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Socioeconomic impact of COVID-19 and willingness to be vaccinated in African American/Black and Hispanic/Latinx adults

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Abstract: Purpose: To describe the socioeconomic and healthcare-related effects of the COVID-19 pandemic, and willingness to receive a free COVID-19 vaccine, among African American/Black (AA/B) and Hispanic/Latinx (H/L) adults with asthma currently enrolled in a large trial.

Methods: The present analysis is a sub-study of the PeRson EmPowered Asthma Relief (PREPARE) study, a pragmatic study of 1201 AA/B and H/L adults with asthma. A monthly questionnaire was completed by a subset of PREPARE participants ($n = 325$) during May–August, 2020. The 5-item questionnaire assessed self-reported impact of COVID-19 on respondents' ability to obtain asthma medications, medical care quality, employment, income and ability to pay bills; and willingness to get a free COVID-19 vaccine. Bivariate analysis and multivariate logistic regression were performed to investigate factors associated with vaccine hesitancy.

Results: Of 325 survey respondents (25% AA/B, 75% H/L), the majority reported no impact of COVID-19 on medical care or ability to get asthma medications. Approximately half of employed respondents experienced a lower level of employment or job loss, and approximately half reported having difficulty paying bills during the pandemic. Thirty-five percent of respondents reported unwillingness and 31% reported being somewhat likely to receive a free COVID-19 vaccine. AA/B race/ethnicity and poorer reported physical health were associated with a higher likelihood of COVID-19 vaccine hesitancy.

Conclusion: AA/B and H/L adults with asthma may experience changes in the quality of their asthma care and increased socioeconomic stressors as a result of the COVID-19 pandemic and may be hesitant or unwilling to receive a COVID-19 vaccine.

Keywords: African American ■ Asthma ■ Coronavirus ■ COVID-19 ■ Hispanic ■ Socioeconomic impact of COVID-19 ■ Vaccine ■ Vaccine hesitancy

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Abbreviations: AA/B, African American/Black; ACT, Asthma Control Test; AIDS, acquired immunodeficiency syndrome; ASUL, Asthma Symptom Utility Index; CDC, Centers for Disease Control and Prevention; COPD, chronic obstructive pulmonary disease; COVID-19, coronavirus disease 2019; EDS, Everyday Discrimination Scale; FDA, Food and Drug Administration; GINA, Global Initiative for Asthma; H/L, Hispanic/Latinx; HIV, human immunodeficiency virus; HPV, human papilloma virus; HRQL-4, Healthy Days Core Module; LABA, long-acting β_2 -agonist; LAMA, long-acting muscarinic antagonist; LTRA, leukotriene receptor antagonist; ICS, inhaled corticosteroid; NIAID, National Institute of Allergy and Infectious Diseases; PCORI, Patient-Centered Outcomes Research Institute; PREPARE, PeRson EmPowered Asthma RELief; SABA, short-acting β_2 -agonist; SAMA, short-acting muscarinic antagonist; SD, standard deviation; Tdap, tetanus/diphtheria/aellular pertussis. © 2022 Published by Elsevier Inc. on behalf of National Medical Association.

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1. INTRODUCTION

African American/Black (AA/B) and Hispanic/Latinx (H/L) individuals in the United States experience disproportionate morbidity and mortality due to coronavirus disease 2019 (COVID-19). According to the Centers for Disease Control and Prevention (CDC), rate ratios for COVID-19 cases, hospitalizations and deaths are higher in both AA/B (1.1, 2.9, and 1.9, respectively) and H/L individuals (1.3, 3.2, and 2.3, respectively) when compared to White, non-Hispanic persons.¹

While COVID-19 has disproportionately burdened the AA/B and H/L communities, strategies to slow the spread of the virus (e.g., quarantine, work from home) may cause additional harm, such as lost wages, reduced access to services, and increased stress, for some individuals.² There has been a growing literature describing the importance of addressing health equity in the national and global response to COVID-19.^{3,4}

