Disparities in COVID-19 Therapeutics Access among People With and Without HIV: An N3C Analysis

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BACKGROUND

- The COVID-19 pandemic significantly impacted Individuals with risk factors like advanced age, obesity, and comorbidities such as diabetes, cardiovascular diseases, and HIV.
- In the U.S., racial and ethnic minority (REM) communities experienced disparities in COVID-19 disease burden, access to therapeutics, and outcomes that mirror the HIV epidemic.
- The intersection of HIV status and access to COVID-19 therapeutics remains largely unexplored.
- This study aims to investigate disparities in COVID-19 therapeutic access between patients with HIV (PWH) and patients without HIV (PWoH) using the National COVID Cohort Collaborative (N3C) data.

METHODS

- Using N3C data, we conducted a retrospective evaluation of remdesivir and nirmatrelvir/ritonavir receipt among PWH and PWoH between December 2021-2024.
- Hierarchically nested models were used (Table 2). The covariates were added sequentially to the logistic regression model.
  - Model 1 used a univariate or “unadjusted” odds ratios obtained via modeling HIV status (as exposure) and COVID-19 therapeutic receipt (as outcome) using logit link function. Model 2 adjusts model 1 for age (categorical), sex, and Charleston Comorbidity Index (CCI) (continuous). Model 3 adjusts model 2 by including race/ethnicity groups. Model 4 adjusts model 3 by including SVI. Reference group is PWoH.
- Additionally, we used a Generalized Linear Model (GLM) (Table 3) to see trends in nirmatrelvir/ritonavir and Remdesivir use over time and based on race/ethnicities.

People with HIV had higher odds of receiving both Remdesivir and nirmatrelvir/ritonavir compared to those without HIV, suggesting targeted treatment efforts for this high-risk group. However, racial disparities persisted, as **Black/African American individuals - regardless of HIV status- were less likely to receive nirmatrelvir/ritonavir**. This suggests potential disparities in outpatient COVID-19 treatment access.

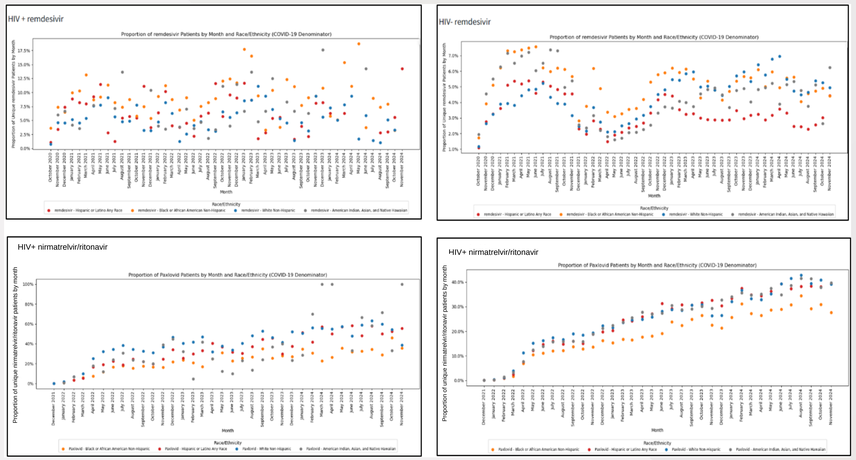


Figure 1. Trends in distribution of Nirmatrelvir/ritonavir and Remdesivir among PWH and PWoH over time

		Univariate OR (95% CI)		Multivariate (Covariates-age, sex, CCI, SVI) OR (95% CI)	
Remdesivir	Race/ethnicities	HIV-	HIV+	HIV-	HIV+
	Black or African American Non Hispanic	1.009 (1.003, 1.015)	1.009 (1.003, 1.016)	1.009 (1.008, 1.01)	1.011 (1.01, 1.012)
nirmatrelvir/ritonavir	Race/ethnicities	HIV-	HIV+	HIV-	HIV+
	Black or African American Non-Hispanic	0.938 (0.921, 0.955)	0.944 (0.93, 0.959)	0.943 (0.941, 0.945)	0.947 (0.945, 0.95)

Reference for race is White non- Hispanic, Reference for SVI is High, Reference for age group is 18-49 years

Table 3. Generalized Linear Model of nirmatrelvir/ritonavir and Remdesivir by HIV status and accounting for race/ethnicities

