

MATERNAL SOCIAL NORMS FOR GYNECOLOGICAL CARE PREDICT HPV
VACCINATION AMONG RURAL AFRICAN AMERICAN ADOLESCENT FEMALES

by

ELIZABETH MARIE SCHULTZ

(Under the Direction of Steven M. Kogan)

ABSTRACT

This Master's thesis addresses the public health issue of suboptimal HPV vaccination rates among rural adolescent African American females by examining the socio-ecological predictors of HPV vaccination and the importance of gynecological care. It was hypothesized that social norms for gynecological care and trust in healthcare providers would predict vaccination. Participation in a women's health exam was hypothesized to mediate the relation between social norms and vaccination, and trust in healthcare providers and vaccination. Knowledge about HPV was predicted to mediate the relation between social norms and vaccination. Hypotheses were tested using logistic structural equation modeling with data from 205 mothers of African American female adolescents. Results indicated that social norms predict vaccination, partially mediated by a women's health exam. Trust predicted vaccination, but this pathway was not mediated by a women's health exam. Knowledge about HPV was not found to be a predictor of vaccination.

INDEX WORDS: HPV vaccination, Adolescents, African American, Rural, Poverty, Social norms, Medical mistrust, Gynecological care

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ELIZABETH MARIE SCHULTZ

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ELIZABETH MARIE SCHULTZ

Major Professor: Steven M. Kogan
Committee: Charlotte Wallinga
Geoffrey Brown

Electronic Version Approved:

Suzanne Barbour
Dean of the Graduate School
The University of Georgia
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CHAPTER 1

INTRODUCTION

This Master's thesis addresses the public health issue of suboptimal HPV vaccination rates among rural adolescent African American females by examining the socio-ecological predictors of HPV vaccination and the importance of gynecological care. In this chapter, I outline the importance of examining the predictors of HPV vaccination. The theoretical and empirical backbone for the study hypotheses will be discussed in Chapter 2. Topics in this introductory chapter are organized as follows: (a) human papillomavirus (HPV) and cervical cancer, (b) the HPV vaccine, (c) predictors of vaccination, and (d) purpose of the study.

Human Papillomavirus (HPV) and Cervical Cancer

Genital human papillomavirus (HPV) is the most common sexually transmitted infection in the United States as well as across the globe (Centers for Disease Control and Prevention [CDC], 2012). It is estimated that more than 14 million people become newly infected with HPV each year, and approximately half of these new cases occur in people ages 15-24 years (Markowitz et al., 2014). There are approximately 40 different types or strains of genital HPV, several of which are known to cause nearly all forms of cervical cancer and genital warts, and many others are linked to various vulvar, vaginal, penile, anal, and oropharyngeal cancers. Two lower risk strains, 6 and 11, account for 90% of cases of genital warts. Genital warts, or bumps or growths on the genitalia, rarely develop into cancer. Although several strains have been found to cause cancer, two strains, 16 and 18, account for over 70% of all cases of cervical cancer (Markowitz et al., 2014).

HPV is spread through contact with an individual's infected skin, mucous membranes, or bodily fluids. This STI can be passed through both anal and vaginal intercourse and oral sex. Although the body fights off most strains of HPV infections on its own, there is no treatment for HPV. Only the symptoms associated with HPV, including genital warts, precancerous lesions, and cancer, can be treated. High risk strains, such as 16 and 18, are much less likely to be eliminated by the body, and much more likely to develop into cancer. Once an individual has been infected by HPV, there is no known cure (Markowitz et al., 2014).

The HPV Vaccine

In 2006, the FDA approved a vaccine for HPV. The first of its kind, this vaccine is composed of a series of three shots given over six months. The quadrivalent vaccine, commonly known as Gardasil, targets strains 6, 11, 16, and 18 (Markowitz et al., 2014). In 2009, a second HPV vaccine was approved for use. This bivalent vaccine, also comprised of three shots given over a six month period, is commonly known as Cervarix and targets strains 16 and 18 (Litton, Desmond, Gilliland, Huh, & Franklin, 2011). As previously mentioned, strains 6 and 11 account for up to 90% of all cases of genital warts, and strains 16 and 18 account for 70% of cervical cancer caused by HPV. Both vaccines were approved for use in females 9-26 years old, but the Advisory Committee on Immunization Practices (ACIP) recommends routine vaccination for females ages 11-12 (Markowitz et al., 2014). Females ages 13-26 who have not been previously vaccinated are also recommended to receive the vaccine. The vaccine is only effective if received prior to infection, hence the recommendation to vaccinate young girls with the intention of protecting them prior to the potential for exposure to the virus.

Despite the effectiveness of the vaccine, vaccination rates remain quite low. As of 2013, less than 38% of adolescents ages 13-17 received all three doses of the HPV vaccine (CDC,

2014). In contrast, completion rates of other childhood vaccinations such as Tdap (tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis) and the MMR (measles, mumps, and rubella) vaccine are more than 85% (Brown et al., 2010). Unlike other routine vaccines, however, the HPV vaccine targets a sexually transmitted infection. This has been found to present unique challenges and barriers to vaccination (Holman et al., 2013).

Examining Predictors of HPV Vaccination

Understanding the predictors of HPV vaccination may help to address barriers to vaccination in order to increase vaccination rates. Several studies have examined the predictors of a caregiver's decision to have a daughter vaccinated, and have found factors such as trust in the healthcare system, knowledge of HPV, perceived social norms, and physician recommendations to influence HPV vaccination behaviors in adolescent females (Allen et al., 2012; Allen et al., 2010; Caskey, Lindau, & Alexander, 2009; Dempsey, Abraham, Dalton, & Ruffan, 2009; Gamble, Klosky, Parra, & Randolph, 2009; Griffioen et al., 2012; Hamlish, Clarke, & Alexander, 2012; Hernandez et al., 2012; Kahn et al., 2009; Kepka, Ulrich, & Cordonado, 2012; Kessels et al., 2012; Kester, Zimet, Fortenberry, Kahn, & Shew, 2013; Kolar et al., 2015; Laz, Rahman, & Berenson, 2012; Reiter, Katz, & Paskett et al., 2013; Reynolds & O'Connell, 2012; Roberts et al., 2011; Thompson, Arnold, & Notaro, 2012; Teitelman et al., 2011). Research has found that adolescent gynecological care provides an ideal opportunity for physicians to recommend HPV vaccination (Delisi & Gold, 2008). Although previous research has supported an association between physician recommendations and HPV vaccination in adolescent females (Caskey et al., 2009; Dempsey et al., 2009; Gamble et al., 2009; Hamlish et al., 2012; Kester et al., 2013; Laz et al., 2012; Reiter et al., 2013; Reynolds & O'Connell, 2012; Roberts et al., 2011; Thompson et al., 2012), there has only been limited research on the

importance of preventative healthcare, such as a gynecological exam, as a predictor of HPV vaccination uptake (Guerry et al., 2011; Kessels et al., 2012; Reiter et al., 2013).

