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HPV Vaccination Information Access, Needs, and Preferences Among Black and Hispanic Mothers

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HPV-associated cancer disparities disproportionately affect Black/African American and Hispanic individuals in the U.S. HPV vaccination, which can prevent many HPV-associated cancers, should be clearly recommended by pediatricians to parents of adolescents aged 9–12, yet uptake and completion remain lower than other adolescent vaccinations. We used the Structural Influence Model of Health Communication to explore communication inequalities from interviews with 19 Black and Hispanic mothers of adolescents. We identified HPV vaccination information seeking behaviors, media use, and preferred channels to address information needs. This study provides insights into how mothers' nativity and ethno-racial identity influenced how they accessed and processed information from various sources. Preferences for digital and community-based strategies to address information gaps and hesitancy concerns are also presented. Findings suggest future prevention strategies must increase access to accurate information that resonates with NH-Black and Hispanic communities' needs and is disseminated via preferred communication channels to maximize the effects of multi-level interventions promoting HPV vaccination among communities experiencing disparities.

Human papillomavirus (HPV) causes over 36,000 cancers each year in the United States (U.S.) (Centers for Disease Control and Prevention, 2022a). Black/African American and Hispanic individuals are disproportionately affected by HPV-associated cancers (Burger et al., 2016; Razzaghi et al., 2018). HPV vaccination has potential to prevent more than 90% of those cancers (Huh et al., 2017; Lehtinen et al., 2017; Palmer et al., 2019), and routine HPV vaccination is recommended for 9–12-year-olds. However, HPV vaccination remains lower than other adolescent vaccines (Centers for Disease Control and Prevention, 2022b; Meites et al., 2016). Notably, Black and Hispanic adolescents are less likely to complete the HPV series compared to non-Hispanic (NH) White adolescents (Spencer et al., 2019).

HPV Vaccination Disparities

Prior research suggests Black and Hispanic parents, especially those with limited English proficiency, receive fewer and weaker provider recommendations (Gilkey & McRee, 2016; Reiter et al., 2021). Black and Hispanic parents also report lower HPV vaccination knowledge and intentions, and higher mistrust in health care professionals and pharmaceutical companies, which contribute to HPV vaccination disparities (Amboree & Darkoh, 2021; Hirth et al., 2019; Lee et al., 2022). Vaccine hesitancy, defined as a person's reluctance or delay in accepting vaccination, also contributes to parents' refusals and low HPV vaccination coverage (Nguyen et al., 2021; Szilagyi et al., 2020). In addition to these documented determinants of vaccination disparities, another potential explanation is that communication inequalities, including parents' differential access to, processing of, or action on vaccination information, may also exacerbate HPV vaccination disparities (Viswanath et al., 2007).

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Communication Inequalities and the Structural Influence Model

The Structural Influence Model (SIM) (Figure 1) emphasizes that social and structural factors can create unequal communication experiences which ultimately affect health outcomes (Viswanath et al., 2007). SIM specifically posits health communication acts as a mediating factor between social

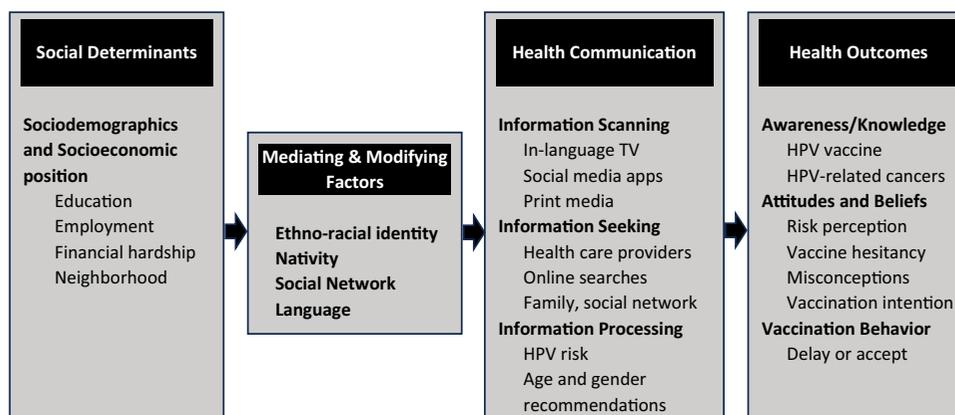


Figure 1. HPV vaccination communication according to the Structural Influence Model.

determinants and health outcomes. Health communication outlined in this model includes health media use, information scanning and seeking, information processing, and information needs and preferences, as these impact knowledge acquisition and beliefs. Multiple studies support that communication inequalities contribute to disparate health outcomes among vulnerable groups (Baker et al., 2021; Bekalu & Eggermont, 2014; McCloud et al., 2017).

