

RESEARCH LETTER

Factors Associated with Intention to Vaccinate Children 0-11 Years of Age Against COVID-19

Melissa S. Stockwell, MD, MPH, Christina A. Porucznik, PhD, MSPH, Ashton Dixon, MPH, Jazmin Duque, MPH, Joseph B. Stanford, MD, MSPH, Vic Veguilla, DrPH, and Fatimah S. Dawood, MD

Background: Millions of children have tested positive for SARS-CoV-2, and over 1000 children have died in the US. However, vaccination rates for children 5 to 11 years old are low.

Methods: Starting in August 2020, we conducted a prospective SARS-CoV-2 household surveillance study in Spanish and English-speaking households in New York City and Utah. From October 21 to 25, 2021, we asked caregivers about their likelihood of getting COVID-19 vaccine for their child, and reasons that they might or might not vaccinate that child. We compared intent to vaccinate by site, demographic characteristics, SARS-CoV-2 infection detected by study surveillance, and parents' COVID-19 vaccination status using Chi-square tests and a multivariable logistic regression model, accounting for within-household clustering.

Results: Among parents or caregivers of 309 children (0 to 11 years) in 172 households, 87% were very or somewhat likely to intend to vaccinate their child. The most prevalent reasons for intending to vaccinate were to protect family and friends and the community; individual prevention was mentioned less often. The most prevalent reasons for not intending to vaccinate were side effect concerns and wanting to wait and see.

In multivariable analysis, parents had much lower odds of intending to vaccinate if someone in the household had tested SARS-CoV-2-positive during the study (adjusted odds ratio = 0.09; 95% confidence interval, 0.03-0.3).

Conclusion: This study highlighted several themes for clinicians and public health officials to consider including the importance and safety of vaccination for this age-group even if infected previously, and the benefits of vaccination to protect family, friends, and community. (J Am Board Fam Med 2022;35:1174–1178.)

Keywords: Caregivers, Child, Chi-Square Test, COVID-19 Vaccines, Logistic Models, New York City, Parents, Prospective Studies, Public Health, SARS-CoV-2, Utah

Introduction

Over 13.8 million children aged <18 years have tested positive for SARS-CoV-2 in the United States¹ with

more than 1290 reported pediatric deaths.² Although the Food and Drug Administration (FDA) approved an Emergency Use Authorization for the COVID-19 vaccine for 5 to 11 year-olds on October 29, 2021, only 36% of children in this age-group were vaccinated as of June 2022, a number that is only slowly increasing.¹ COVID-19 vaccines for children aged

This article was externally peer reviewed.
Submitted 16 February 2022; revised 13 July 2022; accepted 18 July 2022.

From Department of Pediatrics, Columbia University Vagelos College of Physicians and Surgeons; Department of Population and Family Health, Mailman School of Public Health, Columbia University Irving Medical Center, New York, NY (MSS); Division of Public Health, Department of Family and Preventive Medicine, University of Utah School of Medicine, Salt Lake City (CAP, JBS); Centers for Disease Control and Prevention, Atlanta, GA (AD, VV, FSD); Abt Associates, Atlanta, GA (JD).

Funding: This study was funded by the U.S. Centers for Disease Control and Prevention through Contract # 75D30120C08150 with Abt Associates. The funder did participate in the work. Findings and conclusions in this report are those of the authors and do not necessarily

represent the views of the U.S. Centers for Disease Control and Prevention.

Conflict of interest: Dr Porucznik reports personal fees from McKesson Corporation outside the submitted work. The other authors have no relevant conflicts of interest to disclose.

Corresponding author: Melissa S. Stockwell, MD, MPH, Division of Child and Adolescent Health, Columbia University, 622 W. 168th Street, VC 417, New York, NY 10032, Tel: 212-342-5732; Fax: 212-305-8819 (E-mail: mss2112@cumc.columbia.edu).

