

SHORT REPORT



Pediatric hematology/oncology physician and nurse practitioner attitudes towards the COVID-19 vaccines: A qualitative study

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ABSTRACT

As of 05/28/2021, SARS-CoV-2 (COVID-19) had caused 3.9 million infections in the United States (US) pediatric population since its discovery in December of 2019. The development and expansion of vaccination has markedly changed the shape of the epidemic. In this qualitative study, we report on pediatric hematology/oncology provider views on the COVID-19 vaccine prior to approval in the adolescent population <16 years of age. Results from interviews with 20 providers across the state of Indiana showed that most were supportive of the COVID-19 vaccine for healthy adults. However, the majority also expressed a need to see more data on the safety and effectiveness of COVID-19 vaccinations in pediatric hematology/oncology populations. While they recognized the public health importance of vaccination, their duty to protect their patients led to a need for more specific safety and efficacy data.

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Introduction

Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), commonly referred to as COVID-19, was first identified in December 2019. This novel virus has gone on to cause a devastating global pandemic, which at the time of this writing has infected more than 168 million persons and caused >3.5 million deaths worldwide.¹ In the US, the overall rate of COVID-19 infections in the pediatric population is 8,803/100,000, with 6.63 million confirmed cases as of November 2021.² Children account for a total of 16.8% of all cases reported in the US. Rates of hospitalization and mortality with COVID-19 in the pediatric population range from .1–1.9% and .0–.03%, respectively.² Pediatric hematology/oncology patients represent a particularly vulnerable subset of the population; their immunocompromised states place them at much higher risk than the general pediatric population for suffering from adverse events if they were to contract COVID-19. In addition, vaccination of children and adolescents is likely to enhance protection of adults with whom they come into contact (e.g., parents, grandparents, and teachers).

Despite the development of multiple vaccines against COVID-19, misinformation and the politicization of vaccines has caused hesitancy within the general population about receiving the vaccine. Children and adolescents who are cancer survivors or who have sickle cell disease may be at increased risk for morbidity and mortality from COVID-19 infection. As a result, vaccination of these children and their families is particularly important. Based on previous literature, a strong recommendation for vaccination from a trusted provider can make a difference in those who are vaccine hesitant.^{3–6} Studies have found that there is some hesitancy among health-care

workers in general with regard to the COVID-19 vaccine.^{7,8} We evaluated pediatric subspecialty provider perspectives regarding the COVID-19 vaccine for pediatric patients with sickle cell disease and childhood cancer. At the time of the data collection for this article, no COVID-19 vaccine had yet been approved for adolescents under 16 years of age.

Methods

Procedures

As part of larger study of subspecialty provider vaccination practices, 18 physicians and 2 nurse practitioners specializing in pediatric hematology/oncology care in the state of Indiana completed one-on-one qualitative interviews. Participants work in a wide variety of clinical settings, including dedicated clinics focusing on leukemia/lymphoma, bone marrow transplant (BMT), sickle cell disease, solid tumor/neuro-oncology, as well as more generalized hematology/oncology practices. A total of 30 individuals, representing the known cohort of pediatric hematology/oncology clinicians in the entire state of Indiana, were invited via in-person communication or e-mail to participate in a 30-minute interview study assessing provider attitudes toward influenza, human papilloma virus (HPV), and COVID-19 vaccines. Twenty agreed to participate (response = 66.7%). Due to the COVID-19 pandemic, interviews were conducted remotely by phone or via Zoom. No compensation was offered for participation. This study was approved by the Indiana University Institutional Review Board (IRB).

