with CLABSIs, most of the patients (n = 70) had only 1 pathogen isolated, 14 patients had 2 pathogens, and 3 patients had 3 pathogens, bringing the total number of bacteria cultured to 117. *Candida* spp and *Enterococcus* spp were the most frequently isolated pathogens at 19% and 13%, respectively (Fig. 1). There was no statistically significant difference between the pre–COVID-19 and intra–COVID-19 periods for *Candida* spp (rate ratio, 1.391; 95% CI, 0.5477–3.533; $P = .48$) or *Enterococcus* spp (rate ratio, 2.385; 95% CI, 0.8365–6.798; $P = .09$). **Conclusions:** The COVID-19 pandemic did not seem to have an impact on the local epidemiology at Baystate Medical Center in terms of CLABSI rates or type of pathogens causing infections, but the sample size taken into consideration may not have been powerful enough to detect statistical significance.

Note. This project was carried out as part of Dr Satta's MPH requirements at UMass.

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Evaluating racial disparities in central-line–associated bloodstream infections for Tennessee hospitals, 2018–2021

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Background: Central-line–associated bloodstream infections (CLABSIs) significantly burden the US population and healthcare system. Reporting facilities in Tennessee consistently omit race and ethnicity data in the NHSN despite having the option to enter. Racial and ethnic disparities are well documented across many health outcomes, including patient safety. CLABSIs were compared among 3 racial groups to better understand the impact of race on CLABSI incidence in Tennessee. **Methods:** CLABSI data from NHSN were linked with records from the TN Hospital Discharge Data System (HDDS) for 2018–2021. A multivariable linear regression model was used to determine relative risk (RR) between racial groups for contracting a CLABSI after controlling for confounding variables including Charlson comorbidity index (CCI) and social vulnerability index (SVI) scores. Statistical significance was set at $P < .05$. Data linkage and statistical analyses were performed in SAS version 9.4 software. **Results:** In Tennessee between 2018 and 2021, 342 (17.2%) of the 1,980 CLABSI events had race documented, and no ethnicity variables exist in the NHSN. The data linkage process yielded a 72% match (1,426 CLABSIs). The remaining 28% were excluded from the analysis. Per 1,000 central-line days (CL days) for all races, white patients had the highest CLABSI rate (17.5), followed by Black patients (1.36), and Native American or Alaskan Native patients (0.68). Per 1,000 admissions by race, Black patients had a higher CLABSI rate (1.26) than Native American/Alaskan Native patients (0.85) and white patients (0.75). The risk of contracting a CLABSI was 79% higher in Black patients than in white patients (RR, 1.79; 95% CI, 1.55–2.07; $P < .0001$) when controlling for CCI, age group, and SVI. **Conclusions:** These results suggest that racial disparities between Black and white patients are present in Tennessee hospitals regarding CLABSIs. Although most CLABSI events were linked to HDDS patients, there were limitations in the ability to match all cases and calculate CL days by race. This study highlights the need for complete race and ethnicity data in the NHSN. Further studies should examine infection types at the regional and facility levels to target interventions for reducing HAI inequities in Tennessee.

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Epidemiology of central-line–associated bloodstream infection mortality in Canadian NICUs before and after 2017

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Background: The Canadian Nosocomial Infection Surveillance Program (CNISP) observed increased mortality among neonatal intensive care unit (NICU) patients with central-line–associated bloodstream infection (CLABSI) starting in 2017. In this study, we compared NICU patients with CLABSIs before and after 2017, and quantified the impact of epidemiological factors on 30-day survival. **Methods:** We included 1,276 NICU patients from 8–16 participating CNISP hospitals from the pre-2017 period (2009–2016) and the post-2017 period (2017–2022) using standardized definitions and questionnaires. We used Cox regression modeling to assess the impact of age at date of positive culture, sex, birthweight, CLABSI microorganism, region of the country, and surveillance period (before 2017 vs after 2017) on time to 30-day all-cause mortality from date of positive culture. Gestational age was not available for this analysis. We reported model outputs as hazard ratios with 95% CIs. **Results:** In total, 769 (60%) NICU CLABSIs were reported in the pre-2017 period and 507 (40%) in the post-2017 period. The 30-day all-cause mortality rate was 8% (n = 100 of 1,276) overall, and significantly higher after 2017 (12%, n = 61 of 507) than before 2017 (5%, n = 39 of 769) ($P < .001$). During the post-2017 period, cases were significantly younger: 16 days (IQR, 9–33) versus 21 days (IQR, 11–49) ($P = .002$). Median days from ICU admission to infection were shorter: 14 (IQR, 8–31) versus 19 (IQR, 10–41) ($P < .001$). More gram-negative CLABSIs were identified (29% vs 24%; $P = .040$) and fewer gram-positive CLABSIs were identified (64% vs 72%; $P = .006$) compared to the pre-2017 period. Mortality was higher in CLABSIs caused by gram-negative bacteria (15%, n = 50 of 328) than gram-positive bacteria (4.4%, n = 39 of 877) ($P < .001$), and mortality was higher in neonates with birthweight <1,000 g (11%, n = 71 of 673) compared to those weighing ≥1,000 g (5%, n = 28 of 560) ($P < .001$). Adjusting for all other factors, survival modeling indicated that NICU CLABSIs identified in the post-2017 period had 2.12 (95% CI, 1.23–3.66) times the hazard ratio of 30-day all-cause mortality compared to those before 2017 ($P < .006$). Those identified with a gram-positive bacterium had a 0.28 hazard ratio (95% CI, 0.12–0.65) of 30-day mortality compared to those with a gram-negative bacterium or fungus ($P = .003$). In the fully adjusted model, age, sex, and birthweight were not significantly associated with NICU CLABSI survival. **Conclusions:** NICU patients with CLABSIs had significantly higher all-cause mortality between 2017–2022 compared to 2009–2016, and those who acquired gram-positive–associated CLABSIs had improved survival compared to other organisms. Further work is needed to identify and understand factors driving the increased mortality among NICU CLABSI patients from 2017–2022.

