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Short communication

## Acceptability of COVID-19 vaccine mandates among New York City parents, November 2021



Chloe A. Teasdale<sup>a,\*</sup>, Scott Ratzan<sup>b</sup>, Hannah Stuart Lathan<sup>c</sup>, Lauren Rauh<sup>c</sup>, Spencer Kimball<sup>d</sup>, Ayman El-Mohandes<sup>c</sup>

<sup>a</sup> Department of Epidemiology and Biostatistics, City University of New York (CUNY) Graduate School of Public Health and Health Policy (SPH), New York, NY, United States

<sup>b</sup> Department of Community Health and Social Sciences, CUNY SPH, New York, NY, United States

<sup>c</sup> CUNY SPH, New York, NY, United States

<sup>d</sup> Emerson College, Boston, MA, United States

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### ABSTRACT

School-based vaccine mandates improve vaccination coverage in children. We conducted a cross-sectional survey of parents in New York City (NYC) in November 2021 to measure acceptability of COVID-19 vaccine mandates for students, and for teachers and school staff. Random address-based sampling was used to recruit parents of children 5–11 years of age. Among 2,506 parents surveyed, 44.3% supported school-based vaccine mandates for students and 69.1% supported mandates for teachers and school staff. Asian parents, male parents, those with higher income, college education, those voting for the 2021 Democratic mayoral candidate and parents from Manhattan were most likely to support vaccine mandates for students. Among all parents, 25.1% said they would not vaccinate their child if required. Our data show only modest support for school-based COVID-19 vaccine mandates for children despite their importance in improving vaccination coverage.

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### 1. Introduction

In late October 2021, the Pfizer BioNTech COVID-19 vaccine was granted emergency use authorization (EAU) by the US Food and Drug Administration (FDA) and recommended for use by the Centers for Disease Control and Prevention (CDC) in children 5 to 11 years of age [1]. By the end of January 2022, only 22% of US children in this age group were fully vaccinated [2]. Increasing pediatric COVID-19 vaccination coverage is an urgent public health priority in order to protect children from infection, reduce educational disruptions and contain the pandemic [3]. School-based vaccine mandates for children may be one way to increase uptake.

For nearly 100 years, the US Supreme Court has upheld the legality of compulsory vaccination for children attending school [4]. Multiple vaccines, including for measles, mumps and rubella (MMR), varicella and pertussis, are mandated across the US for school attendance. Recent outbreaks of vaccine-preventable illnesses, including the multi-state measles outbreak of 2014, have led to stricter mandates with fewer exemptions in some states

[5]. Data from the 2019–2020 school year showed that coverage of mandated vaccines was > 94% among US kindergarteners [6]. In contrast, uptake of non-mandated vaccines remains much lower; for instance, in the 2018–2019 season, only 63% of children < 18 years received influenza vaccination [7]. While school-based vaccine mandates increase vaccination uptake and protect children from preventable infections [8], there is limited information regarding parental acceptability of mandates [9].

In September 2021, New York City (NYC) instituted a vaccine mandate for all city employees, including teachers and staff in public and charter schools [10]. NYC has the nation's largest school system with over one million students and 150,000 teachers and other school staff. By October 2021, the NYC Department of Education reported that 96% of teachers and 94% of non-teaching staff had been vaccinated [11], higher proportions than in the adult population of NYC which was 81% fully-vaccinated at the time [12]. In December 2021, NYC schools began requiring students 5 years and up be vaccinated for COVID-19 to participate in sports and other activities, however the city has not issued a vaccine mandate for all students [13].

Given the need to increase COVID-19 vaccination in children and current debates about vaccine mandates, we conducted a survey in November 2021 among NYC parents to measure

\* Corresponding author at: Department of Epidemiology & Biostatistics, CUNY Graduate School of Public Health & Health Policy, 55 W125th Street, Room 543, New York, NY 10025.

E-mail address: [chloe.teasdale@sph.cuny.edu](mailto:chloe.teasdale@sph.cuny.edu) (C.A. Teasdale).

acceptability of COVID-19 vaccine mandates for students, and teachers and school staff.

