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Factors that differentiate COVID-19 vaccine intentions among Indiana parents: Implications for targeted vaccine promotion

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ABSTRACT

Given low rates of uptake of the COVID-19 vaccine for children 12–17 and 5–11 years old, research is needed to understand parental behaviors and behavioral intentions related to COVID-19 vaccination for their children. In the state of Indiana, we conducted a non-random, online survey of parents or caregivers ($N = 10{,}266$) about their COVID-19 vaccine intentions or behaviors, demographic characteristics, and potential motivating reasons for getting the vaccine. In terms of behaviors/intentions, 44.8% of participants indicated they were vaccine acceptors (i.e., had already had their children vaccinated or would as soon as it was possible), 13.0% indicated they were vaccine hesitators (i.e., wanted to wait and see), and 42.2% indicated they were vaccine rejecters (i.e., would not vaccinate or only would if mandated). Compared to vaccine rejecters, vaccine hesitators were more likely to be motivated by perceptions of vaccine safety and efficacy, normative influences such as close friends/family who had been vaccinated and a recommendation from a provider, as well as if they were vaccinated themselves. These findings have implications for the development of targeted vaccine promotion strategies, such as social norms messaging and a focus on vaccine safety, in order to increase COVID-19 vaccination for eligible children.

1. Introduction

Rollout of COVID-19 vaccines in the United States focused initially on those most at high risk for hospitalization and death, with the Centers for Disease Control and Preventions (CDC) Advisory Committee on Immunization Practices (ACIP) advising that older age groups and healthcare personnel be prioritized (ACIP COVID-19 Vaccine Recommendations | CDC, 2021). By April 19th 2021, eligibility covered all residents 18 years and older for Moderna and Johnson & Johnson vaccines, and 16 years and older for the Pfizer-BioNTech vaccine (Diesel, 2021), all three of which had received emergency use authorization (EUA) from the FDA. On May 12th, the ACIP recommended the use of Pfizer-BioNTech for adolescents 12–15 years old for the prevention of severe COVID-19 (Wallace, 2021) and on August 23rd the FDA granted full approval for the Pfizer-BioNTech vaccine for persons ages 16 years and older (Food and Drug Administration, 2021). On October 29th, 2021, the Pfizer-BioNTech vaccine received EUA from the FDA for 5–11 year olds, with the ACIP formally recommending it for this age group on November 2nd, 2021 (Hause et al., 2021). In addition to providing immunity against serious illness for vaccine recipients, high vaccination coverage among children will be an important step in preventing schools, and other places where children congregate, from becoming transmission hotspots, as was seen in late Summer 2021 (Forni and Mantovani, 2021; Sanchez, 2021). As such, examining the factors associated with parental intentions to get the COVID-19 vaccination for their children is important information to aid public health efforts to curb the pandemic.

Research examining factors affecting parental vaccine intentions has mostly focused on measles, HPV and influenza. Previous work has shown that parental demographics such as race and income (Smith et al., 2015), parent awareness of, and knowledge about, the necessity of a vaccine (Stokley et al., 2011; Dorell et al., 2011), perceived vaccine-

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related social norms (Oraby et al., 2014), perceived risk of disease (Smith et al., 2017), and even parents' own vaccination status (Kornides et al., 2019) play a role in parental intentions and decisions for childhood vaccines. One of the most consistent predictors of parental vaccine decisions, across vaccines for a variety of illnesses, is a healthcare provider's recommendation (Caldwell et al., 2021). However, negative perceptions of vaccine safety and efficacy are associated with lower vaccine uptake and thus present a significant barrier (Brown et al., 2010).

Recent work has sought to examine factors associated with parental intentions and decisions around the COVID-19 vaccine. One study of vaccine hesitant parents found that while greater formal education was associated with higher parent and child COVID-19 vaccine uptake, many vaccine hesitant parents also believed that their own vaccine-critical personal beliefs and experiences were the most important factors in their decision about COVID-19 vaccination (Rhodes et al., 2020). In a study conducted in February and March of 2021, researchers found that 48% of parents planned to vaccinate their children, while 23% said they wanted to wait and see; parents more likely to vaccinate were also more likely to intend to follow a healthcare provider's recommendation (Szilagyi et al., 2021). Finally, in a national survey of parents conducted in March 2021, about 49% of participants planned to vaccinate their child with the COVID-19 vaccine when it was available, with the remaining suggesting they would not vaccinate (25.6%) or were unsure (25.0%) (Teasdale et al., 2021). That national study also reported that several factors were associated with positive intentions, including demographic factors (Asian race, higher education, male sex, higher income) and parents own COVID-19 vaccination status. Concerns about safety and effectiveness of the vaccines and low perceived necessity were associated with lower intent to vaccinate children (Teasdale et al., 2021).

