Impact of COVID-19 Among Immigrant and Communities of Color Living with HIV in Oregon, 2020: Two Pandemics Rooted in Racism

Amy I. Zlot[1] · Jeff Capizzi[1] · Lea Bush[1] · Timothy W. Menza[1]

Abstract

Over 8100 people living with HIV (PLWH) in Oregon are at risk of acquiring COVID-19, and communities of color are disproportionately impacted by both COVID-19 and HIV. This study identifies factors associated with a positive COVID-19 test among PLWH in Oregon, with the goal of promoting health equity. We probabilistically linked COVID-19 laboratory results with laboratory-confirmed HIV cases. Crude and adjusted risk ratios of having a COVID-19 diagnosis were calculated for each covariate. Almost 6% of the 2390 PLWH tested for COVID-19 had a positive COVID-19 result. PLWH with positive results tended to identify as American Indian/Alaska Native or Hispanic/Latinx. Younger (age < 50) immigrant PLWH were more than twice as likely to have a positive COVID-19 result than did older (age ≥ 50) US-born PLWH. The pandemic has magnified disparities among American Indian/Alaska Native, Latinx, and younger immigrant PLWH. Dismantling institutional racism and redistributing power are strategies that could be considered to help reduce health disparities.

Background

Over 8100 people living with HIV (PLWH) in Oregon are at risk of infection with SARS-CoV-2 (the virus that causes COVID-19) and consequent adverse clinical outcomes. HIV and COVID-19 intersect in a syndemic manner where social factors create a network of health risks that cluster in the same pockets of people and contribute to an excess burden of disease [1]. Along these lines, SARS-CoV-2, HIV, comorbidities, and socially-driven challenges, manifested as stigma and discrimination, synergistically interact to produce increased physical and mental health challenges [2]. Communities of color are disproportionately affected by both COVID-19 and HIV and experience structural, economic and access to care barriers [3].

Black/African American and Hispanic/Latinx people make up 2.2% and 13.4% of the Oregon population but have accounted for 10.8% and 30.9% of Oregon's HIV/SARS-CoV-2 coinfections, respectively [4] (Table 1). US counties with higher proportions of immigrant residents have more

COVID-19 cases, and people born outside of the US are more likely than people born in the US to be diagnosed with AIDS within 1 year of an HIV diagnosis [5, 6].

The purpose of this study is to identify demographic, geographic, transmission, and clinical factors associated with a COVID-19 diagnosis among PLWH in Oregon, with the goal of promoting health equity.

Methods

We probabilistically linked laboratory-confirmed and presumptive COVID-19 cases and negative laboratory COVID-19 results from the Oregon Pandemic Emergency Response Application (Opera) to laboratory-confirmed HIV cases in Oregon Public Health Epidemiologists' User System (Orpheus) and CDC's Enhanced HIV/AIDS Reporting System (eHARS) based on last name, first name, and date-of-birth using Match*Pro v.15 Software (National Cancer Institute, Rockville, Maryland). We examined COVID-19 testing and result information for all PLWH with a specimen collection date between February 29, 2020, and November 29, 2020. Duplicate laboratory results and non-Oregon residents were removed prior to this analysis. If a person tested positive and negative on separate dates, the positive

✉ Amy I. Zlot
    amy.zlot3@dhsoha.state.or.us

1   Oregon Health Authority, HIV/STD/TB Section, 800 NE
    Oregon Street, Suite 1105, Portland, OR 97232, USA

Table 1 Characteristics of people living with HIV by COVID-19 Status, Oregon: February 29, 2020–November 29, 2020