For vaccination, financial hardship, ethno-racial identity, low income, and low education have been linked with communication inequalities (Häfliger et al., 2023), specifically increased exposure to misinformation, low vaccine awareness, and vaccine hesitancy (Kalocsányiová et al., 2023; McFarlane et al., 2023). However, less is known about information access, needs, and preferences. Identifying Black and Hispanic parents' information needs is critical to address hesitancy concerns (Shay et al., 2018) as many parents who learn more about vaccination accept after it's offered again (Kornides et al., 2018). Therefore, SIM presents a useful framework to explore communication factors that may impact vaccine hesitancy in these populations.

Social Determinants

Several studies have examined sociodemographic and socioeconomic position (SEP) affecting HPV vaccination (Kurani et al., 2022; Shato et al., 2023; Xiong et al., 2024). Indeed, perceived discrimination, language barriers, nativity, and SEP related to Black and Hispanic ethno-racial identities have been linked with exposure to HPV vaccine misinformation, low knowledge, and weak provider recommendations (Anuforo et al., 2022; Galbraith-Gyan et al., 2021; Washington et al., 2023). Multiple nationwide surveys on hesitancy report variation by ethno-racial identity and child sex (Szilagyi et al., 2020; White et al., 2023). However, research on trust in information sources and vaccine hesitancy within low SEP communities has been limited.

Information Access: Scanning and Seeking

Information access, including media exposure, can influence parents' vaccination knowledge, beliefs, and decisions. Niederdeppe et al. (2007) define scanning as information acquisition behaviors that occur "within routine patterns of exposure"

while information seeking "describes active efforts to obtain specific information outside of the normal patterns of exposure" (Niederdeppe et al., 2007). Though media coverage of HPV vaccination has historically been low, negative, and with limited details linking it to cancer, especially in low socioeconomic areas (Calloway et al., 2006; Krieger et al., 2013), HPV vaccine discussions are highly prevalent on social media (Ekram et al., 2019; Kang et al., 2017). Exposure to misinformation (i.e., false or inaccurate information) (El Mikati et al., 2023) online is common and negatively affects vaccination behavior (Llavona-Ortiz et al., 2022; Margolis et al., 2019). Specifically, among Black parents, social network exposure to misinformation and medical mistrust has been connected to vaccination refusals (Fu et al., 2019; Hirth et al., 2019).

Despite findings that parents across ethno-racial identities and nationalities rely on pediatric providers for vaccination information (Clark et al., 2014; Schwartz et al., 2023; Shin et al., 2023), parents with minority ethno-racial identities are more likely to report not receiving a provider recommendation for HPV (Rositch et al., 2022). Determining where parents are exposed to and obtain information from remains paramount to addressing misinformation, reducing hesitancy, and promoting vaccination (Burki, 2019).

Information Processing

Group differences in processing and interpreting information, including evaluating the credibility and trustworthiness of the source (K. Glanz et al., 2015; Kelman & Hovland, 1953), can also lead to adverse communication outcomes (e.g., knowledge, attitudes, beliefs, intentions). Health Information National Trends Survey (HINTS) results show that Black adults trust HPV information from television more than non-Hispanic (NH)-White adults (Galbraith-Gyan et al., 2021). Providers are highly trusted and influential among Hispanic parents (Frietze et al., 2023; Galbraith et al., 2016). However, in Black families, studies have found discordant results regarding the connection between trusting information from a provider and vaccination (Fu et al., 2017; J. M. Glanz et al., 2013; Nan et al., 2019a). Trust in family members and friends is common among minorities (Frietze et al., 2023; Harrington et al., 2021);

however, these sources tend to be linked with lower vaccination regardless of ethno-racial identity (Anandarajah et al., 2024).

Information Needs

Culturally-tailored content is instrumental in effective uptake of messages that address the information needs of specific sub-groups (Kreuter & McClure, 2004). Reviews of available and commonly used HPV communication messages (Calo et al., 2018) emphasize the cancer prevention benefits of vaccination, which message experiments have found are acceptable and effective, though samples were predominantly NH-White (Panozzo et al., 2020; Shah et al., 2019). However, for hesitant parents, addressing specific concerns and identifying intrinsic motivations increases uptake (Dempsey & Leary, 2018; Reno et al., 2018). HPV vaccine hesitancy concerns have changed over time, increasingly about safety (Adjei Boakye et al., 2023; Rositch et al., 2022; Sonawane et al., 2021), highlighting the importance of examining current information needs to develop relevant strategies to improve uptake.

