

Parents' Intentions and Perceptions About COVID-19 Vaccination for Their Children: Results From a National Survey

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OBJECTIVES: Assess the degree to which US parents are likely to have their children get coronavirus disease 2019 (COVID-19) vaccines and identify parental concerns about the vaccines.

abstract

METHODS: In February 2021 to March 2021, we surveyed parent members of a nationally representative probability-based Internet panel of ~9000 adults regarding their intent to have their children receive a COVID-19 vaccination, perceptions of COVID-19 vaccines for children, and trust in sources of information about COVID-19 vaccines for children. We used descriptive and multivariate analyses to evaluate parent-stated likelihood of having their children get a COVID-19 vaccine and to assess the association between likelihood of child COVID-19 vaccination and child age, parent demographics, and parental perceptions about COVID-19 vaccines.

RESULTS: Altogether, 1745 parents responded (87% of eligible parents, 3759 children). Likelihood of child COVID-19 vaccination was as follows: very likely (28%), somewhat likely (18%), somewhat unlikely (9%), very unlikely (33%), and unsure (12%). The stated likelihood of child vaccination was greater among parents of older children ($P < .001$) as well as among parents who had a bachelor's degree or higher education ($P < .001$), had already received or were likely to receive a COVID-19 vaccine ($P < .001$), or had Democratic affiliation ($P < .001$); variations existed by race and ethnicity ($P = .04$). Parental concerns centered around vaccine safety and side effects. A key trusted source of information about COVID-19 vaccines for children was the child's doctor.

CONCLUSIONS: Less than one-half of US participants report that they are likely to have their child receive a COVID-19 vaccine. Pediatric health care providers have a major role in promoting and giving COVID-19 vaccination for children.



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WHAT'S KNOWN ON THIS SUBJECT: Little is known about parental hesitancy for coronavirus disease 2019 vaccines for children.

WHAT THIS STUDY ADDS: With this nationally representative survey, we found that less than one-half of US parents are likely to have their child receive the coronavirus disease 2019 vaccine when it is available.

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The coronavirus disease 2019 (COVID-19) pandemic has affected children, and adolescents and children now account for more than one-fifth of new cases in the United States.¹ Although most pediatric infections are asymptomatic or mild, many children have been hospitalized, >300 have died of related complications, and thousands have suffered from multisystem inflammatory syndrome in children.¹ Children have experienced stress from online schooling, disrupted health and social services, family illnesses, and social isolation,² with a disproportionate toll among low-income and racial or ethnic minority children.³

Because 22% (74 million) of the US population is aged <18 years, COVID-19 vaccines for children are needed for both direct and community protection.⁴ Currently, 3 vaccines are recommended by the Advisory Committee on Immunization Practices and the Centers for Disease Control and Prevention (CDC)⁵⁻⁷; the Pfizer vaccine was recommended for individuals aged >16 years in December 2020⁶ and recently authorized for children aged 12 to 15 years.⁸ Trials are underway to assess the safety, reactogenicity, immunogenicity, and effectiveness of COVID-19 vaccines in younger children.^{9,10} However, these vaccines can only be effective if parents desire them.

Vaccine hesitancy is a major public health concern worldwide.^{11,12} Approximately 6% of US parents are hesitant about routine childhood vaccines other than influenza vaccine,¹³ 26% are hesitant about the influenza vaccine,¹³ and 23% are hesitant about the human papillomavirus vaccine.¹⁴ Parental concerns center around questionable seriousness of the infections, vaccine effectiveness, and

vaccine side effects^{13,14}; these issues are relevant for COVID-19 vaccines¹⁵ as well.

Although much is known about COVID-19 vaccine hesitancy among adults,¹⁶⁻²⁰ little is known about parental hesitancy for COVID-19 vaccines for children.^{16,21-23} Rhodes²¹ surveyed US parents of preschool-aged children who were prescreened as hesitant toward childhood vaccines, noting high hesitancy about a future COVID-19 vaccine for children; parents desired information from health care professionals and alternative medical providers. In an early study in April 2020, researchers noted high intent to vaccinate.^{24,25}

Our study objectives were to assess the willingness of US parents to have their children get a pediatric COVID-19 vaccine and to identify parental concerns about the vaccines. Between February 17 and March 30, 2021, we surveyed a representative online sample of US parents about their perceptions regarding COVID-19 vaccines for their children (once available). We also assessed levels of trust in pediatric providers and other sources of information about COVID-19 vaccines for children.

METHODS

The University of Southern California's institutional review board approved the study. Participants provided written, informed consent.