Table 1. Characteristics of Study Population and Associations with Parental Intentions for COVID-19 Vaccination of Their Child (N = 309), Respondents from 172 Households

| | Total Population | 'Very Likely' or 'somewhat likely' | 'Not Too Likely' or 'not at all likely' | P value for Unadjusted Chi Square | Adjusted Odds Ratio (95% CI) 'Very Likely' or 'somewhat likely' |
|--|------------------|---------------------------------------|---|---|--|
| | N (Col %) | N (Row %) | N (Row %) | | |
| TOTAL | 309 | 270 (87.4) | 39 (12.6) | | |
| Site | | | | 0.47 | |
| New York City | 103 (33.3) | 92 (89.3) | 11 (10.7) | | — |
| Utah | 206 (66.7) | 178 (86.4) | 28 (13.6) | | |
| Age group | | | | 0.08 | |
| 0 to 4 years | 111 (35.9) | 92 (82.9) | 19 (17.1) | | ref |
| 5 to 11 years | 198 (64.1) | 178 (89.9) | 20 (10.1) | | 1.8 (0.7 to 4.3) |
| Gender | | | | 0.20 | |
| Male | 137 (44.3) | 116 (84.7) | 21 (15.3) | | — |
| Female | 172 (55.7) | 154 (89.5) | 18 (10.5) | | |
| Race/ethnicity | | | | 0.92 | |
| Hispanic | 64 (20.7) | 54 (84.4) | 10 (15.6) | | |
| White, Non-Hispanic | 236 (76.4) | 207 (87.7) | 29 (12.3) | | — |
| Black and Other, Non-Hispanic | 8 (2.6) | 8 (100) | 0 | | |
| Missing/declined | 1 (0.3) | 1 (100) | 0 | | |
| Insurance | | | | 0.99 | — |
| Yes | 305 (98.7) | 266 (87.2) | 39 (12.8) | | |
| No | 1 (0.3) | 1 (100) | 0 | | |
| Missing/unknown | 3 (1) | 3 (100) | 0 | | |
| Childcare outside the home during cohort participation | | | | 0.02 | 1.1 (0.2 to 5.1) ref |
| Yes | 125 (40.5) | 116 (92.8) | 9 (7.2) | | |
| No | 184 (59.6) | 154 (83.7) | 30 (16.3) | | |
| School outside the home during cohort participation | | | | 0.14 | |
| Yes | 242 (78.3) | 215 (88.8) | 27 (11.2) | | 1.1 (0.2 to 5.7) |
| No | 67 (21.7) | 55 (82.1) | 12 (17.9) | | ref |
| Respondent Parent's Education | | | | | |
| Up to some college | 77 (24.9) | 58 (75.3) | 19 (24.7) | 0.0004 | ref |
| College graduate | 232 (75.1) | 212 (91.4) | 20 (8.6) | | 3.2 (0.8 to 13.8) |
| Household Income | | | | 0.0014 | |
| Less than \$50,000 | 39 (12.6) | 28 (71.8) | 11 (28.2) | | ref |
| \$50,000 to less than \$150,000 | 178 (57.6) | 153 (86.0) | 25 (14.0) | | 3.3 (0.8 to 13.8) |
| \$150,000 or more | 92 (29.8) | 89 (96.7) | 3 (3.3) | | 13.9 (1.2 to 165.8) |
| >1 medical condition in the child | | | | | |
| Yes | 45 (14.6) | 40 (88.9) | 5 (11.1) | 0.74 | — |
| No | 264 (85.4) | 230 (87.1) | 34 (12.9) | | |
| Child has personal doctor or health care provider | | | | 0.27 | |
| Yes | 291 (94.2) | 255 (87.6) | 36 (12.4) | | |
| No | 13 (4.2) | 10 (76.9) | 3 (23.1) | | — |
| Missing | 5 (1.6) | 5 (100) | 0 | | |
| SARS-CoV-2 infection in a household member during study, before survey | | | | 0.008 | |
| Yes | 73 (23.6) | 48 (65.8) | 25 (34.3) | | 0.09 (0.03 to 0.3) |
| No | 236 (76.4) | 222 (94.1) | 14 (5.9) | | ref |

Continued

Table 1. Continued

| | Total Population | 'Very Likely' or 'somewhat likely' | 'Not Too Likely' or 'not at all likely' | P value for Unadjusted Chi Square | Adjusted Odds Ratio (95% CI) 'Very Likely' or 'somewhat likely' |
|---|------------------|------------------------------------|---|-----------------------------------|--|
| | N (Col %) | N (Row %) | N (Row %) | | |
| Respondent parent received COVID-19 vaccine | | | | <0.0001 | |
| Yes | 271 (87.7) | 250 (92.3) | 21 (7.8) | | 12.3 (2.1 to 73.2) |
| No | 38 (12.3) | 20 (52.6) | 18 (47.4) | | ref |

Abbreviation: CI, confidence interval.