Purpose of the Study

The purpose of this study is to examine the predictors of HPV vaccination among African American adolescents living in a rural, resource poor environment. Although African Americans are disproportionately affected by HPV, few studies focus on the predictors affecting this racial/ethnic group in particular (Hamlish et al., 2012), and to my knowledge only one study exists that focuses on African Americans living in a rural area (Thomas et al., 2012). Not only are African American females at a higher risk for developing HPV and cervical cancer, and are less likely to receive the HPV vaccine (Widdice, Bernstein, Leonard, Marsolo, & Kahn, 2011), women living in rural areas are also at an increased risk for contracting HPV and cervical cancer (Cates, Brewer, Fazekas, Mitchell, & Smith, 2009; Fazekas, Brewer, & Smith, 2008; Reiter et al., 2013). Examining the predictors of vaccination among this group may help to increase overall vaccination rates and reduce their rates of HPV and cervical cancer. This study aims to fill in the gaps in current research by examining the predictors of a female caregiver's decision to have her African American daughter receive the HPV vaccine among youth living in a rural resource poor area. Predictors will focus on socio-ecological factors such as perceived social norms, trust in healthcare providers, adolescent gynecological care, and HPV knowledge that may influence vaccination uptake. The results of this study may have important implications for public health policies, healthcare professional training, and interventions for mothers of African American adolescents.

CHAPTER 2

REVIEW OF THE LITERATURE

This chapter presents a review of the relevant literature that informs study hypotheses. It is organized as followed: (a) HPV and cervical cancer in rural communities and among African American females, (b) a focus on the primary female caregiver, (c) predictors of HPV vaccination, and (d) the theoretical perspective: the socio-ecological model. A conceptual model is then presented followed by study hypothesis and literature to support the hypotheses.

HPV and Cervical Cancer in Rural Communities and Among African American Females

African American women are disproportionately affected by cervical cancer. The incidence of cervical cancer is 39% higher for African American females than White females, and of those cases, African American women are more than twice as likely to die from cervical cancer (American Cancer Society, 2011). Women living in rural areas have significantly higher cervical cancer rates than those living in urban areas, and of these women living in rural areas, African Americans have the lowest cervical cancer survival rates (Singh, 2012).

Over 90% of all cervical cancers are caused by the human papillomavirus (CDC, 2012) which also affects African American women more than other racial/ethnic groups (Banister et al., 2015). The HPV vaccine provides promise to help reduce both HPV and cervical cancer, but vaccination rates are low. African American adolescents are 50% less likely to complete the HPV vaccine compared to White adolescents (Widdice et al., 2011). African American females living in rural areas have the lowest rates of vaccination compared to other racial/ethnic groups living in rural and urban areas (Cates et al., 2009).

Resource-poor, rural areas are not conducive to preventative health care given the inadequate medical infrastructures often present (Akers, Newman, Smith, 2007). Individuals living in these areas are often economically disadvantaged which further impacts their receipt of medical care (Cates et al., 2009).

A Focus on the Female Primary Caregiver

Although the HPV vaccine is recommended for girls ages 9-26, in the United States, minors must have consent from a parent or guardian to receive the vaccine (Markowitz et al., 2014). Therefore, in order to understand the predictors of HPV vaccination in adolescents, it is important to understand the factors that influence a parent's decision to have his/her daughter vaccinated, as the decision to vaccinate ultimately lies in the hands of the caregiver. Previous studies indicate that the mother is typically the primary individual responsible for healthcare decisions of children and is often responsible for taking children to the doctor (Dempsey et al., 2009). It can be assumed that the primary female caregiver, most commonly the mother, has the most influence on HPV vaccination decisions for adolescent daughters.

Little research addresses predictors of African American mothers' decision to vaccinate their daughters (Bryer, 2014; Thomas et al., 2012; Thompson, Arnold, & Notaro, 2011). The present study attempts to add to the current limited body of research focusing on African American female caregivers of adolescent girls living in rural areas in order to more clearly understand the predictors of vaccination in this at-risk population.

Predictors of HPV Vaccination

A limited body of research has emerged on various predictors of HPV vaccination among adolescent African American females and those living in resource poor environments. A larger body of research exists for adolescent females of various racial/ethnic groups living various areas.

In this section, I highlight findings of both bodies of research that examine parental predictors of HPV vaccination in order to place the purpose of the present study into perspective and highlight gaps this study will attempt to address.

Social norms. Social norms, or the attitudes and beliefs widely accepted by individuals in one's society, particularly peers, friends, family, and others whose opinion is valued, can strongly influence health behaviors (Smith & Mackie, 2007). Individuals desire to fit in with society, and tend to value following society's rules for behavior (Smith & Mackie, 2007). Social norms provide a guide on how to behave. Social norms have been found to be a robust determinant of health behaviors (Oraby, Thampi, & Bauch, 2014; Rimal & Real, 2003). Importantly, one's perceptions of social norms have been found to predict health behavior, even if the perceived norms are not accurate (Rimal & Real, 2003). Social norms are associated with HPV vaccination among adolescent females (Allen et al., 2010; Dempsey et al., 2009; Kepka et al., 2012; Reynolds & O'Connell, 2012; Teitelman et al., 2011).

For individuals living in resource poor environments, the influence of social norms may be more heavily pronounced than in other areas. Those who do not have adequate resources, such as those living in rural poverty, may rely more on peers for information and support regarding health care decisions (Cattell, 2001).

