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Parental COVID-19 Vaccine Hesitancy in Diverse Communities: A National Survey

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The authors have no conflicts of interest to disclose.

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Received for publication November 15, 2021; accepted June 27, 2022.

ABSTRACT

OBJECTIVE: We surveyed a diverse group of US participants to understand parental coronavirus disease 2019 (COVID-19) vaccine hesitancy.

METHODS: We administered a telephone and online survey from May 7 to June 7, 2021 using stratified sampling to ensure robust sample sizes of racial and ethnic minorities. Of the 20,280 contacted, 12,288 respondents completed the survey (response rate 61%). We used chi-square tests and adjusted risk ratios to compare results by racial/ethnic group.

RESULTS: Overall, 23% of parents stated that they plan to (or have) vaccinated their children; 30% said that they would not vaccinate their children, and 25% were unsure. Latino/a, Native American, and Asian American-Pacific Islander (AAPI) parents were generally more likely to vaccinate their children than Black or White parents. After adjusting for demographic factors, AAPI parents were significantly more likely to vaccinate their children than were others. Of parents who said that they would not vaccinate their child, 55% stated it was due to insufficient research.

However, over half of parents stated that they would follow their child's health care provider's recommendations. After adjusting for demographic factors, trust in their primary care doctor was significantly lower among AAPI, Black, and Native American parents than White parents.

CONCLUSIONS: Parental vaccine hesitancy was similar overall, but drivers of hesitancy varied by racial/ethnic groups. While the perception that vaccines had been "insufficiently researched" was a major concern among all groups, we found that parents are generally inclined to follow health providers' recommendations. Health professionals can play an important role in COVID-19 vaccine education and should provide access to vaccines.

KEYWORDS: coronavirus disease 2019; immunizations; pediatrics; severe acute respiratory syndrome coronavirus 2; vaccine hesitancy

ACADEMIC PEDIATRICS 2022;22:1399–1406

WHAT'S NEW

We conducted a survey on pediatric coronavirus disease 2019 vaccines in diverse populations in the United States, including Asian American-Pacific Islanders and Native Americans. We found that vaccine hesitancy was common; however, parents had a high level of confidence in their child's pediatrician.

ALTHOUGH THE INCIDENCE and severity of coronavirus disease 2019 (COVID-19) is lower in children than adults, more than 12 million children have been diagnosed with COVID-19 in the United States, over 40,000 children have been hospitalized, and over 600 children have died as of the end of March 2022.^{1,2} The emergence of the highly transmissible Delta and Omicron variants have led

to increased number of cases in children, with over 3.5 million cases in children in January 2022 alone.² In addition, thousands of children have suffered mental and physical health impairments from post-infectious consequences of COVID-19: including "long COVID"³ and Multi-system Inflammatory Syndrome in Children (MIS-C).⁴ There have also been significant impacts from the pandemic on mental health^{5,6} and education, secondary to loss and pandemic-induced trauma.⁷

The United States Food and Drug Administration authorized the BNT162b2 mRNA COVID-19 vaccine for use in children who are over 5 years old on October 29, 2021.^{8,9} In addition, the Centers for Disease Control and Prevention (CDC) Advisory Group on Immunization Practices recommends the vaccine for children age 5 and older as of November 2, 2021.^{8,9} Nevertheless, the

percentage of children 5 to 11 years who are fully vaccinated is only 29% as of June 1, 2022.¹ Ongoing studies are evaluating vaccines for younger children¹⁰ but there is substantial concern about low future vaccination coverage for that age group as well.¹¹ Surveys on parental COVID-19 vaccine hesitancy have assessed risk factors¹² and estimated parental hesitancy nationally.^{13,14} In particular, prior surveys have noted disparities in vaccine intent with Black parents being more hesitant.^{13,14} However, these studies have not included large numbers of racial and ethnic minorities. These surveys have had relatively low numbers of parents from Native American and Asian American-Pacific Islander (AAPI) populations.

We conducted a national survey of vaccine intentions and factors influencing those intentions among AAPI, Black, Latino/a, Native American, and White populations in the United States. In this paper, we analyzed responses from a subset of participants in our survey, specifically, those who are parents, about their desire to vaccinate their children.