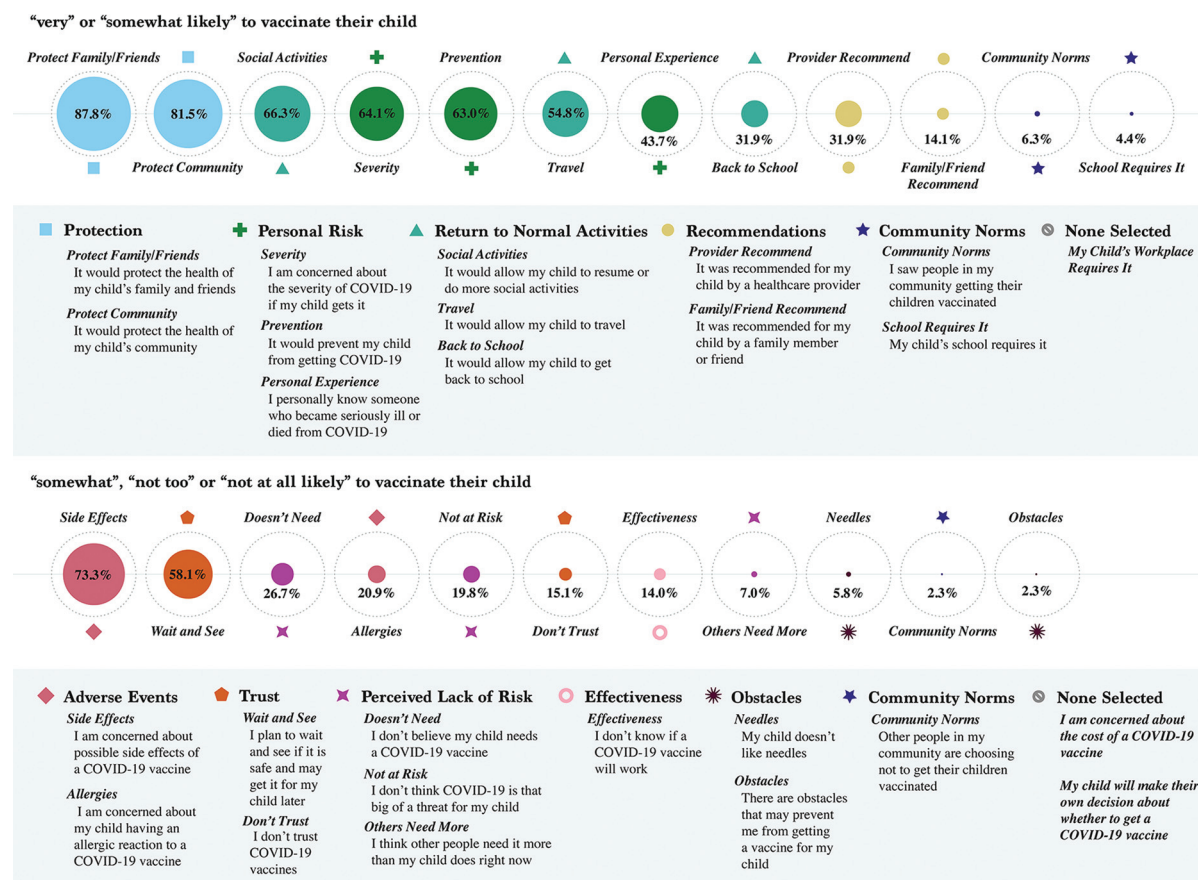
<5 years have just recently been authorized. Understanding factors affecting parents' willingness to vaccinate their children is critical to promoting uptake.

Methods

We previously reported the methods and findings of a SARS-CoV-2 household surveillance study in Spanish and English-speaking households in New York City and Utah.³ During October 21 to 25, 2021 immediately before the FDA meeting, we conducted a short survey asking the reporting caregiver of each child

aged 0 to 11 years about their intent to vaccinate that child against COVID-19 (very, somewhat, not too or not at all likely), and reasons that they might (reported "very" or "somewhat likely") or might not ("somewhat," "not too" or "not at all likely"). Response options about reasons to vaccinate or not vaccinate were adapted from CDC national internet panel surveys that were field tested and have been used to assess attitudes to COVID-19 vaccination periodically during the pandemic. Only 1 caregiver reported for each child, but 1 could report for multiple children each

Figure 1. Reasons respondent parent would chose to vaccinate or not to vaccinate their child aged 0 to 11 years.



separately. We compared intent to vaccinate (very/somewhat likely vs not too/not at all likely) by site, demographic characteristics, SARS-CoV-2 infection detected by study surveillance among household members during the study period, and parents' COVID-19 vaccination status using Chi square tests. Samples were not reweighted in either the main study or this analysis. Variables with a univariate p value <0.1 were entered into a multivariable logistic regression model. Generalized estimating equations assuming working independence with a robust variance estimator addressed correlation from within-household clustering. The University of Utah Institutional Review Board (IRB) was the central IRB and approved the study.