Adolescent Gynecological care. An adolescent's first reproductive health visit, referred to as the "initial" adolescent preventive care visit in medical literature, is often her first interaction with a gynecologist or other women's health professional (ACOG, 2014). Commonly referred to as a "women's health exam", the primary goal of this visit is to provide preventive healthcare services, including age appropriate education and guidance (Delisi & Gold, 2008). The experience of an initial reproductive health visit can set an adolescent on a positive health

trajectory for the rest of her life (Hewitt, 2006). The American College of Obstetricians and Gynecologists recommends that an adolescent receive her first reproductive health visit when she is 13 to 15 years old, and caregivers are encouraged to play an active role during this visit (2014). It is ideal for this encounter to occur before the adolescent is sexually active.

In addition to a physical exam, the reproductive health visit is an opportunity for the health care professional to discuss physical, mental, and sexual health. This visit should include a review of “normal menstruation, diet and exercise, mental health and substance use, healthy sexual decision-making, the development of health, safe relationships, immunization, and injury prevention” (Delisi & Gold, 2008). The visit provides an opportunity for the health professional to educate the adolescent and caregiver about STIs and preventive measures, including HPV vaccination.

Studies suggest that rural African American girls and their caregivers are unlikely to present to providers specifically seeking an HPV vaccination (Blake et al., 2015). Thus adolescents’ participation in a women’s health exam is likely critical in whether or not the family will receive information regarding HPV and the opportunity to receive the vaccine. Although no research on African Americans has been conducted, in a study of college-age Hispanic women, it was found that a history of a gynecological exam was a significant predictor of vaccination (Cohen & Legg, 2014).

Trust in healthcare providers. In the United States, African Americans have a history of mistrust of the health care system and healthcare providers. This mistrust is often attributed to the Tuskegee Syphilis Study, which greatly affected African American perceptions of health care providers (Gamble, 1997). When focusing on African Americans, it is important to consider the element of trust as a predictor of the utilization of healthcare services. Trust in health care

providers has been linked with infrequent preventative health visits, which greatly affect an individual's overall health (Armstrong, Ravenell, McMurphy, & Putt, 2007; Whetten et al., 2006).

If a female caregiver does not trust the healthcare system, she would be less likely to take her adolescent to a women's health exam. Many studies document the influence of trust in a physician or the healthcare system as a predictor of HPV vaccination (Allen et al., 2010; Allen et al., 2012; Griffioen et al., 2012; Hernandez et al., 2012; Kolar et al., 2015). Research that compared the effect of trust on vaccination in multi-ethnic samples found that mistrust had a greater impact on the decision not to vaccinate among African Americans compared to Hispanic, Asian, and White women (Hernandez et al., 2012). Although mistrust has been found to decrease the likelihood of seeking preventative care, research on the impact of a caregiver's mistrust on an adolescent's gynecological care has not yet been studied. The present study aims to fill this gap in research.

Knowledge of HPV. Despite the prevalence of HPV and cervical cancer, many do not have an accurate understanding of HPV, HPV transmission, and its association with cervical cancer (Fishman, Taylor, Kooker, & Frank, 2014). This lack of knowledge may influence a caregiver's decision to vaccinate her daughter. If a caregiver is misinformed about HPV, she may feel as though her daughter would not benefit from the vaccine, or that her daughter does not need the vaccine.

Research reveals that a lack of knowledge regarding HPV is a barrier to vaccination (Allen et al., 2010; Dempsey et al., 2009; Kahn et al., 2009; Kessels et al., 2012; Reiter et al., 2013). In one study, African Americans were found to score lower on HPV knowledge measures than other racial/ethnic groups (Allen et al., 2010).

Theoretical Perspective: The Socio-Ecological Model

The socio-ecological model is a framework for understanding how a variety of domains, both individual and environmental, influence individual behavior (McLeroy, Bibeau, Stecklet, & Glanz, 1988). McLeroy et al. (1988) socio-ecological model which focuses on health promotion behaviors focuses on the joint contribution of intrapersonal factors, interpersonal processes, institutional factors, community factors, and public policy. In contrast to the theories commonly used to explain the predictors of HPV vaccination such as the Theory of Planned Behavior and the Health Belief Model, the socio-ecological model offers a broader approach that encompasses multi-level factors. This study focuses on the first three tiers of the socio-ecological model: the intrapersonal level, the interpersonal level, and the institutional level. Figure 1 demonstrates the first three tiers of the socio-ecological framework used to understand the predictors of HPV vaccination. Intrapersonal factors include characteristics of the individual such as knowledge, attitudes, and beliefs; interpersonal processes include the social relationships that influence behavior; and institutional factors focus on the impact of organizational settings on behavior. Although examining community and policy levels is important to understanding the predictors and barriers to HPV vaccination, these spheres exist outside the scope of this study.

Intrapersonal level. The intrapersonal level of influence in the socio-ecological model focuses on individual factors, mainly attitudes and beliefs that influence health care decisions. In this study, intrapersonal factors include caregivers' *knowledge of HPV* and *trust in healthcare providers*. Knowledge of HPV encompasses the mother's accurate understanding of HPV transmission and its impact on the prevention of cervical cancer. Past research on vaccine uptake from a socioecological perspective has investigated knowledge of the vaccine as an important predictor (Kumar et al., 2012).