METHODS

Our goal was to obtain a sample that is reflective of the diverse cross-section of the American public. We employed “best practices” in the social sciences to accurately sample America’s increasingly diverse and hard-to-reach populations.¹⁵ To recruit participants, the African American Research Collaborative (AARC) contracted with Barreto, Segura and Partners Research, a polling firm with access to panel vendors with large samples of Americans across all racial and ethnic groups.^{16,17} Vendors randomly recruit participants to complete self-administered surveys through either the phone (landline and cell) or over the web. This process resulted in a randomized and stratified sample with over-samples of racial and ethnic minorities, making this data collection approach useful for studying vaccine confidence among racial and ethnic groups.

Each invitation to complete a survey comes with information regarding the privacy policy and a reminder that participation is voluntary and confidential. No deception was employed in the survey. Respondents were not explicitly informed at the beginning of the survey that it was for research purposes, but they were informed when they agreed to take the survey that the results might be used for research. Respondents are incentivized in a variety of ways depending on the supplier used to complete surveys (eg, by earning points/tokens that can be converted into gift cards). In general, survey reward policies and incentives are intended to be unattractive to professional survey takers but serve as a genuine token of appreciation for participants.

Respondents were offered the opportunity to be interviewed through the phone (with live interviews through their cell or landline devices) or via self-administered online surveys (with recruitment using text messages and emails).¹⁸ The phone sample included both cell-only households as well as those with landlines. The internet-based sample included a comprehensive mix of text-to-web recruitment, email-invitation, and the integration of

online panels purchased from panel companies with expertise in hard-to-reach populations and racial/ethnic minorities. Overall, 31% of respondents completed the survey on the phone and 69% online. This approach allowed our research team to maximize coverage of many Americans who lack access to high speed internet and to increase response rates.^{19,20}

We used pre-stratification randomized quota sampling as a starting point to generate nationally representative samples of diverse populations, and we then added post-stratification weights to bring the resulting sample into balance with known census demographic estimates for each racial and ethnic group in the sample. Previous research using this AARC survey confirms that their post-stratification weighting approach yields a sample reflective of the US population.²¹ Specifically, given low and unequal response rates in modern polling research,^{22,23} we used pre-stratification quotas, randomly selecting within strata, to ensure large and representative sample sizes for key demographics including nativity, socio-economic status, and language use. For each racial and ethnic group, post-stratification weights used a raking algorithm to balance the sample with estimates from the 2019 Census.

A total of 20,280 respondents were contacted, of whom 12,377 completed the survey for a completion rate of 61%. We made up to 3 follow-up contacts to respondents across all modes which improved response rates. To decrease the potential for bias through web respondents, an algorithm detected and removed computer generated “bots” by screening for time taken to complete the survey on-line. The survey also had 2 attention checkpoint questions that requires respondents to answer correctly to continue the survey. The survey was fielded May 7 to June 7, 2021 in English, Spanish, Chinese, Korean, and Vietnamese, and was fielded shortly after the Pfizer vaccine was recommended for adolescents between 12 and 15 years old. The questionnaire was not formally pre-tested, but several measures were used in prior surveys conducted by the AARC and Barreto, Segura and Partners Research, and many COVID-19-related questions were similar to those used in prior surveys about COVID-19 vaccine hesitancy,²⁴ including the CDC’s COVID-19 Rapid Community Assessment Guide that was used by our team as a starting point for instrument development.²⁵

Participants self-identified their race and ethnicity based on selection options provided by the research team. We analyzed the sub-sample of parents (n = 3232) with children living at home, measured as: *Are you the parent or primary caregiver of a child who is 18 years of age or younger?* All respondents who reported that they had a child under the age of 18 at home were included in our analyses. A parent was included in our analyses regardless of whether they had one or multiple children under their care.

