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## Parents' Acceptance of COVID-19 Compared to Human Papillomavirus Vaccines

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### ABSTRACT

**Purpose:** The first vaccine against SARS-CoV-2 (COVID-19) for adolescents 16 years and older in the United States received Emergency Use Authorization in December 2020. Soon after its approval, parents expressed concerns about vaccine safety for adolescents. Similar concerns about vaccine safety partially explain suboptimal human papillomavirus (HPV) vaccine uptake. This qualitative study explores similarities and differences in parents' attitudes about these two vaccines.

**Methods:** Parents were recruited through social media and at health centers in Alabama. Semi-structured interviews with parents of adolescents aged 9–17 years were conducted before and after Alabama expanded age eligibility to those 16 and older. Topics included knowledge about HPV and COVID-19 vaccines, and parents' intentions to have children vaccinated. Interviews were analyzed using thematic analysis.

**Results:** From March 11, 2021 to April 24, 2021, 21 in-depth interviews were conducted. Parents discussed the importance of HPV and COVID-19 vaccines for protecting their children's health but differences between the two related to community protection. Parents were concerned about vaccine safety but media coverage about the COVID-19 vaccine led to more favorable attitudes about the benefits of vaccination, which was not observed for HPV vaccines. Instead for HPV vaccination, parents wanted their healthcare providers' opinions about the vaccine before making a vaccination decision.

**Discussion:** Parents had similar concerns about HPV and COVID-19 vaccines. Although provider recommendations can improve vaccine uptake, local news reports were seen to have a positive impact on COVID-19 vaccine acceptance in lieu of provider recommendation. Disseminating information online could be beneficial to promote HPV and COVID-19 vaccines.

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### IMPLICATIONS AND CONTRIBUTION

Vaccine protection and side effects, and provider recommendations are important to parents when deciding to vaccinate their children against both human papillomavirus and COVID-19 infections. Additionally, COVID-19 media coverage may reduce vaccine hesitancy by providing accurate information by trusted local officials.

**Conflicts of interest:** Dr. Niccolai has served as a scientific advisor for Merck, Moderna, and Janssen. Dr. 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

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In December 2020, the first COVID-19 vaccine, Pfizer-BioNTech, became available in the United States under Emergency Use Authorization by the US Food and Drug Administration for persons aged 16 years and older [1]. Two other vaccines, Moderna [2] and Johnson & Johnson/Janssen [3], were approved for use in those 18 years and older soon after. As of June 2022, both the Pfizer-BioNTech and Moderna vaccines have received Emergency Use Authorization approval to be administered to children down to 6 months of age [4]. Additionally, Alabama began vaccinating healthcare providers and other frontline workers in December 2020 and expanded eligibility to include those 16 and older on April 5, 2021 [5].

Adolescents have been significantly impacted by the pandemic, as many were unable to participate in in-person school or socialize with their peers due to social distancing requirements [6]. Additionally, Alabama has one of the lowest adolescent vaccination rates in the country, with about 20% of 12–17 year olds receiving at least one dose of the COVID-19 vaccine, leaving this age group at risk for infections and hospitalizations [7]. Low vaccination rates among this group has been particularly devastating during the winter 2022 COVID-19 Omicron variant surge, which led to significant increases in hospitalizations among adolescents and young adults aged 0–20 years [8].

Parents of adolescents have raised concerns about COVID-19 vaccine safety and questioned the benefits of vaccinating adolescents due to reports and beliefs about limited disease severity among this population, leading many parents to delay or decline vaccination [9]. Additionally, online misinformation including rumors and conspiracy theories and the politicization of COVID-19 vaccines has negatively impacted parents' intentions to vaccinate their children [10,11]. COVID-19-related vaccine hesitancy is especially high among parents of children aged 12–17 years in Alabama [12]. Therefore there is great need to develop and implement effective strategies that help parents understand the benefits of COVID-19 vaccination for adolescents and overcome hesitancy resulting from unfounded concerns about safety [9].