The Understanding America Study

The Understanding America Study (UAS) is a probability-based Internet panel of about 9000 adults aged ≥ 18 years, which is representative of the noninstitutionalized US population.²⁶ Panel members are recruited by using address-based sampling, and tablets and broadband Internet are provided if needed. Surveys are in

English or Spanish. Between April 1, 2020, and February 16, 2021, the UAS surveyed subsamples of the online panel every 2 weeks about the COVID-19 pandemic^{16,26}; starting February 17, 2021, surveys are administered monthly. Survey invitations are balanced by age, sex, employment status, and Los Angeles County residence (these residents were oversampled in the UAS panel). General UAS weights take into account respondents' sex, race and ethnicity, education, and census regions while also correcting for the Los Angeles County oversample. We analyzed the survey sent February 17 to March 16, 2021; panelists had 14 days to respond to the survey, so the survey period was February 17 to March 30, 2021. Incentives were provided to encourage survey completion, including an additional incentive to complete the survey on the day respondents receive their invitation. More than 90% of responses were received within the first 4 weeks of fielding this survey.

Questionnaire Development

We adapted questions from previous surveys^{14,16} and added new questions as a new 3-minute survey module on COVID-19 vaccines for children. Respondents received an additional \$2 to complete the module. Questions regarding parental intent and plans to vaccinate their children were asked about each child in the household. All additional child-specific questions were asked about each child in the household for parents of up to 3 children; for parents of ≥ 4 children, 3 children were randomly selected from the household.

Demographic Measures

The UAS has detailed information about the demographic characteristics of panelists, which is updated quarterly. Parental demographic factors included

parental age, sex, race and ethnicity, and education level.

Intent to Have the Child Get COVID-19 Vaccine

We asked, “How likely are you to get [child’s name] vaccinated for coronavirus once a vaccine is available for children?” (very likely, somewhat likely, somewhat unlikely, very unlikely, or unsure). We coded “very likely or somewhat likely” as “likely to get a coronavirus vaccine”; all others were labeled as “hesitant.” We also asked, “If a vaccine against the coronavirus becomes available for children, do you plan to get [child’s name] vaccinated?” (yes, as soon as possible; yes, but I want to wait and see; no, but I want to wait and see; no, I will not get a COVID-19 vaccine for my child; and not sure).

Perceptions About COVID-19 Vaccines for Children

We modified questions from the World Health Organization’s vaccine hesitancy scale (VHS) to apply to COVID-19 vaccines for children.²⁷ The VHS assesses dimensions of vaccine confidence and risks, has been psychometrically validated, and has been used in numerous countries to examine vaccine hesitancy.^{28–30} We previously modified VHS questions for routine childhood vaccines, pediatric influenza vaccine, and human papillomavirus vaccine.^{13,14}

Parental Likelihood of Getting a COVID-19 Vaccine

We asked parents about their own likelihood of getting a COVID-19 vaccine (same 5-point Likert scale); respondents who had already received a COVID-19 vaccine were coded as “very likely.”

Previous Influenza Vaccination

We asked whether the child had received “a flu vaccine” in the past 2

influenza vaccination seasons (2019 to 2020 and 2020 to 2021).

Sources of Trusted Information About COVID-19 Vaccine

We asked, “How much do you trust the following sources of information about the coronavirus vaccine?” (do not trust at all, trust somewhat, trust mostly, trust completely, not applicable). Sources were the child’s doctor, the child’s school or school district, respondent’s local public health department; CDC; American Academy of Pediatrics (AAP); respondent’s close friends and family members, co-workers, classmates, or other acquaintances; and social media (eg, Facebook, Instagram, Twitter).

Trust in Vaccine Development and Approval Process

We asked, “How much do you trust the process in general (not just for COVID-19) to develop safe vaccines for children? (fully trust, mostly trust, somewhat trust, do not trust)” and “How much do you trust the governmental approval process to ensure a COVID-19 vaccine is safe for children? (fully trust, mostly trust, somewhat trust, do not trust).”

Analyses

We performed descriptive analyses to assess parents’ stated likelihood of having their child get a COVID-19 vaccine and plans to get a COVID-19 vaccine for their child. We assessed associations between vaccination likelihood and demographics, trust in different sources of information, and trust in the vaccine development and government approval processes.

To assess the association between parent-stated likelihood of getting their child a COVID-19 vaccine and above-mentioned factors, we used descriptive analyses and multivariable Poisson regression models with cluster-robust standard

errors. For multivariate analyses, we included the following covariates in our primary model: parent factors (sex, age group, education, race or ethnicity, political party affiliation, and receipt of or likelihood to receive a COVID-19 vaccine) and child factors (age group and receipt of previous influenza vaccine).

