WHAT A MOTHER BELIEVES: MATERNAL KNOWLEDGE AND ATTITUDES REGARDING ADOLESCENT HPV VACCINATION FOR ADOLESCENT BLACK MALES

By

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Written under the direction of Michael Gusmano
and approved by

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ABSTRACT OF THE DISSERTATION

What a Mother Believes: Maternal Knowledge and Attitudes Regarding Adolescent HPV Vaccination for Adolescent Black Males

by KIAMEESHA RENEE EVANS

Dissertation Director:
Michael Gusmano

Background. Human papillomavirus (HPV) is the most commonly transmitted infection among men and women in the United States. Gender and racial disparities are present, with Black males disproportionately affected by HPV-related penile, anal, and rectal cancers. Vaccination against HPV during adolescence is an effective way to reduce HPV transmission, and clinical guidelines have recommended HPV vaccination of males since 2011. However, current uptake remains much lower than Healthy People 2030 objectives. During adolescence, mothers are often the decision makers for the health choices of their minor sons. Thus, an understanding of the factors that shape mothers’ decision-making is essential, as they could serve as the gatekeepers for their sons’ HPV vaccination. Using the Theory of Planned Behavior as a framework, this study was an exploration of the topic of HPV vaccination among adolescent Black males through the lens of their female caregivers.
Methods. This dissertation had a mixed-methods design that included two phases of data collection and analysis. One phase entailed secondary analysis of a national data set, the 2017 National Immunization Survey-Teen Supplement. Multivariate analyses were conducted to examine the performance of teen and maternal variables as explanatory factors for HPV vaccination initiation and completion. Interaction terms for clinical recommendation and maternal educational level were added to assess their respective moderating effects. The second phase entailed using qualitative research methods via semistructured interviews to explore the knowledge, attitudes, and behaviors regarding HPV vaccination among a sample of mothers of Black adolescent boys 11 to 17 years, primarily from New Jersey.

Results. Quantitative and qualitative analyses showed that the relationship between maternal educational attainment and vaccination behavior was not linear. The health care provider’s role was also reaffirmed, with both arms of analysis indicating a greater likelihood of vaccination if mothers received a provider’s recommendation. Awareness and knowledge were also important, although likely insufficient to motivate Black parents to vaccinate their children. Attitudes regarding medical mistrust merit consideration in developing interventions to address HPV vaccination uptake among Black adolescent males. An expanded model that includes constructs regarding perceived susceptibility could be helpful to improve mothers’ knowledge and influence vaccination intention.

Conclusions. Future HPV vaccination uptake researchers should examine understanding and attitudes by subgroups within the Black community. Few current evidence-based efforts to increase HPV vaccination uptake have a primary audience of
adolescent Black males. This research with the mothers of Black adolescent males showed issues of medical mistrust, mothers’ gaps in understanding, and an emerging role of male partners in HPV vaccination decision-making. The development of future evidence-based HPV vaccination promotion efforts should incorporate these concerns.
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Thank you to my prayer warriors, Glenys Wynn, Rose Jean-Baptiste, and Dr. Zupenda Davis-Shine, for your spiritual support and the many texts sent to my phone when I needed to read comforting words the most.

Lastly, thank you to all the family members and friends who have supported me. I would not have been able to close this chapter without you.

Excerpts from this work have been previously published in the following:

DEDICATION

This dissertation is dedicated to the two men and two women who have been my backbone. To my father, Herman Evans, I thank you for your never-ending love and support throughout all my life’s challenges. You kept the piece of paper I wrote in junior high school where I said I would be a doctor one day – I’m happy to check that item off the list!

To my husband, Michael Moore, I could not have done this without your unconditional love and support. You kept our family strong and kept me looking forward in those MANY moments when I wanted to walk away.

To my mini me, Kiameesha, I dedicate this dissertation to you. The hugs, kisses, and forehead rubs you gave throughout the years to “help Mommy feel better” are so appreciated. You are the best cheerleader a mom could ever have.

Lastly, this dissertation is in memory of my mother, Edna Evans (1950-1992). I think she would be proud.
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CHAPTER 1
INTRODUCTION

Statement of the Problem

Human papilloma virus (HPV) is the most commonly transmitted infection in the United States (Satterwhite et al., 2014; VanderVeen et al., 2020). Among men, HPV is associated with genital warts and some cancers, notably anal, penile, and oropharyngeal. In addition, there are racial disparities in HPV infection rates. Research suggests oral HPV infection is more prevalent among Blacks than Whites (Gillison et al., 2012). In early research prior to the introduction of the HPV vaccine, there was higher seropositivity to any HPV vaccine type among Blacks than Whites and Mexican Americans (Introcaso et al., 2014). When examining gender and race together, disparities remain. Data on cancers diagnosed between 2004 and 2008 showed that rates of penile cancer were higher among Blacks than Whites and non-Hispanics, and anal cancer in males was highest among Blacks (Centers for Disease Control and Prevention [CDC], 2012). During 2008 to 2012, Black men had the highest incidence of HPV-related anal and rectal cancer of all racial/ethnic groups and the second-highest incidence of HPV-related penile cancer (CDC, 2019).

HPV is transmitted by vaginal, anal, or oral sex with someone infected. Condoms can reduce the risk of infection. However, because HPV can infect areas not covered by a condom, condom use does not fully eliminate HPV infection risk. Infected individuals might not show symptoms and thus unknowingly transmit the virus to unsuspecting sexual partners (Jeudin et al., 2014; Reiter, Pendergraft, et al., 2010).
The prevalence of HPV infection in the general population is high. Data from the National Health and Nutrition Examination Survey showed a 45.2% prevalence of genital HPV among men 18 to 59 (McQuillan et al., 2017). In 2000, the estimated HPV prevalence in adolescents 15 to 24 years was 74% (Weinstock et al., 2004), suggesting that young people may face exposure to HPV in early sexual experiences. Data from the 2013 Youth Risk Behavior Survey indicated that 39% of New Jersey high school students had initiated sexual activity, 12% had sexual intercourse with four or more partners, and 5% had initiated sexual activity before the age of 13 (CDC, 2013b). Thus, strategies that protect adolescents from HPV infection before they begin having sex could be valuable.

Vaccination against HPV during adolescence has shown to be an effective way to reduce its transmission. The HPV vaccine was originally recommended for girls in 2006, with the recommendation extended to boys in 2011. On the federal level, there have been recent efforts to recognize the importance of HPV vaccination among males. Released in 2010, Healthy People 2020 included no recommendation to have males vaccinated against HPV, an omission rectified following updated HPV vaccination guidelines in 2011 (U.S. Department of Health and Human Services [DHHS], 2014).

Healthy People 2030 objectives include increasing the percentage of male and female adolescents who receive recommended doses of the HPV vaccine to 80% (DHHS, 2020). Although research has shown that vaccination against HPV prior to exposure reduces the risk of infection, uptake remains low in both boys and girls (Pitts et al., 2017; Rambout et al., 2013). According to the DHHS (2020), only 48% of adolescents aged 13 through 15 had received recommended doses of the HPV vaccine by 2018. Vaccine
uptake among Black populations has also increased (Gelman et al., 2013) but still remains lower than the optimal rate.

Work is needed to increase HPV vaccination uptake among Black adolescent males. This study contributes to the body of knowledge around the issue of HPV vaccination among Black adolescent males. Chapter 1 provides an overview of the dissertation’s contents. Chapter 2 presents a review of the literature and conceptual framework for the study. In Chapter 3, there is an outline of the methodology for the qualitative and quantitative arms of the study. Qualitative and quantitative findings appear in Chapter 4, with an overall summary of the study and its implications in Chapter 5.

**Conceptual Framework for the Study**

The Theory of Planned Behavior (Azjen, 1985) was appropriate to explore vaccination behavior and identify areas to target to improve HPV vaccine uptake. According to the Theory of Planned Behavior, behavior is a function of behavioral, normative, and control beliefs (Azjen, 1985; DiClemente et al., 2011; see Figure 1). Based on this model, a mother’s intention to have her son vaccinated against HPV can be influenced by her (a) attitudes regarding HPV vaccination, (b) perceptions regarding how her trusted sources would support her child being vaccinated against HPV, and (c) belief that she can access the HPV vaccine for her son.

Mothers’ attitudes regarding HPV vaccination can be positive or negative and include issues such as safety concerns and appropriate age of vaccination. Knowledge and awareness of HPV vaccination can shape attitudes; however, the extent to which
those attitudes influence HPV vaccination behavior is mixed (Cunningham-Erves et al., 2018; Fishman et al., 2016; Nonzee et al., 2018).

Trusted sources, such as health care providers, parents, and others in a mother’s social network, can affect their HPV vaccination behaviors either positively or negatively (Johnson & Ogletree, 2017; Wilson et al., 2013). Mothers who perceive that their trusted sources believe their sons should be vaccinated against HPV may be more motivated to meet the expectations of those sources and support HPV vaccination for their sons. It is important to have a better understanding of the influence of trusted sources and determine how to leverage this influence to increase vaccine uptake among adolescent Black boys.

In addition, the role of trust of the health care system receives exploration, as research provides conflicting information as to whether it plays a role in HPV vaccine receipt (Fu et al., 2017; Nan et al., 2019).

Perceived behavioral control—or the “Can I do it?” of decision-making—is another construct of the Theory of Planned Behavior to explore. Although there is limited research regarding perceived behavioral control and HPV vaccination behavior, scholars who explored this construct in cervical cancer screening found that perceived behavioral control was an important factor in Latinas’ subsequent screening (Roncancio et al., 2013). To improve vaccination uptake, a better understanding of potential barriers and obstacles that prevent mothers from obtaining HPV vaccination for their sons is necessary.

Attitudes, subjective norms, and perceived behavioral control can influence how a mother views HPV vaccination and her ability to access it for her son. This influence can further shape future intention toward HPV vaccination for her son. It is essential to
understand how these constructs could shape HPV vaccination decision-making, which can inform health education interventions to improve HPV vaccination uptake.

**Figure 1**: Model, Theory of Planned Behavior

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**Purpose of the Study**

The focus of this study was to investigate HPV vaccination uptake and decision-making experiences of mothers of HPV vaccine-eligible Black adolescent males around this issue. To meet this aim, there is a description of vaccination patterns relative to demographic variables from the CDC’s National Immunization Survey-Teen supplement (NIS-Teen). Specifically, I use the survey to estimate the prevalence of HPV vaccination among Black males in 2017 and compare the characteristics between vaccinated and nonvaccinated Black boys and men. Second, I explored mothers’ perceptions and personal beliefs regarding childhood vaccinations and HPV and their reasons for making decisions about HPV vaccination for their Black sons. Collecting data for this step entailed conducting one-on-one qualitative interviews with 23 mothers in the United States.
**Research Questions**

This study explored the topic of HPV vaccination among adolescent Black males using four research questions. To better understand the number of cases of HPV vaccination among adolescent Black males, the first research question was a means to calculate the prevalence of HPV vaccination among Black males in 2017. Vaccination rates among boys and men are low, so the second research question required understanding the characteristics of Black males vaccinated against HPV during 2017 compared to those not vaccinated. The final two research questions allowed the exploration of the beliefs of Black mothers through qualitative interviews. Mothers were appropriate as the sample population, as they are often the primary medical decision maker for their sons. The third research question pertained to Black mothers’ perceptions and personal beliefs regarding childhood vaccinations, and the fourth question entailed exploring the perceptions and personal beliefs that could influence the decision Black mothers make regarding HPV vaccination for their sons.

**Research Approach**

This mixed-methods study included two phases of data collection and analysis. One phase entailed secondary analysis of a national data set, the 2017 NIS-Teen, which documented recent vaccination behavior in the United States. Estimating the prevalence of HPV uptake is important for understanding the scope of the problem. However, increasing HPV vaccination uptake requires identifying the complex reasons parents choose (or do not choose) to have their children vaccinated against HPV. Successful public health strategies must be responsive to the concerns of these critical decision makers. Thus, the second phase was a qualitative approach to explore the knowledge,
attitudes, and behaviors regarding HPV vaccination among a sample of mothers of Black adolescents aged 11 to 17 years.

**Definition of Terms**

The following definitions apply to terms used in this study.

- **Adolescent**: individuals between 11 and 17 years of age
- **African heritage**: those who identify their country of origin or immediate lineage from the continent of Africa
- **African American heritage**: those who identify as American, born in the United States with African lineage
- **Black**: individuals who identify as having African American, Caribbean/West Indian, or African ancestry
- **Caribbean/West Indian heritage**: those who identify their country of origin or immediate lineage from an island in the Caribbean or who emigrated to the United States from the Caribbean
- **Fathers**: male figures in the household who may be biologically related or related by marriage to the adolescent
- **Mothers**: female figures in the household who may be biologically related or serving in a guardianship role, actively involved in the health care decision-making for their adolescent sons
- **Unvaccinated**: those who have received no doses of the HPV vaccine
Procedures

For the quantitative analysis, the 2017 NIS-Teen underwent analysis via SPSS using appropriate complex survey procedures to account for the NIS-Teen’s dual-frame sampling and weighting techniques (DHHS, 2018). For the analyses conducted to address the research questions, the sample was limited to male teens ages 13 to 17 with household survey data. There was application of the dual-frame sampling weight variable for producing estimates for teens with completed household surveys prior to analysis.

Data analysis consisted of the following measurements: (a) univariate analysis of variables to provide descriptive statistics of Black adolescent males, (b) chi-square analyses to examine relationships between teen and maternal variables, (c) multivariate analyses to examine the performance of teen and maternal variables as explanatory factors for HPV vaccination initiation and completion, and (d) interaction analyses to examine the relationship between clinical recommendation and maternal educational level on HPV vaccination initiation and completion.

Qualitative data collection entailed semistructured individual interviews with mothers of Black adolescent males ages 11 to 17 to explore their perceptions and personal beliefs regarding HPV vaccination. There were 23 interviews conducted face-to-face or via voice over internet protocol (VoIP) methods, based on the mothers’ preference and comfort. Interviews ranged from 45 to 60 minutes.

Discussion questions stemmed from existing literature on parental acceptance of the HPV vaccine and reasons for not vaccinating their sons, as identified in the NIS-Teen supplement. The discussion guide was a means to assess (a) understanding of HPV and the vaccine; (b) general thoughts and attitudes about vaccines and being vaccinated; (c)
perception of the influence of family, friends, and others in their network; (d) belief of their control to have their child vaccinated; and (e) barriers and facilitators to initiating and completing the vaccination series. Mothers also discussed trusted sources and how they obtain health information (e.g., printed materials, mass media, social media, referent groups, etc.).

Significance

Mothers are often the decision makers for the health decisions of their adolescent sons. Thus, an understanding of the factors that shape mothers’ decision-making is important, as they may serve as the gatekeeper for their son’s HPV vaccination. Research suggests that vaccination before exposure to the virus (e.g., via sexual activity) is the best way to reduce disease risk. However, parental beliefs about the appropriate time to be vaccinated could conflict with guidelines regarding HPV vaccination.

Early research on HPV vaccination focused primarily on girls, even though national recommendations for HPV vaccination in boys have been in place since 2011. Until recently, there was little consumer advertising promoting HPV vaccination in males. Prior researchers examining health information sources and early childhood vaccination found positive associations between traditional media sources (such as magazines and television) and parents’ perceptions of childhood vaccine benefits (Hwang & Shah, 2018). Scholars exploring the influence of information sources and HPV vaccination behavior reported television as the second most common source of information about the HPV vaccine after a doctor or medical professional (Underwood et al., 2016). Limited research in this area, combined with delayed HPV vaccination
marketing, could be missed opportunities to promote HPV vaccination and contribute to lower vaccination rates among males.

Research that identifies specific barriers and facilitators to HPV vaccination among adolescent boys is needed for developing interventions to improve vaccine uptake in this population (Rambout et al., 2013). Moreover, there is even less research specific to this topic at the intersection of gender and race/ethnicity, which could reveal nuanced issues and concerns unique to this subgroup of adolescents. This study adds to the body of knowledge regarding HPV vaccine acceptability and contributes to the preliminary work needed to create future interventions to increase uptake among Black adolescent males (Schuler et al., 2014; Stupiansky et al., 2012).

Limitations

There are several limitations of this study. The quantitative and qualitative components relied on self-reporting of vaccination behavior, which can be subject to recall bias. Qualitative interviews could have also been subject to social desirability bias, despite significant efforts made to allow mothers to share their genuine feelings without worrying about how their responses would be perceived. Sampling entailed using word of mouth and snowball methods, which could have shaped the sample of mothers who agreed to participate.

The analysis of the NIS-Teen data set included use of the public file, which is subject to data reduction from the CDC before release to the public. This limited my ability to examine all interested variables thoroughly. In addition, the 2017 NIS-Teen did not have questions that specifically measured knowledge of HPV and the vaccine, so I was unable to fully measure subject knowledge using this quantitative data set.
Another limitation was that despite conducting qualitative interviews with mothers of Black adolescent males throughout the country, most were with mothers in New Jersey. Although I did not observe notable differences between New Jersey mothers and those from other U.S. regions, it is important to note that findings from this sample may not generalize to mothers of Black adolescent males outside of New Jersey. Lastly, this study was an examination of vaccine decision-making through the lens of Black mothers rather than the adolescents themselves. Thus, I could not address the beliefs or understanding of the actual recipients of the HPV vaccine.

**Discussion and Future Research**

Chapter 5 includes a description of how the qualitative and quantitative findings complement each other. Recommendations for public health practice using existing national initiatives and evidence-based interventions appear. Last, Chapter 5 presents opportunities for future research and implications to public health vaccines beyond the HPV vaccine.
CHAPTER 2
LITERATURE REVIEW

HPV is the most commonly transmitted infection in the United States (Satterwhite et al., 2014; VanderVeen et al., 2020). Nearly all sexually active men and women are exposed to HPV at some point in their lives (Centers for Disease Control and Prevention [CDC], 2014b, 2019b). Among adults ages 18 to 59, approximately 45% of men and 40% of women have genital HPV infections (McQuillan et al., 2017a). An estimated 74% of HPV-associated cancers (cancers diagnosed in a part of the body where HPV is often found) in men occur due to HPV infection (CDC, 2019a; M. Saraiya et al., 2015).

HPV is a group of more than 150 related viruses divided into two types: low-risk and high-risk. Low-risk HPV can cause genital warts but does not cause cancer. Approximately 90% of genital warts result from two low-risk HPV types (Types 6 and 11). High-risk HPV can cause the formation of abnormal cells that can result in cancer over time if not removed. HPV causes most cervical cancers and some cancers of the vagina, vulva, penis, anus, and oropharynx (CDC, 2019a). In the United States, there is an average of 43,999 HPV-associated cancers reported annually, and an estimated 34,800 (79%) of those are cancers attributable to HPV (Senkomago et al., 2019). High-risk HPV types (Types 16 and 18) cause most HPV-related cancers. An estimated 7,000 HPV-related cancers (including anal, oropharyngeal, and penile) due to high-risk HPV types (Types 16 and 18) occur each year in the United States (CDC, 2011). Globally, high-risk HPV infection is the cause of approximately 5% of cancers (Forman et al., 2012).
Oral HPV infection occurs in much higher rates in men than women, with oropharyngeal cancer the most common HPV-related cancer among men in the United States (McQuillan et al., 2017a). Nationwide, an estimated 6.5 million men have both penile and oral HPV infections, most likely due to large numbers of sexual partners (Patel et al., 2017). Non-Hispanic Black men have the highest prevalence of oral HPV infections from a high-risk HPV type (Choi et al., 2020; McQuillan et al., 2017b; Sonawane et al., 2017).

Some infected individuals clear the virus from their bodies within a few years of their initial infections. However, HPV infection can be a precursor to cancer for individuals who do not shed the virus and HPV infection. There is no definitive way to determine which individuals will clear HPV infections on their own or develop health problems. Thus, public health has focused on primary prevention efforts, such as increasing condom use, limiting the number of sexual partners, and vaccinating individuals against HPV (CDC, 2012).

**HPV Vaccine**

As of 2016, Gardasil 9 is the only distributed HPV vaccine in the United States, as it covers the greatest number of low-risk and high-risk HPV types (see Table 1). In 2015, the Advisory Committee for Immunization Practices (ACIP) suggested the 9-valent (9vHPV) vaccine for routine vaccinations in men and women (Petrosky et al., 2015). Gardasil 9 protects against HPV Types 6, 11, 16, 18, 31, 33, 45, 52, and 58, which can cause anogenital warts, precancerous dysplastic lesions, and anal cancers (Meites et al., 2019). There have been no clinical trials conducted on oral cancers; therefore, pharmaceutical companies cannot market HPV vaccines as protection against oral cancer.
However, research shows that HPV 16 causes many HPV-positive oral cancers (Saraiya et al., 2015); therefore, vaccinating against HPV high-risk type 16 may also be a way to protect against oropharyngeal cancer.

Table 1: HPV Vaccine and HPV Types

<table>
<thead>
<tr>
<th>HPV Types</th>
<th>6</th>
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<th>16</th>
<th>18</th>
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<td>Brand name: Cevarix</td>
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<td>Quadrivalent (4vHPV)</td>
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<td>Brand name: Gardasil 4</td>
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<tr>
<td>9-valent (9vHPV)</td>
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<td>Brand name: Gardasil 9</td>
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History of Vaccine Recommendation and Administration

Available vaccines and guidelines for administration have evolved since the U.S. Food and Drug Administration’s (FDA) approval of the first HPV vaccine in 2006. When the HPV vaccine first arrived on the market, the ACIP recommended vaccination for only girls and women (Markowitz et al., 2013). Original guidelines suggested vaccinations for girls at ages 11 or 12 and “catch-up” vaccinations for women ages 13 through 26 who had not completed the series when younger (CDC, 2010). The vaccination recommendation did not include men until 2011; thus, up to that time, men could not protect themselves against HPV infection through vaccination. In October 2018, despite the FDA’s suggestion to expand the use of Gardasil 9 for men and women through 45 years of age, recommended ages of vaccination have not risen (American Cancer Society, 2019).
There have also been modifications to the original vaccination schedule since 2006. Initially, vaccine administration was via a three-dose series (Months 0, 1–2, and 6). However, in October 2016, updated ACIP guidelines suggested a two-dose schedule (Months 0 and 6) for adolescents initiating vaccination before their 15th birthday (Meites et al., 2016). Gardasil 9 is a vaccine injected in the arm muscle on a two-dose or three-dose schedule for individuals 9 through 14 years of age. Persons older than 15 years receive Gardasil 9 on a three-dose schedule (Meites et al., 2016). In addition, promising research suggests that a single dose of the HPV vaccine may provide some protection (National Cancer Institute, 2020).

**Vaccine Uptake**

Vaccination remains an effective method for protecting against HPV infection and reducing cancer risk. National Immunization Study – Teen (NIS-Teen) data showed that approximately half (51.1%) of adolescents aged 13 to 17 years were up to date with the HPV vaccine series and had received the appropriate two or three doses (based on age and timing). Slightly more than two thirds (68.1%) of the adolescents received at least one dose of the HPV vaccine (T.Y. Walker et al., 2019). Male adolescents are less likely to receive HPV vaccination than females (Sriram & Ranganathan, 2019). The NIS-Teen analysis of vaccine completion was approximately 49% for boys, a rising rate, albeit with modest increases in recent years (T.Y. Walker et al., 2019). There was about 66% HPV vaccine initiation in male adolescents, which suggests that many male adolescents obtain the first dose of the vaccine but do not return to complete the series. Moreover, there was a difference in vaccine receipt by health insurance status. Adolescents with Medicaid had HPV vaccination coverage 8.8 and 5.5 percentage points higher than adolescents with
private health insurance for HPV series initiation and completion, respectively (T.Y. Walker et al., 2019). Similarly, Sriram and Ranganathan (2019) found that adolescents covered by private health insurance were 0.18 times less likely to get vaccinated for HPV than adolescents covered by Medicaid. Nationally, there were also differences between Black and White adolescent males in HPV vaccine initiation (72.8% versus 63.5%) and vaccine series completion (53.3% versus 47.8%; T.Y. Walker et al., 2019). Although there is a rising rate of HPV vaccine initiation and completion in male adolescents, the rate remains below the Healthy People 2020 objective of 80% of adolescents vaccinated (U.S. Department of Health and Human Services [DHHS], 2018). The delay in HPV vaccine uptake among boys results from the delayed recommendation for routine use in this population, as the recommendation for boys followed 4 years after the initial recommendation for girls (Patel et al., 2018).

**Theory of Planned Behavior**

The theory of planned behavior was the approach used to explore vaccination behavior and areas of improvement for HPV vaccine uptake. In addition to vaccination behaviors, scholars have used the theory of planned behavior to explore a variety of health issues, including HIV/AIDS, cancer screening, drug use, nutrition, physical activity, and blood donation (Chan et al., 2019; Earle et al., 2019; Jeihooni et al., 2019; Siuki et al., 2019; Williams et al., 2019; Yee et al., 2019). The theory of planned behavior suggests that behavior is a function of behavioral, normative, and control beliefs (Azjen, 1985; DiClemente et al., 2011), as shown in Figure 1. Previous HPV research using the theory of planned behavior with parents, physicians, and college students showed that
attitudes, subjective norms, and perceived behavioral control influenced behavioral intention (Askelson et al., 2010; Juraskova et al., 2012; Roberto et al., 2011).

**Behavioral Beliefs and Attitudes**

The individual’s beliefs about outcomes or attributes of performing the behavior, weighted by evaluations of those outcomes or attributes indicates attitude (Ajzen & Fishbein, 1980; Azjen, 1985). Attitudes, such as beliefs about vaccination, can affect whether a person engages in the actual behavior of vaccination. In the case of HPV vaccination, a mother with strong beliefs that vaccination will have positive outcomes (e.g., protection against cancer and genital warts) will have a positive attitude about having her child vaccinated. In addition, some people may engage in positive health behaviors, such as HPV vaccination, to help others, a phenomenon known as prosocial behavior (Staub, 1978). A mother may choose HPV vaccination for her child to protect the child from infection and from infecting a future sexual partner.

Attitudes can be positive and negative. Individuals who choose to vaccinate their children may have strong attitudes about the benefits of vaccination that contribute to their thoughts and beliefs about vaccination. Likewise, those who elect not to have their children vaccinated may have equally strong attitudes about the adverse outcomes of vaccination that contribute to their decision not to vaccinate. Understanding the positive and negative attitudes that may indicate HPV vaccination decision-making may help design initiatives to improve HPV vaccination uptake.

**Knowledge and Awareness**

Both knowledge and awareness about an issue contribute to attitude. Knowledge consists of detailed and factual information; awareness comprises personally relevant
information (Trevethan, 2017). The CDC (2013) suggested better education for parents and the development of health education materials to build awareness about HPV and the vaccine to address gaps in understanding HPV vaccination. A lack of knowledge about HPV can affect whether parents express the intention to vaccinate their children (Askelson et al., 2010). In addition, research shows racial disparities in the awareness and knowledge of HPV and the HPV vaccine. Hughes et al. (2009) studied the beliefs of White and Black parents of adolescent/teenaged sons and found that Black parents were less likely to have heard of HPV or the vaccine and subsequently had lower knowledge scores than their White counterparts. Similarly, other scholars found that although less than one third of parents of sons (of all races) knew of the relationships between HPV infection and genital warts, anal cancers, and oral cancers, White parents had more knowledge of HPV infection than Black and Latino parents (Perkins et al., 2012). In addition, research with Latina mothers indicates a lack of information as the most common barrier to HPV vaccination (Btoush et al., 2019).

Research presents conflicting results that suggest that HPV awareness and knowledge do not correlate with HPV vaccination (Cunningham-Erves et al., 2018; Fishman et al., 2016; Nonzee et al., 2018). Nonzee et al. (2018) found that Black parents were less likely to vaccinate even though they had awareness comparable to Whites. Similarly, Fishman et al. (2016) conducted a study in a predominantly Black community in Philadelphia and found that neither parental nor adolescent awareness significantly correlated to adolescent vaccination. A study of Black mothers in Alabama showed that knowledge did not associate with intention to vaccinate by mothers with low or high intention (Cunningham-Erves et al., 2018), indicating that building HPV awareness and
knowledge does not motivate some parents to vaccinate their children. Although greater awareness of HPV or the HPV vaccine does not correlate to increased knowledge of HPV (Hughes et al., 2009; Naleway et al., 2012), greater awareness could be an important first step in the vaccination decision process and HPV vaccine acceptability (Reiter et al., 2010). There is a need for research on how awareness of HPV and the vaccine correlates with subsequent HPV vaccine behaviors (Hirth et al., 2019).

Mothers may control the health decisions for their minor children, but their children will eventually take on the decision-making responsibilities as they transition into adulthood (Gowda et al., 2012). Research of college-aged populations shows that HPV and vaccine knowledge among young people might relate to their attitudes and future HPV vaccination behavior (Gerend et al., 2020; Hanson et al., 2019; Plumb et al., 2020; You et al., 2020). Understanding what parents know about the HPV vaccine could provide insight into what their children know about the vaccine as they reach the age to make their own decisions about vaccination (Barnes et al., 2018; Hanson et al., 2019; Harris et al., 2018).