Data collection

Individuals were provided a study information sheet and electronic consent was obtained prior to the interview. Demographic information on participants' gender, race/ethnicity, age, workplace organization, as well as years in practice was collected via a brief electronic survey. While attitudes regarding multiple vaccines were assessed during the interviews, this paper focuses on the unique issues related to COVID-19 vaccination, given it is a new vaccine while the other vaccines have long been established as standard of care in the pediatric population (and all established vaccines were unanimously supported by our respondents). Additionally, we did not directly ask the clinicians to compare and contrast their attitudes about COVID-19 vaccination versus other vaccines. Thus, this paper focuses solely on clinicians' COVID-19 vaccine attitudes. The interviews took place between January 2021-March 2021 and participants were asked their thoughts on COVID-19 vaccine development, data regarding the vaccine, provider vaccine concerns, vaccine hesitancy, misconceptions, concerns among families, and barriers to COVID-19 vaccination.

Interviews were audio-recorded and transcribed. During each individual interview, the interviewer took notes and completed a field note after the interview. The authors were all in agreement that the 20 completed interviews reached theoretical saturation,⁹ providing adequate representation of attitudes given the emergence of common themes with little new variation regarding COVID-19 vaccination. Codes were organized into an overarching model (Figure 1).

Analysis

We used a thematic approach to analysis.¹⁰ A codebook was created based on a literature review and re-occurring themes encountered during review of transcripts. Each transcript was coded by two authors, with differences resolved by discussion. Example codes included published data, scientific concerns, vaccine misconceptions, and potential barriers of COVID-19 vaccination.

Results

Participants

Of the 20 interviewees, 65% identified as female and 35% identified as male. The majority of those interviewed self-identified as white (85%) and 60% were between the ages 31–40 years. Thirteen (65%) had practiced in their subspecialty for ≤ 10 years. For further participant information, see Table 1. At the time the interviews took place, the COVID-19 vaccine was available for all health-care workers in the state of Indiana. Out of the 20 interviewees, 19 had either completed COVID-19 vaccination, received the first dose, or had imminent plans to receive the vaccine. One individual expressed reservation toward receiving the vaccine, citing concerns about potential side effects due to personal health concerns. Personal motivations for getting the vaccine included: reducing chances of getting COVID-19 ($n = 4$), personal health ($n = 3$), help protect their families ($n = 3$), reducing COVID-19 severity if they acquired it ($n = 2$), help protect their patients ($n = 2$), and reduce the chances of spread of COVID-19 to others ($n = 1$).