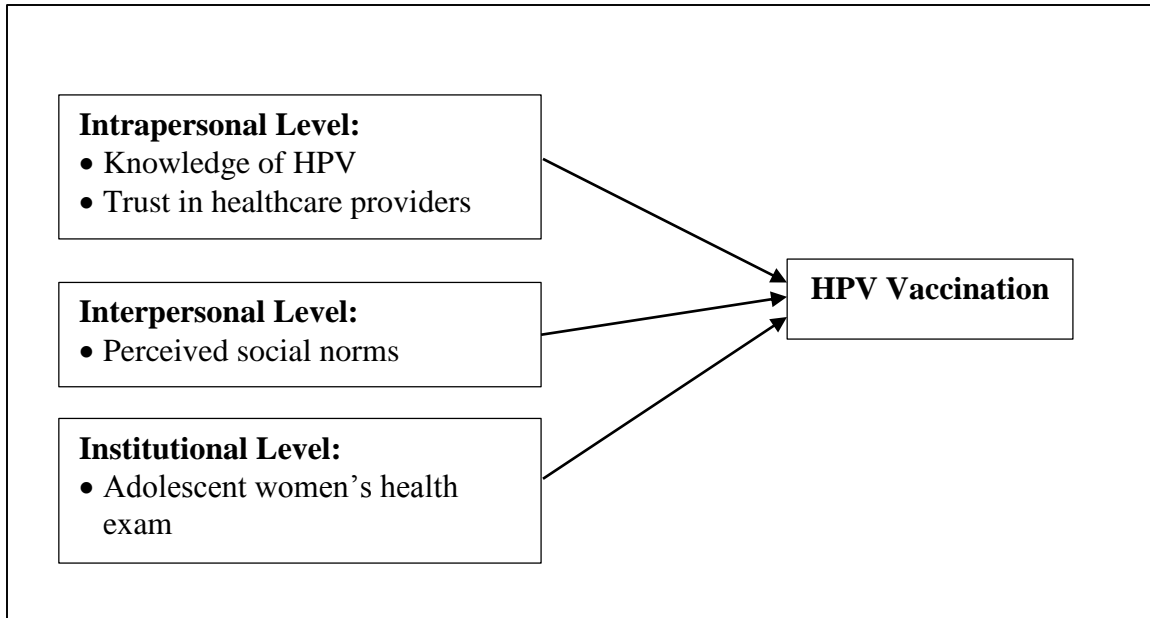


Figure 1: A socio-ecological framework for HPV vaccination among adolescent females

The second intrapersonal factor examined in this study, *trust in healthcare providers*, is informed by many African Americans' concerns regarding racial discrimination in the healthcare system. The trust dimension captures parents' belief that health care professionals have the best interests of their daughter, and of African American individuals as a whole in mind. The construct of trust has been examined as an intrapersonal predictor of vaccination in past research on the predictors of vaccination (Ferrer, Trotter, Hickman, & Audrey, 2014; Kumar et al., 2012).

Interpersonal level. The interpersonal level of influence highlights the importance of social relationships that can influence behavior. In this study, *perceived social norms* are predicted to influence a mother's decision to vaccinate her daughter. Social norms are behaviors or beliefs that are socially accepted by members of one's community. In this study, a mother's perception of her society's norms includes the belief that family, friends, and others who are important to her would approve of vaccinating her daughter or taking her to a women's health exam. Past research on vaccine uptake focused on the HPV vaccine and the flu vaccine used similar constructs of social norms in predictive models based upon the socio-ecological framework (Ferrer et al., 2014; Kumar et al., 2012). In these models, the belief that family and friends approved of vaccination were predicted to increase the likelihood of individual vaccination.

Institutional level. The institutional level represents organizational influences on behavior. The *adolescent women's health exam* is considered to be an institutional factor that acts as an environmental determinant of HPV vaccination. In addition to representing overall engagement in gynecological care, the women's health exam may provide exposure of the vaccine and physician recommendations to receive the vaccine. Engagement in preventative

health care practices has been examined as an institutional predictor of vaccination in past research on the predictors of vaccination (Ferrer et al., 2014; Kumar et al., 2012).

Conceptual Model

Study hypotheses regarding predictors of HPV vaccination are summarized in Figure 2. These hypotheses are informed by the socio-ecological model in addition to existing empirical evidence. Specifically, I predict that social norms regarding gynecological care, trust in healthcare providers, and the adolescent women's health exam will have direct and indirect effects on HPV vaccination. Social norms and trust in healthcare providers are hypothesized to be mediated by the women's health exam. Social norms will influence directly a mother's knowledge of HPV. A mother's knowledge of HPV will mediate the relations between social norms and HPV vaccination. Theory and research supporting these hypotheses are discussed below.

Study Hypotheses

Hypothesis 1: Maternal perception of social norms for gynecological care will directly affect HPV vaccination. The first hypothesis posits that social norms regarding the acceptability of the HPV vaccine and women's health exams for adolescent daughters will predict significantly HPV vaccination. Research regarding both vaccines in general and the HPV vaccine specifically have provided evidence to support the association between social norms and HPV vaccination (Allen et al., 2010; Dempsey, Zimet, Davis, & Koutsky, 2006; Kepka et al., 2012; Oraby et al., 2014; Reynolds & O'Connell, 2012; Teitelman et al., 2011).

Research regarding vaccinations for pediatric infectious diseases indicate that social norms have a strong influence on whether or not a parent chooses to vaccinate his or her child (Oraby et al., 2014). The relations between social norms and vaccination uptake can be positive