## 2. Methods

This was a cross-sectional probability survey of NYC parents of children 5–11 years of age conducted November 10–18, 2021. Eligible participants were adults  $\geq 18$  years, who resided in NYC and were parents or legal caregivers of a child 5–11 years. Address-based stratified random sampling was conducted using a database of almost 5 million NYC adults. Participants contacted by cell phone through short message service (SMS) were linked to an online survey, those contacted on landlines used interactive voice response (IVR). Surveys were conducted in English, Spanish and Mandarin. The institutional review board at the City University of New York (CUNY) School of Public Health and Health Policy approved the protocol.

The study had a target sample size of 2,500 and included 2,506 parents (including 99 from an opt-in online panel) and had a margin of error of  $\pm 1.8\%$  [14]. The stratified random sample was selected to represent the target population, NYC parents of children 5–11 years, based on 2019 US Census and other data. A response rate (proportion of eligible people targeted for recruitment who completed the survey) could not be estimated as we do not know what proportion of the random sample of adults in NYC targeted for the survey were parents (a response rate among all adults in NYC who received information about the survey is inaccurate as the majority were ineligible and could not respond). The survey followed American Association of Public Opinion Research (AAPOR) guidelines and was weighted to reflect NYC parents based on child's age, race/ethnicity and parent's education [14].

The survey was developed for this study with questions modeled based on the KFF Vaccine Monitor [15]. Vaccine mandate acceptability was measured through two questions: "Do you think schools should require students to be vaccinated for COVID-19?" and "Do you think schools should require all school teachers and staff to be vaccinated for COVID-19?" Response options were "yes", "no", "not sure". In addition, parents reported whether they would vaccinate their 5–11-year-old child if required with response options, "yes", "no", "not sure", "child is already vaccinated" and "not applicable". In addition, we asked, "Do you think daycare centers should require all school teachers and staff to be vaccinated for COVID-19?" For demographic information, parents reported data about themselves, their household and their youngest child between the ages of 5 and 11 years.

Survey weights were applied to all analyses to generate prevalence estimates for NYC parents. Descriptive statistics (unweighted counts and weighted percentages) are presented for the sample along with prevalence of acceptability for each type of vaccine mandate. Outcomes were compared to sample characteristics using Rao adjusted Pearson chi-squared tests. Poisson regression models (incorporating survey weights) with robust standard errors were fitted to estimate prevalence ratios (PR) for parental support for vaccine mandates for students and for teacher/staff (in separate models). Models compared parent who supported mandates to those who did not or were unsure, and were adjusted for demographic and household characteristics to yield adjusted PR (aPR).

## 3. Results

Most parents (68.6%) reported their 5–11-year-old child was attending public school, 15.5% were in private school and 9.9% were in charter schools (Table 1). The majority of parents (84.5%) were vaccinated.

**Table 1**  
Characteristics of NYC parents and children 5–11 years (November 2021).

Characteristics	N <sup>^</sup>	Weighted % <sup>*</sup>
Total sample	2,506	100.0
<b>Child age</b>		
5–7 years	1,528	56.8
8–11 years	978	43.2
<b>Child school type</b>		
Public school	1,387	68.6
Private	829	15.5
Charter <sup>**</sup>	166	9.9
Daycare	65	2.5
Other	24	1.5
Not enrolled or homeschooled	35	2.0
<b>Child up to date with vaccines</b>		
Yes	2,254	90.0
No	190	8.0
Not sure	62	2.0
<b>Child flu vaccine status</b>		
Has gotten or parents plans to get	1,940	72.6
No plan to get or unsure	566	27.4
<b>Parent age</b>		
18–29 years	230	13.1
30–49 years	1,155	42.3
50 + years	1,121	44.6
<b>Parent sex</b>		
Male	1,204	36.1
Female	1,252	61.6
Transgender/other	50	2.3
<b>Parent race/ethnicity</b>		
Asian	204	15.3
Hispanic	462	29.6
Multiple	60	2.3
Non-Hispanic Black	361	22.8
Non-Hispanic White	1,317	26.3
Other non-Hispanic	102	3.7
<b>Parent education (highest completed)</b>		
High school or less	353	39.2
Some college or technical school	387	20.7
Completed college or more	1,734	38.6
Prefer not to say	32	1.5
<b>Household income (USD)</b>		
<\$50,000	527	40.1
\$50,000–\$99,999	558	21.5
$\geq$ \$100,000	1,256	28.3
Not sure/missing	165	10.1
<b>Parent COVID-19 vaccination status</b>		
Vaccinated	1,899	84.5
Not vaccinated	518	11.6
Missing	89	3.9
<b>Parent 2021 NYC mayoral election vote</b>		
Eric Adams (Democrat)	1,112	32.1
Curtis Sliwa (Republican)	397	14.0
Did not vote	786	51.7
Other	211	2.2
<b>NYC borough of residence</b>		
Bronx	396	21.0
Brooklyn	743	33.5
Manhattan	671	13.5
Queens	482	26.1
Staten Island	214	5.9

