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COVID-19 Vaccine Intentions and Mistrust in a National Sample of Black Americans

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Abstract: Background: National data indicate low intentions for COVID-19 vaccination among a substantial minority of Black Americans, and disproportionately lower vaccination rates among Black Americans than White Americans.

Methods: A total of 207 of the 318 Black participants (65%) in the RAND American Life Panel, a nationally representative internet panel, were surveyed about COVID-19 vaccine intentions in November-December 2020. Participants' census tracts were geocoded using the Centers for Disease Control and Prevention's Social Vulnerability Index.

Results: Overall, 35% agreed or strongly agreed that they would not get a COVID-19 vaccine, 40% agreed or strongly agreed that they would get vaccinated, and 25% reported "don't know." Significant multivariable predictors of not wanting to get vaccinated included high mistrust of the vaccine itself (e.g., concerns about harm and side effects), OR (95% CI) = 2.2 (1.2-3.9), $p = .007$, and weak subjective norms for vaccination in one's close social network, OR (95% CI) = 0.6 (0.4-0.7), $p < .001$. Residence in an area of higher socioeconomic vulnerability was a marginally significant predictor, OR (95% CI) = 3.1 (0.9-11.0), $p = .08$.

Conclusions: High mistrust around COVID-19 vaccines may lower vaccine confidence. Social network members' attitudes can be influential in encouraging vaccination. Public health communications could use transparent and clear messaging on safety and efficacy, and acknowledge historical and ongoing discrimination and racism as understandable reasons for low confidence in COVID-19 vaccines. Future research is needed to consider vaccine access challenges in tandem with mistrust as contributing to low vaccination rates across health conditions.

Keywords: Black/african americans ■ COVID-19 ■ Medical mistrust ■ Vaccine confidence/hesitancy

As of late April 2021, Black Americans were 1.1 times more likely than non-Hispanic Whites to be diagnosed with COVID-19, were 2.8 times more likely to be hospitalized, and had a 1.9 times higher mortality rate.¹ Systemic inequities in social vulnerability, including higher poverty levels, lower-wage employment (e.g., as low-wage essential workers), and unstable and crowded living conditions, have led to these disparities.²⁻⁶ Social vulnerability also is associated with higher prevalences of underlying health conditions (e.g., diabetes, obesity, chronic obstructive pulmonary disease) associated with severe COVID-19 disease and death.^{7,8}

COVID-19 related inequities may be further exacerbated by lower vaccination rates among Black Americans. Soon after the November 2020 announcements by pharmaceutical companies (Pfizer-BioNTech and Moderna) about their vaccines' high efficacy, polls showed that Black Americans were less willing than individuals of other races/ethnicities to be vaccinated for COVID-19. For example, a December 2020 nationally representative telephone poll found that 35% of Black adults said they would definitely or probably not get vaccinated⁹—and mistrust of vaccines and worry about COVID-19 infection from the vaccine were listed as main reasons for not wanting to get vaccinated by about half of the Black Americans in the sample who showed low vaccine intentions. A November 2020 online survey found that 42% of Black Americans, versus 63% of Hispanic/Latinx and 61% of White adults, said they would definitely or probably get vaccinated—and by March 2021, these percentages substantially increased, although disparities persisted—with 61% of Black Americans vs. 70% of Hispanic/Latinx and 69% of White adults willing to be vaccinated or already vaccinated.¹⁰ However, despite growing vaccine confidence, Black Americans have been disproportionately less likely to be vaccinated than non-Hispanic White Americans, which is a consequence of racial and ethnic inequities in access as well as low confidence in the vaccines.¹¹⁻¹³

Multiple factors determine vaccine confidence, including the perceived value of vaccination (self-perceived risk of infection), access to vaccination (availability and affordability), and trust in the vaccine itself (i.e., in its ef-

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INTRODUCTION

Black Americans show large COVID-19 disparities in diagnoses, hospitalizations, and mortality rates.

fectiveness and safety), in healthcare systems, healthcare providers, and policymakers who support the vaccine, and in those involved in vaccine development (e.g. the pharmaceutical industry).¹⁴ Limited research has specifically focused on determinants of vaccine confidence among Black individuals. Medical mistrust (defined as distrust of the healthcare system, providers, and treatments^{15,16}) may be contributing to vaccine confidence among Black Americans. Medical mistrust has been conceptualized as an understandable, rational, self-protective response to historical and ongoing structural and interpersonal discrimination and racism in healthcare, and lack of trustworthiness of healthcare systems and institutions in U.S. society.^{15,17–20} Thus, medical mistrust may lead to avoidance of healthcare, including of vaccination, among Black Americans.