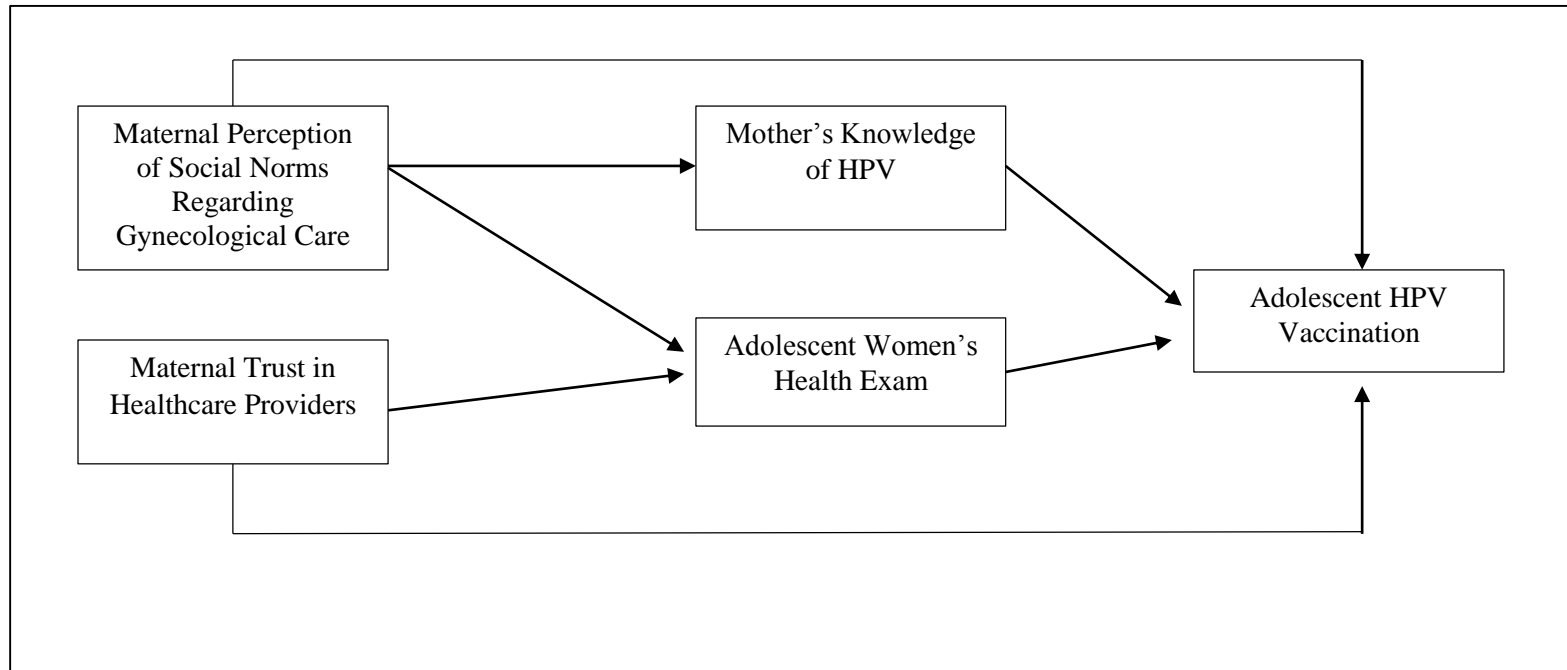


Figure 2: Conceptual model of the predictors of HPV vaccination in rural adolescent African American women

or negative, depending on the perceived social norms. If the norm supports vaccination, parents are more likely to have their child vaccinated. However, if the perceived social norm is not to vaccinate, parents are less likely to vaccinate their children.

Several studies have examined the importance of social norms on a parent's decision to vaccinate a daughter with the HPV vaccine (Allen et al., 2010; Dempsey, Zimet, Davis, & Koutsky et al., 2006; Kepka et al., 2012; Reynolds & O'Connell, 2012; Teitelman et al., 2011). Parents who report their family and friends endorse HPV vaccination are more likely to vaccinate their daughters than are those without endorsing family and friends. Dempsey et al. (2006) found that parental acceptance of the HPV vaccine was associated with peer-group opinions. In addition to quantitative studies, qualitative research on HPV vaccination in adolescent females has found social norms to be a factor associated with reasons parents give as to why they have or would vaccinate or not vaccinate their daughters (Allen et al., 2012; Griffioen et al., 2012).

Hypothesis 2: Trust in healthcare providers will predict HPV vaccination. Trust in healthcare providers is the belief that doctors, nurses, and other healthcare professionals have the best interests in mind of the individual and those who belong to the individual's ethnic group (Thompson, Valdimarsdottir, Winkel, Jadorf, & Redd, 2004). In a study examining the barriers to general immunizations in two year olds, Prislín, Dyer, Blakely, and Johnson (1998) found that distrust of the medical community had a significant impact on parental beliefs about immunization. In a systematic review of the literature surrounding parental decisions to vaccinate their children with the MMR vaccine and other childhood vaccines, it was found that mistrust of the healthcare system was associated with lower rates of vaccination (Brown et al., 2010). Several studies have examined the influence of health provider trust in parental decisions

to vaccinate daughters against HPV (Allen et al., 2012; Kolar et al., 2015; Thompson et al., 2012). These studies support the relations between trust in healthcare providers and HPV vaccination for daughters. For parents who had mistrust of the healthcare system and healthcare providers, they were less likely to vaccinate their daughters.

Hypothesis 3: An adolescent women's health exam will mediate the association between social norms and HPV vaccination, and trust in healthcare providers and HPV vaccination. Social norms and trust in healthcare providers are predicted to influence a mother's decision to take her daughter to a women's health exam. Engagement in a women's health exam is predicted to be a potent factor regarding vaccination status for rural African American adolescents. The adolescent women's health exam visit can be seen as the mechanism through which social norms and trust in healthcare providers predict HPV vaccination.

Engagement in preventative health care practices, such as the women's health exam, has been found to be associated with HPV vaccination uptake (Guerry et al., 2011; Kessels et al., 2012; Reiter et al., 2013). Not only does having a daughter get a women's health exam suggest that a parent is more aware of her adolescent's gynecological and reproductive health, for those living in a rural resource poor area, a women's health exam may be one of the only environments where physicians discuss and recommend the HPV vaccine (Zhang, Tao, Irwin, 2000; Delisi & Gold, 2008). Physician recommendation for the HPV vaccine has been found to be a significant predictor of vaccination (Gamble et al., 2009; Hamlish et al., 2012; Kessels et al., 2012; Reiter et al., 2013; Thompson et al., 2012).

Hypothesis 4: The effect of maternal perception of social norms on HPV vaccination will be mediated by a mother's knowledge of HPV. A mother's knowledge of the HPV vaccine is hypothesized to mediate the association between social norms and HPV vaccination.

A mother's social norms are expected to influence her knowledge of HPV which will then influence her decision to vaccinate her daughter. Social norms have been found to influence the transfer of knowledge (Millar & Choi, 2009). If something is more widely accepted as a social norm, knowledge about that topic will be more readily spread and accessible. If the community approves of HPV vaccination, HPV vaccination will be a much more acceptable topic to discuss. If the community disapproves of HPV vaccination, the topic may be considered taboo and knowledge-seeking behaviors surrounding HPV vaccination would not be as desirable.

Several studies support the hypothesis that knowledge of the HPV vaccine and its benefits has a direct effect on HPV vaccination in adolescent females. In a study examining parental decisions to vaccinate their daughters with the HPV vaccine, it was found that parents who intended to vaccinate or whose daughters were already vaccinated had higher levels of knowledge about HPV and the HPV vaccine than parents who had decided against vaccination (Allen et al., 2010). In another study of 7,207 mothers of 9-12 year old daughters, knowledge of the HPV vaccine was related to a mother's intention to vaccinate her daughter against HPV (Kahn et al., 2009). Lack of knowledge was also cited by parents as a reason not to vaccinate their daughter against HPV in a study examining parents of adolescents in Appalachia (Reiter et al., 2013). In a systematic review of factors associated with HPV vaccination in adolescent females, two studies reported that parents who had knowledge of HPV were more likely to vaccinate their daughters compared to parents who did not have knowledge of HPV (Kessels et al., 2012).