With the recent emergency use authorization of several COVID-19 vaccines by the US Food and Drug Administration (FDA), it is important to understand the willingness of individuals to receive a COVID-19 vaccine, particularly among the racial and ethnic groups most heavily impacted by the pandemic. Previous studies have reported lower rates of vaccine uptake for influenza,^{5–7} Human Papilloma Virus (HPV),⁸ and tetanus/diphtheria/acellular pertussis (Tdap)⁹ among AA/B individuals compared to non-Hispanic Whites. Information about vaccine uptake and hesitancy are more limited among H/L individuals and show mixed results, with some reports indicating a higher proportion of influenza vaccine uptake,¹⁰ and others demonstrating lower rates of vaccine uptake and higher rates of hesitancy.^{5,11} Limited data suggest increased COVID-19 vaccine hesitancy in AA/B versus white individuals.¹²

The objectives of this study are to describe the socioeconomic and healthcare-related effects of the COVID-19 pandemic on AA/B and H/L adults with asthma currently enrolled in a large trial, and to describe their willingness to receive a free COVID-19 vaccine. This knowledge can help inform optimal strategies to maximize vaccine uptake and reduce morbidity and mortality among AA/B and H/L individuals, who are highly impacted by the COVID pandemic.

2. METHODS

The present analysis is a sub-study of the PeRson Empowered Asthma Relief (PREPARE) study. PREPARE is a randomized, open-label, pragmatic, real-world study

which aims to assess whether a patient-guided, reliever-triggered inhaled corticosteroid (ICS) strategy can improve asthma outcomes in AA/B and H/L adult patient populations. Details of the PREPARE study design and methods have been published previously.¹³ PREPARE has enrolled 1201 AA/B and H/L adults with asthma from primary care and specialty clinics in 19 clinical organizations across the United States, and the study is ongoing.

The outcomes of this sub-study are the self-reported impact of COVID-19 on respondents' ability to obtain asthma medications, medical care quality, employment, income and ability to pay bills; and respondents' willingness to get a free COVID-19 vaccine.

Data for this analysis came from a monthly questionnaire completed by a subset of PREPARE participants during the months of May–August, 2020. In May, the research team added COVID-19–related questions to the usual monthly questionnaires completed by PREPARE participants. All PREPARE participants remaining in the study during this time block were eligible and had the option of responding to the COVID-19–specific questions. All participants who were currently enrolled in the PREPARE study at the time of the survey administration (May through August 2020) were therefore invited to complete the survey.

In this report, we describe respondents' answers to five questions which were adapted, with the guidance of the PREPARE Patient Partners, from a survey being conducted at the University of Pittsburgh Asthma & Environmental Lung Health Institute regarding asthma, COVID-19, and socioeconomic impact. Colleagues at the University of Pittsburgh developed the initial questions and reviewed them for internal coherence and interpretability. The PREPARE Patient Partners then reviewed the survey to ensure relevance to participant experience and appropriateness of the readability level. The Spanish-speaking Patient Partners also reviewed the translation for cultural adaptation.

Survey questions may be found in [Appendix A](#). We did not give out any information related to vaccines as part of the survey itself. However, we did communicate with participants about other aspects of COVID-19 prevention. For example, in May 2020, due to reports of asthma patients not using their asthma medications appropriately during COVID, the study team sent a message to remind participants to take their asthma medication. In October 2020, the team sent a mask and a sanitizer to all participants.

Descriptive statistics were used to summarize respondents' baseline characteristics and answers to these questions. We further dichotomized attitudes toward the COVID-19 vaccine as “Vaccine Hesitant” (answered “not likely” to question 5) versus “Vaccine Willing” (answered

“very likely” or “somewhat likely” to question 5). To examine which factors may affect a respondent’s attitude toward the COVID-19 vaccine, bivariate analyses were done to explore relationships between patient baseline characteristics and the dichotomized vaccine hesitancy/willingness variable. Variables found to be significant in bivariate analyses were entered into a multivariate logistic regression model to investigate factors associated with vaccine hesitancy/willingness. All analyses were done in SAS 9.4.