Results

Among respondents for 309 children (305 parents, 2 grandmothers, 2 aunts, response rate 78%) in 172 households, 87% were very or somewhat likely to vaccinate their child (Table 1). The most prevalent reasons for vaccinating were to protect family and friends and the community; individual prevention was endorsed less often. The most prevalent reasons for not vaccinating were side effect concerns and wanting to wait and see (Figure 1). These were the top themes regardless of site or age (0 to 4 years and 5 to 11 years).

In multivariable analysis, parents had much lower odds of intending to vaccinate if someone in the household had tested SARS-CoV-2-positive during the study (adjusted odds ratio [aOR] 0.09; 95% confidence interval, 0.03 to 0.3) (Table 1). Higher household income aOR 13.9 (1.2 to 165.8) and parental COVID-19 vaccine receipt aOR 12.3 (2.1 to 73.2) were independently associated with vaccine intentions, but not child's age, childcare/school attendance outside the home, parental education level, or other selected demographic factors (Table 1). Trends were similar when chi squares were stratified by age-group and by site.

Discussion

In this study, most parents intended to vaccinate their children aged 0 to 11 years once vaccine was available. This study included a convenience sample of a relatively small number of households, and persons of certain racial and ethnic backgrounds, those who were low-income and those who were uninsured persons were under-represented. Thus,

findings may not be generalizable to all segments of the US population. However, findings suggest several themes for clinicians and public health officials to consider when thinking about communication strategies as part of multi-level interventions. First, it may be important to underscore to families the importance of vaccination even if household members have previously had SARS-CoV-2 infection.⁴ Families may also need reassurance about vaccine safety after prior infection. Second, for this younger age-group, the benefits of vaccination to protect family, friends and community may play a particularly important role, even more than personal protection, in motivating parents to vaccinate their child. Addressing concerns about vaccine side effects also remains important. Third, low-income households may benefit from additional outreach efforts to provide information about COVID-19 vaccines for children. Finally, while parental vaccination status was associated with vaccine intention for children,⁵ over 50% of unvaccinated parents reported intention to vaccinate their child, demonstrating the importance of offering COVID-19 vaccine, regardless of parental vaccination status.

The authors acknowledge the families that participated in the C-HEART cohort, the REDCap data platform, and the following people for contributing to the study: Melissa A. Rolfes, PhD, MPH from the Centers for Disease Control and Prevention; Priyam Thind, MPH, Maria Castro, MS, Alisha Sarakki, MPH, and John Paul Harris from Columbia University; Jonah M. Stockwell (figure creation); Emily Hacker, BS, Jacob Anderson, Halle Fiagle, and Kathryn Graham from University of Utah; and Zuha Jeddy, MPH, David Izrael, MS, Utsav Kattel, BSc, Kim Altunkaynak, MS, Danielle Rentz Hunt, PhD, and Parker Malek, BS, from Abt Associates.

To see this article online, please go to: <http://jabfm.org/content/35/6/1174.full>.

References

1. American Academy of Pediatrics. Critical updates on COVID-19. Available from: <https://www.aap.org/en/pages/2019-novel-coronavirus-covid-19-infections/>.
2. Centers for Disease Control and Prevention. Provisional COVID-19 Deaths: Focus on Ages 0-18 Years. Available from: <https://data.cdc.gov/NCHS/Provisional-COVID-19-Deaths-Focus-on-Ages-0-18-Yea/nr4s-juj3>.
3. Dawood FS, Porucznik CA, Veguilla V, et al. Incidence rates household infection risk, and clinical characteristics of SARS-CoV-2 infection among children and adults in Utah and New York City, New York. *JAMA Pediatr* 2022;176(1):59-67.

4. Cavanaugh AM, Spicer KB, Thoroughman D, Glick C, Winter K. Reduced risk of reinfection with SARS-CoV-2 After COVID-19 Vaccination - Kentucky, May-June 2021. *MMWR Morb Mortal Wkly Rep* 2021;70:1081-3.
5. Szilagyi PG, Shah MD, Delgado JR, et al. Parents' intentions and perceptions about COVID-19 vaccination for their children: results from a national survey. *Pediatrics* 2021;148(4):e2021052335.