Parental vaccine hesitancy, which is predictive of, but not the same as, delay or refusal of vaccination, has also been the subject of research over several decades (MacDonald, 2015). Vaccine acceptance and vaccine hesitancy, while related, are not identical because vaccine decisions are made within a complex and context-specific situation (MacDonald, 2015; Larson et al., 2014). Thus, addressing vaccine hesitancy and vaccine concerns must rely on a deep understanding of the target audience in the larger system within which the vaccine is being promoted. Not surprisingly, Dube and colleagues call for the field to move beyond the "knowledge deficit model" of addressing vaccine hesitancy and low vaccine uptake through information provision and education approaches, and instead work to gain a deep understanding of context-specific factors related to vaccine intentions for a specific vaccine in a specific group (Dubé et al., 2015). In order to develop strategies that employ this targeted (or even tailored) approach (Noar et al., 2009), it is essential to conduct formative research to better understand what may motivate behavioral intentions, especially in a novel context like the COVID-19 pandemic and the COVID-19 vaccine. In other words, it is imperative to determine context-specific perceptions and beliefs about COVID-19 vaccination so that effective public health campaigns and clinic-level health education can be developed to promote parental uptake of COVID-19 vaccine for their children.

As of January 2022, the state of Indiana had almost 20,000 COVID-19 deaths (Indiana Department of Health, 2022) and was experiencing very high rates of community transmission (CDC, 2022a). As of the same date, 52.5% of all eligible individuals had been fully vaccinated, but only 38.1% of those aged 12–17 years and 10.3% of those aged 5–11 years had been fully vaccinated (CDC, 2022b), putting Indiana below national averages (The New York Times, n.d.). Research is needed to assess Indiana parents' intentions to vaccinate their children and to identify potential motivating factors among parents who are hesitant so that interventions can be designed to increase vaccination rates for children who are currently eligible and who will become eligible in the future.

In the current study, we analyzed data from a statewide survey of parents in Indiana that assessed their intentions to vaccinate their children against COVID-19. Specifically, we examined how potential motivators, demographic characteristics, and previous experiences with the virus differed for parents who are waiting to decide (i.e., hesitant) and those who expressed firm rejection of the vaccine. Understanding the differences between these two groups can inform the development of strategies to improve vaccine uptake among children.

2. Methods

2.1. Participants and recruitment

This study utilized a cross-sectional statewide anonymous survey of parents or caregivers (hereafter referred to a parents) facilitated through email invitations by school principals and superintendents in community-based school districts in Indiana. The survey was conducted in May and June 2021 in conjunction with the Indiana Department of Health and the Indiana Department of Education. Parents who received the online Qualtrics survey link from their children's school district could self-select into the study. The study was approved as exempt by the Institutional Review Board of the primary authors' university.

2.2. Procedure and measures

The online survey included questions about COVID-19 vaccine behaviors and intentions, reasons for these behaviors and intentions, and demographic characteristics. Participants began the survey by answering a brief set of questions about their child[ren], what grade they were in, and what kind of school they attended. Participants who reported having more than one school-aged child were asked to think about the child with the most recent birthday as they completed the questions. To assist parents in remembering which child they were supposed to be responding about as they answered the questions, participants were asked to enter their child's name, nickname, or initials. Subsequent questions then piped in this entered text, which is represented with the "[child]" wording in the measures below (e.g., if a participant entered "Sally" as their child's name, they would see "Sally" anytime a survey question had "[child]" in the wording.)

Participants were then asked about their intention or behavior towards vaccinating their child against COVID-19. This behavior/intention measure served as the main outcome variable for the study. Specifically, participants were asked "When [child] becomes eligible for the COVID-19 vaccine, will you get it for them?" Response options included A) [child] has already received a dose of one of the COVID-19 vaccines, B) Yes, we've already scheduled a vaccine appointment for [child], C) Yes, as soon as possible; D) I will wait and see, E) Only if required, and F) Definitely not. To facilitate analysis, participants who answered A, B, or C were combined into a category labeled *vaccine acceptors*; these participants represented parents who expressed strong intentions to or already had vaccinated their child. Participants who answered D were labeled *vaccine hesitators* because they indicated neither complete acceptance nor rejection of COVID vaccination. Participants who answered E or F were combined into a category labeled *vaccine rejecters*; these participants were conceptually similar in that they would not autonomously make the decision to get their child vaccinated.

