Severe Acute Respiratory Syndrome Coronavirus 2: Vaccine Hesitancy Among Underrepresented Racial and Ethnic Groups With HIV in Miami, Florida

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Background. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and human immunodeficiency virus (HIV) disproportionally affect underrepresented ethnoracial groups in the United States. Medical mistrust and vaccine hesitancy will likely impact acceptability of SARS-CoV-2 vaccines. This study examined SARS-CoV-2 vaccine hesitancy among underrepresented ethnoracial groups with HIV and identified factors that may reduce vaccine uptake.

Methods. We conducted a cross-sectional study of adults ≥18 years of age with HIV residing in Miami, Florida. Participants were invited to participate in the ACTION (A Comprehensive Translational Initiative on Novel Coronavirus) cohort study. A baseline survey was administered from April to August 2020 and followed by a coronavirus disease 2019 (COVID-19) vaccine hesitancy survey from August to November 2020. The COVID-19 vaccine hesitancy survey was adapted from the Strategic Advisory Group of Experts survey. Comparisons by race and ethnicity were performed using the Freedman-Haltmann extension of the Fisher exact test.

Results. A total of 94 participants were enrolled; mean age was 54.4 years, 52% were female, 60% were Black non-Latinx, and 40% were non-Black Latinx. Black non-Latinx participants were less likely to agree that vaccinations are important for health when compared to non-Black Latinx (67.8% vs 92.1%, $P = .009$), less likely to agree that vaccines are effective in preventing disease (67.8% vs 84.2%, $P = .029$), less likely to believe that vaccine information is reliable and trustworthy (35.7% vs 71.1%, $P = .002$), and less likely to believe vaccines were unnecessary because COVID-19 would disappear soon (11% vs 21%, $P = .049$).

Conclusions. Medical mistrust, vaccine hesitancy, and negative sentiments about SARS-CoV-2 vaccines are prevalent among underrepresented ethnoracial groups with HIV, particularly Black non-Latinx. Targeted strategies to increase vaccine uptake in this population are warranted.

Keywords. COVID-19; HIV; underrepresented racial and ethnic groups; vaccine hesitancy.

Since its emergence in late 2019, the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has spread quickly around the world as the causative agent of the coronavirus disease 2019 (COVID-19) pandemic [1]. As of March 2021, the number of confirmed cases globally of SARS-CoV-2 infection has reached 114.5 million with 2.54 million related deaths [2].

Although containment strategies such as lockdown and social distancing have contributed to the decrease in transmission rates of COVID-19, a large number of individuals are still vulnerable to waves of infection.

To mitigate the harmful effects of the virus on public health and the global economy, remarkable efforts have been made to accelerate the development of an effective and safe vaccine against SARS-CoV-2 (COVID-19 vaccine) [3, 4]. As of December 2020, >40 COVID-19 candidate vaccines were being studied in human trials, 10 of which are in phase 3 [5, 6], and several with emergency use authorization [7–9]. Vaccination is one of the most successful public health interventions as it helps prevent >2 million deaths annually across all age groups [10]. It is estimated that community immunity against SARS-CoV-2 infection would be achieved when at least 70% of the population is immune, either through vaccination or after natural infection [6, 10]. Therefore, achieving high rates of vaccine coverage is one of the highest-impact strategies to end the morbidity and mortality caused by the COVID-19 pandemic.

Vaccine hesitancy denotes the spectrum of decision-making that falls between delay in acceptance and outright refusal of vaccination. Hesitation regarding the use of a vaccine or willingness to be vaccinated against COVID-19 poses a critical challenge for global health [11]. Successful vaccination strategies focus on increasing education and awareness about vaccination within the general public, improving access to and affordability of vaccination, engaging stakeholders, and increasing transparency of the risks and benefits of being vaccinated to ultimately stop viral transmission [6, 12, 13]. Thus, anticipating and working to address hesitancy toward a COVID-19 vaccine can facilitate public uptake and lead to higher rates of vaccination among target populations.