Because vaccine confidence may vary by context, time, and population, it is important to understand contributors to COVID-19 intentions for Black Americans in particular, to enable the tailoring of policy approaches by the community. Thus, we conducted an analysis of vaccine intentions in a nationally representative sample of Black Americans. We examined the extent to which socio-demographic and health-related background characteristics, medical mistrust, the perceived need for vaccination, confidence in vaccine efficacy and safety, social norms for vaccination, and neighborhood-level social vulnerability factors were associated with intentions to get vaccinated for COVID-19.

MATERIALS AND METHODS

Procedure

We conducted a web-based survey of Black Americans, starting on November 17, 2020 (about a week after public announcements by Pfizer-BioNTech and Moderna about their vaccines' high efficacy) and ending on December 2, 2020. Participants were drawn from the RAND American Life Panel (ALP), a nationally representative internet panel. All 318 self-identified Black participants in the ALP were invited to participate, and 207 completed the survey (a 65% completion rate). Participants provided online informed consent after the nature and possible consequences of the study were fully explained, and received a \$17 incentive for the 25 min survey (the standard rate for the ALP panel). Full details of the ALP's methodology are available in a prior report.²¹

Measures

The survey contained items that were developed for the study or adapted from prior research, as described below.

COVID-19 vaccine intentions. Participants were asked two questions to assess negative and positive vaccine intentions, respectively:¹⁸ “If a vaccine were available to prevent COVID-19, I would not get it,” with response options *strongly disagree*, *disagree*, *don't know*, *agree*, and *strongly agree* (dichotomized as strongly disagree or disagree vs. don't know, agree, or strongly agree); and, “Would you be willing to get a COVID-19 vaccine when it becomes available?” with response options *yes*, *no*, and *don't know/not sure* (dichotomized as yes vs. no or don't know/not sure). Two questions were asked in order to assess whether levels and correlates of vaccine intentions differed by question methodology (i.e., asking whether one would not get vaccinated vs. one's willingness to get vaccinated).

Socio-demographic and background characteristics. Socio-demographic characteristics were linked to the present study dataset from the My Household ALP survey (fielded starting October 15, 2020) and included age, gender, race, ethnicity, being U.S. born, marital status, employment status, educational level, household income, and occupational category (on a checklist; dichotomized as *healthcare practitioner and technical occupations and healthcare support occupations* vs. *non-healthcare worker occupation*). Questions were added on sexual identity (*straight or heterosexual; gay, homosexual, or same gender loving; bisexual, pansexual, or other non-monosexual identity; queer; questioning, not sure, or in transition; something else; or don't know*) and gender identity (*transgender male to female, transgender female to male, gender non-conforming, or not transgender*). We also adapted the Epidemic–Pandemic Impacts Inventory²² to assess 13 social, economic, and health consequences of COVID-19 (e.g., job loss, food insecurity), from which a summary score was derived.

Vaccine confidence and mistrust beliefs. Confidence- and mistrust-related beliefs around the vaccine were assessed with items from prior research (see Table 1),^{18,19,23–26} including perceived need for COVID-19 vaccination, perceived ease of vaccine access, and confidence in vaccine effectiveness and safety, as well as vaccine-related mistrust. Mistrust was measured as a multi-faceted construct encompassing distrust of the vaccine itself, in the government, and in health care providers and institutions that provide information about and offer the vaccine—and included perceptions of racial equity in healthcare (i.e., race-based medical mistrust). Response options for all items were *strongly disagree*, *disagree*, *don't know*, *agree*, and *strongly agree*.

Social norms around COVID-19 vaccination. Social norms items were adapted from prior research.^{27,28} Subjective social norms items (i.e., social pressure from oth-

Table 1. Vaccine confidence and mistrust beliefs subscales based on exploratory factor analysis (N = 207).