3. RESULTS AND DISCUSSION

A total of 325 PREPARE participants (71% of the 456 participants remaining in the PREPARE study at the time) completed the monthly COVID-19 questionnaire during May–August 2020. Respondent characteristics are described in [Table 1](#). Although the PREPARE study enrolled approximately 50% ($n = 601$) AA/B and 50% ($n = 598$) H/L individuals in total, the sequence in which sites were initiated led to differential enrollment of AA/B and H/L participants over the course of the study (AA/Bs tended to be enrolled earlier, while H/Ls tended to be enrolled later). Thus, in this sub-study, which was conducted during the later stages of PREPARE enrollment, approximately 25% ($n = 82$) of respondents self-identified as AA/B, while 75% ($n = 243$) self-identified as H/L.

On average, respondents had very poorly controlled asthma at baseline [mean Asthma Control Test (ACT) score = 14.3], and the majority were using asthma medications consistent with Global Initiative for Asthma (GINA)¹⁴ therapy steps 3–5, indicating moderate to severe asthma. Approximately half of respondents reported being in fair or poor general health, and 71% reported at least one comorbidity.

Respondents reported a modest impact of COVID-19 on their medical care. In response to question 1, 87% ($n = 283$) of respondents reported no impact on their ability to get their asthma medications, while the remaining 13% ($n = 41$) experienced some impact: 8% ($n = 27$) had a more difficult time paying for their medications, and 4% ($n = 14$) did not want to go to the pharmacy for fear of contracting COVID-19. Medical care was unchanged for the majority (69%, $n = 222$) of respondents, while 6% ($n = 21$) indicated that medical care changed for the better since the beginning of the outbreak and 25% ($n = 81$) indicated that medical care got worse.

Approximately half of respondents (54%, $n = 172$) were not employed outside of the home when they completed the survey. Of the 149 respondents who were employed, 48% ($n = 72$) reported they kept their same job and level of employment, 17% ($n = 26$) had their hours cut back, 20%

($n = 29$) were put on leave, and 15% ($n = 22$) lost their job completely.

Approximately half of respondents experienced more difficulty paying bills due to the pandemic, with 31% ($n = 99$) reporting a little difficulty, 9% ($n = 30$) reporting a lot of difficulty, and 10% ($n = 34$) reporting very much more difficulty. When looking at responses stratified by race/ethnicity, 27% of AA/B respondents versus 17% of H/L respondents reported a lot or very much more difficulty.

Finally, approximately one-third of respondents reported unwillingness to receive a free COVID-19 vaccine, and 31% reported being somewhat likely to receive a free vaccine. Responses to this question also varied by race/ethnicity, as shown in [Fig. 1](#).

Bivariate analyses ([Table 2](#)) indicated that race/ethnicity, geographic region, and number of days physical health was reported as “not good” had statistically significant differences among a “Vaccine Willing” group (“very likely” or “somewhat likely” to take a free COVID-19 vaccine) and a “Vaccine Hesitant” group (“not likely” to take a free COVID-19 vaccine).

Logistic regression analyses showed that AA/B race/ethnicity and more days per month of one’s physical health reported as “not good” were associated with a higher likelihood of unwillingness to receive the COVID-19 vaccine. AA/B participants were about 2.6 times more likely to be vaccine hesitant than H/L participants [OR 2.649 (95% CI 1.396–5.023), $p = 0.0029$], adjusting for region and days physical health not good. For every 1 day increase in days physical health was “not good”, participants were 1.03 times (3%) more likely to be vaccine hesitant [OR 1.03 (95% CI 1.006–1.053), $p = 0.0118$], adjusting for region and race/ethnicity.

This study adds to the growing literature documenting the importance of addressing racial and ethnic disparities in COVID-19 treatment and prevention. Additionally, this study examines socioeconomic impacts and factors associated with vaccine hesitancy or unwillingness in a sample of 325 AA/B and H/L individuals with moderate to severe asthma and a high burden of comorbidities.

Impact on medical care

Although the majority of respondents reported minimal change in their access to asthma medications and medical care, 13% reported some impact on their ability to get their asthma medications, and 25% indicated that their medical care had gotten worse. From a health equity perspective, it is important to align care and services for higher-risk and/or more vulnerable individuals, and future research should seek to understand and address such issues. For

Table 1. Respondent characteristics.