Information Preferences

Preferences for information sources and communication channels differ for parents who refuse compared to those who delay (Gilkey et al., 2017), emphasizing the need for tailored communication strategies. Many parents prefer obtaining information from pediatric providers or in health care settings (Lai et al., 2017). However, social media use may also play a role in preferences, though this has been understudied in racial/ethnic minorities (Wong et al., 2021). Because vaccine hesitancy varies by context and time (MacDonald, 2015), understanding parents' preferences, including HPV vaccination information sources, messengers, and channels, is important for developing communication strategies.

Current Study

The objective of this analysis is to inform future interventions that facilitate access to culturally-relevant and accurate HPV vaccination information specific to Black and Hispanic families. Therefore, we analyzed interview data from Black and Hispanic parents from a larger qualitative dataset that explored HPV vaccine hesitancy among parents in racially/ethnically diverse communities in a low-income metropolitan area. The current study provides insights into potential communication inequalities regarding HPV vaccination information access, needs, and preferences among Black and Hispanic parents of adolescents. Through the lens of SIM, we explored the following research questions (RQs):

1. What role do communication inequalities (i.e., differences by SEP and sociodemographic characteristics) play in Black and Hispanic parents' HPV vaccine communication (i.e., information access and processing)?
2. How should HPV communication strategies be designed to address Black and Hispanic parents' information needs and media preferences?

Such data are key to designing and disseminating HPV vaccination strategies to reduce communication inequalities and health disparities gaps for HPV-related cancer.

Materials and Methods

Setting

This study took place in the greater Newark metro area of New Jersey (NJ). Adolescent HPV vaccination varies by adolescent age, geography, and ethno-racial identity (New Jersey Department of Health, 2023). The study counties (i.e., Essex and Hudson) include the most diverse cities in the state, where nearly one quarter of the population immigrated to the US and approximately one-third primarily speak a language other than English (U.S. Census Bureau, 2020).

Recruitment

We recruited participants from family-oriented community spaces and events. Eligibility included having a child aged 9–13 years, being the primary health care decision maker, and having internet access. We included parents of adolescents with varying HPV vaccine receipt (i.e., 0 to 2 doses) to explore perspectives and experiences across vaccination behaviors. Data saturation was reached when new themes no longer emerged (Hennink & Kaiser, 2022). Participants received \$50 after the interview. This analysis included 19 NH-Black and Hispanic participants; we excluded three from the original sample who had other ethno-racial identities.

Data Collection

Bilingual and bicultural staff translated and back-translated Spanish materials so that parents could participate in English or Spanish. Participants completed a brief sociodemographic survey (Table 1). Informed by the SIM's health communication construct, our interview guide (Table 2) covered the following topics: health outcomes (e.g., awareness/knowledge, vaccination), information access (e.g., media use/exposure, seeking behaviors, sources), information processing (e.g., perceived credibility, motivating factors), information needs (e.g., hesitancy concerns, knowledge gaps), and preferences (e.g., content and channel).

Two female social scientists trained in health psychology, anthropology, and public health conducted interviews in English and Spanish via Zoom. Summaries were written immediately after each interview. Recordings were professionally transcribed, verified by staff, and deidentified.

Participants

Over half (58%) were born outside the US, specifically in Dominican Republic, Ecuador, Guatemala, Honduras, Mexico, and Nigeria. Mothers interviewing in Spanish (31%) had lower formal education. Of 14 mothers whose adolescent was ≥ 11 years old and should have received a recommendation, three reported their child had initiated the vaccine series.

Table 1. Sample characteristics of mothers and adolescents

Mother characteristics	N (%)
Female	19 (100)
Race/Ethnicity	
Non-Hispanic Black	10 (53)
Hispanic	9 (47)
Educational attainment	
Attended some or completed college	14 (74)
Attended some or completed high school	5 (26)
Language of interview	
English	14 (74)
Spanish	5 (26)
Non-US-born	11 (58)
Adolescent characteristics	
Male	11 (58)
Age of oldest adolescent	
9-10 years	5 (26)
11-12 years	9 (47)
13 years	5 (26)
# of HPV doses	
0	13 (68)
1	2 (11)
2	4 (21)

Table 2. Interview topics and example questions about parents' vaccination communication informed by Structural Influence Model

Model construct	Example question
Awareness and previous exposure	Where did you first hear about HPV vaccination? What have you heard or read about the HPV vaccine? Tell me about the last time your child was vaccinated.
Information scanning and media exposure	Have you talked with your child's health care provider about the HPV vaccine? What about posts related to the HPV vaccine on social media? Or on TV?
Information seeking	Who or where do you go when you want more vaccination information? Have you looked for information about the HPV vaccine? Who have you talked to about HPV vaccination? about your concerns?
Information processing	What have you heard from family members/other parents/church friends about HPV vaccination? What do you think of the information from [different sources]? What makes them trustworthy? What types of stories or posts do you trust? How much do you trust vaccine information on social media?
Information needs and future preferences	What would motivate you to get your child vaccinated against HPV? What questions/concerns do you still have about the HPV vaccine? How would you like to learn more about HPV vaccination in the future? What would be the best way to educate/inform parents?
Hesitancy/concerns	Was there anything that kept you from getting your child vaccinated? Can you tell me a little more about your HPV vaccination questions/reservations/decisions?
Knowledge	What do you know about HPV? What about HPV-related cancers? How necessary do you think the HPV vaccine is for your child?

