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Inequities in COVID-19 vaccination coverage for adolescents with and without disability, national immunization Survey–Child COVID module, July 22, 2021–February 26, 2022

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Abstract

Background: Some people with disabilities are likely at increased risk of health impacts from coronavirus disease 2019 (COVID-19).

Objective: To describe parent-reported COVID-19 vaccination status of adolescents (aged 13–17 years) and parental intent to get their child vaccinated, among adolescents with versus without disability.

Methods: National Immunization Survey–Child COVID Module data from interviews conducted July 22, 2021–February 26, 2022, were analyzed to assess disability status and type and COVID-19 vaccination status for adolescents (n = 12,445). Prevalence estimates with 95% confidence intervals were calculated; T-tests were conducted.

Results: A lower percentage of adolescents with disability received ≥1 dose of COVID-19 vaccine compared to adolescents without disability (52.5% vs. 58.6%), [those with cognition (50.8%) or not performing errands independently (49.5%) disabilities were significantly lower]; and a higher percentage of parents reported intent to definitely vaccinate (9.9% vs. 6.5%) and definitely not vaccinate (14.9% vs.11.8%) their adolescent. Among the unvaccinated adolescents,

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parents of those with disability were more likely to report difficulty getting their child vaccinated (19.1% vs. 12.9%), inconvenient vaccination-site operating hours (7.6% vs. 3.9%), difficulty knowing where to get their child vaccinated (7.2% vs. 2.7%), and difficulty getting to vaccination sites (6.0% vs. 3.0%), than parents of those without disability.

Conclusions: Adolescents with disability had lower vaccination coverage compared to adolescents without disability. Parents of adolescents with disability reported higher intent to get their adolescents vaccinated, but among unvaccinated adolescents with disability, parents reported greater difficulty in accessing COVID-19 vaccines. Findings highlight the need for prioritized outreach to increase COVID-19 vaccination for this population.

Keywords

Disability; Coronavirus; Health disparities; Adolescents

In the United States, 17% of children and adolescents aged 3–17 years have a reported developmental disability[1] and approximately 26% of adults have a disability defined based on having at least one of six functional disability types (e.g., serious difficulty in hearing, vision, mobility, cognition, self-care, and/or independent living).[2] Adults with disability are three times as likely to have heart disease, stroke, diabetes, or cancer than adults without disability,[3] conditions which can place them at increased risk for severe illness from COVID-19.[4] Additionally, some people with disability are likely at increased risk for greater health impact from COVID-19 not only in terms of increased infection, hospitalization, or death due to underlying medical conditions, but also due to social determinants of health, such as living in residential group homes, which poses a higher risk of severe COVID-19 outcomes for people with intellectual and developmental disabilities compared to the general population in New York State.[5,6] While rates of COVID-19 infection, hospitalization, and death are lower for children than adults, children with Intellectual and Developmental Disabilities (I/DD) were found to have higher fatality rates compared to children without I/DD (ages ≤ 17 - IDD 1.6%, without IDD <0.01%).[7] Adults with disability are more likely to live in group or other congregate settings where transmission rates are higher, and people with disabilities across all ages face more barriers to engaging in COVID prevention measures such as social distancing and mask wearing,[8] making COVID-19 vaccination an even more important protection measure. People with disability across the lifespan face barriers in accessing timely and quality healthcare and are disproportionately impacted by delayed or reduced educational or other therapeutic services.[9,10] Furthermore, O'Neill et al.[11] revealed that people with disability have lower rates of vaccination, in general, compared to people without disabilities, as well as the need for further study of the role of systemic inequities as barriers to vaccination.

The scarcity of public health data systems that measure disability status as a demographic variable makes it challenging to properly assess COVID-19-related health disparities and vaccination uptake among people with a disability.[12] To help address this gap in data availability, CDC added a single pilot question to assess disability status to the National Immunization Survey–Adult COVID Module. Analyses of this question showed inequities for adults with disability compared to adults without disability in COVID-19 vaccination status and perceived barriers to vaccination, despite adults with disability being more likely

to report intent to get vaccinated.[13] However, vaccination status among adolescents and parental intent to get their adolescent vaccinated has not previously been described by disability status or type. CDC recommends that people aged 6 months and older receive the COVID-19 vaccine primary series, along with a booster vaccination for people over 5 years.[14] CDC encourages special considerations be given for groups with disproportionate COVID-19 morbidity and mortality, including people with disability, to increase availability and accessibility of vaccines.[15] The objective of this study is to describe parent-reported COVID-19 vaccination status of adolescents aged 13–17 years and parental intent to get their adolescent vaccinated, as well as behavioral and social drivers of acceptance of COVID-19 vaccination, among those with disability compared to those without disability using data from the National Immunization Survey-Child COVID Module (NIS-CCM). This information might help to provide guidance for public health practice on improving vaccination coverage among people with disability.

Methods

The National Immunization Survey-Child COVID Module (NIS-CCM) is a random-digit-dial cellular telephone survey of households with children and adolescents up to 17 years of age eligible for the COVID-19 vaccine. The NIS-CCM began on July 22, 2021, including adolescents aged 13–17 years. The NIS-CCM utilized the same NIS sampling frame used for the NIS-Child survey.[16,17] The respondent to an NIS survey is the parent or guardian, hereinafter referred to as parent, of the child who reports being knowledgeable about the child's vaccination history. This study includes quantitative survey data from the period July 22, 2021–February 26, 2022. We limited the study to parental report focused on adolescents aged 13–17 years as of the time of interview on the NIS-CCM.