Once an epicenter for COVID-19, the US state of Florida continues to have high numbers of new cases, with a daily average of 10 000 cases per 100 000 and 100 deaths [2, 14]. Furthermore, the county of Miami-Dade continues to rank highest in incidence and prevalence of HIV in the US [15]. Both SARS-CoV-2 and HIV disproportionally affect underrepresented racial and ethnic groups in the US, especially Black non-Latinx individuals [16]. Black individuals living in Miami comprise 17.7% of the population, yet account for >40% of those living with HIV in Miami-Dade. Thus, high COVID-19 vaccination coverage is crucial to address health disparities from this pandemic among Black non-Latinx individuals. However, medical mistrust, vaccine hesitancy, and negative sentiments about a COVID-19 vaccine will likely play a significant role in reducing acceptability and uptake of a vaccine by Black Non-Latinx and other underrepresented ethnic groups with HIV [17, 18].

Patterns of abuse and exploitation at the hands of practitioners and researchers alike have persisted since colonial times [19]. Perhaps the most famous example of medical mistrust in the Black community dates back to the Tuskegee Syphilis Study [20], in which researchers withheld treatment from Black men in order to study the natural history of syphilis. This historical context influences months of civil unrest against systemic racism in the US and globally during the COVID-19 pandemic and may play a role in increasing medical and public health mistrust [21]. Medical and public health mistrust around COVID-19 has been prevalent in the US; however, greater COVID-19 mistrust has been reported among people with HIV (PWH), particularly in underrepresented ethnoracial groups [22, 23]. These factors may act as barriers to health care uptake, for example, vaccines, preventive care, health care use, and adherence [24], and contribute to stigma, adverse health consequences, and health disparities [25]. This study examines factors underlying COVID-19 vaccine hesitancy among PWH in order to identify factors that may delay the uptake of vaccine. Results will inform the design of vaccine campaigns and strategies to enhance COVID-19 vaccine uptake in underrepresented ethnoracial groups with HIV.

METHODS

Ethical Approval

Ethical approval for this study was obtained from the University of Miami Institutional Review Board (number 20200340). Verbal informed consent via telephone was obtained prior to conducting any study-related assessments. All procedures were followed in accordance with the ethical standards of the university and with the Helsinki Declaration of 1975, as revised in 2013. Informed consent was obtained from all participants for being included in the study.

Participants

To qualify for the study, participants needed to be fluent in English or Spanish, with a history of HIV, aged 18 years or older, and currently living in Miami, Florida. Participants were enrolled in the ACTION study (A Comprehensive Translational Initiative on Novel Coronavirus), a cohort of people with HIV and SARS-CoV-2 coinfection, living in Miami. The ACTION study recruited PWH through an existing registry created by the Miami Center for HIV Research in Mental Health (CHARM) and the Center for AIDS Research (CFAR). Participants were also recruited directly from the community with the use of printed flyers, spoken word, and referrals from medical professionals. All CHARM/CFAR registry participants were PWH. All ACTION participants (N = 231) were invited to participate; 176 of them completed the survey, of whom 102 were from underrepresented ethnoracial groups. Participants not recruited from the registry provided HIV test results, clinician notes, a list of antiretroviral medications, or copies of laboratory results prior to enrollment. SARS CoV-2 infection was confirmed by a commercially approved polymerase chain reaction test.

Design

This cross-sectional study utilized an adapted COVID-19 survey for PWH. This survey was developed by Multicenter AIDS Cohort Study/Women's Interagency HIV Study Combined Cohort Study (MWCCS) investigators and is in the public domain and available at https://bit.ly/3bSn6V2. The vaccine hesitancy survey was constructed from a 20-item questionnaire integrating the standardized approach developed by the World Health Organization Strategic Advisory Group of Experts working on vaccine hesitancy [26]. Some questions were revised to incorporate COVID-19. Sociodemographic information and measures of vaccine confidence (trust/belief), complacency (perceived risk or benefit), convenience (access), and willingness to get vaccinated were included in the survey [11, 27, 28]. Participants completed a baseline survey during the months of April to August 2020, and a follow-up survey with a supplemental vaccine hesitancy questionnaire during the months of August–November 2020 [29]. The 25-minute survey was administered by telephone by the study staff or it was self-administered by accessing a unique web link via REDCap [30].

Participants were offered an incentive of $15 for completing the survey.

Variables/Measures
COVID-19 Survey.
The COVID-19 baseline survey is an adaptation from the survey used in the MWCCS, which evaluated COVID-19 burden among PWH in the US and other settings [31–33]. This questionnaire includes sociodemographic information such as sex, gender, race, ethnicity, employment status, living situation, and monthly household income. Options for race included White, Black, and other. Options for ethnicity included Hispanic (Latinx), non-Hispanic (non-Latinx), and other.