Next, the survey used response logic to tailor additional questions to participants. Participants who identified as COVID-19 vaccine hesitators or vaccine rejecters, were presented a set of eleven motivating reasons for deciding to get the COVID-19 vaccination for their child which were developed based on previous research (Rhodes et al., 2020; Szilagyi et al., 2021; Teasdale et al., 2021; Goldman et al., 2020) and with expert input from the research team. After each statement, respondents were asked to indicate if this reason made them "more likely to vaccinate," "less likely to vaccinate," or had "no impact" on their decision. These motivating reasons included topics such as perception of vaccine effectiveness (e.g., "the vaccines have been shown to be highly effective in

preventing illness from COVID-19 among children"), normative influences such as perception of child's healthcare provider's desires (e.g., "[Child]'s health care provider recommends they get the vaccine") and perception of other parents' vaccination decisions (e.g., "A close friend or family member got their children vaccinated"), as well as perceptions about the vaccine serving as a catalyst for life normalizing (e.g., "The quickest way for life to return to normal is for most children to get vaccinated."). A full list of the motivating reasons appears below. To facilitate analysis, responses were dichotomized to indicate responses that would have a positive impact on the COVID-19 vaccine decision (e.g., more likely to vaccinate vs. other).

Finally, demographic questions included parent race, parent ethnicity, child grade level (kindergarten thru 5th grade, middle school [6th thru 8th grade] and high school [9th thru 12th grade]), and geographic location (urban, rural, or mixed/suburban). All participants were also asked about previous experiences with COVID-19, including whether they or anyone in their household has ever had COVID-19, and whether they personally knew anyone who has been hospitalized and/or died due to COVID-19. In addition, all respondents were asked whether they had received any doses of the COVID-19 vaccine and whether they believed that COVID-19 was a problem in their community.

To analyze the data, we calculated descriptive statistics for each variable of interest including the frequency of vaccine acceptors, vaccine hesitators, and vaccine rejecters. Next, in order to understand ways to positively influence vaccination decisions among vaccine hesitators, we used Chi-square analysis to examine how each of the eleven motivating reasons that can affect decisions to vaccinate differed between vaccine hesitators and vaccine rejecters. Lastly, we examined the same relationships in a series of logistic regression models that each controlled for an additional block of covariates. Model 1 included all motivating reasons in the regression to examine how each was related to being a vaccine hesitator (as opposed to a vaccine rejecter) while controlling for the other motivating reasons. Model 2 added the demographic variables described above. Lastly, Model 3 also added variables that measured previous experience with COVID-19. All analyses were conducted in IBM SPSS v.27 and statistical significance was considered at the $p < 0.05$ level.

3. Results

The demographic characteristics of the 10,266 parent respondents appear in Table 1. Briefly, approximately half of respondents represented elementary school children (49.6%) while about a quarter each represented middle school (23.5%) or high school (26.9%) students, respectively. The majority of respondents were white (92.4%), lived in an urban area (67.4%), and represented children in a public school (87.0%). Regarding vaccination behaviors or intentions for their children, 44.8% of parental respondents were vaccine acceptors, 42.2% were vaccine rejecters, and 13.0% were vaccine hesitators. Among the vaccine acceptors, most indicated an intention to get their child vaccinated as soon as they were eligible (61.5%). Among vaccine rejecters, almost all (90.4%) indicated they would definitely not vaccinate their child (see Table 1 for a complete breakdown of the numbers of respondents in each category). The remaining analyses focus on vaccine hesitators and vaccine rejecters, as these individuals would be the focus of vaccine promotion efforts germane to the larger study purpose.

Table 2 presents differences between vaccine hesitators and vaccine rejecters with respect to how much influence each of the eleven motivating reasons would positively affect their decision to vaccinate their child against COVID-19. Invariably, vaccine hesitators indicated higher frequencies of being positively influenced by each of the motivating reasons. For example, compared to vaccine rejecters, vaccine hesitators were more likely to indicate they would be positively influenced by information that *the vaccine will help protect their child from getting sick from COVID-19* (60.8% vs. 6.5%, $p < 0.001$) and information that *the vaccines have been shown to be highly effective in preventing illness among*

Table 1
Characteristics of respondents to a statewide parental survey of vaccine intentions in Indiana ($n = 10{,}266$).