Characteristic	Total PLWH tested for COVID-19		PLWH with positive COVID-19 results		Percent positive	PLWH with negative COVID-19 results	
	N = 2390		N = 139		5.8%	N = 2251	
	n	Row %	n	Row %		n	Row %
Gender							
Male	2070	86.6%	113	81.3%	5.5%	1957	86.9%
Female	303	12.7%	25	18.0%	8.3%	278	12.4%
Transgender/non-binary	17	0.7%	1	0.7%	5.9%	16	0.7%
Age[a]							
Median (range)	51 years (9–89)		47 years (19–86)			52 years (9–89)	
< 50 years	1107	46.3%	79	56.8%	7.1%	1028	45.7%
≥ 50 years	1283	53.7%	60	43.2%	4.7%	1223	54.3%
Race/Ethnicity[a,b]							
American non-Indian/Alaska Native	23	1.0%	3	2.2%	13.0%	20	0.9%
Asian & Native Hawaiian/Pacific Islander	54	2.3%	9	6.5%	16.7%	45	2.0%
Black/African American	186	7.8%	15	10.8%	8.1%	171	7.6%
Hispanic/Latinx	315	13.2%	43	30.9%	13.7%	272	12.1%
White	1767	73.9%	67	48.2%	3.8%	1700	75.5%
Multiracial	45	1.9%	2	1.4%	4.4%	43	1.9%
Rurality							
Urban	2094	87.6%	128	92.1%	6.1%	1966	87.3%
Rural/Frontier	257	10.8%	8	5.8%	3.1%	249	11.1%
Country of birth[a]							
United States	2083	87.2%	91	65.5%	4.4%	1992	88.5%
Mexico	93	3.9%	16	11.5%	17.2%	77	3.4%
Foreign-born (not Mexico)	156	6.5%	24	17.3%	15.4%	132	5.9%
Age by country of birth[a]							
< 50 years/Foreign-born	167	7.0%	29	20.9%	17.4%	138	6.1%
≥ 50 years/Foreign born	82	3.4%	11	7.9%	13.4%	71	3.2%
< 50 years/US-born	896	37.5%	42	30.2%	4.7%	854	37.9%
≥ 50 years/US-born	1187	49.7%	49	35.3%	4.1%	1138	50.6%
HIV mode of transmission							
MSM only	1577	66.0%	89	64.0%	5.6%	1488	66.1%
PWID only	199	8.3%	9	6.5%	4.5%	190	8.4%
MSM & PWID	251	10.5%	12	8.6%	4.8%	239	10.6%
Heterosexual contact	213	8.9%	17	12.2%	8.0%	196	8.7%
No identified risk factors	134	5.6%	12	8.6%	9.0%	122	5.4%
Other (including blood products & perinatal exposure)	16	0.7%	0	0.0%	0.0%	16	0.7%
Vital status							
Alive	2340	97.9%	139	100.0%	5.9%	2201	97.8%
Any underlying conditions[a,c]							
Yes	2183	91.3%	108	77.7%	4.9%	2075	92.2%
No	18	0.8%	18	12.9%	100.0%	0	0.0%
Unknown	189	7.9%	13	9.4%	6.9%	176	7.8%
CD4 count							
≤ 200 cells/μL	195	8.2%	7	5.0%	3.6%	188	8.4%
> 200 cells/μL	2159	90.3%	131	94.2%	6.1%	2028	90.1%
Viral load							
≥ 200 copies/mL	196	8.2%	9	6.5%	4.6%	187	8.3%

Table 1 (continued)

Characteristic	Total PLWH tested for COVID-19		PLWH with positive COVID-19 results		Percent positive	PLWH with negative COVID-19 results	
	N = 2390		N = 139		5.8%	N = 2251	
	n	Row %	n	Row %		n	Row %
< 200 copies/mL	2139	89.5%	129	92.8%	6.0%	2010	89.3%
In care							
Yes	2367	99.0%	139	100.0%	5.9%	2228	99.0%
No	23	1.0%	0	0.0%	0.0%	23	1.0%
Recency of HIV diagnosis							
Within 1 year	74	3.1%	7	5.0%	9.5%	67	3.0%
More than 1–5 years	363	15.2%	26	18.7%	7.2%	337	15.0%
5 + years	1953	81.7%	106	76.3%	5.4%	1847	82.1%
Any coinfections							
HCV, CT, GC, or early SY	375	15.7%	18	12.9%	4.8%	357	15.9%
No coinfections	2015	84.3%	121	87.1%	6.0%	1894	84.1%

Not all frequencies add up to the total (N) because of missing data

CT Chlamydia trachomatis; *GC* Neisseria gonorrhoeae; *HCV* hepatitis C virus; *MSM* men who have sex with men; *NH* non-Hispanic; *PWID* people who inject drugs; *PLWH* people living with HIV; *SY* syphilis