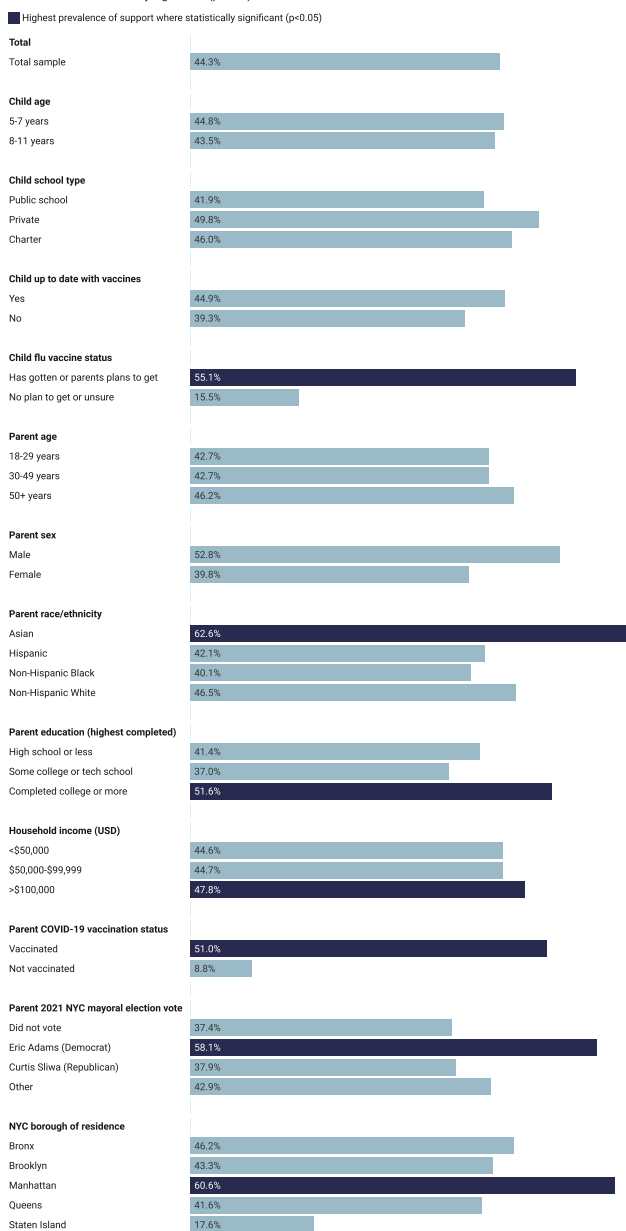
<sup>^</sup> Raw (unweighted) Ns.

<sup>\*</sup> Survey weights applied to sample to represent NYC population of parents by race, ethnicity, education and borough.

<sup>\*\*</sup> Charter schools in NYC are independent public schools founded by not-for-profit Boards of Trustees and are open to all New York City students.