To assess disability, parents were asked the following questions from the American Community Survey – Six Disability Questions (ACS-6)[18]: "Is [child's name] deaf or does [he/she] have serious difficulty hearing; Is [name] blind or does [he/she] have serious difficulty seeing, even when wearing glasses; Does [name] have serious difficulty walking or climbing stairs; Because of a physical, mental, or emotional condition, does [name] have serious difficulty concentrating, remembering, or making decisions; Does [name] have difficulty dressing or bathing; and, Because of a physical, mental, or emotional condition, does [name] have difficulty doing errands alone such as visiting a doctor's office or shopping (not applicable for adolescents aged 13–14 years)?" A 'yes' response to any of these questions denotes a disability. A 'yes' response to each individual question is indicative of that specific disability type: hearing, vision, mobility, cognition, self-care, and not performing errands independently (not applicable for adolescents aged 13–14 years), respectively. A 'no' response to all disability questions is indicative of no disability. All six questions are asked for adolescents ages 15–17 years; whereas all but performing errands independently are asked for adolescents ages 13–14 years, as noted. Disability types are not considered mutually exclusive.

To assess vaccination status, parents were asked[19]: "Has [child's name] received at least one dose of a COVID-19 vaccine"; and "How many doses of a COVID-19 vaccine has [child's name] received?" Among those with unvaccinated children, to classify parent's

intent to have their unvaccinated child vaccinated, they were asked “Would you say you would: definitely get a vaccine for [child’s name]; probably get a vaccine; probably not get a vaccine; definitely not get a vaccine; or are not sure?” Data in this study were limited to those who reported on vaccination status and intent for vaccination as well as disability status (n = 12,445; 90 respondents were excluded due to missing values for one or more of these variables). For this study, fully vaccinated is defined as receipt of the primary series (two or more COVID-19 doses) recommended before April 19, 2023.

To assess potential drivers of COVID-19 vaccine uptake, all parents were asked eleven questions derived from three domains of the Behavioral and Social Drivers of Vaccination (BeSD) framework[20,21]: thinking and feeling domain (questions assessed concern about the child getting COVID-19 disease, confidence in COVID-19 vaccine safety for the child, and confidence in COVID-19 vaccine’s importance for the child), social processes domain (questions assessed COVID-19 vaccination status of family and friends’ adolescents, receipt of a healthcare provider’s recommendation for the child’s COVID-19 vaccination, and the child’s school’s requirement for COVID-19 vaccination), and practical issues domain (questions assessed overall and by four types of difficulties to get the child vaccinated).[1]

Research design

We assessed parent-reported vaccination coverage among adolescents by disability status stratified by select sociodemographic characteristics (i.e., age, race and ethnicity, sex, household income, urbanicity, and social vulnerability index[2]), Additionally, we examined the reported adolescent’s disability type (if applicable), mental health status (ranging from fair or poor to excellent mental health), number of doctor visits in the past 12 months, previous COVID-19 diagnosis (absence or presence), place of vaccination, and respondent’s relationship to the adolescent, stratified by disability status. We calculated unadjusted weighted percentages, along with 95% confidence intervals (CIs), using SAS-callable SUDAAN (version 11.0.3; Research Triangle Institute) and SAS software (version 9.4; SAS Institute) to account for the complex survey design. We performed t-tests to evaluate prevalence differences between groups. Specifically, we first examined the difference in vaccination coverage by overall disability status and each disability type. Then, after stratifying the sample by disability status, we calculated vaccination coverage for each response level of the sociodemographic variables assessed. We compared each response level to a corresponding reference group within each sociodemographic variable. We also compared vaccination coverage among adolescents with disability and without disability by each sociodemographic group. Furthermore, we tested the difference in the prevalence of each BeSD variable among adolescents with or without disability by vaccination status. The NIS-CCM cumulative response rate was 15.1%. The NIS-CCM survey weights adjust for non-response and households without cellular telephones, and these were then calibrated to match counts of adolescents with one or more doses of COVID-19 vaccine by sex within each U.S. Department of Health and Human Services (HHS) region for adolescents aged 13–17 years as of mid-month, using data reported to CDC by jurisdictions. Survey weights

[1]NIS Child COVID Module (NIS-CCM) Hard Copy Questionnaire Q2/2022 (cdc.gov).
[2]https://www.atsdr.cdc.gov/placeandhealth/svi/index.html.

and analytic data files were constructed for each approximate month of data collection. All differences noted were statistically significant with $p < 0.05$. We suppressed estimates that did not meet the National Center for Health Statistics (NCHS) reliability criteria for proportions.[3] This activity was reviewed by the Centers for Disease Control and Prevention (CDC) and was conducted consistent with applicable federal law and CDC policy.