Characteristics	N (%)
Child's grade level	
Elementary school (K-5)	5060 (49.6)
Middle school (6–8)	2391 (23.5)
High school (9–12)	2737 (26.9)
School type	
Public	9806 (87.0)
Private	1300 (11.5)
Charter	162 (1.4)
Race	
White	8723 (92.4)
Black	129 (1.4)
Asian	153 (1.6)
Native	60 (0.6)
Bi-racial or other	375 (4.0)
Ethnicity	
Hispanic/Latinx	314 (3.3)
Not Hispanic/Latinx	9120 (96.7)
Geographic setting	
Rural	627 (6.2)
Urban	6789 (67.4)
Suburban	2664 (26.4)
Vaccination behavior or intention	
Vaccine acceptors	4600 (44.8)
• Child already received a dose of one of the COVID-19 vaccines	• 1436 (31.2)
• Child is scheduled for a vaccine appointment	• 333 (7.2)
• Child will get vaccine as soon as possible when eligible	• 2831 (61.5)
Vaccine hesitators (e.g., plan to "wait and see")	1338 (13.0)
Vaccine rejecters	4328 (42.2)
• Only if required	• 414 (9.6)
• Definitely not	• 3914 (90.4)

Table 2
Differences between Vaccine Hesitators and Vaccine Rejecters with respect to how various factors would influence the decision to vaccinate their child against COVID-19.

	Percent of respondents that indicated item would make them MORE likely to get COVID-19 vaccine for their child		
	Vaccine hesitators $N = 1338$	Vaccine rejecters $N = 4328$	*P*-value
The vaccine will help protect [child] from getting sick from COVID-19	60.8%	6.5%	<0.001
The vaccines have been shown to be highly effective in preventing illness from COVID-19 among children	53.0%	4.1%	<0.001
Millions of children have already been safely vaccinated for COVID-19	52.7%	4.0%	<0.001
[child]'s health care provider recommends they get the vaccine	49.7%	6.5%	<0.001
Researchers determine that vaccinated children are less likely to infect adults	39.9%	3.4%	<0.001
The quickest way for life to return to normal is for most children to get vaccinated	36.6%	3.5%	<0.001
We need to get children vaccinated to get schools back on track	31.5%	2.9%	<0.001
A close friend or family member got their children vaccinated	25.5%	1.8%	<0.001
Public health authorities (e.g., CDC or Dr. Fauci) recommend children get the vaccine	24.0%	1.3%	<0.001
There is no cost to get the vaccine for [child]	14.4%	1.0%	<0.001
A trusted community leader supports people getting vaccinate	11.9%	0.6%	<0.001

children (53.0% vs. 4.1%, p < 0.001). Similarly, vaccine hesitators indicated that knowing *that millions of children have already been safely vaccinated for COVID-19* would positively influence their decisions at greater rates than vaccine rejecters (52.7% vs. 4.0%, p < 0.001).

We present logistic regression results in Table 3 which show how vaccine hesitators and vaccine rejecters differ with respect to being influenced by the eleven motivating reasons (model 1) and while controlling for demographic characteristics (model 2) and also previous experience with COVID-19 (model 3). Overall, the addition of covariates did not change the nature of the relationships observed. Compared to vaccine rejecters, vaccine hesitators were more likely to indicate they would be willing to vaccinate their child if *millions of children have been safety vaccinated* (ORs ranged from 3.55 to 4.78 depending on model, all $p < 0.001$), or upon learning that *the vaccine will help protect [child] from getting sick with COVID-19* (ORs ranged from 2.48 to 3.47 depending on the model, all $p < 0.001$). Vaccine hesitators were also more likely than vaccine rejecters to indicate a willingness to get the vaccine for their child if their child's *health care provider recommends they get the vaccine* (ORs ranged from 2.48 to 3.23 depending on model, all p < 0.001).

Table 3
Items more likely to lead to a positive COVID-19 vaccine decision for child among vaccine hesitating and vaccine rejecting parents (with and without control variables).