Data Analysis

All transcripts were double coded in *NVivo 2020* using a codebook organized by our theoretical framework to identify communication (information scanning, seeking, processing); information needs (insufficient knowledge, misconceptions, hesitancy

concerns); and communication preferences (mode/channel, sources/messenger, content). All Spanish transcripts were double coded by bilingual staff; key quotes were translated. Coders met on a weekly basis to compare coding and reconcile discrepancies until reaching sufficient inter-coder agreement ($\kappa \geq .80$).

The study team, comprised of bilingual speakers, parents, multiple ethno-racial identities, and experts in health services research, health communication, and adolescent sexual health, met regularly to discuss the analysis. Guided by SIM, we analyzed thematic differences by participants' ethno-racial identity, nativity, primary language spoken at home, and education. We conducted multiple rounds of analysis to reflect on our positionality, corroborate findings, and synthesize interpretations (Crabtree & Miller, 2022). Reporting followed COREQ checklist (Tong et al., 2007).

Results

Findings are organized by describing mothers' awareness, information scanning and seeking experiences, as well as how trustworthiness influenced information processing. Differences by nativity and ethno-racial identity are highlighted throughout (Table 3). We characterized information needs and preferences with quotes illustrating preferred channels, sources, and content (Table 4).

HPV Vaccine Awareness and Sources

Most mothers (n = 13, 68%) were aware of HPV vaccination, with over half (58%) learning about it from health care providers and others (26%) recalling being introduced from other sources (i.e., TV, friend). The remaining three participants (16%) learned about the vaccine by participating in this study. Notably, most mothers' first encounters with HPV vaccination information were through routine media use or interpersonal communication. Four non-US-born mothers knew about the

vaccine because of their child's vaccination card. Three mothers reported receiving the HPV vaccine as young adults.

Information Scanning

Mothers accessed HPV vaccination information through various sources including health care providers, websites, media and interpersonal connections.

Health Care Providers

Most (75%) mothers relied on information from providers. Over half (8/14) of mothers with a child ≥11 years who should have received a recommendation reported that they had discussed the HPV vaccine during a routine visit. Although some recalled feeling "satisfied" with information they received from pediatricians, many mothers turned to other sources for more in-depth information:

Recently when I brought him [my son] to the doctor – it was like, "We're not saying you gotta get it, but no pressure. If you think about it, when you come back, we can give it to him." Really, just no communication, which I'm standoffish because of that. - Black mother, 11-y/o with 0 doses

Print Media

Printed HPV vaccine information on posters, brochures/pamphlets, and flyers at pediatric offices or sent home from schools were another source reported by half of mothers. These were generally described as extra information available in waiting areas or exam rooms. However, at least one mother recalled her pediatrician reviewing a pamphlet with her every time they discussed her child receiving a vaccination.

Table 3. Non-Hispanic Black and Hispanic mothers' HPV vaccination communication experiences

	Ethno-racial identity	Nativity
Communication Experiences		
Information scanning	Hispanic mothers encountered misinformation through social networks	Spanish-speaking, non-US born mothers received weaker provider recommendations
Information seeking	Black mothers wanted vaccine information from Black providers	US-born Black mothers sought additional information from secondary sources Spanish-speaking mothers used WhatsApp to look for and share vaccine information
Information processing	Hispanic mothers discounted misinformation from family members	Non-US-born mothers questioned information from health authorities less and acknowledged positive vaccination norms US-born Black mothers' mistrust in government health care authorities
Health Outcomes		
Awareness/ Knowledge		Spanish-speaking, non-US born mothers were more aware of HPV vaccine
Attitudes/ Beliefs	Hispanic mothers did not perceive males to be at risk or need HPV vaccination	
Intentions	Black mothers shared decision-making with spouses/partners Peer/personal experiences with HPV-associated cancer influenced Black mothers	Spanish-speaking non-US born mothers were interested in detailed information after initiating