Because a participating parent could report their vaccination intentions for multiple children, and because multiple parents from a given household could report their intentions for the same child, the unit of observation was parent-child pairs. Intention data were clustered at the household level, and parent-level survey weights were used to make inferences about the US parent population. We use “% of parents” or “% of children” as shorthand to summarize parent-level and child-level characteristics, respectively, as a percentage of the sampled parent-child pairs. We used a significance level of .05 for all analyses and conducted analyses using SAS version 9.4 (SAS Institute, Inc, Cary, NC).

RESULTS

Altogether, 1745 parents responded to the survey, and data are available for 3759 children (Table 1); 33% of parents had high school education or less, and 56% were white, 22% were Hispanic, 13% were Black, and 5% were Asian American. Among children, 40% were aged 11 to 18 years, 36% were aged 5 to 10 years, and 24% were aged <5 years.

For 46% of children, parents were “very likely” or “likely” to have their child get the vaccine; for 9%, parents were “somewhat unlikely”; for 33%, parents were “very unlikely”; and, for 12%, parents were “unsure” (Table 1). Factors associated with higher likelihood of getting a COVID-19 vaccine for children included the following:

TABLE 1 Parents' Reported Likelihood of Getting Their Child Vaccinated Once a COVID-19 Vaccine Is Available for Children

	Weighted <i>n</i>	Likelihood of the Child Getting a COVID-19 Vaccination ^a					<i>P</i>
		Very Likely, %	Somewhat Likely, %	Somewhat Unlikely, %	Very Unlikely, %	Unsure, %	
Overall	3759	28.1	18.2	8.8	32.9	11.9	—
Parent characteristics							
Parental sex							.001
Female	2177	23.1	18.5	8.6	36.2	13.5	—
Male	1582	34.9	17.7	9.2	28.5	9.7	—
Parental age, y							<.0001
18–39	2319	23.3	17.7	10.1	37.9	11.0	—
40–49	870	34.3	20.1	6.6	27.6	11.4	—
50+	570	38.2	17.2	7.3	20.6	16.8	—
Parental education							.0002
High school or less	1226	24.0	14.5	7.0	38.2	16.3	—
Some college	1194	20.7	19.3	9.8	36.5	13.7	—
Bachelor's or more	1337	38.3	20.6	9.7	25.0	6.3	—
Parental race and ethnicity							<.0366
White	843	25.5	20.0	7.0	36.5	11.0	—
Hispanic	2089	35.4	16.4	11.2	24.4	12.7	—
Black	489	22.1	11.7	9.0	37.8	19.3	—
Asian American	178	41.4	21.8	15.6	19.0	2.3	—
Other	156	28.4	19.7	13.1	32.6	6.2	—
Parental party affiliation ^b							<.0001
Democrat	1125	42.1	19.3	7.3	17.2	14.1	—
Republican	1114	15.2	18.4	9.3	46.2	10.9	—
Other	870	24.0	16.8	11.6	38.4	9.2	—
Parent received or likely to receive COVID-19 vaccine							<.0001
Yes	2087	47.9	27.3	9.0	8.0	7.8	—
No	1672	3.2	6.8	8.7	64.2	17.1	—
Child characteristics							
Child's age, y							.0004
11–18	1519	32.7	18.0	7.7	29.4	12.1	—
5–10	1356	27.0	18.9	8.6	32.6	12.9	—
0–4	884	21.8	17.4	11.1	39.5	10.2	—
Child received influenza vaccine (previous 2 y)							<.0001
Yes	1722	41.5	24.5	9.0	16.6	8.4	—
No	1760	15.0	11.8	8.8	49.5	14.8	—

—, not applicable.

^a The parent-child pair was the unit of analysis. Parents' sampling weights were used in the analyses to account for design effects.^b Data are missing on party affiliation for 17% of parents.

parental bachelor's degree or higher educational attainment, parent being Asian American or Hispanic, parents having already received or being likely to receive a COVID-19 vaccine themselves, older age of child, and child having received an influenza vaccine in the past 2 years.

Figure 1 reveals findings for whether parents plan to get their child vaccinated: 48% said "yes" (26% "yes, ASAP" and 23% "yes, but wait and see"), 39% said "no" (27% "no" and 12% "no, but wait and see"), and 13% said "unsure."

Patterns were similar by child age and parent race and ethnicity.