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Examining CLABSI rates by central-line type

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Background: Central-line–associated bloodstream infections (CLABSIs) are linked to increased morbidity and mortality, longer hospital stays, and significantly higher healthcare costs. Infection prevention guidelines recommend line placement in specific insertion locations over others because of the relative risk of infection. The purpose of this study was to assess CLABSI rates by line type to determine whether some central lines had a lower risk of infection and should be recommended over others given

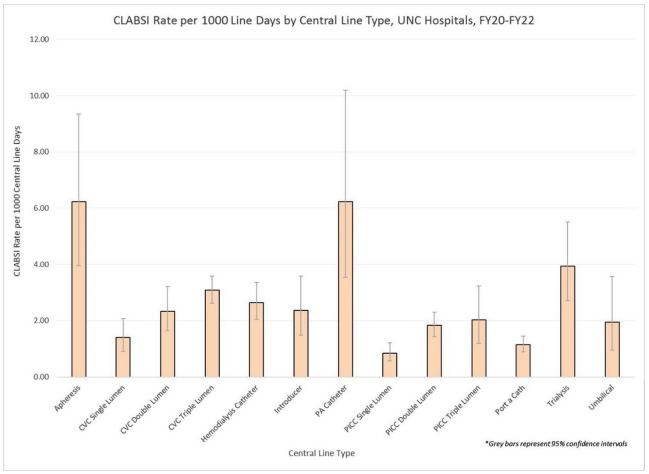

Table 1. Oncology Clinic Patient Characteristics, Bloodstream Infections, Emergency Department Visits, and Unplanned Hospitalizations

	Total N (%)[1]	Hematologic Malignancy N (%)	Solid Tumor Malignancy N (%)	p-value[2]
Cohort Characteristics				
Oncology Clinic Patients	478	271 (57)	207 (43)	--
PICC Lines Among Clinic Patients[3]	645	413 (64)	232 (36)	--
Mean Age (SD)	55.6 (16.9)	52.8 (18.0)	59.2 (14.5)	**<0.0001**
Female Gender	194 (41)	109 (40)	85 (41)	0.853
History of Prior PICC Line	114 (24)	91 (34)	23 (11)	**<0.001**
Mean Line Duration (SD), Days	99 (115)	96 (110)	106 (122)	0.310
Oncology Clinic Visits, Mean (SD)	8.6 (11.7)	10.4 (13.3)	5.4 (7.1)	**<0.001**
Outcomes				
Bloodstream Infection Events[4]	75 (11.6)	43 (10.4)	32 (13.8)	0.199
Gram Positive Pathogen	28 (4.3)	10 (2.4)	18 (7.8)	**0.003**
Gram Negative Pathogen	40 (6.2)	30 (7.3)	10 (4.3)	**<0.001**
Fungal Pathogen	3 (0.5)	1 (0.2)	2 (0.9)	0.391
Polymicrobial Pathogen	4 (0.6)	2 (0.5)	2 (0.9)	0.760
ED Visits ≥1	139 (29)	81 (30)	58 (28)	0.656
Unplanned Hospitalization ≥1	224 (47)	141 (52)	83 (40)	**0.010**

[1]Percentages calculated among all patients. [2]Chi-squared analyses compared frequency of outcomes observed in hematologic malignancy versus solid tumor patients. Differences in mean number of outpatient clinic visits, ED visits, and unplanned hospitalizations assessed using unpaired t-tests. [3]PICC = peripherally inserted central catheters. [4]Bloodstream infection (BSI) events due to any cause; nine patients had more than 1 BSI during the study period.