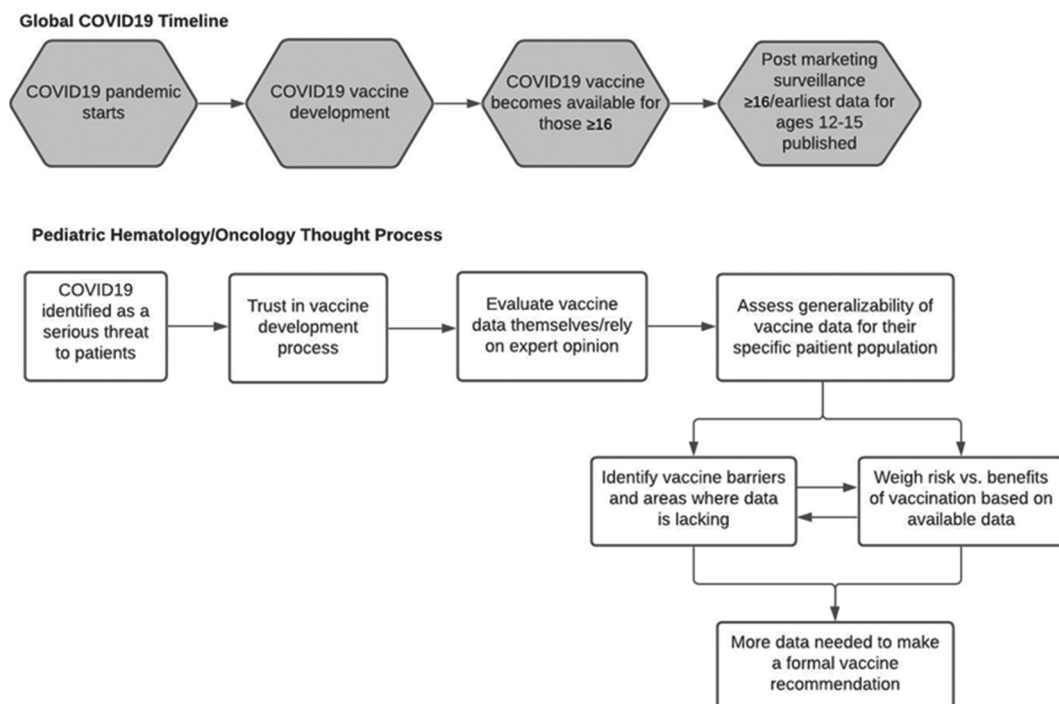


Figure 1. Provider thought process.

Table 1. Participant Demographics

Demographics	n = 20 (%)
Gender	
Male	7 (35%)
Female	13 (65%)
Race/Ethnicity	
White	17 (85%)
Asian	0 (0%)
Pacific Islander or Native Hawaiian	0 (0%)
Native American or Alaskan Native	0 (0%)
African American	2 (10%)
Latinx/Hispanic	1 (5%)
Other	0 (0%)
Age	
20–30	1 (5%)
31–40	12 (60%)
41–50	5 (25%)
51–60	0 (0%)
61–70	2 (10%)
Focus of practice	
General Hematology/Oncology	4 (20%)
Oncology (solid tumor/lymphoma)	4 (20%)
Oncology (CNS tumors)	2 (10%)
Oncology (leukemia)	1 (5%)
Oncology (survivorship)	2 (10%)
Oncology (BMT)	2 (10%)
Hematology (hemoglobinopathies)	3 (15%)
Hematology (hemostasis/thrombosis)	2 (10%)
Years in practicing pediatric Hematology/Oncology	
0–5	9 (45%)
6–10	4 (20%)
11–20	5 (25%)
21+	2 (10%)

Overview

Figure 1 provides an overview of findings and how those findings relate to the COVID-19 vaccine development process. Providers uniformly identified COVID-19 as a global threat to their subspecialty patients and trust in the scientific process. Once efficacy data is published, providers like to review it themselves and/or rely on expert opinion. This is then followed by assessing how the vaccine may be applicable to their specific patient population, weighing the risk and benefits, and concluding whether or not to recommend the vaccines to their patients. These track to the global COVID-19 timeline, from the recognition of COVID-19 as global pandemic to vaccine development, vaccine availability for individuals ≥ 16 , to post marketing surveillance and the start of pediatric trials. For specific quotes regarding the above please see Table 2.

Desire for pediatric data

The majority of those interviewed ($n = 15$) expressed a general need to see more pediatric subspecialty data prior to recommending the vaccine to patients. Participants wanted more data in: pediatric populations ($n = 8$), pediatric immunocompromised/cancer patients ($n = 7$), breast feeding infants ($n = 3$), pregnant women ($n = 2$), long-term effects ($n = 1$), long-term efficacy ($n = 1$), transmission ($n = 1$), and vaccine efficacy in immunocompromised patients ($n = 1$). One provider expressed concerns about lack of adequate distribution of the data from the clinical trials and indicated that they would like to be able to personally review the information themselves, although most would be satisfied by published data or data-based recommendations from organizations like the CDC.

Trust in the scientific process

Most interviewees ($n = 16$) would either recommend the COVID-19 vaccine to their patients or would plan on recommending the COVID-19 vaccine if it was found to be safe and efficacious for their specific patient population, pediatric hematology and oncology patients. At the time of the interviews, only two said that they would not recommend the COVID-19 vaccine, citing the lack of data in the pediatric immunocompromised population. One indicated willingness to recommend the vaccine for those ≥ 18 years but were more tempered about those under age 18 years due to lack of pediatric data at the time of the interview. Rationale for wanting to be able to give the COVID-19 vaccination to their patients included: reducing the patient's chances of acquiring COVID-19 ($n = 4$), protecting family members of the patient ($n = 3$), reducing the severity of COVID-19 infection if their patients were to contract it ($n = 2$), viewing their patient population as more at risk for COVID-19 ($n = 1$), public health benefit ($n = 1$), and due to the increased risk of thrombosis associated with COVID-19 ($n = 1$). For the topic of trust in the scientific process and for all other issues covered in these interviews we did not observe differences in responses based on provider group (physician vs nurse practitioner), provider gender, or provider age.