**Attitudes Regarding Safety Concerns of Vaccines**

Attitudes about safety concerns influence HPV vaccination decision-making. The concern of side effects is a cited barrier to HPV vaccination (Dempsey et al., 2009; Donahue et al., 2014; Marlow et al., 2009; Perkins et al., 2012; Rambout et al., 2013; Reiter et al., 2013). In a systematic review of 33 research studies worldwide, Marshall et al. (2019) identified safety concerns as a central finding. In a study of Black and Latinx adolescents and caregivers, some Black caregivers expressed concern that the HPV vaccine was a “newer” inoculation not proven as safe; this was a particular concern
among those who had not initiated HPV vaccination (Katz et al., 2016). However, the existing systems in place for monitoring negative vaccine events do not provide support for these concerns. Two federal systems, the Vaccine Adverse Event Reporting System and the Vaccine Safety Datalink, are the means of monitoring adverse events after HPV vaccination. Globally, there were more than 80 million doses of Gardasil 4 and Cervarix administered between June 2006 and December 2017. In this time, approximately 11% of those doses reported to the Vaccine Adverse Event Reporting System had serious adverse events (CDC, 2018). There were approximately 29 million doses of Gardasil 9 administered in the United States between December 2014 and December 2017, with 3% adverse event reports. Data from the NIS-Teen showed that adolescents who did not have safety concerns and concerns about side effects were 3.24 times more likely to get the HPV vaccine than adolescents with safety concerns about the vaccine (Sriram & Ranganathan, 2019). Although no research shows dangerous adverse events due to vaccination, safety remains a significant concern for some parents that influences their decisions to have their children vaccinated against HPV.

Normative Beliefs and Subjective Norms

Normative beliefs—specifically, subjective norms—are another construct of the theory of planned behavior (see Figure 1). Subjective norms are the social pressures that may affect an individual’s participation in a behavior (Azjen, 1985; Ajzen & Fishbein, 1980). A mother who thinks that certain trusted sources (i.e., referents) believe her child should receive the HPV vaccination and feels motivated to meet the expectations of those sources holds a positive subjective norm. A mother who thinks these trusted sources believe that her child should not receive the HPV vaccination has a negative subjective
norm. A mother less motivated to comply with those trusted sources has a relatively neutral subjective norm. Examples of trusted sources include health care providers, parents, friends, church clergy people, and other family members. Research suggests that extended family members may also play important roles in the HPV vaccination process, as their input can positively or negatively contribute to the ultimate vaccination decision (Johnson & Ogletree, 2017; Wilson et al., 2013). There is a need for more understanding of the influence of trusted sources and how to leverage them to increase vaccine uptake in the Black community.

**Control Beliefs and Perceived Behavioral Control**

According to the theory of planned behavior, control beliefs, including perceived behavioral control, is another factor with an influence on behavior (see Figure 1). Perceived behavioral control consists of the factors outside individual control that may affect intentions and behaviors (Azjen, 1985; Ajzen & Fishbein, 1980). Perceived behavioral control often equates to self-efficacy. Yzer (2012) described perceived behavioral control as an individual answering the question, “Can I do it?” when considering performing a behavior. A mother who experiences barriers to HPV vaccination (control beliefs; e.g., getting to the medical appointment) but feels she has the control to overcome those barriers (perceived power; e.g., having transportation to the doctor’s office) has high perceived control. Perceived behavioral control could be a significant factor in a mother’s HPV vaccination decision-making for her child. The concept of health care fatalism consists of past negative experiences. This concept suggests that unresolved history produces an environment in which individuals believe that they have no control over addressing ongoing health care injustices. Thus,
individuals may not participate in any healthy behaviors because they feel they will suffer or die, regardless of what they do (Mount et al., 2012).

There is limited research on perceived behavioral control and HPV vaccination among Black adolescent males. However, some scholarship on the construct in cervical cancer screening among Latinas suggests some influence. Roncancio et al. (2013) found that perceived behavioral control was the strongest predictor of intention to undergo cervical cancer screening. Roncancio et al. (2013) also found that those who expressed the intention to undergo cervical cancer screening were more likely to undergo screening. Increasing vaccine uptake requires a better understanding of potential threats to behavioral control and developing interventions that include opportunities to build perceived power to overcome potential threats.

Cost and Insurance Status

System-level barriers, such as cost and insurance status, can influence health behaviors, such as HPV vaccination. Parents have less interest in HPV vaccination as the cost of HPV vaccination increases (Reiter et al., 2010). Wilson et al. (2014) studied HPV vaccination uptake among adolescents in Northern New Jersey and found that insurance was a predictor of vaccination among Black adolescents. Analysis of NIS-Teen data showed that male adolescents with Medicaid had a higher likelihood of HPV vaccination; uninsured male adolescents are less likely than insured ones to receive the HPV vaccination (Lu et al., 2018).

State and federal initiatives are in place to reduce cost barriers for HPV vaccination in eligible populations. Since the Affordable Care Act in 2010, most private health insurance and government insurance programs provide coverage for the HPV
vaccine. Thus, all eligible populations can receive vaccines with no copayment or coinsurance from network providers (U.S. Centers for Medicare & Medicaid Services, n.d.). Eligible uninsured or underinsured individuals might be able to receive HPV vaccines at no cost through the Vaccines for Children Program (CDC, 2014a). As previously indicated, the revised vaccination guidelines from 2016 now suggest for patients younger than 14 years of age to receive the HPV vaccination series in two rather than three doses so there is no need to return for a third shot (Meites et al., 2016).

**Intention**

The theory of planned behavior suggests that there is a need for the intention to perform a behavior before the actual performance of that behavior (see Figure 1). A variety of perceptions contribute to intent, including: (a) perceptions about the advantages of engaging in a behavior, (b) perceptions about how relevant others would view the individual if they knew the individual engaged in the behavior (subjective norms), and (c) perceptions about social pressure to engage (or not engage) in a behavior. Holding attitude and subjective norm constant, a person’s perception of the ease or difficulty of behavioral performance affects behavioral intention (Azjen, 1985; Ajzen & Fishbein, 1980). Research on parental secondary acceptance (or parents’ acceptance of HPV vaccination after declination) shows that parents may decline HPV vaccination for their children at initial recommendation but may opt to or express intention to vaccinate later. Subsequent vaccination behavior correlates with various factors, including learning more about the HPV vaccine and receiving recommendations from their children’s health care providers (Auslander et al., 2019; Kornides et al., 2018). In addition, research has shown that racial and ethnic minorities were more likely to initiate HPV vaccination but less
likely to follow through (Spencer et al., 2019). Repeated exposure to credible messaging from health education sources may be an important way to increase intention behavior and subsequent vaccine uptake.

Parents and Adolescent Health

Mothers significantly influence the health-seeking behaviors of their children (Perez et al., 2017). In many households, mothers are the primary caretakers who control their children’s health care, making and attending medical appointments, filling prescriptions, and paying for health costs. Mothers often handle the decision-making for HPV vaccination, as well. K. K. Walker et al. (2020) explored HPV vaccination decision-making in the United Kingdom and found that mothers were more likely to decide on having their children vaccinated than fathers. Research on HPV vaccination intention among fathers of daughters suggests that fathers prefer for mothers to handle decisions about their daughters’ health care (Allen et al., 2012). Thus, there is a need to understand the factors that mothers consider when making health care decisions for their sons (such as HPV vaccination).

Most scholars have not addressed the role of mothers of children of color in the health behaviors of their children. There has been a small body of research on HPV vaccination in Latinx communities (Bahena et al., 2019; Btoush et al., 2019; Painter et al., 2019; Perkins et al., 2012; Roncancio et al., 2019a; Roncancio et al., 2019b; Roncancio et al., 2013; Scarinci et al., 2020), but there is limited research on this issue in the Black community.

Parents’ decision-making is a factor situated under larger sociocultural factors, such as class and race. There appears to be a relationship between socioeconomic status
and HPV vaccination behavior. Research suggests that individuals of lower socioeconomic status are more likely to engage in prosocial behavior even if the action does not directly benefit them (Polonijo et al., 2016; Sheehy-Skeffington, 2020). Thus, parents may elect to have their children vaccinated because of the societal good. Support of herd immunity (where high levels of immunity in the population produce a protective barrier for those unable to receive vaccination against the disease) is an example of prosocial behavior (Vietri et al., 2012; Quadri-Sherriff et al., 2012). Herd immunity has significant implications for Black men, as HPV-infected men tend to have sexual partners from the same communities. Thus, protecting Black men may also be a way to protect their Black partners from infection (Jeudin et al., 2014) and reduce the burden of HPV infection among the Black population.

Lareau (2002) presented two constructs to describe class-based parenting styles: concerted cultivation and accomplishment of natural growth parenting. In concerted cultivation, middle-class parents get actively involved in their children’s development, creating opportunities for their children to develop the skills they believe they need to thrive in adulthood. Under concerted cultivation, adolescents may have many extracurricular activities to fill their time. Middle-class parents use this time to teach their children to have a voice and negotiate and bargain with adults. Concerted cultivation produces adults who can challenge authority and have the professional skills necessary to thrive in a higher social class (McKenna, 2012). In contrast, Lareau suggested that working-class parents employ a different method of childrearing, termed as accomplishment of natural growth parenting. In this method, parents focus on their children’s present needs and less on developing future talents (Lareau, 2002; Manning,
In this style, parents issue directives (rather than solicit opinions), and children have significant periods of unstructured time to “be children” (McKenna, 2012). The expectation in this style is that children naturally develop into adulthood without the constant, intensive intervention of parents. Research suggests that individuals from low-income groups are more concerned with meeting needs in the present at the expense of preparing for a future perceived as uncertain (Sheehy-Skeffington, 2020).

Lareau (2002) found similar experiences between Black and White families, with differences by class. Manning (2019) critiqued this assertion and suggested that, for Black families, parenting is racialized. Thus, there is a need for intersectional examination of the experiences of mothers of Black sons, as they exist as females and parents of a Black son simultaneously. As mothers make health decisions for their children, their parental decisions may also influence their children’s future health-seeking behavior (Harris et al., 2018). There must be attempts to understand the influence of social demographics on the relationship between parenting, culture, and inequality by viewing families within the broader social and cultural life in which they live (Manning, 2019). An understanding of these nuanced experiences could contribute to shaping health education interventions to increase HPV vaccination uptake.

**How Parents Learn About HPV and the HPV Vaccine**

Parents can learn about the HPV vaccine through a variety of methods, such as personal networks (e.g., friends and family), print media sources (e.g., newspapers, magazines, and advertisements), broadcast media sources (e.g., television and radio), the Internet, and health care providers (e.g., physicians, nurses, and school health providers; Lai et al., 2017). Miller et al. (2014) suggested that family members, including mothers,
fathers, and grandparents, can influence adolescents in their vaccination decision-making, whereas peers and romantic partners have less influence. Mothers’ perceptions of how others view their behaviors can also contribute to their attitudes and potential vaccination behaviors for their sons. Although subjective norms contribute to behavior performance, there is a need to identify which referent members parents rely on when making health decisions (Askelson et al., 2010; Hertweck et al., 2013). Limited research has addressed which specific groups (e.g., family members, friends, other parents, and health care professionals) affect parental behavior and the extent to which these groups do so (Askelson et al., 2010).

Media can be a source of information about HPV vaccines (Baldwin et al., 2013; Cates et al., 2010). Drug company advertising, news stories, and health care providers are potential sources of information for parents (Cates et al., 2010; Hughes et al., 2009). In 2016, Merck & Co. presented a media campaign on the benefits of HPV vaccination, including television advertisements. In one television commercial, a male adult actor announced that he had cancer due to HPV. The male actor asked if his parents knew that they could protect him by having him vaccinated with the HPV vaccine when he was younger. The commercial does not indicate a brand name for the HPV vaccine. McGinley (2020) said, “Merck officials said the decision to run the new commercial was based on market research that revealed that, while 85% of parents were familiar with HPV, only 50% were aware of its link to cancer” (para. 10). There have been mixed reviews of the commercial. On social media, some viewers labeled the commercials as “bullying” or opposed the direct-to-consumer advertising approach (McGinley, 2016; Ramsey, 2016).
Others appreciated that the ad campaign was a way to help parents understand their vital responsibility to protect their children by having them vaccinated (McGinley, 2016).

Commercials such as this one include anticipated regret, suggesting that allowing people to consider the consequences of their actions (or inactions) is a way to help people make “better” decisions. Anticipated regret has been a tactic used in advertising for many health issues, including cancer screening, organ donation, water safety, physical activity, and influenza vaccination (O’Carroll et al., 2011; Hunkin et al., 2020; Janssen & Waters, 2019; Meng & Clarke, 2020). An online survey of parents and adolescent males by Reiter et al. (2011) indicated high levels of anticipated regret on both sides of the decision-making process for parents considering HPV vaccination. Thus, if parents chose to have their son vaccinated against HPV and he fainted after vaccination, they would experience regret for subjecting their child to this adverse event. Similarly, if they opted not to have their son vaccinated and their son later became infected with HPV, they would regret not choosing HPV vaccination.

An increasing number of people use the Internet to seek health information (Madden et al., 2012), and exposure to online health information can affect behavioral intentions and actions for vaccination (Betsch et al., 2010). Some researchers found that individuals who preferred to receive HPV vaccine information from the Internet or had first heard about the HPV vaccine through social media were more likely to decline vaccination (Baumann et al., 2019; Perkins et al., 2012). Lawless et al. (2020) noted that parents who did not consult friends and family members were more likely to consent to vaccination. Parents can receive both positive and negative messages about HPV vaccination, causing them to struggle to distinguish credible sources (Donzelli et al.,
According to the Pew Research Center (2019), 85% of U.S. Black adults use the Internet. Black parents report using the Internet frequently for health information (Lai et al., 2017). This frequent use could be due to limited access to health care providers; thus, the Internet is a credible and convenient source of information that can supplement the knowledge received from a health care provider.

For parents, schools may be a source of information on various health issues. Accordingly, scholars have suggested instituting compulsory HPV vaccination to increase HPV vaccine uptake (North & Niccolai, 2016; Parlfrey, 2016). Partly due to the continued controversy about HPV vaccination, only Rhode Island, Virginia, and the District of Columbia have successfully implemented vaccine-mandated legislation for adolescents, in which HPV vaccination is a requirement for school attendance (National Conference of State Legislatures, 2018). After mandating the distribution of educational materials about HPV in North Carolina schools, a study commenced to assess where parents received information about HPV and the HPV vaccine. Cates et al. (2010) found that only 9% of parents heard of the HPV vaccine from their daughters’ schools. Moreover, parents were less likely to know of the vaccine if they were male or had daughters of a race/ethnicity other than non-Hispanic White. School leaders who serve adolescents of color might miss opportunities to increase HPV knowledge among their student populations.

**The Role of the Health Care Provider**

Health care providers can serve a dual purpose as sources of trusted health information and conduits for actual vaccination behavior. Analyses of national data show
that recommendations for HPV vaccination correlate with HPV vaccine uptake (Gilkey et al., 2016; Hirth et al., 2019; Lu et al., 2019; Peterson et al., 2020). Research has also shown that parents identified their children’s health care providers as preferred sources of HPV information (Baumann et al., 2019; Perkins et al., 2012). Health care professionals are important because they can educate patients about sexually transmitted infections and build awareness of appropriate vaccinations. In a study of pediatricians in Connecticut, Schnatz et al. (2010) found a relationship between physician knowledge about HPV and the willingness to discuss sexually transmitted infections with their adolescent female patients. However, physician knowledge did not associate with actively offering the vaccine to those patients, contradicting other research (Holder et al., 2013) showing correlations between pediatrician knowledge of HPV and vaccine recommendation.

The number of health care encounters between a provider and patient declines as the child ages. In general, an infant may see a health care provider every 1 to 2 months during the first year of life, every 6 months in Year 2, followed by annual visits until 18 years of age. The existing early childhood immunization schedule suggests more than 10 vaccines in the first 6 years of life (Robinson et al., 2020). Adolescents are more likely to see their health care providers during younger adolescence to meet immunization requirements for primary school enrollment. Thus, the best time for HPV vaccination completion is while a child engages with the health care system regularly.

Complete vaccination against HPV should occur before the initiation of sexual activity, which is likely not until mid-to-late adolescence. Therefore, younger adolescence is the optimal time for vaccination (CDC, 2019b). During later adolescence, parents might only seek health care for their child as needed (e.g., injury, illness, and
physical exams for athletics), further reducing the number of health care encounters over time. Each missed annual wellness visit is a missed opportunity to provide credible health education to adolescent patients and their parents that could influence their attitudes on vaccination. If providers see male patients less often for clinical visits and use fewer of those encounters to discuss HPV vaccination in unvaccinated patients, there is less chance to introduce, educate, and promote decision-making on the HPV vaccine (Btoush et al., 2015; Chao et al., 2010; Lu et al., 2019; Moss et al., 2012).

Health professionals are instrumental in creating environments to help parents understand the importance of vaccination for their age-eligible children and making formal recommendations for vaccination. Research shows that clinical recommendations contribute to parents’ decision to express intention or vaccinate their children (Btoush et al., 2019; CDC, 2013; Galbraith-Gyan et al., 2019; Hennebery et al., 2020; Hirth et al., 2019; Kim & LeClaire, 2019; Sriram & Ranganathan, 2019; VanderVeen et al., 2020). Researchers acknowledge that parents of male children have not always received provider recommendations (Gilkey et al., 2012; Reiter et al., 2010); however, more recent data suggest this has improved. NIS-Teen data showed an increase in the percentage of parents of boys reporting that they received recommendations for vaccinations from their health care providers (Burdette et al., 2017; Stokely et al., 2014), with no disparities between racial/ethnic groups. However, vaccination rates are still lower than the Healthy People 2020 objective, indicating the need to increase recommendation rates for all male adolescents and young adults (Landis et al., 2018).

Some physicians fail to recommend the HPV vaccine to their age-eligible patients (Stokely et al., 2014). Moreover, some health care professionals do not offer the vaccine
to their male patients, even while aware of clinical guidelines for recommending the vaccine to both boys and girls (Post et al., 2013). Parents can take the initiative by initiating the conversation with their child’s providers. Still, few parents might proactively seek out the vaccine if their physicians do not offer it (Perkins et al., 2012). Thus, health care providers have an important role.

Weiss et al. (2010) found that health professionals who administered the HPV vaccine to female patients supported gender-neutral vaccination (vaccination of both boys and girls). However, the researchers questioned whether recommendations for such behavior would result in changes to patient or parent attitudes about HPV vaccination or improved vaccination efforts (Weiss et al., 2010). In addition, the responding physicians were less likely to recommend HPV vaccination for male or female children aged 9 to 12. Missed opportunities to educate and engage adolescents and their families about the HPV vaccine can affect vaccination rates (Perkins et al., 2012).

Clinicians have expressed challenges in their ability to recommend HPV vaccination to their patients. Among these are the discomfort to engage in conversations about sex with young adolescent patients, preferring to have such conversations with older adolescents (Kahn et al., 2005; Katz et al., 2016). Parents often depend on the expertise of their health care providers to make informed health decisions for their children (Btoush et al., 2019). Thus, clinicians knowledgeable and comfortable discussing these topics with the parents of their minor patients are more likely to influence parental vaccination intention and ultimate HPV vaccination behavior.
HPV Vaccination and Trust

Multiple layers of trust indicate HPV vaccine acceptance: trust in the HPV vaccine, the health care provider administering the vaccine, and the larger system responsible for its availability (e.g., pharmaceutical companies, researchers, and government). Larson et al. (2018) defined trust as “a relationship that exists between individuals, as well as between individuals and a system, in which one party accepts a vulnerable position, assuming the best interests and competence of the other, in exchange for a reduction in decision complexity” (p. 1599). There is conflicting research on trust and HPV vaccine receipt. Fu et al. (2017) suggested an association between a patient’s trust in the health care provider’s recommendation and HPV vaccine receipt. However, other researchers have not found an association between health care provider recommendations and HPV vaccine receipt (Nan et al., 2016). Health care provider recommendation and HPV vaccine receipt is a complex issue that requires exploration to understand the impact of trust in parents’ decision-making of HPV vaccination for their sons.

Research in communities of color suggests that mistrust of the health care system and the “stain” of Tuskegee remain (Evans et al., 2012; Katz et al., 2016; Kennedy et al., 2007; Mount et al., 2012; Tetteh et al., 2019). Beyond HPV vaccination, research also shows that a lack of trust can affect patients’ health care seeking and compliance and adherence to treatment (Molina et al., 2015). Understanding the perceptions of health among communities of color requires researchers to consider the historical and contemporary environments of racism in the health care setting (Galbraith-Gyan et al., 2019).
Conclusion

The recommendation to expand HPV vaccination to adolescent males occurred in 2011, and Black adolescent males continue to receive the HPV vaccine without significant adverse events. Evidence suggests that HPV vaccination is a way to avert approximately 92% of future HPV-preventable cancers (Senkomago et al., 2019). A lack of intervention to reduce HPV infection could address the consequences of HPV-related cancers, including oral, anal, and penile. Preventing cancer is essential, as there is no definite cure for cancer (Krzowska-Firych et al., 2019). HPV vaccination is a prime strategy for preventing certain types of cancer.

Increasing HPV vaccination uptake is a complex and nuanced issue. There is no quick fix or one-size-fits-all solution; rather, various strategies are necessary to increase parental understanding of HPV and the HPV vaccine and its influence on adolescent HPV vaccination uptake (Barnes et al., 2018; Hirth et al., 2019; Holloway, 2019). Mothers have an integral role in making decisions about their families’ health-seeking behaviors, particularly for their minor children (Berenson et al., 2014; Kaiser et al., 2016; K. K. Walker et al., 2020). Increasing HPV vaccine uptake in children requires an understanding of who and what influenced mothers’ vaccination decisions, as mothers are the gatekeepers to their children’s health. This study pertained to what mothers consider when making decisions about HPV vaccination for their Black adolescent sons. It was necessary to view this study through the lens of these women who base their parenting experiences on their simultaneous identities as women and mothers of adolescent Black sons. There was also a need to note that their experiences could contribute to their sons’ future life experiences. Understanding the influence of Black mothers’ personal
experiences and beliefs in the decisions that they made for their sons may further contribute to the knowledge base of health disparities (Harris et al., 2018). In this mixed-methods study, analysis of quantitative data from a national survey and qualitative data from the community were means to explore four research questions (RQs):

• RQ1: What was the prevalence of HPV vaccination among Black adolescent males in 2017?

• RQ2: What are the characteristics of Black adolescent males who were vaccinated against HPV during 2017 compared to Black adolescent males who were not vaccinated?

• RQ3: What are the perceptions and personal beliefs of Black mothers about childhood vaccinations and HPV?

• RQ4: What are the perceptions and personal beliefs expressed by Black mothers that may influence the decisions they make regarding HPV vaccination for their sons?

For this study, mothers were the population of interest. The definition of “mother” incorporated blended and extended families; the expanded definition of mother allowed that the person making health decisions with/for the adolescent could be a mother, grandmother, or aunt. Inclusion criteria were individuals who served in a maternal caregiving role for adolescents’ health, regardless of their actual family connections. Chapter 3 presents the methodology for the research.
Vaccination against HPV reduces HPV transmission and related cancer risk; however, HPV vaccination uptake remains low among Black male adolescents. The focus of this study was the HPV vaccination uptake and decision-making experiences of mothers of HPV vaccine-eligible Black male adolescents. This chapter presents the quantitative and qualitative approaches used in the mixed-methods study. Mixed-methods scholars combine elements of quantitative and qualitative approaches to gain a comprehensive understanding of a phenomenon (Johnson et al., 2007; Wisdom & Creswell, 2013). This study had a concurrent triangulation approach, with qualitative and quantitative methods used to explore the phenomenon of HPV vaccination among Black male adolescents (Creswell, 2003). Together, the two methods provided a deep exploration of HPV vaccination among this group. The open-ended qualitative interviews effectively addressed the limitations of a quantitative instrument.

A quantitative analysis of the 2017 NIS-Teen commenced to estimate the prevalence of HPV vaccination uptake among Black male adolescents aged 13 to 17 in the United States. Additionally, analysis of the NIS-Teen demographic data showed the characteristics of Black male adolescents vaccinated against HPV. Although this study did not include the design of strategies to increase vaccine uptake, there is a need to inform any interventions mothers consider when deciding to (or not to) have their children vaccinated against HPV. Qualitative interviews with mothers of Black adolescent sons occurred in 2017 to explore their perceptions and personal beliefs about
HPV vaccination and the influential factors in their decision-making around this issue. Also included in the semistructured interview discussions were the reasons for not vaccinating, as indicated by the NIS-Teen sample. Together, these methods allowed for clarification and understanding of potential contradictions between quantitative and qualitative findings, giving a voice to those involved in the decision-making process and using their experiences to frame the findings (Wisdom & Creswell, 2013).

**Data Source: 2017 National Immunization Survey – Teen**

The NIS is an annual survey of the childhood vaccination rates among children 19 to 35 months old. Launched in 2006, the NIS-Teen is an add-on to the NIS and a measure of the vaccination rates among noninstitutionalized teens ages 13 through 17 living in U.S. households. The NIS-Teen includes all teen vaccinations suggested by the ACIP, including HPV vaccination (DHHS, 2018). The 2017 NIS-Teen Supplement provided the data used for quantitative analysis. The ACIP recommendations include the immunization schedule that provides clinical guidance for health practitioners. Published by the CDC, these recommendations are the official public health guidance on using vaccines used by officials from private insurers, states, and the federal government to determine which vaccines to pay for, cover, or reimburse.

**Sampling Design of the National Immunization Survey – Teen**

The NIS-Teen consists of telephone interviews with adolescents’ caregivers and provider record checks. Telephone interviews (via landline and cellular phone numbers) occur with households selected by random digit dialing in all 50 U.S. states, the District of Columbia, and U.S. territories. Using the same sampling frames and sampling methodology of the NIS, the list-assisted method of random digit dialing allows the NIS-
Teen to randomly sample landlines from a batch of 100 consecutive telephone numbers containing one directory-listed residential number. There are quarterly updates to the sampling frame of telephone numbers to reflect new exchanges and area codes. For cellular phone numbers, there is a sample selected from all banks of cellular phone numbers, not just those containing at least one directory-listed residential number. In addition, there are no directory listings available for the Guam landline sample, so there are both the landline and cell phone samples selected in the same manner as the cellphone sample (DHHS, 2018).

The second part of the NIS-Teen survey is provider record checks. To complete this step, at the end of the interview, parents and guardians of eligible adolescents give consent to contact the health care providers responsible for vaccination. There is contact made with health care providers (e.g., pediatricians and family physicians) via mail surveys to obtain information about the immunizations, dates of administration, and additional data facility characteristics. The mail survey is the means used to contact the identified providers through either landline or cellular phone interviews. Contact with the providers occurs 2 weeks after the initial mailing if there is no response, and the providers receive the option to mail or fax back the information. In some cases, there are provider-based histories captured over the phone (DHHS, 2018).

In 2017, NIS-Teen sampling of households commenced via landlines and cell phones. Household interviews occurred between January 5, 2017, and January 19, 2018, with landline users, and household interviews took place between January 5, 2017, and January 26, 2018, for cell phone users. The data used for quantitative analysis in the present study were from the NIS-Teen public use data file, which contained information
for 43,591 teens with completed household data. The data set did not include Guam, the U.S. Virgin Islands, and Puerto Rico due to confidentiality issues and a natural disaster that obstructed the ability to obtain data (DHHS, 2018).

The household-phase weight in the 2017 NIS-Teen public-use data file was for all teenagers in the United States and obtained from the CDC (2021). This weight enabled the formation of estimates from teenagers with completed household interviews, which comprised the data analyzed in this study. The weight reflected the stratified sample design and underwent adjustment for unit nonresponse, the selection of one teenager per household, the number of telephone lines in the household, the combination of the landline and cell phone samples, calibration to population control totals, and the exclusion of nontelephone teenagers (DHHS, 2018). This data set had a limitation. The NIS-Teen is a telephone survey; therefore, there were results weighted to represent all adolescents 13 through 17 years of age. Despite statistical adjustments to account for nonresponse and households without telephones, some bias may have remained. Analysis of the weights provided by the NIS-Teen were means to account for the complex sampling design and calculate nationally representative estimates.

**Analytic Sample**

Although the NIS-Teen included both household survey and provider record check data, the analysis for this study focused on the household survey information. The respondents interviewed were the adults most knowledgeable of the adolescents’ vaccinations. The raw sample size used for analysis was 2,149 and included Black adolescent males between 13 and 17 years of age, with those categorized as “White Only” or “Other + Multiple Race” excluded from the analysis.
Instrumentation and Data Collection

The NIS-Teen commenced with computer-assisted telephone interview methods. This NIS-Teen questionnaire underwent Spanish translation, with language access services used for real-time translation into other languages. The information obtained included vaccination history, teen and household health, demographic information, and permission to contact the teenagers’ vaccination providers (DHHS, 2018).

There was a response rate calculated using the Council of American Survey Research Organizations (CASRO) assumptions. The rate of households among the unresolved telephone numbers was the same as the observed rate of households among the resolved telephone numbers. In addition, the rate of eligible households among unscreened households was the same as the observed rate of eligible households among screened households. Using these assumptions, the CASRO response rate was equal to the product of the resolution rate, the screener completion rate, and the interview completion rate. The response rate for combined landline and cell phone samples for the 2017 NIS-Teen was 25.7%. The 2017 response rate was the lowest since the addition of the cell phone sample to the NIS in 2011. In 2015 and 2016, there was a response rate above 32% (32.9% and 32.7%, respectively). There were lower CASRO response rates for the combined landline and cell phone samples in years with larger cell phone samples and higher CASRO response rates in years with smaller cell phone samples (DHHS, 2018).

Missing Data

Inputs into the NIS-Teen were the means to replace missing values in the socioeconomic and demographic variables used in weighting. There were missing values
of these variables added for all teenagers with completed household interviews (e.g., all teenagers appearing on the public-use data file). There were also missing values of health insurance variables input for teenagers with adequate provider data. The affected variables in this analysis were the sex, race, and health insurance status of the teenagers and the education level, age group, and marital status of the mothers (DHHS, 2018).

Variable Selection and Operationalization

Analysis commenced of the demographic variables and variables related to HPV vaccination from the NIS-Teen to understand the characteristics and vaccination behaviors of Black male adolescents. The section below presents the variables selected for analysis.

