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Parents' News Consumption and COVID Sources in Their Decisions to Vaccinate

Mildred F. Perreault PhD
University of South Florida, Tampa campus, mfwperreault@gmail.com

Katherine Foss PhD
Middle Tennessee State University, katie.foss@mtsu.edu

Introduction

Even before the first COVID vaccine was approved for emergency use in December 2020, the decision to vaccinate was shrouded in controversy and debate. At the beginning of November 2021, approximately 80% of US adults had received at least one dose of a COVID-19 vaccine – a number that fluctuated significantly by age, race, ethnicity, education level, and other demographics.[1] Geographically, fully vaccinated rates varied from 35% in West Virginia to 71% in Vermont.[2] Vaccination uptake also correlated with age, as 86% of individuals over 65 were fully immunized, compared to 68% of those ages 12 and up.[2] In November 2021, after approval from the Food and Drug Administration (FDA), the Centers for Disease Control and Prevention (CDC) Advisory Committee on Immunization Practices (ACIP) voted unanimously to recommend the Pfizer vaccine to include children ages 5-11.[3] As vaccine rollout for the expanded age group began, parents' willingness to vaccinate their children came under question. In September 2021, the Kaiser Family Foundation COVID-19 Vaccine Monitor reported that 48% of parents said that their 12-17-year-old children had received at least one dose.[4] Additionally, 34% indicated that they would get their 5-11-year-old children vaccinated "right away" once they become eligible.[4] Given the rising number of COVID cases and hospitalizations in children, disproportionately of color, at that moment, it became important to understand what factors influence parents' decisions to get their children vaccinated. While research has begun to assess parents' willingness to vaccinate their children, missing is a better understanding of how parents think about messaging, information, and news sources on perceptions and behavior. Understanding how parents think and act on information about vaccines is a growing area of media and communication research.

This study explores the potential relationships between parents' media consumption and intentions to vaccinate their children against COVID-19 prior to approval of the vaccine for ages 5-11. That said, this study does not seek to provide correlation or causal explanations of news consumption, but rather explores who, how, and why parents are seeking out certain news sources concerning COVID-19 and vaccines during a certain time period in fall 2021 and how they might relate to parents' information seeking and health behaviors.

Reasons for Immunization

Most Americans have been in support of routine childhood immunizations

(excluding influenza). Kempe and colleagues[5] found that only an estimated 6% of parents expressed hesitancy in a 2019 survey. And yet, for the same survey, approximately 1 in 4 parents reported "serious concerns towards vaccinating their children."[5,6] That said, immunization exemptions for children entering school are relatively rare. For the 2019-2020 year, the exemption rate was 2.5%--unchanged from the previous year.[7,8] More common than vaccine refusal is under or delayed immunization. The CDC reported that while overall childhood immunization rates remained high during the time period 2012 to 2017, since then there has been a significant increase in children with no vaccines at age 24 months.[9] An assessment of the 2020 National Immunization Survey found that more than one-third of US children between ages 19 and 35 months were not following the recommended early childhood immunization schedule.[10,11] There is no indication that the COVID-19 pandemic has further impeded and delayed immunization.[12] Most vaccine delays are not because of ideological objections, but are due to a lack of access and other obstacles to receiving care.[13] However, alternative schedule timing could indicate a potential for vaccine hesitancy that could impact these children's vaccine uptake.[10]

The reluctance for vaccinating against COVID-19 marks an anomaly in the public response and support for immunization. And, as opposed to previous antivaccination groups, the current opponents to COVID-19 have been much more rooted along partisan lines.[14] Misinformation around health and vaccines is rampant and also readily available online. Concerns about vaccine side effects, lack of trust in vaccines and/or the government, and a disbelief in the need for the vaccine rank among the top justifications for vaccine hesitancy.[1] Individuals' political affiliation and primary source of news and information have also been found to create hesitancy toward COVID vaccination.[15] Given the impact of national vaccination rates on public health, parental reasons for vaccination become especially important. That said, there is a significant gap in research on how parents interpret and act on vaccine information. Many studies have focused on the causal relationship between certain traits and opinions of parents; fewer studies have asked parents about news and information and how that plays a role in their decision-making process. This study sought to capture how parents were interacting with information and feeling at a specific time, when vaccination availability changed for many of their children.