Discussion

When considering whether to recommend COVID-19 vaccine to their pediatric hematology/oncology patients, the majority of the providers interviewed preferred to have data specific to their patient population. Participants also described assessing gaps in the existing data available. Participants uniformly exhibited trust in the scientific process (and would recommend the vaccine to healthy adults), but they hesitated to recommend the vaccine to their patients. Participants also prefer to independently review the data available prior to accepting reported outcomes.

We hypothesize that this finding is due to the relationship between pediatric subspecialty providers and their patients. Pediatric hematology/oncology providers develop a strong rapport with their patients and their patients' families. This relationship is the foundation for developing the safest and best recommendation for their vulnerable patients. While data is currently lacking on how provider recommendations may influence either adult or pediatric uptake of the COVID-19 vaccine, findings from a study done relatively early in the pandemic (May 2020) indicated that a physician recommendation modestly, but significantly increased intention to get the COVID-19 vaccine among adults.¹¹

Although there was no mistrust in the scientific process, providers listed many of the same concerns about COVID-19 vaccination as patients list. A survey of adults found that full Food and Drug Administration (FDA) approval, Centers for Disease Control (CDC) and World Health Organization (WHO) recommendations for the vaccine, a higher margin of vaccine efficacy, and decreased chances of serious adverse reactions would increase their likelihood of receiving the vaccine.^{6,12} Surveys of 1,541 caregivers of children in

