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The role of institutional mistrust on parental endorsement for COVID-19 vaccination

A dissertation submitted in partial satisfaction of the requirements
for the Master's degree

in

Public Health

by

Tina Thao Vi Le

Committee in charge:

Rebecca Fielding-Miller, Chair

Richard Garfein

Maralee Harrell

Esmeralda Iniguez-Stevens

2022

The dissertation of Tina Thao Vi Le is approved, and it is acceptable in quality and form for publication on microfilm and electronically.

University of California, San Diego

2022

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LIST OF ABBREVIATIONS

aOR	Adjusted Odds Ratio
CBP	California Border Patrol
CDC	United States Centers for Disease Control and Prevention
CI	Confidence Interval
COVID-19	Coronavirus disease caused by the SARS-CoV-2 virus
ICE	United States Immigration and Customs Enforcement
MIS-C	Pediatric Multisystem Inflammatory Syndrome
OR	Odds Ratio
SAGE	Strategic Advisory Group of Experts on Immunization
SASEA	Safer at School Early Alert Program
US	United States
WHO	World Health Organization

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To the SASEA team, y'all are amazing, dedicated, and lovable. Thank you for helping me grow professionally and as a person.

All chapters are coauthored with Garfein, Richard; Harrell, Maralee; Iniguez-Stevens, Esmeralda; Fielding-Miller, Rebecca. The thesis author was the primary author for all chapters. Chapters 1, 2, 3, and 4 are currently being prepared for submission for publication.

ABSTRACT OF THE THESIS

The Role of Institutional Mistrust on Parental Endorsement for COVID-19 Vaccination

by

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Master of Public Health

University of California San Diego, 2022

Professor Rebecca Fielding-Miller, Chair

COVID-19 vaccination trends for children aged 5-17 have fallen behind in comparison to older age groups in the United States; this is due to vaccine hesitancy and, potentially, the rise of institutional mistrust. Our objective was to determine whether institutional mistrust is associated with lower parental vaccination endorsement. We defined vaccination endorsement as having a child age 5+ who received at least one COVID-19 vaccine dose or being very likely to vaccinate their child aged 0-4 when eligible. We distributed an online survey among parents from 32 different schools in areas with high levels of social vulnerability relative to the rest of San Diego County. Mistrust reflected level of confidence in institutions using an

aggregate score from 11 to 44. We built a multivariable logistic regression model to assess the association between mistrust and vaccination endorsement. Out of 290 parents in our sample, most were female (87.6%), reported that their child was Hispanic/Latinx (73.4%), and expressed vaccination endorsement (52.1%). In our logistic regression model, for every one-point increase in mistrust score, there was an 8% reduction in the likelihood of participants endorsing vaccination for their child. Other statistically significant correlates included parent vaccination status, child age, parent age, and Hispanic/Latinx ethnicity. Institutional mistrust can undermine public health interventions and, likewise, public health interventions can reduce the trustworthiness of the entity and foster mistrust. When mistrust is high, institutions can improve their trustworthiness by fostering collaboration with key stakeholders and aligning themselves with the interests and goals of their constituents.

CHAPTER I – BACKGROUND

Children aged 0-17 years represent 18.5% of all reported COVID-19 cases and 0.1% of deaths in the United States.^{1,2} Although COVID-19 morbidity and mortality might be lower in children than adults, children are still at risk of severe, long-term health consequences from the virus.³⁻⁶ About 25% of pediatric COVID-19 cases develop long-COVID and experience prolonged symptoms such as mood changes, fatigue, dyspnea, headaches, and cognitive difficulties, which can last for months after initial infection.^{3,7} Furthermore, a small but significant portion of children develop a serious health condition called multi-system inflammatory syndrome (MIS-C), where the heart, lungs, brain, and other organs can become inflamed.⁸⁻¹⁰ These have major health implications for children from socially vulnerable populations, who already face higher rates of morbidity and lower access to healthcare.

Children from socially disadvantaged backgrounds are disproportionately at risk of COVID-19 infection, serious illness, and other health complications. More specifically, children with chronic diseases such as obesity, asthma, and lung, neurological, or cardiovascular disease are at higher risk of COVID-19 hospitalization and severe illness,¹¹⁻¹³ which often coincide with lower-income and racial minority status.^{14,15} Likewise, cumulative COVID-19 hospitalization rates among American Indian/Alaskan Native, Black, and Hispanic/Latinx children aged 0-17 years are over two times higher than among White children.¹⁶ Black and Hispanic/Latinx children also account for over half of reported MIS-C cases in the US.¹⁷⁻¹⁹ COVID-19 vaccination significantly lowers risk of severe illness and hospitalization among children^{20,21}; however, data are limited on vaccination progress among these socially vulnerable populations.²² Vaccinating children remains an important strategy for improving health equity and ending the COVID-19 pandemic.

The World Health Organization (WHO) had set a goal of 70% full vaccination coverage for COVID-19 in all countries by June 2022,^{23,24} but as of July 2022, the United States fell short of this target at 67.2%.²⁵ When stratifying vaccination progress by age group, children ages 5-11 years and 12-17 have the lowest proportion of fully vaccinated individuals at 30% and 59%, respectively (Figure 1).^{26,27} Despite

these age groups having been eligible for vaccination for at least nine months now,^{28,29} vaccination progress for children has been slower compared to older age groups in a comparable time frame. One reason why there is a delay in COVID-19 vaccination trends for children is due to parental vaccine hesitancy.

