 54-bed level IV NICU at Yale-New Haven Children's Hospital with a HABSI between January 1, 2013 and December 31, 2018. HABSI was defined as a positive blood culture at >72 hours of life growing an organism not considered a contaminant. Clinical definitions per treating NICU team and NHSN site-specific definitions were compared for source attribution using McNemar's Chi-square test.

**Results.** We identified 88 HABSIs with an incidence rate of 0.81 per 1,000 patient-days. Only 13% of these were central line-associated bloodstream infections (CLABSI). Infants with a HABSI had median birth weight and gestational age of 830 grams and 26 weeks, respectively, with a high percentage requiring mechanical ventilation parenteral nutrition and vascular access (Table 1). Sepsis-related mortality was 24%. The majority of HABSIs were caused by gram-positive and gram-negative bacteria (Figure 1). Most were secondary to necrotizing enterocolitis, pneumonia or a source that was not identified (Table 2). NHSN definitions were less likely to identify a source compared with clinical definitions per NICU team (P < 0.001, Table 2). Fifty percent of patients without an identified source of infection by NHSN criteria were identified with a Mucosal Barrier Injury (MBI) organism, likely causing bacteremia from gut translocation.

**Conclusion.** HABSIs occur in premature babies with comorbidities, and are more prevalent than CLABSI. Gut translocation with MBI organisms may be an important unidentified source of HABSIs in neonates. With the increasing focus on HABSI prevention, there is a need for better NHSN definitions for source attribution of bloodstream infections in neonates.

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### Table 1: Patient-related variables for Healthcare-associated bloodstream infections in Neonates

| Variable | NSN (N, %) | Clinical Definition (N, %) |
|----------|-----------|--------------------------|
| Sepsis-related mortality | 22 (24.8) | 28 (31.8) |
| Necrotizing Enterocolitis | 21 (23.9) | 24 (27.7) |
| Pneumonia | 14 (15.8) | 15 (17.2) |
| CLABSI | 11 (12.5) | 15 (17.2) |
| Escherichia coli | 5 (5.7) | 6 (6.9) |
| Skin Soft Tissue Infection | 2 (2.27) | 2 (2.27) |
| Urinary Tract Infection | 2 (2.27) | 2 (2.27) |
| Intra-abdominal Infection | 2 (2.27) | 2 (2.27) |
| Meningitis | 1 (1.1) | 1 (1.1) |
| Septicemia | 1 (1.1) | 1 (1.1) |
| Thrombocytopenia | 0 | 0 |
| ECMO related | 2 (2.27) | 2 (2.27) |
| Maternally or externally acquired infection | 0 | 0 |

**Source unknown:**

- **NSN:** 24 (27.3)
- **Clinical Definition:** 10 (11.4)

**Figure 1: Microbiology of 88 Healthcare-Associated Bloodstream Infections in Neonates**