similar clinical indications. **Methods:** At UNC Hospitals, data were obtained on central lines across a 3-year period (FY20–FY22) from the EMR (Epic Systems). Central lines were categorized as apheresis catheters, CVC lines (single, double, or triple lumen), hemodialysis catheters, introducer lines, pulmonary artery (PA) catheters, PICC lines (single, double, or triple lumen), port-a-catheters, trialysis catheters, or umbilical lines. The line type(s) associated with each CLABSI during the same period were recorded, and CLABSI rates by line type per 1,000 central-line days were calculated using SAS software. If an infection had >1 central-line device type associated, the infection was counted twice when calculating the CLABSI rate by line type. We calculated 95% CIs for each point estimate to assess for statistically significant differences in rates by line type. **Results:** During FY20–FY22, there were 264,425 central-line days and 458 CLABSIs, for an overall CLABSI rate of 1.73 CLABSIs per 1,000 central-line days. Also, 16% of patients with a CLABSI had >1 type of central line in place. Stratified data on CLABSI rates by each central-line type is presented in the Figure. CLABSI rates were highest in patients with apheresis lines (6.22; 95% CI, 3.96–9.35) and PA catheters (6.22; 95% CI, 3.54–10.20), and the lowest CLABSI rates occurred in patients with PICC lines (1.44; 95% CI, 1.19–1.73) and port-a-catheters (1.14; 95% CI, 0.89, 1.45). For both CVC and PICC lines, as the number of lumens increased from single to triple, CLABSI rates increased, from 0.91 to 2.63 and from 0.57 to 1.20, respectively. **Conclusions:** At our hospital, different types of central lines were associated with statistically higher CLABSI rates. Additionally, a higher number of lumens (triple vs single) in CVC and PICC lines were also associated with statistically higher CLABSI rates. These findings reinforce the importance of considering central-line type and number of lumens to minimize risk of CLABSI while ensuring that patients have the best line type based on their clinical needs.

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Bloodstream infection burden among cancer clinic patients with PICC Lines: A prospective, observational study

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Background: Oncology patients are at high risk for bloodstream infection (BSI) due to immunosuppression and frequent use of central venous catheters. Surveillance in this population is largely relegated to inpatient settings and limited data are available describing community burden. We evaluated rates of BSI, clinic or emergency department (ED) visits, and hospitalizations in a large cohort of oncology outpatients with peripherally inserted central catheters (PICCs). **Methods:** In this prospective, observational study, we followed a convenience sample of adults (age>18) with PICCs at a large academic outpatient oncology clinic for 35 months between July 2015 and November 2018. We assessed demographics, malignancy type, PICC insertion and removal dates, history of prior PICC, and line duration. Outcomes included BSI events (defined as >1 positive blood cultures or >2 positive blood cultures if coagulase-negative *Staphylococcus*), ED visits (without hospitalization), and unplanned hospitalizations (excluding scheduled chemotherapy hospitalizations). We used χ^2 analyses to compare the frequency of categorical outcomes, and we used unpaired *t* tests to assess differences in means of continuous variable in hematologic versus solid-tumor malignancy patients. We used generalized linear mixed-effects models to assess differences in BSI (clustered by patient) separately for gram-positive and gram-negative BSI outcomes. **Results:** Among 478 patients with 658 unique PICC lines and 64,190 line days, 271 patients (413 lines) had hematologic malignancy and 207 patients (232 lines) had solid-tumor malignancy. Cohort characteristics and outcomes stratified by malignancy type are shown in Table 1. Compared to those with hematologic malignancy, solid-tumor patients were older, had 47% fewer clinic visits, and had 32% lower frequency of prior PICC lines. Overall, there were 75 BSI events (12%; 1.2 per 1,000 catheter days). We detected no significant difference in BSI rates when comparing solid-tumor versus hematologic malignancies ($P = 0.20$); BSIs with gram-positive pathogen were 69% higher in patients with solid tumors. Gram-negative BSIs were 41% higher in patients with hematologic malignancy. Solid-tumor malignancy was associated with 4.5-fold higher odds of developing BSI with gram-positive pathogen (OR, 4.48; 95% CI, 1.60–12.60; $P = .005$) compared to those with hematologic malignancy, after adjusting for age, sex, history of prior PICC, and line duration. Differences in gram-negative BSI were not significant on multivariate analysis. **Conclusions:** The burden of all-cause BSIs in cancer clinic adults with PICC lines was 12% or 1.2 per 1,000 catheter days, as high as nationally reported inpatient BSI rates. Higher risk of gram-positive BSIs in solid-tumor patients suggests the need for targeted infection prevention activities in this population, such as improvements in central-line monitoring, outpatient care, and maintenance of lines and/or dressings, as well as chlorhexidine bathing to reduce skin bioburden.

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