

Table: Incidence and rate of blood pathogens in the pre and post SARS-CoV-2 period.

Blood Pathogen	Pre-SARS-CoV-2 (7/2019-2/2020, Total Admissions = 2,001,793)		During SARS-CoV-2 (3/1/2020-5/19/2020)						Total (Total Admissions = 2,875,219)	
	Organism	Rate/1000 Adm	SARS-CoV-2 Positive (Total Admissions = 125,303)		SARS-CoV-2 Negative (Total Admissions = 1,294,437)		SARS-CoV-2 Not Tested (Total Admissions = 1,455,483)		Organism	Rate/1000 Adm
			Organism	Rate/1000 Adm	Organism	Rate/1000 Adm	Organism	Rate/1000 Adm		
<b>Gram-negative</b>										
<i>E. coli</i>	17,748	8.9	359	2.9	6,156	4.8	2,599	1.8	9,114	3.2
<i>K. pneumoniae</i>	3,690	1.8	175	1.4	1,958	1.5	753	0.5	2,686	1.0
<i>P. aeruginosa</i>	1,364	0.7	94	0.8	833	0.6	343	0.2	1,270	0.4
<i>P. mirabilis</i>	1,590	0.8	75	0.6	771	0.6	275	0.2	1,121	0.4
<i>E. cloacae</i>	753	0.4	45	0.4	419	0.3	185	0.1	649	0.2
<i>B. fragilis</i>	357	0.2	26	0.2	378	0.3	152	0.1	556	0.2
<i>S. marcescens</i>	496	0.2	44	0.4	287	0.2	120	0.1	451	0.2
<i>K. oxytoca</i>	343	0.2	14	0.1	233	0.2	90	0.1	337	0.1
<i>E. aerogenes</i>	273	0.1	37	0.3	155	0.1	64	<0.1	256	0.1
<i>A. baumannii</i> spp	353	0.2	21	0.2	159	0.1	60	<0.1	240	0.1
<i>M. morgani</i>	255	0.1	12	0.1	134	0.1	55	<0.1	201	0.1
<i>S. maltophilia</i>	180	0.1	9	0.1	66	0.1	38	<0.1	113	<0.1
<i>C. freundii</i>	102	0.1	4	<0.1	71	0.1	30	<0.1	105	<0.1
<i>P. stuartii</i>	63	<0.1	10	0.1	59	<0.1	16	<0.1	85	<0.1
<b>Gram-positive</b>										
<i>S. aureus</i>	12,797	6.4	636	5.1	6,050	4.7	2,842	1.8	9,328	3.2
Enterococcus	1,508	0.8	308	2.5	1,812	1.4	725	0.5	2,845	1.0
Grp B Strep	1,524	0.8	110	0.9	1,739	1.3	603	0.4	2,452	0.9
<i>S. pneumoniae</i>	1,703	0.9	70	0.6	659	0.5	372	0.3	1,101	0.4
Grp A Strep	840	0.4	47	0.4	631	0.5	305	0.2	963	0.3
<b>Fungus/Yeast</b>										
Non-C. albicans	1,259	0.6	250	2.0	1,033	0.8	470	0.3	1,753	0.6
<i>C. albicans</i>	762	0.4	251	2.0	660	0.5	293	0.2	1,204	0.4
Other - Candida	37	<0.1	7	0.1	4	<0.1	6	<0.1	17	<0.1

Gray indicates significantly lower rate compared to pre-pandemic time period, black indicates significantly higher rates compared to pre-pandemic.

Methods: This was a multi-center, retrospective cohort analysis of all hospitalized patients from 267 US acute care facilities with >1-day inpatient admission between 7/1/19-5/19/21 (BD Insights Research Database [Becton, Dickinson and Company, Franklin Lakes, NJ]). SARS-CoV-2 infection was identified by a positive PCR during or ≤7 days prior to hospitalization. All admissions with a non-contaminant culture positive GN, GP, and fungal/yeast pathogen from a blood source were evaluated prior to and during the SARS-CoV-2 pandemic as rates per 1,000 admissions ( $p < .05$  for significance).

Results: There were 2,001,793 admissions in the pre-SARS-CoV-2 period (7/2019-2/2020) and 2,875,219 admissions during the SARS-CoV-2 pandemic. Incidence of GN/GP blood stream pathogens was significantly higher prior to the SARS-CoV-2 pandemic than during the pandemic. Higher rates of blood stream pathogens occurred in those who were tested for SARS-CoV-2, but all non-tested patients had significantly lower rates than pre-pandemic. Rates of *Candida* spp., *Enterococcus* spp., *Serratia marcescens*, and *Enterobacter cloacae* were higher in SARS-CoV-2 positive patients compared to pre-pandemic patients. Compared to the prior pandemic period, the incidence of *B. fragilis*, *Streptococcus*, *Enterococcus* and *Candida* were higher among those tested for SARS-CoV-2 but were negative.

Conclusion: In general, rates of positive blood cultures for bacterial pathogens were either lower or similar during the SARS-CoV-2 period compared to the pre-SARS-CoV-2 pandemic period. The patients that were tested for SARS-CoV-2 but were positive who had higher rates of infection than prior may indicate the similarity in viral and bacterial clinical presentation. Further evaluation of higher rates of *Enterococcus* and *Candida* in the pandemic period are warranted.