Table 4. Mothers' future preferences for HPV vaccination communication

Media Channel	# mothers (n = 19)	Source	Message content	Exemplary Quotes
Email	9	HC provider or office School system/ nurse	Updated vaccine research Appointment reminders with HPV facts	"If the doctor emailed me information on HPV that was from the FDA or the CDC - if she trusted in it enough to share it with the parents of her patients - I would have confidence in it." Hispanic mother, 13 y/o female, 2 doses
Text Message	8	HC provider or office HC authorities (CDC, DOH)	General HPV/vaccination facts about risk, side effects, efficacy Links to trusted websites about HPV vaccination	"By text message is easier, I think, because, checking e-mail always requires a little more time. Instead, when your phone rings (or dings, like a notification sound), you quickly open it." Hispanic mother, 12 y/o male 0 doses
Printed Materials	8	HC provider or office School system/ nurse HC authorities (CDC, DOH)	General HPV/vaccine facts about risk, side effects, efficacy Testimonials	"They [pediatricians] should offer an information flyer. 'Look, your son is nine years old, take the flyer, this informs you about the vaccine option and that can protect him/her' . . . but there is nothing like that! I think that if we were receiving it from a pediatrician, it would give us more confidence than going to Google." Hispanic mother, 11 y/o female, 0 doses
Social Media/ App	6	HC provider or office School system/ nurse HC authorities (CDC, DOH)	General HPV/vaccine facts about risk, side effects, efficacy Testimonials	". . . post it where people can see it. Because I guess unless they go to the doctor, they're not going to know anything about it. And a lot of people spend a lot of time on social media, so . . ." Hispanic mother, 10 y/o female, 0 doses
Workshop	6	HC provider or other medical professional School system/ nurse Community member	General HPV/vaccine facts about risk, side effects, efficacy Benefits of HPV vaccination Parent Q&A	"Give us information about this vaccine - I would love it! I would appreciate it. My son's school, the youngest one, they give us workshops. They provide workshops about COVID, about parenting, about a lot of issues and events and subjects. I wish we had this kind of [HPV vaccine] knowledge from the schools." Black mother, 11 y/o male, 0 doses
Video	4	HC provider or office Community members	Testimonials from vaccinated adults/adolescents, parents choosing to vaccinate, providers discussing safety and efficacy	"Because a piece of paper just doesn't - we don't need to read it sometimes [. . .] we put it away in our purse and it goes away. But if you have something that you can send to someone via e-mail or in videos - a doctor having a conversation with a parent, stuff like that." Hispanic mother, 10 y/o male, 0 doses

Notes: HC, Health Care; FDA, Food and Drug Administration; CDC, Centers for Disease Control and Prevention; DOH, Department of Health; Q&A, Question and Answer

Television

A few (26%) mothers reported TV news media and commercials as initial information sources. One participant was surprised to learn about the vaccine through Telemundo, which prompted her to search for information online. Mothers also recalled seeing HPV vaccine commercials.

Social Media

Two mothers recalled seeing Twitter posts and YouTube videos about girls experiencing "short-term paralysis" after receiving the HPV vaccine. However, these mothers' safety perceptions

were not influenced, with one mentioning she "didn't pay any attention to it."

Information Seeking

Although most conversations took place with their adolescent's pediatrician, two mothers initially consulted with their own adult providers. Most mothers sought secondary sources, but more Black mothers described seeking additional information after their first exposures. They searched online and consulted spouses, parent peers, or providers. Spanish-speaking mothers

used WhatsApp as a social media platform for additional health and vaccine information seeking and sharing.

Pediatric Providers

Pediatricians were generally considered trustworthy information sources, so mothers often verified what they had seen or heard from commercials, news media, or informal interpersonal communication. Multiple Hispanic mothers described going to their pediatricians to “confirm what I saw in the news story” and verify “the information [was] valid.”

Websites

Online information-seeking was reported by nearly half of mothers who used Google or other search engines. Some used “health sites” like healthychildren.org, kidshealth.org and mayoclinic.org, as secondary information sources after initial exposures via mass media, personal health encounters, or vaccination cards. Vaccine information was occasionally accessed on government websites.

Social Networks

Nearly half of mothers discussed the HPV vaccine with friends, coworkers, and family members. Some participants who heard personal HPV vaccine and HPV-related cancer stories within their social networks were motivated to vaccinate their children. For example, one participant who was undecided about vaccination was reassured by a close friend who relayed advice from their own pediatrician:

Her pediatrician had told her, “Hey, ten years ago I might not have said to. But it’s been around for 20 years, so I’m pretty sure that it’s safe for your guys.” – Black mother, 13-y/o and 11-y/o with 0 doses

Information Processing

We observed some discrepancies in how Black, Hispanic, and non-US-born mothers interpreted information and evaluated source credibility. Spanish-speaking mothers described social norms of accepting vaccination, though they had lingering questions. US-born Black mothers discussed broad community conversations of distrust in government health authorities influencing vaccination beliefs and behaviors.