[a]Chi-square test (or Fisher's Exact test for small cell sizes) for significant differences between PLWH with positive COVID-19 results and PLWH with negative COVID-19 results with P-value < 0.05

[b]Racial/ethnic categories were mutually exclusive; Hispanic/Latinx included any race, and racial categories did not include Hispanic/Latinx ethnicity

[c]Reported underlying conditions include: diabetes, cardiovascular disease, current/former smoker, chronic lung disease, obesity, neurological disease, immune compromise, chronic renal disease, or chronic liver disease

test was included, and the negative result was excluded. If a person had multiple concordant results, the earliest test was included, and the latter were excluded.

Frequencies of COVID-19 diagnoses and percent positivity were calculated for covariates and interaction terms: gender, age, race/ethnicity, rurality, country of birth, HIV mode of transmission, vital status, CD4 count, viral load (unsuppressed was defined as ≥ 200 copies/mL, and suppressed was defined as < 200 copies/mL), in care (having a CD4 count or viral load laboratory result during the study period), recency of HIV diagnosis, confirmed or presumptive hepatitis C (HCV) diagnosed anytime, confirmed chlamydia, confirmed or presumptive gonorrhea, confirmed or presumptive early syphilis (primary, secondary, early latent, or early non-primary non-secondary) diagnosed within 30 days of a COVID-19 test, any self-reported underlying conditions [diabetes, cardiovascular disease, current/former smoker, chronic lung disease, obesity, neurological disease, immune compromise (including people on immunosuppressant medications, people diagnosed with HIV, inherited or primary immunodeficiency syndromes, cancer undergoing chemotherapy, or organ transplant recipients), chronic renal disease, and chronic liver disease], and the interaction term, age by country of birth. Gender, race/ethnicity, country of birth, transmission risk and underlying conditions were

self-reported or, if the patient was unreachable, abstracted from the medical chart. Other clinical comorbidity and HIV testing information were imported from electronic laboratory reports. Racial/ethnic categories were mutually exclusive; Hispanic/Latinx included any race, and racial categories did not include Hispanic/Latinx ethnicity.

We used a generalized linear model with a log binomial distribution and log link in SAS 9.4 (SAS Institute, Cary, North Carolina) to calculate crude and adjusted risk ratios with 95% confidence intervals. Covariates with $P \leq 0.25$ in the bivariable models were included in the final multivariable model; interaction terms with $P \leq 0.05$ in the adjusted model remained in the final model. This evaluation was deemed public health practice rather than human subjects research and was not submitted to our institutional review board.

Results

Approximately 30% (2390/8100) of PLWH were tested for COVID-19 as of November 29, 2020. Among PLWH who were tested, 139 (5.8%) had a positive result, which was lower than for Oregon as a whole (7.4%, p = 0.006) (data not shown) [7]. Compared to PLWH with a negative COVID-19

result, PLWH with a positive result tended to be immigrants, younger, and identify as persons of color (Table 1). Nearly 78% of PLWH with positive COVID-19 results reported having any underlying medical condition, compared with 92.2% of PLWH with a negative result. Viral suppression remained high regardless of COVID-19 status. The percent positivity for COVID-19 was higher among PLWH who were diagnosed with HIV within the year of their COVID test (9.5%) compared to PLWH who were diagnosed more than 5 years before being tested for COVID-19 (5.4%). The percent positivity was 17.4% among immigrant PLWH younger than age 50 and was 13.4% among immigrant PLWH age 50 or older. All PLWH with a COVID-19 diagnosis remained alive during the study period.

Apart from multiracial PLWH, communities of color were at increased risk of being diagnosed with COVID-19 compared to white PLWH in the unadjusted model. The adjusted relative risk of having a COVID-19 diagnosis for American Indian/Alaska Native PLWH was 4.3 (95% CI 1.4–13.0) and 2.2 (95% CI 1.2–3.8) for Latinx PLWH compared to white PLWH. Immigrant PLWH < 50 years of age were 2.3 (95% CI 1.2–4.3) times as likely as US-born PLWH age ≥ 50 to be diagnosed with COVID-19. Gender, rurality, HIV mode of transmission, CD4 count, viral load, having an underlying condition, acquiring HCV or a sexually transmitted coinfection, and recency of diagnosis were not associated with a COVID-19 diagnosis (Table 2).