Outcome Variables

The following outcome variables of the NIS-Teen public use data set were appropriate to measure vaccination behavior: (a) receipt of at least one HPV shot and (b) receipt of all HPV shots (see Table 2). There was receipt of at least one HPV shot operationalized using the receipt of any HPV shots variable. In the NIS-Teen public use file, coding of the receipt of any HPV shots variable was by yes, no, don’t know, missing in error, and refused. For analyses in this dissertation, this was a variable recoded as the receipt of at least one HPV shot variable and was a binary variable, with don’t know and missing in error. It was necessary to recode refused as no, as these responses did not provide additional detail to the analysis.

Operationalizing HPV vaccination completion was by using the receipt of all HPV shots variable in the NIS-Teen public use data set. For the HPV vaccine, the data included those eligible for vaccination with a two-dose or three-dose schedule based on
the revised vaccination schedule for those receiving their first dose before age 15. Thus, after October 2016, adolescents receiving their first dose before age 15 qualified as fully covered with two doses (Meites et al., 2016). Data in the 2017 NIS-Teen data only included adolescents receiving vaccination after that time (T. Y. Walker et al., 2018). In the public use file, there was receipt of any HPV shots recoded to a binary variable (*all shots, not all shots*) with *refused* and *don’t know* responses recoded to *not all shots* for analysis.

**Table 2: Operationalization of Outcome Variables**

<table>
<thead>
<tr>
<th>Variable Description</th>
<th>Response Options</th>
<th>Recoded for Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receipt of any HPV shots</td>
<td>yes/no/don’t know/missing in error/refused</td>
<td>yes/no</td>
</tr>
<tr>
<td>Receipt of all HPV shots</td>
<td>all shots/don’t know/refused</td>
<td>all shots/not all shots</td>
</tr>
</tbody>
</table>

**Demographic Variables**

Table 3 shows the demographic variables used in the analysis. The demographic variables were the variables analyzed for this research question and segmented into the following categories: teen demographics, parent demographics, and health engagement.
### Table 3: Operationalization of Demographic Variables

<table>
<thead>
<tr>
<th>Variable Description</th>
<th>Response Options</th>
<th>Recoded for Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Teen demographics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age of teen</td>
<td>numerical age</td>
<td>no change</td>
</tr>
<tr>
<td>Insurance coverage of teen</td>
<td>private insurance/ Medicaid/other insurance/uninsured</td>
<td>insurance/uninsured</td>
</tr>
<tr>
<td><strong>Parent demographics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Area of residence</td>
<td>Northeast/West/South/Midwest</td>
<td>no change</td>
</tr>
<tr>
<td>Family income categories</td>
<td>above poverty ($&gt;75k)/above poverty ($≤75k)/below poverty/unknown</td>
<td>above poverty ($&gt;75k)/below poverty</td>
</tr>
<tr>
<td>Mother’s age</td>
<td>≤34 years/35-44 years/≥45 years/don’t know/missing in error/refused</td>
<td>≤34 years/35-44 years/≥45 years</td>
</tr>
<tr>
<td>Mother’s educational level</td>
<td>less than 12 years/12 years/more than 12 years, non college grad/college grad/don’t know/missing in error/refused</td>
<td>less than 12 years/12 years/more than 12 years, non college grad/college grad</td>
</tr>
<tr>
<td>Mother’s marital status</td>
<td>married/never married, widowed, divorced, separated, deceased, living with partner</td>
<td>married/unmarried</td>
</tr>
<tr>
<td><strong>Health engagement</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinical recommendation for HPV vaccination</td>
<td>yes/no/don’t know/missing in error/refused</td>
<td>yes/no</td>
</tr>
<tr>
<td>Receipt of 11-12 well checkup</td>
<td>yes/no/don’t know/missing in error/refused</td>
<td>yes/no</td>
</tr>
<tr>
<td>Receipt of any vaccination</td>
<td>yes/no/don’t know/missing in error/refused</td>
<td>yes/no</td>
</tr>
</tbody>
</table>
Teen demographics included teenager age and insurance coverage of teenager (see Table 3). The participants provided the age of their teenagers in the household interviews, captured as a continuous number. There was also insurance status of the teenagers recorded in the health insurance module of the NIS-Teen (i.e., *private insurance/*any Medicaid/*other insurance/*uninsured). There was recoding of the insurance status variable to two levels (*insurance/*uninsured), with *private insurance, any Medicaid, and other insurance* recoded to *insurance*.

As shown in Table 3, the parental/household demographics were (a) area of residence, (b) family income categories, (c) mother’s age, (d) mother’s educational level, and (e) mother’s marital status. Responses for area of residence were *Northeast, Midwest, South,* and *West.* There was recoding of the family income categories variable, with unknown responses recoded as *system missing* and removed from the analysis. Recoding of the maternal age and maternal educational level variables entailed labeling *don’t know, missing in error,* and *refused* as *system missing* and removing them from analysis.

Prior research has shown that health care providers can influence vaccination intention and subsequent behaviors by creating opportunities for recommending HPV vaccination (Btoush et al., 2019; CDC, 2013; Galbraith-Gyan et al., 2019; Hennebery et al., 2020; Hirth et al., 2019; Kim & LeClaire, 2019; Sriram & Ranganathan, 2019; VanderVeen et al., 2020). In this study, health engagement variables underwent analysis to assess the teenagers’ engagement with health care providers: (a) recommendation for HPV vaccination from a health care provider, (b) receipt of 11- to 12-year-old wellness checkup, and (c) receipt of a vaccination of any type. For all three variables, there were
variables recoded with *missing in error* and *refused* marked as *system missing* and eliminated from analysis, as these responses provided no additional insight.

*Reasons Not to Vaccinate*

The theory of planned behavior addresses behaviors over which people have control (Ajzen & Fishbein, 1980). Mapping the reasons for the lack of vaccination in the next 12 months occurred along the framework of the theory of planned behavior. In the NIS-Teen household survey, if there were fewer than the required HPV vaccinations reported, the respondents indicated the likelihood that the teenagers would receive HPV vaccinations in the next 12 months. The response options were *very likely, somewhat likely, not too likely, not likely at all, not sure/don’t know, missing in error, and refused*. For analysis in this study, there was recoding of the response options *missing in error* and *refused* in the intention to vaccinate in 12 months variable as *system missing* and removal from analysis.

Those who reported *not too likely, not likely at all, or not sure/don’t know* indicated the reason that the teenagers would not receive HPV vaccinations in the next 12 months. The respondents selected a response and could provide another reason as an open-ended response (via other reason). Table 4 shows the respondents’ reasons for declining HPV vaccination for the teenagers categorized using the constructs of the theory of planned behavior: behavioral beliefs, normative beliefs, and control beliefs.
Table 4: Reasons for Declining HPV Vaccination

<table>
<thead>
<tr>
<th>Construct</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavioral beliefs</td>
<td>• Already up-to-date: the child has received all of the recommended doses</td>
</tr>
<tr>
<td></td>
<td>• Child fearful: belief that the adolescent is fearful because the shot could be painful</td>
</tr>
<tr>
<td></td>
<td>• Child is male: the belief that the adolescent’s male sex was the reason vaccination was not needed Don’t believe in immunizations: mother does not believe in immunizations</td>
</tr>
<tr>
<td></td>
<td>• Effectiveness concern: belief that vaccine is not effective</td>
</tr>
<tr>
<td></td>
<td>• Increased sexual activity concern: concern that adolescent may become sexually active if they receive the shot</td>
</tr>
<tr>
<td></td>
<td>• Lack of knowledge: mother did not know about HPV disease</td>
</tr>
<tr>
<td></td>
<td>• More info/new vaccine: belief that vaccine was new and more information was needed</td>
</tr>
<tr>
<td></td>
<td>• Not appropriate age: adolescent is not at the appropriate age; provider indicated adolescent could vaccinate at older age</td>
</tr>
<tr>
<td></td>
<td>• Not needed or not necessary: belief that vaccine is not needed or necessary</td>
</tr>
<tr>
<td></td>
<td>• Not recommended: did not know the vaccine was recommended for my adolescent</td>
</tr>
<tr>
<td></td>
<td>• Not sexually active: belief that vaccination was not needed because adolescent was not sexually active</td>
</tr>
<tr>
<td></td>
<td>• Safety concern/side effects: belief that vaccine was not safe or had bad side effects</td>
</tr>
<tr>
<td>Subjective norms</td>
<td>• Child should make the decision: adolescent is receiving the shot and should be the person making the decision</td>
</tr>
<tr>
<td></td>
<td>• Family/parental decision: decision should be made by the parents</td>
</tr>
<tr>
<td></td>
<td>• Religion/Orthodox: religion would not support vaccination</td>
</tr>
<tr>
<td>Control beliefs</td>
<td>• Costs: uninsured; insurance doesn’t fully cover shots; insurance co-pay or other costs (e.g., office visit charges) too high</td>
</tr>
<tr>
<td></td>
<td>• Difficulty making or getting to appointment/transportation problems: difficulty making or getting to appointments; transportation problems</td>
</tr>
<tr>
<td></td>
<td>• Handicapped/special needs/illness: adolescent is handicapped, has special needs, or illness that prevents them from being vaccinated</td>
</tr>
<tr>
<td></td>
<td>• Intend to complete but have not yet/already planned: future intention to vaccinate but have not yet</td>
</tr>
<tr>
<td></td>
<td>• Not a school requirement: HPV vaccination not required for school enrollment</td>
</tr>
<tr>
<td></td>
<td>• No doctor or doctor’s visit scheduled: adolescent does not have a physician or doctor’s visit scheduled</td>
</tr>
<tr>
<td></td>
<td>• Not available: HPV vaccine not available</td>
</tr>
<tr>
<td></td>
<td>• Time: too much time required to get all the required shots</td>
</tr>
</tbody>
</table>
Analysis Plan

Downloaded as an R file, the 2017 NIS-Teen data set underwent conversion for analysis in SPSS version 26 (IBM Corp., 2018). Statistics performed entailed using appropriate complex survey procedures to account for the NIS-Teen’s dual-frame sampling and weighting techniques (DHHS, 2018). To address the research questions, analysis included a sample limited to male teenagers ages 13 to 17, as indicated by the sex variable in the NIS-Teen data set. There was the dual-frame sampling weight variable for producing estimates for teens with completed household surveys (DHHS, 2018) applied to the data set prior to analyses.

The statistical computations consisted of the following: (a) univariate analysis of variables to provide descriptive statistics, (b) chi-square analyses for relationships between select variables, (c) and multivariate analyses to examine the performance of select independent variables as explanatory factors for the dependent variables. In addition, moderation analyses were means to examine the relationship between clinical recommendation and (a) any HPV vaccine receipt and (b) number of HPV shots received by maternal educational level.

Research Questions 1 and 2

Table 5 presents the variables explored for Research Questions 1 and 2.
Table 5. Research Questions 1 and 2 by Variables Analyzed

<table>
<thead>
<tr>
<th>Research Question</th>
<th>Variables</th>
</tr>
</thead>
</table>
| 1. What is the prevalence of HPV vaccination among Black adolescent males in 2017?| • Receipt of any HPV shots  
• Receipt of all HPV shots                                                     |
| 2. What are the characteristics of Black adolescent males who were vaccinated against HPV during 2017 as compared to those who were not vaccinated?| • Age of teen  
• Insurance coverage of teen  
• Family poverty level  
• Mother’s age  
• Mother’s educational level  
• Mother’s marital status  
• State of residence  
• Clinical recommendation for HPV vaccination  
• Receipt of 11-12 well checkup  
• Receipt of any vaccination |

RQ1: What was the prevalence of HPV vaccination among Black adolescent males in 2017?

Univariate analyses commenced to report descriptive statistics with weighted percentages for teen demographics, maternal demographics, health engagement variables (i.e., clinical recommendation and receipt of 11- to 12-year-old well checkup), and vaccination behavior. Also reported was the likelihood of HPV vaccination in the next 12 months. In addition, there were frequencies of parents who did not intend to vaccinate their children against HPV in the next 12 months calculated and presented. Statistical analysis of the lack of intention to have sons vaccinated against HPV in the next 12 months entailed analyzing the responses of not too likely or not likely at all to the prior question on the likelihood of HPV vaccination in the next 12 months.

RQ2: What are the characteristics of Black adolescent males who were vaccinated against HPV during 2017 compared to Black adolescent males who were not vaccinated?
To explore within group characteristics, there was the segmentation of the variables analyzed for this research question into categories: teen demographics, maternal demographics, health engagement variables, and receipt of HPV vaccination.

Chi-square analyses (with an alpha set at 0.05) commenced to test the relationships between the following categorical variables.

- Being married (two levels) and receipt of clinical recommendation (two levels)
- Having insurance (two levels) and receipt of at least one HPV shot (two levels)
- Increase in maternal age (three levels) and receipt of at least one HPV shot (two levels)
- Receipt of 11- to 12-year-old well checkup (two levels) and receipt of at least one HPV shot (two levels)

Regression analyses commenced to test the following hypotheses:

H\(_{0a}\): Teen demographics, maternal demographics, and health engagement have no influence on HPV vaccination initiation

H\(_{1a}\): Teen demographics, maternal demographics, and health engagement have a positive influence on receipt of at least one HPV shot

H\(_{0b}\): Teen demographics, maternal demographics, and health engagement have no influence on HPV vaccine completion

H\(_{1b}\): Teen demographics, maternal demographics, and health engagement have a positive influence on receipt of all HPV shots

A binary logistic regression occurred to test whether teen demographics, maternal demographics, and health engagement were positive predictors of the receipt of at least one HPV shot. The dependent variable was receipt of at least one HPV shot. The independent variables were (a) insurance status, (b) family income categories, (c) geographic region, (d) maternal age, (e) mother’s educational level, (f) mother’s marital
status, (g) receipt of 11- to 12-year-old checkup, and (i) receipt of provider recommendation for HPV vaccination. There were an interaction term for mother’s educational level and clinical recommendation added to the model to explore interaction effects.

A binary logistic regression commenced to test whether teen demographics, maternal demographics, and health engagement were positive predictors of the receipt of all HPV shots. The dependent variable was receipt of at least one HPV shot. The independent variables were (a) insurance status, (b) family income categories, (c) geographic region, (d) maternal age, (e) mother’s educational level, (f) mother’s marital status, (g) receipt of 11- to 12-year-old checkup, and (i) receipt of provider recommendation for HPV vaccination. There was an interaction term for mother’s educational level with clinical recommendation added to the model to explore interaction effects.

**Overview of Qualitative Interviewing**

The purpose of qualitative interviews is to gain a better understanding of reality (Wengraf, 2001). Qualitative interviews are a useful way to understand frequently underresearched populations and communities (McGrath et al., 2019; Reeves et al., 2015). Research interviews are a means of exploring the views, experiences, beliefs, and motivations of individuals on specific matters (Gill et al., 2008). Interviews occur with one researcher and one participant for interactivity and to elicit in-depth, context-rich personal perspectives and perceptions (Bloomberg & Volpe, 2019). This study included semistructured interviews, with several key questions used to guide the discussion while providing the opportunity to explore responses in detail. Semistructured interviews
enable researchers to dig deeper (McGrath et al., 2019) and produce information not originally considered by the researchers (Gill et al., 2008; Wengraf, 2001).

Research Questions 3 and 4

The qualitative portion of this study addressed RQ3 and RQ4.

RQ3: What are the perceptions and personal beliefs of Black mothers about childhood vaccinations and HPV?

RQ4: What are the perceptions and personal beliefs expressed by Black mothers that may influence the decisions they make regarding HPV vaccination for their sons?

Recruitment Methods

Participant recruitment occurred using an approved flyer and word of mouth. Distribution of the recruitment flyers was to a variety of organizations and sites where eligible participants congregated, such as fraternal organizations (e.g., sororities, fraternities, Mason/Shriners, and Order of the Eastern Star), community-based organizations (e.g., MOCHA Moms, Jack and Jill, Boys and Girls Club, NAACP, Civic League), houses of worship, and youth programs (e.g., Pop Warner and cheerleading programs). There were online (e.g., social media and e-mail) and offline/word-of-mouth strategies to promote the study and direct potential participants for enrollment. In addition, some participants shared recruitment materials with mothers in their networks potentially eligible to participate. Although recruitment was primarily directed to mothers who resided in the state of New Jersey, interviews were conducted with eligible mothers outside New Jersey. Recruitment was an opt-in method in which the participants contacted the project investigator to express interest and provide follow-up contact information. There were eligibility criteria reviewed (presented in the following section)
once the potential participants contacted the project investigator. If eligible, the participants provided convenient days and times to conduct the interviews, and they shared their preferred communication methods for the interviews.

**Eligibility Criteria**

The eligibility criteria were women residing in a household with at least one male child ages 11 to 17 who identified as Black (African American, Caribbean/West Indian, or African), willingness to participate in an in-person or online 45- to 60-minute interview, ability to complete a preinterview survey, and ability to read and speak English. The mothers who met the inclusion criteria were eligible for participation, regardless of their adolescents’ HPV vaccination status. Those who did not meet all of the criteria received thanks for their interest and exclusion from participation. Appendix 1 presents the terms used in the qualitative part of this study.

This study included the term “Black mothers” to describe the caregivers who participated in the qualitative interviews. However, the focus was the experiences of mothers of Black sons to understand the influences in the decisions that they made for their adolescent sons aged 11 to 17. Therefore, women who did not identify as Black but had sons who identified as Black were also eligible for participation.

**Protection of Human Subjects**

Twenty-three interviews took place between August 2017 and December 2017. The participants received informed consent forms via e-mail before the interviews for review. The participants could ask any questions about the research at the beginning of their interviews. The participants verbally agreed to participate after the interviewer read aloud the audiotape addendum of consent. The participants provided audio-recorded
verbal agreement before the interviews commenced. Rutgers University’s Institutional Review Board provided approval for the study procedures. After the interviews, the participants received an educational sheet on HPV and the HPV vaccine by CDC and a $35 Visa or Target gift card as thanks for their time and insight.

Interviews

Upon agreeing to a date or time and online video application (e.g., Facebook Video Calling, Skype, FaceTime, Zoom, GoToMeeting, Google Hangouts), the participants received the consent form via an e-mail with a hyperlink to a pre-interview survey. The pre-interview survey helped to ease respondent burden on the day of the interview, allowing them to complete the instrument at their pace and convenience. The purpose of the survey was to obtain mothers’ and children’s demographic information (e.g., age, health insurance status, and vaccination behavior of age-appropriate vaccines). The use of video (via telephone, tablet, or computer screen) enabled the interviewer and participant to see each other during the interview. This method provided a personal environment because the interviewer could respond to facial cues and tones and enabled the online interviews to occur similarly to face-to-face interviews. However, there was only audio captured and recorded for transcription purposes for both online interviews and face-to-face interviews. The interviews lasted between 30 to 60 minutes, with an average length of approximately 45 minutes.

Interviews commenced face-to-face or via VoIP methods. For individuals with limited technological literacy (e.g., those who did not have a computer with a camera or did not know how to use an online video application) and residence within the State of New Jersey, there was an option to conduct the interview in person. Such participants
suggested alternative locations where they felt comfortable (e.g., their homes, coffee shops) to conduct in-person interviews. The interviewer then traveled to the agreed-upon locations.

Video interviews more closely approximate the face-to-face experience among a broad group of participants while still taking advantage of the cost-effectiveness of the phone interviews (Deakin & Wakefield, 2014; Janghorban, 2014; Lo Iacono & Brown, 2016). The participants selected an online video application based on their preference and comfort; all the available interviewing applications had similar features and capabilities. The participants used the devices they felt most comfortable using for the interviews (i.e., mobile phones, tablets, or desktop/laptop computers). Interviews times were available 7 days of the week, with times in the morning, afternoon, and evening (as late as 10:30 p.m.) to accommodate the participants’ schedules.

**Interview Questions**

Prior research on parental vaccine acceptance with adolescent and teenage women showed that not following up and asking participants about issues that might have influenced vaccine acceptability was a limitation (Reynolds & O’Connell, 2012). Thus, individual interviews were appropriate in this study to explore the HPV vaccination decision-making of mothers of Black male adolescents with the theory of planned behavior as the overarching framework. Semistructured interviews (approximately 30 to 60 minutes in length) with open-ended questions entailed using targeted probing questions used where appropriate to gain more information. Discussion questions stemmed from the existing literature on parental acceptance of the HPV vaccine and the reasons for not vaccinating their teens as indicated in the NIS-Teen supplement.
The discussion guide allowed for the assessment of the following: understanding of HPV and the vaccine; general thoughts and attitudes about vaccines and vaccination; perceptions of the influences of family, friends, and others in their networks; belief of their control to have their children vaccinated; and barriers and facilitators to initiating and completing the vaccination series. The mothers also described trusted sources and how they obtained health information (e.g., printed materials, mass media, social media, and referent groups). The NIS-Teen provided quantitative data on why the children would not receive the vaccination in the next 12 months. There were select reasons explored through the qualitative interviews to obtain a better understanding of these concerns.

The participants described how they discussed health and their perceptions of their sons’ role in health decision-making, attitudes to vaccination, understanding of HPV and the vaccine, their role and control in the son’s vaccination behavior, their sons’ vaccination status, and the likelihood of future vaccination (for those who had not initiated or completed the vaccination series at the time of interviews). There were constructs from variables in the NIS-Teen data set (including demographic variables, health care provider recommendation, prior vaccination behavior, HPV vaccination intention, and reasons for not vaccinating) used to frame discussions about the reasoning for not vaccinating and the factors considered when making vaccination decisions.

Table 6 presents the questions used in the interview.
Table 6: Research Interview Questions

<table>
<thead>
<tr>
<th>Topic</th>
<th>Questions</th>
</tr>
</thead>
</table>
| Awareness and knowledge of HPV                  | • What kinds of things have you heard about the HPV virus?  
• What kind of discussions have you had with your sons about HPV? |
| Awareness and knowledge of HPV vaccine          | • What kinds of things have you heard about the HPV vaccine?  
• How important do you feel it is for a boy to be vaccinated against HPV?  
• What is the earliest age that you think someone can be vaccinated against HPV?  
• What is the earliest age that you think someone should be vaccinated against HPV? |
| Factors (positive and negative) affecting vaccination | • Some vaccines are required for children to attend school. If vaccines were not required for children to attend school, would you still have your children vaccinated? Why or why not?  
• Some people believe that being vaccinated against HPV may increase the likelihood of that son becoming sexually active. How do you feel about that?  
• Some caregivers have concerns about the “newness” of the HPV vaccine. What do you think about that?  
• Imagine that it is true that the HPV vaccine would prevent your son from transmitting the HPV virus to a future sexual partner. How much would that influence your decision to vaccinate your son against HPV?  
• The HPV vaccine was previously administered in three doses over the course of 6 months. Now it is available for some in only two doses. How do you feel about that? |
| Decision-making about son’s health              | • How involved is your son in making decisions about his health?  
• More specifically, when making decisions about vaccination for your son, how much is your son involved in the decision-making?  
• Who are other people, if any, who have a role in the decision-making about vaccination? |
<p>| Intention for future HPV vaccination            | • (For those whose sons have not completed the series) Using a range from very unlikely to very likely, how likely is it that you will have your son vaccinated against HPV in the next 12 months? What is the main reason you selected that answer? |</p>
<table>
<thead>
<tr>
<th>Topic</th>
<th>Questions</th>
</tr>
</thead>
</table>
| Feelings about vaccines in general (including influenza and meningococcal) | • What do you think about vaccines?  
• Has your son ever received the meningitis vaccine? Why did you make that decision?  
• Has your son ever received the flu shot? Why did you make that decision? |
| Perceived behavioral control | • How much control do you believe you have over whether your son receives the HPV vaccine? Why do you feel that way? |
| Sources of health information | • What kinds of places have you seen advertising or materials about the HPV vaccine?  
• When deciding whether to vaccinate your son, where do you go for information? Who do you consider trustworthy sources for information? |
| Influencers | • What do you think your family would think about your son if they learned he was vaccinated against HPV?  
• What do you think your friends would think about your son if they learned he was vaccinated against HPV?  
• (For those who attend a house of worship regularly) What do you think the leadership in your place of worship would think if they learned your son was vaccinated against HPV?  
• How is your son’s father involved in the decision-making around your son’s health? |
| HPV Risk perception | • How much do you think boys are at risk for being infected with HPV?  
• Do you think they are more or less at risk for being infected than girls? Why do you think that? |
| Role of health care provider | • How much do you consider the advice of your health care provider when making a decision regarding vaccination?  
• What has your health care provider said to you about the HPV vaccine?  
• For those who have had a conversation with your health care provider about the vaccine, did you initiate the conversation, or did they bring up the topic? |
| Reasons for not completing HPV vaccination series | • For those of you whose sons have received 1 or 2 doses but have not completed the series, why have you not completed the series? |
Coding and Thematic Analysis

Following each participant interview, there was transcription of the digital audio file to a text file with a professional transcription company. The files underwent editing to change the names of participants and remove the names of the children. Analysis of the interview transcripts commenced using Dedoose, a qualitative research software (SocioCultural Research Consultants, 2019). Recruitment of participants and interviews occurred until there was no new information obtained (Krueger & Casey, 2008). There was audio from the interview captured on multiple digital recorders. Each audio file underwent review to ensure the clarity of the audio. Once determined satisfactory, the digital file was uploaded to a computer for transcription to text.

Qualitative analysis consisted of reading transcripts, making analytical memos, creating codes, developing categories, and developing major concepts. Thematic analysis helped to identify patterns in the transcripts to explain what the mothers know about HPV and other vaccines, mothers’ attitudes and opinions about HPV vaccination, the role of parents and sons in decision-making about sons’ health, influencers, and reasons for vaccinating. An essentialist method was appropriate to examine the experiences and meanings of the participants and extract relevant quotes (Braun & Clarke, 2006). A mix of deductive and inductive methods entailed including the themes previously identified in the literature and the themes not yet identified that emerged from the interviews.

Documentation of the analytic memos occurred throughout the qualitative analysis. Analytic memos are reflections of the coding process, code choices, and patterns and themes emergent from the data (Saldaña, 2016). The analytic memos were
the means used to note areas for future exploration and particularly insightful participant responses.

Open coding is the analytic process for categorizing and segmenting textual information (Bloomberg & Volpe, 2019). During this initial coding, there were codes assigned to portions (e.g., words, phrases, sentences, or paragraphs) of the participants’ responses reflective of the themes of HPV vaccination. In vivo coding (i.e., using terms based on the participants’ actual language) also occurred. Readings of the transcripts happened multiple times for the creation of subcodes. Compiling the codes into a final list facilitated analyzing the transcript text. The codes underwent organization and grouping into categories or “families” because of similar characteristics.

Exploring the mothers’ comments and how they related to HPV vaccination behavior allowed for the development of connections between the data. Data reduction was the means used to condense the data to highlight the most important concepts. A central category emerged, as well as other categories related to that category.

Reliability Testing

A second coder independently coded a sample of the qualitative in-depth interview transcripts to assess interrater (or intercoder) reliability. Interrater reliability is a means of assessing the degree to which multiple raters similarly assess the same phenomenon. A random selection of excerpts from completed interview transcripts underwent a second coding to determine reliability. There was a second coder trained on the use of the coding materials who coded the excerpts with the interrater platform on Dedoose. The training included a review of the coding process to ensure that the coder could correctly identify and classify instances of themes relevant to the research. The
second coder practiced applying the coding methodology to transcript excerpts. Training also included a hands-on review of the Dedoose software.

After analysis of the sample excerpts, the two coders discussed the results and reconciled disagreements. Using Dedoose, the second coder independently analyzed excerpts of approximately 15% of transcript data. There were good reliability results, with a Cohen’s kappa value of .87. The coders had subsequent discussions to resolve differences in data interpretation.

The results from the in-depth interviews consisted of descriptive reporting of the participants (obtained from the pre-interview survey) and the themes identified from the transcripts that addressed the research questions. Chapter 4 presents the excerpts and quotes used to highlight the themes.
CHAPTER 4
RESULTS

Researchers have found that mothers declined HPV vaccination for their sons for complex and nuanced reasons (Hausman, 2019; Joseph, 2020). Research has not addressed whether the reasons mothers decline vaccination for their sons varies by race or explored the experiences of Black mothers related to HPV vaccination for their sons. With qualitative and quantitative methods, this study filled the gap in HPV vaccination literature on the experiences of mothers of Black male adolescents. The quantitative analysis contributed to the research in this arena by focusing on vaccine uptake at one point in time. It also enhanced the literature by addressing if increased maternal educational attainment is a moderating factor for the relationship between clinical recommendation and the receipt of any or all HPV shots. The qualitative analysis contributed to the literature with in-depth interviews with mothers of Black male adolescents to learn about their experiences as they navigated the vaccination decision-making process for their sons and the reasons for their decisions. The vaccination uptake among Black male adolescents is not a rate close to the recommended 80% objective of Healthy People 2020 (T. Y. Walker et al., 2019). Understanding these decisions may be a means of developing interventions to increase HPV vaccination uptake in this population.

**RQ1: What was the prevalence of HPV vaccination among Black adolescent males in 2017?**

A quantitative analysis of the 2017 NIS-Teen commenced to estimate the prevalence of HPV vaccination uptake among Black male adolescents ages 13 to 17 in
the United States. There is a description of the sample provided below. As indicated in
the methodology chapter, there were no missing data included in the analysis.

Characteristics of the Sample

The mean age of the teenagers analyzed during the NIS-Teen interview was 15.04
years, with a range of 13 to 17 years (see Table 7). Most of the teenagers had health
insurance (95.2%); the remaining 4.8% did not. Approximately 65% of NIS-Teen
respondents were above poverty, and 35% were below poverty. More than half of the
Black male adolescents in the sample (57.7%) lived in the Southern United States. Most
mothers in the sample were above the age of 35 (35 to 44 years of age [47.1%] and 45
years of age or more [40.4%], respectively). The mothers in this sample had high levels
of educational attainment; more than half of the sample had some college (31.1%) or
college degrees (28.6%). In this sample, almost 40% of respondents were married. More
than 95% had received at least one vaccination during their life. Approximately 58% of
the Black male adolescents received recommendations from health care providers for
HPV vaccination.