Parents with a child (or children) living at home were asked several questions about vaccination for their children. Specifically, parents were asked about their intent to vaccinate their child with the question (note that the Pfizer vaccine had been recommended for children 16 to 17 years for

some time so responses clarified child ages): *Although the vaccine rollout is currently focused on adults, soon there will be a similar effort to vaccinate children across the country. As vaccines become available for those under age 18, do you plan to sign your child/children up for the vaccine?* Responses included: “Yes, I will sign up a 16- or 17-year-old” (or “12–15 years” or “child 11 or younger,” as appropriate), “I have already vaccinated my 16- or 17-year-old,” “I will vaccinate my older children but not the younger ones,” “No I will not sign up my child,” and “Don’t know/it depends.” Among those who stated “No” or “Don’t know/it depends” we asked: *Why are you not planning to sign up your child for a vaccine?* All parents were asked: *I will do what my child's pediatrician, doctor or health care provider recommends about the COVID-19 vaccine for my child/children with 5 possible responses ranging from total disagree to strongly agree.* We also asked about sources of trusted information about COVID-19 vaccination by asking: *On a scale of 0 to 10, with 0 meaning you do not trust at all and 10 meaning you totally trust, how much would you trust each of the following if they participated in a campaign to encourage Americans to get the COVID-19 vaccine?* Consistent with the approach used in previous AARC surveys, and borrowing conventions from the extant literature on “trusted messengers,”^{26,27} parents who selected scores of 8 to 10 were categorized as having a high level of trust in those sources.

We compared results of bivariate analyses by race and ethnicity using chi-square tests of independence for parents who were AAPI, Black, Latino/a, Native American, and White. We did not test for contrasts between 2 specific race and ethnicity groups because there is no obvious 2-group comparison. For the multivariate analyses, we calculated adjusted rate ratios (aRRs) and 95% confidence intervals to account for demographic factors that might contribute to vaccine hesitancy.²⁸ All statistical analyses were conducted using Stata, version 17.

RESULTS

A total of 3232 parents completed the survey. The race or ethnicity of parents with children at home was AAPI (18%), Black (17%), Latino/a (25%), Native American (18%), and

White (22%). Among all parents, 40% had a college degree or higher; 42% were from a large city or urban area; also, 54% of parents were fully vaccinated. Supplementary Table 1 allows for comparisons between parents and non-parents across various demographic categories.

Overall, 4% of parents of 16- to 17-year-olds already had their children vaccinated, and 23% of these parents stated on the survey that either they had or will have their children vaccinated (Table 1). As a point of reference (and according to the May 30, 2021 results from the CDC’s COVID Data Tracker),¹ roughly 20% of children aged 12 to 15 had received the vaccine when the survey was administered.²⁹ Table 1 also shows that parental intent to vaccinate their children differed by race and ethnicity. AAPI (45%), Latino/a (33%), and Native American parents (42%) had a higher intent to vaccinate than Black (23%) or White (20%) parents ($P < .001$ by chi-square test).

Parents who said that they were not going to vaccinate their child[ren] were asked why they would not vaccinate them (Figure). The 2 most common reasons parents gave for not vaccinating their child[ren] were the perceived lack of sufficient research (55%) and the concern about long lasting health problems or side effects (40%). Figure reveals that concerns about insufficient research were most prevalent among White parents (63%). However, this sentiment was also present among other groups: AAPI (48%), Black (39%), Latino (38%), and Native American (50%) ($P < .01$). White parents were also more likely to believe that their child did not need the vaccine once the adults were vaccinated (15%) while AAPI (3%), Black (4%), Latino/a (3%), and Native American (5%) had lower levels of hesitancy about their child’s need for a vaccine ($P < .01$). A high proportion (more than 30% in all groups, and no statistical differences across groups) agreed with the statement that COVID-19 vaccine might cause lasting health problems for their children. Likewise, a sizable proportion of parents who were not intending to vaccinate their child agreed with the statement that they “did not believe in vaccinating children [with COVID-19 vaccine];” differences across groups were statistically significant: AAPI (32%), Black (26%), Latino/a (18%), Native American (22%) and White (22%) ($P < .01$).