Among parents who had already received or are likely to get a COVID-19 vaccine (Table 2), 75% indicated they are "very likely" or "somewhat likely" to get the vaccine for their child; conversely, among parents who stated they are "unlikely," "somewhat unlikely," or "unsure" about the vaccine for themselves, only 10% responded they are very or somewhat likely to get their child vaccinated.

A high proportion of parents stated that the vaccine will be beneficial, effective, and important for their child's health and the health of others (Fig 2). More than two-thirds strongly or somewhat agreed that they will do what their child's doctor or health care provider recommends about the COVID-19 vaccine. On the other hand, many parents agreed that a COVID-19 vaccine might cause lasting health problems for their child or were concerned about serious vaccine side effects and the novelty of the vaccine.

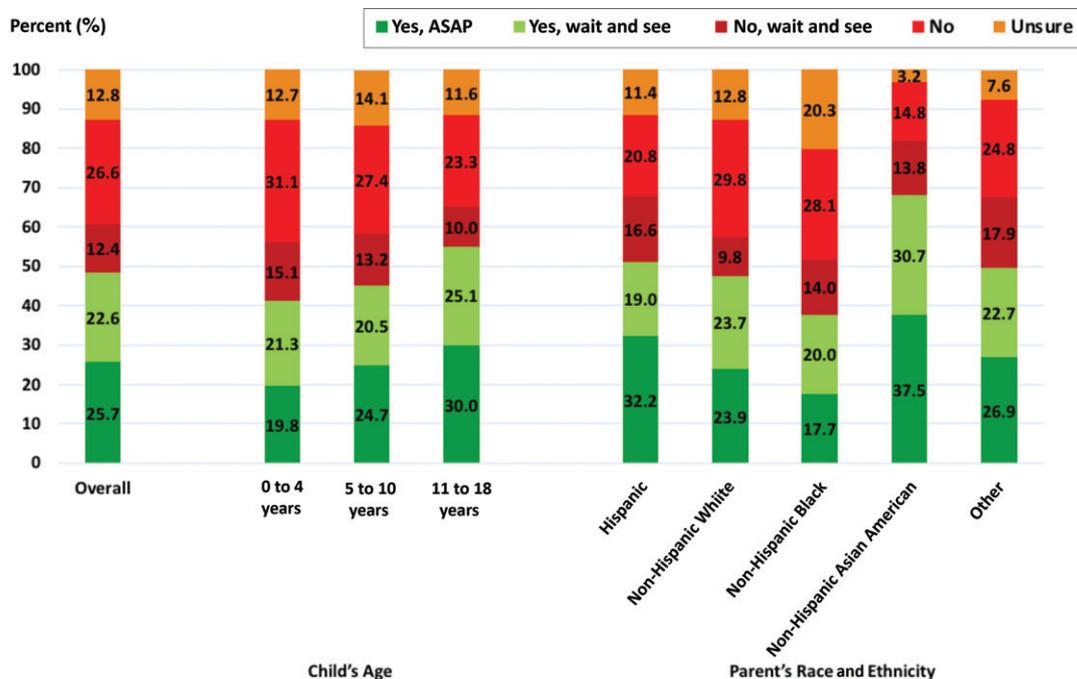


FIGURE 1

Parents' response to the question, "If a vaccine against the coronavirus becomes available for children, do you plan to get [child's name] vaccinated?" ASAP, as soon as possible.

Table 3 reveals parents' perceptions of COVID-19 vaccines for children, stratified by whether they were "very likely" or "somewhat likely" to get their child vaccinated or not. Parents who were very or somewhat likely to get their child vaccinated were far more likely to agree that COVID-19 vaccines are beneficial and effective, and much less likely to agree that the vaccines are unsafe, than parents who were hesitant about vaccination for their child.

The most trusted source of information about the COVID-19

vaccine (Table 4) was the child's doctor, with 72% of parents stating they completely or mostly trust their child's doctor. A high proportion of parents also trusted their local public health department, the CDC, and the AAP, as well as the government approval process and the vaccine development process in general. Lower levels of trust were observed for information from schools, co-workers, classmates, or other acquaintances, and lowest regarding information from social media.

As Table 5 shows, trust in the child's doctor, school or school district, the local public health department, the CDC, the AAP, and the vaccine approval and development process were all highly associated with parents stating that they were likely to get a COVID-19 vaccine for their child.