Discussion

Magnified by historical disparities in social determinants of health and structural racism, the COVID-19 pandemic has likely exacerbated susceptibility to COVID-19 among American Indian/Alaska Native people, communities of color, and younger people born outside of the US and diagnosed with HIV. Systemic injustices, including inequities in the healthcare system, pose challenges for affected communities to take full advantage of PrEP, HIV and COVID-testing, anti-retroviral therapy, and COVID-19 vaccinations [8]. In addition, a majority of PLWH face the added burden of living with chronic comorbidities [9]. In our cohort, 91.3% of people living with HIV reported being diagnosed with an underlying medical condition, regardless of COVID-19 status, and nearly 78% of PLWH with a positive COVID-19 result reported having any underlying medical condition compared with 92.2% of PLWH with a negative result. For comparison, 51.2% of all Oregonians diagnosed with COVID-19 during the same period reported having an underlying condition [4].

Although the biomedical model is responsible for many of the health advances we enjoy today, not all communities have benefitted equally. While the literature substantiates that social drivers are root causes of disparities in health outcomes, the biomedical approach focuses on changing high-risk behaviors among individuals (often oppressed), an approach that has failed to reduce health inequities in substantive, meaningful ways [10]. In fact, communities of color report greater protective behaviors and fewer HIV risk factors but are more likely to acquire HIV compared to white populations. Similarly, Black people are more likely to wear personal protective equipment and maintain physical distance but have been disproportionally affected by COVID-19 [8]. Notably, communities are not inherently vulnerable, and institutional barriers prevent disadvantaged communities from reaching their highest health potential [11].

Identifying a pathogen or discovering a cure is not sufficient if the social and environmental, in addition to the medical needs of the specific communities are not met. Millett describes how "structural racism operates through social determinants of health to exacerbate SARS-COV-2 and HIV disparities in communities of colour [8]." Years of poverty, unstable housing, unemployment, segregation, inequitable healthcare access, provider bias, the unjust criminal system, and unfair laws and policies all contribute to the inequities communities of color face today. Addressing inequities will not rely on a one-size-fits-all solution but will need to adopt provider-level, organizational-level, and policy-level solutions based on the intersectional needs and assets of communities (e.g., younger, foreign-born PLWH will require different supports than Native PLWH).

Public health and our health care system could embrace strategies that go beyond individual-level behavior interventions and ensure that communities have access to the best and most convenient testing, prevention, and care possible [12]. Comprehensive programs, like the Health Resources and Services Administration's (HRSA) Ryan White HIV/AIDS Program, which offer treatment and support services have proven effective in reducing disparities in viral suppression among people of color, transgender people, and houseless populations, but health systems also could be in the business of preventing infectious and chronic disease. This requires an intentional examination of our educational, economic, housing, and criminal justice system, a redistribution of power, and more support in public health for wellness and health promotion.

Strengths and Limitations

Typically, public health only has access to positive test results for notifiable diseases; a strength of this study is that the authors were able to link positive and negative COVID-19 test results to HIV cases, before the Oregon Health Authority changed their methodology from reporting on person-based positivity to test-based percentage positivity in December, 2020. Although the subset of PLWH

Table 2 Log-binomial regression analysis of characteristics associated with COVID-19 positivity among people living with HIV, Oregon: February 29, 2020–November 29, 2020