Table 1. Parental Interest in Vaccinating Their Children, Response to the Following Question: *Although the Vaccine Rollout Is Currently Focused on Adults, Soon There Will Be a Similar Effort to Vaccinate Children Across the Country. As Vaccines Become Available for Those Under Age 18, Do You Plan to Sign Your Child/Children up for the Vaccine?*

	Total	AAPI N = 637	Black N = 485	Latino N = 814	Native American N = 694	White N = 602	Chi-Square P Value
Yes, will sign up a 16 or 17 year old	16%	16%	18%	20%	16%	13%	$P = .004$
Yes, will sign up a child age 12 to 15 years	15%	23%	12%	20%	17%	12%	$P = .003$
Yes, will sign up a child 11 or younger	17%	22%	13%	17%	18%	16%	$P < .001$
I have already vaccinated my 16 or 17 year old	4%	7%	5%	3%	8%	3%	$P = .006$
I will vaccinate my older children but not the younger ones	4%	5%	4%	6%	2%	3%	$P = .014$
No, will not sign up my child	30%	17%	30%	21%	28%	36%	$P < .001$
Don't know/it depends	22%	19%	26%	21%	19%	22%	$P = .128$
Total all children (have/will vaccinate [d])	23%	45%	23%	33%	42%	20%	$P < .001$

AAPI indicates Asian American-Pacific Islander.

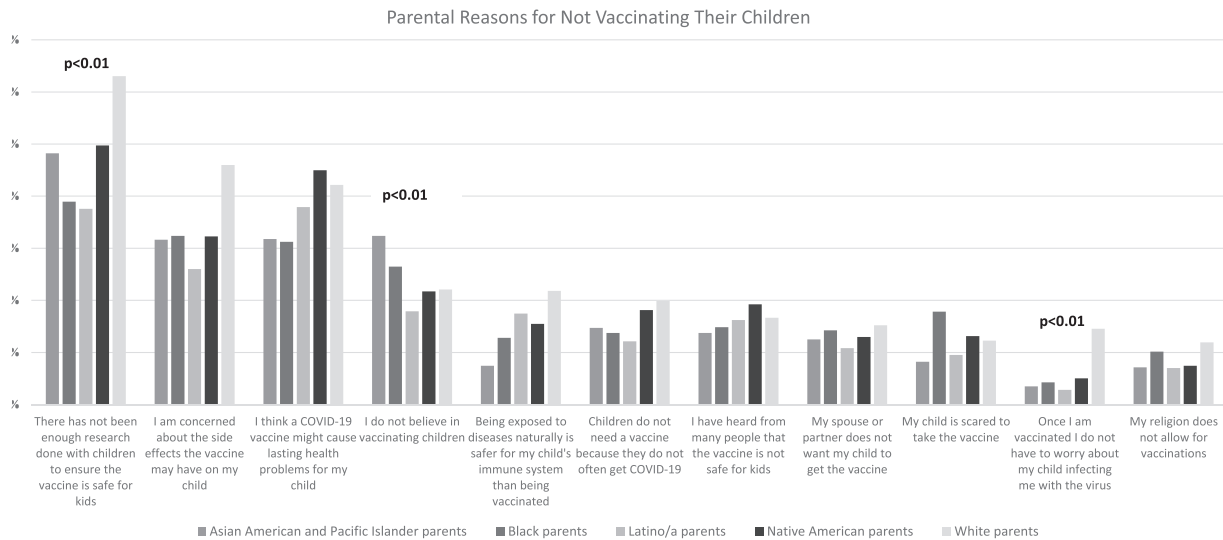


Figure. Parental Reasons for Not Vaccinating Their Children. Each bar represents the proportion of parents within each racial and ethnic group who cite that particular reason for not vaccinating their child.

We also included an item in our survey that gauges where parents would prefer their children be vaccinated: *If you have a choice, where would you prefer to get the COVID-19 vaccine?* Half (52%) of parents overall preferred that their child receives a COVID-19 vaccine in their child’s doctor’s office, with the following differences across groups: Black 57%, Latino/a 43%, AAPI 43%, Native American 46%, and White 54% ($P < .004$). The second most preferred location for parents seeking to vaccinate their children was the hospital, and there were no statistically-significant racial/ethnic group differences in this preference: Black 28%, Latino/a 26%, AAPI 22%, Native American 23%, and White 27% ($P > .52$).

