University of Colorado Anschutz Medical Campus

THE MISSING US

Uncovering differential disparities at the intersection of race, sex, & HIV in patients with sepsis

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BACKGROUND

- Sepsis is a leading cause of inpatient death in the US, with pneumonia as the most common cause [1,2]
- Despite initiatives to standardize sepsis care such as early detection and bundled management, significant race and sex-based disparities exist [1,3-4]
- The impact of HIV infection on the risk of death from pneumonia/sepsis has evolved in the era of ART [4-6]
- HIV infection may increase the risk of death for non-physiologic reasons such as bias and stigma
- Few studies have investigated the impact compounding of sex, race and HIV on sepsis outcomes.

KEY QUESTION: Does HIV status impact the risk of death from pneumonia sepsis differentially in certain race/sex groups?

METHODS

- Identified adult patients with diagnosis codes for pneumonia and/or sepsis from Healthcare Cost and Utilization Project State Inpatient Database from 7 states from 2018-2020 (AZ, CA, FL, IA, MD, MS, NY)
- Stratified cohort into patients with and without HIV using ICD10 codes, excluded encounters missing data for race, HIV status, or vital status, or those transferred out to another hospital
- Risk adjustment: age, 38 Elixhauser comorbidities, acute organ failures present on admission, surgical status, DNR order

- ***Model 1:*** unadjusted in-hospital mortality by race and race/sex for those with and without HIV
- ***Model 2:*** hierarchical logistic regression to calculate risk adjusted odds of death using hospital ID as random intercept for those with and without HIV
- ***Model 3:*** hierarchical logistic regression testing interaction between HIV status with race and race/sex

RESULTS

Table 1. Descriptive characteristics of patients identified with pneumonia/sepsis.

Category		Race (without HIV)					Race (with HIV)				
		Total	White	Black	Asian	Other	Total	White	Black	Asian	Other
Number of patients- N **(%)**		2,879,649	2,009,326 (69.8)	382,916 (13.3)	143,328 (5.0)	344,149 (12.0)	42,646	14,748 (34.6)	21,067 (49.4)	472 (1.1)	6,359 (14.9)
Female- %		48.6	48.6	50.5	48.4	47.1	32.3	22.3	40.9	18.0	28.4
Age- Mean		66.7	68.4	61.6	70.2	61.7	51.3	52.5	50.7	48.2	51.0
HCUP Comorbidity Mortality Index- Mean		12.8	12.4	14.0	17.0	11.8	6.7	6.2	7.2	8.1	6.4
Acute Organ Failures - %	Shock	19.9	19.5	20.6	22.1	20.5	19.6	19.8	18.8	22.7	21.8
	Acute Respiratory Failure	28.8	28.2	29.3	30.9	30.7	26.1	27.3	24.7	33.7	27.4
	Renal Failure	36.6	34.8	44.2	40.8	36.5	38.2	33.3	42.6	36.0	35.1
	Neurologic Failure	17.5	17.3	19.5	18.2	16.2	13.0	13.3	13.1	12.1	12.1
Surgical status- %		10.2	9.9	11.4	9.0	11.1	7.6	8.5	7.2	7.6	6.9
DNR order- %		15.4	16.8	8.9	19.6	12.7	6.2	8.7	4.2	5.3	7.2

Summary of Findings:

- 2,922,295 encounters with pneumonia and/or sepsis, 42,646 with HIV and 2,879,649 without HIV
- Patients with HIV were younger, more likely male, and had lower comorbidity index than those without HIV
- Patients with HIV had lower crude mortality in most groups (Figure 1)
- In Model 2, subgroups with higher odds of death varied in patients with and without HIV, with patients identified as Female Asian having the largest trend towards increased mortality (Figure 2)
- Model 3 demonstrated significant interaction between race and HIV (p=0.0031) and race/sex and HIV (p=0.008).

Figure 1.