	Vaccine hesitators (vs. vaccine rejecters)		
Block 1: Items more likely to lead to vaccine decision	Model 1 ORs	Model 2 ORs	Model 3 ORs
The vaccines have been shown to be highly effective in preventing illness from COVID-19 among children	2.26***	2.43***	2.33***
Researchers determine that vaccinated children are less likely to infect adults	1.68***	1.58***	1.42*
The vaccine will help protect [child] from getting sick from COVID-19	3.23***	3.47***	2.48***
[child]'s health care provider recommends they get the vaccine	2.02***	2.04***	1.44**
The quickest way for life to return to normal is for most children to get vaccinated	1.40*	1.37	0.97
Millions of children have already been safely vaccinated for COVID-19	4.69***	4.78***	3.55***
We need to get children vaccinated to get schools back on track	1.25	1.21	0.93
There is no cost to get the vaccine for [child]	1.37	1.16	1.35
Public health authorities (e.g., CDC or Dr. Fauci) recommend children get the vaccine	1.16	1.06	0.88
A close friend or family member got their children vaccinated	1.78***	1.69*	1.75**
A trusted community leader supports people getting vaccinate	0.73	0.98	0.86
Block 2: Demographics			
Elementary school (K-5)		0.81	0.62***
Middle school (6–8)		1.01	0.81
High school (9–12)		Reference	Reference
White		Reference	Reference
Black		0.38	0.33
Asian including Asian Indian		4.31***	4.19*
American Indian/ native islander		0.37	0.37
Biracial/other		1.05	1.30
Hispanic/Latinx		0.77	0.82
Urban			Reference
Mixed/suburban			0.95
Rural			0.75
Block 3: Previous experience with COVID-19			
Someone in household had COVID			0.69***
Know someone hospitalized or died			0.98
Parent received COVID vaccine			6.32***
Believe COVID is a problem in community (dichotomized as yes vs other)			1.66***
Nagelkerke R^2	0.499	0.515	0.593

*p ≤ 0.05, ** ≤ 0.01, ***p ≤ 0.001.

Lastly, parental vaccine hesitators were more likely than vaccine rejectors to be vaccinated themselves (OR = 6.32, p < 0.001) and to believe COVID-19 was a problem in their community (OR = 1.66, p < 0.001).

4. Discussion

The overall purpose of our study was to assess Indiana parents' behaviors or intentions related to COVID-19 vaccination for their school-aged children, as well as factors that may motivate parents to vaccinate, especially among vaccine hesitant parents. In the current study, only about 45% of parents indicated being COVID-19 vaccine acceptors. These findings reveal that behaviors and intentions related to COVID-19 vaccination for Indiana children are somewhat lower than vaccination uptake for other non-required vaccines for children, such as HPV (more than half of eligible children are vaccinated) (Elam-Evans, 2020) and influenza (>75% of eligible children received a flu shot during the last flu season) (CDC, 2021). To affect relatively low COVID-19 vaccination rates and vaccination intentions among parents of Indiana children, understanding and addressing what may motivate vaccine hesitant parents is key.

We found that vaccine-hesitant parents may be motivated by assurances of the vaccine's effectiveness and safety more so than vaccine rejecters, which is similar to other recent work (Karlsson et al., 2021). Importantly, these findings may indicate that the messaging around vaccine effectiveness and safety in protecting children is potentially powerful, but existing messaging may not have adequately addressed this concern in a meaningful way for these parents. With the recent authorization of COVID-19 vaccines for younger children, public health leaders must work now to accurately communicate the safety and efficacy of this vaccine in younger and older children. As noted by Karlsson and colleagues, it will be important to focus on "communications that underscore the safety of the vaccine [as] more important than highlighting the risks of the disease." (Karlsson et al., 2021)

Our study generated several significant findings which constituted proximal, or "close to home," reasons which can inform promotional messaging to motivate hesitators to vaccinate. For example, parents' perception that COVID was a problem in their own community was something that made them more likely to be hesitant rather than rejecting of the vaccine for their children. Our findings also suggest that normative influences – both descriptive and injunctive - may be particularly salient for motivating behavior (Montaño and Kasprzyk, 2015). For example, knowing a friend or family member who had vaccinated their own child (i.e., a descriptive norm) or having the child's healthcare provider recommend the vaccine (i.e., injunctive norm) were strong motivating reasons to vaccinate their child among vaccine hesitant parents as opposed to vaccine rejecters in our study. From a health belief model perspective, these findings may be best understood through the idea that higher perceived threat of a disease (i.e., perceptions of susceptibility and severity of the disease) and cues to action from our social networks (i.e., other parents choosing to vaccinate their children, a provider's recommendation) will likely increase a person's health behaviors or behavioral intentions (Champion and Skinner, 2008; Head et al., 2021).