Overall, 44.3% (95 %CI 41.0–47.6) of parents supported school-based vaccine mandates for students (Fig. 1). The highest levels of support for vaccine mandates for students was observed among parents who said their child had (or would) receive the flu vaccine (55.1%, 95 %CI 51.1–59.1%), male parents (52.8%, 95 %CI 47.6–58.0), Asian parents (62.6%, 95 %CI 53.7–71.5) those who completed college (51.6%, 95 %CI 48.0–55.2), vaccinated parents (51.0%, 95 %CI 47.3–54.8%), those who voted for the Democratic candidate in

Survey weights were applied to generate prevalence estimates of acceptability for school-based vaccine mandates for students among NYC parents of children 5–11 years in November 2021. Groups with highest prevalence of support are indicated where statistically significant ( $p < 0.05$ ).



**Fig. 1. Prevalence of support for school-based vaccine mandates for students among NYC parents of children 5–11 years, November 2021.** Survey weights were applied to generate prevalence estimates of acceptability for school-based vaccine mandates among NYC parents of children 5–11 years of age in November 2011. Footnotes: p-values from Rao adjusted Pearson Chi-squared tests were used to compare expected to observed frequencies among groups by characteristic for parental agreement with vaccine mandates. Some levels of characteristics shown in Table 1 not presented due to unreliable standard error estimates.

the 2021 mayoral election (58.1%, 95 %CI 53.1–63.2) and parents in Manhattan (60.6%, 95 %CI 52.7–68.5) (Fig. 1).

Among all parents, 69.1% (95 %CI 66.1–72.0) supported mandates for teachers and school staff (Fig. 2). Parental support for vaccine mandates for teachers and school staff was highest among parents of children attending charter schools (72.6%, 95%CI 64.2–81.0), children vaccinated for flu (or those who planned to) (80.4%, 95 %CI 77.2–83.6), Asian parents (87.7%, 95 %CI 82.0–93.5), parents with income of \$50,000–\$99,999 (72.5%, 95 %CI 67.5–77.6), vaccinated parents (79.2%, 95 %CI 76.2–82.3), those voting for the Democratic mayoral candidate (85.0%, 95 %CI

81.7–88.3) and parents in Manhattan (81.1%, 95 %CI 74.6–87.7%) (Fig. 2).

In multivariable models, parents who said their child had or would receive flu vaccination (aPR 2.38, 95 %CI 1.70–3.31), male parents (aPR 1.18, 95 %CI 1.01–1.38) and Asian parents (aPR 1.29, 95%CI 1.07–1.57) were more supportive of student mandates compared to parents whose children were not vaccinated for flu, female and Non-Hispanic White parents (Table 2). Parents who were vaccinated (aPR 3.45, 95 %CI 2.35–5.09) and those voting for the Democratic mayoral candidate (aPR 1.32, 95 %CI 1.20–1.56) were more likely to support student mandates compared to unvaccinated parents and parents who did not vote. Compared to parents in Manhattan, those in Queens (aPR 0.70, 95 %CI 0.57–0.87) and Staten Island (aPR 0.39, 95 %CI 0.26–0.56) were significantly less likely to support student vaccine mandates. Characteristics associated with parents' support for teacher/staff mandate were similar (Table 2).

Nearly half (46.2%; 95 %CI 42.8–49.5) of parents said they would vaccinate their 5–11-year-old child if mandated for school attendance, in addition to 11.9% (95 %CI 10.6–13.2) who reported their child was already vaccinated. A quarter of all parents (25.1%, 95 %CI 22.3–27.8) said they would not vaccinate their child if required for school attendance and 16.2% (95 %CI 13.5–18.9) reported being unsure. Among all parents, 69.3% (95 %CI 66.3–72.3) supported mandated vaccination for daycare workers.