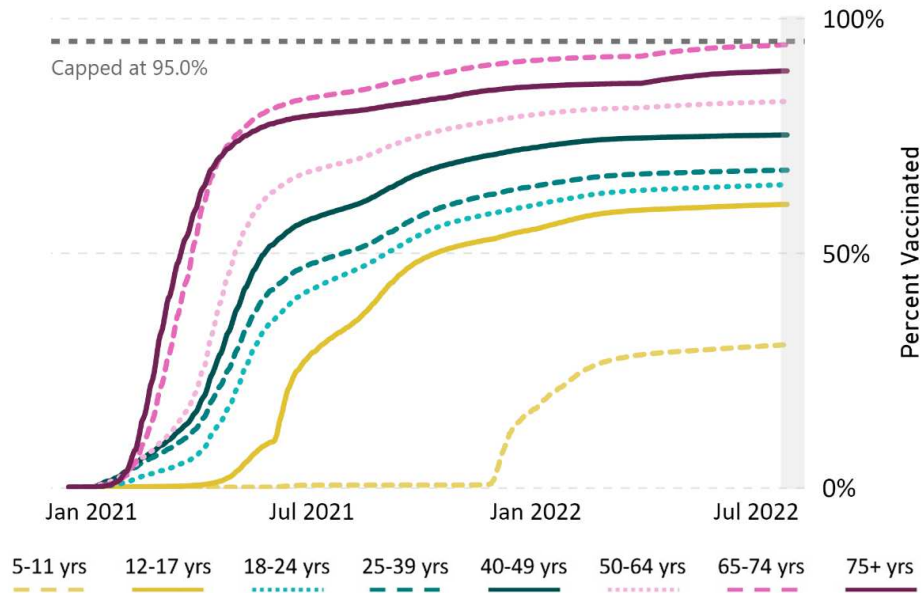


Figure 1. Proportion of People Fully Vaccinated for COVID-19 by Age Group, United States, December 2020 – July 2022
Source: CDC COVID Data Tracker

COVID-19 vaccine hesitancy is the latest manifestation of a longstanding trend in vaccine hesitancy. Parents have had to navigate complex, multifaceted decision-making processes in order to determine the best health choices for their children since before and during the pandemic. Parental vaccine hesitancy has always been prevalent but has become especially apparent in recent times. In 2015, the Strategic Advisory Group of Experts on Immunization (SAGE) developed a framework to describe the different level factors involved in vaccine hesitancy and vaccine decision making (Table 1).³⁰ We used the Vaccine Hesitancy Determinants Matrix to conceptualize factors influencing COVID-19 parental vaccination decision-making (Table 2).

Table 1. Vaccine Hesitancy Determinants Matrix developed by SAGE Working Group

<p>Vaccine and Vaccination Specific Issues Directly related to vaccine or vaccination</p>	<ul style="list-style-type: none"> a. Risk/benefit (epidemiological and scientific evidence) b. Introduction of a new vaccine or new formulation or a new recommendation for an existing vaccine c. Mode of administration d. Design of vaccination programme/Mode of delivery (e.g., routine programme or mass vaccination campaign) e. Reliability and/or source of supply of vaccine and/or vaccination equipment f. Vaccination schedule g. Costs h. The strength of the recommendation and/or knowledge base and/or attitude of healthcare professionals
<p>Individual and Group Influences Influences arising from personal perception of the vaccine or influences of the social/peer environment</p>	<ul style="list-style-type: none"> a. Personal, family and/or community members' experience with vaccination, including pain b. Beliefs, attitudes about health and prevention c. Knowledge/awareness d. Health system and providers – trust and personal experience e. Risk/benefit (perceived, heuristic) f. Immunization as a social norm vs. not needed/harmful
<p>Contextual Influences Influences arising due to historic, socio-cultural, environmental, health system/institutional, economic or political factors</p>	<ul style="list-style-type: none"> a. Communication and media environment b. Influential leaders, immunization programme gatekeepers and anti- or pro- vaccination lobbies c. Historical influences d. Religion/culture/gender/socio-economic e. Politics/policies f. Geographic barriers g. Perception of the pharmaceutical industry

Table 2. Factors Influencing COVID-19 Vaccine Decision-Making Adapted from the Vaccine Determinants Matrix

<p>Vaccine and Vaccination Specific Issues</p>	<p>a. Vaccine approval timeline b. FDA EUA vs FDA approval c. Vaccine safety <ul style="list-style-type: none"> • Adverse health effects </p>
<p>Individual and Group Influences</p>	<p>a. Perceived susceptibility to COVID-19 infection b. Perceived benefit of vaccination c. Social norms about vaccination d. Narratives and personal experiences about vaccination e. History of vaccination for other diseases</p>
<p>Contextual Influences</p>	<p>a. Sociodemographic factors <ul style="list-style-type: none"> • Gender, age, race/ethnicity, income, education, income, religion b. Political climate <ul style="list-style-type: none"> • Institutional trust • Political alignment </p>