Pediatric Providers

Spanish-speaking mothers reported receiving optional vaccination recommendations from pediatricians. For example, one mother who requested the vaccine for her adolescent left the appointment feeling underwhelmed, pointing out that her pediatrician could have done “a bit more” to promote the vaccine and “speak of the consequences of not vaccinating.” Another Spanish-speaking mother accepted vaccination for her adolescent, but still had questions and wanted more information.

During routine pediatric visits, two mothers received misinformation about the necessity of HPV vaccination for males, but neither mother believed what they heard. For example, one participant discredited a nurse’s opinion:

One of the nurses came in and she was like, “You don’t need to get the shot. Why would a young man need to get the

shot?” And I listened to what she said, and he still got the vaccine because I had read the information. There was information from the CDC on the wall, right? - Black mother, 13-y/o with 1 dose

Traditional and Social Media

TV commercials about vaccination resonated with one mother because “it was a mom and her son. Someone like me” (Black mother, unvaccinated 10-year-old male). Both Black and Hispanic mothers mentioned being motivated to bring up and even request the HPV vaccine at their next pediatric appointments because of what they saw on TV. In addition to the mothers who were unaffected by the Twitter and YouTube posts, another Hispanic mother discounted all vaccine-related information on social media as “opinions disguised as facts.”

Social Networks

US-born Black mothers described interpersonal and community discussions about “not trusting the government,” which was framed as an underlying skepticism of all information disseminated by public health authorities. Some explained their trust in government entities had diminished due to the COVID-19 pandemic with one Black mother acknowledging she and other parents “do not trust the government and these vaccinations that have been coming out.” The other two Black mothers who spoke about mistrust pointed out how, “Black people, historically, have been tested on” and explained longstanding, cultural skepticism:

In my family and my culture, they put it in us from when we’re little that you don’t trust everything that you see and hear from FDA, CDC. [. . .] Certain things that they test, they may not test it on people that look like me. So, I think that’s part of the reason why I don’t trust these CDCs—because of what I was told when I was younger. And because of things that has happened in history to people that look like me, specifically Black women. — Black mother, 10-y/o with 0 doses

Family input was described among some Black mothers who shared vaccine decision-making with family members, mainly matriarchs and spouses. This finding was not echoed by Hispanic mothers.

Information Needs

Mothers expressed confusion and little understanding, often due to misinformation about HPV vaccine necessity, side effects, and HPV transmission. Information on recommendations for all genders, vaccination benefits and effectiveness, and long-term safety specifically for younger adolescents was needed.

Vaccination Need and Recommendations for All Genders

Despite many mothers being aware of the vaccine, participants expressed confusion and lacked specific knowledge about HPV and/or HPV vaccination. Non-US-born mothers interviewing in Spanish were aware that the acronym “HPV” stood for “human papillomavirus,” using the full name in narratives. However, these Spanish-speaking mothers associated the virus and vaccine-specific risk with girls. Thus, they were confused about

their sons and boys generally needing HPV vaccination; they did not perceive males to be at risk for HPV-related cancers. Three other participants perceived gendered differences in vaccination need and benefits, mainly from knowledge about routine screening for HPV-related cancers:

There's not a screening for men. So, that's why, oddly enough, I'd be more apt to do it for my son than for my daughter because most women I know are very good about their Pap smears. - Black mother, 13-y/o with 0 doses

HPV Transmission and Vaccine Benefits

Some mothers did not understand HPV risk and the benefits of vaccinating before sexual debut. Although the non-US-born mothers interviewing in Spanish knew that HPV was common, incurable, and could cause genital warts, they had heard it could be spread among “promiscuous” people and from “using hotel towels.” Despite some mothers being vaccinated themselves, they did not appreciate the benefits of vaccinating adolescents before becoming sexually active. Although they questioned the vaccine's efficacy, two of these mothers were still open to vaccinating their children. However, one remained hesitant about HPV vaccination based on her personal experience being vaccinated as a young adult and receiving abnormal Pap test results later in life.

HPV Vaccine Side Effects and Safety

Some non-US-born Spanish-speaking mothers were confused and conflicted because of misinformation they were exposed to from friends, family, and health care providers. For example, long-term side effects of the vaccine could “stop you from having a baby.” Although these mothers admitted they did not refute the misinformation during the actual conversations, in interviews they described what they heard as “conspiracy theories.” However, one mother noted that misinformation “gets stuck in [her] mind” and her adolescents remained unvaccinated. Others, especially those with younger adolescents, also wanted more vaccine safety information for prepubescent children.