Literature Review

Even before COVID-19 was declared a pandemic in March 2020, media consumption had already dramatically shaped public perceptions of the

impending crisis. Studies of early messaging in January through March identified abundant misinformation in the initial months of the impending crisis.[16] News outlets varied significantly in how they covered the pandemic. As early as a month after the World Health Organization (WHO) declared COVID-19 pandemic, researchers began assessing factors influencing parents' willingness to get their children vaccinated against COVID-19.[17] An early study in April 2020 found that 73% of the 2270 surveyed indicated that they would get their kids immunized.[17] In June 2020, scholars examined parents' willingness to vaccinate in Chicago and Cook County, Illinois, finding that 33% of those surveyed expressed vaccine hesitancy.[18] Scholars conducted similar surveys in fall 2020 and throughout 2021.[19-23]

Across studies and time, parents who were Hispanic or White, older, insured, and/or vaccinated themselves were most likely to indicate willingness to vaccinate their children against COVID.[17,18,24,25] Intention to vaccinate also correlated with beliefs about COVID-19. Parents who were more concerned about the risks associated with COVID were also more likely to vaccinate.[19] On the contrary, those who believed more misconceptions about COVID were less likely to be in favor of vaccinating.[25]

An international study published in September 2021 found that "reporting on COVID-19 had moderate scientific quality and low sensationalism."[26] Often people get information from online websites, according to a study by the Pew Research Center, and 55% of Americans use online information to make health decisions.[27] Studies have also found that online information might be artificial intelligence (AI) generated or amplified by trolls or algorithms that favor negative comments.[28]

The study also found that US newspapers categorized as left leaning had more exposing coverage of issues around health and policies, misinformation, and solutions to those issues than newspapers that were more right leaning.[26,29] In addition the study found that articles with lower sensationalism, or a way of presenting articles to make them seem more impactful or extra ordinary,[30] often failed to inform "readers to public-health risks, misinformation, or policy failures" and also "may have exacerbated the public-health effects of the disease."[26]

The challenges to addressing misinformation in real time are not unique to the COVID-19 pandemic[31] but were very likely amplified by the unknowns of the virus earlier on.[32] A study conducted of misinformation shared on social media from 2006-2017 found that certain types of news spread quicker and were more difficult to correct:

> Falsehood diffused significantly farther, faster, deeper, and more broadly than the truth in all categories of information, and the effects were more pronounced for false political news than for false news about terrorism, natural disasters, science, urban legends, or financial information. We found that false news was more novel than true news, which suggests that people were more likely to share novel information."[31]

Misinformation often originates from quotes shared through news organizations or commentators and then evolves into individuals' mis-sharing information. From 2020-2021, misinformation, disinformation, and conspiracy theories undermined public health efforts to implement mask-wearing, social distancing, and other mitigation strategies.[33-36] These struggles remain central hurdles in the vaccine communication environment; many people do not regularly consume news directly through news outlets. That said, news consumption across platforms and levels (i.e. local, regional, national and international) has been found to be a deterrent to belief in conspiracies.[34] For example, in response to COVID-19, news organizations like the *New York Times* and the *Washington Post* attempted to maintain accurate counts concerning vaccinations in different states by sorting public data with interactive tools.[2,37]

Vaccination communication has been challenging in the past; in fact, researchers have recently examined vaccine hesitancy and attitudes toward vaccination based on personal experiences, news, and social media interactions.[38-40] Another challenge for vaccine campaigns is that often geographically unrestricted Facebook networks provide gathering places for parents around vaccination hesitancy and refusal, which also allow the parents to justify their concerns and form a collective identity.[41] When thinking about engagement around vaccines, it is valuable to consider the ways people engage with online information from both official and unofficial sources. In a study conducted from 2018-2020, scholars discovered that negative information often traveled faster on social media.[40] When people are interacting with vaccine information, it is important to consider that people often get information about public health from online sources.[42] In this study we are concerned with social media and news sources that parents can access online. Social media are often used to engage with crisis response and eliminate misinformation to help people make sense of the crisis and respond responsibly.[43,44] In addition, news which has local information would be valuable to people considering concerns for public health.[19,45]

However, the COVID-19 vaccine is not the only one that concerns people. Social media users were more likely to remember information about the dangers of vaccines even before the pandemic.[46] In fact, a large-scale study published in 2017 found that negative Twitter messaging (with misinformation and conspiracies) coincided with lower rates of vaccination for HPV.[47] In fact, states with higher amounts of negative vaccine information around the HPV vaccine were more likely to have lower vaccination rates.[47] However, many Americans (88% according to a Pew Research Center study) believe that getting vaccinated for measles, mumps, and rubella (MMR) is a better option than the possibility of getting the diseases.[48] Other research on HPV found that people who consult social media sources often had a higher perception of risks associated with vaccines.[49]