In Table 2, we asked parents about their level of trust in sources of information about COVID-19 vaccination. Parents had the most trust in personal doctors/primary care physicians, their child’s doctor, family, or friends that have received the vaccine, the State Department of Health, and CDC. A lower percent trusted pharmacies or

religious leaders. Parental trust in sources of information about COVID-19 vaccination overall tended to be lowest among Black and Native American parents and highest among Latino/a and AAPI parents (Table 2). Black and Native American parents had the lowest levels of trust in their child’s doctor (46% and 43%, respectively) while Latino/a (55%), AAPI (51%), and White (56%) parents had higher trust levels ($P < .001$).

In addition, 58% of all parents stated they would follow their child’s health care provider’s recommendations about COVID-19 vaccine for children, with variations by racial and ethnic groups: AAPI (69%), Black (51%), Latino (58%), Native American (52%), and White (58%); $P < .001$.

MULTIVARIATE ANALYSIS

Table 3 reports the results from logistic regression analyses of parents’ willingness to vaccinate their children. The table shows adjusted RRs (and 95% confidence

Table 2. Parental Trust in Sources of Information About COVID-19 Vaccines, Responses to the Following Question: *On a Scale of 0 to 10, With 0 Meaning You Do Not Trust at All and 10 Meaning You Totally Trust, How Much Would You Trust Each of the Following If They Participated in a Campaign to Encourage Americans to Get the COVID-19 Vaccine?*

	Total	AAPI N = 838	Black N = 819	Latino N = 1186	Native American N = 830	White N = 1058	P Value
Personal doctor/primary care physician	58%	57%	51%	60%	51%	60%	<.001
My child’s doctor	54%	51%	46%	55%	43%	56%	<.001
Friends or family who have received the vaccine	53%	53%	45%	55%	46%	54%	<.001
State Department of Health	54%	58%	43%	56%	46%	55%	<.001
Centers for Disease Control and Prevention (CDC)	51%	59%	45%	55%	48%	51%	<.001
County health officials	49%	49%	42%	51%	39%	49%	<.001
A local pharmacist where I pick up prescriptions	48%	45%	41%	51%	39%	49%	<.001
Anthony Fauci	43%	47%	42%	43%	33%	44%	<.001
Religious leaders from your church or place of worship	40%	33%	42%	41%	30%	40%	<.001

AAPI indicates Asian American-Pacific Islander.

The table shows the percentage of parent respondents who had the highest level of trust (rank of 8, 9, or 10) in each of the sources above.

Table 3. Estimates of Parental Intent to Vaccinate Their Child for COVID-19

Demographic Characteristic	Percent*	Pred. Prob. [†]	Adj. RR [‡] (95% CI)
Overall (parent who will vaccinate child)	68%	.75	Not applicable
Race and ethnicity			
AAPI	7%	.81	1.12 (1.04, 1.21)
Black/African American	13%	.71	0.99 (0.91, 1.08)
Latino/a/X	19%	.79	1.10 (1.0, 1.22)
Native American/Am. Indian	1%	.72	1.04 (0.95, 1.14)
White	60%	.71	Reference category
Political affiliation [§]			
Democrat	43%	.83	1.07 (0.99, 1.15)
Republican	27%	.55	0.76 (0.64, 0.88)
Independent	25%	.74	Reference category
Education completed			
Some college	26%	.77	0.91 (0.79, 1.05)
College graduate and beyond	40%	.79	0.89 (0.77, 1.03)
High school or less	34%	.70	Reference category
Income			
Earns more than median income	39%	.83	1.10 (1.02, 1.19)
Earns less than median income	61%	.71	Reference category
Location			
Rural area	10%	.61	0.89 (0.76, 1.05)
Small town	22%	.67	0.91 (0.81, 1.02)
Large city	68%	.80	Reference category
Flu vaccine history			
Always gets flu shot	42%	.89	1.53 (1.37, 1.72)
Gets flu shot some years but not always	24%	.77	1.24 (1.14, 1.36)
Usually does not get the flu shot	14%	.58	1.06 (0.95, 1.18)
Never get flu shot	20%	.50	Reference category
Age group			
Age 35–59	35%	.76	1.01 (0.91, 1.12)
Age 60 and above	57%	.82	1.15 (1.00, 1.32)
Age 18–34	8%	.73	Reference category
Health care occupation			
Works in health care	85%	.88	1.17 (1.05, 1.29)
Does not work in health care	15%	.73	Reference category

AAPI indicates Asian American-Pacific Islander; CI, confidence interval; and COVID-19, coronavirus disease 2019.