Table 6 presents results of the multivariate analyses, revealing the independent association of parent characteristics, child characteristics, and parental trust in information sources with parents stating that they are "very likely" or "somewhat likely" to have their child get the COVID-19 vaccine. Results are shown for 4 models. Model 1 includes parent and child demographic characteristics and parents' political affiliation. Older parents and those with higher education were more likely to state their child will receive a vaccine, whereas Black parents were less

TABLE 2 Parents' Intent to Have Their Children Vaccinated Based on Their Own COVID-19 Vaccination

	Parents Very Likely or Likely to Have Their Child Get the COVID-19 Vaccine ^a	
	Yes	No
Parents very likely or somewhat likely to get the COVID-19 vaccine for themselves, %		
Yes	75.2	24.8
No	10.0	90.0

^a The parent-child pair was the unit of analysis. Parents' sampling weights were used in the analyses to account for design effects.

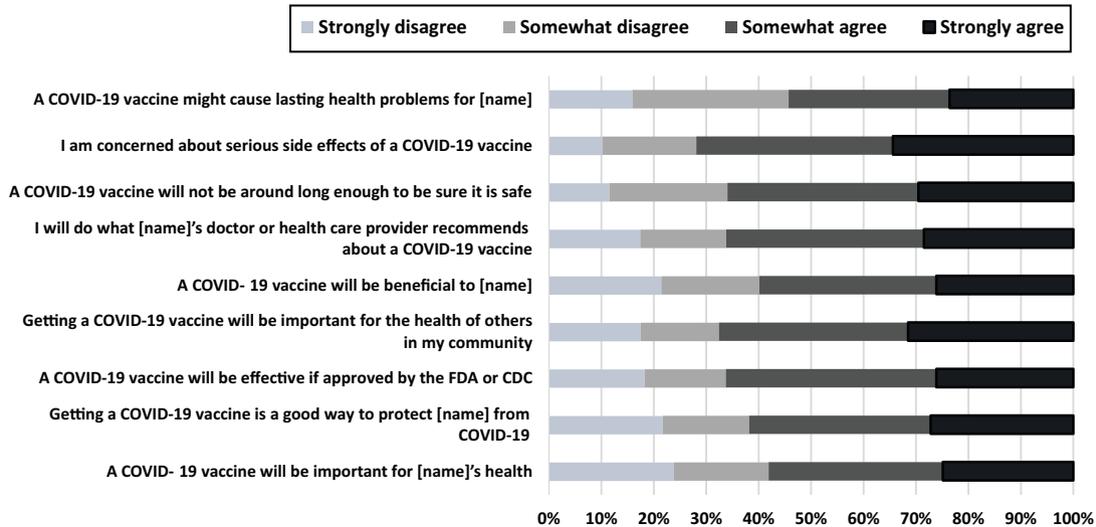


FIGURE 2

Parental perceptions about COVID-19 vaccination for their child from the 9-item modified VHS, adapted to COVID-19 vaccination for children. FDA, US Food and Drug Administration.

likely. Model 2 adds the questions on trust; parental characteristics are no longer independently associated with likelihood of the child getting a COVID-19 vaccine, but trust in the child's doctor or social media and the vaccine development or approval process are associated. Model 3 adds whether the child received an influenza vaccination in the previous 2 years; this factor is

associated with likelihood of future COVID-19 vaccination (aRR = 1.44, 95% confidence interval [CI]: 1.24–1.67). Model 4 adds whether parents received or are likely to receive a COVID-19 vaccine themselves; this factor is the strongest predictor (aRR = 3.42, 95% CI: 2.32–5.04), and other predictors are the child's previous influenza vaccination and trust in the child's doctor, social

media, and the government approval process for COVID-19 vaccines. The child's age was not associated with likelihood of vaccination in any of the adjusted models.

DISCUSSION

We found a high level of parental hesitancy for COVID-19 vaccines for children. Less than one-half of

TABLE 3 Percentage of Parents Who Strongly or Somewhat Agree With Each of These Statements, by Whether They Are Very or Somewhat Likely or Very or Somewhat Unlikely to Have Their Children Vaccinated Against COVID-19

	Percentage of Parents Who Strongly Agree or Agree With Statements ^a	
	Very or Somewhat Likely to Vaccinate Child	Very or Somewhat Unlikely to Vaccinate Child or Unsure
Positive perceptions about COVID-19 vaccines, %		
A COVID-19 vaccine will be important for [name]'s health.	93.8	27.1
Getting a COVID-19 vaccine would be a good way to protect [name] from COVID-19.	96.0	32.2
A COVID-19 vaccine will be effective if it is approved by the FDA or CDC.	95.8	40.9
Getting a COVID-19 vaccine will be important for the health of others in my community.	96.2	43.0
A COVID-19 vaccine will be beneficial to [name].	95.3	29.4
I will do what [name]'s doctor or health care provider recommends about a COVID-19 vaccine.	94.7	41.5
Negative perceptions about COVID-19 vaccines, %		
A COVID-19 vaccine will not have been around long enough to be sure it is safe.	47.7	81.6
I am concerned about serious side effects of a COVID-19 vaccine.	55.1	86.4
I think a COVID-19 vaccine might cause lasting health problems for [name].	26.8	78.0

Questions are from the 9-item modified VHS, adapted to COVID-19 vaccination for children. FDA, US Food and Drug Administration.