Based on these findings, it is important for Indiana parents to have accurate information about the number of people who have been safely vaccinated, particularly in their own community. Whereas one recent study showed no effect for a general social norms message on overall childhood vaccination rates (Clayton et al., 2021), our findings suggest that social norms messaging may be an effective strategy for motivating COVID-19 childhood vaccination, particularly if the normative influences are proximal (i.e., a close friend or family member). Building vaccine confidence must include messaging that addresses the social norms of pro-vaccination attitudes and behaviors in their community. This could include, for example, sharing positive vaccination decisions with others through social media (Ittefaq et al., 2021) or purposeful

interpersonal conversations between friends, family members, and especially healthcare providers about support for the vaccine. Not surprisingly, the findings from our study suggest that family physicians, pediatricians, and other primary care providers have a role in urging vaccination by strongly recommending the COVID-19 vaccine to their eligible patients, irrespective of their ability to currently administer the vaccine within their practice.

There were a few other key differences between vaccine hesitators and rejecters. Importantly, parents' own COVID-19 vaccination uptake was the strongest predictor of parents' status as hesitators rather than rejecters. This is consistent with work that has showed that mothers' own HPV vaccination status strongly predicted their child's vaccination status (Kornides et al., 2019). One key difference between COVID-19 vaccination and vaccination efforts in other diseases is the observation that many vaccinated parents in the current study still expressed hesitancy to vaccinate their child against COVID-19, suggesting that messaging may be needed to emphasize the importance of having all family members vaccinated in order to ensure maximum protection. By contrast, parents who were not vaccinated, as well as parents of elementary aged children, were more likely to be vaccine rejecters, suggesting that many individual households with younger children may continue to be entirely unvaccinated – and consequently more at risk for infection – despite expanded vaccine availability for more age groups over time.

Finally, a sobering note in our findings is that a relatively small proportion of parents were in the hesitant group (13%) compared to the rejecting group (42.2%), reflecting a smaller percentage of "unsure" parents than previous studies (Szilagyi et al., 2021; Teasdale et al., 2021). Although our results suggest ways to sway hesitant parents, significant challenges remain in reaching the larger group of parents who indicate that they will not consider vaccinating their children against COVID-19.

4.1. Limitations

Although we recruited a large statewide sample of respondents, several limitations are worth mentioning. First, we used non-random sampling that has the potential to limit the representativeness of respondents. The racial demographics of our sample in particular are not concordant with Indiana's population (United States Census Bureau, 2021). In addition, as this was an opt-in, voluntary survey, there is the potential for nonresponse bias, given that certain pre-existing attitudes may have induced greater or lesser participation in the survey. Further, we made a conscious effort to keep the survey brief to reduce participant burden and increase likelihood of participation. However, we recognize that the brevity of the survey precluded use of longer validated measures that assess common theoretical predictors of vaccination behavior and intentions, such as vaccine attitudes or perceived threat. Furthermore, while our questions related to motivating reasons are consistent with the literature, they have not been formally validated, this we recognize this as a limitation of the work. Additionally, our survey targeted parents of school-aged children in public and private schools in Indiana. Thus, we recognize that the results may not be generalizable to other states or to parents of homeschooled children. Lastly, our survey was conducted in late Spring/early Summer 2021 at a time when the FDA had recently approved EUA of one of the COVID-19 vaccines for use in children ages 12–16 years—and we recognize that parental attitudes likely change over time, particularly as more information becomes available on vaccine safety and effectiveness in children.

5. Conclusion

Almost half of Indiana parents were vaccine acceptors and almost as many indicated being COVID-19 vaccine rejecters for their children. Vaccine hesitators represent the group of parents of unvaccinated children that are most amenable to timely intervention. Understanding and addressing the potentially motivating factors that can influence parents who express COVID-19 vaccine hesitancy will improve vaccination rates among children. In this regard, our findings can yield actionable messaging and promotion strategies by public health agencies and partners for developing targeted interventions to increase vaccination for currently eligible children.

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Declaration of Competing Interest

Katharine J. Head has received investigator-initiated research funding from Merck, administered through Indiana University, and serves as an unpaid advisory member to the Indiana Immunization Coalition. Gregory D. Zimet has served as an external advisory board member for Merck and Moderna, and as a consultant to Merck. He also has received investigator-initiated research funding from Merck administered through Indiana University and serves as an unpaid member of the Board of Directors for the Unity Consortium, a non-profit organization that supports adolescent health through vaccination. The other authors have no potential conflicts of interest to declare.

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