HPV Vaccination Prevalence in the Sample

More than 92% of the Black male adolescents received well checkups at age 11 or
12. Approximately 48% of Black male adolescents received at least one HPV shot. About
33% received all HPV shots.
Table 7: Descriptive Characteristics of Black Adolescent Males and Mothers, NIS-Teen, 2017

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>% (Weighted Frequency)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample</td>
<td>(1,621,066)</td>
</tr>
<tr>
<td>Age of teen (years)</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>19.5 (315,893)</td>
</tr>
<tr>
<td>14</td>
<td>17.9 (290,370)</td>
</tr>
<tr>
<td>15</td>
<td>21.2 (343,821)</td>
</tr>
<tr>
<td>16</td>
<td>22.2 (359,361)</td>
</tr>
<tr>
<td>17</td>
<td>19.2 (311,621)</td>
</tr>
<tr>
<td>Insurance status of teen*</td>
<td></td>
</tr>
<tr>
<td>Insured</td>
<td>95.2 (651,263)</td>
</tr>
<tr>
<td>Uninsured</td>
<td>4.8 (33,106)</td>
</tr>
<tr>
<td>Area of residence</td>
<td></td>
</tr>
<tr>
<td>Northeast</td>
<td>16.7 (270,266)</td>
</tr>
<tr>
<td>Midwest</td>
<td>16.7 (270,648)</td>
</tr>
<tr>
<td>South</td>
<td>57.7 (935,946)</td>
</tr>
<tr>
<td>West</td>
<td>8.9 (144,205)</td>
</tr>
<tr>
<td>Family income categories**</td>
<td></td>
</tr>
<tr>
<td>Above poverty (&gt;=$75k)</td>
<td>23.9 (353,350)</td>
</tr>
<tr>
<td>Above poverty (≤$75k)</td>
<td>41.0 (605,597)</td>
</tr>
<tr>
<td>Below poverty</td>
<td>35.1 (518,447)</td>
</tr>
<tr>
<td>Mother’s age</td>
<td></td>
</tr>
<tr>
<td>≤34 years</td>
<td>12.5 (201,908)</td>
</tr>
<tr>
<td>35-44 years</td>
<td>47.1 (764,120)</td>
</tr>
<tr>
<td>≥45 years</td>
<td>40.4 (655,038)</td>
</tr>
<tr>
<td>Mother’s educational level</td>
<td></td>
</tr>
<tr>
<td>Less than 12 years</td>
<td>14.8 (239,524)</td>
</tr>
<tr>
<td>High school</td>
<td>25.5 (412,947)</td>
</tr>
<tr>
<td>Some college, noncollege graduate</td>
<td>31.1 (504,521)</td>
</tr>
<tr>
<td>College graduate</td>
<td>28.6 (464,073)</td>
</tr>
<tr>
<td>Mother’s marital status</td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>39.4 (638,427)</td>
</tr>
<tr>
<td>Never married/widowed/divorced/separated/deceased/ living with partner</td>
<td>60.6 (982,639)</td>
</tr>
<tr>
<td>Clinical recommendation for HPV vaccination**</td>
<td>57.8 (891,647)</td>
</tr>
<tr>
<td>Receipt of 11-12 year old well checkup**</td>
<td>92.2 (1,334,677)</td>
</tr>
<tr>
<td>Receipt of any vaccination**</td>
<td>95.3 (1,543,260)</td>
</tr>
<tr>
<td>Receipt of any HPV shots**</td>
<td>48.2 (780,728)</td>
</tr>
<tr>
<td>Receipt of all HPV shots****</td>
<td>32.6 (178,868)</td>
</tr>
</tbody>
</table>

*57.8% cases missing; **<11% cases missing; ****66.1% cases missing

Source: 2017 National Immunization Survey – Teen (NIS-Teen)
The next two tables provide a description of those who did not intend to vaccinate their sons in the next year. Table 8 shows the responses to whether participants intended to have their sons vaccinated in the next 12 months. Approximately 40% of mothers stated they were very likely or somewhat likely to have their sons vaccinated against HPV in the next 12 months. More than one-quarter of respondents stated that they were not too likely or not likely at all to have their sons vaccinated in the next 12 months.

Table 8: Intent to Vaccinate Against HPV in the Next 12 Months

<table>
<thead>
<tr>
<th>Responses</th>
<th>% (Weighted Frequency)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very likely</td>
<td>22.3 (361,660)</td>
</tr>
<tr>
<td>Somewhat likely</td>
<td>16.8 (271,858)</td>
</tr>
<tr>
<td>Not too likely</td>
<td>9.0 (145,943)</td>
</tr>
<tr>
<td>Not likely at all</td>
<td>17.4 (282,713)</td>
</tr>
<tr>
<td>Not sure/Don’t know</td>
<td>10.3 (166,427)</td>
</tr>
</tbody>
</table>

*24.2% cases missing. Source: 2017 National Immunization Survey – Teen (NIS-Teen)

Table 9 shows the main reasons why the participants responded not too likely or not likely at all to having their sons vaccinated in the next 12 months. The table presents the main reasons, categorized with the constructs of the theory of planned behavior (i.e., behavioral beliefs, subjective norms, and control beliefs). The five most common reasons for not vaccinating in the next 12 months connected to behavioral beliefs: not recommended (16.7%), already up-to-date (15.7%), lack of knowledge (11.2%), not needed or necessary (10.8%), and safety concerns/side effects (10.4%). There were fewer reasons aligned with subjective norms and control beliefs; none of these were reasons representative of more than 6% of the sample.
Table 9: Reasons for Declining HPV Vaccination in the Next 12 Months
(Weighted N = 595,083)

<table>
<thead>
<tr>
<th>Reasons</th>
<th>% (Weighted Frequency)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Behavioral beliefs</strong></td>
<td></td>
</tr>
<tr>
<td>Not recommended: did not know the vaccine was recommended for my adolescent</td>
<td>16.7 (99,493)</td>
</tr>
<tr>
<td>Already up-to-date: the child has received all of the recommended doses</td>
<td>15.7 (93,329)</td>
</tr>
<tr>
<td>Lack of knowledge: mother did not know about HPV disease</td>
<td>11.2 (66,878)</td>
</tr>
<tr>
<td>Not needed or not necessary: belief that vaccine is not needed or necessary</td>
<td>10.8 (64,443)</td>
</tr>
<tr>
<td>Safety concern/side effects: belief that vaccine was not safe or had bad side effects</td>
<td>10.4 (61,923)</td>
</tr>
<tr>
<td>Not sexually active: belief that vaccination was not needed because adolescent was not sexually active</td>
<td>3.6 (21,325)</td>
</tr>
<tr>
<td>Not appropriate age: adolescent is not at the appropriate age; provider indicated adolescent could vaccinate at older age</td>
<td>1.7 (10,320)</td>
</tr>
<tr>
<td>More info/new vaccine: belief that vaccine was new and more information was needed</td>
<td>1.2 (7,316)</td>
</tr>
<tr>
<td>Increased sexual activity concern: concern that adolescent may become sexually active if they receive the shot</td>
<td>0.3 (2,025)</td>
</tr>
<tr>
<td>Don’t believe in immunizations: mother does not believe in immunizations</td>
<td>0.3 (1,704)</td>
</tr>
<tr>
<td>Child fearful: belief that the adolescent is fearful because the shot could be painful</td>
<td>0.3 (1,511)</td>
</tr>
<tr>
<td>Child is male: the belief that the adolescent’s male sex was the reason vaccination was not needed</td>
<td>0.2 (1,239)</td>
</tr>
<tr>
<td>Effectiveness concern: belief that vaccine is not effective</td>
<td>&lt;0.01 (76)</td>
</tr>
<tr>
<td><strong>Subjective norms</strong></td>
<td></td>
</tr>
<tr>
<td>Child should make the decision: adolescent is receiving the shot and should be the person making the decision</td>
<td>2.9 (17,241)</td>
</tr>
<tr>
<td>Family/parental decision: decision should be made by the parents</td>
<td>1.9 (11,551)</td>
</tr>
<tr>
<td>Religion/Orthodox: religion would not support vaccination</td>
<td>0.4 (2,403)</td>
</tr>
</tbody>
</table>
### Reasons

<table>
<thead>
<tr>
<th>Reasons</th>
<th>% (Weighted Frequency)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control beliefs</td>
<td></td>
</tr>
<tr>
<td>Not a school requirement: HPV vaccination not required for school enrollment</td>
<td>5.8 (34,483)</td>
</tr>
<tr>
<td>Costs: uninsured; insurance doesn’t fully cover shots; insurance co-pay or other costs (e.g., office visit charges) too high</td>
<td>0.8 (4,620)</td>
</tr>
<tr>
<td>Intend to complete but have not yet/already planned: future intention to vaccinate but have not yet</td>
<td>0.5 (2,828)</td>
</tr>
<tr>
<td>Handicapped/special needs/illness: adolescent is handicapped, has special needs, or illness that prevents them from being vaccinated</td>
<td>0.4 (2,227)</td>
</tr>
<tr>
<td>No doctor or doctor’s visit scheduled: adolescent does not have a physician or doctor’s visit scheduled</td>
<td>0.3 (1,646)</td>
</tr>
<tr>
<td>Time: too much time required to get all the required shots</td>
<td>0.1 (333)</td>
</tr>
<tr>
<td>Difficulty making or getting to appointment/transportation problems: difficulty making or getting to appointments; transportation problems</td>
<td>&lt;0.01 (287)</td>
</tr>
<tr>
<td>Not available: HPV vaccine not available</td>
<td>&lt;0.01 (241)</td>
</tr>
</tbody>
</table>

Source: 2017 National Immunization Survey – Teen (NIS-Teen)

**RQ2: What are the characteristics of Black adolescent males who were vaccinated against HPV during 2017 compared to Black adolescent males who were not vaccinated?**

As shown in Table 7, most of the Black male adolescents had at least one vaccination in their lifetimes (95.2%), almost half had received at least one HPV vaccination (48.2%), and 11% had received all HPV shots. Teen demographics, parental demographics, and health engagement were the variables analyzed to explore the relationships with clinical recommendation or receipt of HPV vaccination.

An analysis commenced to determine if maternal marital status (i.e., being married) positively associated with receipt of clinical recommendation for HPV vaccination (see Table 10). The chi-square analysis indicated a statistically significant
difference between maternal marital status and receipt of clinical recommendation for HPV vaccination, $\chi^2 = 17.412$, $df = 1$, $p < 0.001$. Both married and unmarried mothers had sons who received recommendations for HPV vaccination (65.6% and 65.2%, respectively).

**Table 10: Mother’s Marital Status and Clinical Recommendation for HPV Vaccination**

<table>
<thead>
<tr>
<th>Marital Status</th>
<th>No Receipt of Recommendation (weighted %)</th>
<th>Receipt of Recommendation (weighted %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Married</td>
<td>34.4</td>
<td>65.6</td>
</tr>
<tr>
<td>Never married/widowed/divorced/separated/deceased/living with partner</td>
<td>34.8</td>
<td>65.2</td>
</tr>
</tbody>
</table>

Source: 2017 National Immunization Survey – Teen (NIS-Teen)

Table 11 shows the relationships between the selected demographic variables and receipt of HPV vaccination. A chi-square test of independence commenced to evaluate whether having insurance related to receiving at least one HPV shot. As shown in Table 11, among those with insurance, 54.2% had received at least one HPV vaccine, and 48.5% had received no HPV vaccination. For those uninsured, 31.5% had received at least one HPV vaccine, and 68.5% had received no HPV vaccination. The results of the chi-square indicated a statistically significant difference between insurance status and receipt of any HPV vaccines, $\chi^2 = 6519.449$, $df = 1$, $p < 0.001$.

A chi-square analysis occurred to determine whether an increase in maternal age associated with receipt of at least one HPV shot. The results of the chi-square indicated a statistically significant difference between mother’s age and receipt of at least one HPV shot, $\chi^2 = 1145.789$, $df = 2$, $p < 0.001$. As shown in Table 11, of the mothers less than 34 years of age, 49.1% of their Black adolescent sons had received at least one HPV vaccine. Similarly, among mothers older than 45 years, 49.6% of their Black adolescent
sons had received at least one HPV vaccine. Fewer than half of mothers in the 35 to 44 age group received at least one HPV vaccine (46.8%). As shown in Table 11, there was no linear relationship, as the percentage of sons who received HPV vaccination did not increase as the mother’s age increased.

A chi-square analysis commenced to determine whether an increase in maternal educational attainment associated with receipt of at least one HPV vaccine. The analysis showed a relationship between mother’s educational attainment and receipt of any HPV shots (see Table 11). The results of the chi-square indicated a statistically significant difference between mother’s age and receipt of any HPV shots, $\chi^2 = 9884.671$, $df = 3$, $p < 0.001$. There was increased receipt of any HPV vaccine as level of educational attainment increased. Among mothers with less than 12 years of education, 60.3% received no HPV vaccine, and 39.7% received at least one HPV vaccine. Mothers with high school completion also had a larger percentage of Black male adolescents who had received no HPV vaccination (52.9%) than those who had received at least one HPV shot (47.1%). Among those with some college, there was almost an even split between Black male adolescents who had received no HPV vaccination (49.8%) and those who had received at least one HPV vaccine (50.2%). Among mothers with college degrees, 48.8% of Black male adolescents had received no HPV vaccination, whereas 51.5% had received at least one HPV vaccine.

The vaccination schedule suggests HPV vaccination for boys at age 11 (CDC, 2019). According to the vaccination schedule, health professionals can introduce the opportunity to have sons vaccinated if they receive 11- or 12-year-old well check visits. In the NIS-Teen, the respondents indicated if their sons had received well checkups
between the ages 11 and 12. The results of the chi-square indicated a statistically
significant difference between the receipt of the 11- to 12-year-old well check and receipt
of any HPV shots, $\chi^2 = 8520.614$, $df = 1$, $p < 0.001$. There was a relationship between
receipt of the 11-to 12-year-old well checkup and receipt of at least one HPV shot (see
Table 11). Among Black male adolescents who did not receive the 11- to 12-year-old
well checkup, approximately 31% had received at least one HPV vaccine. Among those
who had received the 11- to 12-year-old well checkup, approximately 50% had received
at least one HPV vaccine.

**Table 11:** Teen and Maternal Demographics and Receipt of at Least One HPV Shot

<table>
<thead>
<tr>
<th>Variable</th>
<th>No Receipt of any HPV Shots (weighted %)</th>
<th>Receipt of One or More HPV Shots (weighted %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insurance status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No insurance</td>
<td>68.5</td>
<td>31.5</td>
</tr>
<tr>
<td>Insurance</td>
<td>45.8</td>
<td>54.2</td>
</tr>
<tr>
<td>Mother’s age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\leq$34 years</td>
<td>50.9</td>
<td>49.1</td>
</tr>
<tr>
<td>35-44</td>
<td>53.2</td>
<td>46.8</td>
</tr>
<tr>
<td>$\geq$45 years</td>
<td>50.4</td>
<td>49.6</td>
</tr>
<tr>
<td>Mother’s educational level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 12 years</td>
<td>60.3</td>
<td>39.7</td>
</tr>
<tr>
<td>High school</td>
<td>52.9</td>
<td>47.1</td>
</tr>
<tr>
<td>Some college, noncollege graduate</td>
<td>49.8</td>
<td>50.2</td>
</tr>
<tr>
<td>College graduate</td>
<td>48.5</td>
<td>51.5</td>
</tr>
<tr>
<td>Receipt of 11-12-year-old well checkup</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No receipt of 11-12-year-old well checkup</td>
<td>68.8</td>
<td>31.2</td>
</tr>
<tr>
<td>Receipt of 11-12-year-old well checkup</td>
<td>49.5</td>
<td>50.5</td>
</tr>
</tbody>
</table>

Source: 2017 National Immunization Survey – Teen (NIS-Teen)

A chi-square analysis commenced to examine the relationship between maternal
demographics and vaccination intention and behavior (see Table 12). The results of the
chi-square indicated a statistically significant difference between maternal education level and future intention for their Black adolescent sons to receive HPV vaccination, $\chi^2 = 49786.541, df = 12, p < 0.001$. There were phi and Cramer’s V tests conducted as tests of the strength of association. Both were significant tests ($\phi = .201, p < 0.001$; Cramer’s $V = .116, p < 0.001$), indicating some association between the variables. As educational attainment increased, the percentage of mothers who expressed intention for future HPV vaccination decreased. Among mothers with less than a high school diploma, approximately 21% stated they were not too likely or not likely at all to have their Black adolescent sons vaccinated against HPV in the next 12 months, compared to approximately 56% of mothers who stated they were somewhat likely or very likely to have their sons vaccinated. Among mothers who completed high school, 53% stated that they were somewhat likely or very likely to have their sons vaccinated in the next 12 months (compared to 34.5% who expressed that they were not too likely or not likely at all). Similarly, approximately 53% of those with some college stated that they were somewhat likely or very likely to have their sons vaccinated in the next 12 months (compared to 33.2% who expressed that they were not too likely or not likely at all). For mothers who completed college, there was a similar percentage of those who stated that they were somewhat likely or very likely to have their sons vaccinated in the next 12 months to those who expressed that they were not too likely or not likely at all (46.3% vs. 44.1%). In addition, the percentage of mothers who stated that they were unsure of whether they would have their sons vaccinated against HPV in the next 12 months decreased as their level of educational attainment increased.
Table 12: Mother’s Educational Level and Future Intention to Receive HPV Vaccination

<table>
<thead>
<tr>
<th>Educational level</th>
<th>Very likely (weighted %)</th>
<th>Somewhat likely (weighted %)</th>
<th>Not too likely (weighted %)</th>
<th>Not likely at all (weighted %)</th>
<th>Not sure/don’t know (weighted %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 12 years</td>
<td>30.2</td>
<td>25.5</td>
<td>9.9</td>
<td>11.4</td>
<td>23.0</td>
</tr>
<tr>
<td>High school</td>
<td>27.8</td>
<td>25.2</td>
<td>9.3</td>
<td>25.2</td>
<td>12.6</td>
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<tr>
<td>Some college, non-college graduate</td>
<td>33.4</td>
<td>19.7</td>
<td>13.8</td>
<td>19.4</td>
<td>13.7</td>
</tr>
<tr>
<td>College graduate</td>
<td>25.9</td>
<td>20.4</td>
<td>13.0</td>
<td>31.1</td>
<td>9.5</td>
</tr>
</tbody>
</table>

Source: 2017 National Immunization Survey – Teen (NIS-Teen)

A logistic regression model was the means used to predict the odds of the receipt of at least one HPV vaccine compared to no receipt of the HPV vaccine among Black male adolescents. The model included a total of 854 cases (Table 13). The model also included the demographic variables statistically significant in prior bivariate analyses and identified in the literature. This model included the following independent variables: health insurance, geographic region, family income category, maternal age, maternal marital status, maternal educational attainment, clinical recommendation, and receipt of 11- to 12-year-old well checkup visit. There were interaction terms for maternal educational attainment and clinical recommendation included. The dependent variable was receipt of at least one HPV vaccine.

Among Black male adolescents, there were odds of receiving at least one HPV vaccine for those with health insurance 1.1 times higher than those uninsured (OR = 1.105; \( p < 0.001 \)). Black male adolescents in households of more than $75,000 had approximately 33% lower odds of receiving at least one HPV shot compared to those below poverty level. Black male adolescents who resided in the Midwestern and
Southern United States had lower odds of receiving at least one HPV vaccine than those who lived in the Northeastern United States (33% and 15%, respectively; \( p < 0.001 \)). However, those who lived in the Western region of the United States had 2.2 times the odds of receiving at least one HPV vaccine compared to those who lived in the Northeastern United States.

With regards to maternal age, there were odds for receipt of at least one HPV vaccine approximately 15% lower for Black male adolescents with mothers ages 35 to 44 (OR = .497; \( p < 0.001 \)) and approximately 40% lower for Black male adolescents with mothers over the age of 45 (OR = .606; \( p < 0.001 \)). Increasing maternal education positively associated with odds of receipt of any HPV vaccination compared to less than 12 years of high school education. There were higher odds of having any HPV receipt for those with mothers with 12 years of education, some college education, and college degrees (3, 3.9, and 2.1 times, respectively; \( p < 0.001 \)) However, Black male adolescents with married mothers had less odds of receiving at least one HPV vaccine than unmarried mothers (OR = .452; \( p < 0.001 \)).

Similar to prior research, receipt of provider recommendation for HPV vaccination associated with higher likelihood of HPV vaccination (Gilkey et al., 2017; Hirth et al., 2019; Lu et al., 2019; Peterson et al., 2020). Those who received provider recommendations had 43 times the odds of receiving at least one HPV vaccine. Examination of the interaction between maternal education and provider recommendation showed lower odds of receipt of any HPV vaccine across all levels of maternal education compared to those with less than high school who did not receive provider recommendations for HPV vaccination. Black male adolescents who had received
provider recommendations for HPV vaccination and had mothers with 12 years of education had approximately 70% lower odds of receiving at least one HPV vaccine than those who had not received provider recommendations and had mothers with less than a high school education (OR = .296; \( p < 0.001 \)). Black male adolescents who received provider recommendations and had mothers who had attained some college education had approximately 74% lower odds than those who had received no provider recommendations and had mothers with less than a high school education (OR = .260; \( p < 0.001 \)). Black male adolescents who had received provider recommendations and mothers with college degrees had approximately 29% lower odds than those who had not received provider recommendations and had mothers with less than a high school education (OR = .717; \( p < 0.001 \)). Figure 2 is a histogram of the interaction of maternal education level and provider recommendation for HPV vaccination.
Table 13: Logistic Regression Results for Characteristics Associated with Receipt of at Least One HPV Shot, NIS-Teen, 2017 (N = 854)

<table>
<thead>
<tr>
<th>Term (Reference Group)</th>
<th>Estimate</th>
<th>Std. Error</th>
<th>OR</th>
<th>95% CI for OR</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insurance status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>(Insured)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uninsured</td>
<td>.100</td>
<td>.010</td>
<td>1.105</td>
<td>1.066-1.146</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Family income categories</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Below poverty)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Above poverty ($≤$75K)</td>
<td>-.178</td>
<td>.009</td>
<td>.837</td>
<td>.823-.852</td>
<td>&lt;0.001</td>
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<tr>
<td>Above poverty ($&gt;$75K)</td>
<td>-.408</td>
<td>.013</td>
<td>.665</td>
<td>.648-.681</td>
<td>&lt;0.001</td>
</tr>
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<td>Geographic region</td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>(Northeast)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Midwest</td>
<td>-.486</td>
<td>.012</td>
<td>.615</td>
<td>.600-.630</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>West</td>
<td>.828</td>
<td>.015</td>
<td>2.288</td>
<td>2.220-2.358</td>
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<tr>
<td>South</td>
<td>-.163</td>
<td>.010</td>
<td>.850</td>
<td>.833-.866</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Maternal age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(≤34 years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35-44 years</td>
<td>-.700</td>
<td>.011</td>
<td>.497</td>
<td>.486-.508</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>≥45 years</td>
<td>-.502</td>
<td>.012</td>
<td>.606</td>
<td>.591-.620</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Maternal education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Less than 12 years)</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>12 years</td>
<td>1.115</td>
<td>.019</td>
<td>3.049</td>
<td>2.940-3.162</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Some college</td>
<td>1.372</td>
<td>.018</td>
<td>3.945</td>
<td>3.807-4.088</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>College graduate</td>
<td>.776</td>
<td>.023</td>
<td>2.172</td>
<td>2.077-2.271</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Married)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Unmarried</td>
<td>-.793</td>
<td>.008</td>
<td>.452</td>
<td>.445-.460</td>
<td>&lt;0.001</td>
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<tr>
<td>Receipt of 11-12-year-old checkup</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(No receipt)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receipt of check up</td>
<td>.027</td>
<td>.015</td>
<td>1.027</td>
<td>.997-1.058</td>
<td>.078</td>
</tr>
<tr>
<td>Provider recommendation for HPV vaccination</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(No recommendation)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receipt of recommendation</td>
<td>3.769</td>
<td>.023</td>
<td>43.335</td>
<td>41.573-45.171</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>
### Interaction: Provider recommendation x maternal education

(No recommendation receipt * less than high school)

<table>
<thead>
<tr>
<th>Term</th>
<th>Estimate</th>
<th>Std. Error</th>
<th>OR</th>
<th>95% CI for OR</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommendation receipt * 12 years</td>
<td>-1.217</td>
<td>.025</td>
<td>.296</td>
<td>.282-.311</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Recommendation receipt * Some college</td>
<td>-1.345</td>
<td>.024</td>
<td>.260</td>
<td>.248-.273</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Recommendation receipt * College graduate</td>
<td>-0.305</td>
<td>.027</td>
<td>.717</td>
<td>.699-.778</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Source: 2017 National Immunization Survey – Teen (NIS-Teen)

**Figure 2:** Histogram, Maternal Education Level and Provider Recommendation for HPV Vaccination

![Histogram](image-url)
There was a logistic regression model used to predict the odds of receipt of all HPV vaccines compared to no receipt of all HPV vaccines among Black male adolescents. The model included a total of 272 cases (see Table 14). This model also incorporated the demographic variables statistically significant in prior bivariate analyses and identified in the literature. The model included the following independent variables: health insurance, geographic region, family income category, maternal age, maternal marital status, maternal educational attainment, clinical recommendation, and receipt of 11- to 12-year-old well checkup visit. There were interaction terms for maternal educational attainment and clinical recommendation included. The dependent variable was the receipt of all HPV vaccines.

Insured Black male adolescents had 4.9 times higher odds of receiving all HPV vaccines than those uninsured (OR = 4.922; \( p < 0.001 \)). Black male adolescents in households with income more than $75,000 had approximately 5.6 times the odds of receiving all HPV vaccines than those below poverty level. Black male adolescents who resided in the Midwestern and Southern United States had lower odds of receiving all HPV vaccines than those in the Northeastern United States (OR = .734 and OR = .687, respectively; \( p < 0.001 \)). Those who lived in the Western United States had 1.7 times the odds of receiving all HPV vaccines (OR = 1.748; \( p < 0.001 \)).

Regarding maternal age, there were approximately 29% lower odds of receipt of all HPV shots for Black male adolescents with mothers ages 35 to 44 (OR = .497; \( p < 0.001 \)), but approximately 25% higher odds for Black male adolescents with mothers over the age of 45 (OR = 1.254; \( p < 0.001 \)). Increasing maternal education was positively associated with odds of receiving all HPV vaccines compared to less than 12 years of
high school education. There were higher odds of receiving all HPV vaccines for mothers with 12 years of education, those with some college education, and college graduates (3.0, 3.9, and 2.1 times, respectively; \( p < 0.001 \)). Black male adolescents with married mothers had lower odds of receiving all HPV vaccines compared to those with unmarried mothers (OR = .458; \( p < 0.001 \)).