^a The parent-child pair was the unit of analysis. Parents' sampling weights were used in the analyses to account for design effects.

TABLE 4 Parents' Level of Trust in Sources of Information

Sources of information about COVID-19 vaccine, %	How Much Do You Trust the Following Sources of Information About the COVID-19 Vaccine? ^a				
	Trust Completely	Trust Mostly	Trust Somewhat	Do Not Trust	Not Applicable
Child's doctor	35.7	36.1	21.3	4.4	2.5
Child's school or school district	9.9	23.4	35.6	17.6	13.6
Your local public health department	11.4	31.4	40.9	15.4	0.8
The CDC	21.1	29.0	29.5	19.8	0.7
AAP	18.6	29.1	35.0	15.1	2.3
Your close friends and members of your family	5.8	24.0	50.7	18.4	1.1
Your co-workers, classmates, other acquaintances	2.2	14.4	48.6	32.5	2.3
Social media (eg, Facebook, Instagram, Twitter)	0.9	3.7	33.7	59.9	1.9
Vaccine approval or development process, %					
Government approval process for COVID-19 vaccine for child	9.3	30.0	28.3	32.4	—
Vaccine development process in general for child	12.8	34.1	29.0	24.1	—

—, not applicable.

^a The parent-child pair was the unit of analysis. Parents' sampling weights were used in the analyses to account for design effects.

parents state that they are very or somewhat likely to have their children get a COVID-19 vaccine; one-third are very unlikely, and many state that they will “wait and see.” Parents who are white or Black were less likely than those who are Hispanic or Asian American, although these disparities disappeared when we controlled for other parent and child factors. Many parents are concerned about vaccine safety and side effects, although most also feel that the vaccines will be effective in protecting their children and others. The most important trusted source of information for parents about

COVID-19 vaccines for children is their children's doctor. However, less than one-half of parents stated that they trust their local health department, the CDC and the AAP, or the vaccine approval and development process. Political affiliation was strongly related to parent-stated intention to vaccinate their child: parents with Democratic affiliation were far more likely to get their child vaccinated. Finally, parents' own COVID-19 vaccination or likelihood of vaccination was the most important factor independently associated with the likelihood of the child getting a vaccine, although the child's

previous influenza vaccination and trust in the child's doctor, social media, and the vaccine approval process were also independently associated with likelihood of getting the child vaccinated.

Despite high levels of vaccine hesitancy, an encouraging finding is that many parents want to “wait and see” and may become more interested in the vaccines as results of the pediatric trials are disseminated and more parents and older children are vaccinated. This might mirror the trend seen for adult COVID-19 vaccination, with interest in the vaccines rising over time, at least

TABLE 5 Percentage of Parents Who Are Very or Somewhat Likely to Get a Vaccine for Their Children, by Trust in Information Sources, the Governmental Approval Process, and Vaccine Development

Sources of information about COVID-19 vaccine, %	Percentage of Parents Who Are Very or Somewhat Likely to Vaccinate Their Children Against COVID-19 ^a				
	Trust Completely	Trust Mostly	Trust Somewhat	Do Not Trust	P
Child's doctor	71.3	46.0	14.1	14.5	<.0001
Child's school or school district	67.8	67.9	43.4	19.2	<.0001
Your local public health department	88.1	66.0	34.4	9.3	<.0001
The CDC	79.7	62.3	30.8	11.8	<.0001
AAP	82.6	62.8	29.6	10.4	<.0001
Your close friends and members of your family	45.0	54.4	44.6	41.6	.0828
Your co-workers, classmates, other acquaintances	54.3	50.4	47.7	42.0	.0900
Social media (eg, Facebook, Instagram, Twitter)	49.1	66.5	48.2	43.9	.0361
Vaccine approval or development process, %					
Government approval process for COVID-19 vaccine for child	90.7	79.4	40.1	8.3	<.0001
Vaccine development process in general for child	86.2	69.1	32.9	8.8	<.0001

^a The parent-child pair was the unit of analysis. Parents' sampling weights were used in the analyses to account for design effects.