References

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RESULTS

				Remdesivir		Nirmatrelvir/ritonavir	
		Overall N3C COVID Positive patients (%)	Overall HIV+ among N3C COVID positive patients (%)	Total in N3C receiving Remdesivir in overall N3C covid positive cohort (%)	HIV + receiving remdesivir/Total HIV+ in Overall N3C covid positive cohort (%)	Total in N3C receiving Paxlovid in overall N3C covid positive cohort (%)	HIV + receiving Paxlovid/Total HIV+ in Overall N3C covid positive cohort (%)
Stratification Variables		7806412	45508 (0.58)	239796 (3.07)	2564 (5.63)	507901 (6.51)	6151 (13.51)
Age groups	18–49 years	3817667 (48.9)	19552 (42.96)	36012 (0.94)	717 (3.67)	140928 (3.69)	2216 (11.33)
	50–64 years	1849981 (23.7)	16509 (36.28)	53438 (2.89)	1003 (6.07)	144062 (7.79)	2398 (14.52)
	65 + years	2138764 (27.4)	9447 (20.76)	150366 (7.03)	864 (9.14)	222931 (10.42)	1557 (16.46)
Sex	Male	3266446 (41.84)	29606 (65.06)	120974 (3.7)	1689 (5.7)	189607 (5.8)	4086 (13.8)
	Female	4359012 (55.84)	15079 (33.13)	112309 (2.58)	850 (5.63)	318153 (7.3)	2068 (13.71)
Race/Ethnicity	White non-Hispanic	4700694 (60.22)	16633 (36.55)	150133 (3.19)	745 (4.48)	349475 (7.43)	3453 (20.75)
	Black or African American Non-Hispanic	1000377 (12.81)	16278 (35.77)	42760 (4.27)	1249 (7.67)	49158 (4.91)	1316 (8.08)
	Hispanic or latino	971398 (12.44)	7801 (17.14)	25488 (2.62)	401 (5.13)	50652 (5.21)	873 (11.18)
	American Indian, Asian and native Hawaiian	306476 (3.93)	1388 (3.05)	10590 (3.45)	74 (5.29)	28183 (7.39)	207 (14.81)
CCI	0	4611152 (59.07)	15236 (33.48)	32786 (0.71)	248 (1.63)	189507 (4.11)	1858 (12.19)
	1 to 3	2247925 (28.8)	19029 (41.81)	86151 (3.83)	854 (4.49)	234588 (10.44)	3008 (15.8)
	≥4	947345 (12.14)	11253 (24.72)	120879 (12.76)	1482 (13.17)	83826 (8.85)	1305 (11.6)
Covid 19-related hospitalization	Yes	433694 (5.56)	3996 (8.78)	146299 (33.73)	1377 (34.37)	11457 (2.64)	160 (3.99)
	No	7372718 (94.44)	41512 (91.22)	93507 (1.27)	1197 (2.88)	496454 (6.73)	6001 (14.45)
Social Vulnerability Index	Low	2345029 (30.04)	7506 (16.49)	63469 (2.71)	409 (5.44)	188451 (8.04)	1860 (24.75)
	Moderate	1544077 (19.78)	9516 (20.91)	50004 (3.24)	562 (5.9)	107757 (6.98)	1609 (16.89)
	High	2401920 (30.77)	16320 (35.86)	72301 (3.01)	1018 (6.23)	116102 (4.83)	1522 (9.32)

Table 1. Baseline Characteristics of N3C cohort.

	HIV status	Model 1: Univariate OR (95%CI)	Model 2: M1+ age, sex, CCI, OR (95%CI)	Model 3: M2 + race/ethnicity OR (95%CI)	Model 4: M3 + SVI OR (95%CI)
Remdesivir	People with HIV	1.81 (1.73, 1.89)	1.29 (1.23, 1.35)	1.18 (1.13, 1.24)	1.26 (1.20, 1.33)
Nirmatrelvir/ritonavir	People with HIV	2.19 (2.13, 2.25)	2.31 (2.24, 2.37)	2.57 (2.49, 2.64)	2.86 (2.77, 2.95)

Reference for HIV status was People without HIV,
Abbreviations: OR=odds ratio; CCI=Charlson Comorbidity Index; SVI=Social Vulnerability Index

Table 2. Results of hierarchically-nested models for HIV status (exposure) and remdesivir and nirmatrelvir/ritonavir exposure (outcome) for people with HIV with incident COVID-19 co-infection documented in the N3C.

CONCLUSIONS

- The data suggests PWH were more likely to receive COVID-19 therapeutics than PWoH, suggesting better access to care for this group.
- Remdesivir appears more equitably distributed, but the lower odds of receipt of nirmatrelvir/ritonavir among Black individuals highlights inequities in outpatient COVID-19 treatment access, potentially exacerbating health disparities.
- Future research should examine the role of structural barriers, healthcare access, and provider prescription practices in these disparities.

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