Vaccine Confidence and Mistrust Beliefs Subscales	M (SD)**	Factor Loading	% Strongly Agree	% Agree	% Don't Know	% Disagree	% Strongly Disagree
Confidence and Need Subscale (α = 0.90)	3.34 (0.78)						
It will be necessary to get a COVID-19 vaccine	3.11 (1.13)	0.77	8	34	30	16	12
Getting vaccines is a good way to protect me from disease	3.55 (1.14)	0.75	19	45	17	13	7
The COVID-19 vaccine will be important for my health	3.17 (1.21)	0.79	12	32	30	11	14
Getting vaccinated for COVID-19 is important for the health of others in my community	3.61 (1.00)	0.82	17	44	27	8	4
I generally do what my doctor or healthcare provider recommends about vaccines for me	3.51 (1.18)	0.68	18	49	7	19	7
When it comes to COVID-19, doctors have the best interests of patients in mind	3.78 (0.95)	0.45	23	45	23	8	2
The COVID-19 vaccine will be effective	3.21 (0.82)	0.75	4	30	52	9	4
The COVID-19 vaccine will be safe	3.07 (0.84)	0.69	3	24	56	12	6
It will be convenient to get a COVID-19 vaccine	3.05 (1.06)	0.58	8	26	39	18	9
It will cost too much to get a COVID-19 vaccine *	2.87 (0.92)	0.01	6	12	52	23	7
COVID-19 Vaccine Mistrust Subscale (α = 0.73)	3.60 (0.79)						
If a vaccine were available to prevent COVID-19, I would not trust it	3.20 (1.26)	0.47	22	18	23	30	7
If a vaccine were available to prevent COVID-19, I am worried that it could be harmful	3.69 (1.12)	0.68	27	37	15	18	2
I am concerned about serious side effects of a COVID-19 vaccine	4.05 (0.93)	0.68	36	42	15	7	1
New vaccines carry more risks than older vaccines	3.48 (0.95)	0.43	18	24	46	10	1
Government-related COVID-19 Mistrust Subscale (α = 0.83)	3.64 (0.81)						
The government cannot be trusted to tell the truth about COVID-19	3.70 (1.12)	0.58	30	29	24	14	3
A lot of information about COVID-19 is being held back by the government	3.72 (1.00)	0.68	23	41	24	10	2

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Table 1 (continued)

Vaccine Confidence and Mistrust Beliefs Subscales	M (SD)**	Factor Loading	% Strongly Agree	% Agree	% Don't Know	% Dis-agree	% Strongly Disagree
When it comes to COVID-19, the government is lying to us	3.54 (1.07)	0.81	21	33	29	14	3
The government is hiding information about COVID-19	3.75 (0.94)	0.86	22	43	27	7	2
People who take a COVID-19 vaccine will be like human guinea pigs	3.52 (1.08)	0.41	18	41	18	21	2
People who participate in medical research about COVID-19 vaccines or treatments are like human guinea pigs *	3.77 (0.97)	0.37	23	45	19	12	1
There is a cure for COVID-19, but it is being withheld from Black people *	2.46 (1.05)	0.25	5	7	39	27	22
COVID-19 is manmade *	3.45 (1.09)	0.45	22	22	42	9	5
Race-based COVID-19 related Mistrust Subscale ($\alpha = 0.70$)	3.09 (0.79)						
Black people should be suspicious of information from the government about COVID-19	3.07 (1.10)	0.68	11	23	35	23	8
When it comes to COVID-19, Black people cannot trust healthcare providers	2.65 (1.05)	0.56	6	13	30	39	11
When it comes to COVID-19, Black people will receive the same medical care from healthcare providers as people from other groups	3.00 (1.18)	0.42	11	24	30	23	12
Within the healthcare system, people from my racial/ethnic group are treated differently than people from other groups	3.66 (1.05)	0.6	22	41	21	13	3
I would be more comfortable having a COVID-19 vaccine explained to me from a doctor or healthcare worker with a racial or ethnic background similar to mine *	3.01 (1.15)	0.35	10	29	19	34	7

Note. The table indicates that confidence and mistrust are comprised of distrust of the vaccine itself, in the government, and in health care providers and institutions that provide information about and offer the vaccine, as well as perceptions of racial equity in healthcare.

*Item not included in subscale due to poor factor loading or low scale reliability with item. ** Response options for all items are 1=strongly disagree to 5=strongly agree.

ers such as friends and family) included “How important do you think your friends [family members] think it is to get a COVID-19 vaccine?” on a scale from 0, *not at all important*, to 100, *extremely important*; and “Of the people close to you, what proportion of them would want you to get the COVID-19 vaccine?” on a scale from 1 = *few (0–20%)* to 5 = *most or nearly all (81–100%)*. Perceived descriptive social norms (i.e., the extent to which others would get vaccinated) included, “How many people in the U.S. [of your own race] do you think will get the COVID-19 vaccine when it becomes available?” on a scale from 1 = *few (0–20%)* to 5 = *most or nearly all (81–100%)*.

Neighborhood-level variables. We derived the CDC’s Social Vulnerability Indices (overall index and four sub-components) for each participant’s census tract using 15 census variables (e.g., poverty, crowded housing) that measure “potential negative effects on communities caused by external stresses on human health.”²⁹ The four social vulnerability sub-components are: socioeconomic status; household composition and disability; minority status and language; and housing type and transportation. We also linked the survey data to the urban/rural residency variable measured in the ALP.

Statistical methods

Exploratory factor analysis. We conducted an exploratory factor analysis using varimax rotation³⁰ on the 27 items that represented the conceptual components of vaccine confidence and mistrust, shown in Table 1. Based on an eigenvalue minimum value criterion of 1, four factors were extracted and four subscales were created, retaining items with factor loadings of > 0.40. The four subscales were: confidence and need ($\alpha = 0.90$); mistrust of the COVID-19 vaccine ($\alpha = 0.73$); mistrust of the government around COVID-19 information and intentions ($\alpha = 0.83$); and race-based medical mistrust around COVID-19 ($\alpha = 0.70$). Final scale items and their descriptive statistics are shown in Table 1.