Vaccine hesitancy was seen early on as concern for effective herd immunity to COVID-19, and many who were reluctant give reasons they consider to be valid--like dissenting opinions about vaccine effectiveness and safety, and distrust of the information they had received about the vaccines from authorities and news media, friends, and family.[50,51] Studies have found that many parents cite fear as the main reason for not vaccinating their children, and social media users and news organizations often augment fear based messaging because of the reactionary nature of social media platforms.[50]

In addition, several factors have been found to impact how people understand news and information, specifically in crises or disasters, and in an elongated crisis like COVID-19.[52] In studies about political identity and perceptions of COVID-19, conservatives perceived the disease to be less severe and thought themselves to be less vulnerable to the disease.[53] Similarly, states with democratic governors were quicker to enact emergency declarations related to the pandemic and public health departments, and these states tended to have a proactive approach to communication and preventive actions.[54] While various studies have attempted to gauge individuals' reasons for and against vaccination, few studies have examined where parents who chose to vaccinate or not vaccinate their children are getting their information. The June 2020 survey of Illinois parents found that those who reported specific sources of information showed lower vaccine hesitancy.[18] Yet this research emerged prior to the wealth of information about COVID vaccines that accompanied FDA emergency authorization and the rollout for adults.

The patterns of communication concerning the willingness to

vaccinate for COVID-19 have been studied widely since before COVID-19 vaccines were first available in late 2020. In a survey from February to March 2021, 46% of parents were "very likely" or "somewhat likely" to vaccinate their children, 42% were "somewhat unlikely" or "very unlikely," and 12% were "unsure."[21] Intentions to vaccinate were linked to political affiliation, as parents identifying as Democrats were more likely to vaccinate.[21] Hispanic or Asian Americans viewed vaccination more favorably, as did those with higher levels of education attained. Moreover, vaccine status predicted intention, as 75% of parents who received or planned to receive the vaccine were "very" or "somewhat likely" to get their children vaccinated.[21] What is not clear from the literature is how news sources impact parents' decisions about the COVID-19 vaccine--an objective of the current study. In addition, parents' willingness to get vaccinated increased significantly from October 2020 to spring 2021, when the general adult population became eligible.[55-56] Studies since 2021 have revealed that people are more likely to seek news sources and information that confirm their previous beliefs and relationships rather than news sources that are more likely to change people's minds about vaccines.[21,49,57,58] The current study delves more into how messaging and information may shape parents' willingness to vaccinate.

Theoretical Framework

This study is underscored by a communication ecology framework. Communication ecology helps to explain how people interact with information, and operate and cope with adjustments to crises or disasters like COVID-19. Communication ecology attempts to explain how and why people communicate and act in certain ways. News organizations are part of an individual's communication ecology and so during the COVID-19 pandemic, people often share information with each other and make decisions about actions they will take based on how they relate to this information.[43,44,59] Communication ecologies are defined as "the networks of communication connections that groups or individuals depend upon in order to achieve a goal."[60] Within communication ecologies are specific goals and expectations; therefore, how people often engage in information about health concerns may differ from how they cope with disasters both at the individual and group levels.[61-63] That said, these information resources might overlap or create connections that may impact future engagement around health, disasters, politics, and even daily life. With that in mind, we ask several research questions pertaining to who, how, and why these parents are seeking certain vaccine information and how they are

interacting with news sources.

In considering communication ecology frameworks, it is valuable to understand not only how people make connections but also how they act. That said, this study did not put a specific value judgment on certain actions or interpretations, but rather sought to gain a deeper understanding of the who, why, and how of parents who intended to vaccinate or not vaccinate their children and what news media and sources they consulted in the process. This addresses the gap we identified in the literature, in that the study provides depth and a deeper understanding of those components of communication and media ecology.

Research Questions

RQ1) What type of parents are more likely to vaccinate their children? Which parents are more likely to wait or refuse to vaccinate?

RQ2) Where do parents get their information about COVID vaccines and what news sources do parents list as sources of information about COVID vaccines?

RQ3) How do parents talk about information sources or news when asked about vaccination decisions?

Methodology

This study drew from the array of existing surveys on adults and COVID-19 vaccines (i.e., the Kaiser Family Foundation [KFF] *COVID-19 Vaccine Monitor* and Gallup and Pew Research Center polls) along with general survey structure guidance to create a survey questionnaire with 25 closed and open questions.[64-67] Several of the questions were multiple choice with the option to expand on answers. A mixture of open and closed questions has the potential to provide more in-depth answers as well as reveal participant biases and rich data, even without statistical significance.[68] The survey questionnaire inquired about parents' vaccination status, children's COVID-19 vaccination status (if eligible) or intent to vaccinate, and their sources of information about COVID-19 vaccines.