Communication Preferences

We identified various preferences for channels, sources, and content for future HPV vaccination information (Table 4). Mothers were interested in digital messaging (i.e., text or e-mail), attending interactive webinars or workshops, and wanted to see more media and materials in community and clinical spaces. Testimonials from parents, health care providers, and community leaders were recommended. Suggested timing was prior to or during well-visits and the beginning and end of the school calendar.

Digital Messaging

The most preferred modes of communication were text message (50%) and e-mail (56%), but mostly “anything you could get on your phone” as mothers deemed phone-based communication “easy [to] access” and favored the ability to review details at later, more convenient times. Although social media generally was not considered credible, posts from trustworthy sources,

such as the CDC, “credible hospitals” and other medical facilities, Department of Health, and American Academy of Pediatrics, were acceptable and suggested by some due to widespread use.

Community Spaces and Places

Over one-third of mothers suggested interactive webinars or in-person workshops delivered by health care providers who have “a license to administer the actual vaccine.” There was also interest in print media and videos at pediatricians' offices and from school nurses. Mothers strongly valued the ability to access information in community spaces. Spanish-speaking mothers did not identify language as a barrier.

Providers, Parents, and Community Members as Messengers

Mothers also suggested personal testimonials from adults who received the HPV vaccine as adolescents, adolescents who recently received the vaccine, parents who decided to vaccinate their adolescent, and providers involved with administering vaccines. Notably, Black mothers were interested in receiving HPV vaccination information from “Black doctors who I trust, are from the community.” Similarly, religious leaders were suggested to disseminate information in “the language of the community” to “non-medical people.”

Discussion

This analysis builds on existing literature with specific examples of how to design and reach Black and Hispanic parents with HPV vaccination information they need via trusted sources and accessible channels. Framed within SIM, we explored the role communication inequalities play in how Black and Hispanic parents' access and process HPV vaccination information (RQ1). Health care providers, online websites, family members and peers, and some types of media were common information sources. These findings highlight that US-born Black mothers expressed medical mistrust, sought additional information sources, and relied on family input for vaccine decision-making.

We also assessed information needs and preferred sources and channels for future messages to address vaccine hesitancy (RQ2) and described mothers' information needs largely based on exposure to misinformation and beliefs, which were also shaped by nationality and ethno-racial identity. Cellphone-based interventions, personal testimonies, and interactive workshops were suggested. Pediatricians were preferred messengers for HPV vaccination necessity, benefits, and safety information.

Discussions surrounding information scanning indicated that many mothers were introduced to HPV vaccination through routine encounters with providers. Despite the importance of high-quality provider recommendations being well-documented (Gilkey et al., 2016; Shay et al., 2018), Spanish-speaking mothers with lower formal education described receiving non-evidence-based recommendations and misinformation about HPV transmission. National survey data also suggest mothers with lower education levels receive fewer recommendations (Mohammed et al., 2016). Although others found that limited English proficiency or

a preference for Spanish language may contribute to not receiving a provider recommendation (Aragones et al., 2016; Gilkey et al., 2015; Reiter et al., 2021), language was not a barrier to Spanish-speaking mothers in our study. Thus, provider- and system-level interventions (e.g., communication training, standing orders, reminders), remain important to alleviate differences and improve vaccination overall (Brewer et al., 2017; Dempsey et al., 2018; Zimet et al., 2018).

Media exposure was also discussed with a few mothers learning about the vaccine from television, including news stories. This may be an example of how minority groups are more likely to trust media sources (Harrington et al., 2021). However, misinformation was encountered through social media in addition to some health care conversations and social networks. Ensuring information online and messaging more broadly prioritize cancer prevention benefits of timely vaccination for both girls and boys is also critical (Brandt et al., 2023).

Information seeking behaviors were common after initially being exposed through provider or media encounters. Despite some health care conversations, mothers still had questions about the HPV vaccine and sought details from other sources, mainly health websites. This is similar to what others have found about parents wanting more detailed information before making vaccination decisions (Beavis et al., 2022; Wong et al., 2021). Information seeking was particularly important for Black mothers as they described broader medical mistrust, especially government health sources, with some citing historical mistreatment as reasons for wanting a variety of information sources. Others have shown that mistrust of government agencies and pharmaceutical companies is linked to vaccine hesitancy and low vaccination intentions among Black families (Cunningham-Erves et al., 2018; Nan et al., 2019b).

However, as mothers processed information, they relied heavily on perceived credibility of the source. Generally, mothers in our sample considered their health care providers to be trustworthy and provide accurate HPV vaccine information, which is consistent with the literature (Anandarajah et al., 2024). Hispanic mothers, however, wrestled with the misinformation they encountered through social networks. Spanish-speaking mothers also noted vaccination acceptance was the norm, though they did not always believe the information they received. Questioning misinformation from social networks has also been reported among US- and non-US-born Hispanic women (Garcia et al., 2023). Understanding how different sources influence vaccination perspectives and behaviors remains critical to promoting HPV vaccination (Baeker Bispo et al., 2023).