TABLE 6 Multivariate Analysis of Likelihood of Child COVID-19 Vaccination by Parent and Child Characteristics

	Percentage Very Likely or Likely to Get a Vaccine for the Child, %	aRR (95% CI)			
		Model 1: Parent Factors, Child Factors	Model 2: Parent Factors, Child Factors, and Parent Perceptions	Model 3: Adds Whether Child Received Influenza Vaccination	Model 4: Adds Parents' COVID-19 Vaccination Status or Likelihood of Vaccination
Parent characteristics					
Overall	46.3				
Parental age, y					
18–39	41.1	Reference	Reference	Reference	Reference
40–49	54.5	1.08 (0.90–1.30)	1.07 (0.93–1.24)	1.09 (0.95–1.26)	1.06 (0.93–1.21)
50+	55.4	1.25 (1.00–1.55)	1.14 (0.97–1.36)	1.15 (0.97–1.36)	1.04 (0.89–1.21)
Parental sex					
Female	41.7	Reference	Reference	Reference	Reference
Male	52.7	1.27 (1.08–1.49)	1.11 (0.99–1.26)	1.16 (1.03–1.30)	1.11 (0.99–1.24)
Parental education					
High school or less	38.5	Reference	Reference	Reference	Reference
Some college	40.0	1.01 (0.80–1.29)	0.89 (0.73–1.07)	0.86 (0.71–1.03)	0.81 (0.69–0.97)
Bachelor's degree or more	59.0	1.36 (1.10–1.70)	0.95 (0.81–1.12)	0.89 (0.76–1.05)	0.84 (0.72–0.99)
Parental race or ethnicity					
White	45.5	Reference	Reference	Reference	Reference
Hispanic	51.8	0.90 (0.72–1.12)	0.91 (0.76–1.08)	0.93 (0.78–1.11)	0.94 (0.79–1.13)
Black	33.8	0.50 (0.36–0.70)	0.99 (0.77–1.28)	1.03 (0.80–1.33)	0.97 (0.78–1.21)
Asian American	63.1	0.97 (0.75–1.24)	1.00 (0.79–1.26)	0.98 (0.77–1.24)	0.93 (0.74–1.15)
Other	48.1	0.99 (0.64–1.53)	0.90 (0.62–1.33)	0.88 (0.63–1.23)	0.95 (0.67–1.34)
Parental political affiliation					
Democrat	61.4	Reference	Reference	Reference	Reference
Republican	33.6	0.97 (0.75–1.24)	0.74 (0.64–0.87)	0.77 (0.67–0.90)	0.81 (0.71–0.93)
Other	40.9	0.99 (0.64–1.53)	0.90 (0.76–1.05)	0.91 (0.77–1.07)	0.92 (0.79–1.07)
Parent received or likely to receive COVID-19 vaccine	75.2	—	—	—	3.42 (2.32–5.04)
Child characteristics					
Child's age, y					
11–18	50.7	Reference	Reference	Reference	Reference
5–10	45.9	0.96 (0.84–1.10)	0.99 (0.89–1.11)	0.98 (0.88–1.10)	1.00 (0.90–1.12)
<5	39.3	0.84 (0.69–1.02)	0.94 (0.79–1.13)	0.97 (0.82–1.15)	0.94 (0.79–1.12)
Child received influenza vaccine (previous 2 y)	66.1	—	—	1.44 (1.24–1.67)	1.28 (1.11–1.48)
Trust in sources or processes^a					
Child's doctor	58.6	—	1.79 (1.28–2.48)	1.62 (1.17–2.25)	1.40 (1.04–1.88)
Child's school or school district	67.8	—	1.04 (0.92–1.18)	1.06 (0.94–1.20)	1.05 (0.93–1.18)
Local public health department	71.9	—	1.08 (0.88–1.32)	1.08 (0.89–1.32)	1.06 (0.88–1.28)
The CDC	69.7	—	1.30 (0.93–1.81)	1.30 (0.93–1.81)	1.14 (0.83–1.56)
The AAP	70.5	—	1.13 (0.84–1.54)	1.12 (0.82–1.52)	1.12 (0.83–1.52)
Close friends and family members	52.6	—	0.88 (0.78–1.01)	0.87 (0.76–0.98)	0.92 (0.80–1.05)
Co-workers, classmates, acquaintances	51.0	—	0.94 (0.76–1.16)	0.94 (0.76–1.16)	0.92 (0.75–1.14)
Social media	63.1	—	1.42 (1.11–1.83)	1.51 (1.17–1.96)	1.47 (1.10–1.95)
Government approval process for COVID-19 vaccine	82.1	—	1.76 (1.39–2.24)	1.72 (1.38–2.16)	1.30 (1.03–1.63)
Vaccine development process in general	73.8	—	1.46 (1.12–1.91)	1.41 (1.10–1.81)	1.24 (0.97–1.58)

The parent-child pair was the unit of analysis. Parents' sampling weights were used in the analyses to account for design effects. In total, 493 respondents indicated "not applicable" for ≥ 1 of the trust items and were excluded from the regression analysis. —, not applicable.