*Based on the sample of parents in the 2021 COVID-19 Vaccine Poll (n = 4731 out of 7556 respondents). For each variable, “reference” is the omitted category to which we compare all other categories. A parent vs non-parent comparison is not applicable because only parents were asked the child-vaccination questions.

†Predicted probability of a respondent saying s/he will sign her child(ren) up to get vaccinated for COVID-19.

‡We calculated adjusted risk ratio (based on results of a logistic regression model of parental intent to vaccinate) using *adjrr* command in Stata (Norton et al. 2013). Estimates indicate the odds of parental vaccination (relative to a reference category), controlling for other factors.

§The percentages for party affiliation do not total to 100% because 5% of the respondents did not list a party affiliation.

intervals) for groups versus a particular reference category adjusting for demographic factors. Parents who earned more than the median income (compared to those with below-median incomes; aRR = 1.10), worked in health care (relative to non-health care employees; aRR = 1.17), and received their flu vaccine annually or “some years but not always” (aRRs are 1.53 and 1.24, respectively, and the reference category is “never”), were significantly more likely to get vaccinated than their counterparts (Table 3).

After adjusting for demographic factors, we found that parental trust in their primary care doctor or physician was significantly lower among AAPI (aRR = 0.87), Black (aRR = 0.86), and Native American (aRR = 0.90) parents than White parents (Table 4). Individuals who reside in rural areas or small towns were also less likely to trust their primary care doctor or physician than those living in cities (aRR = 0.91 and aRR = 0.92, respectively). Trust was significantly higher among Democratic parents

(relative to Republicans; aRR = 1.15), college graduates and those with advanced degrees (compared to respondents with a high school education or less; aRR = 1.10), parents that make above (versus below) the median income (aRR = 1.06), and parents that are over 34 years of age (age 35–59; aRR = 1.10 and age 60 and older; 1.23). Compared to never getting a flu shot, getting it annually (aRR = 1.63), some of the time but not always (aRR = 1.27), or “usually” was significantly associated with parents trusting their primary care doctor (Table 4).

DISCUSSION

In our survey administered May to June 2021 (just after approval of the Pfizer vaccine for children 5–11 years), less than half of AAPI, Black, Latino, Native American and White parents (higher if AAPI; lower if Black and White parents) stated they will vaccinate their child with COVID-19 vaccine, irrespective of their child’s age. After

Table 4. Estimates of Parental Trust in Personal Doctor/Primary Care Physician

Demographic Characteristic	Percent*	Pred. Prob. [†]	Adj. RR [‡] (95% CI)
Overall (parent who will vaccinate kids)	68%	.61	Not applicable
Race and ethnicity			
AAPI	7%	.61	0.87 (0.82, 0.92)
Black	13%	.55	0.86 (0.81, 0.90)
Latino/a/X	19%	.64	0.98 (0.94, 1.04)
Native American	1%	.55	0.90 (0.85, 0.95)
White	60%	.68	Reference category
Political affiliation [§]			
Democrat	43%	.69	1.15 (1.08, 1.24)
Republican	27%	.55	1.00 (0.92, 1.08)
Independent	25%	.53	Reference category
Education completed			
Some college	26%	.53	0.96 (0.89, 1.03)
College graduate and beyond	40%	.70	1.10 (1.02, 1.18)
High school or less	34%	.56	Reference category
Income			
Earns more than median income	39%	.56	1.06 (1.02, 1.11)
Earns less than median income	61%	.70	Reference category
Location			
Rural area	10%	.51	0.91 (0.86, 0.96)
Small town	22%	.52	0.92 (0.86, 0.98)
Large city	68%	.66	Reference category
Flu vaccine history			
Always gets flu shot	42%	.75	1.63 (1.51, 1.75)
Gets flu shot some years but not always	24%	.61	1.27 (1.20, 1.34)
Usually does not get the flu shot	14%	.47	1.13 (1.06, 1.21)
Never get flu shot	20%	.36	Reference category
Age group			
Age 35–59	35%	.64	1.10 (1.03, 1.17)
Age 60 and above	57%	.74	1.23 (1.22, 1.37)
Age 18–34	8%	.54	Reference category
Health care occupation			
Works in health care	85%	.61	0.91 (0.82, 1.00)
Does not work in health care	15%	.63	Reference category