Characteristic	African American/ Black (n = 82)	Hispanic/Latinx (n = 243)	Total Sample (n = 325)	PREPARE Population(n = 1201)
Age (yrs), mean (SD)	51.8 (12.9)	48.3 (13.7)	49.2 (13.5)	48.2 (13.7)
Gender, n (%)				
Female	69 (84%)	198 (81%)	267 (82%)	1005 (84%)
Male	13 (16%)	45 (19%)	58 (18%)	196 (16%)
Preferred language, n (%)				
English	82 (100%)	131 (54%)	213 (66%)	934 (78%)
Spanish	0 (0%)	112 (46%)	112 (34%)	267 (22%)
Region, n (%)				
Northeast	18 (22%)	110 (45%)	128 (39%)	486 (40%)
Ohio Valley Central	26 (32%)	27 (11%)	53 (16%)	173 (14%)
Puerto Rico	0 (0%)	25 (10%)	25 (8%)	102 (8%)
Southeast	38 (46%)	25 (10%)	63 (19%)	370 (31%)
Southwest	0 (0%)	56 (23%)	56 (17%)	70 (6%)
Baseline ACT ¹ score, mean (SD)	14.9 (4.6)	14.0 (4.6)	14.3 (4.6)	14.6 (4.4)
Baseline ASUI ² score, mean (SD)	0.68 (0.21)	0.67 (0.22)	0.67 (0.21)	0.67 (0.21)
Baseline asthma medication use, n (%)				
Short-acting bronchodilator rescue inhaler (SABA, SAMA, SABA/SAMA)	82 (100%)	243 (100%)	325 (100%)	1201 (100%)
Inhaled corticosteroid (ICS) ^c	26 (32%)	85 (35%)	111 (34%)	453 (38%)
ICS/LABA ³	60 (73%)	188 (77%)	248 (76%)	859 (71%)
Long-acting bronchodilator (LABA, LAMA, LAMA/LABA)	7 (9%)	54 (22%)	61 (19%)	149 (12%)
Leukotriene receptor antagonist (LTRA)	45 (55%)	144 (59%)	189 (58%)	598 (50%)
Biologic	3 (4%)	21 (9%)	24 (7%)	36 (3%)
Baseline history of asthma hospitalization in past year, n (%)				
0	63 (77%)	192 (79%)	255 (78%)	972 (81%)
1	11 (13%)	30 (12%)	41 (13%)	132 (11%)
2	3 (4%)	10 (4%)	13 (4%)	50 (4%)
3+	5 (6%)	11 (5%)	16 (5%)	47 (4%)
Baseline number of comorbidities⁴, n (%)				
0	18 (22%)	77 (32%)	95 (29%)	357 (30%)
1	17 (21%)	49 (20%)	66 (20%)	276 (23%)
2	21 (26%)	38 (16%)	59 (18%)	252 (21%)

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Table 1 (continued)

Characteristic	African American/Black (n = 82)	Hispanic/Latinx (n = 243)	Total Sample (n = 325)	PREPARE Population (n = 1201)
3	14 (17%)	39 (16%)	53 (16%)	167 (14%)
4+	12 (15%)	40 (16%)	52 (16%)	149 (12%)
General health (CDC HRQOL-4)⁵, n (%)				
Excellent	3 (4%)	2 (<1%)	5 (2%)	22 (2%)
Very Good	5 (6%)	28 (12%)	33 (10%)	128 (11%)
Good	37 (45%)	78 (32%)	115 (35%)	394 (33%)
Fair	28 (34%)	107 (44%)	135 (42%)	529 (44%)
Poor	9 (11%)	28 (12%)	37 (11%)	128 (11%)
Days per month physical health not good, mean (SD)	9.8 (10.1)	12.2 (10.7)	11.6 (10.6)	10.8 (10.6)
Days per month mental health not good, mean (SD)	6.0 (9.5)	9.5 (10.3)	8.6 (10.2)	8.3 (10.2)
Baseline EDS ⁶ score, mean (SD)	9.4 (4.6)	8.6 (4.5)	8.8 (4.5)	8.9 (4.6)