While we do provide some descriptive statistics as part of our study, our main interest was to see what sources parents were consulting in their decision-making process; therefore, statistical significance was not the goal. Questions also asked about sources of information about COVID-19, specifically social media platforms and news sources. The study was

submitted to the Institutional Review Board (IRB) at all the researchers' universities in June and July 2021 and approved for distribution in August 2021. There was no incentive to complete the survey questionnaire in a certain amount of time, and we left the questionnaire open for a few weeks to allow people to complete at their own pace. This study is trying to explain how parents with different identities interacted with news, not generalize the responses of participants.

The objectives of this study were to determine how information sources, specifically news sources, were considered when someone's intent to vaccinate their children. This study also sought to understand how people were thinking through the process of vaccinating or not vaccinating their children in relation to COVID-19. The survey questionnaire was distributed through social media channels of Facebook, Twitter, LinkedIn and Reddit. The researchers also shared the survey through several email newsletters and local community boards in their networks. Social media groups ranged from 30 to more than 6000 members. Survey participants had to reside within the United States and were excluded by Qualtrics if they were not in the US. Per university IRB restrictions, participants could not reside in the European Union at the time they took the survey. The survey was open for completion September 4 through 12, 2021 – prior to the FDA-authorized and CDC-recommended vaccination approval of the COVID-19 vaccine for children ages 5-12 years.

For this survey questionnaire, a participant was required to identify as a parent, pregnant, or expecting a child to continue with the survey. After clicking on the survey link, participants were asked if they consented to the study. If they gave consent, the survey continued. Participants could choose to skip questions. After the study concluded, participants were asked if they were willing to possibly participate in a short interview sometime later in the study.

Demographic data was tabulated by the researchers by tallying and counting participant's self-reported responses to the multiple-choice and open-ended responses. Statistical data and open-ended responses were then counted and coded by the researchers, an assistant researcher, and an additional coder, who verified the statistics where insignificant. This is when we decided to focus on the qualitative open-ended responses as the foundation for our work. For this study, the researchers focused on parents' demographics, COVID vaccine status, vaccine status/intention for their children, and the questions focused on information and news consumption (questions 23 through 25). Question 23 asked about where people got

information about vaccines with multiple-choice options (check all that apply). Questions 24 and 25 were open-ended and asked participants to list their news sources and why they consult those sources. Participants were asked directly if they had been vaccinated and where they got vaccine information. Participants were also asked to indicate if they consume specific news sources. We categorized news media based on the Ad Fontes Media Bias Chart and what participants described, or how the news organization described itself in its mission statement if none was available.[69]

Participants self-reported by selecting checkboxes based on their news consumption and listed them in open-ended responses. The open-ended responses were then coded by type based on categories defined by Ad Fontes Media (we also discussed and deliberated when an information source could fit in multiple categories). Type of information, news outlets, social media sites, websites, and other sources were coded by hand, as many participants listed names of news organizations or broadcast affiliates for which we needed to confirm their locations or if they were radio or television stations. For this study we did not follow up with participants about their answers. While the two main researchers developed codes based on the standards and categories indicated by Ad Fontes Media, this meant some news organizations were coded for multiple categories. NPR, for example, became both local and national. Because this study is not a causal study but rather one that seeks to understand where and how people are getting information, what is relevant for the qualitative portion of this study is what they are reporting and how the participant thinks about their source of information and how they labeled it, not necessarily how it fit in a particular category.[70,71] This deductive approach allowed us to gain perspective on what parents said and understood about news and information around Covid-19. Data on participants was based on self-report from the completed surveys. Below represents the answers provided by participants based on their self-report; competition numbers differ for each category.

Findings

Overall, 1061 participants completed at least part of the survey questionnaire during the distribution period, although those who completed demographic information differed. To complete the survey questionnaire, participants had to be parents or expecting parents. Participants took an average of 12.4 minutes to finish the survey and were allowed to skip or not answer individual questions; some took multiple days or more than a week to submit their responses.

Appendix 1 details the demographic breakdown of participants. In the following sections we break down the number of responses for certain demographic, vaccine, and news consumption questions. We also provide some short answers participants shared in the open-ended sections of the survey questionnaire. For some questions participants could click multiple options--for example, if they had multiple children, some might be vaccinated, and others might still be waiting.

For this section all demographic information provided is based on self-reported information from participants. Vaccinated indicates if the parent was vaccinated for COVID-19, and pro-vaccination/anti-vaccination indicates they are/are not in favor of vaccinating their child/children. If any of these answers were left blank or multiple options were selected, we labeled them “unclear.”