Table 2. Participant quotes

Model component	Example quote
Physician/APP support for COVID19 vaccine	<p>"I think the benefits are huge. I think number one is protection for myself and my family, mainly for myself right now is not being hospitalized and hopefully not having a severe COVID infection."</p> <p>"I think it's pretty outstanding that they've been able to do what they've done in a short time. I think mRNA vaccination in general, I think while we haven't administered an mRNA-based vaccine to date as part of routine public health, my sense is that there's adequate experience in that arena to be able to safely provide the COVID vaccine."</p>
COVID19 vaccine development	<p>"It was obviously faster than the other vaccines we've produced in this country historically, but I think that probably is primarily related to the technology that we now have, which facilitated the development much more quickly."</p> <p>"Initially, I was nervous about it. So, I understood that because I wasn't up to date on all the research that had been done on doing an mRNA vaccine just because that's not my area of focus. But after learning what type of vaccine, it was and then going back and reading about it."</p> <p>"I feel comfortable with the timeline, knowing the science behind it."</p>
Physician/APP COVID19 infection concerns	<p>"Eliminating or minimizing the risk of another potential deadly infection, not only to the patient but to their siblings, their grandparents, their parents, their other patients in the clinic, just minimizing their general spread of it."</p> <p>"I think that we have seeing that in the pediatric group with the data that's available and there's not a lot but that I think we all know that most children do very, very well if they acquire COVID-19 disease. But in the pediatric patients receiving chemotherapy, the curve is shifted to the right where that there are some patients are more likely to have side effects than the general pediatric population. Unfortunately, a few have died."</p> <p>"But the immunocompromised, we do worry that they may not have a reaction to the vaccine and may have to get it again."</p>
Physician/APP COVID19 vaccine concerns	<p>"I think mostly that will just be me wanting to see long-term data, long-term safety, outcome, data and outcomes and duration of the immunity that's provided."</p> <p>"The consensus statement that I read was at this time they didn't feel, and I can't remember. I think it was maybe who didn't feel like there was evidence that we should be vaccinating oncology patients yet. So, I would definitely be willing to if the science showed that it was safe, which I would think it would be, given that it's an mRNA vaccine, but the other piece is effective. We give the flu shot and it's maybe analogous to that. I feel like the literature is evolving on that and if the consensus is yes and there's data to support it, then I would definitely recommend it. I've already had families asking me what I think about it and so far I haven't been telling them to do it, but if that's changing, I would be onboard."</p> <p>"I think adequate is a tough word. I think that there's enough data available for me to make a decision of benefit outweighing risk."</p> <p>"That's a little more complicated. I think the issue is when it is approved in immunocompromised children, yes, absolutely. I think the problem is that the studies that have been done, as far as I'm aware, do not include children and do not include immunocompromised patients."</p>
Physician/APP COVID19 vaccine barriers	<p>"It gets back to the general public really doesn't understand how vaccinations work and what they're doing. That's always what I go back to. I'm like if you didn't have some level of a reaction or some level of response by this where you're not used to the vaccines, I might be concerned that you haven't really started that process to build immunity. I explain to them having symptoms for 48 to 72 hours is much different than having something that can hurt you that last well over 14 to 21 days and has ..."</p> <p>"If it's like the flu shot, I always get sick when I get the flu. So I don't want to get sick. So understanding that it doesn't actually give them COVID."</p>
Institution- and system level COVID-19 vaccine barriers	<p>"Distribution has not been as quick as we were hoping."</p> <p>"Most of our patients are of African descent and those who are here kind of know about some of the discrimination and things like that that have happened in the past."</p>
Provider strategy to overcome hesitancy/question	<p>"So, to me the better route to convincing people to be vaccinated is not a cognitive intellectual argument, it's actually something involving attachment theory. This comes from some current theories, this comes from my spirituality work around, why do people choose one spiritual system over another? It used to be that people said, well, it's cognitive. If you argue with somebody about the right theology or the right religion, that you would convince them. I think that's shown that's done more damage than good. So now in the ethical situation of spiritual care, it's really important and it's codified in ethics in medical literature, that we do not proselytize. And yet somebody is in relationship and they're drawn to certain things and they want to find that out themselves and seek that out, that is acceptable. That's very powerful, because it comes from that person. What I worry about with some of our attempts at vaccination is that we are setting up medicine as a new religion, in that we are in fact, doing a new form of proselytization. I think that's similar to how religious proselytization can lead to shame for those that don't accept or don't go that way. I think that we could do the same thing for our patients that are that are against vaccination. So, I feel that the best way to open them to the benefits of vaccination are through relationship and through building trust."</p> <p>"I approached them by saying I had three things that I was waiting on. I needed to see the data from the CDC and I needed the CDC to say that it was okay. I needed the FDA to say that it was okay. Then I needed to see the first 46,000 people get it. Then when they hear that, they're like oh wow, 46,000 people got it. I'm like yes, in general. It was for the Pfizer. I'm like 46,000 people got this vaccine. We were able to look at it and see how they did. I'm like I feel comfortable enough that if I got these two groups that govern everything else plus seeing the data with my own eyes that I feel more uncomfortable and anticipating, so that has been helpful."</p>
COVID19 data	<p>"I mean, from everything I've read, it sounds like it's the benefit of having all of these years of research and how to effectively vaccinate people that they didn't have 100 years ago during the influenza pandemic back then. (re:MRNA)."</p> <p>"I think breastfeeding and pregnant females need to have a separate study. Obviously, children need to as well and then just more data, just more numbers especially regarding the side effects following the vaccines."</p> <p>"It would be good to have studies in peds."</p> <p>"I think for me the biggest gaps are the same gaps that exist after most clinical trials, the populations that were excluded from the trials. I think what's going to be hard is making recommendations for or against the vaccine in our cancer patients, for example, people that are getting active chemo, or in our pediatric patients. I think that's where there's a lot of chatter on some of the online groups that I'm part of, is how and when is this going to be able to be extrapolated to children because it's not been studied."</p>

