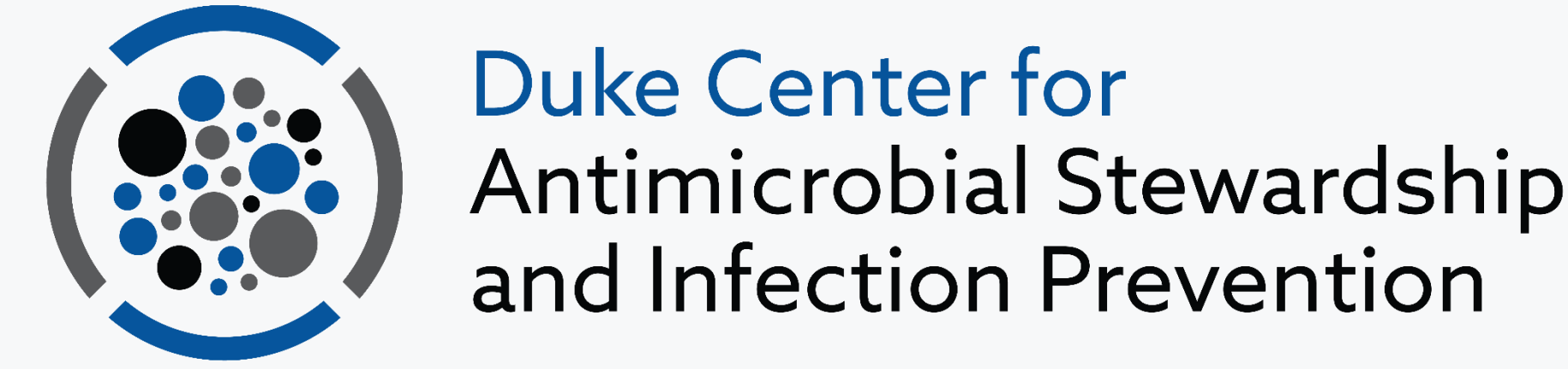


# Analysis of Social and Clinical Characteristics of Individuals who Acquired a Central Line-Associated Bloodstream Infection (CLABSI)



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## Abstract

Previous analysis of surveillance data at our medical center identified higher CLABSI rates among non-Hispanic Black patients compared to White patients. In the context of a growing understanding of social determinants of health (SDOH), we sought to better describe those patients who acquired a CLABSI. We conducted a retrospective analysis of patients with CLABSI who were admitted to our health system in 2022. We compared demographic, admission, clinical and SDOH data between patients identifying as White or non-Hispanic Black. Among 167 patients with CLABSI, 86 (52%) identified as White and 67 (40%) identified as Black. Four clinical and social characteristics were independently associated with Black race in a multivariable logistic regression: presence of a dialysis catheter (odds ratio [OR] 3.6 [95% confidence interval {CI}, 1.5-9.4]), limitations in activities of daily living (OR 4.5 [95% CI, 1.9-11.0]), a lack of psychosocial stress concerns prior to or during admission (OR 3.4, [95% CI, 1.2-9.8]), and absent documentation on psychosocial stress concerns (OR 4.1, [95% CI, 1.7-10.6]). Two characteristics were identified to be associated with White race: the absence of food insecurity (OR 11.8 [95% CI, 1.7-240.4]) and absent documentation of food insecurity (OR 19.2, [95% CI 2.6-406]). These results support the complex interrelatedness of biopsychosocial factors that may predispose to disparate needs for central venous catheters and therefore inequities in the risk of CLABSI. Disparities in screening and documentation of SDOH also existed in this cohort.

## Background

- SDOH are non-medical factors that impact the mental and physical well-being of all people [1].
- Healthcare associated infections (HAIs) are an area where disparities have been identified, but the impact of SDOH has been investigated less.
- Among patients admitted to the Duke University Health System between 2018 and 2021, CLABSIs occurred at higher rates in non-Hispanic Black patients than in White patients [2].
- The primary goal of this study is to better understand the interrelatedness of food insecurity, interpersonal safety, housing insecurity, transportation insecurity, utilities, and increased susceptibility to CLABSI.

## Methods

- Included Individuals were identified via surveillance data of CLABSI events as defined by the National Healthcare Safety Network (NHSN).
- Social and medical data were collected via EHR export and chart review.
- Comorbidities were evaluated using Elixhauser scores [3].
- Home addresses were analyzed via Social Deprivation Index [4].
- To identify variables associated with race that may mediate differences in CLABSI acquisition, we created a logistic regression model using stepwise backwards selection.

## Results

- Line specific characteristics are described in table
- Social and clinical characteristics are summarized in table 2.
- Variables associated with race are included in table 3.
- Median Elixhauser scores (9 v. 10, p = 0.2) and median Social Deprivation Index (64 v. 66, p = 0.4) were not different between races.

Line Characteristics	Total Cohort n, (%) N=167	White Patients n, (%) N=86	Black Patients n, (%) N=67	p-value (X <sup>2</sup> )
Had a dialysis catheter	39 (23.4)	11 (12.8)	24 (35.8)	0.002*
Had a port	23 (13.8)	13 (15.1)	9 (13.4)	0.9
Had a tunneled (permanent) line	80 (47.9)	38 (44.2)	35 (52.2)	0.4
Had multiple central lines at time of diagnosis	33 (19.8)	13 (15.1)	18 (26.9)	0.1
Line associated with infection present on admission	57 (34.1)	31 (36.1)	22 (32.8)	0.8