Similar opinions about vaccine safety and benefits have led to suboptimal uptake of the human papillomavirus (HPV) vaccine, which has been available to adolescents since 2006 [13,14]. HPV vaccination rates remain below Healthy People 2030 goal of 80% of adolescents aged 13–15 receiving the recommended doses and Alabama reflects some of the lowest HPV vaccination rates across the country with 40% of 13–17 year olds completing the series [13,15,16]. Reasons for suboptimal intake include negative media attention including the feminization of the vaccine and parental concerns about vaccine side effects due to misinformation about vaccination leading to harmful side effects (e.g., Guillain-Barre syndrome) [17,18]. Healthcare provider recommendations improve vaccine uptake, especially when conversations focus on cancer prevention, but many barriers can limit administration including discomfort discussing how HPV is sexually transmitted (when this issue arises), perceived parent hesitancy, and beliefs about vaccine side effects [19–22]. Due to similar beliefs about these vaccines and low HPV and COVID-19 vaccine uptake in the southeastern United States, this qualitative study explored parents' opinions to better understand factors that future vaccine promotion programs should target.

## Methods

Parents or guardians (hereby referred to as “parents”) of adolescents aged 9–17 years were eligible for participation if they lived in Alabama and could conduct the interview in English. We targeted parents of adolescents between the ages of 9 and 17 years because HPV vaccines can be administered starting at age 9 and we wanted to understand parents' opinions about vaccination across a wide range of ages and before their child was considered a legal adult. Recruitment flyers were displayed at pharmacies in high- and low-income neighborhoods across Jefferson County, Alabama and adolescent clinics in urban and rural counties across Alabama. Additionally, flyers were posted on social media webpages including Facebook, Twitter, and Instagram to be shared with a wide range of people across Alabama. Interviews lasted approximately 60 minutes and due to the COVID-19 pandemic were conducted remotely via web-based video conference. Prior to the interview, participants received an electronic copy of the consent form and verbal consent was obtained. Interviews took place from March 11, 2021 to April 24, 2021, at which time a vaccine was approved for adolescents 16 and older. Participants received a \$50 gift card. This study was reviewed and approved by the University of Alabama at Birmingham Institutional Review Board.

### Data collection

Semi-structured interview guides were developed using the Andersen Behavioral Model of Healthcare Utilization, which examines how societal and individual characteristics interact with and affect healthcare utilization [23,24]. Andersen Behavioral Model of Healthcare Utilization describes factors that predispose (e.g., demographic characteristics, health beliefs, and socioeconomic factors), enable (e.g., financial and organization factors), or suggest need for (e.g., prevalence rates and illness symptoms) use of health services such as vaccination [25].

Within the interview guide items about predisposing factors focused on parent and adolescent demographics, beliefs, and knowledge about HPV and COVID-19 vaccines. Items related to enabling factors included barriers and facilitators to vaccine uptake and where participants receive information about HPV and COVID-19 vaccination. The interview guide also included questions about perceived need for vaccinations including factors that impacted a parent's decision about getting their child vaccinated for HPV and COVID-19. If children were vaccinated, participants were asked how many HPV and COVID-19 doses were received. For adolescents who were not approved to receive the COVID-19 vaccine, participants were asked if they would get their child vaccinated and reasons for why or why not. Parent and adolescent demographics were also collected. If a participant had multiple children between the ages of 9 and 17, parents were instructed to provide answers about the child closest to 9 years of age to (1) examine if parents in this sample vaccinated younger children against HPV, since vaccination can begin at 9 years old and (2) to explore differences in opinions about vaccinating younger children for HPV vaccines that were currently available to COVID-19 vaccines, which were expected to be available later.