The four subscales were significantly correlated with each other: COVID-19 vaccine mistrust with the confidence and need subscale ($r = -0.46$), the government mistrust subscale ($r = 0.48$), and the race-based mistrust subscale ($r = 0.30$); the confidence and need subscale with the government mistrust subscale ($r = -0.35$) and the race-based mistrust subscale ($r = -0.29$); and the government mistrust subscale with the race-based mistrust subscale ($r = 0.42$) (all $p < 0.05$).

Logistic regressions. We conducted bivariate and multivariable logistic regressions predicting lack of intention to get vaccinated (0 = *strongly disagree/disagree* vs. 1 = *strongly agree/agree* or *don’t know*, that they would

not get vaccinated) and willingness to get vaccinated (1 = *yes* vs. 0 = *no* or *don’t know/not sure*, that they would be willing to get a COVID-19 vaccine), in separate models. Because of the large number of potential predictors (and inadequate statistical power to examine all of them simultaneously), in the multivariable logistic regression analyses, we examined independent variables in four separate conceptually distinct sets, predicting negative and positive vaccine intentions using (1) socio-demographic and background characteristics; (2) individual-level vaccine confidence and mistrust beliefs (confidence and need subscale, mistrust subscales); (3) perceived social norms; and (4) neighborhood-level variables that were significant at $p < .05$ in the bivariate models. We then conducted a final regression that included all significant variables (at $p < .05$) from the four regressions for each outcome.

Design weights were employed in all analyses to be representative of the national population of Black and African American adults. The weighting algorithm included highest educational level, age, and family income by the number of household members. Due to small cell sample sizes for gender (when gender was crossed with these variables), gender was not included in the weighting algorithm.

RESULTS AND DISCUSSION

Results

Participant characteristics. Participants were diverse demographically (see Table 2): They were 50.8 years old on average (SD = 12.7, Range = 25–86 years); 71% self-identified as female, 37% were married, and 6% were Latinx. About 14% identified as a sexual or gender minority. Most (91%) were born in the U.S. and resided in urban areas (93%). Half (50%) were not currently employed, about a quarter (23%) had a high school degree or less, and about half (48%) reported less than \$40,000 annual household income. As compared to the national population of Black and African Americans, participants were older on average, and a higher percentage were female and from the U.S. Middle-Atlantic and Pacific regions (with a lower percentage from Southern regions); these differences may be a consequence of the relatively low sample size.

Overall, over a third had low intentions to get vaccinated (11.4% agreed and 23.5% strongly agreed that they would *not* get a COVID-19 vaccine), and an additional 25.2% said “don’t know”; only two-fifths agreed (21.6%) or strongly agreed (18.4%) that they *would* get vaccinated. In addition, 30.4% said that they were willing to get vaccinated for COVID-19, 31.6% said that they were not willing to get vaccinated, and 37.9% said “don’t know/not sure.”

Table 2. Socio-demographic characteristics of the American Life Panel (ALP) survey subsample of Black Americans (n = 207) as compared to the U.S. population of Black and African American adults.

Socio-Demographic Characteristic	Current Sample *	National Population **
Age M (SD)	50.8 (12.7)	44.5
Self-reported female gender	71.3	53.1
Transgender (yes) ^a	0.5	
U.S.-Born (yes)	90.5	86.2
Latinx (yes)	6.1	4.1
Sexual Orientation ^a		
Straight or heterosexual	87.1	
Gay, homosexual, or same gender loving	2.0	
Bisexual, pansexual, or other non-monosexual identity	4.4	
Something else or don't know	6.6	
Same-sex couple ^b		1.8
Marital Status		
Married or living with a partner	36.8	30.9
Separated	5.2	5.5
Divorced	16.4	12.2
Widowed	4.3	3.3
Never married	37.3	48.0
Employment Status		
Working	50.2	59.4
Unemployed and looking for work	8.9	5.0
Temporarily laid off, on sick or other leave	3.6	0.6
Disabled, retired, or homemaker ^a	35.9	
Other ^a	1.4	
Not in labor force ^b		35.0
Highest Educational Level		
Less than high school	1.2	3.2
Some high school, no diploma	8.1	9.7
High school graduate or equivalent	14.1	32.0
Some college, no degree	30.7	26.2
Associate's degree	18.3	8.2
Bachelor's degree	11.9	13.1
Master's degree	13.4	6.0
Professional school degree	0.9	0.9
Doctorate Degree	1.5	0.7
Annual Income Level		
Less than \$5k	9.2	3.5
\$5K to \$7.499K	3.0	1.2
\$7.5K to \$9.99K	3.3	2.4