Emergency Departments internationally found that 65% intended to vaccinate their child with the most common reason being to protect their child (62%). The most common reason for vaccine refusal was the novelty of the vaccine (52%). Factors associated with a greater willingness to vaccinate included the child being an older age, children who were up to date on vaccines or received a flu vaccine in the past year, those who had no chronic illnesses, and if the caregiver was more concerned that they or the child had COVID-19 on arrival to the ED.¹³ A second survey of 1,321 mothers of children aged 9–12 years assessed intention to vaccinate against COVID-19 and found that 60.4% planned to vaccinate, 8.6% were not planning to vaccinate, and the remaining 31% unsure. Factors associated with uncertainty or no intent to vaccinate included low education levels, lower income, and a history of being unvaccinated or partially vaccinated. These factors were also confirmed in a systemic review, with increased hesitancy to COVID-19 vaccination among those of African American descent, pregnant and breastfeeding women, and lower income status.¹⁴ Lower vaccine hesitancy was found amid those who had either a college degree or higher, being age >45, or being male.¹⁴ Regardless of intention to vaccinate, themes common to both providers and patients in the decision-making process including vaccine safety and efficacy, recommendation from a health authority, and individual risk.¹⁵

Since the time that these interviews have taken place, knowledge surrounding the COVID-19 vaccination has continued to evolve. In May 2021, there were publications regarding the safety, immunogenicity, and efficacy of the Pfizer (BNT162b2) two dose COVID-19 vaccine in adolescents aged ≥12–15 years, followed by a recommendation to vaccinate down to 12 years of age.¹⁶ While the safety profile was acceptable in their study population, children with chronic diseases or who were immunosuppressed were excluded, limiting extrapolation of this data to children with a history of cancer. Finally, in a most recent update on October 29th, 2021, the FDA authorized emergency use of the Pfizer-BioNTech COVID-19 vaccine in children ages 5–11 for the prevention of COVID-19.¹⁷

Limitations

While we were able to obtain in-depth information regarding attitudes, knowledge, barriers, and concerns of pediatric hematology/oncology providers, there are limitations to this study. The respondents were predominantly female and White, with samples taken largely from a metro area in one state, so our results may not be applicable to other groups from different geographic locales. At the time of these interviews, the COVID-19 vaccine was approved for adolescents/adults ≥16 years of age, but every state had individual approaches to COVID-19 vaccine prioritization. In the state of Indiana, this was done initially on an age-related basis and the vaccine did not become available to adolescents until March 2021. As a result, during the timeframe interviews took place, there was a lack of real-world experience with the vaccine in this subspecialty pediatric population. To date, there is still limited information available regarding pediatric patients less than 12 years of age. Data is limited not only in immunocompromised adults, but even more so in the

pediatric population. It is unknown how effective the vaccines may be compared to healthy individuals given the potential for a blunted immune response. Additionally, given the rapidly expanding knowledge of COVID-19 and the vaccines, the interviewees stances on COVID-19 vaccination as above may have shifted since the time during which these interviews were completed. Finally, only a specific subspecialty of pediatrics was included in this study, limiting the ability to generalize these findings. Further understanding and longer-term data of COVID-19 vaccination will help clarify these current unknowns.

Conclusion

Although there are still many unknowns regarding the long-term data with COVID-19 vaccination, most subspecialty pediatric hematology/oncology providers are likely supportive of the COVID-19 vaccine once sufficient data are available in immunocompromised children and children with chronic disease. This continues to be a rapidly evolving area as new data emerges. This article serves to offer insight into the thought processes of subspecialty pediatric hematology/oncology providers for the novel COVID-19 vaccines and can inform provider-focused interventions to strengthen vaccine recommendations among pediatric subspecialty providers.


Disclosure statement

Gregory D. Zimet has served as a consultant and advisory committee member for Merck regarding HPV vaccination and as an advisory committee member for Moderna regarding COVID-19 vaccination. He has also received investigator-initiated research funding from Merck, administered through Indiana University.

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