¹ The Asthma Control Test (ACT) is a patient self-administered tool for assessing level of asthma control.¹⁵ The ACT is a validated, 5-item questionnaire that assesses asthma symptoms, rescue medication use, daily functioning, and overall perception of asthma control, with a 4-week recall. Scores on each item range from 1 to 5 and the total score ranges from 5 to 25. ACT scores of 20–25 are classified as well-controlled asthma; 16–19 as not well-controlled; and 5–15 as very poorly controlled.¹⁴

² The Asthma Symptom Utility Index (ASUI), which assesses preference-based quality of life, is a validated, 10-item questionnaire designed to assess four asthma symptoms (cough, wheeze, dyspnea, and nocturnal awakening) and side effects from asthma medications over a 2-week recall period. The frequency and severity of each item are assessed on a 4-point Likert scale. The items are then weighted according to patient preferences, and the summary score is a continuous scale ranging from 0 (worst possible symptoms) to 1 (no symptoms).¹⁶

³ Some participants were taking both ICS and ICS/LABA.

⁴ Comorbidities included heart disease, cancer, stroke, diabetes, chronic kidney disease, COPD, Human Immunodeficiency Virus (HIV)/Acquired Immunodeficiency Syndrome (AIDS), and hypertension.

⁵ General health was assessed using question 1 from the Healthy Days Core Module (CDC HRQOL-4).¹⁷

⁶ The Everyday Discrimination Scale (EDS) is a validated questionnaire which assesses self-perceived discrimination. The questionnaire contains 9 items, each of which is measured on a 6-point Likert scale. Scores range from 1 to 54, with higher scores indicating higher perceived discrimination.¹⁸

ACT: Asthma Control Test; ASUI: Asthma Symptom Utility Index; CDC HRQOL-4: Healthy Days Core Module; COPD: chronic obstructive pulmonary disease; EDS: Everyday Discrimination Scale; ICS: inhaled corticosteroid; LABA: long-acting β_2 -agonist; LAMA: long-acting muscarinic antagonist; LTRA: leukotriene receptor antagonist; SABA: short-acting β_2 -agonist; SAMA: short-acting muscarinic antagonist; SD: standard deviation.

example, future research could address whether volunteer driver programs, access to other transportation systems, access to internet and telehealth, or addressing inequitable medication distribution may help improve equity in access to medications and medical care for those most in need.^{4,19}

Employment instability/financial difficulties

Respondents experienced significant job losses and economic hardship due to the COVID-19 pandemic. Of those

who were employed, half had their job hours cut, were put on leave, and/or lost their job completely. Not surprisingly, about half also reported difficulties paying their bills due to the pandemic. These rates are comparable to national unemployment rates reported for Black (16.7%) and Hispanic (18.9%) workers between April and December 2020.²⁰ Other literature has highlighted challenges in closing the gap on disparities for COVID prevention, treatment, and access to care for vulnerable individuals with