Results

The percentage of adolescents reported with any disability who received ≥ 1 dose of COVID-19 vaccine (52.5%) was lower compared to adolescents without disability (58.6%; Table 1). Adolescents with disability were also less likely to be fully vaccinated (48.4%) compared to adolescents without disability (55.3%) (Difference = 6.9%, p-value: 0.0002; data not shown). Additionally, among adolescents who were fully vaccinated, a smaller percentage of adolescents with disability received a booster dose (20.7%) than adolescents without disability (31.6%) (Difference = 10.9%, p-value: 0.0001; data not shown). When COVID-19 vaccination status was examined by disability type, vaccination coverage among adolescents who had disability in cognition (50.8%) or performing errands independently (49.5%) had lower vaccination coverage compared to adolescents without disability (58.6%). There were no statistically significant differences in COVID-19 vaccination coverage for the other disability types (Table 1).

When comparing reported COVID-19 vaccination coverage among adolescents by disability status and sociodemographic variables, vaccination coverage was lower among adolescents with disability compared to adolescents without disability among several sociodemographic characteristics, including among younger adolescents (aged 13–15 years), adolescents who are non-Hispanic White or non-Hispanic other[4] or multiple races, males, adolescents where the respondent was a female parent or guardian, adolescents living in a suburban metropolitan statistical area (MSA), and adolescents living in areas of moderate social vulnerability (Table 1). Vaccination coverage was also lower among adolescents with disability compared to adolescents without disability for adolescents who have never had COVID-19, and among all strata of adolescents' mental health status (excellent, very good, or good; fair or poor mental health) and having seen a doctor or health professional at a doctor's office, a clinic, or some other place (excluding being hospitalized overnight, emergency department visits, home visits, dental visits, or telephone calls) 1, 2–3, or ≥4 times in the past 12 months.

For both adolescents with and without disability reported vaccination coverage was higher among Hispanic adolescents and among those who had never had COVID-19 compared with non-Hispanic White adolescents and adolescents who had ever had COVID-19, respectively (Table 1). Vaccination coverage was lower among adolescents aged 13–15 years, those living in a rural non-MSA, and those living in lower-income households (below the poverty level and above the poverty level but with an annual household income <$75 K) compared

[3]NCHS Vital and Health Statistics, Series 2, Number 175, August 2017 (cdc.gov)
[4]Non-Hispanic other races include: Non-Hispanic American Indian, Non-Hispanic Alaska Native, Non-Hispanic Asian, Non-Hispanic Native Hawaiian and Non-Hispanic Pacific Islander.

with adolescents aged 16–17 years, those living in an urban MSA, and those living in higher-income (≥$75 K) households, respectively.

Only among adolescents without disability, vaccination coverage differed by additional demographic and health-related characteristics (Table 1). Among adolescents without disability, vaccination coverage was lower for non-Hispanic Black adolescents, and adolescents living in areas of higher social vulnerability, compared with non-Hispanic White adolescents, when the respondent was a female parent, and adolescents living in areas of lower social vulnerability, respectively. When the respondent was a male parent, vaccination coverage was higher for adolescents with non-Hispanic other/multiple races, females, and among adolescents who had seen a doctor or health professional in the past 12 months. Whereas, when the respondent was a female parent, vaccination coverage was higher for non-Hispanic White adolescents, males, and adolescents who had not seen a doctor or health professional in the past 12 months.

There were no differences observed between adolescents with and without disability as related to place of vaccination (Table 2). All adolescents were more likely to be vaccinated in pharmacies or drug stores (46.6% and 45.6% for adolescents with disability and without disability, respectively) and least likely to be vaccinated in other nonmedically related places (4.3% and 4.5% for adolescents with disability and without disability, respectively) (Table 2).

Parental report of COVID-19 vaccination status and intent to vaccinate their adolescent varied by children's disability status. Parents of adolescents with disability were more likely to indicate they definitely would get their child vaccinated compared to parents of those without disability (9.9% vs 6.5%); they were also more likely to report that they definitely would not get their child vaccinated compared to parents of adolescents without disability (14.9% vs 11.8%) (Fig. 1).

Parents' reported attitudes and experiences related to COVID-19 vaccination varied depending on their adolescent's disability status and vaccination status. Parents of adolescents with disability were more likely than those without disability to report being very or moderately concerned about their child getting COVID-19 disease regardless of vaccination status (vaccinated: 54.1% vs. 48.8%, respectively; unvaccinated: 49.4% vs. 37.9%, respectively) (Fig. 2). Among parents of adolescents who were vaccinated, those who had adolescents with disability were less likely to report they had complete or very high confidence in vaccine safety for their adolescent (77.3% vs. 81.5% and that almost all or many friends and family had their adolescents vaccinated (57.0% vs. 67.6%), compared with parents of adolescents without disability. Parents of vaccinated adolescents with and without disability were equally likely to report that the vaccination is important, was recommended by a healthcare provider, was a school requirement for the adolescent, and that they had difficulty getting their adolescent vaccinated. Parents of unvaccinated adolescents with disability were more likely to report it was very or somewhat difficult to get their child vaccinated (19.1% vs. 12.9%), that vaccination sites for their child were not open at convenient times (7.6% vs. 3.9%), they had difficulty with not knowing where to get their

child vaccinated (7.2% vs. 2.7%), and difficulty getting to vaccination sites for their child (6.0% vs. 3.0%), compared with parents of unvaccinated adolescents without disability.