COVID-19 Vaccine and Vaccination-Specific Issues

Vaccine and vaccination-specific issues refer to the scientific risk/benefit, delivery, costs, administration route, and scheduling of vaccines. These factors directly relate to specific vaccine or vaccination issues. Regarding COVID-19 vaccination, important considerations in the decision-making process include the approval timeline of the vaccine and vaccine safety.³¹⁻³⁸ Morales et. al found that vaccine hesitant participants were concerned about how quickly the COVID-19 vaccine was approved for public use and were waiting for more research to be conducted.³⁷ Similarly, Kitro et. al found that vaccine hesitant participants had 3.56 times higher odds (95% CI: 1.69–7.48) of reporting being concerned about the speed of vaccine production, concerned about vaccines not being widely used yet, or who needed more information/observation about vaccines.³⁸ Studies assessing vaccine safety and vaccine hesitancy have largely focused on concerns about adverse health effects.³⁸⁻⁴⁰ In the previously mentioned study conducted by Kitro et. al, 82.5% of participants were concerned about vaccine side effects and 60% were concerned

about vaccine safety.³⁸ Participants who were concerned about the adverse effects of a future COVID-19 vaccine were more likely to be vaccine hesitant (aOR = 2.71, 95% CI: 1.49–4.92). Skeens et. al reported similar findings among caregivers of children with cancer and found that parents reported significantly greater side effect concerns for their children than for themselves.⁴⁰ Likewise, Ruggiero et. al found that parents who were concerned about serious side effects from the vaccine or who were concerned that the vaccine would not prevent disease had 73% (OR = 0.27, 95% CI: 0.16 – 0.46) and 91% (OR = 0.09, 95% CI: 0.05 – 0.16) lower odds of intending to vaccinate their children against COVID-19, respectively.³⁹

Individual/Social Group Influences on COVID-19 Vaccination Decision-Making

Individual and group influences comprise of social norms and narratives, attitudes, beliefs, interpersonal relationships, and perceived risk/benefit. Many individuals will consider their perceived susceptibility and perceived benefit when making decisions about vaccination for themselves and for their dependents.^{38,41} According to a study by Qin et. al, parents were significantly more accepting of a COVID-19 vaccine booster if they reported moderate or high levels of perceived susceptibility to COVID-19 compared to low perceived susceptibility (aOR = 1.56, 95% CI: 1.07–2.29; aOR = 1.75, 95% CI: 1.06–2.89, respectively).⁴¹ In addition, parents were more accepting of booster doses if they reported high levels of perceived benefit from vaccination (aOR = 7.22, 95% CI: 2.63–19.79). According to Kitro et. al, parents who believed that COVID-19 vaccination was necessary for their children's health were less likely to refuse or be unsure about vaccinating their children (aOR = 0.16, 95% CI: 0.04–0.67).³⁸ Along with specific vaccination considerations for their children, parents are also influenced by their own vaccination considerations. Many studies found a statistically significant association between parent COVID-19 vaccination status and their child's vaccination status or their intent to vaccinate.^{42–46}

Likewise, social norms and narratives have played a big role in the vaccine decision making process by influencing people's attitudes and perceived risk towards the COVID-19 vaccine and the virus itself.^{37,47,48} A qualitative study conducted by Morales et. al found that conversations with friends and family both reinforced and alleviated participants' hesitancy to get the COVID-19 vaccine; social pressure was a large influence in the vaccine decision making process for participants.³⁷ Another qualitative study

exploring health information during the pandemic by Lockyer et. al found that participants reported being exposed to a high volume of controversial or dramatic COVID-19 stories, especially if they were shared by close contacts.⁴⁷ These social media posts contributed to feelings of confusion and distress during the pandemic and thus facilitated vaccine hesitancy. Similarly, Gorman et. al found that vaccine hesitant participants had recurring thoughts of negative testimonies about COVID-19 vaccination that reinforced their vaccine hesitancy.⁴⁸

Contextual Factors Influencing COVID-19 Vaccination Decision Making

Contextual factors include sociocultural and institutional level influences such as communication and media, politics/policies, influential leaders, culture, religion, socio-economic, and gender. Previous studies have posited gender,^{34,36,49–52} age,^{52–54} race/ethnicity,^{45,52,53,55–59} income level,^{52,53,56,60} education level,^{52,53,53,61–64} and religiosity^{65–67} as significant sociocultural factors associated with COVID-19 vaccination hesitancy/non-acceptance. Bell et. al found that participants from lower income households were 1.8 (95% CI: 1.17 – 2.28) times more likely to reject vaccination than participants from medium household incomes.⁵⁶ McElfish et. al found that respondents with a high school diploma and below and respondents with some college or a technical degree had 2.58 and 1.97 greater odds of COVID-19 vaccine hesitancy compared to respondents with a 4-year college degree, respectively.⁵² According to a study by Rane et. al, Black (aOR = 2.5, 95% CI: 1.8 – 3.6) and Hispanic/Latinx adults (aOR = 1.4, 95% CI: 1.0 – 2.0) had higher odds of vaccine refusal than White adults in June 2021, seven months into the vaccine distribution program in the US.⁵⁷

Institutional level factors like policies and political climates impact institutional trust and influence COVID-19 vaccination behavior.^{68–72} Lazarus et. al found that higher levels of trust in information from government sources are associated with a higher likelihood to accept a COVID-19 vaccine.⁶⁸ Alternatively, according to Jennings et. al, general mistrust and distrust in government are associated with around three times lower odds of being willing to get the vaccine.⁷³ Similar to Jennings, Tobin et. al found that participants who reported trust in government were 3.35 times more likely to accept a vaccine compared to those who reported mistrust in government.⁶⁹ Regarding the US bipartisan system, Albrecht found that

Republicans had 41-90% lower odds of vaccination intent than Democrats depending on their perceived level of political polarization.⁷⁰ Similarly, an analysis by Ye found that Republican counties in the US had consistently lower vaccination rates than Democratic counties between January and August 2021.⁷¹

1.1 Institutional Mistrust during the COVID-19 Pandemic

Institutional mistrust refers to a lack of confidence toward a particular organization and more specifically reflects doubt or skepticism about its trustworthiness.⁷⁴ Institutional mistrust is dynamic, involving a continuous evaluation of an entity's performance relative to the expectations of its individual and collective constituents.⁷⁵ Compared to the other concepts of trust, mistrust is not based on a set belief and is associated with cautious, questioning attitudes.⁷⁵ The actions of an institution shape its perceived trustworthiness, which in turn impacts their constituents' trust and receptiveness to future actions.