Table 2. Differences in vaccine hesitant versus vaccine willing groups.¹

Characteristic	Vaccine Hesitant (n = 115)	Vaccine Willing (n = 209)	P-value ²
Age (yrs), mean (SD)	49.82 (12.45)	48.72 (14.08)	0.482
Gender, n(%)			0.0907
Female	100 (87%)	166 (79%)	
Male	15 (13%)	43 (21%)	
Race/Ethnicity, n(%)			0.0015
African American/Black	41 (36%)	41 (20%)	
Hispanic/Latinx	74 (64%)	168 (80%)	
Language, n(%)			0.7323
English	77 (67%)	136 (65%)	
Spanish	38 (33%)	73 (35%)	
Region, n(%)			0.0210
Northeast	50 (44%)	78 (37%)	
Ohio Valley Central	26 (7%)	27 (13%)	
Puerto Rico	8 (7%)	16 (8%)	
Southeast	20 (17%)	43 (21%)	
Southwest	11 (10%)	45 (22%)	
Baseline ACT score, mean (SD)	14.54 (4.26)	14.11 (4.77)	0.4165
Baseline ASUI score, mean (SD)	0.68 (0.20)	0.66 (0.22)	0.4201
Baseline asthma medication use, n(%)			
Short-acting bronchodilator rescue inhaler (SABA, SAMA, SABA/SAMA)	115 (100%)	209 (100%)	0.4656
Inhaled corticosteroid (ICS)	42 (37%)	69 (33%)	0.5244
ICS/LABA	86 (75%)	161 (77%)	0.6488
Long-acting bronchodilator (LABA, LAMA, LAMA/LABA)	24 (21%)	37 (18%)	0.4854
Leukotriene receptor antagonist (LTRA)	73 (63%)	115 (55%)	0.1401
Biologic	10 (9%)	14 (7%)	0.5113
Baseline history of asthma hospitalization in past year, n(%)			0.8556
0	88 (77%)	166 (79%)	
1	15 (13%)	26 (12%)	
2	6 (5%)	7 (3%)	
3+	6 (5%)	10 (5%)	
Baseline number of comorbidities, n(%)			0.7572
0	33 (29%)	62 (30%)	
1	26 (23%)	39 (19%)	
2	22 (19%)	37 (18%)	

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Table 2 (continued)

Characteristic	Vaccine Hesitant (n = 115)	Vaccine Willing (n = 209)	P-value ²
3	15 (13%)	38 (18%)	
4+	19 (16%)	33 (16%)	
General health (CDC HRQOL-4), n(%)			0.8887
Excellent	2 (2%)	3 (1%)	
Very good	13 (11%)	20 (10%)	
Good	37 (31%)	77 (37%)	
Fair	48 (42%)	87 (41%)	
Poor	15 (13%)	22 (11%)	
Days per month physical health not good, mean (SD)	13.46 (11.12)	10.52 (10.20)	0.0168
Days per month mental health not good, mean (SD)	8.36 (10.13)	8.74 (10.25)	0.7447
Baseline EDS score, mean (SD)	9.05 (4.44)	8.64 (4.56)	0.4339

¹ N values total to 324 as one survey respondent did not respond to this question.

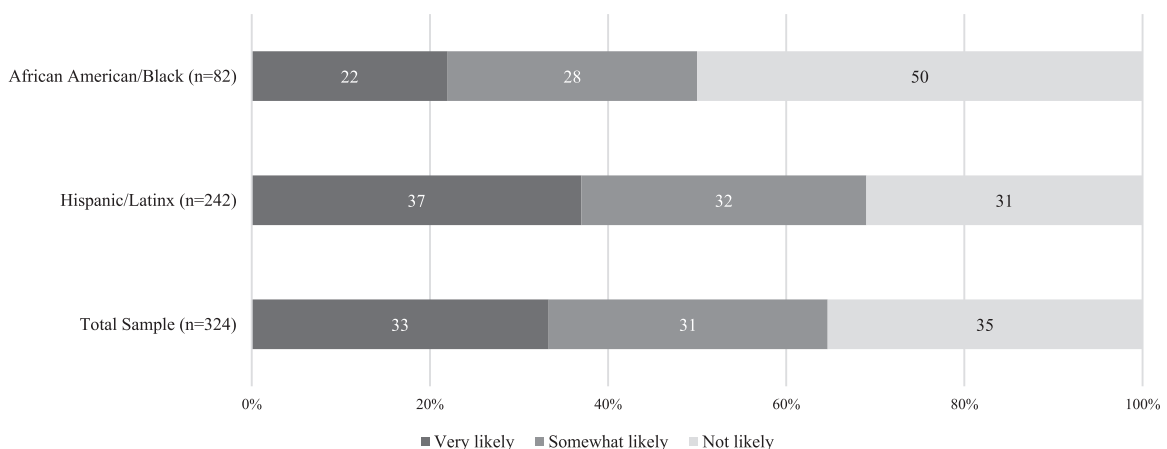
² Bolded p-values indicate statistical significance of p < 0.05.