Discussion

COVID-19 vaccinations have been safe and effective in reducing the risk of infection and in preventing serious illness and death due to SARS-CoV-2.[22,23] Additionally, there is some evidence that vaccination reduces the occurrence and severity of post-acute sequelae of SARS-CoV-2 (PASC)[24] also known as "long COVID", which has been associated with post-infection disability.[25,26] Regardless of disability status, adolescents tend to be at lower risk for serious illness and death due to COVID-19 particularly compared to the highest-risk older adults.[13] However, individuals with disability are at higher risk for serious illness and death due to COVID-19 at any age.[5,7] Given the increased risk for a negative impact due to COVID-19 and the proven effectiveness of vaccination, high vaccination coverage for adolescents with disability is an important preventive measure. However, we found that vaccination coverage was lower for adolescents with disability (52.5%) compared to adolescents without disability (58.6). Even among those who were fully vaccinated, fewer adolescents with disability had received a booster dose (20.7%) than those without disability (31.6%). Further examination of vaccination coverage by disability status indicated differences by factors such as sociodemographic characteristics, adolescent mental health status, and number of reported adolescent doctor visits within the past year.

Reported COVID-19 vaccination coverage was lower for adolescents in this survey than that for routine adolescent vaccinations, which tend to have high coverage apart from the Human papillomavirus (HPV) vaccination.[27] COVID-19 vaccination coverage was low regardless of disability status, and vaccination coverage was higher among Hispanic adolescents compared to Non-Hispanic White adolescents. This finding is consistent with higher vaccination among Hispanic adolescents for the meningococcal vaccine and higher intent to vaccinate for COVID-19 among Hispanic parents.[27–30] Also, for all adolescents, those who never had COVID-19 were more likely to be vaccinated, possibly reflecting the protective effect of the vaccination and an association between likelihood to be vaccinated and increased health-promoting behaviors reducing exposure.[31] Another contributing factor might be parents of adolescents who had COVID-19 are less likely to have their child vaccinated because they are less concerned about their child getting COVID-19 again. Recent data indicate that younger children have lower COVID-19 vaccination coverage than older children (e.g., 36.5% of children aged 5–11 years as compared to 69.9% of children aged 12–17 years received 1 dose).[32] In this study, younger adolescents (aged 13–15 years), both with and without disability, were less likely to be vaccinated, potentially reflecting increased hesitancy among parents of younger adolescents or a shorter time for which adolescents less than 16 years were recommended for COVID-19 vaccine. Similar to reported patterns in adults, adolescents living in rural areas and from lower to mid-level income families were less likely to be vaccinated.[33]

Despite some similar patterns of vaccination coverage among adolescents with and without disability across several different sociodemographic and health-related factors, vaccination coverage among adolescents with disability was reported to be consistently lower compared

to adolescents without disability. In this study, the gap in receipt of COVID-19 vaccination between the adolescents with and without disability was greatest among those who were younger, male, non-Hispanic White, or non-Hispanic other/multiple races. In addition to usual health disparity patterns indicating less vaccination coverage in rural areas and areas with high Social Vulnerability Index (SVI),[33,34] which was observed among all adolescents with respect to a rural domicile and among adolescents with disability with respect to SVI, those with disability living in suburban and moderate SVI areas were significantly less likely to be vaccinated than their peers without disability. Vaccination was also lower for the disability group across both parental rating levels of adolescent mental health (poor to very good). While seeing a healthcare provider once or more annually was associated with higher vaccination rates among adolescents without disability, there was not an association between the number of health care provider visits in the past 12 months with vaccination coverage among persons with disability. Further evaluation of the differential association between seeing a healthcare provider and vaccination status among adolescents with and without disability is warranted. Other studies indicate that factors influencing COVID-19 vaccination are different and more complex than those with other routine vaccinations.[29] A recent study of parents of adolescents in the US found that parental vaccination status, use of prevention measures, COVID-19 misconceptions, and vaccine mistrust predicted COVID-19 vaccination coverage among the adolescents.[35] Our findings indicate potential additional complexity among influences on vaccination status among some subgroups of adolescents with disabilities compared to those without.

Among adolescents who were vaccinated, parents reported similar attitudes and experiences regardless of the disability status of their adolescents. One exception was that parents of adolescents with disability were more likely to report being very or moderately concerned about their adolescent getting COVID-19 regardless of vaccination status. Further evaluation of the reasons for lower vaccination coverage despite higher concern among parents of adolescents with disability is warranted. Regardless of disability status, parents of vaccinated adolescents almost universally (97%) indicated that vaccination is important, about 50% indicated that their healthcare provider recommended COVID-19 vaccination, only 11–12% indicated that vaccination was a school requirement for their adolescent, and only 7–8% reported experiencing difficulty in getting their adolescent vaccinated. Although the majority from both groups reported complete or high confidence in COVID-19 vaccine safety and that almost all or many of their friends and family had their children vaccinated, confidence and coverage among friends and family were lower for adolescents with disability.