Parent Identity and Vaccines

RQ1) What type of parents are more likely to vaccinate their children? Which parents are more likely to wait or refuse to vaccinate?

Out of 1061 responses, 932 (87.8%) indicated they were fully vaccinated against COVID-19 and 10 participants indicated they were partially vaccinated. Sixty-two participants (5.8%) were not vaccinated: 2 because they had had COVID, 3 didn’t think they needed the vaccine, 4 indicated that they were waiting for a later time, and 35 said that they weren’t vaccinated and didn’t plan to do so.

Children’s COVID Vaccine Status

Through closed and open responses, 966 participants indicated their children’s vaccine status. For the 368 participants with children old enough to be eligible, 330 had received a COVID vaccine. Five were old enough but had chosen to wait, and 33 indicated that their children were old enough but would not receive the COVID vaccine. Of this pool, 581 reported, “My child is not old enough to be vaccinated,” with 487 explaining their intentions and/or decisions to vaccinate.

In total, 752 participants indicated that they had had their eligible children vaccinated and/or would vaccinate their children when they became eligible. Sixty-six participants reported uncertainty about vaccinating, indicated they would wait, or had mixed beliefs about their children getting the COVID vaccine. Fifty-four participants indicated they

would not have their children get the COVID vaccine.

While most of the codes were easy to detect--local, national, aggregator--the coders discussed what qualified as a commentator or blog or niche based on information provided on the organization's website and how they were labeled on the Ad Fontes Media site.

News and Other Information Sources

RQ2) Where do parents get their information about COVID vaccines and what news sources do parents list as sources of information about COVID vaccines?

Parents also were asked to list news sources they generally consulted, for which (survey questionnaire question 25) 633 of the participants reported specific news sources, blogs, commentators, and aggregators (233 total). These included a variety of local and national news sources. Participants were most likely to list the *Washington Post*, National Public Radio (NPR), Fox News, and their local television affiliates as sources of news. More than 112 unique local news sources ranging from local news websites, alternative newsweeklies, local NPR affiliates, and local television stations were listed by participants. Table 1 lists some of the responses. There were 482 participants who did not list news sources.

Table 1. News Outlets by Type

Type	Defined (listed)	Count (unique answers)
National	CNN, Fox, cable networks, MSNBC, *New York Times, Washington Post*, NPR	69
Local	Local radio, broadcast, newspapers, NPR	112
Aggregator	Google, Apple News, Yahoo, newsletters	12
Commentator	Opinion based, often political	12
Blogs	Personalities, microblogs,	11

	nonmainstream media personalities	
Niche	Religion, health, science, politics	18

The top news sources for all participants were CNN with 216, NPR with 320, the *New York Times* with 234, the *Washington Post* with 156, and the BBC with 103. Of those surveyed, 323 said they consulted a local news source, 331 indicated national level news sources, and 218 also indicated they consulted both a local and national news source. Of the parents who are willing to vaccinate their children, 241 listed local and 207 listed national news sources.

For this study NPR was coded as both a local and national source. Of the 324 people who listed NPR, 10 were not planning to vaccinate and 13 were unsure about vaccinating their children. Only 10 who intended to vaccinate their children listed both a local and national news source other than NPR, although many also cited Apple News and Google News or newsletters that aggregate national content like the Skimm (a public relations-geared digest of news) as their sources.

More than half of the unvaccinated parents did not list any news outlets or said they do not consume news, leaving blank spaces. Of those not planning to vaccinate their children (antivaccine), only 8 listed news sources. They also listed similar news sources (these included CNN, CBS, NPR, Fox News, Newsmax, and other conservative commentators). Of those who were not planning to vaccinate, the most common news sources were Fox News, CBS, and NPR.

Many of those who listed sources included a variety of national sources, but other participants in this group provided a vague answer as to their news consumption habits, or said they no longer consume news because “now it is all garbage,” “try to avoid when possible,” or “With all the political nonsense in the media, I rarely consume news.” The absence of news consumption or the intentional avoidance of news was more common with those unwilling to vaccinate. Of the 22 who were unsure or waiting for their children to be vaccinated, the most common news sources were Fox News, the BBC, and CNN.

Parents who reported that they consumed alternative publications or

commentators were more likely to be unsure or unwilling to vaccinate their children. However, because this is a small portion of the sample, we were unable to identify a statistical correlation between the two. From our data, parents who did not intend to vaccinate were less likely to list local news sources; however, there was not enough data to determine a direct relationship.

The parents surveyed provided a variety of reasons for their decisions, including personal reasons and risk factors. That said, many indicated their trust in science and scientists in their responses.