Black male adolescents who attended the 11- to 12-year well checkup had two times the odds of receiving all HPV vaccines (OR = 2.008; \( p < 0.001 \)). Those who received provider recommendations had 10 times the odds of receiving all HPV vaccines. Black male adolescents who received provider recommendations for HPV vaccination with mothers with 12 years of education had 48% higher odds of receiving all HPV vaccines than those who did not receive provider recommendations and had mothers with less than a high school education (OR = 1.481; \( p < 0.001 \)). Black male adolescents who received provider recommendations and had mothers who attained some college education had approximately 2.4 higher odds of receiving all HPV vaccines than those who did not receive provider recommendations and had mothers with less than a high school education (OR = 2.413; \( p < 0.001 \)). However, Black male adolescents who received provider recommendations and had mothers with college degrees had approximately 17% lower odds of receiving all HPV vaccines than those who did not receive provider recommendations and had mothers with less than a high school education (OR = .717; \( p < 0.001 \)).
Table 14: Logistic Regression Results for Characteristics Associated with Receipt of All HPV Shots, NIS-Teen, 2017 ($N = 272$)

<table>
<thead>
<tr>
<th>Term (Reference Group)</th>
<th>Estimate</th>
<th>Std. Error</th>
<th>OR</th>
<th>95% CI for OR</th>
<th>Sig.</th>
</tr>
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<tbody>
<tr>
<td>Insurance status</td>
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<td>(Insured)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Uninsured</td>
<td>1.594</td>
<td>.052</td>
<td>4.922</td>
<td>4.449-5.445</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Family income categories</td>
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<tr>
<td>(Below poverty)</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Above poverty ($\leq$ $75K)</td>
<td>1.197</td>
<td>.017</td>
<td>3.310</td>
<td>3.204-3.419</td>
<td>&lt;0.001</td>
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<tr>
<td>Above poverty ($&gt;$ $75K)</td>
<td>1.735</td>
<td>.027</td>
<td>5.672</td>
<td>5.382-5.977</td>
<td>&lt;0.001</td>
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<tr>
<td>Geographic region</td>
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<td></td>
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<tr>
<td>(Northeast)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Midwest</td>
<td>-.309</td>
<td>.023</td>
<td>.734</td>
<td>.703-.768</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>West</td>
<td>.559</td>
<td>.028</td>
<td>1.748</td>
<td>1.655-1.848</td>
<td>&lt;0.001</td>
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<tr>
<td>South</td>
<td>-.375</td>
<td>.019</td>
<td>.687</td>
<td>.662-.714</td>
<td>&lt;0.001</td>
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<tr>
<td>Maternal age</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(≤34 years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35-44 years</td>
<td>-.340</td>
<td>.023</td>
<td>.711</td>
<td>.680-.744</td>
<td>&lt;0.001</td>
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<tr>
<td>≥45 years</td>
<td>.226</td>
<td>.023</td>
<td>1.254</td>
<td>1.198-1.312</td>
<td>&lt;0.001</td>
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<tr>
<td>Maternal education</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>(Less than 12 years)</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>12 years</td>
<td>1.115</td>
<td>.019</td>
<td>3.049</td>
<td>2.940-3.162</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Some college</td>
<td>1.372</td>
<td>.018</td>
<td>3.945</td>
<td>3.807-4.088</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>College graduate</td>
<td>.776</td>
<td>.023</td>
<td>2.172</td>
<td>2.077-2.271</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Marital status</td>
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<td>(Married)</td>
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<td></td>
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</tr>
<tr>
<td>Unmarried</td>
<td>-.780</td>
<td>.017</td>
<td>.458</td>
<td>.444-.474</td>
<td>&lt;0.001</td>
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<tr>
<td>Receipt of 11-12-year-old checkup</td>
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<td></td>
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<tr>
<td>(No receipt)</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Receipt of check up</td>
<td>.697</td>
<td>.030</td>
<td>2.008</td>
<td>1.893-2.130</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Provider recommendation for HPV vaccination</td>
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<td></td>
</tr>
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<td>(No recommendation)</td>
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<tr>
<td>Receipt of recommendation</td>
<td>2.365</td>
<td>.034</td>
<td>10.644</td>
<td>9.949-11.388</td>
<td>&lt;0.001</td>
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<tr>
<td>Term (Reference Group)</td>
<td>Estimate</td>
<td>Std. Error</td>
<td>OR</td>
<td>95% CI for OR</td>
<td>Sig.</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------------------</td>
<td>----------</td>
<td>------------</td>
<td>------</td>
<td>---------------</td>
<td>-------</td>
</tr>
<tr>
<td>Interaction: Provider recommendation x maternal education</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(No recommendation receipt * less than high school)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recommendation receipt * 12 years</td>
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<td>1.481</td>
<td>1.359-1.615</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Recommendation receipt * Some college</td>
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<td>2.413</td>
<td>2.215-2.630</td>
<td>&lt;0.001</td>
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<td>-.177</td>
<td>.045</td>
<td>.838</td>
<td>.767-.915</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Source: 2017 National Immunization Survey – Teen (NIS-Teen)

*Qualitative Analysis – Interviews with Black Adolescent Males*

In-depth, semistructured interviews with mothers of Black male adolescents commenced to explore their perceptions and personal beliefs about early childhood vaccination, HPV, and the HPV vaccine. Qualitative interviews are a useful means of exploring the experiences and beliefs of individuals and the areas difficult to explain with quantitative data alone. Semistructured interviews served to guide the discussion and provide space for the mothers to share thoughts they perhaps could not share in the predesigned discussion guide. There were 23 interviews with mothers in the United States, although the majority of interviews were with mothers who resided in the state of New Jersey (one person submitted the anonymous pre-interview survey but did not complete the online interview). Although some mothers did not feel comfortable using online video methods for the interview, all the mothers felt comfortable with the Internet and completed the online pre-interview survey. Each interview had a length of approximately 45 to 60 minutes. Following the interview, many mothers shared that they intended to look up additional information online or have future conversations with their
sons’ health care providers about HPV vaccination. To support their efforts, all interview participants received an educational handout on the HPV vaccine by the CDC after their interviews.

The recorded audio for each interview underwent transcription, followed by analysis for themes to explore the two qualitative research questions, which were:

- RQ3: What are the perceptions and personal beliefs of Black mothers about childhood vaccinations and HPV?
- RQ4: What are the perceptions and personal beliefs expressed by Black mothers that may influence the decisions they make regarding HPV vaccination for their sons?

The following section presents the responses provided by the mothers, with excerpts of the participants’ words to support the findings, where appropriate. The participant names were changed to maintain confidentiality. “I##” after the participant’s name indicates the interview number, followed by the age of the participant’s son at the time of the interview.

Description of Sample

All the interview participants (presented in this narrative as “mothers” or “participants”) identified as female and as a mother or guardian of at least one male adolescent who identified as Black between the ages of 11 and 17. Twenty-two biological mothers and one aunt serving as a guardian for multiple children participated in the interviews. Table 15 shows the demographic characteristics of the mothers who participated in the interviews.
More than 90% of mothers had at least a college degree. Mothers ranged in age from 30 years to 57 years, with a mean age of 41.8 years. Most of the mothers had more than one child (58.3%), with a range of one child to seven children. Most of the participants identified themselves as the mother or stepmother of eligible sons; one participant was a biological aunt who was the guardian of the nieces and nephews in her care. More than half of the mothers (58.3%) stated that their sons had not received HPV vaccines at the time of the interview. Approximately 25% reported that their sons had initiated the HPV vaccine series, and approximately 13% had completed the HPV vaccine series.

Table 15: Descriptive Characteristics of Black Adolescent Males and Mothers, Qualitative Interviews, 2017

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<th>Characteristics (N = 24)</th>
<th>% (Frequency)</th>
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<tr>
<td>Private health insurance</td>
<td>79.2 (19)</td>
</tr>
<tr>
<td>Medicaid</td>
<td>12.5 (3)</td>
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<tr>
<td>Missing/unknown</td>
<td>8.3 (2)</td>
</tr>
<tr>
<td>Number of children (mean, 2.4; range, 1-7)</td>
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</tr>
<tr>
<td>1</td>
<td>25 (6)</td>
</tr>
<tr>
<td>2-3</td>
<td>58.3 (14)</td>
</tr>
<tr>
<td>4+</td>
<td>16.7 (4)</td>
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<td>Caregiver status</td>
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</tr>
<tr>
<td>Mother/stepmother</td>
<td>95.8 (23)</td>
</tr>
<tr>
<td>Aunt/guardian</td>
<td>4.2 (1)</td>
</tr>
<tr>
<td>Mother’s age (mean, 41.8; range 30-57)</td>
<td></td>
</tr>
<tr>
<td>≤34 years</td>
<td>12.5 (3)</td>
</tr>
<tr>
<td>35-44 years</td>
<td>54.2 (13)</td>
</tr>
<tr>
<td>≥45 years</td>
<td>33.3 (8)</td>
</tr>
<tr>
<td>Mother’s educational level</td>
<td></td>
</tr>
<tr>
<td>High school</td>
<td>4.2 (1)</td>
</tr>
<tr>
<td>Some college, noncollege graduate</td>
<td>4.2 (1)</td>
</tr>
<tr>
<td>College graduate</td>
<td>91.6 (22)</td>
</tr>
</tbody>
</table>
### Characteristics (N = 24)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>% (Frequency)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPV vaccine receipt</td>
<td></td>
</tr>
<tr>
<td>No vaccine received</td>
<td>58.3 (14)</td>
</tr>
<tr>
<td>Receipt of at least one HPV shot*</td>
<td>25 (6)</td>
</tr>
<tr>
<td>Series completed</td>
<td>12.5 (3)</td>
</tr>
<tr>
<td>Not sure</td>
<td>4.2 (1)</td>
</tr>
<tr>
<td>Son’s prior receipt of meningitis vaccine</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>37.5 (9)</td>
</tr>
<tr>
<td>No</td>
<td>33.3 (8)</td>
</tr>
<tr>
<td>Unsure/don’t know</td>
<td>29.2 (7)</td>
</tr>
<tr>
<td>Son’s prior receipt of flu vaccine</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>75 (18)</td>
</tr>
<tr>
<td>No</td>
<td>25 (6)</td>
</tr>
<tr>
<td>Age of son at time of qualitative interview (N = 23)</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>5 (21.7)</td>
</tr>
<tr>
<td>12</td>
<td>6 (26.1)</td>
</tr>
<tr>
<td>13</td>
<td>6 (26.1)</td>
</tr>
<tr>
<td>14</td>
<td>2 (8.7)</td>
</tr>
<tr>
<td>15</td>
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<tr>
<td>16</td>
<td>1 (4.3)</td>
</tr>
<tr>
<td>17</td>
<td>1 (4.3)</td>
</tr>
</tbody>
</table>

* Partial vaccine receipt is defined as one or two doses of three-vaccine series or one dose of two-vaccine series

**RQ3: What are the perceptions and personal beliefs of mothers of Black adolescent males regarding childhood vaccinations and HPV?**

Following the CDC’s vaccination schedule, there are up to 10 vaccines offered to children in the first 24 months of life (Robinson et al., 2020). The first qualitative research question addressed mothers’ beliefs about early vaccinations. When talking to mothers about early vaccination, the following themes emerged: concern about early childhood vaccination, vaccine spacing and delay, concern about vaccine safety, and vaccination mandates.
Confusion About Early Childhood Vaccination

The participating mothers had mixed views about early childhood vaccination. Some viewed early childhood vaccines positively because of their prior experiences with infections and illnesses. Lucy, a mother of Kenyan heritage, understood how to affect diseases such as polio or meningitis through the vaccines, and she considered them necessary:

Well, I come from Africa, so for me, vaccines is something, I think, that is necessary. I’ve seen a lot of diseases, [and] I’ve had friends in school who had polio. So my kids are vaccinated from the time they were small. (I18, son age 15)

Liz also viewed early childhood vaccinations positively, suggesting that the resurgence of previously uncommon diseases in the United States may correlate with antivaccination sentiments:

I vaccinated my kids. I think more people should. [The] reason I feel that way is just because we’re seeing the measles and mumps, things we thought [that] we would never hear of people having again are coming back up. [O]ne has to wonder if this big push to not vaccinate is what’s causing us to see diseases we haven’t seen in ages. (I20, son age 13)

Others perceived childhood vaccines negatively. There was a range of concerns, with some mothers questioning whether there was a need for vaccines at all. For some, the lack of diseases was proof that there was no longer need for vaccines, rather than proof of the effectiveness of vaccines.

I haven’t heard of a case of the measles since I’ve been born, but yet kids are vaccinated against measles, so I don’t know. (I13, son age 11)

Do we still need to get a polio vaccine? But I don’t want to not take it just because there’s the risk that it’s still something that could [get caught]. I haven’t researched it to find out like at this point, is there [a] real concern for the polio vaccine? (I10, son age 12)
Vaccine Spacing and Delay

No research suggests the usefulness, effectiveness, or safety of vaccine spacing or delaying. In their interviews, all the mothers stated that they believed in vaccines’ effectiveness; however, some expressed concerns about the need for all the vaccines recommended in the existing immunization schedule. Some mothers exercised the option to delay early childhood vaccinations for their children based on personal research or health care provider recommendations:

I think sometimes they give too many vaccines at one time. I just spaced mine out a little bit more than what the recommendations are because based on what I had read, my understanding was that there had been some research done that made those recommendations that certain vaccines should not be all given at one time and they should be spaced out. (I8, son age 13)

I can understand doing delayed vaccinations just because sometimes it’s a lot, especially when you’re talking about a newborn baby. They’re going to the doctor every month, every other month, and almost every single appointment, they’re getting shots. Some of those shots, even though it’s one shot, it’s three vaccinations in one shot. I don’t see that my kids have had any negative side effects to any of the vaccinations that they’ve had thus far, but I know my doctor is pretty good on if they are getting a lot, he may not do some. (I20, son age 13)

None of the mothers who opted to delay vaccination stated that their health care providers refused or pushed back when they requested to adjust the spacing of their children’s vaccinations. Although clinical guidelines do not suggest vaccine spacing, some health care providers permit the practice, believing it better to alleviate parental concerns than risk not having the child vaccinated at all (Kempe et al., 2015).

Concern Regarding Vaccine Safety

Many mothers mentioned vaccine safety as a factor that contributed to their thoughts about vaccination. The number of vaccines given in early childhood and the potential side effects of childhood vaccination were significant concerns for the
participants, as mentioned in multiple discussions. All mothers reported their sons receiving at least one childhood immunization in life, yet there remained mixed viewpoints about vaccinations in general. Two mothers described vaccines as “a necessary evil”:

I think that they are a necessary evil. If these [diseases] were gone, then there would be no need for the vaccine[s]. But we’re seeing cases of these things rising up. So, in general, I don’t have a problem with vaccines. (I21, son age 12)

I didn’t really understand why [my daughter] needed that [meningococcal] vaccine, but you know, she wants to stay on campus, so in order for her to stay there, it’s a necessary evil. (I13, son age 11)

Some mothers agreed that vaccines were necessities, while others were concerned about the chemical contents and felt that children had too many vaccinations in early childhood. (Infants may receive up to seven vaccines in the first year of life.) Most mothers understood the importance of vaccines and agreed on their effectiveness (to some degree); however, they had concerns about side effects, allergies, and potential long-term effects.

Three mothers spoke at length about preservatives and other foreign substances. Although no women referenced the specific substances in vaccines, they expressed concern about harmful ingredients inside vaccines. Sandy acknowledged the fear of vaccine allergies but said that she did not allow that to affect her thinking about all vaccines:

For me, I personally feel like you can’t condemn the whole vaccine population because of an allergy. It’s like eating peanut butter. I have [such] an extensive food allergy that I have to carry an EpiPen. That’s the same with vaccines. I can’t give my child that vaccine. That’s it. (I7, son age 13)

Although vaccination may have some side effects on some children, Sandy did not suggest eliminating vaccination for everyone. For some mothers, the risk of negative
reactions from vaccination is enough of a reason not to have their children vaccinated at all. For others like Sandy, there is an understanding that negative reactions in some do not indicate negative reactions in everyone.

“Too many” was the phrase mentioned by mothers regarding the number of vaccines administered in the first years of life, the timing of their administration, and even the number of vaccines within one vial, or “cocktail,” as described by one mother. Many mothers felt that they did not have enough understanding of the impact of these vaccines on children when delivered close together or in a “cocktail.” Like Sandy, many mothers felt that vaccination was a “double-edged sword”:

I personally think we have too many vaccines. I do think there is a need for vaccines because we need to be protected. Just like anything, I do think there’s kids who have adverse reactions to the vaccines. Just like we have allergies to eggs and milk and peanut butter, there’s kids who have an adverse reaction to vaccines. (I7, son age 13)

A few caregivers shared the horror stories that they had heard about young people who had received vaccinations (including someone vaccinated against HPV):

She’s doing what she thinks is best for her child. She took her to a doctor. She got vaccinated. Not even a day later, she died. And it was ’cause of her getting a shot that was bad. Literally, blood out the mouth. I don’t think all shots are good for all people. (I4, son age 11)

I’ve heard [that] the HPV vaccine has made people very sick. People are having a lot of adverse reactions. There has been some horror stories about the vaccine, and I saw something come up on [an Internet] feed that said one of the people from the pharmaceutical company, somebody high up, has the true secrets of the HPV vaccine. I never clicked on the story, but I should [have] because I wanted to see what was true about the HPV vaccine. (I7, son 13)

Although there was a discussion on side effects not explicitly focused on the HPV vaccine, the mothers expressed concerns about vaccine safety and side effects. This was a finding consistent with results from the 2017 NIS-Teen, where 10.4% of mothers of Black adolescent males reported that they did not intend to have their sons vaccinated
against HPV in the next 12 months because they did not believe the vaccine was safe or that it had bad side effects (see Table 9).

The connection between vaccinations and adverse health conditions was a common theme for the interviewed mothers. Karen referenced Kawasaki disease (a childhood disease that can cause an increased risk of heart disease), and she questioned if that diagnosis associated with childhood vaccination:

I haven’t heard or seen of any cases where children that have not been vaccinated, where they became deathly ill or anything of that nature. Of course, kids that are vaccinated are less likely to be sick; however, my son has received all of his vaccinations, but he also, at the age of I want to say 4, he was diagnosed with a very rare [Kawasaki disease] that we have no clue [how he got] because there’s no linkage in our family, where it could have come from. The only thing that I can gather is it came from a vaccination. (I13, son age 11)

Karen connected her son’s diagnosis with a life-threatening disease to his early childhood vaccinations, although she did not state that there was a proven connection between early vaccinations and this disease (and no empirical evidence suggests a connection).

As expected, the connection between autism and vaccines was a controversial issue. The debate between vaccines and autism originated in 1992 with a study in the United Kingdom that suggested that receiving the mumps-measles-rubella (MMR) vaccine linked to autism in children. However, no other researcher has ever replicated the study’s original findings, and there is overwhelming evidence against the claim that the MMR vaccine links to autism. Major health organizations, such as the CDC, Institute of Medicine, U.S. Public Health Service, and American Academy of Pediatrics, continue to recommend childhood vaccinations (including the MMR). Yet, concerns about vaccine safety and the misinformed connection to autism continue to emerge in public discourse.

There was purposeful exclusion of a question on autism from the primary questions of the interview’s discussion guide. Every participant referenced autism or
other intellectual disabilities without mention by the interview facilitator. Some said that they knew the parent of an autistic child; others did not know a specific person but retold anecdotes of “people [who] they [had] heard about.” For example, Frankie stated that she knew of a connection between autism and vaccines but also admitted that she had heard conflicting information about the accuracy of the connection:

A lot of the talk [is] now about [vaccines] being linked to autism. It’s kind of scary as a parent because you have to make a decision of whether or not you want to protect your child from a disease but make them subject to other things. And you have some studies that show it’s true, and some studies that show it’s not, and you really don’t know which ones to believe. (I14, son age 11)

For Frankie, the conflicting information made the decision to have her son vaccinated unclear.

Vaccination Mandates

There are childhood vaccinations divided into two categories: those required for school enrollment (e.g., MMR, Tdap, Hep. B) and those voluntary in nature (e.g., influenza and HPV). One barrier to HPV vaccination uptake could be that HPV vaccination is not a requirement for school attendance. Thus, the school requirement for childhood vaccinations influenced the participants’ vaccine decision-making. All of the mothers interviewed knew of the immunization rules required for their sons to attend school. One mother expressed that she exercised a religious exemption to delay early childhood vaccinations (e.g., MMR, Tdap) for her son, as she felt concerned about his health at the time, the prevalence of autism, and the number of vaccines for children in the first years of life:

[B]y the time he was in the first grade, I was like, “Okay, I think I’ve delayed long enough.” I felt like he was physically strong enough. So, when I spoke to my doctor about it, I kind of talked to him about the vaccinations [for diseases] that
were life-threatening. I reflected on my own experience, having had measles, mumps, and rubella and [having] lived to tell the tale. [laughs] (I19, son age 12)

Natalie’s value judgments on life-threatening diseases influenced her vaccination decisions when she ultimately decided to have her son vaccinated.

During the interview, the participants described whether they would continue to have their sons vaccinated if it were no longer a school requirement. Only one mother stated that she would not choose to have her son vaccinated at all if it was not a school requirement. Many mothers agreed that they would still have their sons vaccinated, feeling the risk of disease greater than the negative feelings some had about vaccines:

I don’t want him contracting the diseases that can give you those long-term, debilitating things, especially like polio or having scarlet fever or something that is extremely contagious. I’d rather put him at risk [by being vaccinated] than putting everybody else at risk. (I22, son age 17)

Others, like Natalie, shared that they would probably continue to have their sons vaccinated but would exercise the ability to select the vaccines they believed necessary:

Measles or chickenpox, those ones that if [they] don’t take [the vaccine], they can be deadly, and they’re very contagious. [T]hose are the ones that I see [that] when someone gets it, forget about it. Everybody’s gonna get it. (I2, son age 15)

Measles, mumps, go for it. Diphtheria, whatever, those other ones, I would still make the decision to do it only because you’re sending them to school with people. (I3, son age 11)

However, Daisy expressed a different opinion and suggested that the ability to select vaccines was part of the problem:

[Vaccines are] why we don’t have polio. Whooping cough is coming back, but the reason why whooping cough is coming back is because now we all the liberty to say, “I want this vaccine and not that one and this one and not that one.” (I16, son age 11)
Even with mandated vaccines required for school attendance, some mothers made value judgments on which were the important vaccines, selecting the vaccines and deciding on their administration, if given the option.

During the discussion of required vaccinations, the mothers indicated which vaccines they would select for their sons if they could determine which vaccines their sons could receive. None of the mothers selected the HPV vaccine. Among those interviewed, less than half had begun or completed the HPV vaccine series for their sons. Similarly, the 2017 NIS-Teen found that less than half of Black male adolescents received at least one HPV vaccine (see Table 7). Moreover, among those who stated that they did not intend to have their sons vaccinated against HPV in the next 12 months, 5.8% of mothers indicated that they did not have their sons vaccinated because the HPV vaccination was not a requirement for school enrollment (see Table 9).

**RQ4: What are the perceptions and personal beliefs expressed by Black mothers that may influence the decisions they make regarding HPV vaccination for their sons?**

The beliefs about early childhood vaccinations varied widely among mothers in the study. Those experiences could have remained in their memories as they made decisions about HPV vaccination years later. The second qualitative research question addressed mothers’ beliefs as they made decisions about HPV vaccination for their sons. The themes that emerged about beliefs of HPV vaccination were confusion about HPV and the HPV vaccine, concern about the newness of the HPV vaccine, concerns about the recommended age for HPV vaccination, the role of media, other decision-makers, and medical mistrust.
Confusion About HPV and the HPV Vaccine

According to the 2017 NIS-Teen, 11.2% of the mothers of Black male adolescents stated that they did not intend to have their sons vaccinated against HPV in the next 12 months due to lack of knowledge about the HPV vaccine. In addition, 10.8% of mothers in the NIS-Teen stated they did not seek HPV vaccination because they believed the vaccine unnecessary (see Table 9). During the qualitative interviews in this study, some mothers expressed confusion about HPV and the HPV vaccine. An understanding of the “basics” of the HPV vaccine could be a way to help mothers appreciate the benefits of vaccination for their sons and a facilitator for deciding to have their sons vaccinated against HPV. In the qualitative interviews, the participants had limited knowledge of HPV and the HPV vaccine. When asked to state what they knew about HPV or the HPV vaccine, a few participants mentioned that HPV is a virus or consists of strains/types. One participant stated that there were two vaccines available and the years of the release of the initial vaccine. In the qualitative interviews, almost one-third of the participants (seven mothers) did not mention the connection between HPV and genital warts even after prompted.

A mother’s understanding of how her son could get exposed to HPV and the consequences of HPV exposure could contribute to her perception of HPV vaccination. Many mothers knew that HPV was a sexually transmitted virus; only one participant expressed confusion about whether HPV transmission could occur via sexual activity. One participant knew that individuals could spread the virus via skin-to-skin contact.

The mothers had varying levels of understanding about HPV and cancer. When asked whether HPV infection linked to cancer, all but two mothers knew that HPV
infection could lead to cancer. Some mothers were aware of the connection between HPV infection and cervical cancer but had less knowledge of the other cancers linked to HPV infection, such as cancers of the vagina, vulva, penis, anus, rectum, and oropharynx. When probed to identify the specific cancers associated with HPV, many mentioned cervical cancer; no one said vaginal or vulvar cancer. Without probing, one mother referenced that there can be anal exams (similar to Pap exams) conducted on gay men, suggesting that she knew of the connection between HPV infection and anal cancer. Four mothers mentioned penile cancer, and five mothers mentioned oral or throat cancer without probing. When asked to identify the cancers associated with HPV infection, some mothers incorrectly identified cancers such as prostate, ovarian, and uterine cancer. Three mothers stated they knew of HPV’s connection to cancer but did not know the cancers associated with HPV.

One mother had a shifting decision about HPV vaccination over time, and her prior experience influenced making this decision for another child. Asia had an older daughter and admitted that she initiated (but did not complete) the HPV vaccination series with her daughter. Moreover, her lack of understanding about the virus and vaccine in boys made her decide against vaccinating her son:

Cervical cancer was one that came up. There was a lot on prostate cancer, but cervical cancer is what I heard the most, which is part of the reason I did the first series of shot with my daughter, but then again, I don’t even have those histories in my family, so it’s like, “What am I really preventing?” (I3, son age 11)

Asia did not complete the vaccination series for her daughter because she believed that she did not have a family history of cervical cancer; however, she understood that a family history of cervical cancer could increase the risk of developing cervical cancer. Moreover, she incorrectly believed that HPV infection correlated to prostate cancer.
There was no family history of prostate cancer in her family; therefore, she did not consider having her son vaccinated necessary. It is also important to note that she incorrectly believed that prostate cancer risk was affected by HPV vaccination. It remained unclear if Asia would have felt differently about HPV vaccination if she had accurate information about the associated cancers.

There was a need to know if mothers felt their sons were at risk for HPV, which could have contributed to their beliefs on whether their son needed vaccination against HPV. No mother explicitly stated that she believed her son at risk for contracting HPV. When probed and asked which sex they believed at greater risk for HPV infection, some mothers answered “girls,” considering them “fast,” promiscuous, and willing to have multiple partners, which would result in increased risk of infection; interestingly, other mothers answered “boys” for the same reasons.

Some mothers shared that they believed girls more at risk because they only knew of cervical cancer as a potential negative health outcome of HPV infection. In the qualitative interviews, only three mothers referenced oral HPV infection as a consequence of oral intercourse. These mothers appeared very knowledgeable about virus transmission, as two worked in health care (including a sexually transmitted disease [STD] clinic) and shared that she currently had an HPV infection.

The next set of questions was to explore the participating mothers’ knowledge of the 2016 change to the HPV two-dose series. During the interview, the mothers indicated if they knew of this alternative schedule and their thoughts about the change. Few mothers were aware of the newer option. When asked to share their thoughts about this new option, the participants had mixed opinions. One mother viewed the new option as
marketing for promoting the vaccine to patients. Others liked that they could have their children fully vaccinated with less inconvenience (e.g., fewer medical visits, less pain to the child due to fewer injections, and fewer opportunities for allergic reactions).

However, some mothers viewed the recent addition of a two-dose option less positively and expressed skepticism about the update:

That makes me a little more leery of it. Like you had it in three. What did you do to reduce it to two? Is it a higher dose? You never needed three? Or, did you guys keep those three and split it between the two? (I5, son age 12)

I would want to know why. Is it convenience or does it compromise anything? Like, just tell me why it went from three to two. (I9, son age 12)

A few mothers did not view the addition of a two-dose option positively; instead, they indicated a lack of trust in the vaccine.

The mothers did not state that learning about the two-dose option would influence their decision-making. For mothers not interested in having their sons vaccinated, the two-dose option did not cause them to change their decisions. For other mothers considering HPV vaccination for their sons, they stated that they would have their sons vaccinated regardless of how many times they needed to visit medical offices.

Although the purpose of a two-dose series may have been to make series completion easier and increase vaccine uptake, the mothers did not have a clear understanding of when and why this change occurred. The two-dose series produced greater confusion, as some questioned the HPV vaccine and others questioned the revised HPV vaccination guidelines. For caregivers who already had reservations about HPV vaccination, this confusion may have contributed to the reasons for their concerns.
"Newness" of HPV and the HPV Vaccine

Although the HPV vaccine debuted in 2006 for girls, the recommendation of the HPV vaccine for boys in the routine immunization schedule did not occur until 2011. Even with the availability of the HPV vaccine for more than 5 years at the time of the qualitative interviews, some mothers in the qualitative interviews considered the virus and vaccine “new.” In the 2017 NIS-Teen, 1.2% of mothers of Black male adolescents stated that they did not intend to have their sons vaccinated against HPV in the next 12 months because they considered the vaccine new and needed more information (see Table 9). During the interviews, some participants felt that they had only heard about HPV recently and suggested insufficient research on the vaccine’s side effects to justify using it.

One participant, Karen, stated that her son’s health care provider recommended that her son not receive HPV vaccination, feeling there was insufficient research:

Not enough research has been done, and it’s pretty much still in the research stage. Whereas, all the other vaccines, my children are still rather young, and those vaccines I had to get those when I was a kid. So, I feel a little more comfortable [with those vaccines]. (I13, son age 11)

It’s new. There really haven’t been any real solid studies done or proof that this really works, how effective it is for preventing these cancers. I don’t know. I think it’s a little different than chickenpox. [T]hat’s also to me a more recent vaccine that we’ve seen, and we know that it’s to prevent chickenpox. But with the HPV thing, the Gardasil, it takes a little longer to show the evidence of whether or not it’s actually preventing them from getting these cancers. (I8, son age 13)

However, other mothers disagreed, feeling that there was sufficient research to support its use:

I feel like that first round of people are 22, 23, 25 [years old now]. So, if there was something to come up with it, I think at this point, that would have come up. (I23, son age 14)
[The] chickenpox [vaccine] was new when it first came out, the measles [vaccine was] new when it first came out. Just because it’s new doesn’t mean that it’s bad. Doesn’t mean it’s right because they researched it, but because it’s new doesn’t mean I’m gonna be like, “No, it’s too new for me to try.” (I4, son age 11)

In addition, some shared an understanding of the evolution of research:

I am no HPV vaccine expert. However, new to me doesn’t necessarily make it “new” new, right? And I would guess that there was some time that went into its development and research. We may learn something with this generation of vaccinated folks that we didn’t understand before. I’m just saying that you gotta start somewhere. (I6, son age 12)

Most people haven’t questioned the MMR, the polio, because we can go back and look at the outbreaks, [and] how many people died. Whereas with something like this, it’s like this new thing all of a sudden and now we’re kind of like, “Wait, wait, wait, what’s going on?” But, just like there’s foods that we eat now that they didn’t used to eat back then, there’s medicines we have now. Just like everything else, things evolve. (I20, son age 13)

For one participant, prior experience influenced her beliefs of the “newness” of the HPV vaccine. Jackie got involved with HPV vaccination decision-making when her adolescent sister-in-law lived with her more than a decade ago. By the time she began considering HPV vaccination for her son, she did not consider the vaccine new and understood the connection between HPV and cancer. However, she still had reservations about the need to have her son vaccinated. During our interview, she reflected on her HPV vaccine decision-making:

I mean, it’s not new anymore, but it still feels very new, which I think is another reason why the ads have increased because people didn’t necessarily take it so seriously. [We] hadn’t really thought about it, nobody’s approached us at the doctor’s office about it, so it’s just sort of been like, oh, there’s another commercial about that. It still doesn’t feel like something I have to do I really need to do quite yet. (I10, son age 12)

Recommended Age of HPV Vaccination

In the qualitative interviews, the participants answered two questions on their thoughts of the recommended vaccination age: “What do you believe is the earliest age
that a child can receive the vaccination against HPV?” and “What do you believe is the earliest age that a child should receive the vaccination against HPV?” For the first question, most participants knew of the clinical guidelines and responded 11 or 12 years of age; six participants stated 9 or 10 years of age. One participant stated that vaccination was not a possibility until 14 to 15 years of age. (Gardasil is a vaccine indicated for female and male children as young as 9 years of age.)