Summary

Studies indicate that African American females living in rural environments are at an elevated risk of contracting HPV and cervical cancer, and focusing on maternal predictors of

adolescent vaccination may shed light on the factors that shape vaccination uptake. Social norms, trust in healthcare providers, knowledge of HPV, and whether or not the adolescent's has had a women's health exam are hypothesized predictors of HPV vaccination. In the next chapter I will outline the methods used for the proposed study, including a description of the study sample, recruitment, and data collection procedures, followed by each of the measures used to test study hypotheses, and concluding with a section on planned analyses.

CHAPTER 3

METHODS

Sample

Study hypotheses were tested utilizing data from the Women's Health Study (WHS), a study examining factors associated with women's health for African American female caregivers and their female adolescent dependent, henceforth referred to as "daughters."

The sample consists of 205 African American primary female caregivers of daughters aged 13-17 living in rural counties in central Georgia. The caregivers ranged in age from 27.4 to 76.9 years old, with a mean age of 42.38 (SD= 8.22). Caregivers reported a median income of \$1008 per month, which is representative of individuals living in poverty with few economic resources. Of the caregivers, 25% reported having less than a high-school education, 25% reported having a high school diploma or GED, and less than 8% with a college degree. The remaining 42% reported having some college. In addition, approximately 67% of caregivers were single-parents.

Recruitment. Participants for the study were recruited using convenience and snowballing techniques. Participants were initially recruited from the Rural African Families Health Project (RAAFHP), a randomized prevention trial (Kogan et al., 2012). Female caregivers who were assigned to the control condition in RAAFHP and who also had a daughter age 13-17 were invited to participate in the Women's Health Study (WHS). Once the female caregivers agreed to participate in the WHS, they were asked to recommend other women with a daughter age 13-17 from their neighborhood. A total of 205 female caregivers were recruited for the study,

66 from the original RAAFHP study and 139 via snowballing. The caregivers received an incentive of \$40.

Procedures

Trained African American field researchers made home visits to collect data. At the visits, self-report questionnaires were administered to the primary female caregiver via audio computer-assisted self-interviewing (ACASI) technology on laptop computers. Participants who were recruited for the RAAFHP study completed the questionnaires for both studies in the same visit.

Primary caregivers provided data on HPV vaccination status and a variety of contextual and personal factors hypothesized to predict HPV status and attitudes. Contextual factors of interest included measures of social norms and mistrust of the medical community. Personal factors of interest included experience with women's health exams and knowledge of HPV and the HPV vaccine. Data collection began in August of 2009 and was completed in March of 2010.

Measures

HPV vaccination. Participants were given a portion of text regarding the HPV vaccine including information that "the HPV vaccine is a series of three shots." The outcome variable of HPV vaccination uptake was then measured using the following survey item: "Has your daughter received the HPV vaccine?" Mothers were given the following response choices: "yes," "no", "not sure." The "no" and "not sure" responses were collapsed to create a dichotomous "no" variable. Measuring HPV vaccination with this single item is consistent with studies examining predictors of HPV vaccination in adolescent females (Bynum, Brandt, Sharpe, Williams, & Kerr, 2011; Kolar et al., 2015).

Adolescent women's health exam. Engagement in gynecological care was measured using a single item with a dichotomous yes/no response. Mothers were asked "Has your daughter had a women's health exam?"

Social norms. The mother's perception of social norms regarding gynecological care was assessed using nine items with a 5-point Likert scale response ranging from "strongly disapprove" to "strongly approve." The measure included items highlighting the perceived norms for adolescent gynecological care of "people who are important to me," family members, and friends. For example, "If I took my daughter to have a women's health exam, members of my family would..." and "My friends believe that all girls should get the HPV vaccine by age 16." (See Appendix A for complete measure). The measure was found to be reliable ($\alpha = 0.84$).

Knowledge about HPV. HPV Knowledge was assessed via 10 statements about HPV and the HPV vaccine with true/false/not sure response choices. The measure's items are listed in Appendix B. If the question was answered correctly, it was scored as 1. If it was answered incorrectly or "not sure" was chosen as a response, it was scored as 0. The scores were then summed to create an overall knowledge score. The knowledge about HPV measure created for this study used a similar format and items found in several studies including those examining parental decision making about the HPV vaccine (Allen et al., 2010), HPV vaccine knowledge and attitudes in college women (Kolar et al., 2015), and predictors of HPV vaccine uptake in young African American women (Bynum et al., 2011).

Trust in healthcare providers. Trust in healthcare providers was measured using the three item Group Disparities in Health Care subscale of the Group-Based Medical Mistrust Scale (GBMMS; Thompson et al., 2004). The GBMMS uses a 5-point Likert response scale ranging from "strongly disagree" to "strongly agree". The items included in the subscale can be found in

Appendix C. The GBMMS was utilized in a similar study examining HPV vaccination in young adult females by Kolar and colleagues (2015). The Group Disparities in Health Care subscale has been found to be reliable in the current study ($\alpha = 0.76$).

Planned Analyses

Study hypotheses were tested with logistic structural equation modeling using Mplus software (Muthén & Muthén, 2012). The model was estimated using full information maximum likelihood (FIML), which tests the model against all available data. Age of the adolescent daughter was controlled in the model. Model fit was assessed using chi square, χ^2/df , the comparative fit index (CFI), and the root mean square error of approximation (RMSEA).

CHAPTER 4

RESULTS

Table 1 presents the percentage of vaccination by age group. Overall, 36.5% of the sample received the HPV vaccine. Of the youngest participants (ages 13-14), approximately 39% received the vaccine. Approximately 40% of participants age 15-16 received the vaccine, and approximately 28% of 17-year-old daughters received the vaccine. Table 2 presents the means, standard deviations, and bivariate associations for all study variables.