^a Among parents who stated that they "trust completely" or "trust mostly" these sources or processes versus parents who stated that they "trust somewhat" or "do not trust."

among older adults and Black individuals.^{31,32} Notably, many parents are hesitant about COVID-19 vaccination for themselves, which is highly predictive of their hesitancy

about the vaccines for their children. Strong outreach is needed to address vaccine hesitancy for both parents and children, including targeted educational efforts to parents who

want to "wait and see" about the vaccines for children.

Because vaccine safety and side effects were key parental concerns, clear

messages and transparent communications from public health, government, and leaders about vaccine safety for children are critical. Parental skepticism about the vaccine development and approval processes points to the need for continued transparency and active public education regarding the rigorous development and approval process by the US Food and Drug Administration, the Advisory Committee on Immunization Practices, and the CDC.^{33,34} The current vaccine safety monitoring system for COVID-19 vaccines is robust,³⁵ and it is important to emphasize the safety profile of the vaccines for children from both the vaccine trials and from postapproval data that will accumulate rapidly as children are vaccinated.

A major finding is that the most trusted source of information about COVID-19 vaccines is the child's doctor or health care provider. Previous studies reveal that recommendations and effective communication by primary care clinicians have a large impact on vaccine receipt.^{11,36,37} It is important for pediatric providers to communicate about COVID-19 vaccines for children during routine office visits, even before the vaccines are approved for younger children. Once vaccines are approved, providers can reach out to patients using reminder/recall communications,^{38,39} information placed on practice Web sites, and in-office educational information for parents. Our findings on trust and political affiliation highlight a role for specific trusted sources and messengers, including political leaders who might be effective in reassuring parents who remain hesitant about the vaccines.

Previous studies and published documents highlight approaches to address parental hesitancy for vaccines in general^{11,37,40-42} which should also be considered for COVID-19 vaccines.⁴³ Some useful techniques⁴² might include the following: using motivational interviewing communication (eg, asking parents' permission to discuss COVID-19 vaccines for their child⁴⁴); telling stories⁴⁵ (eg, the practice's experience with children who were sick from severe acute respiratory syndrome coronavirus 2 infection); relating positive experiences regarding the health care provider's own children or other children in the practice receiving COVID-19 vaccines (ie, "narrative medicine"⁴⁶); reminding parents why children need COVID-19 vaccines (eg, making it safer to participate in sports and group activities and to attend school); and reinforcing social norms⁴⁷ (eg, stating that "many of our practice's children are getting the vaccine").

Our study has strengths and limitations. We surveyed a large, nationally representative sample of parents using an online panel with a high response rate. One limitation involves generalizability from any sample, although the UAS sampling and recruitment approach mitigated these concerns. Our age groups do not align perfectly with current vaccine approval of >12 years of age. We had small numbers of Asian American respondents. Some respondents might have completed previous UAS surveys³² about adult COVID-19 vaccination, although that should not bias their responses about their children's vaccination. We do not know what specific factors about the vaccine approval

and development processes drove parents' mistrust. In addition, the UAS was designed to sample American adults and not children; thus, our findings reflect the general population of parents, although our analyses are at the child level and percentages reflect percent of children. Finally, this survey was conducted in March 2021, and the public's perception of COVID-19 vaccines can change rapidly, particularly as vaccines are recommended for younger children or if rare side effects are noted.^{48,49}

In summary, our nationally representative survey found high rates of parental hesitancy for COVID-19 vaccines, with many parents unlikely or unsure they will get their child vaccinated or wanting to "wait and see" about the vaccines. Because pediatric providers were noted to be the most trusted sources of information about COVID-19 vaccines in children, the pediatric community has a major role in promoting and vaccinating the nation's children against severe acute respiratory syndrome coronavirus 2.

ABBREVIATIONS

AAP:	American Academy of Pediatrics
aRR:	adjusted risk ratio
CDC:	Centers for Disease Control and Prevention
CI:	confidence interval
COVID-19:	coronavirus disease 2019
UAS:	Understanding America Study
VHS:	vaccine hesitancy scale

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