## Analysis

Interviews were audio-recorded and transcribed verbatim. An inductive thematic analysis approach was utilized to identify, analyze, and report on themes identified from the data. With this approach, three authors (A.F., N.K., and B.V.D.P.) utilized a multiphase approach that began with familiarizing themselves with the data and generating initial codes. The authors then met to discuss initial codes and create a codebook. The authors were all in agreement that the 21 completed interviews reached thematic saturation [26], providing adequate representation of attitudes given the emergence of common themes and limited new variation on the topic. Afterwards the authors applied codes to transcripts noting major themes and subthemes. The resulting themes and subthemes were discussed and reviewed collectively, and the final set of themes was defined by consensus. Illustrative quotes are presented to illustrate each theme and subtheme in the results. NVivo 12 (QSR International, Melbourne, VIC) was utilized to store, review, and code all transcripts and generate code reports.

## Results

### *Participant demographics and vaccine utilization*

In total, 21 interviews were completed from March 11, 2021 to April 24, 2021. There were few issues in obtaining the study sample and the majority of people interested in participating were eligible to participate. The median age of participants was 42 (range: 34–50). The majority of participants identified as non-Hispanic White (57.1%) and 42.9% of participants identified as non-Hispanic Black. Respondents were predominately mothers (80.9%). The median age of participants' children was 11 (range: 9–17).

Six of 21 (28.6%) of the participants' children had previously received at least 1 dose of the HPV vaccine, 13 (61.9%) had not received any doses, and 2 (9.5%) did not know if their child had received any doses. Of the 13 parents with unvaccinated children, 1 parent refused the HPV vaccine for their child, and other parents were undecided about vaccinating their child for HPV and/or wanted to wait until their child was old enough to make the decision on their own. Differences in vaccination rates by child's gender were not observed.

Four (19%) parents were interviewed prior to Alabama's COVID-19 vaccine eligibility expansion in April. During the study period, 1 (4.8%) parent had their 17-year-old child receive at least 1 dose of the COVID-19 vaccine, 1 (4.8%) parent had scheduled a vaccination appointment for their 16-year-old child, 12 (57.1%) parents intend to have their child vaccinated, 5 (23.8%) were still unsure about getting their children vaccinated, and 2 (9.5%) parents reported that they would not get their child vaccinated.

### *Qualitative findings*

We compared barriers and facilitators that impact uptake of HPV and COVID-19 vaccines among parents. Similarities and differences were identified across three major themes including the following: (1) protection that the vaccine can offer; (2) side effects from the vaccines; and (3) healthcare provider recommendations for vaccination.

**Protection.** Parents who approved of both HPV and COVID-19 vaccinations cited the need to protect their children and others.

HPV vaccines were discussed as beneficial for protecting girls from cervical cancer, especially those with a family history of cancer or those who witnessed someone they knew be diagnosed with cancer.

I just hope if and when he becomes sexually active that it will help prevent him from getting the things or passing on certain things...and cancer runs in our family as well, so therefore I was like yeah let me go ahead and do it, and once my daughter gets of the age, she'll have it as well. PAR008 (Mother of 13-year-old son)

However, multiple parents of boys expressed confusion over the benefits of vaccination for their children. These parents expressed how vaccination mainly prevented against cervical cancer, which they believed to have little effect on their male children, highlighting that gender often matters when deciding to get an HPV vaccine, which was not discussed for COVID-19.

If I remember correctly...it protected the female partners against cancer potentially. That it did not really affect males as much as...I seem to remember that it was something about it protected female partners against cervical cancer. PAR011 (Mother of 17-year-old son)

One parent discussed that if vaccinating their son for HPV could prevent HPV infections in others, it would be beneficial.

It would be to prevent the human papillomavirus, which is sexually transmitted infection which can lead to cervical cancer in women and girls. I think boys are usually asymptomatic but can spread it and the vaccine can help prevent them from spreading it. PAR009 (Father of 11-year-old son)

The need to protect those at higher risk for infection was unique among COVID-19 vaccine opinions when compared with HPV. When discussing COVID-19, parents who approved of vaccination, discussed the need to protect their children and the "elderly and immunocompromised" that their children might encounter. Multiple parents discussed hearing about COVID-19 infections being mild among adolescents. One parent discussed that even if COVID-19 infections were mild, there was still a need to protect children from future variants and from transmitting to others.