Choosing News Sources

In addition to listing specific news sources, some participants used the open response to explain their choices and consumption of news. Some suggested a random means of gathering information. Here are some examples of open-ended responses about where people got their information about COVID-19:

> Whatever people post on Facebook. My network has a lot of folks in higher Ed. I trust them. (Parent Respondent 1: Democrat, female, vaccinated, pro-vaccine).
>
> Whatever comes across my feed (Parent Respondent 2: Democrat, female, vaccinated, pro-vaccine).
>
> NPR, PBS primarily but I also click random articles that appear on my news feed and Reddit. (Parent Respondent 3: Democrat, female, vaccinated, unclear intention)

Another participant explained, “I don’t really follow much news. But my husband does. He has kept me truly informed.” (Parent Respondent 4: “Prefer not to say,” female, vaccinated, pro-vaccine).

Proponents of vaccinating tended to list multiple news sources, emphasizing their newsgathering process:

> *NYT*, the *Guardian*, NPR; other news outlets who publish stories and are reputable. So, something like CNN or PBS. I don’t seek those out, but I would click on them if I saw a news story, I was interested in. I’ll also read the *Washington Post* or the *Atlantic* or even *Rolling Stone* (some surprisingly good reporting on current events) (Parent Respondent 5: Democrat, female, vaccinated).

> I try to avoid the Facebook bubble, but if I am honest most of the news I access is through Facebook (most often click the *Atlantic, NY Times, Wall Street Journal*) (Parent Respondent 6: Democrat, female, vaccinated).
>
> I'll read/watch anything from any source other than Fox (Parent Respondent 7: Democrat, female, vaccinated).

This group of participants were also very interested in conveying the "balance" in their news consumption, as one (Parent Respondent 8: Democrat, female) stated that in addition to "CNN, Politico, NPR, the *New York Times*, and the *Wall-Street Journal*, I also occasionally watch Fox News to compare/contrast." A second participant (Parent Respondent 9) listed similar sources, adding, "and yes, I check Fox News daily too for 'balance.'" Two parent participants explicitly mentioned using the "Media Bias Chart" for guidance on news consumption "to ensure scope," focusing on "the ones in the top center (most factual, least biased either direction).

Of the participants willing to vaccinate, only 12 explicitly stated that they did not consume news. Some participants against vaccination also described their consumption process. For example, a Republican, unvaccinated woman (Parent Respondent 10) explained that she consumed "a wide variety. I check the *New York Times, Washington Post*, major news outlets like CNBC, ABC, occasionally Fox and *Atlantic*."

Those who indicated they will not vaccinate their kids were dismissive or skeptical of news outlets. One participant (Parent Respondent 11: female, independent, unvaccinated) stated, "In recent months I have abstained from all news." Similarly, another participant (Parent Respondent 12: female, independent, unvaccinated) who listed the conservative website Newsmax as a source of information, explained, "With all the political nonsense in the media, I rarely consume news. I only research headlines I see to get unbiased facts." Likewise, a participant (Parent Respondent 13) explained, "I prefer not to consume 'news' but will look at national or worldwide news articles if needed."

Parents also expressed a shift in their consumption. One parent (Parent Respondent 14), who self-reported as "not likely" to get their children vaccinated, said, "Pre-pandemic: NPR, CNN, *NY Times,* the *Atlantic,* Politico. Now: It's all garbage, both left and right." Similarly, a participant responded, "None on a regular basis anymore as they are far too inflammatory for my taste" (Parent Respondent 14: Republican,

unvaccinated, female). A parent whose vaccination intention was unclear stated, “In recent months I have abstained from all news” (Parent Respondent 16).

Overall, the variety of sources and consistency of sources were interesting in that most sources tended to be traditional journalistic sources, and many parents in our study (n=175) were consuming an average of four news sources.

Information and News around Vaccination Decisions

RQ3) How do parents talk about information sources or news when asked about vaccination decisions?

While we found no statistical correlation or relationships between news consumption and vaccination decisions, we did see some patterns in information consumption and opinions about vaccination. Participants were asked to list their news, social media sites, other websites, and other sources of information about COVID-19 and the pandemic. Of the 855 that indicated sources of information, 418 provided more specific information or explanation about their chosen sources.

For the 752 parents who supported vaccinating their children, 381 added news or social media sites, or explained where they got their information in the open-ended portion of the survey questionnaire. Among the 107 participants who named news sites or multiple news sites, CNN ranked highest with 59 mentions, followed by local news (54 plus individual stations), NBC (46), NPR (25), and MSNBC (18).