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Table 2 (continued)

Socio-Demographic Characteristic	Current Sample *	National Population **
\$10K to \$12.499K	5.3	2.5
\$12.5K to \$14.99K	1.4	1.9
\$15K to \$19.99K	3.9	4.3
\$20K to \$24.99K	4.0	4.6
\$25K to \$29.99K	5.7	4.6
\$30K to \$34.99K	4.3	4.8
\$35K to \$39.99K	7.6	4.4
\$40K to \$49.99K	7.6	8.8
\$50K to \$59.99K	7.9	7.7
\$60K to \$74.99K	9.7	10.7
\$75K to \$99.99K	8.0	12.9
\$100K to \$124.99K	8.9	8.8
\$125K to \$199.99K	7.6	11.6
\$200K or more	2.8	5.3
Urbanicity ^c		
Small to midsize city or Large city, population of ≥50,000	6.8	10.0
Rural or Small Town, population <50,000	93.2	90.0
Census Division		
New England	2.9	2.8
Middle Atlantic	28.7	14.0
East North Central	5.9	13.3
West North Central	0.0	3.5
South Atlantic	24.6	34.0
East South Central	3.9	9.0
West South Central	9.5	13.4
Mountain	2.3	2.5
Pacific	22.2	7.4

Note: The table indicates differences between the sample and the U.S. population by age and U.S. region.

*Weighted percentages or mean are presented.

**of Black Americans aged 18 years or older from American Community Survey 2019 Public Use Microdata Sample - 1-year.

^a ALP only.

^b American Community Survey only.

^c Derived from panelist's zip code and based on Census definition – for majority of population.

Bivariate and multivariable predictors of vaccine intentions. Bivariate analyses are presented in Table 3, and multivariable analyses are presented in Tables 4 and 5.

Socio-demographic and background characteristics. In bivariate tests, participants who self-identified as female and who were employed in a healthcare-related occupa-

tion were more likely to say that they would not get vaccinated, compared to those who were male and who were not employed in a healthcare-related occupation; these factors were reduced to marginal significance in the multivariable model of the socio-demographic and background characteristics block. Furthermore, partici-

Table 3. Bivariate logistic regressions predicting COVID-19 vaccine intentions with sociodemographic & background characteristics, vaccine confidence and mistrust beliefs, perceived social norms, and neighborhood-level factors (n = 207).

Predictor	Negative Intentions ^a		Positive Intentions ^b	
	OR (95% CI)	p-value	OR (95% CI)	p-value
Sociodemographic & Background Characteristics				
Age	1.0 (1.0–1.0)	0.12	1.0 (1.0–1.1)	0.01
Male	0.4 (0.2–0.8)	0.01	2.6 (1.3–5.1)	0.006
Sexual or gender minority	0.7 (0.3–1.7)	0.41	1.3 (0.5–3.4)	0.56
Married or cohabitating	0.6 (0.3–1.0)	0.06	1.3 (0.7–2.6)	0.37
Education level: College graduate	0.6 (0.3–1.1)	0.08	1.4 (0.8–2.7)	0.27
Income > \$40,000 annually	1.7 (0.9–3.2)	0.09	0.7 (0.4–1.3)	0.25
Healthcare-related occupation	3.0 (1.2–7.3)	0.02	0.6 (0.2–1.4)	0.23
Negative COVID-19 impacts	1.2 (1.0–1.5)	0.11	0.7 (0.6–0.9)	0.004
Vaccine Confidence and Mistrust Beliefs				
Confidence and Need	0.4 (0.2–0.6)	<0.001	14.4 (4.1–50.7)	<0.001
Government-related COVID-19 Mistrust	1.7 (1.1–2.5)	0.009	0.4 (0.2–0.6)	<0.001
COVID-19 Vaccine Mistrust	3.3 (2.0–5.4)	<0.001	0.2 (0.1–0.3)	<0.001
Race-based COVID-19 related Mistrust	1.3 (0.9–1.9)	0.16	0.6 (0.4–0.8)	0.004
Perceived Social Norms				
Subjective social norm: friends ^c	1.0 (1.0–1.0)	<0.001	1.1 (1.0–1.1)	<0.001
Subjective social norm: family ^c	1.0 (1.0–1.0)	<0.001	1.0 (1.0–1.1)	<0.001
Subjective social norm: people close to you ^d	0.5 (0.4–0.6)	<0.001	3.3 (2.2–4.8)	<0.001
Descriptive social norms: people in the U.S. ^d	0.6 (0.4–0.8)	0.001	2.5 (1.6–3.8)	<0.001
Descriptive social norms: people of your own race ^d	0.5 (0.4–0.7)	<0.001	2.8 (2.0–4.0)	<0.001
Neighborhood-Level Factors				
Social Vulnerability Index	3.0 (1.0–9.0)	0.05	0.2 (0.1–0.8)	0.02
Socioeconomic status vulnerability	3.5 (1.2–10.3)	0.03	0.2 (0.1–0.7)	0.01
Household composition vulnerability	1.7 (0.6–4.6)	0.29	0.5 (0.2–1.4)	0.19
Racial-ethnic/language vulnerability	3.0 (0.8–11.6)	0.11	0.4 (0.1–1.5)	0.19
Housing/transportation vulnerability	1.6 (0.6–4.9)	0.37	0.3 (0.1–1.0)	0.05
Urban (vs. rural) Resident	0.4 (0.1–1.3)	0.11	2.1 (0.6–6.8)	0.23