Among unvaccinated adolescents, over half of their parents indicated that vaccination is important; however, confidence in vaccine safety, vaccination coverage among friends and family, a healthcare provider’s recommendation, and awareness of a school requirement were low for both adolescents with and without disability. Given the effectiveness of COVID-19 vaccines and the less-than-ideal vaccination rate among all adolescents in this study, more universal strategies to increase confidence and receipt of vaccinations and boosters are warranted.[36] Despite similar attitudes, parents of adolescents with disability were more likely to indicate they would definitely get their child vaccinated than parents of adolescents without disability. Barriers to vaccine access might contribute to lower vaccination rates among adolescents with disability despite parental endorsement of the

importance of vaccination and being more likely to report intent to vaccinate. Parents of adolescents with disability were also more likely to indicate that they would not get their child vaccinated which might also contribute to lower vaccination rates. Parents of unvaccinated adolescents with disability reported experiencing more difficulty than parents without disability with getting their child vaccinated, not knowing where to go for a vaccine, difficulty getting to a vaccination site, and with neighborhood vaccination sites being open at convenient times. These findings parallel previous findings from the NIS in adults with disability.[13] Strategies to increase availability and accessibility of vaccination locations, times, information, and strategies to better include people with a range of functional disabilities (e.g., vision, hearing, understanding, communication, mobility) have been recommended (13) and implemented[37] with tools available to assist.[38]

Although disability severity and associated support needs were not measured in this survey, the only statistically significant differences in vaccination of adolescents with disability compared to those without was observed among adolescents whose parents reported their child had cognitive disabilities or they were unable to perform errands independently. The significance of this finding is not readily apparent but could indicate that adolescents with challenges understanding or following directions and/or needing more support to participate in being vaccinated might have specific issues with vaccination access and participation. This finding may be further explored in other studies with a focus on identifying, implementing, and evaluating ways to assess functional needs and improve access to vaccination for families of adolescents with disability.[37,39,40]

While it might be expected that healthcare provider or school locations would be where COVID-19 vaccination was most likely to occur for children and adolescents, the most common location was the pharmacy or drugstore for both groups of adolescents (approximately 46%), possibly mirroring where their parents were vaccinated due to the ease of access and routine vaccination distribution locations. Given the amount of time spent in school settings and the presence of educators and other specialists who might be able to assist with supporting a student with additional needs, further consideration for reaching students with disability in school settings is warranted.[41]

This study might be subject to at least four limitations. First, the response rates were low (15%) and bias in estimates might remain after weighting. Survey weights were calibrated to the specific COVID-19 vaccine administration data by region, age group, and sex to mitigate possible bias from incomplete sample frame and nonresponse. Second, vaccination status was parent-reported and subject to misclassification and social desirability bias. The weighting calibration to the COVID-19 vaccination data might also mitigate misclassification bias at the group level, although it cannot correct for individual respondent-level misclassification. Third, disability status was based on parent report of serious difficulty in one of six functional areas with no additional information on the level of disability or support needs. Finally, the survey is cross-sectional and thus cause and effect relationships cannot be determined.

Conclusion

The findings from this study suggest that adolescents with disability were less likely compared to adolescents without disability to have received at least one dose of COVID-19 vaccine, to be fully vaccinated, or to have received a booster dose among those fully vaccinated. There was lower vaccination coverage among adolescents with cognitive disability or disability in performing errands independently compared to adolescents without disability. Parents of unvaccinated adolescents with disability reported higher intent to get their adolescents vaccinated, but also experiencing greater difficulty in doing so. With less than half of adolescents with disability being fully vaccinated and only one-fifth among them boosted, there are significant gaps in the use of one of the most effective and safe prevention tools available to reduce the risk of serious illness or death from COVID-19. These findings highlight the need for focused outreach to this population, including increased accessibility and education among families and providers regarding the importance of COVID-19 vaccination among youth with disability and their families.[13,42,43] This situation has increased importance with the recommendation for the updated bivalent COVID-19 vaccine; as of April 19, 2023, persons 6 years and older are up-to-date if they have received at least one bivalent COVID-19 vaccine.[44] This work highlights the importance of collecting disability status and type in all public health data collection systems to address systemic inequities for this population.

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Disclaimer

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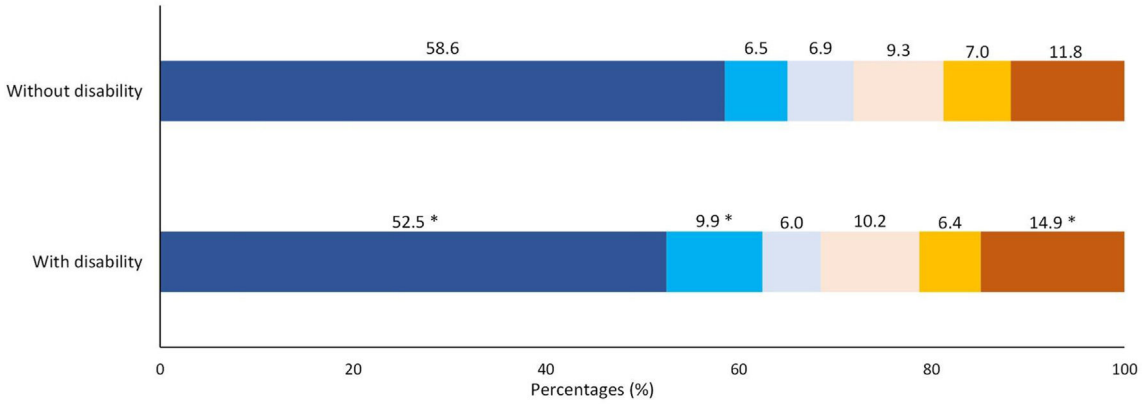

Fig. 1.