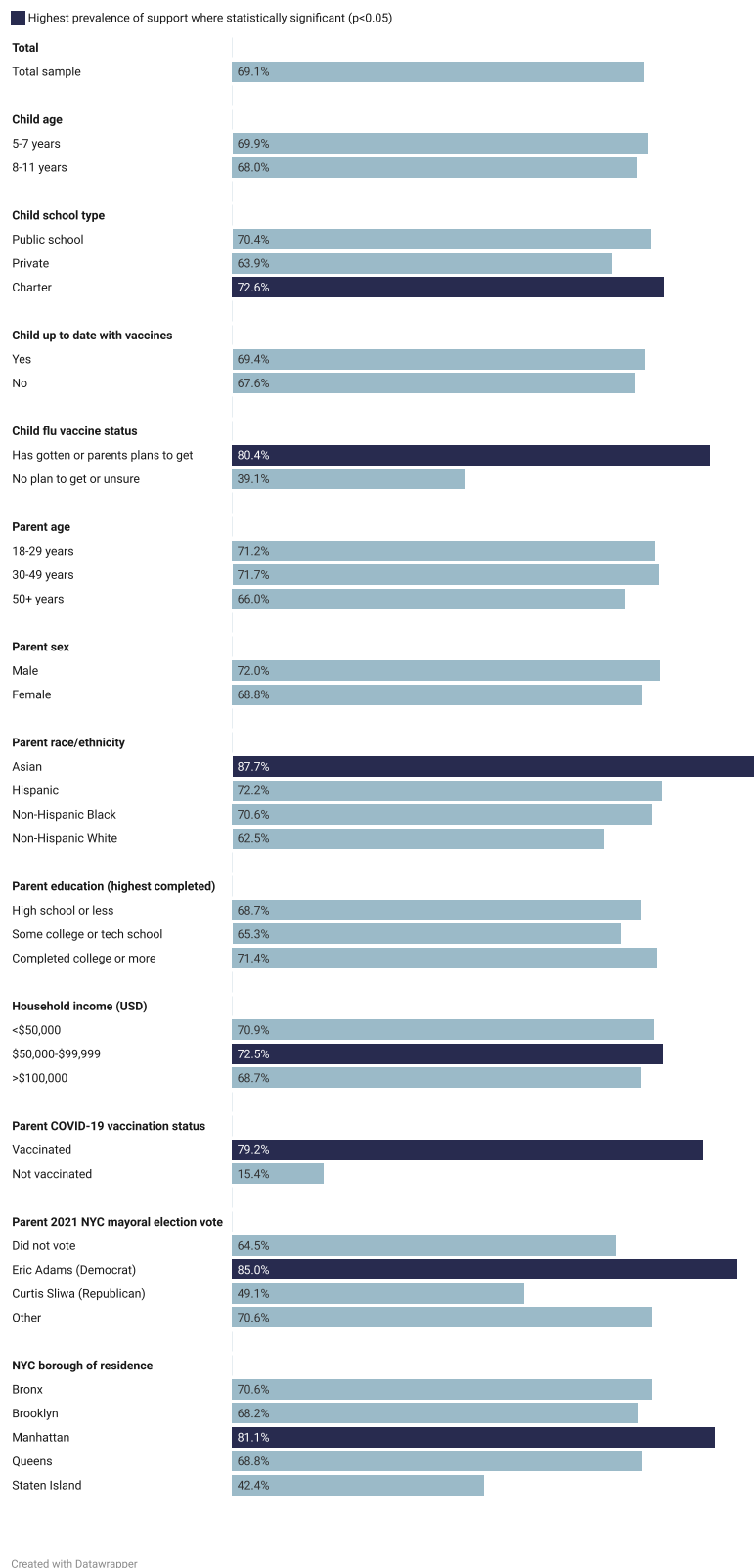
#### 4. Discussion

Less than half of NYC parents surveyed in November 2021 supported school-based vaccine mandates for students and a quarter said they would not vaccinate their child if required to do so. In contrast, almost 70% of parents supported vaccine mandates for teachers and school staff, and there was equally strong support for mandated vaccination for daycare workers. This is one of only a few studies measuring attitudes about COVID-19 vaccine mandates and the first among parents in the nation's largest school district.

As of the end of January 2022, 41.3% of children 5–11 years of age in NYC had received the COVID-19 vaccine [16] and the pandemic continues to disrupt education for children and adolescents. From September 2021 through January 2022, there were more than 132,000 reported cases of COVID-19 among students in the NYC school system [17]. Vaccine mandates could play a critical role in increasing vaccination coverage among school-aged children which would reduce the risk of infection leading to fewer educational interruptions and a faster return to normal activities.