Note. Significant Odds Ratios (ORs) (p < .05) are bolded.

^a Strongly disagree/disagree (vs. strongly agree/agree or don't know) with the statement, "If a vaccine were available to prevent COVID-19, I would not get it"; 18% strongly disagreed, 22% disagreed, and 25% said "don't know".

^b Response of "yes" (vs. "no" or "don't know/not sure") to the question, "Would you be willing to get a COVID-19 vaccine a year from now?"; 30% responded yes, 32% responded no, and 38% responded don't know.

^c 0 = Not Important to 100 = Very Important.

^d 1 = Few (0–20%), 2 = Less than half (21–40%), 3 = Around half (41–60%), 4 = More than half (61–80%), 5 = Most or nearly all (81–100%).

Table 4. Multivariable logistic regressions (by separate blocks and overall) predicting negative COVID-19 vaccine intentions with sociodemographic and background characteristics, vaccine confidence and mistrust beliefs, perceived social norms, and neighborhood-level factors (n = 207).

Predictor	Negative Intentions ^a		Final Multivariable Model	
	Separate Multivariable Models (by Block)		OR (95% CI)	p-value
Sociodemographic & Background Characteristics Block				
Age	1.0 (1.0–1.0)	0.68		
Male	0.5 (0.3–1.1)	0.10		
Healthcare-related occupation	2.5 (1.0–6.4)	0.05		
Negative COVID-19 impacts	1.2 (0.9–1.4)	0.18		
Vaccine Confidence and Mistrust Beliefs Block				
Confidence and Need	0.5 (0.3–0.9)	0.02	0.9 (0.5–1.7)	0.82
Government-related COVID-19 Mistrust	1.0 (0.6–1.7)	0.95		
COVID-19 Vaccine Mistrust	2.8 (1.6–4.8)	<0.001	2.2 (1.2–3.9)	0.007
Race-based COVID-19 related Mistrust	0.8 (0.5–1.4)	0.43		
Perceived Social Norms Block				
Subjective social norm: friends ^b	1.0 (1.0–1.0)	0.30		
Subjective social norm: family ^b	1.0 (1.0–1.0)	0.99		
Subjective social norm: people close to you ^c	0.6 (0.4–0.8)	0.004	0.6 (0.4–0.7)	<0.001
Descriptive social norms: people in the U.S. ^c	1.1 (0.6–1.9)	0.80		
Descriptive social norms: people of your own race ^c	0.9 (0.6–1.4)	0.62		
Neighborhood-Level Factors Block				
Socioeconomic status vulnerability	3.5 (1.2–10.4)	0.02	3.1 (0.9–11.0)	0.08

Note. Significant Odds Ratios (ORs) are bolded. For all model results N=206 as response was missing for one individual. Overall weighted mean was imputed when predictors were missing; data were missing for n=0 (for most items in this table) to n=5 (3%; for healthcare-related occupation).

^a Strongly disagree/disagree (vs. strongly agree/agree or don't know) with the statement, "If a vaccine were available to prevent COVID-19, I would not get it."

^b 0 = Not Important to 100 = Very Important.

^c 1 = Few (0–20%), 2 = Less than half (21–40%), 3 = Around half (41–60%), 4 = More than half (61–80%), 5 = Most or nearly all (81–100%).

participants who were older, self-identified as male, and experienced a lower number of negative consequences from COVID-19 showed greater willingness to get vaccinated than those who were younger, female, and did not experience as many negative consequences; except for age, these factors remained significant in the multivariable model of the socio-demographic and background characteristics block.

Vaccine confidence and mistrust beliefs. Bivariate tests indicated that participants who mistrusted the COVID-19 vaccine itself, who mistrusted the government around

COVID-19, and who held weaker confidence in the COVID-19 vaccine, were more likely to say that they would not get vaccinated. In contrast, participants who had greater trust in the vaccine, in healthcare providers, and in the government around COVID-19, as well as stronger confidence in the vaccine, were more willing to get vaccinated, and those who had higher levels of race-based mistrust were less willing to get vaccinated.