Institutional mistrust is especially relevant to the pandemic and has been attributed to weakening COVID-19 response efforts.⁷⁶⁻⁸⁰ In the US, institutional mistrust has been facilitated by factors such as widespread misinformation and has discredited government sources of information for vaccines.^{81,82} Likewise, perceived competence of local elected leaders and public health officials has fallen to 50% favorability, down from 79% since the initial outbreak in early 2020.⁸³ As a consequence, only 25% of adults believe that the US is very prepared to deal with future COVID-19 variant outbreaks.⁸¹ Public trust is essential for legitimizing government authority and successfully navigating through public health threats; however, as seen during this pandemic, low trust in government impedes public cooperation and hinders vaccination progress.⁸⁴

1.2 Aim of the Study

The aim of this study was to determine whether institutional mistrust is associated with lower parental endorsement for COVID-19 vaccination after controlling for known and potential confounders. Assessing to what extent institutional mistrust impacts parental decision making will be important to formulating structural efforts for facilitating COVID-19 vaccination progress among children. In this study, we defined parental vaccination endorsement as having a child aged 5-17 years who received at least one

dose of a COVID-19 vaccine or being very likely to vaccinate their child aged 0-4 years when the COVID-19 becomes available.

1.3 Acknowledgement

I would like to acknowledge Dr. Rebecca Fielding-Miller for her support as the co-chair of my thesis committee. This chapter is coauthored with Garfein, Richard; Harrell, Maralee; Iniguez-Stevens, Esmeralda; Fielding-Miller, Rebecca. The thesis author was the primary author for this chapter. This chapter is currently being prepared for submission for publication.

CHAPTER II – METHODS AND PROCEDURES

This was a secondary analysis of data from a cross-sectional survey nested within the Safer at School Early Alert (SASEA) Program, an environmental monitoring system aimed at preventing potential COVID-19 outbreaks in 32 childcare and K-8 school sites across San Diego County, California. As part of the SASEA program evaluation, monthly surveys were sent to parents of children enrolled at SASEA sites asking about their perceptions and experiences during the pandemic regarding topics such as health care use, perceived wellbeing, and engagement in COVID-19 mitigation behaviors.

2.1 Setting and Participants

San Diego is the second most populous county in California and is ethnically diverse, with approximately 22% of residents identifying as an immigrant and 35% identifying as Hispanic or Latinx.^{85,86} SASEA school sites were selected for participation if they had elevated COVID-19 case rates and were located in census tracts with high levels of social vulnerability according to the California Healthy Places Index.⁸⁷ At the time of the study, children aged 5-17 were authorized for vaccination from the Food and Drug Administration.

All parents and guardians of SASEA-affiliated students were eligible for this study. To avoid overburdening parents with surveys, three classrooms were randomly selected per school site for each survey wave. Parents were recruited through paper flyers that were sent home with students. Teachers of participating classrooms also sent out email announcements with virtual flyers to encourage participation.

2.2 Data Collection

Surveys were self-administered using REDCap, a web-based survey tool provided by the University of California, San Diego.^{88,89} Participants could access the survey by scanning a quick response (QR) code with their smartphone or by calling in to verbally complete the survey with the assistance of a researcher. Survey items covered demographic data and perceptions about physical, mental, and social health during the pandemic. Surveys were offered in English and Spanish and were distributed in two waves between February 7 and April 11, 2022.

2.3 Variables and Measures

Our outcome of interest for this analysis was parental vaccination endorsement. We measured this variable by combining responses for two survey items: “Has your child [aged 5-17] received at least one dose of a COVID-19 vaccine?” and “How likely is your child [aged 4 and under] to get an approved COVID-19 vaccine when it becomes available?” Skip logic was used in the survey to present the appropriate question after the respondent specified their child’s age. Responses were categorized as “*Yes*” if the participant indicated that their child received at least one dose or that their child was very likely to get the vaccine when it becomes available. Responses were categorized as “*No*” if the participant indicated that their child had not received at least one dose or that their child was fairly likely, not too likely, or definitely not likely to get the vaccine when it becomes available.