ACT: Asthma Control Test; ASUI: Asthma Symptom Utility Index; CDC HRQOL-4: Healthy Days Core Module; EDS: Everyday Discrimination Scale; ICS: inhaled corticosteroid; LABA: long-acting β₂-agonist; LAMA: long-acting muscarinic antagonist; LTRA: leukotriene receptor antagonist; SABA: short-acting β₂-agonist; SAMA: short-acting muscarinic antagonist; SD: standard deviation.

limited financial resources.⁴ For example, a recent review examining the disparate health impact of the COVID-19 pandemic on the H/L population found that only 16.2% of H/L workers held jobs that would allow them to telecom-

mute.²¹⁻²³ Only 20% of AA/B have the privilege of working at home.²⁴ Our study’s findings are consistent with other reports describing the effects of social determinants of health (such as job instability and economic hardship)

Fig. 1. Proportion (%) of respondents who reported being very likely, somewhat likely, and not likely to take a free COVID-19 vaccine. Percentages may not total to 100 due to rounding.



contributing to health disparities, for example, through loss of employer-provided health care coverage and financial stress. Individuals experiencing significant financial pressures and employment instability might need to focus on immediate needs for survival before prioritizing prevention activities, such as vaccination.²⁵

Vaccine hesitancy and unwillingness

Our study, in which approximately one-third of respondents reported being unwilling to receive vaccination, is consistent with other published reports of AA/Bs and H/Ls reporting relatively high levels of vaccine unwillingness.^{5–9,11,12} In our study, AA/B respondents reported statistically significantly higher levels of unwillingness (50%) to receive a free COVID-19 vaccine than H/L individuals (31%). The level of vaccine unwillingness among AA/Bs in our study is higher than in another recent publication which reported vaccine hesitancy or mistrust among 32–35% of AA/Bs.²⁶ Medical mistrust, safety concerns, and/or past or current experiences with racism may all be reasons for this finding, and have been described in other reports. For example, a recent publication examining levels of COVID-related medical mistrust among 101 HIV-positive AA/B individuals also found high levels of medical mistrust around COVID-19, including vaccine and treatment hesitancy.²⁶ There is a robust literature documenting the current and historical systemic racism and mistreatment which has contributed to medical mistrust among communities of color in the United States.^{25,27,28} It may also be possible that our study participants were influenced by the larger climate of uncertainty and polarization around the vaccine during the survey time period of May–August, 2020, which may have resulted in higher levels of vaccine hesitancy. Indeed, recent national polls indicate that vaccine hesitancy among African Americans has decreased in recent months to be lower than many other groups, illustrating the dynamic shifting nature of this issue.²⁹

Another novel finding is that individuals reporting poor health (>13 days per month, among our respondents) were more likely to report higher levels of vaccine hesitancy or unwillingness. Although this finding was modest, it is clinically relevant as it speaks to the fact that individuals with a high burden of illness may be a group with whom it is important to address concerns about side effects or the effort required to access the vaccine.

Taken together, these findings point to the importance of addressing COVID vaccine hesitancy or unwillingness in the context of a person's other concerns, especially if they report poor health, socioeconomic stressors, mistrust, anxiety, and/or other signs of ambivalence or uncertainty

about vaccination. Previous reports have shown that, for AA/Bs, knowledge about the vaccine in and of itself is not associated with a higher receipt of vaccination. Making an informed choice about vaccination may be based on assessment of the degree of trust in the source of information, rather than on specific content.³⁰ It is therefore likely to be important to build upon a foundation of trust and rapport, and also focus on addressing concerns and highlighting safety.¹¹

There is consensus across the literature that AA/Bs and H/Ls value their physician(s) and other health care team members as trusted sources of information (especially relative to other sources such as the media, government, or industry/pharmaceutical companies). Studies have shown that a strong provider recommendation is one of the most potent factors associated with vaccine uptake.³¹ Distrust of doctors generally decreases willingness to vaccinate, and this effect is largest among AA/Bs.¹¹ In addition, high levels of distrust among AA/Bs towards the government, FDA, CDC, and pharmaceutical companies^{6,32} impacts decision-making about vaccination.³³

In addition to a recommendation from a trusted provider/source,³⁴ a collaborative communication style has also been shown to help close the gap on disparities in vaccination.^{35,36} Strategies to optimize collaborative communication at the level of the patient-clinician interaction³⁵ include making a clear recommendation while engaging with the person's concerns, having a collaborative non-judgmental style, anticipating and responding to ambivalence, and addressing safety and side effect concerns in the context of the individual's health goals and motivations.