The multivariable models for these vaccine beliefs indicated that greater mistrust of and lower confidence

Table 5. Multivariable logistic regressions (by separate blocks and overall) predicting positive COVID-19 vaccine intentions with sociodemographic and background characteristics, vaccine confidence and mistrust beliefs, perceived social norms, and neighborhood-level factors (n = 207).

Predictor	Positive Intentions ^a			
	Separate Multivariable Models (by Block)		Final Multivariable Model	
	OR (95% CI)	p-value	OR (95% CI)	p-value
Sociodemographic & Background Characteristics Block				
Age	1.0 (1.0–1.1)	0.14		
Male	2.2 (1.0–4.4)	0.04	1.9 (0.6–6.5)	0.30
Healthcare-related occupation	0.8 (0.3–2.1)	0.62		
Negative COVID-19 impacts	0.8 (0.6–1.0)	0.04	0.9 (0.6–1.4)	0.68
Vaccine Confidence and Mistrust Beliefs Block				
Confidence and Need	14.3 (5.3–38.7)	<0.001	6.2 (1.9–20.4)	0.003
Government-related COVID-19 Mistrust	0.6 (0.3–1.1)	0.08		
COVID-19 Vaccine Mistrust	0.2 (0.1–0.4)	<0.001	0.2 (0.1–0.6)	0.004
Race-based COVID-19 related Mistrust	1.6 (0.7–3.5)	0.23		
Perceived Social Norms Block				
Subjective social norm: friends ^b	1.0 (1.0–1.1)	0.16		
Subjective social norm: family ^b	1.0 (1.0–1.0)	0.53		
Subjective social norm: people close to you ^c	2.1 (1.3–3.4)	0.004	2.0 (1.3–3.2)	0.002
Descriptive social norms: people in the U.S. ^c	0.7 (0.3–1.6)	0.35		
Descriptive social norms: people of your own race ^c	1.8 (1.0–3.2)	0.04	1.3 (0.7–2.4)	0.34
Neighborhood-Level Factors Block				
Socioeconomic status vulnerability	0.2 (0.1–0.7)	0.01	0.2 (0.0–1.8)	0.17

Note. Significant Odds Ratios (ORs) are bolded. For all model results N = 207. Overall weighted mean was imputed when predictors were missing; data were missing for n = 0 (for most items in this table) to n = 5 (3%; for healthcare-related occupation).

^a Response of “yes” (vs. “no” or “Don’t Know/Not Sure”) to the question “Would you be willing to get a COVID-19 vaccine a year from now?”.

^b 0 = Not Important to 100 = Very Important.

^c 1 = Few (0–20%), 2 = Less than half (21–40%), 3 = Around half (41–60%), 4 = More than half (61–80%), 5 = Most or nearly all (81–100%).

in COVID-19 vaccines were associated with lower vaccine intentions for both outcomes; additionally, mistrust in the government around COVID-19 information was marginally associated with lower willingness to get vaccinated.

Perceived social norms. In bivariate models, participants who had lower subjective and descriptive norms for COVID-19 vaccination showed lower vaccine intentions for both outcomes. In the multivariable model for the social norms block for negative intentions, the only remaining significant predictor was perceived subjective norms for “people close to you” wanting one to get vaccinated;

for positive intentions, both perceived subjective norms for “people of your own race” and “people close to you” remained significant.

Neighborhood-level variables. Bivariate models showed that participants who resided in areas of greater social vulnerability overall, and of greater social vulnerability related to socio-economic status, showed lower vaccine intentions for both outcomes. Because the overall and socio-economic social vulnerability variables were highly correlated (r = 0.94), and because socio-economic vulnerability showed the largest effects, only the socio-economic vulnerability sub-

component was included in multivariable analyses going forward.

Final multivariable predictors of vaccine intentions.

As shown in [Table 4](#), for the outcome of negative vaccine intentions, the final model combining all significant predictors from the four regressions of each conceptual grouping of variables indicated that participants who held stronger mistrust beliefs about the vaccine itself, and who perceived weaker subjective norms for vaccination regarding people close to them, were more likely to say that they would not get vaccinated. Residing in an area of higher (vs. lower) socio-economic vulnerability was marginally associated with not wanting to get vaccinated. For the outcome of positive vaccine intentions ([Table 5](#)), those who trusted the vaccine itself and who held stronger confidence beliefs about the vaccine, and who perceived stronger subjective norms for vaccination, showed higher willingness to get vaccinated.