Vaccine Hesitancy Scale.
Ten questions from the Vaccine Hesitancy Scale [27] were included and used a 5-point Likert scale: 1 = strongly agree; 2 = agree; 3 = neutral; 4 = disagree; and 5 = strongly disagree (see Supplementary Materials). One of these 10 questions was adapted to expand the perceived risk measure specific to COVID-19 [11]: "I do not need vaccines for coronavirus as it will disappear soon." Additional binary yes/no questions were included based on the Health Belief Model [34] to assess general attitudes toward vaccines, vaccine-related conspiracy beliefs, trust or distrust in medical and governmental institutions, and perceived risk or benefit of a COVID-19 vaccine within the context of HIV infection. The primary measure for hesitancy or willingness to get vaccinated was assessed via the following yes/no question: "If a COVID-19 vaccine was available would you get vaccinated?" The last question assessed the number of individuals known to the respondent who had died from COVID-19.

Statistical Analysis
All data were interrogated using graphical and numeric exploratory data analysis methods. Responses with percentages are reported by ethnoracial group (Black non-Latinx and non-Black Latinx). Group differences were explored using the Freedman-Haltmann extension to Fisher exact test to handle small cell frequencies. Further, Cochran-Mantel-Haenszel methods were used after grouping the vaccine hesitancy 5-point Likert scale into 3 groups, agree/unsure/disagree, to consider the rank order of the responses. Both methods afforded similar inferences. Bivariate logistic regression models predicting willingness to get vaccinated by vaccine hesitancy items and ethnoracial groups as well as their 2-way interaction were built.

The association between the belief/trust questions and the willingness to get vaccinated question "If a vaccine to prevent COVID-19 infection was available, would you get vaccinated?" was explored using logistic regression methods, with a nominal P value of < .05 considered statistically significant. The 3-level

willingness to get vaccinated variable was converted to a binary yes vs unsure/no indicator. Bivariate models, using each predictor along with ethnoracial groups and the predictor by ethnoracial group interaction, were built. To ease interpretation and to minimize handle small cell frequencies, ordinal predictors were converted to binary variables (yes vs unsure/no), and univariate odds ratios (ORs) with Wald P values and 95% confidence intervals (CIs) are reported for all except 1 variable. All data were collected and stored using REDCap software [30, 35] Analyses were accomplished using R software (version 4.0.3) [36] with the tidyverse (1.3) [37], janitor [38], and REDCap [39] packages.

RESULTS

Sociodemographic Characteristics
A total of 94 participants were enrolled. Participants were primarily from 2 ethnoracial groups: 56 (60%) Black non-Latinx and 38 (40%) non-Black Latinx. Due to the low number of Latinx Black and White non-Latinx (n = 8), those ethnoracial groups were not included in the analysis. Sociodemographic characteristics by ethnoracial group are presented in Table 1. Overall, 52% of participants were female, 72% were unemployed, 82% were living on their own, and 61% earned less than US$1000 per month.

Vaccine Hesitancy Scale by Ethnoracial Groups
Vaccine hesitancy items by ethnoracial groups are presented in Table 2. Black non-Latinx participants were less likely to agree with vaccinations being important for their health when compared with non-Black Latinx (68% vs 92%, respectively, P = .009). Black non-Latinx were also less likely to agree with the statement that vaccines are effective in preventing disease (68% Black non-Latinx agreed, 84% non-Black Latinx agreed, P = .029). A substantially lower proportion of Black non-Latinx (36%) compared to non-Black Latinx (71%) reported believing that vaccine information is reliable and trustworthy (P = .002). A lower proportion of Black non-Latinx (11%) were less likely to believe that vaccines were unnecessary because COVID-19 would disappear soon compared with non-Black Latinx (21%) (P = .049).

Vaccine Hesitancy Scale Predicting Willingness to Get Vaccinated
There were no interactions between ethnoracial groups and the Vaccine Hesitancy Scale items, except for the statement "Vaccines are effective in preventing disease" (P = .237). For non-Black Latinx participants, there was a linear relationship between increasing Likert responses and the belief in the statement. Predicted probabilities ranged from 0.89 for those who responded "strongly agree" to 0.008 for those who responded "strongly disagree." Among Black non-Latinx participants, the relationship between vaccine hesitancy and willingness to be vaccinated was diminished with probabilities of 0.57 and 0.25.