Our data show that many NYC parents do not support school-based COVID-19 vaccine mandates for children and some said they would not vaccinate their child if required. While our analysis focused on parental support for vaccine mandates, rather than acceptability of the vaccine, attitudes on these issues appears to be very similar. We estimate that 44% of NYC parents support vaccine mandates for students which aligns closely with the 41% of school-aged children in NYC who have been vaccinated for COVID-19 in the three months since the vaccine became available for 5–11 year olds. In addition, the characteristics of parents supportive of vaccine mandates are similar to those previously identified in studies of COVID-19 vaccine acceptability. Our findings that support for vaccine mandates was higher among parents of children vaccinated for flu, male parents, Asian parents, those who were themselves vaccinated and parents who identify as Democrats are the same as the characteristics of parents who intended to vaccinate or had already vaccinated their children [18,19]. Taken together, these findings suggest that better communication regarding the efficacy and

Survey weights were applied to generate prevalence estimates of acceptability for school-based vaccine mandates for teachers and school staff among NYC parents of children 5–11 years in November 2021. Groups with highest prevalence of support are indicated where statistically significant ( $p < 0.05$ ).



**Fig. 2. Prevalence of support for school-based vaccine mandates for teachers and school staff among NYC parents of children 5–11 years, November 2021.** Survey weights were applied to generate prevalence estimates of acceptability for school-based vaccine mandates among NYC parents of children 5–11 years of age in November 2021. Footnotes: p-values from Rao adjusted Pearson Chi-squared tests were used to compare expected to observed frequencies among groups by characteristic for parental agreement with vaccine mandates. Some levels of characteristics shown in Table 1 not presented due to unreliable standard error estimates.

**Table 2**  
Adjusted prevalence ratios for NYC parental support for school-based vaccine mandates for student and for teachers and school staff, November 2021.

Child characteristics	Adjusted prevalence ratios for parental support for vaccine mandates for students <sup>^</sup>			Adjusted prevalence ratios for parental support for vaccine mandates for teachers and school staff <sup>^^</sup>		
	aPR*	95 %CI	p-value	aPR*	95 %CI	p-value
<b>Age</b>						
5–8 years	0.98	0.85–1.14	0.82	0.99	0.92–1.07	0.80
9–11 years	1.00	ref	–	1.00	ref	–
<b>Type of school</b>						
Public school	1.00	ref	–	1.00	ref	–
Private school	1.14	0.99–1.31	0.08	0.98	0.88–1.10	0.79
Charter School	1.08	0.83–1.41	0.55	0.96	0.86–1.07	0.44
<b>Child up to date with routine vaccines</b>						
Yes	1.05	0.80–1.39	0.72	0.97	0.87–1.08	0.58
No	1.00	ref	–	1.00	ref	–
<b>Child's flu vaccine status</b>						
Has or plans to vaccinate child	2.38	1.70–3.31	<0.0001	1.39	1.21–1.58	<0.0001
No plans or unsure	1.00	ref	–	1.00	ref	–
<b>Parent characteristics</b>						
<b>Age</b>						
18–29 years	1.06	0.82–1.37	0.66	0.97	0.85–1.11	0.70
30–39 years	1.00	ref	–	1.00	ref	–
40 + years	1.13	0.97–1.32	0.13	0.94	0.87–1.02	0.14
<b>Sex</b>						
Male	1.18	1.01–1.38	0.03	1.01	0.93–1.09	0.86
Female	1.00	ref	–	1.00	ref	–
<b>Race/ethnicity</b>						
Non-Hispanic black	0.82	0.66–1.01	0.06	1.06	0.95–1.18	0.34
Asian	1.29	1.07–1.57	0.01	1.25	1.14–1.38	<0.0001
Hispanic	0.93	0.76–1.13	0.47	1.06	0.94–1.20	0.35
Non-Hispanic White	1.00	ref	–	1.00	ref	–
<b>Education (highest completed)</b>						
High school or less	1.00	ref	–	1.00	ref	–
Some college or tech school	0.94	0.75–1.18	0.60	0.92	0.82–1.03	0.14
Completed college or more	1.03	0.85–1.26	0.76	0.89	0.79–0.99	0.04
<b>Household income, USD</b>						
<\$50,000	1.00	ref	–	1.00	ref	–
\$50,000–\$99,999	0.89	0.73–1.08	0.23	1.03	0.93–1.13	0.59
≥\$100,000	0.82	0.67–1.00	0.05	0.99	0.88–1.11	0.86
<b>Parent COVID-19 vaccination</b>						
Vaccinated	3.45	2.35–5.09	<0.0001	3.97	2.99–5.27	<0.0001
Not vaccinated	1.00	ref	–	1.00	ref	–
<b>2021 mayoral election</b>						
Did not vote	1.00	ref	–	1.00	ref	–
Curtis Sliwa (Republican)	1.11	0.89–1.38	0.37	0.92	0.80–1.06	0.24
Eric Adams (Democrat)	1.32	1.20–1.56	0.001	1.24	1.15–1.35	<0.0001
Other	1.11	0.84–1.46	0.46	1.15	1.03–1.27	0.01
<b>NYC borough</b>						
Bronx	0.94	0.76–1.16	0.56	0.95	0.84–1.07	0.40
Brooklyn	0.86	0.74–1.03	0.10	0.93	0.84–1.04	0.21
Manhattan	1.00	ref	–	1.00	ref	–
Queens	0.70	0.57–0.87	0.001	0.87	0.76–0.98	0.03
Staten Island	0.39	0.26–0.56	<0.0001	0.69	0.55–0.86	0.001