Characteristic	Unadjusted relative risk (95% CI)	P value	Full adjusted model with interaction terms (age by country of birth) relative risk (95% CI)[a]	P value
Gender				
Female	1.5 (1.0–2.3)	0.0517	0.9 (0.4–2.0)	0.7276
Male	1.0		1.0	
Age				
< 50 years	1.5 (1.1–2.1)	0.0110		
≥ 50 years	1.0			
Race/Ethnicity[b]				
American Indian/Alaska Native	3.4 (1.7–10.1)	0.0251	4.3 (1.4–13.0)	0.0091
Asian & Native Hawaiian/Pacific Islander	4.4 (2.3–8.3)	<.0001	1.7 (0.7–4.5)	0.2635
Black/African American	2.1 (1.2–3.6)	0.0061	1.7 (0.9–3.1)	0.1106
Hispanic/Latinx	3.6 (2.5–5.2)	<.0001	2.2 (1.2–3.8)	0.0071
Multiracial	1.2 (0.3–4.6)	0.8209	1.2 (0.3–4.7)	0.8111
White	1.0		1.0	
Rurality				
Rural/Frontier	0.6 (0.3–1.2)	0.1532	0.8 (0.4–1.5)	0.4664
Urban	1.0		1.0	
Country of birth				
Mexico	3.9 (2.4–6.4)	<.0001		
Foreign-born (not Mexico)	3.5 (2.3–5.4)	<.0001		
United States	1.0			
Interaction: age*country of birth				
< 50 years/Foreign-born	4.2 (2.7–6.5)	<.0001	2.3 (1.2–4.3)	0.0137
≥ 50 years/Foreign born	3.2 (1.8–6.0)	0.0002	1.7 (0.8–3.7)	0.2119
< 50 years/US-born	1.1 (0.8–1.7)	0.5364	1.0 (0.6–1.6)	0.9944
≥ 50 years/US-born	1.0		1.0	
HIV mode of transmission				
PWID, including MSM	0.8 (0.5–1.3)	0.1731	1.0 (0.6–1.7)	0.9590
Heterosexual contact	1.4 (0.9–2.3)	0.1164	1.3 (0.6–3.1)	0.5296
MSM only	1.0		1.0	
CD4 count				
≤ 200 cells/μL	0.6 (0.3–1.3)	0.1679	0.7 (0.3–1.6)	0.4017
> 200 cells/μL	1.0		1.0	
Viral load				
≥ 200 copies/mL	1.3 (0.7–2.5)	0.4180		
< 200 copies/mL	1.0			
Recency of HIV diagnosis				
Within 5 years	1.4 (1.0–2.0)	0.0857	1.7 (0.8–3.7)	0.4433
5+ years	1.0		1.0	
Any coinfections				
HCV, CT, GC, early SY	0.8 (0.5–1.3)	0.3631		
No coinfections	1.0			

CT Chlamydia trachomatis; *GC* Neisseria gonorrhoeae; *HCV* hepatitis C virus; *MSM* men who have sex with men; *NH* non-Hispanic; *PWID* people who inject drugs; *PLWH* people living with HIV; *SY* syphilis

[a]Adjusted for all other characteristics in the model

[b]Racial/ethnic categories were mutually exclusive; Hispanic/Latinx included any race, and racial categories did not include Hispanic/Latinx ethnicity

diagnosed with COVID-19 was small (n = 139), the fact that we were able to detect significant differences between racial and country of birth subgroups indicates that the differences in COVID-19 risk were likely real. Key limitations include PLWH, who were not tested for COVID-19 were not included in this study. Consequently, the measure of effect of acquiring COVID-19 among immigrants and people of color could be different than our reported findings if the undiagnosed cases were included in the analysis.

What Action Steps has Oregon Taken?

Based on our surveillance efforts and understanding that COVID-19 and HIV disproportionally affects immigrants and communities of color, the Oregon HST (HIV/STD/TB) Section, Oregon Health Authority partnered with community-based organizations to share timely information about COVID-19 and HIV, assisted clients with housing and language barriers, set up clinics for specific populations, and secured vaccine appointments. In addition, Oregon considered PLWH as having an underlying health condition and at increased risk of becoming severely ill or dying from COVID-19 and therefore prioritized PLWH to receive COVID-19 vaccinations in late March, 2021, before people in their same age group without underlying conditions.

Conclusions

This study contributes to the evidence that American Indian/ Alaska Native, Latinx and younger immigrant PLWH are at greater risk for other infections, such as SARS-CoV-2. Our findings of increased risk of COVID-19 diagnosis among communities of color and immigrants living with HIV suggest that in order to effectively create a level playing field, a multi-system, multi-layered approach that confronts and dismantles stigma and racism is needed at all levels.

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