It is crucial to consider culturally congruent communication and relationship-building approaches. For example, promoting *personalismo* (valuing and building interpersonal relationships, relational warmth), *confianza* (trust and familiarity), and *simpatía* (maintaining politeness and kindness) may be important factors to consider when engaging H/L communities through interventions and interpersonal communications to address COVID-19 vaccine hesitancy and unwillingness.³⁷

Results from this study also contribute to the recent growing literature emphasizing that strategies to optimize health equity will likely need to be multi-pronged, and will need to intensify community engagement and community-based interventions as a means for optimizing equitable access to vaccines.^{38,39} As the National Medical Association's COVID-19 Task Force on Vaccines and Therapeutics states, "Building equity in plans to distribute the vaccines including culturally sensitive, multi-lingual outreach tailored for local communities will be essential for closing gaps in health outcomes."⁴⁰

Limitations

Study limitations include that this was a cross-sectional survey conducted during a rapidly changing situation; it is possible that the same questionnaire would produce different results at different time points in the course of the pandemic. While 71% of PREPARE participants chose to complete the COVID-19 questionnaire, the respondents represent a convenience sample for this sub-study rather than a random sample of participants in the PREPARE trial. The generalizability of the results of this sub-study may be limited to the characteristics of the PREPARE study participants, though a strength of PREPARE is that it has broad eligibility criteria which allow for the inclusion of many patients typically excluded from asthma studies (e.g., smokers), and has few exclusions for comorbidities. Finally, we lack qualitative data for this sub-study which would have provided a richer understanding for the reasons that participants answered the questions as they did.

Importance of context in interpreting these results

During the four-month period in which this survey was administered (May–August, 2020) there was escalating polarization, tension, and ongoing demonstrations around racial injustice in the US and globally, galvanized by increasing national attention to the deaths of many AA/B men and women over the preceding year such as George Floyd, Ahmaud Arbery, Breonna Taylor, and Elijah McClain. It was also a time of uncertainty and national anxiety about many aspects of COVID, social distancing, economic and unemployment crises, and the vaccine development distribution process. While our survey questions did not explicitly ask about our respondents' views or experiences related to these issues, it is possible that the events that were (and are) ongoing influenced respondents' answers in ways we were unable to fully explore for this sub-study.

4. IMPLICATIONS

AA/B and H/L adults with asthma may experience changes in the quality of their asthma care and increased socioeconomic stressors as a result of the COVID-19 pandemic and may be hesitant or unwilling to receive a COVID-19 vaccine. Future studies should explore associations between socioeconomic stressors and asthma outcomes over time and seek to understand and optimize COVID-19 vaccine receptivity in this population.

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APPENDIX A

1. Has the COVID-19/coronavirus outbreak impacted your ability to get your asthma medicines?
 - a. Yes, I have had a more difficult time paying for them
 - b. Yes, I do not want to go to the pharmacy to pick them up because I'm afraid of getting COVID-19/coronavirus
 - c. No, it has not impacted my ability to get my asthma medicines
2. Has your medical care been changed due to the COVID-19/coronavirus outbreak?
 - a. It has gotten better
 - b. It has not changed
 - c. It has gotten worse
3. Has your job been impacted by COVID-19/coronavirus?
 - a. No, I have the same job I had before COVID-19/coronavirus

- b. No, I am not employed outside the home
 - c. Yes, my hours were cut back
 - d. Yes, I was put on a leave of absence
 - e. Yes, I lost my job
4. Has the COVID-19/coronavirus outbreak made it more difficult to pay your bills?
- a. Not at all
 - b. A little
 - c. A lot
 - d. Very much
5. If a vaccine is developed for COVID-19/coronavirus and it is free, would you take it?
- a. Very likely
 - b. Somewhat likely
 - c. Not likely

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