Abbreviations: CI = confidence interval; USD = US dollars.

§Categories not presented in the table were excluded due to unreliable standard error estimates.

<sup>^</sup> Prevalence ratios comparing parents who support student vaccine mandates vs. those who do not or are unsure.

<sup>^^</sup> Prevalence ratios comparing parents who support teacher/staff vaccine mandates vs. those who do not or are unsure.

\* Adjusted models compare parents who were unsure, not very likely and not at all likely to vaccinate children to parents of vaccinated children and parents very or somewhat likely to vaccinate children; models include all variables shown in the table except child race/ethnicity due to collinearity with parent's race/ethnicity.

safety of the COVID-19 vaccine for children is still be needed and hopefully can increase parental support for both vaccination and vaccine mandates.

In our survey, a quarter of NYC parents said they would not vaccinate their child for COVID-19 if it was required for school attendance. While these data are informative, it is possible that a lower proportion of parents would refuse to comply if a mandate were implemented as a requirement for school enrollment. It is difficult to predict what the true compliance rate for mandated COVID-19 vaccination would be, however previous evidence shows there is high compliance with school-based mandates for other vaccines.

In addition, recent studies from California have shown that elimination of non-medical vaccine exemptions led to a 25% reduction of exemptions among students in the state [20] and was not associated with increased homeschooling rates [21].

In contrast to attitudes about mandates for students, there was wide support among NYC parents for vaccine mandates for teachers and other school staff, as well as for daycare workers. Our survey was conducted after such a NYC mandate had been implemented, and it is possible that the success of that mandate, with > 90% vaccination coverage among school workers, may have contributed to the high levels of support. Further research is



needed to understand how attitudes about vaccine mandates may change after their implementation.

Our study was designed to measure the attitudes in November 2021 when vaccines had just been approved for children 5–11 years and the focus of the survey was parents of children in this age group. This is a limitation as our results cannot be generalized to parents of adolescents (11–17 years) or younger children, nor to other parts of the US. In addition, the study was conducted prior to the most recent COVID-19 surge driven by the Omicron variant. It is possible that a higher proportion of parents now would support vaccine mandates as a result of the surge and subsequent in-person school disruptions. Finally, we do not have data on attitudes among NYC parents about school-based mandates for other vaccines which could provide context for these findings.

School-based vaccine mandates have been employed for nearly a century throughout the US and have contributed to significant increases in vaccination coverage which protects the health of children, adolescents and their communities. While our data show that school-based mandates for COVID-19 vaccines had only modest support among NYC parents, without mandates, it is likely that COVID-19 vaccination coverage among school-age children will remain low.

### Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### Appendix A. Supplementary material

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.vaccine.2022.05.010>.

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