For parents in favor of vaccinating their children, 202 also specified social media sites they have used for COVID information, with Facebook (137 responses), Twitter (67 responses), and Instagram (22 responses) listed the most. Some individuals did not list specific sources, explaining that there were “too many to specifically name” (Parent Respondent 18), “multiple local news stations” (Parent Respondent 19), or a “variety” (Parent Respondent 20). Another participant explained, “I listen and watch many sources to try to get a well-rounded idea of current information and opinions” (Parent Respondent 21). Participants also referenced websites as sources of information: the CDC (69 responses), WHO (50), FDA (13), and the National Institutes of Health (4). Dr. Anthony Fauci was specifically mentioned 6 times.

Of the participants (49) who had indicated that they were waiting,

uncertain, or had mixed responses about vaccinating their children, 21 added news, social media sites, or additional explanation of information. Eighteen listed news sources, with NBC (5), Fox (3), NPR (2) and CNN (2) listed the most. Fifteen mentioned Facebook as a source of information and 13 listed websites or other forms of information (the CDC, podcasts, journal articles).

Fifty-four participants indicated that they were not going to have their children vaccinated. Of this number, 19 wrote down news outlets, social media, or provided further explanation of information. Only 3 mentioned specific news outlets for COVID information: One person listed CBS, NBC, and CNN; another participant noted Fox, Newsmax, CNN, and MSNBC; and a third individual named 2 local stations. Facebook was mentioned 8 times as a source of information.

Additionally, the CDC was listed twice among participants. A few also listed podcasts but none specifically about health. Participants also provided vague responses to questions about other forms of media and information. One parent respondent (22) wrote, “I read research papers and medical journals to try to avoid (biased) and false media.” Two others similarly stated that they “conducted their own research.”

Discussion

Parents who completed this survey on news sources and intent to vaccinate overwhelmingly identified as Democrat, educated, White, cis-women who were already vaccinated against COVID-19. Their willingness to have their children vaccinated, then, parallels existing studies that use political affiliation, education level, and parents’ vaccine status to predict vaccine status.[22] What has not been noted in other literature is the diversity of news sources that pro-vaccine parents consume. From our observations of this sample, pro-vaccine parents consume multiple news sources and generally think critically about the process of news consumption, striving for multiple perspectives/balance in their information. On the other hand, those who adamantly refuse to have their children vaccinated reported they were less likely to consult news sources, and they reported fewer news sources. They also tended to be more dismissive in their short answers of news consumption, suggesting that outlets were “garbage” or “biased.” These responses indicate a distrust of information as well as the news outlets providing that information.

Those parents in our sample who were listening to NPR or both a local and national news source reported that they intended to or had already vaccinated their children. They also rarely cited Fox News or commentators as a source of news, whereas many of those who were unsure cited Fox as a source. That said, NPR was a common source among both the pro-vaccine and anti-vaccine parents. While this is consistent with the data concerning pre-pandemic news engagement and vaccines, it does not entirely explain the intentionality of parents to consume some local or national news sources rather than others.[47] While we do not have samples large enough to draw connections or statistical correlations between identity and intention to vaccinate or not vaccinate, what we found interesting were the trends and news consumption practices of parents in both groups.

In considering the disaster communication ecology model for individuals in disaster and crisis, there are several observations. Parents in our study who intended to vaccinate (pro-vaccine parents) tended to seek out a variety of (they listed four on average) news sources at both the local and national level. Even if pro-vaccine parents reported consulting social media posts (not from news organizations) or other sources, they still listed at least one news source. Several sought information from social media posts by friends or family or from sources other than news sources, like the CDC, NIH, and other sources outside of their personal networks like health researchers and medical professionals. Many networks of communication and connections to information included news sources, showing people still considered news sources as reputable and trustworthy sources concerning COVID-19 and vaccination.

While previous research shows that certain types of news spreads quicker and is more difficult to correct. For our study participants who were consuming local and national level print and digital media sources were consuming news sources that were center or left of center. According to studies about news consumption, sources that are center or left of center tend to spread less misinformation than commentators or blogs.[26,29,31,69] This supports recent research that shows traditional, journalistic sources are still more likely to be consulted by people who intend to vaccinate their children. Several of the parents in our studies, like other studies, reported that they were likely to trust scientific evidence and peer-reviewed medical science, even if the medical studies are outliers.