Our primary predictor was institutional mistrust measured by the survey item, “Please indicate how much confidence you, yourself, have in the following institutions.” This item listed eleven different entities [i.e., the participant’s church, government officials, public schools, newspapers, pharmaceutical companies, television news, the police, news websites, the U.S. Immigration and Customs Enforcement (ICE) and Customs and Border Patrol (CBP), the County Board of Supervisors, and UC San Diego] and quantified trust using four-point Likert-like scale ranging from *A great deal* to *Not at all*. Scale rankings for mistrust were converted into numeric scores 1 to 4. Aggregate mistrust scores were calculated and ranged from 11 to 44, with 1 representing the lowest mistrust score and 44 representing the highest mistrust score. This survey item was adapted from the Gallup Poll’s Measurement for Confidence in Institutions.⁹⁰

Potential confounders included in the analysis were parent vaccination status, household income, age of the child who brought the survey flyer home, parent education level, parent age, parent gender, and child ethnicity. Parent vaccination status was a binary variable that reflected whether the respondent had received any dose of a COVID-19 vaccine. Child’s ethnicity was a binary variable that reflected whether or not the participant’s child was of Hispanic, Latinx, or Spanish origin. This variable was used because most respondent’s identified their child as Hispanic/Latinx and we wanted to avoid racial misclassification.^{91,92} Household income was determined by self-reported household gross income earned

in 2019. Parent education level was determined by the respondent's self-reported highest level of education completed. Both income and education levels were measured as an ordinal variable but were treated as a continuous to acknowledge that these variables are a spectrum in real life and to avoid misclassification bias.

2.4 Statistical Analysis

Bivariate analyses using chi-square for categorical variables and t-test for continuous variables were used to assess the association between child vaccination status and variables of interest. Logistic regression was used to determine whether there was an association between institutional mistrust and child vaccination status after adjusting for confounders. If a classroom had been sampled twice, responses from the survey wave with the lower response rate were excluded from analysis. Missing data was treated as missing completely at random after conducting sensitivity analyses and was handled using listwise deletion. Responses were also stratified by children aged 0-4 years and children aged 5 years or older to assess differences in correlates in the logistic regression model. Statistical significance was defined as $p < 0.05$. RStudio version 4.2.0 was used for analysis.

2.5 Ethics

This study was approved by the UC San Diego Human Research Protections Program with protocol number 201627. Funding was provided by the County of San Diego Health and Human Services Agency. Participants were asked to review and sign a consent form prior to completing the survey and all survey responses were kept confidential. Participation in this survey was voluntary and participants could skip questions they did not want to answer. As an incentive to increase response rates, all respondents were entered into a raffle to win a nominal prize after completing the survey. The classroom with the highest response rate after each round of data collection was offered a pizza party.

2.6 Acknowledgement

I would like to acknowledge Dr. Rebecca Fielding-Miller for her support as the co-chair of my thesis committee. This chapter is coauthored with Garfein, Richard; Harrell, Maralee; Iniguez-Stevens,

Esmeralda; Fielding-Miller, Rebecca. The thesis author was the primary author for this chapter. This chapter is currently being prepared for submission for publication.

CHAPTER III – RESULTS

In total, 507 individuals completed the survey between February and April 2022, and 290 respondents were included for analysis (Figure 2). Most participants were female (87.6%), had at least a high school education (86.6%), and reported that their child was Hispanic/Latinx (73.4%) (Table 3). Approximately half of participants reported having an annual household income of \$35,000 or less in 2019. 88.6% of participants reported that they had received at least one dose of a COVID-19 vaccine while 52.1% of participants endorsed COVID-19 vaccination for their child. The mean institutional mistrust index score was 26.4 with a standard deviation of 6.3.