When asked, “What do you believe is the earliest age that a child should receive the vaccination against HPV?” some mothers found the age suggested in the clinical guidelines was appropriate. Some mothers recommended an earlier age for vaccination, believing that many children become sexually active by 10 to 12 years of age. However, some mothers felt concerned by the recommendation, feeling that vaccination at 11 to 12 years was “too early.” Two mothers expressed concern about administration during early adolescence, believing that there was no need to introduce the vaccine until a child starts to consider sexual activity.

I believe [the recommended age for vaccination is] 10. I don’t think that people are giving kids a chance. I don’t understand why they would vaccinate so early. They didn’t even start their journey. They’re still kids. They’re not even thinking about stuff like that, so I don’t think it would be needed. (I4, son age 11)

Among those who refused to have their sons vaccinated because they felt them “too young,” none of the mothers expressed an understanding that the reason for vaccinating as early as 11 years was to provide time for building an immune response.

In the 2017 NIS-Teen, when asked why they would not have their sons vaccinated in the next 12 months, approximately 3% of respondents stated that they believed their children should make the decisions for their vaccination (see Table 9). This was a finding among some participants in the qualitative interviews in this study:
I know that it prevents transmission. But I’m not comfortable doing it right now. I know I have a window, so when he’s 20, and he feels like he wants to have it, he can have it. He can make the decision to have it for himself. But for now, I have made a decision that he shouldn’t have it. (I16, son age 11)

At his 11-year-old checkup, they had it on the paper. They’re talking middle school, and I’m like, “Middle school, really?” I just think that that’s just way too young to even open that door. Once you leave my house and you start partying, I feel like you’re more apt to try different things or let somebody get in your ear and make a decision that you probably shouldn’t be making even in college. That’s why I say, in college [it would be appropriate to] think about getting that vaccination. (I3, son age 11)

Asia acknowledged that young people might engage in sexual activity at a younger age but suggested that parents control when their children become sexually active through their parenting styles and home environments.

Laura expressed less concern about her son becoming sexually active and more concern about the effects of the vaccine on her son’s body:

I think 11 to 13 is way too soon, so I would say maybe 18 to 21. It just seems that just the child in that bracket, from 11 to 17, is that puberty. Some other things are going on in the body that I think needs to mature a little bit. (I1, son age 13)

Although some mothers knew of the recommended age for HPV vaccination in the immunization schedule, they still questioned the appropriateness of the recommended age and shifted the responsibility of vaccination decision-making to their sons for when they reached adulthood.

The Role of Media

Media impacted where the mothers learned about the risk of HPV and benefits of the HPV vaccine. When asked whether they had seen advertisements about HPV or the vaccine, and if so, where, the mothers mentioned seeing informational brochures or posters in medical and health offices, such as the gynecologist’s office, their sons’ pediatric practices, or the local health department. One mother said that she saw
advertisements at the library, while others referenced seeing information in printed media via scientific journals, parenting magazines, or medical publications. One mother remembered seeing an outdoor billboard with an advertisement. Another who worked in New York City stated that she had seen promotional materials while riding on a New York City MTA bus. For some mothers, their first introduction to the HPV vaccine occurred when they received information from their sons’ health care providers when the providers recommended the vaccination.

When the mothers described the places where they had seen advertising or materials about the HPV vaccine, they often cited the Internet as a source of information, particularly Google, WebMD, and government websites, such as the CDC and FDA. Others mentioned using online resources to speak with other parents through discussion boards and chat groups. Three mothers recalled reading something about vaccines on the Facebook social media platform. Those who referenced seeing information on Facebook referenced antivaccination content:

I do not consider Facebook news, in any way, shape, or form, [but] someone showed their daughter who was fine one day [who] went and got the [HPV] shot. And, a week later, this child looked like she was almost a vegetable. (I5, son age 12)

Although Marla acknowledged concerns about Facebook’s credibility, she also shared antivaccination vignettes and personal stories that remained in her memory.

One mother stated that she did not have network TV and had limited access to commercials aired on network or cable channels. However, most of the mothers recalled seeing advertisements about the HPV vaccine on television. The interviews occurred in late 2017; during this time, Merck & Co. presented a new media campaign to promote HPV vaccination for girls and boys. The commercials showed the connection between
HPV and cancer and the benefits of vaccination against HPV. Because the HPV vaccine was initially solely for young women, the commercials also informed parents that the HPV vaccination was now available and recommended for young men.

Many mothers referenced these commercials during the qualitative interviews when asked to discuss where they had seen HPV vaccine information. As mentioned, some mothers did not know when the vaccine became available for male children. Some participants first learned about HPV promotion for boys through television advertisements:

I never felt like they really talked about boys. It’s just recently. I saw a commercial [where] the child says to you from the adult to the child. The child goes, “But you knew? You could’ve done something.” And that’s when I realized, “Oh! Boys are in the mix?” (I5, son age 12)

I don’t know that we have or that I have heard the message as strongly for boys as I’ve heard it for girls. Like I said, until they started doing these ads on television here recently, I don’t even think I really thought about it for boys, to be honest, because now they have an ad with a young man and [it] really caught my eye because up until that point I really feel like they were pushing it for girls, which was concerning to me. (I10, son age 12)

For Jackie, the original promotion of the HPV vaccine among girls was a concern, and the extension of the campaign to boys indicated other issues.

During the qualitative interview, if a mother mentioned seeing a television advertisement, she also described the ad as she remembered it. Similar segments of the advertisement appeared to resonate with the participants. The mothers recalled that the commercial began with a “present-day” young man (or woman) stating that he had cancer due to HPV infection. The actor asked hypothetically if the mother and father had known that they could have had protected him by having him vaccinated against HPV. Sandy (son age 13) remembered the commercial but incorrectly attributed it to meningitis, another vaccine recommended during the same schedule as HPV vaccination.
The commercial included credible information about the HPV vaccine and could have been an opportunity for mothers to introduce the topic of HPV vaccination to their sons. A few mothers stated that their sons saw the commercial and asked questions about the vaccine. Only one participant, Amber (son age 16), said that she used the commercial to initiate a conversation about the vaccine with her teenage children. Others changed the topic or minimized the severity of the issue when their sons asked about it. Asia shared:

He was like, “You would let me get HPV?” I’m like, “No, I wouldn’t let you get HPV.” He was just like, “Should we go get the vaccine then?” I’m like, “No.” We had to talk a little bit, so it kind of forced me into a conversation that, at 11, I really don’t want to have, but I didn’t want him to be scared and [think], “Oh, God, my mom’s going to let me catch something.” I had to reassure him, basically, that “You’re okay. It’s a commercial. Their point is to try to draw you in and try to get you to do something.” I’m like, “No more than Olive Garden salad on the TV and you’re like, ‘Oh my God, I got to have a salad.’” (I3, son age 11)

Asia did not choose to use the commercial as an opportunity for additional discussion. The commercial did not explicitly indicate HPV as an STD. However, it appeared that Asia knew that HPV was an STD, as she shared that (a) she did not want to be “forced” into a conversation with her 11-year-old son (suggesting a conversation about sex, which she may have considered a sensitive topic), and (b) she did not want her son to believe that she would allow him to “catch something.” However, her desire not to have a conversation about sex with her son at his age caused her to reframe her discussion to minimize the need for HPV vaccination.

The commercial includes a call to action, a reference to a website for more information (www.HPV.com), and a suggestion to speak with children’s medical providers. When asked to recall the commercial, no one mentioned seeing that part. One mother indicated that the lack of comprehensive information about the virus and vaccine caused concern:
What I’m seeing about this is what they show on commercials. No one is sitting down and saying, “This is what this is. This is what it could cause.” You know? There’s really not. It’s like you have this vaccine that has just popped up, and it’s just like, well, what is it for? What do you need it for? What is it preventing? [There’s] not really a lot of other information about it unless you Google it yourself. (I14, son age 11)

Even though she had seen the Merck commercial that had provided additional online resources for information, Frankie wanted more individualized education about the HPV vaccine.

Many mothers described a gradual shift when they came to understand that boys could receive the HPV vaccine. Moreover, the addition of males to the clinical guidelines caused confusion and concern among mothers, as some did not know why boys were not a population included from the beginning.

It makes sense that it should be available to both. A sexual disease that only women could catch but not the guy? That didn’t make sense to me. (I5, son age 12)

Why would you make a vaccine for girls only if also boys can get and transmit the disease? And at first I think it was just for girls, but now it’s for both boys and girls. (I16, son age 11)

Karen believed that there were two different HPV vaccines, one for girls and another for boys:

Yeah, it concerns me that they have a vaccine, that this vaccine, in particular, they have one for both boys and girls? No other vaccine that I’ve heard of is kind of split like that, where they have one just for boys and one just for girls. Why isn’t it just one vaccine for everyone? If it’s something that [children] can contract, is it not something that adults can contract? Why is it not a vaccine for someone a little older in age? It’s weird to me. (I13, son age 11)

Her belief in two different vaccines resulted in further confusion about why there might be separate vaccines and the age restrictions for vaccination guidelines. This confusion influenced some mothers’ thoughts about the HPV vaccine and whether it was appropriate for their sons.
For one mother, the lack of vaccine promotion in boys was part of a larger issue of stigma and stereotypes about those at risk for infection. Asia was the mother of a son and daughter 10 months apart in age. She reflected that her son’s physician never introduced the topic of HPV vaccination to her but that her daughter’s physician did:

Yeah, I actually questioned this doctor. I’m like, “Okay, so what’s up with this HPV thing. You ain’t asked me [if] I want[ed it].” He was like, “Oh, is that something you’re interested [in]?” I’m like, “No, not really, but you didn’t ask me.” I think people, generally, because all of our stuff [as women] is internal and [men’s] is external, they automatically [think that] it’s more of a female issue than a male issue. (I3, son age 11)

Although she did not want her son vaccinated, Asia noticed the difference in how physicians promoted the HPV vaccination to her children and believed the variation occurred due to biological differences between the sexes. For Asia, that difference was why many consider HPV vaccination a “female issue.” Joann similarly noted that early discussions about the vaccine and sexual health focused on girls and did not include boys:

Some of those early conversations about the vaccine were based on girls, and I felt like parents of boys were like, “Oh, I don’t have to worry about that.” [Parents of girls] were having these conversations about a vaccine, which was couched around saving girls from cervical cancer. I think it puts sexual health, again, into the laps of girls. It’s uncomfortable, nonetheless, for everybody, but I think when we make it a gender-based conversation, it becomes unfair. (I23, son age 14)

Some participants assumed HPV vaccination was just for girls because the vaccine’s initial promotion only addressed protection against cervical cancer. As mentioned, some participants learned from their sons’ health care providers that boys and girls could receive the vaccine, whereas others found out from television advertisements. Notably, one mother disclosed not knowing that boys could receive the vaccine until she received the recruitment flyer for this study. Another mother questioned if the vaccine underwent modification for boys and if there were the same potential vaccine side effects for both sexes. Overall, most mothers supported the availability of the HPV vaccine for
boys because HPV is a sexually transmitted virus. However, some expressed confusion about the vaccine’s extension to boys that showed their lack of understanding about HPV and the HPV vaccine.

Other Decision-Makers

This study was a way to explore mothers’ understanding of HPV vaccination; however, in some discussions, the mothers presented male figures as important persons in their decision-making. The role of the fathers (or male household figures) varied by family type, as those interviewed had diverse family structures. The participants had households with various family structures, including nuclear, blended, single parent, and stepfamily. In cases where there was no father present in the household, the mothers made all health care decisions for their son. Some families had male figures in the home who may not have been a biological relation to the sons in the study. However, family structure did not indicate the role or influence of the male partners. Male partners in the home assumed a fatherly role and influence, regardless of their biological relationships to the sons.

Some mothers with male partners in the household suggested that the male partners’ behaviors contributed to the view of illness in the household. Moreover, there were interesting similarities and differences between ethnic subgroups. Lucy believed that her husband set an example of health-seeking for her son, but she wanted her son to feel comfortable informing her when he felt sick and engaged in preventative behaviors:

My husband, he would not go to the doctor unless otherwise stated, so for [my son], I am trying to change that. Women talk about it, but not [men]. I never hear him talk [with] his friends about anything health related. I think it’s just a Kenyan macho thing or African macho thing. (I18, son age 15)

Anna shared a similar viewpoint about her Puerto Rican husband:
He doesn’t force this issue to go to the doctor, unless he gets to the point where he’s absolutely dead to the world and feels that he can’t get up. I’ll say to him, “Listen, you know, you really need to get that thing checked out right there, that mole.” And he’ll say, “Oh, okay, I know, yeah.” I do agree that it is more of an issue with men of color. (I2, son age 15)

However, Marla felt that she had a different experience in her West Indian household:

I think if you’re in [a] West Indian household, it’s almost flip-sided. The men in the house are gods, and you treat them as so, even if they’re boys. But then, when they’re ill, they’re like big babies. Even if they’ve been married 20 years, if their mother’s alive, they need to go their mother’s house to get taken care of. (I5, son age 12)

In some cases, the male partners’ influence varied by their interest or concern about the issue at hand. Thus, if the fathers had a strong opinion about vaccination (positive or negative), they could exert their influence and shape vaccination behavior:

“He’s gotta get the shot, he has to go to the doctor.” [The male figure] is very engaged and involved in terms of the shots that he feels [the son] needs to have as well, and he will take the leadership role in taking him to the doctor himself so that he can get that vaccination if he needs to get it. (I4, son age 11)

I probably would have went on and did [the flu vaccination] because the doctor says every year it’s so important for them to do it. The West Indian part of me probably would say, “Well, I know I have these doubts, but she’s saying that they need to do it.” And my husband was like, “Absolutely not.” (I5, son age 12)

Most of the participating mothers were the lead decision-makers, possibly considering their male partners’ input but making the final decisions themselves. In some relationships, the mothers were more assertive and felt that health care was entirely their responsibility. In other relationships, the mothers stepped back, allowing the male figures to lead decision-making about their sons’ health. The male partners received varied responsibilities in health care activities. A few mothers expressed that the male partners took primary control for health care activities; in those instances, the mother’s influence remained front and center:
So, I take the kids to the doctor’s appointments unless I absolutely cannot. And in those situations where I can’t, I try to provide detailed instructions because, in terms of my ability to convey history, background, connections to specialists, or whatever, that’s my lane, so I do that. (I6, son age 12)

However, for discussions about health that included puberty and sex, some mothers relied on their male partners:

They talk about all the men stuff. It used to be that [my son] would come to me with a lot of questions, and I had to tell him, “I don’t have a penis. You need to talk about your daddy about that because I don’t know how it works.” As he has gotten older, they have [had] more of those conversations about what’s happening with his body and ways to approach different [things] as they arise. (I10, son age 12)

That’s my husband’s job. I take the girl, he takes the boy. (I16, son age 11)

In certain families, the male household figures take larger roles in discussions about topics related to sexual health; however, the female caregivers could be the adults participating in the medical appointments where there are decisions made about HPV vaccination.

In addition, the sons emerged as potential decision-makers. When discussing a mother’s control of a son’s HPV vaccination, the participants mentioned their control of their sons’ overall health-seeking behaviors. Prior research suggests that masculinity may affect men’s health behaviors, as men are less likely to engage in preventative behaviors (such as HPV vaccination) or seek care when sick (Gilkey et al., 2012; Marcell et al., 2007; Mount et al., 2012; Ott, 2010). This is an important finding, as adolescent males who have received vaccination against HPV may make decisions about their vaccination status once they reach adulthood:

I think in young Black men, we instill in them that you need to be independent, you need to be able to hold your ground, [and] you need to be independent. You need to be able to identify yourself because you’re not going to be a baby forever. (I4, son age 11)
There was a section of the interview devoted to understanding how the participants’ sons engaged in or avoided health care when sick. Overall, the mothers said that their sons let them know quickly when they did not feel well and often depended on their mothers to access care. Sons with chronic or life-threatening illnesses had an acute awareness of the importance of quickly seeking health care when they started to feel ill and were more likely to express when they felt sick. A few mothers shared instances when their sons avoided letting someone know of injury or illness, often because they felt concerned that the injury or illness would prevent them from competing in an athletic sport or they did not want to be “babied.” Mothers discussed whether they believed that the young men, specifically young Black men, could freely express when they felt sick or engage health care services when injured. Some mothers felt that the inability to seek help related to age, gender, or both. Some mothers did not view this inability as specific to Black boys, but more of a reflection of the attitudes placed on men in general:

Seeing boys and having worked with a lot of preteen and teen boys, I would say that they do tend to keep things to themselves and feel like they have to man up. They [feel like they] have to just handle it, or else they’re being a baby. (I19, son age 12)

I’ve been teaching in K–12 education for 12 years, and I probably can count on one hand the amount of times that a boy has actually asked to go to the nurse, especially middle-school-aged boys. (I23, son age 14)

Moreover, Asia correlated the lack of care-seeking behavior to an increased risk for HPV infection among boys:

I think girls get checked a lot more than boys do. Boys go around thinking everything is fine and, “I don’t need to go to a doctor. I’m good.” (I3, son age 11)

There were mixed opinions on whether culture had an influence on health care-seeking among Black men. Asia felt that culture had an impact:
I think it’s more prevalent in the Black community to kind of take it like a man. You’re not a wimp. You’re not a punk. You’re not a sissy, or whatever. (I3, son age 11)

Vicki felt that both culture and gender had an impact:

I think most boys kind of tend to act that way, but I do definitely believe that young Black boys are almost forced to take it like a man, to deal with it. (I21, son age 12)

Sandy believed that this was an issue particularly salient for mental health, a topic she mentioned multiple times during her interview:

Even the way we talk about mental health. They have the mindset that boys ain’t supposed to cry, boys [are] supposed to be tough. No, you tell me what’s going on. You can cry. I’m your mother. You can cry. Let’s talk about it. (I7, son age 13)

Some mothers felt that sons’ relationships with their parents were the most important predictors of how they viewed illness and health-seeking. They acknowledged their role as mothers in creating environments that enabled their sons to seek health care when needed and take active roles in their health. Thus, sons who can express to their parents when they need to access care seek care earlier and reduce the risk of continued illness or discomfort. The participants had mixed feelings when asked to discuss how they felt mothers in general considered their role in this phenomenon. Although the women believed they had created environments that enabled their sons to express their needs honestly, some recognized the fine line between coddling and self-sufficiency. Moreover, many expressed that boys, and in some cases Black boys, are raised to address health in different ways:

I think we are more involved in our kids’ health, and it’s not necessarily that tough love. We tend to spoil our boys more and give them a lot more care. (I13, son age 11)

I find that some Black mothers, they do too much. They pamper too much. And instead of letting them man up, they’re doing the opposite. I don’t want to coddle
him, but at the same time, I don’t want him to keep everything to himself. (I12, son age 14)

Discussion during the interview addressed how the mothers viewed their sons’ control of their health. The mothers in this study were the primary adults responsible for most of their sons’ health-promoting behaviors, including making and attending medical appointments and filling prescriptions. Mothers with young sons often reported remaining in the room for clinical visits; older mothers were more likely to note that they left, offered to leave, or were requested to leave the room during clinical examinations. When asked to describe their sons’ involvement in decision-making about their health, most stated that their sons had limited roles. Some mothers agreed that they allowed their sons to voice concerns and opinions, and some let their sons speak directly to health care providers during clinical encounters or select their providers in medical practices:

We discuss what’s going on or why we’re doing something, but ultimately the final decision comes from me. I tend to ask him how he feels about things and make note of it so that he will at least feel some value. (I21, son age 12)

Some participants allowed their sons to take the lead in health-promoting behaviors, such as developing healthier eating practices, being more physically active, or alerting parents when prescription refills were necessary. However, the parents, most often the mothers, made health decisions for medical treatments, therapies, or vaccinations, such as the HPV vaccine.

The 2017 NIS-Teen showed that 2.9% of mothers of Black male adolescents stated that they did not intend to have their sons vaccinated against HPV in the next 12 months because their sons were the ones receiving the shot and therefore should make the decisions about vaccination (see Table 9). During the qualitative interviews in this study, the mothers described when they felt that their sons would be ready to take more
responsibility for their health and make decisions for themselves. Many participants stated that they had not given this question much thought. Through the discussion, most participants suggested age 18 (or when leaving for college) as the most appropriate age for their sons to take charge of their health. A few shared that they might prepare their sons for the task by slowly shifting responsibilities (e.g., making appointments or driving to appointments alone) a year or so before they reached adulthood. One mother shared that her son’s pediatric practice required her son (age 13) to complete his own medical history forms. However, she found some of the questions (e.g., smoking behavior or sexual activity status) inappropriate for someone his age to answer by himself. She felt further taken aback when the health care provider later asked her to leave the room during that same clinical visit.

Jackie (son age 12) was a therapist and shared that in her work, adolescent minors often had to complete and sign forms so they could become more familiar and engaged in the services received. Some medical settings present adolescence as an opportunity to build independence for minor patients, helping these patients create autonomy by completing medical forms and participating in physical examinations alone. Although these mothers recognized that their sons would soon be responsible for their health, few had plans for shifting responsibility or understood how to equip their sons to make health decisions in the future.

Medical Mistrust

Health research indicates mistrust as a significant concern among people of color, regardless of the health topic (Kennedy et al., 2007). In these interviews, the participants did not introduce mistrust as a specific topic; however, many mothers referenced distrust
when asked to describe what they had heard about vaccines in the Black community and as they shared their decisions not to have their sons vaccinated. Some participants referenced the influence of pharmaceutical companies in the creation of large numbers of vaccines:

So, I think generally speaking, they’re good for public health, but I do tend to worry about some of the new vaccines that are sort of being introduced because there’s the practical side of me that knows that certain companies, pharmaceutical companies to be exact, have something to gain. So there’s that dichotomy of public health but also pushing [and] wanting your company to thrive. (I19, son age 12)

I think that the only thought I’ve ever had is, “Why is the number of vaccines children [need] growing year after year?” I start to question, “Is a vaccine needed, or is this a money thing?” (I5, son age 12)

Some mothers mentioned conspiracies about pharmaceutical companies, the government, and even physicians themselves:

The way [the HPV vaccine] was launched was kind of fishy. That there were shortcuts when it came to the FDA [and] kickbacks. From the get-go, there [were] a lot of issues about that vaccine, and it made me uncomfortable. I even went [to a meeting] where [the makers of] Gardasil [were] trying to push to make [the vaccine] mandatory in schools. I don’t know if big pharma always has our best interest at heart. (I16, son age 11)

I want to have deeper conversation with the doctor, knowing I’m only going to get the medical perspective. I feel the medical perspective downplays all side effects. (I5, son age 12)

I’ve heard that in the Black community, they usually give some more things that are not good for us because they assume we don’t know better. I would tend to agree with that. I don’t typically take my child to places in Black communities for that purpose. If I know there’s a health clinic in my area or an area where there are a lot of Blacks or Hispanics, I don’t take my kids. (I12, son age 14)

The Black community includes a wide variety of subcommunities, including African American, West Indian/Caribbean, and those of African descent who have emigrated to the United States. Representatives of the Black community’s subgroups shared different viewpoints about vaccination and subsequent behaviors in their
interviews. Regardless of ethnic background, the mothers acknowledged how being Black in America could result in pervasive mistrust:

Because, historically, African Americans have been exposed to unfortunate medical events and have been experimented on and treated in very inhumane ways. That’s [why] we probably have a greater sort of doubt, and that could also work against us in some ways because we’re sometimes less likely to get help and seek the treatment and prevention that we could because we just don’t trust the medical professionals. (I10, son age 12)

I think in the African American community, there’s [a lot of] conspiracy theor[ies]. They don’t trust the government, period. So, if anything is out by the government or the pharmaceutical companies, you know, there’s a distrust there. (I16, son age 11)

Two participants presented different attitudes about vaccination in the West Indian community. Natalie, who identified as Black, felt that her Black friends were the most critical influences in her decision to delay vaccination for her son after birth:

My family and my friends that are African Americans that are not of Caribbean descent, they thought I was crazy. [laughs] They thought that I should really just kind of get it done. It was my Caribbean-American friends [who] had concerns and had decided it along the way to wait for some of their vaccinations for their children as well. (I19, son age 12)

In contrast, Marla, who identified as West Indian, said that those in her West Indian community were most likely to support the recommendations of the health care providers. In contrast, those in the Black community were more likely to mistrust the health care system:

I almost feel I think West Indian people say, “The doctor said to do it. Okay.” They question no authority. They don’t even try to find out information about it. It’s just an immediate yes. I would say anybody who has ever made [statements about mistrust of the health care system] to me are actually African Americans. I don’t think it’s a bad thing. I think you should question. I think it’s culturally where West Indians don’t question the authority when they see doctors and lawyers and cops, and they see things like that as authority. They would never question anything. (I5, son age 12)
During the discussions about trust in the health care system, three mothers mentioned a connection between vaccines and autism, particularly in the Black community:

It has been brought to us that with the frequency of autism in the Black community and amongst boys that the vaccines were a cause of [autism]. But [there’s] also talk that the government is just trying to poison you or control you [with vaccines]. And then, they’ll cite the Tuskegee experiment. [A] lot of the things [you] hear tend to be more conspiracy theories, in my opinion, because we have also had the same facts that come around that disprove those things. All I know is [that] everybody in my family has been vaccinated. Even though my nephew has autism, he is the only person who has autism. (I21, son age 12)

It’s just [that there are] a lot of the vaccines being used to inject other types of diseases or being linked to other issues that are in the community. Autism, ADHD, all of that thing. When you have those issues in the African American communities, your kids get labeled a lot quicker. They’re put in the system a lot quicker, and they’re medicated a lot quicker, so you’re trying to figure out is there really something wrong with my child, or did something cause this to happen or occur? (I14, son age 11)

As mentioned, there is no research in support of a connection between vaccines and autism. In addition, research shows a disparity in autism spectrum disorder diagnoses, with White children more likely to receive a diagnosis than Black or Hispanic children (National Center on Birth Defects and Developmental Disabilities, 2018). Yet, the mothers in this study considered the belief that autism and other intellectual disabilities as prevalent in the Black community as real. Some believed that vaccines might be the reason for the prevalence of such disabilities.

Prior research on medical mistrust in communities of color has included references to the Tuskegee syphilis experiment or phrases such as “guinea pigs” and “test dummies” (Kennedy et al., 2007). The interviews in this study showed similar sentiments, even if the participants did not use those exact words:

I know stories from really back in the day about Black people being vaccinated by what they thought would be one thing, and then it was something totally different, so you’re basically a guinea pig. So that was a negativity, and unfortunately it really sticks with people to this day. (I17, son age 13)
I think that the Black community is highly critical and highly distrusting of modern medicine. I think we are very distrusting of doctors. I think we’re very fearful that someone is giving us something or [is] testing things out [on us]. (I10, son age 12)

Two mothers explained that their mistrust originated from a belief that there are vaccines designed for different groups of people:

In our community, I see it as people are afraid, just like they’re afraid to go to the doctors, because they feel the same thing—that we’re being put out there as test dummies and guinea pigs to be used on to see how this is gonna react. Then you’re wondering, “Are they really putting the actual medicine in, or did they single these out and these are for the Black people, these are for the White people. Are they putting something else in there?” (I2, son age 15)

I’ve heard that vaccines, they have a Black vaccine. That’s what I’ve heard. I’ve heard people say they have Black vaccines, which are vaccines that, in the long run, make us worse off than if we didn’t have the vaccine. So, I have some people [who] say the vaccine actually gives you the actual illness. So, people believe that. If they don’t get a measles shot, then they’ll be better off than getting it, the measles shot, because then they’ll get the measles. (I12, son age 14)

Sandy shared that she had heard similar things among those she knew in the Black community but felt differently about the concerns raised by some:

Yes, out here, people say, “Vaccines is poison. They trying to poison us.” I say, “Well, if they’re trying to poison us, why everybody getting it?” They don’t just say only Black people got to get the vaccine. It’s everybody: Black, Spanish, Chinese. I think a lot of that stems back from our reputation in the Black community and not trusting people in research. (I7, son age 13)

The mothers’ personal, lived experiences and perceived experiences shared by people they knew contributed to their attitudes. Some mothers chose to vaccinate despite their mistrust. Other participants indicated that mistrust was a significant factor in their decisions not to vaccinate.

A health care provider can be a trusted resource and influence on HPV vaccination behavior. Similar to prior research (CDC, 2013), this study showed that the
patients relied on the guidance provided by their sons’ health care providers when deciding on HPV vaccination:

I also tend to follow the instruction of the physician. I’m not a doctor. (I9, son age 12)

Approximately 17% of the mothers of Black male adolescents in the qualitative study stated that their sons’ health care providers had not yet introduced or mentioned the HPV vaccine. Similarly, 16.7% of mothers of Black male adolescents in the 2017 NIS-Teen reported that they did not intend to have their son vaccinated against HPV in the next 12 months because they did not know it was a vaccine recommended for their adolescents (see Table 9). In this study, the participants who received recommendations from their sons’ health care providers reported varied approaches. The mothers recalled that some providers introduced and recommended vaccination at the same clinical visit. In contrast, other physicians used the first conversation to introduce the idea of HPV vaccination but did not suggest vaccination at that time.

