Estimated HIV Attributable Fraction of US COVID-19 Hospitalizations by Race/Ethnicity (2020-2022)

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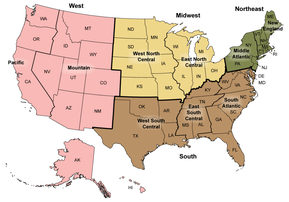
BACKGROUND

People living with HIV (PLWH) are at increased risk of severe COVID-19 outcomes, including hospitalizations, relative to people living without HIV (PLWOH). Racialized and geographic disparities in social determinants of health and access to care impact both HIV and COVID-19 outcomes.

Aim: to investigate the differential population health impact of HIV and lack of viral suppression on COVID-19 hospitalizations by race/ethnicity and region in the US.

METHODS

We calculated the fraction of COVID-19 hospitalizations attributable to HIV and unsuppressed HIV in the US from 2020-2022 stratified by region and race/ethnicity.



Prevalence of HIV and Unsuppressed HIV

Averaged yearly region- and race/ethnicity- stratified prevalence of HIV per 100k persons and of unsuppressed HIV per 100 PLWH using US HIV surveillance data from CDC AtlasPlus.

Relative Risk (RR) of COVID-19 Hospitalization by HIV and Unsuppressed HIV status

Study design: retrospective cohort study of patients in the National Clinical Cohort Collaborative (N3C) database with a COVID-19 diagnosis from Jan 1, 2020 to Dec 31, 2022.

- PLWH identified with medical conditions, laboratory measures and HIV drug prescriptions
- Unsuppressed HIV viral load >=200 copies/ml up to a year before and 30 days after COVID-19 diagnosis. Missing values imputed with the most recent viral suppression status 2 years before diagnosis and random sampling.

Analyses: stratified modified Poisson regression using robust standard errors adjusted for age and sex.

Population Attributable Fraction (PAF)

PAF estimated with region- and race/ethnicity- stratified prevalence rates of HIV and unsuppressed HIV and the relative risk of COVID-19 hospitalizations of each exposure.

Regional and racial/ethnic disparities in HIV impact on COVID-19 hospitalizations

RESULTS

Table 1: Characteristics of the N3C Cohort for Analyses of HIV and COVID-19 Hospitalization

	Midwest N=2,471,800 (48.6%)	Northeast N=720,726 (14.2%)	South N=1,345,180 (26.5%)	West N=543,742 (10.7%)	US N=5,081,456
PLHIV	6267 (0.3%)	6923 (1.0%)	9340 (0.7%)	3562 (0.7%)	26,100 (0.5%)
Unsuppressed HIV*	1681 (0.07%)	635 (0.09%)	773(0.06%)	238 (0.04%)	3336 (0.07%)
Sex: Female	1,367,080 (55.3%)	412,401 (57.2%)	783,706 (58.3%)	307,341 (56.5%)	2,870,540 (56.5%)
Age: Median [Min, Max]	43.0 [13.0, 99.0]	49.0 [13.0, 99.0]	46.0 [13.0, 99.0]	42.0 [13.0, 99.0]	44.0 [13.0, 99.0]
Race/Ethnicity					
Asian/AIAN/NHOPI**	30,755 (1.2%)	34,148 (4.8%)	32,944 (2.5%)	23,777 (4.4%)	121,655 (2.4%)
Black	256,010 (10.4%)	98,313 (13.6%)	330,488 (24.6%)	23,940 (4.4%)	708,761 (13.9%)
Hispanic or Latino	201,955 (8.2%)	122,595 (17.0%)	94,110 (7.0%)	139,888 (25.7%)	558,560 (11.0%)
White	1,795,810 (72.7%)	376,604 (52.3%)	786,145 (58.4%)	291,071 (53.5%)	3,249,643 (64.0%)
Other/Unknown	187,255 (7.5%)	89,031 (12.3%)	101,470 (7.6%)	65,037 (12.0%)	442,816 (6.8%)

* Proportion of unsuppressed HIV among PLWH with known VS
- Midwest- 46%
- Northeast- 24%
- South-17%
- West-11%
- US- 26%

Missing VS values (~50%) were imputed

**American Indian Alaska Native (AIAN), Native Hawaiian and other Pacific Islander (NHOPI) and Asian were combined due to small sample sizes.