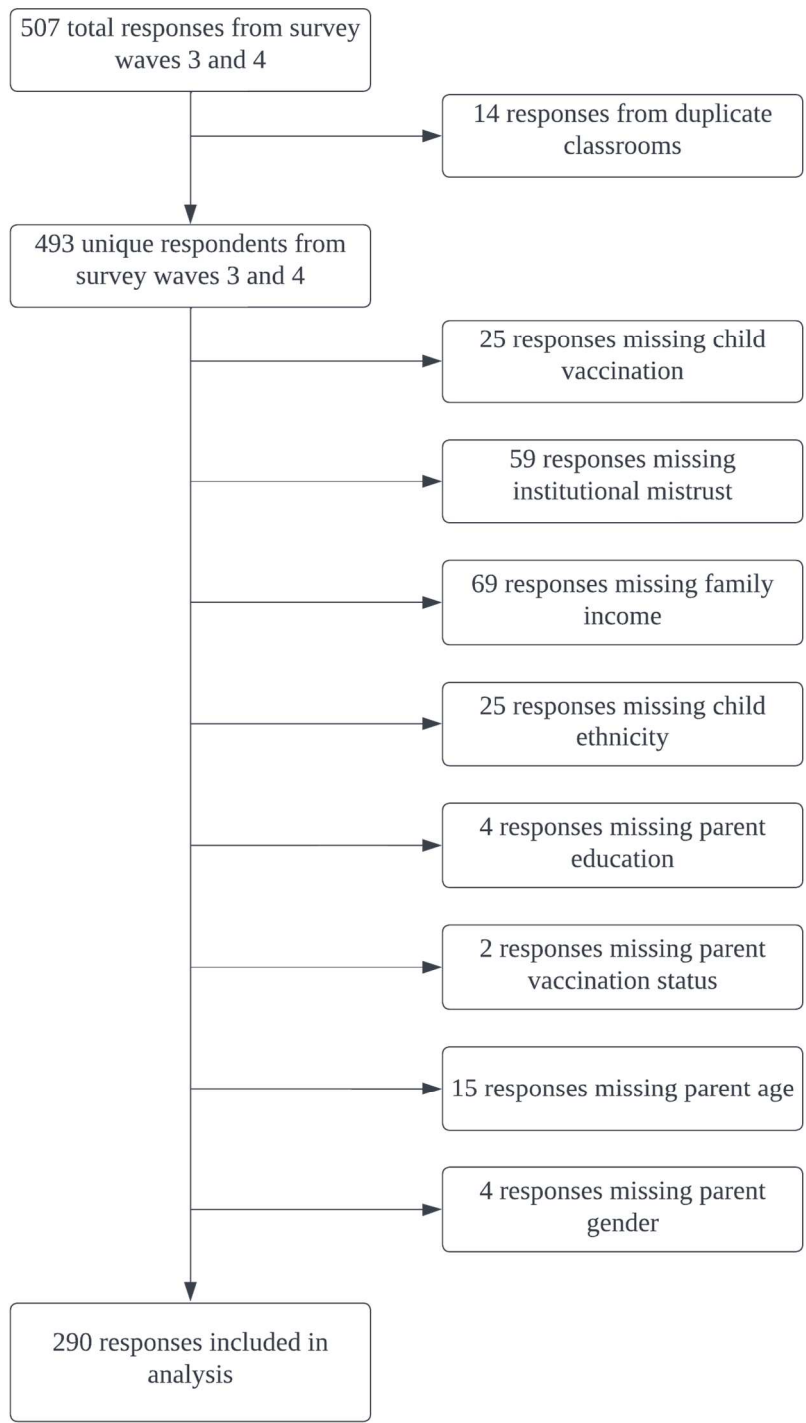


Figure 2. Flow Diagram for Selection of Survey Respondents

Table 3. Demographic Characteristics of Survey Respondents

Variable	Included Participants (n=290) n (%)	Excluded Participants (n=203) n (%)	p-value
<i>Institutional Mistrust Index (Mean±SD)</i>	26.4±6.2	26.5±7.1	0.867
<i>Parent Age (Mean±SD)</i>	37.2±8.4	35.0±8.4	0.032
<i>Child Age (Mean±SD)</i>	8.1±2.6	8.1±2.4	0.892
<i>Parental Vaccination Endorsement</i>			0.199
No	139 (47.9)	97 (54.5)	
Yes	151 (52.1)	81 (45.5)	
Declined to answer	-	25	
<i>Parent Gender</i>			1.000
Male	36 (12.4)	18 (12.4)	
Female	254 (87.6)	127 (87.6)	
Declined to answer	-	58	
<i>Child Ethnicity</i>			0.424
Not Hispanic/Latinx	77 (26.6)	24 (20.2)	
Hispanic/Latinx	213 (73.4)	95 (79.8)	
Declined to answer	-	84	
<i>Parent Vaccination Status</i>			0.023
Not Vaccinated	33 (11.4)	35 (19.4)	
Vaccinated	257 (88.6)	145 (80.6)	
Declined to answer	-	23	
<i>Annual Family Income</i>			0.379
<15,000	42 (14.5)	12 (14.3)	
15-20,000	22 (7.6)	10 (11.9)	
20-25,000	33 (11.4)	9 (10.7)	
25-35,000	44 (15.2)	15 (17.9)	
35-50,000	49 (16.9)	19 (22.6)	
50-75,000	50 (17.2)	13 (15.5)	
75-100,000	27 (9.3)	3 (3.6)	
>100,000	23 (7.9)	3 (3.6)	
Declined to answer	-	119	
<i>Parent Education Level</i>			0.107
Less than High School	39 (13.4)	32 (21.5)	
High School or Equivalent	157 (54.1)	80 (53.7)	
Bachelor's Degree	72 (24.8)	30 (20.1)	
Postgraduate Degree	22 (7.6)	7 (4.7)	
Declined to answer	-	54	

^aTotal responses may exceed sample size as survey item was multi-select

3.1 Bivariate Analysis of Child Vaccination Status by Institutional Mistrust Index and Covariates

The mean institutional mistrust index score was 3.2 points lower for parents who endorsed vaccinating their child compared to parents who did not endorse vaccination (Table 4). In other words, parents who endorsed vaccination reported significantly higher confidence in institutions than parents who did not endorse vaccination. Parents who endorsed vaccination were also more likely to be vaccinated themselves than parents who did not endorse vaccination. Average reported child age and parent age were significantly higher among participants who endorsed vaccination compared to those who did not. There was a significant difference in mean education levels and family income between parents who endorsed vaccination and unendorsed vaccination but no significant difference in the proportion of Hispanic/Latinx nor female identifying respondents.

Table 4. Bivariate Analysis of Factors Associated with Parental Vaccination Endorsement for COVID-19 (n=290)

Variable	No n (%)	Yes n (%)	p-value
<i>Mistrust Index (Mean±SD)</i>	28.1±6.0	24.9±6.0	<0.001
<i>Parent Vaccination Status^b</i>			<0.001
No	31 (22.3)	2 (1.3)	
Yes	108 (77.7)	149 (97.7)	
<i>Ethnicity^b</i>			0.105
Not Hispanic or Latinx	43 (30.9)	34 (22.5)	
Hispanic or Latinx	96 (69.1)	117 (77.5)	
<i>Family Income^c</i>			0.004
<15,000	22 (15.8)	20 (13.2)	
15-20,000	15 (10.8)	7 (4.6)	
20-25,000	19 (13.7)	14 (9.3)	
25-35,000	20 (14.4)	24 (15.9)	
35-50,000	26 (18.7)	23 (15.2)	
50-75,000	23 (16.5)	27 (17.9)	
75-100,000	8 (5.6)	19 (12.6)	
>100,000	6 (4.3)	17 (11.3)	
<i>Child Age (Mean±SD)</i>	7.7±2.4	8.5±2.8	0.005
<i>Parent Age (Mean±SD)</i>	35.3±6.7	38.9±9.3	<0.001
<i>Education Level^c</i>			0.183
Some High School	15 (10.8)	24 (15.9)	
High School or Equivalent	89 (64.0)	68 (45.0)	
Bachelor's Degree	27 (19.4)	45 (29.8)	
Postgraduate Degree	8 (5.6)	14 (9.3)	
<i>Parent Gender^b</i>			0.655
Male	16 (11.5)	20 (13.2)	
Female	123 (88.5)	131 (86.8)	