Most mothers expressed that their sons’ health care providers did not pressure them to vaccinate. Sandy, a health care provider in pediatrics, shared that she did not pressure her patients to proceed with vaccination immediately if they felt uncomfortable, a strategy referenced by other participants in their experiences with their sons’ health care providers:

When parents are hesitant about vaccines, I’m quick to say, “Hold off on it. If you feel that you don’t want to do it, let’s do some research. You educate them, and you give them the information, and let them make an informed decision. (I7, son age 13)

[My son’s doctor] told me to start thinking about if [the HPV vaccine] was something I [had] thought about giving him. I told her I wasn’t comfortable doing it yet. Let’s revisit it on his next visit. And, she said, “Fair enough.” And I told her that we most likely would need to speak before we talk to him to get me to a comfort zone to move forward with him, which she was fine with. (I5, son age 12)
The type of education that the participants received about HPV vaccination and its delivery in the clinical visit varied. Some stated that they received written materials or literature at the initial clinical visit where the health care providers introduced the topic, regardless of whether they elected to vaccinate at that time. Other participants said that there were only verbal conversations and that there was no additional information provided. Two mothers reported that their sons had not seen health care providers for annual wellness visits at ages 11 or 12; only one mother shared that her son did not regularly see a physician for preventative care.

Almost all the participants responded that they relied on their sons’ health care providers for guidance, and expert feedback had a significant influence on their decision-making. Karen’s health care provider suggested that she not have her son vaccinated:

[The health care provider] offered [the HPV vaccine] to us but did not recommend it. She just didn’t feel as though there was enough studying done on it, and from the studies that had been done, they were not very favorable. So, she kind of left the decision up to me as to whether or not to give him the vaccination, so I decided against it. (I13, son age 11)

When asked whether a more positive recommendation would have affected her final decision, Karen responded:

If [the physician] had been more favorable, definitely had she had [provided] a little more favorable information, as far as studies and numbers and things of that nature, then that could have possibly swayed me. But, the fact that she did have some information that was unfavorable, it helped in making my decision, as well.

Amber’s children’s pediatrician had introduced the topic, stating that HPV vaccination was a school requirement in New Jersey. She declined vaccination at that time but followed up with the school nurse, who also recommended vaccination and confirmed its requirement. It is noteworthy that, as of 2018, HPV vaccination was not a requirement for school attendance in New Jersey. However, Amber’s understanding that
it was required, combined with recommendations from multiple trusted health care providers, led her to continue with vaccination.

Laura never received a recommendation from her son’s health care provider, and she had many questions:

I’m not sure why my pediatrician never mentioned it. It is because the child is supposed to have some kind of a characteristic to get it or be told about it? Or, maybe it wasn’t for boys. The push wasn’t for boys. It was for girls. So yeah, I just need a lot more information. (I1, son age 13)

Laura did not have an interest in having her son vaccinated against HPV and never asked her son’s pediatrician for more information, although she had questions.

*Gender and Racial Concordance Between Doctors and Patients*

There is little research on the intersectionality of gender and race in doctor-patient interactions and whether such interactions could increase HPV vaccine uptake. The available research has mixed outcomes. Some research indicates that patients are more likely to have better outcomes (e.g., seeking preventative care, trusting in their doctors, engaging in positive health behaviors) if they have doctors of the same race or ethnicity; in contrast, others suggest no difference (Meghani et al., 2009). The semistructured discussion guide for this study did not have specific questions on this dynamic. Still, it was a theme explored after a few mothers referenced the race and gender of their sons’ pediatricians during their discussions about trust in the health care system.

The mothers in this study indicated if they had chosen their sons’ health care providers based on gender or race. For some mothers, gender was a factor, as they preferred their sons to have male practitioners. For those whose sons had female health care providers, most said that as long as their sons felt comfortable, they had no intention to change to male providers as their sons age. In one case, a mother shared that her son’s
health care provider suggested that he switch to a male practitioner. For other participants, selecting their sons’ health care providers related less to gender and more to personal recommendation and the providers’ years of experience, educational backgrounds, and credentials. Some mothers used the same health care providers they had when they were children. Frankie disclosed during her interview that she was pregnant and considering a new pediatrician after her daughter was born, as she felt her son’s health care provider was “getting a little old” (he was also her pediatrician when she was a child). Interestingly, Frankie was the only participant who did not know that boys could receive the vaccine until she had received this study’s recruitment flyer, as her 11-year-old son’s health care provider did not discuss HPV vaccination.

Roni and Asia considered the providers’ race more important than their gender. Roni intentionally sought a Black pediatrician, although she felt concerned that this provider did not have children. The recommendation of her son’s sports physician, who was Black, contributed to Asia’s decision not to have her son vaccinated against HPV:

[My son’s] sports physical person, she’s Black. His primary pediatrician is White. His primary pediatrician was like, “Yeah, you need to get [the HPV vaccine].” When I talked to his sports physician about it, she was like, “No. That is not something that I will recommend.” She was like, “Is [your son] promiscuous? Do you allow him to be promiscuous? No, don’t let them scare you into thinking he needs something that he really does not need.” She was like, “When you really look at the statistics about it and who’s really affected…it’s really not us.” (I3, son age 11)

Asia trusted the sports physician more, and she considered her clinician’s recommendation more credible than that of her son’s primary health care provider. In addition, another clinician (who also matched her ethnic background) confirmed her reservations about vaccination and helped her justify not proceeding with an HPV vaccination that she did not want anyway.
Conclusion

Analysis of the 2017 NIS-Teen shows that Black male adolescents have not achieved the 80% vaccination objective outlined in Healthy People 2020. When exploring demographic variables, insurance coverage was associated with the receipt of at least one HPV vaccine. Despite all interviewees having some type of health insurance, this did not correlate with HPV vaccination, as less than 50% of their sons had received any HPV vaccination. The percentage of sons who received at least one HPV vaccine decreased as maternal education increased; however, the percentage of sons who received all HPV shots increased as maternal education increased. This phenomenon did not occur among the mothers who participated in the qualitative interviews in this study. Six of the participants’ sons had received one or two shots (of the three-dose series), five mothers had Master’s degrees, and one mother had a high school diploma. Only three of the participants’ sons had received all HPV shots; one mother had a bachelor’s degree, one mother had a Master’s degree, and one mother had a doctoral degree.

Data from the 2017 NIS-Teen analysis showed mothers’ reasons for not seeking HPV vaccination for their sons in the next 12 months: a lack of knowledge about the HPV vaccine, a belief of the vaccine as unneeded or unnecessary, and safety concerns about the HPV vaccine. There were similar findings from the qualitative interviews in this study. Few mothers (outside of those who worked in the health care profession) had a clear understanding of HPV and the vaccine, although all the mothers stated that they had heard of the HPV vaccine. The mothers shared various reasons for why they believed the HPV vaccine unnecessary for their sons. Many of the participants expressed safety concerns about the HPV vaccine in the qualitative interviews. Moreover, the participants
had basic concerns about early childhood vaccination, which influenced their thinking about HPV vaccination.

Research shows that health care providers serve an important role in vaccination receipt. According to NIS-Teen data, a lack of recommendation for the HPV vaccine by health care providers was a reason why mothers did not intend for their sons to receive HPV vaccination within the next 12 months. In the qualitative interviews, some mothers said they had not received recommendations for having their sons vaccinated against HPV, showing missed opportunities for health care providers to impact HPV vaccination uptake. Furthermore, mistrust of the health care system had a significant influence on these mothers’ thoughts and beliefs about HPV vaccination, in some cases, even after receiving a recommendation from a health care provider.

A small percentage of respondents in the NIS-Teen identified the desire for sons to make the decisions about HPV vaccination, and thus this was a reason for the sons not to receive HPV vaccination in the next 12 months. This theme also arose from a few mothers in the qualitative interviews. In addition, the male family figures emerged as potential influencers in the decision-making for the HPV vaccination even though it was not part of the original discussion guide. The NIS-Teen public use data set did not include exploration outside of the married/not married binary. Still, the qualitative results suggest that male adult figures may have larger roles in the decision-making process.
Overview of Study

This mixed-methods study was an examination of HPV vaccination behavior by mothers of Black adolescent males. For the quantitative arm of the study, analyses presented the demographics of Black adolescent males captured in the 2017 NIS-Teen data set and the characteristics of boys vaccinated against HPV compared to those not vaccinated. Additionally, the analysis showed characteristics that predicted HPV vaccination (i.e., increased maternal educational attainment, receipt of HPV vaccination recommendation, teen having insurance, and teen participation in 11- to 12-year-old well check-up visit). In the qualitative arm of the study, interviews with mothers of Black adolescent males were the means to obtain a deeper understanding of why they chose to (or not to) have their sons vaccinated against HPV. It is important to note that a disproportionate share of the convenience sample of mothers of Black adolescent males resided in New Jersey. This chapter includes a discussion of the implications of the study’s empirical findings and connections to existing research on the topic of HPV vaccination. Ideas for future research and study strengths and limitations are also in Chapter 5.
Summary of Research Findings

RQ1: What is the prevalence of HPV vaccination among Black adolescent males in 2017?

The Black adolescent males in the 2017 NIS-Teen sample reflected a group engaged with the health care setting. The majority of Black adolescent males in the NIS-Teen sample had health insurance. Similar to other research (e.g., Williams et al., 2020), lack of access to health care was not an issue, as more than 90% received a well check-up at age 11 or 12. Moreover, this large percentage showed that Black adolescent males were using clinical services when HPV vaccination would be recommended (if their health care provider was following vaccination guidelines). Prior vaccinations were also common in this sample, with more than 95% of Black adolescent males in the 2017 NIS-Teen receiving at least one vaccination in their life. However, close to half of the Black adolescent males in the NIS-Teen reported that they did not receive a recommendation for HPV vaccination from their health care provider, highlighting areas of missed opportunities to promote HPV vaccination (Gilkey et al., 2016; Hirth et al., 2019; Lu et al., 2019; Peterson et al., 2020).

As noted in prior research (Sriram & Ranganathan, 2019; Walker et al., 2019), achieving full HPV vaccination remains an issue, with almost half of Black adolescents receiving at least one HPV shot but a much lower percentage having vaccine completion. For Black adolescent males who were not vaccinated, the five most common reasons for noninterest in HPV vaccination in the next 12 months were related to behavioral beliefs: (a) belief HPV vaccination was not recommended, (b) belief that the son was already up to date on their HPV vaccination, (c) lack of knowledge about HPV and the HPV
vaccine, (d) belief that HPV vaccination was not needed or necessary, and (e) safety concerns/side effects with the HPV vaccine. These primary reasons for noninterest in HPV vaccination have remained stable over time. In earlier research exploring noninterest in future HPV vaccination among males, the top five primary reasons included all but son was already up-to-date on their HPV vaccination. In earlier NIS-Teen analyses, belief that an adolescent was not sexually active was a top-five primary reason for noninterest in HPV vaccination, but parents have shifted their concerns from issues related to sexuality (Beavis et al., 2018; Thompson et al., 2017).

**RQ 2: What are the characteristics of Black adolescent males who were vaccinated against HPV during 2017 as compared to those who were not vaccinated?**

Black adolescent males’ health insurance was positively associated with receipt of HPV vaccination, which aligns with earlier research showing that uninsured individuals are less likely than insured adolescents to receive the HPV vaccination (Lu et al., 2018). There were differences between boys who received who started HPV vaccination and those who completed HPV vaccination. Individuals with family incomes above the federal poverty level had lower odds of vaccine initiation but greater odds of HPV vaccine completion.

Maternal demographics were associated with recommendation and receipt of HPV vaccinations, but some characteristics did not extend to subsequent vaccination behavior. Mohammed et al. (2017) found that maternal education was the strongest predictor of parental intent to obtain HPV vaccination for their children. Moreover, among parents of boys, maternal marital status was a significant predictor of intention to obtain HPV vaccination, suggesting interventions to improve vaccine uptake should
target this population (Mohammed et al., 2017). In the quantitative arm of this study, having a mother who was married was positively associated with a Black adolescent male’s receipt of a clinical recommendation for HPV vaccination but negatively associated with HPV vaccine initiation or completion. Maternal age was also associated with HPV vaccination behavior. Black adolescent males who completed the HPV vaccination series had mothers over age 45. In addition, for Black adolescent males who initiated HPV vaccination, the relationship between increasing maternal age and HPV vaccine initiation was not linear. Among Black adolescent males who were not vaccinated, mothers’ intention for their sons to be vaccinated against HPV in the next 12 months decreased as maternal educational attainment increased. Across all levels of education, increasing maternal education was positively associated with odds of HPV vaccine initiation and HPV vaccine completion.

Similar to prior research (Gilkey et al., 2016; Hirth et al., 2019; Lu et al., 2019; Peterson et al., 2020), receipt of provider recommendation for HPV vaccination was associated with higher likelihood of HPV vaccination. Black adolescent males who initiated and completed HPV vaccination also received a provider recommendation. The interaction between maternal education and provider recommendation indicated that the odds of HPV vaccination initiation were lower across all levels of maternal education compared to mothers with less than high school completion who did not receive a provider recommendation for HPV vaccination. The model used to predict the odds of HPV vaccination completion showed that sons with mothers with higher educational attainment had greater odds for HPV vaccination completion. In addition, Black adolescent males who received a provider recommendation also had greater odds for
HPV vaccination completion. Interaction effects in the model indicated greater odds of completing HPV vaccination for Black adolescent males who received a recommendation and whose mothers had 12 years of education or some college education but not a college degree.

**RQ 3: What are the perceptions and personal beliefs of mothers of Black adolescent males regarding childhood vaccinations and the human papillomavirus vaccine?**

From the 23 qualitative interviews conducted with mothers of Black adolescent males, four themes emerged: (a) concerns regarding early childhood vaccination and vaccine safety, (b) confusion regarding the scheduling of early childhood vaccination, (c) vaccine spacing and delay, and (d) concerns regarding vaccination mandates.

Understanding of the reason for vaccines in general was mixed and reflected the mothers’ understanding of diseases. Some mothers believed that vaccines were necessary because their use has resulted in the near elimination of some early childhood diseases; others felt there should be fewer required vaccines because some early childhood diseases are not as prevalent as they once were. Mothers mentioned trust in the safety of childhood vaccines and the HPV vaccine in the qualitative interviews. Although all mothers reported that their sons had received at least one childhood vaccination in their life, some expressed concerns about the safety of those vaccines. Prior research showed similar split thinking, with Gilbert et al. (2021) finding that more than 20% of mothers *somewhat agreed* and *disagreed* that early childhood vaccines are safe. Research has shown that mothers concerned about HPV vaccine safety were less likely to agree to HPV vaccination (Nan et al., 2016).
Although current clinical practice does not suggest vaccine spacing or delay, some mothers choose to exercise this option out of concern about the number of early childhood vaccines their child could receive (Bianco et al., 2019), feeling that the current guidelines provide too many vaccines in the first years of life. When asked whether they would still have their son vaccinated if there was no school requirement, some mothers responded that they would still vaccinate but would use their judgment to select which vaccines they believed their son needed to receive.

It is noteworthy that HPV is an optional vaccine that is not required for school attendance in most states. Some have suggested making HPV vaccination a requirement for age-eligible males and females, an idea met with significant pushback. Some individuals perceive HPV as a sexually transmitted disease, not a contagious disease like polio or measles; therefore, mass vaccination does not seem appropriate. Also, HPV infection can resolve on its own in some cases while developing into cancer in others. Presently, it is not possible to determine which path will occur: resolution or HPV-related cancer. This unknown trajectory underscores why mass vaccination is important. For some, the mortality rate of HPV-related cancers is so low that mass HPV vaccination does not address imminent harm and is thus not valuable (Balog, 2009). When asked what vaccines they would select for their son if given the option, no mothers selected the HPV vaccine. Vaccine hesitancy, even among those who have immunized their children, is important to note and address, as this could lead to future vaccine delay, refusal, or an increase in vaccine-preventable diseases (Bianco et al., 2019; Gilbert et al., 2021).

All mothers in the qualitative interviews had their son vaccinated as a requirement for him to attend school, although one mother did use the religious exemption to delay his
early childhood vaccination. When discussing early childhood vaccinations, none of the mothers who opted to exercise vaccination delay stated that their health care provider refused or pushed back when they requested to adjust the spacing of their child’s vaccination. Although clinical guidelines do not recommend vaccine spacing, some health care providers permit this practice, believing it is better to alleviate parent’s concerns than risk not having the child vaccinated at all (Kempe et al., 2015). Current vaccination guidelines are to protect children from diseases when they are most likely to have serious complications. Moreover, for those early childhood vaccines that require more than one dose, full protection does not occur until completing all recommended doses. Vaccination delay can create opportunities for children to become sick, as well as spread illness to others who are not protected (National Center & Respiratory Diseases, 2020).

*RQ 4: What are the perceptions and personal beliefs expressed by mothers of Black adolescent males that may influence the decisions they make regarding HPV vaccination for their sons?*

Among the mothers interviewed, less than half began or completed HPV vaccination for their sons. From the 23 qualitative interviews with mothers of Black adolescent males, six themes emerged: (a) confusion regarding HPV and the HPV vaccine, (b) “newness” of HPV and the HPV vaccine, (c) recommended age of HPV vaccination, (d) the role of media, (e) other decision makers, and (f) medical mistrust.

Although not the sole factor, mothers’ understanding of HPV and the HPV vaccine is important in the HPV vaccine decision-making process (Askelson et al., 2010; Reiter, McRee, et al., 2010; Zhu et al., 2019). During the qualitative interviews, mothers
expressed confusion regarding HPV and the HPV vaccine. Although the HPV vaccine was introduced for girls in 2006 and recommended for expansion to boys in 2011, some mothers felt the vaccine was still too new to allow their sons to be vaccinated. Conversely, other mothers expressed less concern, believing that significant research had occurred before the vaccine’s release for public use. Earlier researchers have also identified conflicting results related to HPV knowledge and subsequent HPV vaccination, with some finding that HPV knowledge did not influence mothers’ decision-making (Cunningham-Erves et al., 2018; Fishman et al., 2016; Nonzee et al., 2018).

Most mothers were aware of the recommended age for HPV vaccination; however, quite a few had concerns about starting vaccination at that age. Although the CDC recommends HPV vaccination in males beginning at ages 11 or 12 (CDC, 2011), mothers expressed concern that 11 or 12 was too young to start vaccination. This belief has emerged in other studies exploring parents’ beliefs related to HPV vaccination (Bednarczyk, 2019; Galbraith-Gyan et al., 2019). Many mothers were not aware that the recommendation of 11 to 12 years was to allow the child’s body to develop an immune response before the youth becomes sexually active. Mothers used their beliefs that their sons were not sexually active to justify why their son had not been vaccinated, and many said they had no intention to have him vaccinated in the near future.

A few mothers also refused to have their sons vaccinated because they wanted their son to make his own decision regarding HPV vaccination when he reached adulthood or became sexually active. Prior research has shown that some mothers prefer to allow their children to reach adulthood so they have the responsibility for making the decision regarding their HPV vaccination (Dempsey et al., 2009), and this qualitative
research showed similar results. However, prevalence data suggests that children become sexually active around age 15. Thus, a child may become sexually active before his parents or health care provider introduce the topic of HPV vaccination.

Many mothers said they learned about HPV risk and benefits of the HPV vaccine from media. Social media was a source of HPV vaccination information noted in the qualitative interviews. However, mothers did not view any messaging promoting HPV vaccination; they only mentioned seeing antivaccination messaging on social media platforms. Mothers did not remember specifically how they encountered the content but were able to remember the overall tone as negative.

Television commercials about HPV resonated with many mothers. Unfortunately, the commercials caused confusion about the HPV vaccine’s expansion to male adolescents. None of the mothers in qualitative interviews who saw the Merck commercial felt compelled to seek HPV vaccination for their son or engage in discussion with their son’s health care provider. Moreover, mothers did not mention visiting (or noticing) the website listed at the end of the commercial to get more information about the HPV vaccine. For these mothers, sharing new information and credible resources at the end of the commercial did not motivate them to learn more about the issue. Walker et al. (2020) supported this finding, stating that mothers use social media and health websites for HPV vaccination, but commercials and print media were “passively absorbed.”

Mothers were the focus of this work because research suggested they are the primary decision makers in the household (Berenson et al., 2014; Kaiser et al., 2016; Perez et al., 2017; Waller et al., 2020). However, the role of paternal figures in the HPV
vaccination decision-making process emerged as a theme during the qualitative interviews. Some mothers reported that paternal figures’ behavior shaped the household view of illness and vaccination behavior. In addition, some mothers relied on their male partners to take a larger role with their sons regarding topics related to sexual health. Even so, mothers were usually the final decision makers for vaccination because they were involved with the clinical appointments when providers made recommendations for vaccination.

During qualitative interviews, mothers expressed mistrust of many facets of the health care arena, from providers to pharmaceutical companies to the government (Katz et al., 2016; Mount et al., 2012; Tetteh et al., 2019). Comments included that pharmaceutical companies were motivated more by financial incentive than protecting children to more extreme conspiracy thinking (e.g., the government received “kickbacks” and the FDA had taken shortcuts to ensure approval of the HPV vaccine). This was enough for some mothers to strongly feel that HPV vaccination was not in their son’s best interest. Mistrust, combined with the elective nature of vaccination, creates an impediment to increasing HPV vaccine uptake.

Mothers in qualitative interviews acknowledged that many in the Black community have a general mistrust of the health care system. Moreover, this was a widespread belief, as mentioned by mothers who identified as African American, West Indian, and African. Many of the trust issues reflected concerns about cultural or structural racism rather than race. According to Wijeysinghe et al. (1997), race is a social construct used to divide people into groups based on physical characteristics, cultural affiliation, or ethnic classification. Cultural racism includes the attribution of value and
normality to Whites and Whiteness, while stereotyping and labeling people of color as “other” or “less than.” Wijeysinghe et al. posited that structural racism refers to the network of structures, practices, and policies at an institutional level that creates privileges for Whites not afforded to other racial groups. Mothers did not believe that race put their sons at increased risk for HPV infection. However, some felt that racist practices (such as subjectivity to pharmaceutical drug testing or ineffective medicines) were in place because of their son’s race. As expected, mothers from the qualitative interviews referenced phrases such as “Tuskegee,” “guinea pigs,” and “test dummies” when discussing medical mistrust. Mothers acknowledged that past mistreatment of Black people in America by the government could explain the distrust that some continue to have. Some mothers chose to vaccinate despite their mistrust; for others, the mistrust weighed heavily in their decision not to vaccinate.

The Theory of Planned Behavior suggests that mothers’ decisions to have their sons vaccinated against HPV can be predicted by their behavioral intentions, which are further predicted by their attitudes towards HPV vaccination, subjective norms, and perceived behavioral control (Ajzen, 1991). Health literacy can shape decision-making and subsequent health behavior and predict health outcomes (Badarudeen & Sabharwal, 2010; Zarcadoolas et al., 2006). A health literacy framework could be a consideration when developing health education interventions to (a) positively influence mothers’ attitudes around HPV vaccination; (b) enhance environments that will shift subjective norms toward supporting HPV vaccination; and (c) ensure mothers have access to HPV vaccination, especially for those who could be initially hesitant but later change their
mind. The next section of this chapter presents how the qualitative interviews about HPV vaccination are related to health literacy.

Strategies to build fundamental literacy include providing health education materials at a reading level understood by the largest proportion of the population. Health education organizations have suggested composing health education materials at a sixth-to eighth-grade reading level (Badarudeen & Sabharwal, 2010). It is important to remember that the educational levels of mothers making decisions regarding HPV vaccination will vary and include those with limited literacy or numeracy skills. Also, health literacy is not equal to educational attainment but is instead contextual. For instance, having a college degree in business might not ensure that someone is well versed in health issues (Sharon & Baram-Tsabari, 2020; Zarcadoolas et al., 2006). Recognizing the importance of fundamental literacy becomes especially significant when communicating complex scientific information. For this research, the quantitative and qualitative samples included mothers with at least some college education; however, less than half in both groups had their sons vaccinated against HPV. This suggests that providing well-designed, low health literacy education materials, although a great first step, might not be enough.

Some findings in this study suggest that interventions to improve the scientific literacy of mothers could be valuable in improving HPV vaccination uptake. During qualitative interviews, most mothers were not very knowledgeable on the facts of vaccines in general and HPV and its vaccine in particular. Concerns about the “newness” of the HPV vaccine and recommended age of vaccination suggest the need to build mothers’ understanding of viruses, vaccines, and the risk of developing a disease. Better
education on the male-specific risks and benefits is necessary to allow parents to make informed decisions. Education could also help mothers better understand the rationale and importance of HPV vaccination for their sons according to the recommended guidelines.

Qualitative findings also show the role of the media and concerns regarding mistrust of the health care system. These findings underscore the need to address issues related to civic literacy. As noted by other researchers (e.g., A. L. McRee et al., 2011; Tan & Goonawardene, 2017), the study suggested that the Internet and social media platforms were important ways to obtain health information and make health decisions. According to the Pew Research Center (2018), approximately nine in 10 American adults use the Internet. In addition, approximately seven in 10 American adults use social media to learn, share information, and connect with others; many use social media platforms daily, such as Facebook and Instagram (Pew Research Center, 2018). Access to credible online resources is important, as parents may use the information found on the Internet to make health decisions. All the mothers in the qualitative arm of this study had access to the Internet. Many of the interviews occurred via online chat-based methods, and all mothers had at least basic e-mail and Internet knowledge to complete the pre-interview survey. In addition, all interviewees reported using Internet and online sources to obtain health information. Understanding how mothers find and judge health information, particularly online, is important, as many mothers use digital resources for their research.

Prior researchers have explored constructs of the Theory of Planned Behavior in online cancer information utilization (Shin et al., 2020). Patients had positive attitudes about searching online because it gave them control over their health. In general, they
received positive feedback from their significant others (who also used online sources to obtain health information). Difficulties searching the Internet were due to the inability to judge the credibility of information sources they identified through their research. Shin et al. (2020) indicated a need to improve the online environment by increasing health literacy for patients.

Judging the credibility of health information requires the ability to evaluate material for accuracy and assess whether the source is trustworthy. HPV misinformation often spreads through antivaccination messaging, particularly via online methods. Antivaccination messaging is vital to acknowledge and understand, as it can be compelling, have an extensive reach, generate subsequent antivaccination behavior (Burki, 2019; Hoffman et al., 2019). For mothers unable to judge the credibility of online sources, antivaccination information might confirm their fears and reduce the likelihood of allowing their sons to receive the HPV vaccination. Thus, it is important to ensure that credible information reaches mothers who are considering HPV vaccination for their sons, and mothers have the skills to evaluate which sources are valid. This is particularly significant for mothers who already have negative attitudes regarding HPV vaccination.

In this study, perceived behavioral control, or the perception of the difficulty of enacting a behavior (Ajzen, 1991), was not a construct that influenced mothers’ HPV vaccination decision-making. All mothers interviewed had health insurance coverage for their family, and only two mothers identified cost as a potential concern should they desire to have their son vaccinated. Moreover, most mothers reported their son visited a health care provider for wellness checks. Thus, boys could seek medical care as needed,
and mothers felt well equipped to seek health care and make health decisions for their sons.

The implementation of the Affordable Care Act increased families’ ability to access the HPV vaccination. The Affordable Care Act requires most private insurance plans to cover some recommended preventive services and immunizations recommended by the CDC’s ACIP without consumer cost-sharing (Henry J. Kaiser Family Foundation, 2018). Thus, private plans must cover HPV vaccination in eligible populations, pap tests, and HPV testing for women. In addition, costs are fully covered for those who access public programs such as Medicaid, the Vaccines for Children Program, the Immunization Grant Program, and the Children’s Health Insurance Program. For many, logistical barriers to HPV vaccination, such as health care access, are diminishing. Quantitative analysis showed that Black adolescent males who had health insurance were more likely to be vaccinated. The public health system must maintain the infrastructure to encourage HPV vaccination without barriers so that mothers are able to access HPV vaccination services when they are ready.

Communicating in a culturally literate way requires that health information (a) can be understood by the population of interest, (b) is relevant to the target population, (c) is accessible for the target population, (d) will not be perceived as offensive or judgmental, and (e) is responsive to the target population’s concerns and realities (Zarcadoolas et al., 2006). Structural and cultural racism add an additional layer of complexity to the goal of increasing HPV vaccination uptake, as dismantling these long-standing oppressive attitudes and institutions requires significant resources and effort.
Eradication is not possible by simply providing better education or health education materials.

The health care provider can be influential in empowering the cultural literacy of mothers as they navigate the HPV vaccination decision-making process. In both the qualitative and quantitative analyses, the role of the health care provider was important. Research on the influence of health care providers in making HPV vaccination recommendations to their patients received discussion in Chapter 2. Exploring health literacy and the Theory of Planned Behavior and applying health literacy approaches when working with health professionals were effective in enhancing behavioral intention among patients for health issues, such as diabetes and tobacco control (Lin et al., 2020; Maharani et al., 2021).

Some mothers’ introduction to the HPV vaccine came when the provider recommended the vaccine for their son. Therefore, having a well-informed health care provider with a positive attitude toward HPV vaccination can influence how mothers view HPV vaccination for their sons. Hansen et al. (2019) highlighted cognitive biases (such as anchoring bias and optimism bias) encountered by providers that could weaken recommendations for the HPV vaccine. In addition, a patient’s age might suggest that the patient is not yet sexually active. There is an assumption that clinicians caring for adolescent patients are knowledgeable about the HPV vaccine and comfortable discussing the vaccine with their patients; however, training opportunities for health providers on strategies to introduce the topic of HPV vaccination with the patients may be warranted (Hansen et al., 2019; Malo et al., 2016). Trusted health care providers can
reduce cultural barriers and create better opportunities for mothers to obtain, interpret, and understand health information (Zarcadoolas et al., 2006).

