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Provider Recommendations for Human Papillomavirus Vaccine (HPV) Among Adolescent Males in Southwest Georgia Counties and The Associated Hpv Prevalence in This Population

Benjamin K. Poku

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PROVIDER RECOMMENDATIONS FOR HUMAN PAPILLOMAVIRUS
VACCINE (HPV) AMONG ADOLESCENT MALES IN SOUTHWEST GEORGIA
COUNTIES AND THE ASSOCIATED HPV PREVALENCE IN THIS POPULATION

by

BENJAMIN POKU

(Under the Direction of GULZAR SHAH)

ABSTRACT

Objective: The purpose of this research study was to examine the variation in healthcare providers' behavior in recommending the Human Papillomavirus (HPV) vaccine to young male adolescents (aged 11-12), middle male adolescents (aged 13-17) and late male adolescents (aged 18-26) in rural Southwest Georgia counties. This research also aimed to identify factors associated with providers' behaviors concerning HPV vaccination recommendation to youth in various age groups.

Methods: Upon IRB approval, secondary data were obtained from Albany Area Primary Care for a paper-based survey that was conducted in 2014 using a representative random sample of family physicians (n=12), pediatricians (n=6), and nurse practitioners (n=33). The survey had a response rate of 76% and the researcher employed descriptive statistics, paired *t* tests and analysis of variance (ANOVA) to describe the pediatricians' (Peds), nurse practitioners' (NPs/Nurses), and family physicians' (FPs) recommendations to HPV vaccinations and the association of HPV prevalence in Rural Southwest GA.

Results: Statistical testing and analysis show barriers such as healthcare providers' and parents' discomfort with the vaccination of pre-teens when it concerns a

sexually transmitted disease, lack of awareness to the role that males play in the spread of HPV, absence of government mandates, and non-completion of the three-dose series of vaccination due to financial or logistical reasons. Provider specialty, age, ethnicity, and reported barriers were significantly associated with recommendations and association to HPV prevalence.

Conclusions: Findings suggest missed HPV vaccination opportunities for adolescent males. Perceived barriers and support to HPV vaccination to providers may drive decisions about HPV vaccine uptake and completion of vaccination series. Findings also suggest the need for policy level interventions to increase HPV vaccination among US adolescent males.

INDEX WORDS: HPV, Adolescent males, Health Care Providers, Vaccination, Quadrivalent, Cervarix

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DEDICATION

I would like to dedicate my dissertation to my mother Mary Abena Mensah and my father the late Daniel Kofi Anane Poku and to all family members. Their prayers, love, motivation, and sacrifice on my behalf made this achievement a reality.

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CHAPTER 1

INTRODUCTION

Statement of the Problem

Human papillomavirus (HPV) is a sexually transmitted infection (STI) that is very common in the United States and that has been recognized as one of the most dangerous viruses as it is linked to various genital-related health problems in males (CDC, 2013). It is responsible for approximately 4,000 deaths annually within the country, and it is causally linked to cancers in areas such as the anus, genitals, and oropharynx (Schiffman et al., 2011). Each year, 9,000 males in the United States contract HPV-related cancer (Dunne et al., 2014). In 2008, the vaccine targeting HPV, Gardasil™, entered the market and was targeted at males aged between 9 and 26 years. The Centers for Disease Control Advisory Committee on Immunization Practices (ACIP) subsequently recommended vaccination of males between 9 and 26 years of age (CDC, 2013). In 2009, another vaccine, Cervarix, was introduced into the market (CDC, 2010). Despite a wave of federal and state policy initiatives aimed at promoting the vaccine's use, a review of pertinent literature shows that there exist several barriers to the vaccination efforts. Research indicates that primary healthcare providers' recommendations are a key factor for vaccine uptake among adolescents (Vadaparambil et al., 2011). The purpose of this paper is to describe healthcare providers' recommendations to HPV vaccine to adolescent males.

Current Situation

The HPV virus is responsible for over 70% of cervical cancer cases. The HPV virus vaccination is currently recommended for girls 9 to 12 years of age and can also be administered for ages 13 to 26 (CDC, 2012). It is more effective if given before the girls' first sexual contact. Absent vaccination, the only recommended and sure way of preventing infection with the HPV

virus is by total abstinence from sexual intercourse since the virus can be transmitted by the areas not covered by a condom even if a condom is used. As such, concerted efforts ought to be employed to avoid infection by vaccinating men as well as women (Shi, 2008). Currently the emphasis on HPV vaccination is skewed towards females, but this research proposes a balanced approach by targeting adolescent males for HPV vaccination as well.