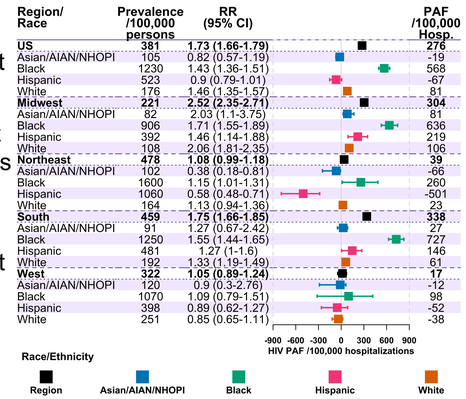
Fraction of COVID-19 Hospitalizations Attributable to HIV (per 100,000)

US: HIV attributable COVID-19 hospitalizations per 100,000 COVID-19 hospitalizations in the US was 276 and was highest for Blacks (568) and Whites (81).

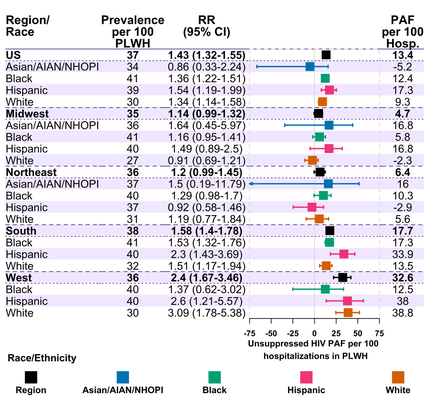
Region: HIV PAF was highest in the South (338) and Midwest (304), where the risk of hospitalization was 1.75 and 2.52 times higher for PLWH than PWOH.

Race: Across all regions, the HIV prevalence and PAFs were highest among Blacks, with significant PAFs in South, Midwest and NE. HIV PAFs were second highest among Hispanics in the South, and for Whites in the NE and South. HIV PAF for Asian/AIAN/NHOPI was only significant in the Midwest.

** Findings of lower risk of hospitalization in PLWH for any group should be interpreted with caution.



Fraction of COVID-19 Hospitalizations Attributable to Unsuppressed HIV (%)



US: Among PWLH, 37% had unsuppressed HIV, and the risk of COVID-19 hospitalization was 1.43 times higher than in virally suppressed PLWH. 13.4% of hospitalizations were attributed to unsuppressed HIV, with the highest PAFS among Hispanics and Blacks.

Region: Unsuppressed HIV PAF was highest in the West (32.6%) and South (17.7%), where the RR of hospitalization of unsuppressed HIV were highest.

Race/ethnicity: Hispanics had the highest PAFs in all regions except Northeast and were comparable to PAFs among Asian/AIAN/NHOPI in the Midwest and Whites in the West.

*Results for Asian/AIAN/NHOPI in South and West not shown as RR were not estimable

CONCLUSIONS

- While the population-level contribution of HIV to severe COVID-19 in the U.S. is small due to low HIV prevalence, unsuppressed HIV contributes substantially to COVID-19 hospitalizations among PLWH, with differences in racial/ethnic groups regionally.
- COVID-19 hospitalizations attributable to HIV were highest among Blacks in most regions while those attributable to unsuppressed HIV were not, suggesting that other factors drive hospitalizations in this group.
- Residual confounding may contribute to lower risk estimates of COVID-19 hospitalization in some groups of PLWH compared to PWOH.
- Further research on regional differences in healthcare access and social policies impacting PLWH can improve COVID-19 outcomes.

ADDITIONAL KEY INFORMATION

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PLAIN LANGUAGE SUMMARY

Although the health impact of HIV on COVID-19 hospitalizations in the US is small, there are regional and racial and ethnic disparities. Unsuppressed HIV contributes to a substantial amount of COVID-19 hospitalization in PLWH, with differences across regions and by race/ethnicity.