Table 1. Demographic Characteristics of 94 Participants With HIV Living in Miami, Florida, Stratified by Ethnoracial Group

Characteristics	Non-Black Latinx	Black Non-Latinx	Overall
Total	38 (100)	56 (100)	94 (100)
Age, y			
Mean (SD)	51.3 (11.4)	56.4 (10.8)	54.4 (11.3)
Median (Min, Max)	51.0 (27.0, 68.0)	59.5 (27.0, 71.0)	57.0 (27.0, 71.0)
Sex			
Male	23 (60.5)	22 (39.3)	45 (47.9)
Female	15 (39.5)	34 (60.7)	49 (52.1)
Employed			
Yes	17 (44.7)	9 (16.1)	26 (27.7)
No	21 (55.3)	47 (83.9)	68 (72.3)
Living situation			
Own place	32 (84.2)	45 (80.4)	77 (81.9)
Someone else's house	6 (15.8)	11 (19.6)	17 (18.1)
Monthly household income			
≤$1000	18 (47.4)	39 (69.6)	57 (60.6)
≥$1000	20 (52.6)	17 (30.4)	37 (39.4)

Data are presented as No. (%) unless otherwise indicated.

Abbreviation: SD, standard deviation.

Agreeing or strongly agreeing with vaccines being important for health, as well as agreeing or strongly agreeing with vaccines being effective, were both associated with greater odds of being willing to get vaccinated overall (OR, 12.00 [95% CI, 3.22–44.79], $P < .001$ and OR, 5.1 [95% CI, 1.78–14.59], $P = .001$, respectively). Agreeing or disagreeing with "Getting vaccinated is important for my health and the health of others in my community" and "All vaccines offered by the government program in my community are important for good health" were similarly associated with 8-fold greater odds of willingness to get vaccinated (OR, 8.00 [95% CI, 2.11–30.28], $P < .001$ and OR, 8.36 [95% CI, 2.77–25.22], $P = .001$, respectively). Agreeing or strongly agreeing that information about vaccines is reliable and trustworthy was associated with a >6-fold greater odds of willingness to get vaccinated (OR, 6.76 [95% CI, 2.71–16.88], $P = .001$). Agreeing or strongly agreeing with the statement about following doctors' recommendations about vaccines was associated with >5-fold greater odds of willingness to get vaccinated (OR, 5.28 [95% CI, 1.57–17.71], $P = .001$). Likewise, agreeing or disagreeing with "Getting vaccines is a good way to protect myself from disease" was associated with >7-fold greater odds of being willing to get vaccinated (OR, 7.07 [95% CI, 2.14–23.42], $P < .001$). No other items were associated with being willing to get vaccinated.

Beliefs about COVID-19 vaccination by ethnoracial group were not different and are presented in Table 3. No statistically significant differences by ethnoracial group emerged. Many participants (42%) knew someone who died from COVID-19. The most common response was the death of a friend (22%).

DISCUSSION

This study examined COVID-19 vaccine hesitancy and its impact on willingness to be vaccinated among PWH from underrepresented ethnoracial groups in Miami, Florida, a city with high incidence and prevalence of HIV and COVID-19. Overall, both Black non-Latinx and non-Black Latinx with HIV reported high vaccine acceptance, but Black non-Latinx were more hesitant toward vaccination in general. Similarly, Black non-Latinx were more concerned about risks and side effects associated with new vaccines. Among both ethnoracial groups, willingness to get vaccinated was greater among PWH who believed that vaccines are effective in preventing diseases, important for health, and a good way to protect one's self. Additionally, willingness to be vaccinated was higher among those who believed that vaccines are reliable and trustworthy and recommended by doctors.

Similar to another study [23], our data also suggest that vaccine hesitancy toward COVID-19 vaccines is high among Black non-Latinx living with HIV and may constitute a barrier for vaccine uptake. Health-related mistrust is a byproduct of the intersection between the history of Black communities, systemic racism, and their interaction with the health care system [18, 19]. Black and Latinx individuals may face social and economic vulnerabilities and higher rates of comorbidities. In our sample, a substantial proportion of participants reported being unemployed and with low income, which has been associated with limited access to medications and missed medical appointments in previous studies in this ethnoracial group [40, 41]. Furthermore, within the context of the COVID-19 pandemic, these underrepresented groups also have higher rates of SARS-CoV-2 infections and/or COVID-19 morbidity and mortality compared to the general population while also experiencing financial and social strains.