Parental report of COVID-19 vaccination status and intent to vaccinate their adolescents by disability status among adolescents 13–17 years —National Immunization Survey Child COVID Module, July 22, 2021–February 26, 2022. * Statistically significant at $P < 0.05$ comparing proportions of each level of COVID-19 vaccination status and parental intent among adolescents with disability with proportions among adolescents without disability. Categories are mutually exclusive, however percentages among those with and without disability may not add up to 100% due to rounding.

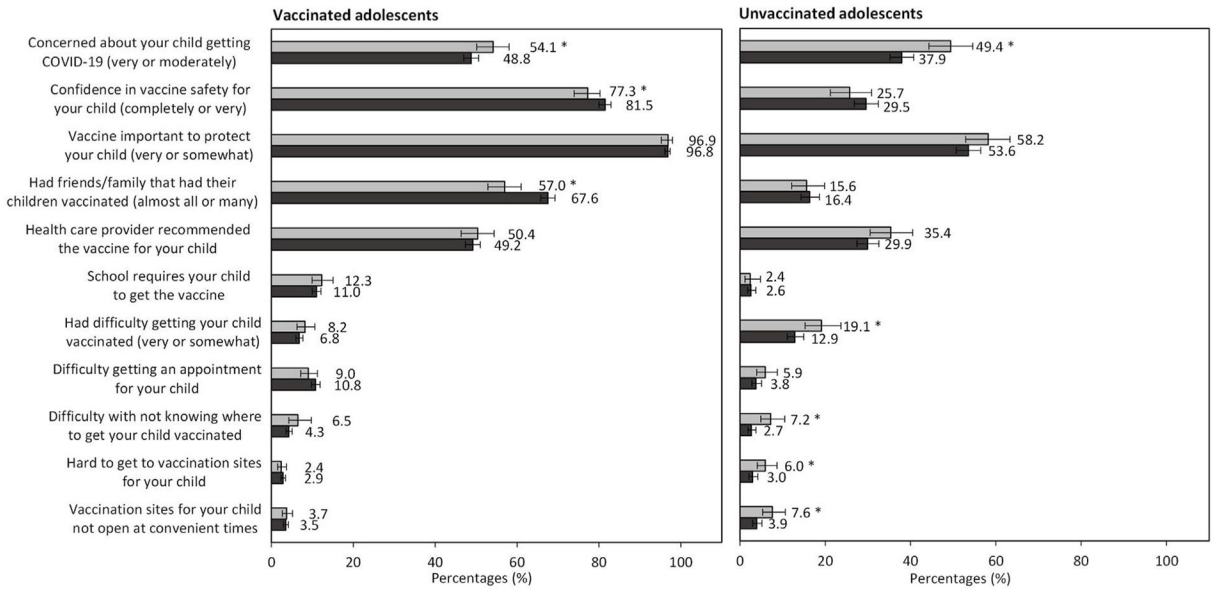

Fig. 2.

Parental report of COVID-19 vaccine key attitudes and experiences for their adolescents 13–17 years, by disability status and vaccination status for their adolescents — National Immunization Survey Child COVID Module, July 22, 2021–February 26, 2022. The error bars in the figure are 95% confidence intervals for corresponding percentages. * Statistically significant at $P < 0.05$ comparing prevalence of each BeSD of COVID-19 vaccination among adolescents with disability with prevalence among adolescents without disability.

Table 1

COVID-19 vaccination status of adolescents 13—17 years, by disability status, disability type, and sociodemographic characteristics —National Immunization Survey Child COVID Module July 22, 2021—February 26, 2022.

	N	Weighted % of adolescents with disability	Adolescents with disability		Adolescents without disability		Comparison of proportion≥1 dose vaccinated among those with vs without disability
		weighted % (95% CI)	≥ 1 dose Vaccinated weighted % (95% CI)	unadjusted prevalence difference (95% CI)	≥ 1 dose Vaccinated weighted % (95% CI)	unadjusted prevalence difference (95% CI)	unadjusted prevalence difference (95% CI)
Total	12,445	21.2 (20.0–22.4)	52.5 (49.2–55.7)		58.6 (56.9–60.2)		–6.0 (–9.7 to −2.4)[f]
Age 13–15	7504	21.7 (20.1–23.3)	49.1 (44.9–53.3)	−8.9 (−15.5 to −2.3)[g]	56.8 (54.7–58.9)	−4.3 (−7.6 to −1.0)[g]	−7.7 (−12.4 to −3.0)[f]
16–17 (Ref)	4941	20.4 (18.6–22.3)	58.0 (52.9–63.0)	Ref	61.2 (58.6–63.7)	Ref	−3.1 (−8.8–2.6)
Race and ethnicity[a]							
White, non-Hispanic (Ref)	7087	20.1 (18.6–21.7)	50.4 (46.1–54.7)	Ref	57.0 (54.9–59.1)	Ref	−6.6 (−11.4 to −1.8)[f]
Black, non-Hispanic	1352	21.1 (18.0–24.7)	53.8 (44.6–62.8)	3.5 (−6.7–13.6)	50.1 (45.5–54.7)	−6.9 (− 12.0 to −1.8)[g]	3.7 (−6.5–14.0)
Hispanic	2318	22.8 (20.2–25.6)	59.2 (52.1–65.9)	8.8 (0.6–17.0)[g]	62.1 (58.2–65.9)	5.2 (0.8–9.5)[g]	−3.0 (−10.9–5.0)
Other or multiple races, non-Hispanic	1613	22.4 (18.7–26.6)	48.9 (38.8–59.0)	− 1.5 (−12.6–9.6)	68.9 (64.0–73.4)	11.9 (6.8–17.1)[g]	−20.0 (−31.3 to −8.7)[f]
Sex							
Male (Ref)	6475	22.9 (21.3–24.7)	50.8 (46.6–55.1)	Ref	56.9 (54.6–59.1)	Ref	−6.0 (−10.9 to − 1.2)[f]
Female	5918	19.3 (17.6–21.0)	54.7 (49.6–59.6)	3.8 (−2.8–10.4)	60.2 (57.8–62.5)	3.3 (0.0–6.6)[g]	−5.5 (−11.1–0.0)
Disability Type[b]							
Hearing	177	100	48.0 (36.4–59.8)	NA	NA	NA	− 10.6 (−22.7–1.5)
Vision	318	100	57.8 (48.7–66.3)	NA	NA	NA	−0.8 (−9.8–8.3)
Mobility	148	100	49.6 (38.0–61.4)	NA	NA	NA	−8.9 (−20.9–3.1)
Cognition	1824	100	50.8 (47.1–54.4)	NA	NA	NA	−7.8 (−11.8 to −3.8)[f]
Self-care	179	100	52.1 (41.3–62.8)	NA	NA	NA	−6.4 (−17.5–4.6)
Not performing errands independently[c]	473	100	49.5 (42.4–56.6)	NA	NA	NA	− 11.4 (−18.8 to −3.9)[f]
Respondent relationship to	8335	22.9 (21.5–24.5)	50.5 (46.8–54.3)	Ref	57.3 (55.3–59.3)	Ref	−6.8 (−11.1 to −2.6)[f]