Sensitivity analysis. Because our main analyses categorized “don’t know” responses with responses indicative of negative vaccination intentions (i.e., with responses that one would not get vaccinated, or was not willing to get vaccinated), we conducted a follow-up sensitivity analysis, in which we ran a series of bivariate multinomial logistic regressions modeling vaccination intentions with responses classified separately as positive intentions (would or willing to get vaccinated), negative intentions (would not or not willing to get vaccinated), or “don’t know.” Relative to positive intentions, significant predictors of “don’t know” and negative intentions to get vaccinated were generally the same. However, the magnitude of the associations for the predictors of vaccine beliefs and perceived social norms was greater for positive intentions to get vaccinated than for “don’t know” responses (results shown in online Supplemental Appendices A and B).

Discussion

In this nationally representative sample of Black Americans, surveyed about a week after public announcements about vaccine efficacy, we found low intentions to get vaccinated for COVID-19 among about a third of those surveyed (using two different question wordings), similar to previously reported levels at that time.⁹ Interestingly, a high proportion of respondents endorsed “don’t know” or “not sure” when asked about their intention or willingness to be vaccinated (a quarter of those who were asked if they “would not” get vaccinated, and 38% of those who were asked if they were willing to get vaccinated). Such individuals may have felt that they did not yet have sufficient information about the vaccine to make an informed deci-

sion, but they may be more open to change than those who stated that they would not get vaccinated.

The present study found that mistrust of the vaccine, concerns about potential harm and side effects, and lack of confidence in vaccine effectiveness and safety are primary factors underlying low vaccine intentions. Previous studies on influenza as well as COVID-19 vaccine hesitancy^{23,27,31} have shown similar results and also have suggested that concerns about safety and efficacy are higher among Black Americans compared to White and Latinx adults. Our analysis further suggests that vaccine-related mistrust is a multifaceted construct that includes distrust of healthcare and healthcare providers (to be equitable), the government (to provide truthful information), and the vaccine itself (to be safe), as well as lack of confidence in vaccine efficacy. Perceived social norms were also important correlates of vaccine intentions, with participants who believed that close others wanted them to get vaccinated being more willing to get vaccinated. Bolstering confidence in our results, these effects were mostly consistent across the two measures of intentions.

Additionally, residence in neighborhoods with higher levels of social vulnerability, especially related to socioeconomic status, was associated with unwillingness to get vaccinated. These same types of neighborhoods—those with greater social vulnerability—have been the most affected by COVID-19 and also show lower vaccination rates.^{5,32} Such neighborhoods may have more residents with lower-wage jobs as essential workers, a higher proportion of individuals living with chronic health conditions, and inadequate healthcare access. Such factors may not only increase COVID-19 risk but also increase medical mistrust if the government response to COVID-19 is perceived to be inequitable. For example, media reports suggest that resources for COVID-19 treatment are less adequate in hospitals in lower-income areas with greater COVID-19 prevalence, compared to hospitals in higher-income areas with lower prevalence.³³ Moreover, the initial disorganized vaccine roll-out in many states combined with some states’ lack of first-tier prioritization of non-healthcare essential workers for vaccination may increase mistrust, if such actions are perceived to be intentional government policies that increase or foster inequities.

A key limitation of our analysis is the small sample size, which led to design weights that did not include all key characteristics, such as gender, as well as insufficient statistical power. For example, the effect for social vulnerability was marginally significant in the final model, but significant in bivariate analyses, possibly because of the low sample size to detect geographic differences. In addition, the sample did not include sufficient proportions of especially vulnerable subgroups to examine differences in

vaccine intentions, including youth and young adults, sexual and gender minority individuals, and individuals not born in the U.S., who are affected by large health disparities due to intersectionality of identities and inequalities. Moreover, this study only included Black Americans, and thus we could not test whether predictors of vaccine intentions differed by racial/ethnic group. Finally, the present study was conducted prior to the wide-scale availability of vaccination in the U.S., and attitudes about COVID-19 vaccination may have changed since these data were collected.

IMPLICATIONS

The present study results suggest a need to develop public health messaging prior to launching vaccination roll-out efforts and can inform efforts to increase vaccination for health conditions, beyond COVID-19. In the short term, in addition to transparent and clear messaging detailing safety and potential side effects, acknowledgment of systemic racism and medical mistrust should be explored as a health communication strategy. Moreover, it is essential to determine reasons for lack of vaccination in distinct, meaningful Black subgroups and communities, such as areas of greater socio-economic vulnerability, to tailor messages while working to determine acceptable and trusted vaccine access points among healthcare facilities and community-based organizations. Longer-term, there is a need to establish authentic community collaborations to increase the trustworthiness of the government, the pharmaceutical industry, and health care organizations, so that ongoing positive partnerships are in place to enhance the resilience of communities for future public health challenges, beyond COVID-19.²⁰

SUPPLEMENTARY MATERIALS

Supplementary material associated with this article can be found, in the online version, at doi:[10.1016/j.jnma.2021.05.011](https://doi.org/10.1016/j.jnma.2021.05.011).

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