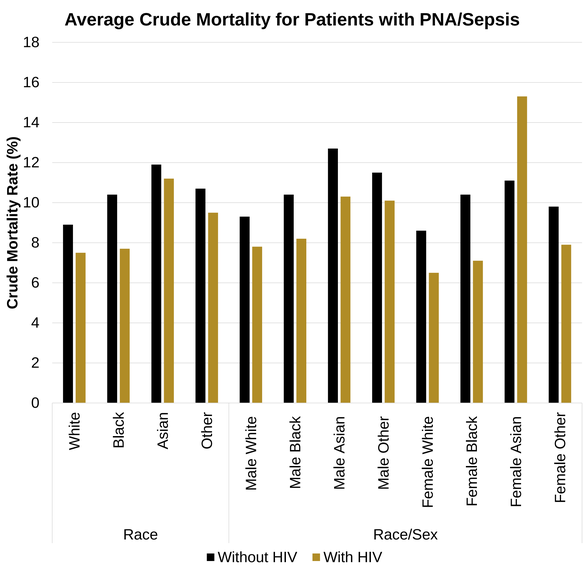


Figure 1. Unadjusted mortality rate for patients with PNA and or sepsis stratified by HIV status. Exposure by race and then by a composite of race and sex (Model 1).

Figure 2.

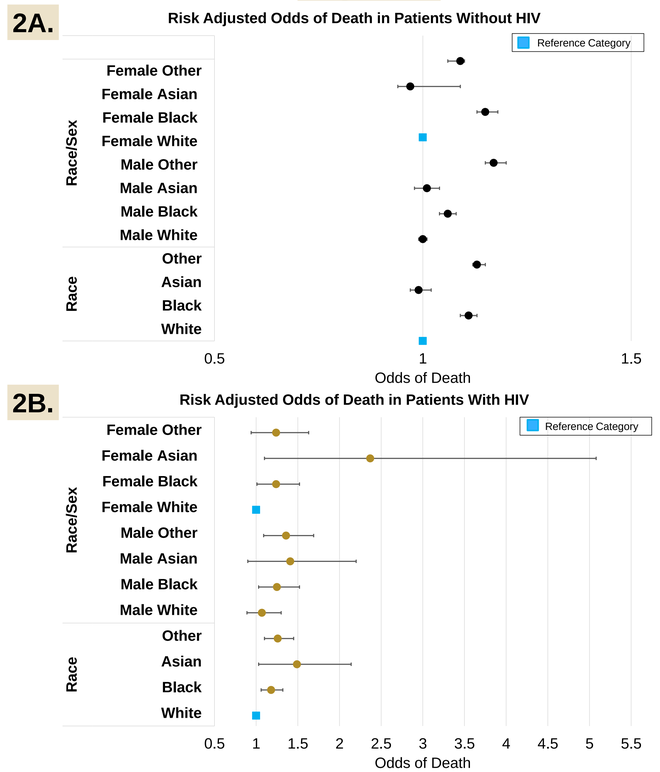


Figure 2. Risk adjusted odds of death with 95% CI for patients with pneumonia/sepsis by race then by composite of race and sex (Model 2). **2A.** Patients without HIV and **2B.** Patients with HIV. Risk adjusted odds of death was determined using hierarchical logistic regression with hospital ID as random intercept and after adjustment for age, 38 Elixhauser comorbidities, and acute organ failures present on admission, surgical status, and DNR order. Reference category shown in blue was chosen based on lowest unadjusted mortality rate.

CONCLUSIONS

- In the era of ART, HIV may have minimal impact on mortality for patients with pneumonia/sepsis in the US. This is in line with other recent studies. [7-8]
- HIV status differentially impacted certain race and race/sex subgroups. This effect was most notable in patients identified as Female Asian
- Factors such as bias and discrimination, access to care, variation in care patterns, may differentially impact race/sex groups of patients with and without HIV.

Future directions:

- Evaluate hospital-level differences in outcomes for patients with HIV
- Use more granular data source to test for differential patterns of care such as timely antibiotics and ICU admission
- Further examine race/sex disparities in critically ill HIV patients

Limitations:

- Use of billing data, limited generalizability due to limited number of states
- Lack physiologic data for risk adjustment
- Small numbers of patients in HIV subgroups

KEY FINDINGS: Patterns of race and sex-based disparities were different in patients with and without HIV and may be the result of differential social, structural, and clinical factors.

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DISCLOSURES

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