Characteristic	Total Cohort n, (%) N=167	White Patients n, (%) N=86	Black Patients n, (%) N=67	p value (X <sup>2</sup> )
Female	66 (39.5)	33 (38.4)	29 (43.3)	0.7
Age ≥ 65	59 (35.3)	37 (43.0)	18 (26.9)	0.06
Immunosuppressed/Immunocompromised	97 (58.1)	57 (66.3)	32 (47.8)	0.03*
Documented History of Drug Use	44 (26.4)	22 (25.6)	16 (23.9)	1
Previous visit or referral with a social worker	115 (68.9)	56 (65.1)	53 (79.1)	0.09
Had a PCP prior to admission	151 (90.42)	77 (89.5)	64 (95.5)	0.3
ADL				
Independent in all ADL	123 (73.7)	73 (84.9)	40 (59.7)	0.0009*
Dependent in some or all ADL	44 (26.4)	13 (15.1)	27 (40.3)	
Admission Service				
Cardiology	32 (19.2)	13 (15.1)	19 (28.4)	0.002*
Intensive Care	22 (13.2)	8 (9.3)	10 (14.9)	
Medicine	30 (18.0)	11 (12.8)	15 (22.4)	
Oncology	57 (34.1)	33 (38.4)	20 (29.9)	
Surgery	26 (15.6)	21 (24.4)	3 (4.5)	
BMI				
Healthy (18.5-24.9)	41 (24.6)	22 (25.6)	15 (22.4)	0.5
Obese (>30)	65 (38.92)	30 (34.9)	31 (46.3)	
Overweight (25-29.9)	47 (28.1)	26 (30.2)	17 (25.4)	
Underweight (<18.5)	14 (8.4)	8 (9.3)	4 (6.0)	
Comorbid Diagnoses				
Congestive Heart Failure	74 (44.3)	35 (40.7)	36 (53.7)	0.1
Complicated Diabetes	65 (38.9)	30 (34.9)	32 (47.8)	0.1
Complicated Hypertension	85 (50.9)	37 (43.0)	44 (65.7)	0.009*
Renal Failure	91 (54.5)	42 (48.8)	42 (62.7)	0.1
Lymphoma/Solid Tumor/Metastatic Cancer	52 (31.1)	30 (34.9)	18 (26.9)	0.4
Financial Resource Strain				
Low Risk	75 (44.9)	41 (47.7)	26 (38.8)	0.7
Moderate Risk	26 (15.6)	14 (16.3)	12 (17.9)	
High Risk	12 (7.2)	6 (7.0)	5 (7.5)	
No Documentation	54 (32.3)	25 (29.1)	24 (35.8)	
Food Insecurity				
Experienced Food Insecurity	8 (4.8)	1 (1.2)	7 (10.5)	0.03*
No Food Insecurity	84 (50.3)	44 (51.2)	34 (50.8)	
No Documentation	75 (44.9)	41 (47.7)	26 (38.8)	
Housing				
Unstable Housing	10 (6.0)	5 (5.8)	5 (7.5)	0.7
Stable Housing	150 (89.9)	78 (90.7)	58 (86.6)	
No Documentation	7 (4.2)	3 (3.5)	4 (6.0)	
Insurance				
Medicare/Medicaid	58 (34.7)	29 (33.7)	25 (37.3)	0.8
Mixed	36 (21.56)	18 (20.9)	15 (22.4)	
Private	69 (41.3)	36 (41.9)	26 (38.8)	
Other	4 (2.4)	3 (3.5)	1 (1.5)	
Social Support Network				
No Issues Identified	145 (86.8)	80 (93.0)	53 (79.1)	0.02*
Issues Identified	18 (10.8)	4 (4.7)	13 (19.4)	
No Documentation	4 (2.4)	2 (2.3)	1 (1.5)	
Psychosocial Stress Concern				
Concern Present	73 (43.7)	47 (54.7)	18 (26.9)	0.002*
No concerns present	32 (19.2)	13 (15.1)	18 (26.9)	
No Documentation	62 (37.1)	26 (30.2)	31 (46.3)	
Transportation				
Unmet Transportation Needs	7 (4.2)	1 (1.2)	6 (9.0)	0.03*
No Transportation Needs	155 (92.8)	84 (97.7)	58 (86.6)	
No Documentation	5 (3.0)	1 (1.2)	3 (4.5)	
Education				
Less than High School	5 (3.0)	1 (1.2)	3 (4.5)	0.2
High School	31 (19.6)	15 (17.4)	14 (20.9)	
Some college	18 (10.8)	6 (7.0)	11 (16.4)	
Associate's/Bachelor's Degree	42 (25.2)	25 (29.1)	16 (23.9)	
Graduate Degree	14 (8.4)	9 (10.5)	3 (4.5)	
Not Documented	57 (34.1)	30 (34.9)	20 (29.9)	

Variable	Odds Ratio	95% Confidence Intervals	p value
Had a dialysis catheter	3.6	1.5, 9.4	0.006*
Dependent in some or all ADL	4.5	1.9, 11.0	0.0008*
Psychosocial Stress Concern			
No concerns Present Prior to or During Admission	3.4	1.2, 9.8	0.02*
No Documentation	4.1	1.7, 10.6	0.002*
Transportation			
No Unmet Transportation Needs	0.1	0.007, 1.03	0.09
No Documentation	0.6	0.01, 29.7	0.8
Food Insecurity			
No Food Insecurity	0.08	0.004, 0.6	0.03*
No Documentation	0.05	0.002, 0.4	0.01*

## Discussion and Conclusions

- Black patients with CLABSIs more frequently required assistance in their ADLs, more frequently had a line dedicated to dialysis, and were less likely to have psychosocial concerns identified or documented compared to White patients with CLABSI
- Disparities in screening and documentation of SDOH exist in this cohort
- Our findings provide strong rationale for both continued study in our patient population as well as expanded use of SDOH research methods to other sub-populations

## References

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