From the variant and from getting it and possibly, more than anything, passing it on. I know that the children are not having as much issue with it and so I would like to make sure that they do not pass it on to the grandparents or to other people who maybe cannot get the vaccine for various health reasons. And things like that...and to protect them. PAR005 (Mother of 10-year-old daughter)

Another parent discussed how even though infections were mild, the thought of severe infections left them emotional and highlighted the need for vaccination and protection of their child.

...Everybody kind of says kids are resilient and [COVID] does not affect them so badly. The notion, for me, as a mom watching either of my kids struggle to breathe, struggle to have one breath just guts me. That alone, I guess it's selfish that's why I want them to have it. The notion of having to see them struggle to breathe just guts me. PAR002 (Mother of 12-year-old daughter)

Unlike with HPV, parents described the impact that COVID-19 infection would have on their child's emotional and mental

health. One parent suggested that their child would feel personally responsible and experience guilt if they had unwittingly spread COVID-19 to others.

...I could not live with myself if I knew that our child got sick and we did not know it, and then pass it on to a grandparent who would most likely die from it, that would just tear me up and I would not want my child to have that on them as well. So, yeah, so that's kind of it, and maybe because it's just so real right now it's just so real and so present... PAR005 (Mother of 10-year-old daughter)

Finally, personal experiences with HPV and COVID-19 infections and vaccinations resulted in mixed opinions among parents about vaccinating their children. Once mother who reported receiving the HPV vaccine, was still unsure if she would vaccinate her daughter because of concerns about vaccine side effects. However, another mother reported having friends diagnosed with HPV lead one mother to vaccinate their child against HPV and similarly another mother discussed the need to protect their children from experiencing the symptoms they had when infected with COVID-19.

I've had two friends who did end up with cervical cancer because of HPV back in college. We did not have the vaccine when we were growing up and seeing them go through that it does kind of help give you a different perspective because...when somebody actually gets cancer and they know what the direct cause of it was, then, when you find out there is a way that can help prevent it, it's sort of a no-brainer. I think it would have been a little bit more of a no-brainer if I had a daughter, but I do know that boys are a very important part of this piece and that's...I think one of the reasons why you know, in addition to all the other things I talked about, that I decided to do it. PAR017 (Mother of 11-year-old son)

One mother reported that her husband and daughter had both been infected with COVID-19 and had mild symptoms, but she and her son were not infected. She remained unsure about whether her children would receive the vaccine due to concerns about safety and vaccine-related side effects that, to her, outweighed the risk of severe COVID-19 disease. However, multiple parents reported how their COVID-19 infection or vaccination inspired them to have their children vaccinated.

My mom actually had COVID...So we've had conversations about it and because my mom has been vaccinated and I have been vaccinated and I work in a school and by them being in school, and knowing people who had it and have it, we see how it just really changed their life...We do have conversations and he's like I do not like shots but if it helps me to not be as sick as my grandmother and to go through the things that she went and other people that we know I think I'll get it. PAR008 (Mother of 13-year-old son)

*Side effects.* Although the COVID-19 vaccine was approved in 2020, many parents discussed an emergent need for the vaccine because of the pandemic. Additionally, parents were less concerned about COVID-19 vaccine side effects because they felt vaccine had been heavily "scrutinized." However, with HPV, parents expressed how there was too little research on the vaccine, which resulted in them delaying or turning down the vaccine for their children.

You want to just kind of dismiss this idea that vaccine injury is very common...I did not think it was, but I wanted to make sure, because this HPV vaccine is relatively new on the scene compared to some of the others and been around longer. It has not been tested for as long in the general public, and you just want to make sure that the risks are really low. The incidence of vaccine injury is pretty rare. PAR003 (Mother of 15-year-old son)

News media and social media had different effects on vaccine acceptance for HPV and COVID-19. News coverage about the COVID-19 vaccine alleviated parents' concerns about vaccine side effects for the majority of parents. However, when the Johnson & Johnson vaccine administration was paused due to concerns about vaccine-related blood clots, several parents expressed apprehension about this vaccine and the potential side effects of blood clots in their children, especially when there was a family history of blood clots. News coverage impact on vaccination decisions was a novel theme among discussions about COVID-19 vaccines and was not observed when discussing HPV.