Table 2. Vaccine Hesitancy Scale Items by Ethnoracial Groups Living in Miami, Florida

Scale Item	Non-Black Latinx, No. (%)	Black Non-Latinx, No. (%)	P Value
Total	38 (100)	56 (100)	
Vaccination is important for my health			
Strongly agree	19 (50.0)	18 (32.1)	.009
Agree	16 (42.1)	20 (35.7)	
Neutral	2 (5.3)	11 (19.6)	
Disagree	0 (0.0)	3 (5.4)	
Strongly disagree	1 (2.6)	4 (7.2)	
Vaccines are effective in preventing disease			
Strongly agree	17 (44.7)	18 (32.1)	.029
Agree	15 (39.5)	20 (35.7)	
Neutral	5 (13.2)	8 (14.3)	
Disagree	1 (2.6)	7 (12.5)	
Strongly disagree	0 (0.0)	3 (5.4)	
Getting vaccinated is important for my health and the health of others in my community			
Strongly agree	18 (47.4)	18 (32.4)	.283
Agree	14 (36.8)	27 (48.2)	
Neutral	5 (13.2)	4 (7.1)	
Disagree	1 (2.6)	5 (8.9)	
Strongly disagree	0 (0.0)	2 (3.6)	
All vaccines offered by the government program in my community are important for good health			
Strongly agree	16 (42.1)	12 (21.4)	.117
Agree	14 (36.8)	26 (46.5)	
Neutral	7 (18.4)	11 (19.6)	
Disagree	1 (2.6)	4 (7.1)	
Strongly disagree	0 (0.0)	3 (5.4)	
The information I receive about vaccines from the vaccine program is reliable and trustworthy			
Strongly agree	9 (23.7)	7 (12.5)	.002
Agree	18 (47.4)	13 (23.2)	
Neutral	6 (15.8)	18 (32.1)	
Disagree	3 (7.8)	17 (30.4)	
Strongly disagree	2 (5.3)	1 (1.8)	
Generally, I do what my doctor or health care provider recommends about vaccines for my health			
Strongly agree	20 (52.6)	16 (28.6)	.077
Agree	15 (39.5)	26 (46.4)	
Neutral	1 (2.6)	8 (14.3)	
Disagree	2 (5.3)	5 (8.9)	
Strongly disagree	0 (0.0)	1 (1.8)	
I do not need vaccines for coronavirus at it will disappear soon			
Strongly agree	2 (5.3)	5 (8.9)	.049
Agree	2 (5.3)	7 (12.5)	
Neutral	10 (26.3)	20 (35.7)	
Disagree	13 (34.2)	13 (23.3)	
Strongly disagree	11 (28.9)	11 (19.6)	
Getting vaccines is a good way to protect myself from disease			
Strongly agree	18 (47.4)	17 (30.9)	.132
Agree	14 (36.8)	24 (43.6)	
Neutral	5 (13.2)	7 (12.8)	
Disagree	1 (2.6)	6 (10.9)	
Strongly disagree	0 (0.0)	1 (1.8)	
New vaccines carry more risks than older vaccines			
Strongly agree	9 (23.7)	10 (17.9)	.614
Agree	9 (23.7)	13 (23.2)	
Neutral	15 (39.5)	25 (44.6)	
Disagree	5 13.2)	4 (7.1)	
Strongly disagree	0 (0.0)	4 (7.2)	
I am concerned about serious adverse effects of vaccines			

Table 2. Continued

Scale Item	Non-Black Latinx, No. (%)	Black Non-Latinx, No. (%)	P Value
Strongly agree	12 (31.6)	12 (21.4)	.810
Agree	15 (39.5)	28 (50.0)	
Neutral	5 (13.2)	9 (16.1)	
Disagree	5 (13.2)	6 (10.7)	
Strongly disagree	1 (2.5)	1 (1.8)	

Therefore, it is critically important to increase prevention efforts among underrepresented groups in the US.