In terms of information needs, we observed some commonalities – mothers generally needed information – and nuanced differences, which were largely driven by misinformation exposure. For example, most participants wanted and needed more information about the necessity of HPV vaccination, especially those with sons. Another mostly Hispanic sample demonstrated similar findings among Spanish-speaking parents regarding the need for and importance of vaccination for boys (Tsui et al., 2023). Although recent survey data suggest boys and girls have

similar HPV vaccination uptake, some of our mothers perceived gender differences or were unfamiliar with recommendation for HPV vaccination for all genders (Centers for Disease Control and Prevention, 2022b). Another difference by nativity stood out: non-US-born Spanish-speakers needed information about HPV vaccination, while US-born mothers tended to need information about HPV risk. Indeed, parents' lack of knowledge is a barrier to vaccination (Mansfield et al., 2021), and providers often address questions parents raise about misinformation (Tsui et al., 2021). Identifying knowledge gaps and easing parents' main concerns remain important to reduce hesitancy (Reno et al., 2018, 2019).

Regarding channels to disseminate HPV vaccination information, mothers preferred to access information through their cellphones (i.e., text or e-mail). Mothers emphasized wanting time to review and process details before making decisions, which a systematic review also confirmed (Oh et al., 2021). Similarly, a study of middle-school parents found e-mails and a school-based event highly acceptable, though the intervention had low uptake (Calo et al., 2023). Community spaces were also suggested by our participants as sources for future HPV communication strategies. Linguistically-appropriate tools in community settings remains important for promoting HPV vaccination (Lindsay et al., 2022; Scarinci et al., 2020) and efforts geared toward Hispanic audiences should consider how factors like country of origin and language impact preferences (Elder et al., 2009).

Building on credibility and trustworthiness of sources, providers and parent peers were highly-desired messengers. Personal testimonials have been encouraged by other parents, in alignment with our findings, as a means to promote HPV vaccine acceptance (Becker et al., 2022; Dela Cruz et al., 2017). Black mothers also preferred information from Black providers; however, the shortage of Black primary care physicians highlights the challenge of Black families accessing trusted providers (National Center for Health Workforce Analysis, 2023). This underscores the importance of representation in other communication channels designed for Black audiences (Snyder et al., 2023), which may also need to account for historical injustices and use religious leaders (McFarlane et al., 2023; Rabin & Kohler, 2023). Using multiple channels to disseminate HPV vaccination remains important to reach diverse populations.

As with all studies, this analysis has some limitations. We collected data from a small group of non-US-born mothers, most of whom had lower formal educational levels and completed the interview in Spanish. This limited our ability to parse out what was driving the differences observed for this group, though they may also be due to intersecting identities or social positions (Bauer, 2014). Although we did not interview adolescents, other work has shown they obtain vaccine information from similar sources (i.e., traditional and online media) and trust health care providers (Mitchell et al., 2022). We also note these findings are specific to Black and Hispanic parents around Newark, NJ, and the nature of vaccine hesitancy warrants context-specific investigations into HPV vaccination communication (Morales-Campos et al., 2023).

Conclusions

This analysis identified differences in how HPV vaccination information was accessed and processed among Black and Hispanic mothers as well as information that they need and want. Designing and disseminating culturally-tailored HPV vaccination messages about cancer prevention benefits through trusted messengers from credible sources across multiple channels may improve adolescent HPV vaccination in low SEP communities. Despite some differences, Black and Hispanic mothers wanted access to more in-depth HPV vaccination information in health care and community settings. They were interested in accessing information online through their cell-phones. To maximize the effects of multi-level interventions promoting HPV vaccination, future strategies must expand access to accurate risk and recommendation information that resonates with NH-Black and Hispanic communities' needs and is shared via their preferred communication channels.

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Data Availability Availability

The datasets used and/or analyzed during the current study may be available from the corresponding author on reasonable request.

Author Contributions

Conceptualization, REK, LK, KG, RB; Formal Analysis, REK, RW, JV; Data Curation, REK, RW, JV; Writing – Original Draft Preparation, REK, RW, JV; Writing – Editing, REK, LK, KG, RW, YMR; Funding Acquisition, REK

Institutional Review Board Availability

The study was conducted according to the guidelines of the Declaration of Helsinki and approved by the Institutional Review Board of Rutgers Cancer Institute (Pro2020002372).

Informed Consent Statement

Informed consent was obtained from all participants involved in the study. Electronic informed consent has been obtained from the participants to publish this paper.

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