Because I've seen on the news people have been having some side effects from it and they've actually closed down some vaccine sites that were given the Johnson and Johnson. I think they set to open them back up, but, it has, it does instill a sense of questioning about that that particular brand of vaccine. PAR012 (Mother of 16-year-old daughter)

However, parents utilized social media to learn about the HPV vaccine, which provided misinformation about vaccine side effects. Specifically, one parent discussed how parent group pages on social media and stories from friends and families about negative reactions ignited fear and concerns about HPV vaccination.

Seeing things...blogs on the Internet or different stories about people whose children have had negative reactions or maybe a few stories of kids who died after a vaccine and I do not know if they necessarily attributed just to the vaccine. I've seen more negative things about HPV just running through parents' circles and things on the Internet. PAR004 (Mother of 9-year-old daughter)

Finally, parents who were vaccinated against COVID-19 were more comfortable getting their child vaccinated. These parents discussed the mild side effects from their COVID-19 vaccination and that they expected their children would have similar mild reactions. Again, this was a novel theme when discussing COVID-19 vaccines as only one mother reported receiving the HPV vaccine and they were still unsure about vaccinating their child over concerns of safety and side effects.

Because I have had the vaccine myself, I would feel comfortable getting him vaccinated because I'm not going to ask him to do something that I have not done myself. PAR011 (Mother of 17-year-old son)

*Healthcare provider recommendations for vaccination.* Healthcare provider recommendations were viewed quite differently between HPV and COVID-19. Recommendations were extremely important for parents when making decisions about HPV vaccinations but less so for COVID-19. Of those whose children had received the HPV vaccine, all mentioned how their child's healthcare provider had recommended the vaccine and provided

information about adverse reactions and benefits of vaccination. Of those who were unsure or had not received the HPV vaccine, most mentioned that they were waiting for their healthcare provider to initiate a conversation about vaccination and recommend when it would be appropriate for their child to receive the vaccine.

For most of the childhood vaccines, like the mumps, measles, rubella, the ones that have been around for a long time...I just trust that they have reduced disease so much that it has helped. I trust the science. When the HPV vaccine came out and it was newer, I did have some hesitancy just because I did not really understand it, but after talking to my doctor, after talking to the pediatrician, I understood the need for it, and why it was a good vaccine. PAR007 (Mother of 17-year-old daughter)

In contrast, most parents discussed feeling comfortable getting their child vaccinated against COVID-19 without discussing this with their healthcare provider. Parents mentioned that the COVID-19 vaccine was discussed extensively in the public sphere, and this eliminated many concerns about the vaccine. One parent specifically mentioned that the COVID-19 pandemic was highly scrutinized and she and her partner had already decided to vaccinate their child and therefore did not need to have a conversation with their child's healthcare provider.

We have not talked to our pediatrician about it. We made that decision on our own because there has been so much, so many reports about [COVID] and we feel like there have been trusted voices that have explained about how the vaccine has been developed and what it can do, and that it has a high efficacy rate. We felt like we could make that decision on our own. We understand that the Pfizer vaccine is the only one that 16- and 17-year-olds should take and if we did not understand that we may have sought out her advice. I would also say that we're probably impacted a lot on that we had somebody die from it and my husband and I both also got vaccinated before she did and we knew a lot of people who had and we were seeing the outcomes so... PAR011 (Mother of 17-year-old daughter)

## Discussion

In this qualitative study we found both similarities and differences in parental opinions about HPV and COVID-19 adolescent vaccines, especially regarding vaccine protection, side effects, and provider recommendations. Similar to other studies [14], parents expressed concerns and misinformation about vaccine safety and if HPV and COVID-19 vaccinations would protect their children. The need to protect community members helped in motivating parents to vaccinate their children. Therefore, incorporating how HPV vaccines can benefit children but also the wider community could be helpful to improve uptake. This could be especially beneficial for parents of boys who think that HPV vaccination primarily benefits girls.