^bCalculated using t-test

^cCalculated using chi square test

3.2 Univariate and Multivariable Logistic Regression Analysis of Factors Associated with Parental Vaccination Endorsement

After adjusting for covariates, higher mistrust scores were associated with lower odds of COVID-19 vaccine endorsement (Table 5). For every one-point increase in mistrust score, there was an 8% reduction in the likelihood of participants endorsing vaccination for their child. Parent vaccinated status had the largest effect size on vaccination endorsement (aOR 16.49, 95% CI: 4.61 – 105.78). Income (aOR 1.23, 95% CI: 1.06 – 1.44), child age (aOR 1.16, 95% CI: 1.04 – 1.29), and parent age (aOR 1.05, 95% CI: 1.01 – 1.09) were also positively associated with vaccine endorsement. Hispanic/Latinx ethnicity was not associated with vaccination endorsement in the unadjusted regression analysis but was significant after adjusting for covariates (aOR 2.11, 95% CI 1.12 – 4.04). Parent education level and female gender were not associated with vaccination endorsement in both analyses.

Table 5. Univariate and Multivariable Logistic Regression Analysis of Factors Associated with Parental Vaccination Endorsement for COVID-19 (n=290)

Variable	OR (95% CI)	Adjusted OR (95% CI)
Institutional Mistrust Index	0.91 (0.87 – 0.95)	0.92 (0.88 – 0.96)
Parent Vaccinated Status	21.38 (6.29 – 133.85)	16.49 (4.61 – 105.78)
Hispanic/Latinx Ethnicity	1.54 (0.91 – 2.62)	2.55 (1.33 – 4.99)
Family Income	1.18 (1.05 – 1.32)	1.23 (1.06 – 1.44)
Child Age	1.14 (1.04 – 1.25)	1.16 (1.04 – 1.29)
Parent Age	1.06 (1.03 – 1.10)	1.05 (1.01 – 1.09)
Education Level	1.22 (0.91 – 1.65)	1.05 (0.70 – 1.57)
Female Gender	1.17 (0.58 – 2.40)	0.74 (0.33 – 1.66)

3.3 Multivariable Logistic Regression Analysis of Factors Associated with Parental Vaccination Endorsement Stratified by Age Group

After stratifying by age group, the association between institutional mistrust and parent vaccination endorsement remained statistically significant for both children aged 0-4 and aged five and older (Table 6). For children aged 0-4, there was a 26% reduction in the likelihood of parents endorsing COVID-19 vaccination for every one-point increase in mistrust score; for children aged five and older, there was a 7% reduction. Parent vaccinated status, Hispanic/Latinx ethnicity, income, child age, and parent age remained statistically significant correlates of parental vaccination endorsement for children aged five and older.

Table 6. Multivariable Logistic Regression Analysis of Factors Associated with Parental Vaccination Endorsement for COVID-19 by Age Group

Variable	<u>Children Aged 5 and Older (n=253)</u>		<u>Children Aged 0-4 (n=37)</u>	
	aOR	p-value ^d	aOR	p-value ^d
Institutional Mistrust Index	0.93	0.005	0.74	0.044
Parent Vaccinated Status	14.7	<0.001	1.40E+08	0.996
Hispanic/Latinx Ethnicity	2.26	0.020	2.91	0.552
Family Income	1.2	0.001	0.94	0.88
Child Age	1.27	0.358	8.57	0.098
Parent Age	1.04	0.025	1.29	0.078
Education Level	1.22	0.739	0.24	0.291
Female Gender	0.87	0.051	6.85e-0.8	0.997

^dp-value was used instead of 95% confidence interval due to the limited sample size of children aged 0-4

3.4 Acknowledgement

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CHAPTER IV – DISCUSSION

Our study found a statistically significant association between mistrust index scores and parental vaccination endorsement. Higher institutional mistrust index scores were associated with lower odds of COVID-19 parental vaccination endorsement among parents affiliated with SASEA. This association remained statistically significant after stratifying by ages 0-4 and ages five and older. Other characteristics that were associated with vaccination endorsement included parent history of COVID-19 vaccination, older age for both the parent and child, Hispanic/Latinx ethnicity, and higher household income. Parent education level and gender were not found to be significant correlates after adjusting for covariates.

Our findings provide further evidence for the role of institutional trust on vaccine uptake.⁹³⁻⁹⁷ Similar to our results, a study by Vinck et al. found that low institutional trust was associated with a decreased likelihood of accepting the Ebola vaccine and seeking formal health care during the 2018-2019 Ebola outbreak in the Democratic Republic of Congo.⁹⁴ Furthermore, institutional mistrust was associated with reduced H1N1 influenza vaccination in multiple countries during the 2009 pandemic.⁹⁸⁻¹⁰¹ Institutional mistrust can undermine public health interventions during disease outbreaks and, likewise, public health interventions can facilitate mistrust in these institutions depending on perceived responsiveness and efficacy of the entity. Institutional mistrust is not isolated to COVID-19 and, if not addressed, will likely hinder future pandemic responses.