The most interesting finding was the absence of news responses from those who were hesitant to vaccinate. Intentional avoidance—or a reply about avoiding the news—was more common with those who

responded no, but this is consistent with vaccine hesitancy around other vaccines, as well as political affiliation.[47,51,53] Similarly, other research has found that certain populations and personalities tend to be more active on social media, so to tap into a more diverse population, researchers need to use alternatives to social media surveys.[70]

While the questions did not specifically ask about misinformation, several participants expressed concerns about misinformation in their responses. Misinformation is often challenging to detect in crises as there is often a lot of unknown information. For this reason, people turn to what they have found to be familiar and trustworthy in the past, and what others in their networks find to be trustworthy when making health decisions.[40] From this data set, researchers were able to see parents consulting familiar and trusted news sources when making decisions about vaccination, but also parents often lacking the confidence to consult only one source. Vaccine misinformation is often attributed to the practices of anti-vaccination advocates and campaigns, often tied to ideological, political, or religious movements.[71] Many of these movements are not built from medical science and center their messages around anecdotal experiences and narratives that share well through email or on social media platforms.[40] That said, the participants of our study did not specifically express getting information from online sources supported by anti-vaccine groups--although it was clear that many were misinformed about vaccinations.

Limitations and Implications for Future Research

Several limitations for this study exist. Participants were recruited through multiple social media groups and channels. Despite advertising the survey across numerous groups, those who participated primarily identified as Democrat, White, vaccinated, educated cis-gender women. Thus, the sample is limited in perspectives and vaccination intentions. While there were no significant statistical correlations, there were some interesting connections between news sources (or lack of news sources) and intentions to vaccinate. Future studies could use additional channels to reach more diverse audiences.

Timing could also be considered a limitation. For many of the participants, their intention to vaccinate indicated future behavior, not a current reality, since their children weren't eligible for the vaccine during the distribution period. A follow-up study could measure vaccine behavior, noting possible shifts from intention to vaccinate after the expansion of emergency authorization to the 5-11-year-old group, or under 5 (when

approved). Lastly, the survey design allowed for a large sample but limited responses to the questions posed. Future research could include interviews or focus groups of parents to better understand the decision-making processes for vaccination against COVID-19.

Conclusion

Children have had more than 6.4 million COVID cases, with disproportionately higher rates of hospitalization and mortality for children of color.[72,73] It is imperative that parents choose to vaccinate their children, both to decrease their risks and to help stop COVID-19 from spreading and mutating. Therefore, the low percentage of the public willing to vaccinate is problematic and detrimental to public health.

The current study noted a difference between sources of COVID information and news consumption between those willing and those unwilling to vaccinate. It is not enough to disseminate pro-vaccine information through mainstream channels since they will likely not be received across audiences. The disparity demonstrates the importance of targeted messages toward vaccine-hesitant parents, utilizing the types of sources and news that they are the most likely to trust. Pro-vaccine content provided by physicians and circulated on social media sites and across many news sites (accounting for varied political leanings, platforms, educational levels, and ages) could increase the likelihood that reluctant or hesitant parents receive and trust the messages. There is still much more to understand about what factors influence parents' vaccination decisions for routine immunizations, as well as the newly approved ones against COVID-19.

Appendix 1. Participant Demographics (N=1061)

Gender identity	**No.**	**%**
Cisgender (non-trans) woman	942	89%
Cisgender (non-trans) man	51	5%
Transgender man	1	<1%
Transgender woman	2	<1%

Nonbinary/gender nonconforming	9	<1%
Not listed	4	<1%
Left blank/prefer not to say	52	5%

Age range	**No.**	**%**
18-24	7	<1%
25-34	142	13%
35-44	600	57%
45-54	234	22%
55 and older	35	3%
Left blank	43	4%

Race/ethnicity	**No.**	**%**
American Indian or Alaskan Native	3	<1%
American Indian or Alaskan Native, White	7	<1%
Asian American	18	<2%
Asian American, White	5	<1%
Black or African American	13	<2%
Black or African American, Hispanic/Latino	1	<1%
Black or African American, White	3	<1%
Hispanic/Latino	13	<2%
White	941	89%
White, Hispanic/Latino	9	<1%
Left blank	48	5%

Highest level of education	**No.**	**%**
High school degree or equivalent (GED)	10	<1%
Some college, no degree	54	5%
Associate degree	33	3%
Bachelor's degree	212	20%
MBA or other master's degree	253	24%
Doctorate, JD, or medical degree	434	41%
More than one advanced degree	24	2%
Left blank	41	4%

Political affiliation	No.	%
Democrat	684	64%
Republican	73	7%
Independent	203	19%
Left blank/prefer not to say	100	9%

Parents' COVID-19 vaccine status	No.	%
Fully vaccinated*	932	88%
Partially vaccinated	10	>1%
Unvaccinated	62	6%
Left blank	57	5%

*Completed the primary series

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