	N	Weighted % of adolescents with disability	Adolescents with disability		Adolescents without disability		Comparison of proportion≥1 dose vaccinated among those with vs without disability
		weighted % (95% CI)	≥ 1 dose Vaccinated weighted % (95% CI)	unadjusted prevalence difference (95% CI)	≥ 1 dose Vaccinated weighted % (95% CI)	unadjusted prevalence difference (95% CI)	unadjusted prevalence difference (95% CI)
child Child's mother or female guardian (Ref)							
Child's father or male guardian	3464	15.0(13.1 − 17.2)	57.5 (49.8–64.8)	6.9 (−1.5–15.3)	63.6 (60.5–66.7)	6.3 (2.6–10.0)[g]	−6.2 (−14.3–1.9)
Other or unknown	646	26.9 (21.7–32.8)	58.8 (46.3–70.2)	8.3 (−4.5–21.0)	49.1 (42.4–55.8)	−8.2 (− 15.3 to −1.2)[g]	9.7 (−4.2–23.6)
Urbanicity							
Urban (MSA, principal city) (Ref)	4010	20.8 (18.8–22.9)	57.9 (52.1–63.5)	Ref	62.1 (59.2–64.9)	Ref	−4.2 (−10.6–2.3)
Suburban (MSA, nonprincipal city)	5921	20.1 (18.5–21.9)	52.4 (47.6–57.1)	−5.5 (−13.0–1.9)	61.1 (58.8–63.4)	− 1.0 (−4.6–2.7)	−8.7 (−14.0 to −3.5)[f]
Rural (Non-MSA)	1971	25.3 (22.2–28.8)	40.2 (33.2–47.5)	−17.8 (−27.0 to −8.6)[g]	38.2 (34.6–41.9)	−23.9(−28.6to −19.2)[g]	2.0 (−6.1 − 10.0)
SVI of county of residence[d]							
Low (Ref)	4468	18.4 (16.6–20.3)	54.3 (48.6–60.0)	Ref	60.5 (57.7–63.2)	Ref	−6.2 (−12.5–0.2)
Moderate	4239	21.1 (19.2–23.1)	50.3 (45.0–55.7)	−4.0 (−11.8–3.8)	59.5 (56.7–62.2)	− 1.0 (−4.9–2.8)	−9.1 (−15.1 to −3.1)[f]
High	3048	23.5 (21.2–25.9)	52.8 (46.9–58.5)	− 1.6 (−9.8–6.6)	54.9 (51.9–58.0)	−5.6 (−9.7 to −1.5)[g]	−2.2 (−8.8–4.4)
Household income[e]							
Below poverty	1608	31.2 (28.0–34.7)	40.6 (34.9–46.6)	−26.0 (−34.0 to − 17.9)[g]	39.2 (35.1–43.5)	−28.3(−33.1to −23.5)[g]	1.4 (−5.8–8.6)
Above poverty, <$75 k	2550	25.7 (23.2–28.5)	53.6 (47.4–59.6)	− 13.0 (−21.3 to −4.8)[g]	52.7 (49.2–56.1)	−14.8(−19.0to −10.7)[g]	0.9 (−6.1–7.9)
Above poverty, ≥$75 k (Ref)	6034	14.9 (13.4–16.4)	66.6 (60.8–71.9)	Ref	67.5 (65.2–69.7)	Ref	−0.9 (−6.9–5.1)
Unknown income	2253	19.3 (16.5–22.6)	45.6 (37.0–54.5)	−21.0 (−31.4 to −10.5)[g]	61.0 (57.0–64.8)	−6.5 (− 11.1 to −2.0)[g]	− 15.4 (−25.1 to −5.7)[f]
Adolescent's mental health Excellent, very good, or good (Ref)	11,228	17.1 (15.9–18.3)	52.9 (49.1–56.7)	Ref	58.4(56.7–60.1)	Ref	−5.5 (−9.7 to − 1.3)[f]
Fair or poor	1171	56.4 (51.9–60.8)	51.5 (45.2–57.7)	−1.5 (−8.8–5.9)	61.3 (54.3–67.8)	2.9 (−4.1–9.8)	−9.8 (−19.0 to −0.6)[f]
Number of times child has seen doctor or other health professional in past 12 months							
0 (Ref)	1728	17.9(15.1–21.1)	47.8 (38.8–57.0)	Ref	48.7 (44.4–52.9)	Ref	−0.9 (−11.0–9.3)