Our study did not identify educational attainment as a predictor for vaccine endorsement while other studies have. Despite research linking COVID-19 vaccine hesitancy to lower educational levels, the role of educational attainment on vaccine uptake in general is nuanced and evidence for this association is conflicting.^{102,103} A study by Facciola et al. found that rates of childhood vaccination were inversely associated with level of education for both parents, meaning that parents with lower levels of education were more likely to vaccinate their children.¹⁰⁴ Conversely, a study by Bertonecello et al. found that lower parental education was significantly associated with vaccine refusal (aOR 1.89-3.39).¹⁰⁵ Measuring educational attainment in surveys has been used as a proxy for socioeconomic status but can introduce bias

when interpreting study findings. Survey participants with low education may be healthier than non-participants with low education, which could cause researchers to observe a spurious negative association between educational attainment and health status.¹⁰⁶⁻¹⁰⁸ Likewise, attributing disparities in health behavior to education level obscures individual differences.^{109,110} Rather than focusing on educational attainment for vaccine behavior, assessing health literacy may be a more accurate way to interpret this.¹¹¹

We found that Hispanic/Latinx children were twice as likely to be vaccinated compared to non-Hispanic/Latinx children. These results may not be generalizable to the rest of the US as there were strong collective efforts to reach Spanish speaking populations in San Diego County during the pandemic. In July 2020, 60% of COVID-19 cases with known race/ethnicity in San Diego were Hispanic/Latinx despite only making up 34% of the total population.^{86,112} County health officials addressed this disparity by expanding testing in areas with large Spanish speaking populations, working with community health workers (promotores) to educate communities, and launching ads and public awareness campaigns on popular Spanish media sites.¹¹²⁻¹¹⁵ By May 2021, 50% of Hispanic/Latinx residents in San Diego County had received their first dose of the COVID-19 vaccine as compared to 25% in the US.¹¹⁶ A community partner accredited the successful outreach to trust, saying, “We want to hear it from someone that we trust.”

Institutional trust is a fragile process that is built over time by embracing characteristics such as benevolence, accountability, and mutual respect between the institution and its constituents.^{117,118} Trust is asymmetrical: it can be lost instantly and can take a long time to rebuild.¹¹⁹ When an institution is no longer perceived as trustworthy, previous behaviors and actions will not be received the same way. Institutions need to develop new behaviors and actions that interconnect and reinforce each other.¹¹⁷ Morrison, Boyle, and Mahaffey identified eight practices that demonstrate institutional trustworthiness: public interest objective, transparency, engagement, accountability, independence, collaboration, adaptability, and awareness.¹²⁰ These practices aim to promote genuine investment and inclusion of both the institution and its constituents in policy making, providing services, and other processes. Referring back to the Hispanic/Latinx outreach efforts in San Diego County, public health officials strategically partnered with trusted community figures and the media to create and disseminate culturally sensitive resources to Spanish

speaking populations. From their efforts, they were able to successfully increase vaccination rates among Hispanic/Latinx individuals. During these times when institutional mistrust is high, organizations can improve their trustworthiness by fostering collaboration with key stakeholders and aligning themselves with the interests and goals of their constituents.

Although institutional mistrust and other societal-level influences play a role in COVID-19 vaccination, it is also important to acknowledge the structural and geographic barriers that directly influence vaccination access. Vaccination requires financial, time, and transportation costs for parents,^{35,118–120} which may be especially impactful for families from socially vulnerable backgrounds.¹²⁴ One way to overcome these barriers would be to strategically establish COVID-19 vaccination sites or mobile units in geographic locations and/or times that are easily accessible.¹²⁵ This method addresses all three factors in the Vaccine Hesitancy Determinants Matrix. Strategically placed vaccination sites and mobile sites allow for people to see others get vaccinated, promoting positive social norms about vaccination. Furthermore, they eliminate geographic barriers and promote an impression that vaccine supply is secure and reliable.

4.1 Limitations

Our study has several limitations. Most of the participants in our sample reported that they were vaccinated, which may have overestimated the association between parental vaccinated status and child vaccination endorsement. We asked participants to report their household income earned in 2019 which may not reflect their financial situations during the pandemic. Similarly, the survey item captured income in a variety of intervals, and we were unable to determine family income relative to participant household size, which may have overestimated the association between family income and vaccination endorsement. We were unable to distinguish how many vaccine doses the respondent had received due to the wording of the survey item. We also did not ask participants their reason for not vaccinating their child, which may have omitted potential confounding variables that were not included in analysis.

4.2 Conclusion

Vaccination behavior is complex and is guided by individual, social, and institutional influences. In the context of the COVID-19 pandemic, parents must navigate through unprecedented issues and

determine the best courses of action for their children's health. The rise of misinformation, political polarization, and social upheaval has complicated pandemic response and has contributed to institutional mistrust. Although our findings support the association between institutional mistrust and lower parental vaccination endorsement, one way to overcome this is through building community partnerships and disseminating culturally sensitive care and resources. Findings from this paper can be used to inform public health interventions and prepare for future pandemic response.

4.3 Acknowledgement

I would like to acknowledge Dr. Rebecca Fielding-Miller for her support as the co-chair of my thesis committee. This chapter is coauthored with Garfein, Richard; Harrell, Maralee; Iniguez-Stevens, Esmeralda; Fielding-Miller, Rebecca. The thesis author was the primary author for this chapter. This chapter is currently being prepared for submission for publication.

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