AAPI indicates Asian American-Pacific Islander; CI, confidence interval.

*Based on the sample of parents in the 2021 COVID-19 Vaccine Poll (n = 4731 out of 7556 respondents). For each variable, “reference” is the omitted category to which we compare all other categories. A parent vs non-parent comparison is not applicable because only parents were asked the child-vaccination questions.

†Predicted probability of a respondent expressing a high level of trust in their personal doctor/primary care physician (ie, scoring an 8 or greater on a 10-point scale).

‡We calculated adjusted risk ratio (based on results of a logistic regression model of parental intent to vaccinate) using *adjrr* command in Stata (Norton et al. 2013).²⁸ Estimates indicate the odds of parental trust (relative to a reference category), controlling for other factors.

§The percentages for party affiliation do not total to 100% because 5% of the respondents did not list a party affiliation.

adjusting for demographic factors, the probability of getting their children vaccinated was significantly higher among AAPI parents compared to White parents. The most trusted source of information about COVID-19 was their doctor or their child’s doctor, respondents who were parents were asked to evaluate both. Around half of parents from these racial and ethnic groups trusted and planned to follow the advice from their child’s physician about COVID-19 vaccine and about half preferred vaccination in their child’s pediatric practice. After adjusting for demographic factors, trust in their doctor was significantly lower among AAPI, Native American, and Black parents. Trust in other sources of information was lower.

Most parental concerns were related to not having enough research done with children, vaccine side effects, and potential long-lasting effects from the vaccines. These concerns were most prominent among White parents. Pediatric providers should be well informed in educating

parents about the safety and efficacy of the currently approved vaccines as well as the short- and long-term side effects of COVID-19 infection. While many providers are educating parents about the COVID-19 vaccines during well-child checks; it is important for providers to educate parents and families about vaccine efficacy and safety for COVID-19 vaccines during all visits as long as the pandemic period lasts. Data from one study demonstrated that 47% of parents who initially refused vaccination chose to vaccinate their child after a discussion with their pediatrician,³⁰ so it is important to discuss vaccination repeatedly, even for parents who previously refused.

Since information about COVID-19 vaccines is ubiquitous and parents read from a variety of sources, it is important for providers to keep up on developments regarding the vaccines. Local health departments and national organizations, including the American Academy of Pediatrics and the CDC regularly host informational

sessions for pediatric providers on COVID-19 updates and vaccines. Pediatric providers should be encouraged to attend these events through continuing medical education credits and other incentives. In addition, pediatric providers should develop an understanding of post-licensure and post-authorization vaccine surveillance systems, including Vaccine Adverse Event Reporting System and the vaccine safety data link.^{31,32} Trust may be gained as parents learn to appreciate the rigorous pre- and post-licensure safety regulations and monitoring systems around vaccines.

White parents had substantial vaccine hesitancy and had the highest concerns regarding whether there was sufficient research on vaccines. White parents were also significantly more likely to believe that vaccines were not necessary for their children if adults were vaccinated. Focused messaging on the importance of vaccinating children despite parents being vaccinated may be important to overcome parental concerns and perceived lack of need.