We tested the model based on the pathways specified in Figure 2 (Chapter 2) controlling for age of the daughter. The data fit the model well: $\chi^2(3) = 4.018, p = 0.26$; $\chi^2/df = 1.34$; CFI = .95; RMSEA = .041 (0, .13). Figure 3 presents the model. Mother's perceived norms regarding gynecological care for her adolescent significantly predicted whether or not her daughter had a gynecological exam ($\beta = .237, p = .005$), the mother's knowledge of HPV ($\beta = .171, p = .030$), and whether her daughter received the HPV vaccine ($\beta = .184, p = .038$). Maternal trust in healthcare providers significantly predicted adolescent HPV vaccination ($\beta = .192, p = .035$) but did not predict whether or not her daughter had a women's health exam ($\beta = .109, p = .138$). Whether or not an adolescent had a gynecological exam significantly predicted whether or not she received the HPV vaccine ($\beta = .219, p = .019$). A mother's knowledge of HPV did not significantly predict whether or not her daughter received the HPV vaccine ($\beta = .141, p = .09$). The indirect effect of social norms on vaccination via a gynecological exam was .094, $SE = .024, p = .023$ suggesting that gynecological exams partially mediated the influence of norms on vaccination.

Table 1

Percentages of HPV Vaccination by Age

Age of Daughter	% Received HPV Vaccine
13 (<i>N</i> =24)	33.3
14 (<i>N</i> =40)	42.5
15 (<i>N</i> =41)	36.6
16 (<i>N</i> =42)	42.9
17 (<i>N</i> =53)	28.3
Total	36.5

Table 2

Correlation Matrix and Descriptive Statistics for Study Variables Controlling for Age (N=205)

	1	2	3	4	5
1. HPV Vaccination Uptake ^a	---				
2. Social Norms for Gynecological Care	.220**	---			
3. Trust in Healthcare Providers ^a	.203**	.154*	---		
4. Adolescent Women's Health Exam	.249**	.259**	.148*	---	
5. Maternal Knowledge of HPV	.158*	.183*	.104	.051	---
<i>M</i>	.366	23.556	6.000	.350	4.498
<i>SD</i>	NA	5.480	2.367	NA	3.058
<i>Minimum</i>	0	5	0	0	0
<i>Maximum</i>	1	36	12	1	10

Note. NA= Not applicable to a dichotomous variable.

^a 1=yes, 0=no

* $p < .05$. ** $p < .01$.

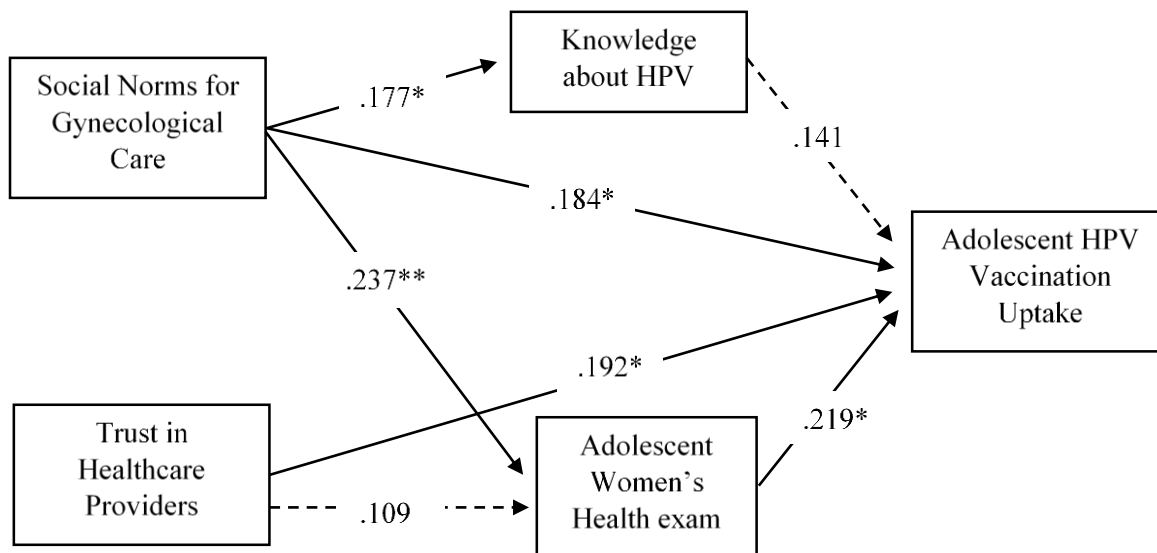


Figure 3: Structural equation model showing all predicted pathways
 * $p < .05$. ** $p < .01$.

CHAPTER 5

DISCUSSION

African Americans living in rural areas are disproportionately affected by HPV and cervical cancer, and are less likely to receive the HPV vaccine. HPV vaccination rates are complicated by links to sexual health, and recommendations to vaccinate women at a young age. Maternal factors that influence the decision to have a daughter vaccinated revolve around socio-ecological variables such as social norms and trust in health care providers. For women in resource-poor areas, social norms influence healthcare decisions such as vaccination and taking a daughter to a women's health exam.

Vaccination Rates

Although the American Council on Immunization Practices (ACIP) recommends that girls ages 11-12 and up to age 26 receive the HPV vaccine, vaccination rates remain quite low. Overall, approximately 36.5% of the sample received the HPV vaccine. This is lower than the national average of vaccination rates of 13-17 year old girls at 44.3% (CDC, 2010). This finding is consistent with literature that suggests that vaccination rates among minority adolescents and those living in rural poverty are lower than the general population (Cates et al., 2009; Fazekas et al., 2008; Guerry et al., 2011). Despite recommendations to vaccinate girls before they become sexually active and potentially exposed to the virus, the results from the study show that the oldest participants were the least likely to be vaccinated. The same trend has been found in other research examining vaccination rates among adolescent females (Guerry et al., 2011). This is

particularly concerning due to the fact that the vaccine is not effective once someone has been exposed to the virus, which is much more likely as adolescents age and become sexually active.