Additionally, our study showed that news coverage of the COVID-19 pandemic and vaccine helped to inform parents about the safety and need for vaccination, which differs from previous studies that have shown media platforms to be a source of misinformation for both HPV and COVID-19 vaccines. This difference could stem from COVID-19 threatening the health and wellbeing of males and females alike, with the vaccine being

approved for males and females at the same time. This is in contrast to HPV, a sexually transmitted infection, that was initially seen as primarily a cause of cervical cancer, with the result that HPV vaccine was sexualized and only routinely recommended for males several years after approval for females, following evidence that it prevented anal cancers [17]. Therefore, using the news to promote vaccination with a focus on protecting communities could be beneficial for both HPV and COVID-19 vaccine uptake.

As seen with COVID-19 [27], researchers and trusted community officials could appear on news channels or social media to provide accurate information about HPV, especially during times when many adolescents are receiving vaccines, like before the start of k-12 school sessions. Previous studies have identified family members and religious organizations as trusted officials other than healthcare providers when disseminating HPV information among minority communities [28]. Having these trusted sources share information on social media through town halls could help in improving misinformation on social media, as seen in previous studies that utilized town halls on Facebook to disseminate accurate COVID-19 information to a wide range of communities [29].

However, other studies have reported that media to be a source of misinformation about COVID-19 and HPV [11,18,30,31]. Additionally, multiple parents in this study reported media as a source of HPV misinformation, which highlights the negative impact that media can have on vaccine uptake. Therefore, when using media to disseminate information it will be important to provide accurate information and additional resources that can help dispel the misinformation that circulates on different social media platforms. Additionally, when using social media, it is important to note that there are a multitude of factors that can impact vaccine acceptance and uptake among different racial and ethnic groups including mistrust stemming from unethical research studies, need for vaccine safety and efficacy by sub-population, and lack of diversity in vaccination promotion materials [32–34]. Therefore, future studies should focus on identifying who different racial and ethnic groups trust when delivering information about HPV and COVID-19 vaccines along with how that information should be disseminated. This should ensure that we are using culturally appropriate messaging when raising awareness about vaccines that will be imperative to promote uptake of HPV and COVID-19 vaccines.

Finally, previous studies have shown that healthcare provider recommendations can help improve vaccine uptake [35,36]. However, our results showed that for COVID-19 vaccines, news coverage about the vaccine was sufficient in providing parents with the confidence to vaccinate their children before talking to healthcare providers. Therefore, distributing vaccine information through news channels, radio, or other sources that parents trust, could help in improving HPV vaccine confidence in lieu of a healthcare provider recommendation.

This study should be contextualized among several limitations. Interviews were completed while COVID-19 vaccine approvals and recommendations were rapidly changing. Therefore, not all parents had access to and approval for their children to receive a COVID-19 vaccine and opinions could have changed as more information about the pandemic was released. All participants were from the southeastern United States, an area with low vaccination rates, and therefore opinions expressed may not be generalizable outside of this area. All interviews were conducted in English, which excludes parents who speak other languages

and might have different opinions about HPV and COVID-19. Additionally, all interviews were conducted on a web-conferencing platform to abide by physical distancing protocols, limiting participants to those with broadband internet or cellular access. Research is needed to continue to understand parental acceptance of COVID-19 vaccines.

Overall, HPV and COVID-19 vaccines can save lives but continue to be underutilized. Novel communication and education strategies are needed to promote uptake of both vaccines, especially as the pandemic continues and discussions about COVID-19 becoming endemic begin. Using trusted officials to deliver information about these vaccines on different media platforms could be extremely beneficial. However, public health officials and healthcare providers need to explore communication strategies that are informative and trusted among the populations they serve, which is why continued research on this subject is needed. The results of this study can be used as part of a comprehensive multilevel public health strategy to improve vaccine uptake and promote population health.

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