**Connection Between Qualitative and Quantitative Findings**

Quantitative results from this study showed areas also found in the qualitative arm. The quantitative analysis showed that the relationship between maternal educational attainment and vaccination behavior was not linear. This finding was similar in the qualitative interviews. As mothers’ educational attainment increased, the desire to have their sons vaccinated did not increase. Some mothers with advanced academic degrees shared they did not have their sons vaccinated against HPV, and many stated they did not intend to do so in the near future. In addition, mothers who did not work in the health care setting had limited understanding of HPV and the vaccine, suggesting public health is unsuccessful in delivering credible and accurate information to mothers in a meaningful way.

The quantitative results also reaffirmed the role of the health care provider. Black adolescent males had greater odds of initiating and completing the HPV vaccination series if they received a recommendation for HPV vaccination from a health care provider. Health care providers are responsible for creating a safe environment so mothers will bring their sons to key clinical visits where the topic of HPV vaccination can arise. Many mothers in the qualitative interviews shared they used the information provided by their son’s health care provider when making vaccination decisions for their sons. Because some received a provider recommendation but still opted not to have their son vaccinated against HPV, a more significant issue could be at play.
The Theory of Planned Behavior asserts that behavior is a function of behavioral, normative, and control beliefs. According to the NIS-Teen survey, the top five reasons respondents gave for not having their sons vaccinated against HPV in the next 12 months reflected behavioral beliefs. In the qualitative interviews, mothers referenced all but one of these beliefs. Many of the mothers did not have a good understanding of HPV. Some did not believe the vaccine was needed, and many were concerned that the HPV vaccine was unsafe or would have side effects. In addition, a few mothers did not receive a recommendation from their health care provider and were not aware that HPV vaccination was recommended for their sons.

Some prior research has shown knowledge and awareness as factors influencing HPV vaccination (Askelson et al., 2010; Zhu et al., 2019). Other scholars have suggested knowledge and awareness are not associated with HPV vaccination (Cunningham-Erves et al., 2018; Fishman et al., 2018; Nonzee et al., 2018). Although there is some ambiguity in the literature, the findings from this study support the idea that awareness and knowledge are important. However, they may not be enough to motivate Black parents to vaccinate their children.

In the case of vaccination, some suggested that the strongest predictor in the Theory of Planned Behavior model, attitudes, could be the most useful factor to target (Xiao & Wong, 2020). This was an assertion reinforced by the present study, which showed that attitudes regarding medical mistrust shaped mothers’ beliefs about the HPV vaccine. Thus, addressing potential concerns of medical mistrust should be a consideration when developing interventions to address HPV vaccination uptake among Black adolescent males. In addition, research has suggested that increasing perceived
susceptibility beliefs related to HPV might improve attitudes regarding vaccination (Xiao & Wong, 2020). This statement had support in the present study’s qualitative findings, which showed that some mothers were not very knowledgeable on the connection between HPV infection and cancer or the benefits of vaccination prior to disease exposure. An expanded model that includes constructs regarding perceived susceptibility could be helpful to improve mothers’ knowledge and influence vaccination intention.

A meta-analysis of research exploring vaccine hesitancy and perceived behavioral control showed that perceived behavioral control was not as strong a predictor as attitudes and subjective norms (Xiao & Wong, 2020). Findings from my research were similar. In my NIS-Teen analysis, beliefs related to behavioral control were not the reasons most mothers with no intent to vaccinate in the next 12 months gave for their decision. Mothers in the qualitative interviews reflected this concept, as well. In addition, the samples in both the qualitative and quantitative arms of this study showed mothers who were overwhelmingly educated and teens who had access to health insurance. For mothers in the qualitative interviews, few identified vaccine cost as an issue, and all stated they believed that they could access HPV vaccines for their son if they chose to do so. Quantitative and qualitative findings did not identify significant issues related to subjective norms, suggesting that this construct is not a significant issue for the participating mothers of Black adolescent mothers. However, it could be an important factor for other communities.

**Recommendations for Public Health Practice**

The President’s Cancer Panel on HPV Vaccination presents four goals and opportunities to increase HPV vaccine uptake: (a) reduce missed clinical opportunities to
recommend and administer the HPV vaccine, (b) increase parents’ acceptance of HPV vaccination, (c) maximize access to HPV vaccination services, and (d) promote global HPV vaccine uptake (“HPV Vaccination for Cancer Prevention,” 2018). Findings from this dissertation have yielded some suggestions to address the first three goals presented by the President’s Cancer Panel, as discussed in the following sections.

Reduce Missed Clinical Opportunities to Recommend and Administer the HPV Vaccine

The President’s Cancer Panel strongly recommended implementing provider- and systems-level changes, as these options have great potential to eliminate missed clinical opportunities and normalize HPV vaccination (“HPV Vaccination for Cancer Prevention,” 2018). Health care providers can have a significant influence on mothers who may be questioning HPV vaccination. In the qualitative interviews, the majority of mothers acknowledged the importance of their physician’s input, and in some cases, refused vaccination because of their physician’s skepticism. Pediatric providers should be well versed in the HPV vaccination guidelines yet might not recommend HPV vaccination to their patients (Leung et al., 2019). According to Leung et al. (2019), prior research has suggested a variety of reasons why providers might not recommend HPV vaccination to their patients. These include a lack of knowledge about HPV and the HPV vaccine, absence of communication skills required to counsel parents regarding the HPV vaccine, and discomfort talking about sexual issues. Education regarding HPV and the vaccine is often for parents and patients, but research suggests that providers also need education. Improving vaccine uptake will require interventions that build awareness, buy-in, and comfort among health care providers, as it is clear that their role in parental acceptability is a great one. Interventions to evaluate the effectiveness of provider-
focused education and skills-building efforts to increase HPV vaccination uptake among adolescents could be valuable.

Provider-level changes might include incorporating a sociocultural history to the traditional medical history gathered in the clinical setting. Health care providers need to understand mothers’ underlying values and concerns that may decrease their interest to have their son vaccinated against HPV (Kaebnick & Gusmano, 2019). Taking a medical history is a standard procedure in clinical practice and can help health care providers understand the best ways to appeal to parents who are considering HPV vaccination. Traditional medical histories are ways to identify the potential family risk of diseases, such as heart disease, high blood pressure, stroke, certain cancers, and diabetes. These histories can also be useful to gather information about family values and beliefs, which the present study suggests could significantly influence vaccination decisions. Providers should consider asking (a) where mothers get health information, both sources (family, partner, coworkers, etc.) and places (Internet, TV, etc.); (b) thoughts on health care; (c) the role of their male partners (if applicable); and (d) the motivations that shaped their prior vaccination decision-making. This information can help build a more comprehensive picture of the family and help identify strategies to introduce the topic of HPV vaccination. Having such information could also reduce the medical mistrust found in communities of color, with medical trust linked to the quality of doctor–patient communication (Petrocchi et al., 2019).

For some mothers, mistrust of the health care system outweighed the “science” they believed they knew about HPV and the vaccine, and this mistrust subsequently influenced their decision not to have their son vaccinated. The horrors of the Tuskegee
Syphilis Experiment came to light in the 1970s, approximately 50 years ago. There have been sweeping reforms implemented in the scientific process to prevent such atrocities from occurring, including institutional review boards and policies to ensure participants can provide informed consent. Moreover, vaccines are designed to be a life-saving measure. Thus, providers expect positive attitudes and thoughts about vaccination in communities of color. At the same time, racial differences in health practices and outcomes continue—for example, (a) belief in differences in pain tolerance by race (Hoffman et al., 2016); ordering fewer hospital tests for children of color (Zhang et al., 2019); and disparities in maternal mortality (Howell, 2019). The history of structural racism remains, even as the health care system stresses transparency and diversity. Moreover, current experiences in inequity continue to highlight differences in health care based on race, suggesting that institutionalized, personally mediated, and internalized racism are at play (Jones, 2000).

Mothers in this study often mentioned medical mistrust as a driver behind their reasons not to vaccinate their sons. Improving gender and racial concordance for health care professionals serving this population could be beneficial for building trust in the doctor–patient relationship. Doctor–patient concordance is necessary to break down disproportionate structural barriers (e.g., educational segregation, removing implicit bias in medical schools, and low-quality health care in communities of color) to effectively address health disparities (Hardeman et al., 2016; Johnson, 2020; Kennedy et al., 2007). Gender concordance between clinician and son could provide value, as some mothers shared that they preferred for their sons to have a male health care provider. Racial concordance may play a more significant role, as well. Health professionals of color often
serve in communities that reflect their racial and ethnic background. Also, representation of professionals that reflect the communities they serve could decrease mistrust of the health care system and increase participation in health care and research (Kennedy et al., 2007).

Much of the research about HPV vaccination and health care providers has focused on providers in the pediatric space, where a majority of adolescent vaccinations occur. However, other health care providers can be instrumental in increasing HPV vaccination uptake among eligible men and women, including oral health practitioners (Shukla et al., 2019) and obstetrician-gynecologists (Committee on Adolescent Health Care, 2016; O’Leary et al., 2018). Mothers in qualitative interviews sought guidance from other health care professionals (e.g., nurses, obstetrician-gynecologists, sports medicine physicians) when considering whether to have their sons vaccinated against HPV, particularly because these other experts were of the same racial background as their sons. Having providers outside the pediatric space who understand HPV and the HPV vaccine could help change the culture and build a larger cadre of health professionals who can share provaccination messaging. This may be even more useful for mothers who use a variety of health “experts” to inform their decisions and seek providers from the same cultural background.

Increase Parents’ Acceptance of HPV Vaccination

Parents are the primary decision makers for the health-seeking behaviors of their sons during adolescence. The President’s Cancer Panel recommends delivering credible key messages to parents to guide them through the vaccination decision-making process. Key messages may include that the HPV vaccine (a) prevents cancers and other diseases,
(b) prevents cancers in both boys and girls, (c) is safe, and (d) is most effective when administered to adolescents before potential exposure to the virus ("HPV Vaccination for Cancer Prevention," 2018). This recommendation aligned with results from the qualitative arm of this dissertation, as some mothers were unclear on the connection between HPV and specific cancers, some questioned the recommended age of administration, and some were concerned about vaccine safety. Parents might respond more positively if presented with clear information about the HPV vaccine and clinical recommendations at all health care visits.

It is important to note the value and potential role of male leaders in the family. The NIS-Teen collects demographic information for the mother in the household. The decision to exclude fathers from the present study was based on research suggesting that mothers were often the primary decision makers for their minor children. Thus, women are the primary targets of health education and promotion strategies. Understanding how fathers understand HPV, the vaccine, and the risk could be essential to explore as they might play a larger-than-expected role in educating their sons about sexual health. Moreover, social marketing approaches targeting HPV vaccination for males should incorporate male leaders in the family involved in the decision-making process (Dempsey et al., 2009) and include them in health materials, programs, and educational programs.

Some mothers believed they could avoid vaccinating their sons against HPV by teaching safer sex practices, such as condom use. However, the CDC (2013a) does not recommend condom use as a substitute for HPV vaccine in vaccine-eligible populations. Thus, mothers could recommend behaviors that they erroneously believe are as effective as HPV vaccination. In addition, providing sexual health education to adolescents could
help to reduce their risk practices. Researchers found that nearly half of the mothers who talked to their daughters about the HPV vaccine reported that the vaccine discussion led to a discussion about sex (A. McRee et al., 2011). In another study, researchers found that most mothers believed vaccinated girls would be less likely to practice riskier behaviors due to the education the girls received with HPV vaccination (Mullins et al., 2015). Some mothers even reported using the vaccination visit as an opportunity to talk about their family’s values related to sex and provide sexual health education to their daughter. Conversations about the HPV vaccine and sexual health can (and should) occur concurrently. Developing messages that clearly explain the means of HPV transmission as part of sexual health education could help counter misinformation.

**Maximize Access to HPV Vaccination Services**

The President’s Cancer Panel asserted that HPV vaccination must remain affordable and convenient to eliminate any cost barriers related to vaccination (“HPV Vaccination for Cancer Prevention,” 2018). In addition, they suggested that alternative settings, such as pharmacies and schools, expand access to HPV vaccination for some. Challenges to implementation include complicated billing, competing priorities, and low desire from parents to have their children vaccinated in the school setting (Daley et al., 2014; Kempe et al., 2018). For mothers of Black adolescent males, the influence of trust is another consideration. Vaccinating against HPV provides societal benefit, as it reduces the risk of transmitting HPV to others. High vaccination rates can create herd immunity, which protects those in society who might not be able to receive the HPV vaccine. The Healthy People 2030 goal is to have 80% of adolescents 13 through 15 years of age receiving recommended doses of the HPV vaccine (DHHS, 2020).
The HPV vaccine remains voluntary for most states; however, vaccination mandates are a suggested strategy to improve HPV vaccination uptake among children. Since 2006, at least 42 states and territories have introduced legislation regarding the HPV vaccine. Attempts at legislation have faced controversy; thus, legislators nationwide suggested a wide variety of strategies, from HPV vaccine educational programs for public or school-aged children to build awareness, to increased state funding for the HPV vaccine, to mandated HPV vaccination for school attendance.

Currently, only two states (Rhode Island and Virginia) and the District of Columbia require the HPV vaccine for school attendance. The District of Columbia and Virginia permit exemption from HPV vaccination for medical, moral, or religious opposition; the requirement in Rhode Island does did have an exemption at the time of this study. During the 2017–2018 legislative year, eight states introduced legislation regarding HPV vaccination. Again, proposed bills covered a wide range, including (a) promotion of the HPV vaccine, (b) allowing trained pharmacists to administer the vaccine, (c) allowing minors to consent to receive HPV vaccination, (d) creating an HPV registry or HPV immunization rate report, and (e) requiring HPV vaccination for school attendance (National Council of State Legislators, 2018).

Vaccination mandates could increase mistrust. For many mothers, trust in the health care system was already a concern. The HPV vaccine is a two- or three-dose series, so provider–parent trust must be strong enough for a mother to opt to bring her son for subsequent shots to complete the series. NIS-Teen data indicated that even fewer Black adolescent males returned to complete the vaccination series. Although mandates could improve vaccination rates, mandatory vaccination might backfire, creating more
mistrust between mothers and the system attempting to protect their children. Thus, it is necessary to weigh the tradeoffs of improving vaccination uptake through policy change against the continued erosion of trust.

A successful HPV vaccination program in North Dakota built partnerships with local newspapers, radio stations, and movie theaters to increase community awareness while providing on-site vaccination in middle and high schools (Pastir, 2017). One strategy to increase HPV vaccination uptake may include building awareness regarding the benefits of HPV vaccination, particularly among Black adolescent males. Although the present study focused on mothers, increasing HPV vaccination awareness among adolescents merits consideration. Research has suggested that adolescents want to be more involved in health decisions, including learning about vaccinations, such as HPV (Herman et al., 2019b; Pennella et al., 2020; Silverman et al., 2019). However, few mothers in the qualitative interviews created active opportunities for their sons to build skills regarding common health-seeking activities (e.g., making appointments, filling prescriptions, etc.). Moreover, most did not have a clear plan regarding how or when they would begin to shift some of those responsibilities to their sons so the boys would be appropriately prepared as they matured. It is essential that adolescents have the ability to develop civic literacy to make informed health decisions about HPV vaccination when their parents shift that responsibility to their children when they reach adulthood.

Some parents and health care providers could be uncomfortable having discussions with young adolescents about sex and sexually transmitted infections like HPV. Thus, schools can serve as valuable places to empower young adolescent males with scientific literacy and disseminate credible messages about HPV and the vaccine.
Comprehensive sexuality education in schools can increase young adolescent males’ knowledge about HPV. Sexuality education is a means to help prevent and reduce the risks of adolescent pregnancy, HIV, and sexually transmitted infections for children and adolescents (Breuner et al., 2016).

Currently, each state determines the sexuality education content taught in their K-12 schools, as well as when and how they deliver the content. As of 2016, 24 states and the District of Columbia require public schools to teach sex education; however, only 20 states necessitate that the information they provide be “medically, factually, or technically accurate” (National Conference of State Legislatures, 2016). Although states select the curricula for implementation, the CDC recommends addressing 16 critical topics in comprehensive sex education curricula for middle and high school students, eight addressing sexually transmitted infections and effective condom use. A report from the CDC’s 2014 School Health Profiles showed that, among 44 participating states, most middle schools were not providing sex education that met the CDC’s criteria (National Center for HIV/AIDS Viral Hepatitis STD, 2015). Thus, young men and women might not learn about HPV when they are age-eligible for HPV vaccination. Without intervention, that lack of knowledge could continue as they also take on the responsibility for protecting themselves against HPV upon reaching adulthood.

The COVID-19 Connection

Findings from this research could inform the ongoing coronavirus pandemic. Public health leaders have wrestled with misinformation since the emergence of COVID-19 in early 2020. Daily press conferences with credible health professionals have been
insufficient to combat the viral nature of social media in the 24/7/365 distribution of false information, home remedies, and conspiracy theories (Johnson, 2020; Larson, 2020).

Pandemics disproportionately affect poor and underresourced communities (Abrams & Szefler, 2020; Ahmed et al., 2020; Patel et al., 2020). In the United States, there are significant health disparities in the COVID-19 crisis. The Black community has been disproportionately burdened by the coronavirus, with higher rates of infection, hospitalization, and death. Structural racism contributes to this disparity, with higher rates of poverty, substandard housing, and high-risk employment exacerbating existing inequities (Bogart et al., 2021). Although COVID-19 vaccines are now available in the United States, states continue to battle a lack of supply to meet the needs of those who desire to be vaccinated. COVID-19 infection disproportionately affected communities of color, with infections and deaths significantly higher in Black and Brown communities. Some vaccination rates continue to show disparities among individuals affected by the coronavirus pandemic and individuals who have received the vaccination.

Similar to the quest to increase HPV vaccination uptake, medical mistrust around COVID-19 is prevalent. Because vaccines are a lifesaving measure, one would expect positive attitudes toward and interest in vaccination. However, among those with existing mistrust, long-standing structural inequalities and health disparities can magnify the mistrust. A recent study of Black Americans living with HIV showed high levels of hesitance and mistrust regarding COVID-19 and the potential vaccine (Bogart et al., 2021). Almost all (97%) participants acknowledged at least one mistrust belief (e.g., the government is hiding information about COVID-19; Black people should be suspicious of information from the government about COVID-19; COVID-19 is manmade). Some
mothers shared similar language during qualitative interviews. More than one third of U.S. individuals surveyed stated that they would not trust a COVID-19 vaccine if it were available (Bogart et al., 2021). Similar to the HPV vaccine, the coronavirus vaccine remains optional. Estimates suggest an immunization threshold of 60% to 90% to reach herd immunity (Zhang, 2021), which makes vaccine hesitancy a greater issue.

However, there are opportunities. In the Bogart et al. (2021) study, 74% stated that, when it comes to COVID-19, doctors have the best interests of patients in mind. In addition, when asked to evaluate their trust in sources of information about COVID-19, participants showed the greatest trust in health care providers over social media and the government. Findings in the qualitative interviews on HPV vaccination indicate areas where health care providers (e.g., Black Doctors COVID-19 Consortium and 60 Black Doctors) can take a more active role in interventions to address COVID-19 on the local level, particularly in communities of color (Jaklevic, 2021; LaVeist & Benjamin, 2021).

In qualitative interviews, some mothers believed the 2006 HPV vaccine was “too new” and did not have enough research to confirm its efficacy. This is a common sentiment shared about the COVID-19 vaccine (Paul et al., 2020), as some have questioned whether the COVID-19 vaccine could be effective when taken from conception to market in less than 12 months. These types of comments appear in more recent conversations regarding the COVID-19 vaccine rollout and proposed vaccination mandates. Health organizations, such as the CDC, National Institutes of Health, and World Health Organization, highly recommend vaccination against COVID-19. However, skeptical individuals suggest that vaccination mandates are less about
protecting communities and more about creating large profits for pharmaceutical companies (Paul et al., 2020).

Results from the present study show that messaging can be highly persuasive in promoting HPV vaccination behavior. This is particularly important for vaccines delivered in multiple doses, as individuals could initiate but not complete the series (Walker et al., 2020). As seen from the COVID-19 pandemic, messaging will continue to play a significant role in perceptions of the virus and vaccination.

Limitations

There are several limitations of this study. The quantitative and qualitative arms of the study relied on self-reporting of vaccination behavior. During the NIS-Teen phone interview, mothers gave contact information for their child’s health care provider to validate their remembered vaccination information. A follow-up survey sent to the child’s health care provider yielded limited results, as providers were less likely to return the survey. This missing data yielded a small sample of cases with complete parent and health care provider data. Thus, quantitative analysis used self-reported recall data. Qualitative interviews relied on mothers’ self-reporting of behaviors, which could be subject to recall bias.

The NIS-Teen public use file includes variables reduced and condensed when made available. Examples include maternal age and maternal marital status. Therefore, I was unable to perform more specific analyses exploring the relationship between smaller age windows. In the future, I will seek funding to conduct analyses using the unrestricted data set. In addition, although the qualitative interviews allowed for a deeper exploration of knowledge regarding HPV and the HPV vaccine, the 2017 NIS-Teen did not have
questions that specifically examined HPV knowledge. Future research exploring HPV knowledge among Black parents should include targeted research in these populations using HPV knowledge items to comprehensively examine within-group differences.

Data from the qualitative interviews and the quantitative NIS-Teen were subject to recall bias. Interviews with mothers required them to rely on their memory of HPV vaccination behavior for their sons. For some mothers who participated in the qualitative interviews, discussion about their son’s HPV vaccination occurred days or weeks prior. Mothers of older adolescents might have needed to recall experiences that happened months or years ago. In most states, HPV vaccination is voluntary and might not be a medical history detail that mothers remembered. Thus, the reasons for mothers’ decisions identified in the present study might not fully reflect their decision-making process at the actual time of vaccine consideration.

Qualitative interviews could have also been subject to social desirability bias. At the start of interviews, I asked mothers to be honest and share their genuine opinions, whether positive or negative. Face-to-face and video interviews created a comfortable space for mothers to share their experiences. Open-ended questions were the means to explore beliefs about HPV vaccination. This approach was appropriate to minimize interviewer-imposed bias in responses. Moreover, the study’s purpose of exploring HPV vaccination was clear during recruitment; however, some mothers who participated in the qualitative interviews stated they had chosen not to vaccinate their sons against HPV. Although mothers appeared to provide genuine responses, some might have had underlying beliefs regarding HPV vaccination that they did not feel comfortable discussing, believing it would be contrary to my beliefs about the topic.
Overall, mothers who participated in qualitative interviews were older and more educated. The recommended age for a child’s HPV vaccination is more than 10 years after the child’s birth, so a sample of women in their late 30s to mid-40s would be expected. In addition, the convenience methods of word of mouth and snowball sampling were means to recruit participants who identified as being of African ethnicity. Many African subgroups form close, tight-knit communities, relying heavily on each other for information based on strong trust and shared identity. Women of Kenyan heritage contacted me based on a recommendation from an initial Kenyan participant. In addition, the majority of mothers who participated in the qualitative interviews were from New Jersey, although recruitment was open to mothers throughout the United States. Thus, results from this research represent the experiences of a small sample of mothers, showing the need to increase HPV vaccination uptake in this state. Although there was a lack of diversity in the sample, the aim of this qualitative study was not to produce results generalizable to a population, but to develop an understanding of the factors influencing mothers’ thinking about HPV vaccination among the mothers of Black adolescent males in New Jersey. This limitation could also be a benefit, as research in this segment of the community allowed me to identify factors important in shaping this group’s decision-making regarding HPV vaccination for their sons.

Last, I examined vaccine decision-making through the lens of caregivers rather than the adolescents themselves. In a prior study, 86% of parents identified themselves or their spouses as the primary person making vaccine decisions, although adolescents provide input into the decision-making process (McRee et al., 2010). As noted, young people could desire to have an active role in their health (Herman et al., 2019a).
Exploring these issues from the adolescents’ perspectives is an area for future research. This could be especially important for unvaccinated males in late adolescence. In the present study, some mothers reported delaying decisions on HPV vaccination so their sons could choose for themselves upon reaching adulthood. A better understanding of knowledge and attitudes among adolescents could be increasingly important, as they could be responsible for navigating these HPV vaccination decisions for themselves.

**Future Research and Conclusion**

None of the mothers in the qualitative arm of this study stated they were vaccinated against HPV. This was an expected finding, as most were older than the recommended age window when the vaccine became available. Thus, their first encounter with HPV vaccination likely came when a health care provider recommended it for their child. Current clinical guidelines endorse vaccination of all males and females starting at age 11 years. Future research samples will increasingly include mothers and fathers who may have been offered a recommendation for HPV and possibly received a vaccine against HPV in early adolescence. Data from the interviews revealed that mothers with older children (particularly daughters) used the HPV vaccination experiences and decisions with their female children to influence the HPV vaccination behavior for their sons. Future researchers should examine if the HPV vaccination behaviors of parents positively or negatively influence what they choose for their children.

There were some interesting similarities and differences shared by mothers of Black subgroups. The mothers in the qualitative interviews identified as African (e.g., those who have come to the United States from an African country, such as Nigeria or
Kenya), West Indian (e.g., of Caribbean heritage such as Haitian and Jamaican), or African American (e.g., Americans with total or partial ancestry from the African continent). The discussion regarding trust highlighted differences by subgroups, with West Indian and African mothers having greater trust in the health care system than their African American counterparts. Future scholars should explore understanding and attitudes regarding HPV vaccination by subgroups within the Black community. In addition, as this study included mothers of Black adolescent males from New Jersey, there should be further research to investigate whether these findings are similar for mothers of Black adolescent males in other parts of the United States. Being able to immerse oneself in these communities for formative research could be valuable for designing targeted messaging and programs.

Shortly after a child’s birth, mothers receive introduction to the concept of vaccinations. Attitudes regarding those early childhood experiences can influence their later vaccination attitudes and decisions. Although most childhood vaccinations are necessary for school entry in most states, HPV vaccination is recommended but optional. Although this research focused on HPV vaccination, the issue of mistrust in the health care system remains relevant, particularly as science and technology facilitate vaccine development to protect populations from potentially deadly diseases. Addressing myths and parental concerns (real and perceived) about HPV vaccination is necessary for changing views regarding HPV vaccination and ultimately influencing HPV vaccination uptake. Interventions and messages targeting mothers of Black adolescent males will need to address the underlying issues of mistrust in many marginalized communities. The issue may be not race, but racism.
Efforts to increase HPV vaccination uptake among Black adolescent males will require input from multiple stakeholders. Two efforts on the national level are the National HPV Vaccination Roundtable and the Evidence-Based Cancer Control Programs from the National Cancer Institute. The National HPV Vaccination Roundtable is a coalition of approximately 70 organizations charged to raise HPV vaccination rates and prevent HPV cancers in the United States. Founded in 2014 by the American Cancer Society and the CDC, this collective works to bring together public and private partners on the local, state, and national level to communicate credible information and identify evidence-based strategies that will positively shift the culture regarding HPV vaccination (National HPV Vaccination Roundtable, 2021). Although the HPV Roundtable’s vision is the elimination of nearly all cervical cancers, its work includes increasing vaccination rates for boys and girls, which will have an impact on male HPV-related cancers. The HPV Roundtable also added a commitment to health equity to its 2021 Action Plan, recognizing a need for more diversity inclusion in its work. There is an understanding that vaccination uptake and HPV disease burden vary by community, necessitating varied strategies to improve uptake.

The National Cancer Institute highlighted six evidence-based cancer control programs based on evidence-derived research studies implementable in various settings. Among the six programs targeting HPV vaccination uptake, only two—Development of Systems and Education for HPV Vaccination and Making Effective HPV Vaccine Recommendations—include adolescent males as a priority audience. Both programs are means to educate providers and develop their ability to recommend HPV vaccination and increase vaccination uptake within their clinical practices. Give Teens Vaccines is
another evidence-based program designed for the clinical setting that includes a family focus through automated reminder calls to increase patient engagement with the clinical setting. There are two programs designed for young adult women: HPV Vaccine Decision Narratives: Encouraging Informed HPV Vaccine Decision-Making and 1-2-3 Pap: Easy Steps to Prevent Cervical Cancer. The final evidence-based program, Promoting HPV Vaccination Among American Indian Girls, uses culturally tailored activities via mother–daughter social interactions to educate mothers and promote HPV vaccination. The present study of mothers of Black adolescent males indicated issues regarding medical mistrust, mothers’ gaps in understanding, and the emerging role of male partners in HPV vaccination decision-making. The creation of future evidence-based HPV vaccination promotion efforts should incorporate these concerns.

Mothers of Black adolescent males use their own lived experiences (and those heard from friends and family) to determine the experiences they will allow their sons to endure. Although mothers in qualitative interviews did not rely on others’ views to influence whether they would have their son vaccinated, the stories and experiences shared from people in their networks did affect how the mothers viewed HPV vaccination. Thus, solely providing factual health information to mothers is not enough to affect HPV vaccination uptake. If it were, health care providers would need only to give mothers a brochure about the benefits of HPV vaccination, parents would agree to have their sons vaccinated against HPV, and vaccination rates would rise. The values that mothers hold greatly influence the health decisions they make for their sons (Kaebnick & Gusmano, 2019).
HPV vaccination uptake in the United States remains much lower than recommended levels. Increasing HPV vaccination uptake is a multifactorial issue and will require multifactorial solutions. There is no silver bullet, but there is a need for approaches directed to all stakeholders involved in the HPV vaccination decision, from parents to health care providers to adolescents themselves.


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