Predictors of HPV Vaccination

Maternal social norms for gynecological care was found to be a significant predictor of HPV vaccination among rural African American adolescents. These findings are consistent with our hypothesis that social norms for gynecological care will be a significant predictor of whether or not a daughter is vaccinated. Prior studies investigating the predictors of HPV vaccination among African American adolescents have found similar results that support the idea that social norms predict vaccination uptake (Bryer, 2014; Hamlish et al., 2012). These findings are also consistent with studies that suggest the perceptions of peers regarding HPV vaccination and gynecological care are an important predictor of parental vaccination decisions regardless of race/ethnicity, socioeconomic status, or geographic location (Allen et al., 2010; Dempsey et al., 2006; Ferrer et al., 2014; Oglivie et al., 2007; Rambout, Tashkandi, Hopkins, & Tricco, 2014; Reynolds & O'Connell, 2012).

Trust in healthcare providers was found to significantly predict HPV vaccination among adolescents. Mothers who believed healthcare providers had her best interests in mind were more likely to have her daughter vaccinated. This finding is consistent with studies of African American parents that found that medical trust is an important predictor of HPV vaccination (Hernandez et al., 2012; Thompson et al., 2012). Research that examined parental decision making regarding the HPV vaccine found that those who are more mistrusting of doctors and the healthcare system are also less likely to vaccinate their daughters (Allen et al., 2010; Griffioen et al., 2012; Kolar et al., 2015). Trust in healthcare providers is more likely to occur when the healthcare providers is of the same race/ethnicity as the patient (Gamble, 1997). These results

support the idea that more African American healthcare providers in rural resource-poor areas may help to increase vaccination rates.

Participation in an adolescent women's health exam was found to be a mediator between maternal perceived norms for gynecological care and vaccination. These results suggest that positive social norms regarding gynecological care impact a mother's decision to take her daughter to have a women's health exam, which in turn increases the likelihood of vaccination. Although no prior studies have examined this particular pathway, these results are consistent with predicted pathways based on literature surrounding the impact of social norms on behavior and the importance of gynecological care. These results may help to inform future interventions regarding vaccination. The focus should be on getting these adolescents a women's health exam where vaccination is likely.

The hypothesis that the relationship between HPV vaccination and trust in the healthcare system would be mediated by an adolescent's women's health exam was not supported by the results of this study. Trust in healthcare providers was not found to significantly predict participation in a women's health exam. This finding is inconsistent with research that suggests parents who are mistrustful of physicians or the healthcare environment are less likely to engage in preventative health care tasks such as gynecological care (Zhang et al., 2000). This inconsistent finding may be due to the difference between examining trust versus mistrust. It is possible that the positive lens of trust is not as predictive as the negative aspect of mistrust. Future research focusing on rural African Americans should investigate both trust and mistrust to help identify the mechanism by which this variable influences HPV vaccination.

Contrary to the hypotheses and findings from previous studies, the results of the study did not support knowledge about HPV as a significant mediator between social norms and

vaccination. Although social norms were found to be positively associated with HPV knowledge, HPV knowledge did not predict vaccination. This is inconsistent with studies that have found knowledge about HPV to be a significant predictor of a parent's decision to vaccinate a daughter (Allen et al., 2010; Kahn et al., 2009; Kessels et al., 2012; Reiter et al., 2013). Perhaps there are other variables such as insurance coverage, access to the vaccine, and other socioeconomic considerations specific to adolescents living in rural poverty that may influence this relationship beyond just knowledge about the vaccine. Future research addressing these factors may help to clarify the importance of HPV knowledge.

Limitations and Directions for Future Research

Strengths of this study include its unique sample and sophisticated assessment techniques. A number of limitations, however, are notable. Although it is important to examine this at-risk population of rural African Americans, the results of the study are only generalizable to similar populations. Low HPV vaccination rates is a public health problem all over the world, but it is not known if these predictors hold true for other races/ethnicities or geographic areas. This study does not examine the processes by which a women's health exam influences vaccination. It can only be hypothesized that physician recommendations occur during these visits and the vaccine is more readily available to those who attend these exams. Additional variables such as physician recommendations at the women's health exam or where the adolescent received the vaccine would help to understand these particular processes.

Conclusion

Low HPV vaccination rates is a public health concern that affects African Americans living in rural areas more than many other groups. This is one of very few studies to examine predictors of vaccination among rural African American adolescent females, and the only one to

form a link between social norms, gynecological care, and vaccination. The present findings make an important contribution to the research regarding this issue by identifying socio-ecological factors such as social norms, trust in healthcare providers, and engagement in gynecological care that influence vaccination rates with this population. The findings of this study may help to inform future research in an attempt to minimize this public health problem.

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APPENDIX A: Social Norms Measure

0	1	2	3	4
Strongly Disapprove	Disapprove	Neutral/Mixed	Approve	Strongly Approve

1. If I took my daughter to have a woman's health exam, most people who are important to me would:
2. If I took my daughter to have a women's health exam, my friends would
3. If I took my daughter to have a women's health exam, members of my family would
4. Most people who are important to me believe that all girls age 9-12 should get the HPV vaccine.
5. My friends believe that all girls age 9-12 should get the HPV vaccine.
6. Members of my family believe that all girls age 9-12 should get the HPV vaccine.
7. Most people who are important to me believe that all girls should get the HPV vaccine by age 16.
8. My friends believe that all girls should get the HPV vaccine by age 16.
9. Members of my family believe that all girls should get the HPV vaccine by age 16.

APPENDIX B: Knowledge of HPV Measure

- | | |
|--|-------|
| 1. HPV is the virus that causes herpes | False |
| 2. HPV is the virus that causes genital warts | True |
| 3. HPV is a virus that can cause cervical cancer. | True |
| 4. HPV is a virus that can cause breast cancer. | False |
| 5. A person can have HPV but not know they have it. | True |
| 6. I can protect myself from HPV by washing my hands. | False |
| 7. I can protect myself from HPV by avoiding people who are sick (coughing, sneezing). | False |
| 8. HPV is the virus that causes AIDS. | False |
| 9. If I had HPV I would know it. | False |
| 10. A person can get HPV from sexual contact | True |

APPENDIX C: Group-Based Medical Mistrust: Group Disparities Subscale

0	1	2	3	4
Strongly Disagree	Disagree	Neutral/Mixed	Agree	Strongly Agree

1. Black people receive the same medical care from doctors and health care workers as people from other groups.
2. Black people are treated the same as people of other groups by doctors and health care workers.
3. In most hospitals and medical settings Black people receive the same kind of care as other people.