Our study provides the opportunity to better understand hesitancy among 2 of the least surveyed communities in the United States, Native Americans and AAPIs, with hopes of improving uptake. The survey suggests that although AAPI communities had lower trust in their child's doctor than White parents, they were still very responsive to their child's doctor. In contrast, Native American parents had relatively low levels of trust in traditional messengers used for vaccination outreach, including their children's doctor. Utilizing tribal leaders with outreach regarding vaccination has been found to be effective, particularly with messages that stress the power of vaccination of children to protect elders from the virus, and consequently prevent language and culture loss.¹⁷

Strengths of this study include a large national sample of a diverse population and focus on the timely topic of pediatric COVID-19 vaccination since these rates remain low. The results of this study have enduring relevance around trusted messengers to inform other vaccination campaigns. Our survey is unique as it included high numbers of AAPI, Black, Latino/a/X, and Native American parents. We found that these groups were hesitant to vaccinate their children and that a common concern was a lack of sufficient research on vaccine safety. Lack of trust in vaccine safety in these populations is likely secondary to prior experiences within the health care system, structural racism, and other personal experiences which have been shown to affect trust in the health care system in general.³³ Because different racial and ethnic groups have different lived experiences with medical and public health systems including experiences of racism,^{34–36} messages and outreach should be culturally tailored and should come from trusted sources.^{26,37} It is important that primary care providers work with these communities to build trust and gain confidence in the vaccines.^{38,39}

There are several limitations to our study. One limitation is that although we attempted to sample a nationally representative population of diverse participants and many demographic features of respondents resemble national census characteristics, participants may

nevertheless differ from the general population in unmeasured ways. Second, although our response rate (61%) is similar or higher than response rates of other national surveys, respondents may not reflect the entire population. Third, our survey was fielded prior to pediatric COVID-19 vaccines being approved for 5- to 12-year-olds. The survey was conducted prior to any of the vaccines receiving full licensure, and we could not conclude whether full licensure of the vaccine would impact vaccine hesitancy. Additionally, our survey was conducted in May through June 2021 when there were early reports of myocarditis in adolescents. These reports may have influenced parental responses; subsequent investigation of these reports and risk benefit analyses have been conducted suggesting that the benefits of the vaccine vastly outweigh the risks of myocarditis and that myocarditis is mild in virtually all cases.⁴⁰

We conclude that in May to June 2021, less than half of parents from a large group of diverse populations had or intended to have their children receive the COVID-19 vaccine. However, most parents trusted their doctor's advice or their child's doctor's advice about the vaccine and many desired to receive their child's vaccine in their pediatrician's office. Although our study was conducted earlier in the pandemic, enduring lessons remain. Parents trust their physicians' recommendations regarding vaccines and prefer to receive vaccines in their providers' office. As the vaccine and boosters are approved for more age groups, it will be crucial for pediatric providers to remain informed and provide access to vaccines. Interestingly, as of April 4, 2022 (more than 9 months later), only 69% of 12- to 17-year-olds and 34% of 5- to 11-year-olds had received at least one dose of COVID-19 vaccine;¹ this reflects our survey findings of the percent of parents who had or planned to have their child vaccinated. Our findings portend significant challenges to COVID-19 vaccination for children of all racial and ethnic groups. National and local efforts should engage pediatric providers in administering COVID-19 vaccines to our nation's children within pediatric practices and should partner with local community-based organizations to communicate with parents from diverse backgrounds regarding parents' decisions to have their children receive COVID-19 vaccines.

ACKNOWLEDGMENTS

Financial statement: This work was supported by the Commonwealth Fund, the Robert Wood Johnson Foundation, and the WK Kellogg Foundation. The funder/sponsor did not participate in the work.

The authors are grateful to the additional members of the African American Research Collaborative 2021 COVID group. Listed in alphabetical order by last name, the group includes Matt Barreto, Erica Bernal-Martinez, Gayle Chacon, Henry Fernandez, Ray Foxworth, Matt Hildreth, Robert P. Lennon, Marcella Nunez-Smith, Eric C. Schneider, Arnav Shah, Janelle Wong, and Laurie Zephrin.

SUPPLEMENTARY DATA

Supplementary data related to this article can be found online at <https://doi.org/10.1016/j.acap.2022.06.016>.

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