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## 222. Clinical and Microbiological Characteristics of Common Bacterial Bloodstream Infections in the US Military Health System

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Session: P-10. Bacteremia

Background: Bloodstream infections (BSI) are associated with inpatient morbidity in the United States. We sought to characterize the epidemiology of common bacterial BSIs in individuals receiving care within the US Military Health System (MHS), which actively prospectively captures clinical and microbiological data from both retired and active-duty US Uniformed Service members and their beneficiaries.

Methods: We performed a retrospective cohort study analyzing MHS patients with blood cultures positive for all bacterial pathogens, between January 2010 and

December 2019. Microbiological data captured by the Navy and Marine Corps Public Health Center, excluding cultures isolating contaminants, were retrospectively collated with clinical and demographic data from the MHS Data Repository.

Results: The most frequent nine bacterial pathogens, as well as *Acinetobacter* spp. represented 17,206 episodes of BSI from 14,531 individuals. The cohort was predominantly male (59.4%) and ≥65 years old (48.7%). Most individuals were retired (N=5,249) or active duty (N=1,418) service members and their dependents (N=5,236). Median Updated Charlson Comorbidity Index Score was 2. Chronic pulmonary disease was the most frequent comorbid condition. Hospital admission was associated with 13,733 (79.8%) BSI episodes, including 5,870 admissions to the ICU. Overall, inpatient mortality was 8.3%. *E. coli* (29.7%, N = 5,114) was isolated with the highest frequency, followed by *S. aureus* (22.4%, N=3,853). Further, 9.5% of *E. coli* and 36.9% of *S. aureus* isolates were resistant to ceftriaxone and oxacillin, respectively. Beta-hemolytic streptococci represented the highest percentage (6.3%) of recurrent BSI episodes occurring at least 14 days post-initial BSI. Males or Native American race were most commonly infected with *S. aureus*. *E. coli* BSI was most common in all other demographic categories.

Frequency of Bacterial Blood Stream Infections in the US Military Health System

Bacterial Species	Frequency of All BSI Episodes	Total Patients with BSI Episodes	Patients with Multiple BSI Episodes, 214 days after initial BSI (% of Total Patients)
<i>Escherichia coli</i>	5,114	4,866	217 (4.5)
<i>Staphylococcus aureus</i>	3,853	3,581	218 (6.1)
<i>Klebsiella pneumoniae</i>	1,680	1,561	97 (6.2)
<i>Streptococcus Beta-Hemolytic Group</i>	1,356	1,253	79 (6.3)
<i>Streptococcus species</i>	1,193	1,168	23 (2.0)
<i>Streptococcus Viridans Group</i>	1,177	1,160	15 (1.3)
<i>Enterococcus faecalis</i>	1,059	991	60 (6.1)
<i>Streptococcus pneumoniae</i>	770	753	15 (2.0)
<i>Pseudomonas aeruginosa</i>	740	705	30 (4.3)
<i>Acinetobacter species</i>	264	253	6 (2.4)
Total	17,206	14,531*	730*

\* not mutually exclusive

The most frequent nine bacterial pathogens, as well as *Acinetobacter* spp. in the US Military Health System.

Conclusion: We assessed the epidemiologic features of all individuals with BSI receiving care in the MHS over a 10-year period. We noted demographic differences in the occurrence of microbiological causes of BSI including *S. aureus*. Further assessments are underway into BSI-related risk factors for occurrence, antimicrobial resistance and mortality, after controlling for comorbidities and disease severity.

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## 223. The Value of Neutrophil to Lymphocyte Count Ratio for Predicting the Clinical Outcomes of Patients with Carbapenem-resistant *Klebsiella pneumoniae* Blood Stream Infection

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Session: P-10. Bacteremia

Background: The neutrophil to lymphocyte count ratio (NLR) has been recognized as a useful marker of inflammation. But, the prognostic function of NLR in patients with Carbapenem-resistant *Klebsiella pneumoniae* (CRKP) blood stream infection is still largely unknown. The aim of this study was to explore the relationship between postoperative NLR and mortality in those patients.

Methods: We performed a retrospective study based on the database from Computerized Patient Record System in Sir Run Run Shaw Hospital from 1/1/2017 to 31/10/2020. Logistic analysis was performed to assess the associations between NLR and 28-day mortality. Multivariate analyses were used to control for confounders.

Results: A total of 134 CRKP blood stream infection inpatients were included in this study, including 54 fatal cases and 80 survival cases on the 28-day after the onset of CRKP BSI, the overall 28-day mortality rate of patients with a CRKP BSI episode was 40.3% (54/134). We conducted a multivariate analysis on these 134 patients and found that APACHE II score on the 4<sup>th</sup> day (OR 1.379 95% CI 1.065- 1.785,  $p = 0.015$ ), NLR on the 4<sup>th</sup> day (OR 1.134 95% CI 1.054- 1.221,  $p = 0.001$ ) were significant risk factors for the 28-day mortality of CRKP BSI patients

Conclusion: Elevated NLR was significantly associated with increased 28-day mortality as well as APACHE II score on the 4<sup>th</sup> day after first positive culture. NLR is promising to be a readily available and independent prognostic biomarker for patients with CRKP blood stream infection.

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## 224. Evaluating the Epidemiology of Bloodstream Infections: A Population-Based Study

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Session: P-10. Bacteremia

Background: Bloodstream infections (BSI) are a major cause of morbidity, mortality, and health care costs worldwide. Population-based studies are key to assess BSI