Despite the availability of a vaccine, vaccination alone cannot control the spread of COVID-19 if community members are unwilling to be vaccinated. Interestingly, while almost 60% of Black non-Latinx participants in our study thought that their current health status made it important for them to get a COVID-19 vaccine, they were highly hesitant of getting vaccinated. As such, the lower acceptance among underrepresented groups living with HIV accentuates the need for rapid implementation of targeted strategies to avoid exacerbating existing health disparities within these communities [42, 43]. Additionally, most participants agreed to do what their doctor or health care provider would recommend about vaccines for their health. Previous studies have identified social service and health care providers as a trusted source for information, and PWH were more likely to get vaccinated if a doctor recommended the vaccine [23]. Furthermore, PWH were much more likely (8-fold increase) to be vaccinated if they felt it important for the community [44]. Therefore, strategies that target patient-provider relationships focused on reducing misinformation as well as messaging targeted toward community health could promote COVID-19 vaccine uptake among PWH.

Vaccines are an effective prevention strategy and a COVID-19 vaccine should have the potential to control the spread of the highly contagious and lethal SARS-CoV-2 virus. In our study, while most participants believed that vaccines were important for the good health of others and the community, a large majority of Black non-Latinx participants reported not finding the information about the vaccine program reliable and trustworthy. Traditionally, individuals of the lowest income categories are less trustful of the health care community and are more likely to rely on unofficial sources such as social media to make their medical decisions [45, 46]. While it

Table 3. Beliefs About COVID-19 Vaccination of 94 Participants With HIV Living in Miami, Florida, Stratified by Ethnoracial Group

Items	Non-Black Latinx, No. (%)	Black Non-Latinx, No. (%)	P Value
Total	38 (100)	56 (100)	
Do you believe a vaccine could be an effective way to prevent a COVID-19 infection?			
Yes	28 (73.7)	28 (50.0)	.067
No	4 (10.5)	8 (14.3)	
Unsure	6 (15.8)	20 (35.7)	
If a vaccine to prevent COVID-19 infection was available, would you get vaccinated?			
Yes	25 (65.8)	26 (47.3)	.057
No	5 (13.1)	15 (27.3)	
Unsure	8 (21.1)	14 (25.4)	
Do you feel that your current health status or other health conditions would make it unsafe to get a COVID-19 vaccine?			
Yes	12 (31.6)	15 (27.3)	.894
No	18 (47.4)	25 (45.4)	
Unsure	8 (21.0)	15 (27.3)	
Do you feel that your current health status or other health conditions make it important for you to get a COVID-19 vaccine?			
Yes	25 (65.8)	32 (57.1)	.288
No	8 (21.0)	18 (32.2)	
Unsure	5 (13.2)	6 (10.7)	
If getting vaccinated was a requirement to go back to your daily activities (working, traveling, public places), would you get vaccinated?			
Yes	32 (84.2)	38 (67.8)	.214
No	5 (13.2)	9 (16.1)	
Unsure	1 (2.6)	9 (16.1)	
Do you feel that health care professionals, government, local authorities, or leaders may force you into getting vaccinated?			
Yes	18 (47.4)	19 (33.9)	.387
No	17 (44.7)	27 (48.2)	
Unsure	3 (7.9)	10 (17.9)	

Abbreviation: COVID-19, coronavirus disease 2019.

is challenging to estimate the effect and the extent to which these sources influence people's thoughts, it is essential that stakeholders, public education, and outreach put in significant efforts to counteract any disinformation and to address potential concerns to enable individuals to make informed decisions.

Limitations of this study include a convenient sample, small sample size, limited time frame for data collection prior to availability of a vaccine, and limited racial and ethnic representation from the Southern US, where rates of HIV among Whites are low. This limits generalizability. In addition, some variables were dichotomized due to small cell sizes during the analysis. Despite these limitations, our findings suggest avenues for targeting potential barriers to COVID-19 vaccination. Health disparities may increase unless the root causes and the components of this complex issue are understood so they can be approached with focused strategies and advocacy. Larger studies using nationally representative samples of underrepresented ethnoracial groups living with HIV are needed to inform interventions that address mistrust and COVID-19 health disparities.

In summary, our study is among the first to report vaccine hesitancy among a vulnerable population, such as underrepresented ethnoracial groups living with HIV. Targeted strategies to increase vaccine acceptability and uptake in the US are urgently needed. More specifically, stakeholders should focus on enhancing patient-provider relationships, reducing misinformation, and leveraging social norms to overcome mistrust toward COVID-19 vaccination.

Supplementary Data

Supplementary materials are available at *Open Forum Infectious Diseases* online. Consisting of data provided by the authors to benefit the reader, the posted materials are not copyedited and are the sole responsibility of the authors, so questions or comments should be addressed to the corresponding author.

Notes

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