	N	Weighted % of adolescents with disability	Adolescents with disability		Adolescents without disability		Comparison of proportion≥1 dose vaccinated among those with vs without disability
		weighted % (95% CI)	≥ 1 dose Vaccinated weighted % (95% CI)	unadjusted prevalence difference (95% CI)	≥ 1 dose Vaccinated weighted % (95% CI)	unadjusted prevalence difference (95% CI)	unadjusted prevalence difference (95% CI)
1	3872	15.4(13.6–17.3)	51.3 (44.6–58.0)	3.5 (−7.9–14.9)	60.4(57.5–63.1)	11.7 (6.6–16.8)[g]	−9.0 (−16.3 to −1.7)[f]
2–3	4509	20.4 (18.5–22.5)	52.9 (47.4–58.5)	5.1 (−5.6–15.9)	59.3 (56.6–61.9)	10.6 (5.6–15.6)[g]	−6.3 (−12.5 to −0.1)[f]
4+	2239	34.4 (31.3–37.8)	54.2 (48.0–60.2)	6.4 (−4.7–17.4)	63.4 (59.2–67.5)	14.8 (8.8–20.7)[g]	−9.3 (−16.6 to −1.9)[f]
Child ever had COVID-19							
Yes (Ref)	2498	21.6 (19.2–24.3)	41.2 (35.1–47.7)	Ref	45.2 (41.9–48.4)	Ref	−3.9 (−11.1–3.2)
No	9866	20.9 (19.6–22.3)	56.3 (52.6–60.1)	15.1 (7.8–22.5)[g]	63.3 (61.5–65.2)	18.2 (14.4–21.9)[g]	−7.0 (−11.2 to −2.8)[f]
COVID-19 vaccination status							
Fully vaccinated and received at least 1 booster dose	858	12.0 (9.4–15.2)	100	NA	100	NA	NA
Fully vaccinated	9135	19.0(17.7–20.5)	100	NA	100	NA	NA
Received only 1 dose	526	24.7 (18.8–31.8)	100	NA	100	NA	NA

Abbreviations: CI = confidence interval; MSA = metropolitan statistical area; NA = not applicable; Ref = referent group; SVI = social vulnerability index.

NA is used to describe the absence of subgroups for adolescents without disability when compared to adolescents with specific disability types. All disability type comparisons are made to the general adolescents without disability category.

[a]Race of child was reported by parent or guardian respondent. Adolescents of Hispanic ethnicity may be of any race. Adolescents identified as multiple races had more than one race category selected.

[b]For statistical significance test, the vaccination coverage among adolescents with each disability type was compared to the coverage among adolescents without disability.

[c]Not performing errands independently disability question was only asked to parents/guardians with adolescents 15–17 years. T-test was performed among adolescents 15–17 years who had non-missing value for vaccination status.

[d]CDC/Agency for Toxic Substances and Disease Registry Social Vulnerability Index (SVI) uses 15 U S. census variables to help officials identify communities that may need support before, during, or after disasters.

[e]Income/Poverty level was defined based on total family income in the past calendar year, and the U.S. Census poverty thresholds for that year specified for the applicable family size and number of adolescents <18 years. Poverty thresholds are available at .

[f]Statistically significant at P < 0.05 comparing COVID-19 vaccination coverage among adolescents with disability to coverage among adolescents without disability.

[g]Statistically significant at P < 0.05 comparing COVID-19 vaccination coverage between each response level and the referent group.

Table 2

Place of receiving COVID-19 vaccination among children 13–17 years, by disability status — National Immunization Survey Child COVID Module, July 22, 2021—February 26, 2022.

	With disability		Without disability		With disability vs. without disability	
	N	weighted % (95% CI)	n	weighted % (95% CI)	unadjusted prevalence difference (95% CI)	p value
Place of most recent COVID-19 vaccination						
Pharmacy or drug store	725	46.6 (42.6–50.6)	3314	45.6 (43.8–47.4)	1.0 (−3.4–5.4)	0.6558
Medical place	646	35.9 (32.3–39.8)	2896	34.9 (33.2–36.6)	1.1 (−3.0–5.2)	0.6055
Mass vaccination site	151	8.3 (6.5–10.5)	899	10.0(9.0–11.2)	−1.8 (−4.0–0.5)	0.1315
Elementary or middle or high school	86	4.9 (3.5–6.8)	471	5.0 (4.4–5.8)	−0.1 (−1.9–1.6)	0.8821
Other nonmedically related place	67	4.3 (2.8–6.4)	357	4.5 (3.8–5.2)	−0.2 (−2.1–1.7)	0.8364