The many opposing opinions about HPV vaccinations can affect funding and research efforts concerning the effects of HPV among males (Siu, 2014). Recommendations by the Joint Committee on Vaccination and Immunization (JCVI) to introduce vaccination in boys have attracted criticism. The implementation of these JCVI recommendations would show that the male adolescent benefits from the vaccination. Boys would have minimal chances of contracting and spreading the HPV and HPV-related cancers. Among sexually transmitted diseases, HPV-related infections are the most common in the US. In fact, it is estimated that 14 million US citizens are infected with this virus annually. The number of people suffering from the disease at any given time is about 70 million. Of the 150 identified strains of the HPV, 40 are carcinogenic and believed responsible for causing different types of cancers such as cervical cancer, as well as some less common types of cancers such as cancers of the anus and vagina (Stocker, Dehnert, Schuster, Wichman, & Delere, 2013).

Two types of vaccines against HPV infections are currently available. These include bivalent (Cervarix) and quadrivalent (Gardasil) vaccines. These vaccines are totally effective against strains 16 and 18 which are the most potent causative agents of cervical cancer. Usually three shots of the vaccine are given to protect against HPV. These shots are administered as a series over a period of six months. Immunity against cervical cancer in women is provided using Cervarix and Gardasil. Gardasil is also effective in preventing genital warts, and vaginal, anal,

and penile cancers. Cervarix, however, is effective only against the strains of HPV that cause cervical cancers. The vaccines are effective when given to preteen boys and girls before they become sexually active. As such, the vaccine is currently recommended for preteen boys and girls (Vadaparampil et al., 2011).

In addition to preteen girls and boys, the HPV vaccine is also currently recommended to teenage boys and girls who might not have been vaccinated at an earlier age. For males, the vaccine is recommended to be given through to the age of 21, but can be administered to males up to age 26. It is also recommended for men who engage in sex with other men, and for men with compromised immune systems. (CDC, 2012). Girls should be vaccinated up the age of 26. Vaccinations done after these ages have proven not to be effective (Vadaparampil et al., 2011).

Purpose Statement

This study will generate knowledge that will identify issues surrounding primary healthcare providers' frequency of recommending the HPV vaccine to male adolescents aged 11–26 in Southwest Georgia.

Due to the burden of morbidity, mortality, and financial cost associated with this virus, the vaccine targeting HPV, Gardasil™, entered the market to target males aged between 9 to 26 years. This also caused ACIP to recommend male immunization and vaccination against the virus targeting those between 9-26 years of age (CDC, 2013).

This research examined the prevalence of providers' recommendation of HPV vaccination to early male adolescents (aged 11-12), middle male adolescents (aged 13-17) and late male adolescents (aged 18-26), as well as finding the factors associated with such recommendations, mainly in early male adolescents. The rationale for grouping of early, middle,

and late adolescents is due to the hormonal and physical differences that can be seen among these age groups. The CDC also recommends vaccination to start at 11-12 years of age.

Concept of the Study

The purpose of this study is to identify the effects of missed vaccination opportunities to a community's health. Specifically, this researcher will seek to identify the relationship between the rate at which health care providers recommend HPV vaccine and the prevalence of HPV-related diseases. In this, the effects of missed HPV vaccination opportunities will be revealed. It is expected that low rates of HPV vaccine recommendation will translate to high prevalence rates of HPV-related diseases among the population. The study will also look at the support and barriers healthcare providers encounter to recommending HPV vaccine (Gostin & DeAngelis, 2007).

The study will encompass at several factors that affect the rate at which healthcare providers recommend the HPV vaccine to their patients, and as well as factors that contribute to missed vaccination opportunities including how attitudes, culture, and financial factors affect healthcare providers' recommending or not recommending the vaccine. Therefore, this study will help identify solutions that will prevent the spread HPV-related infections (Gamble, Klosky, Parra, & Randolph, 2010).

Terms and Definitions

Health Care	General community efforts to diagnose disease, treat disease, and prevent disease from developing. It requires the input of both individuals and the community such as practitioners in allied health. A healthcare venue allows the provision and accessibility to resources and conditions that foster individual health-promoting behaviors. Health care refers to the
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work done by primary, secondary, and tertiary care professionals, as well as public health.

Primary Care	The first point of entry by a consumer of health (patient) into the healthcare delivery system. This venue carries out public health functions of primary prevention, such as immunizations. While primary care providers normally treat individual patients, public health takes a population-health approach to disease prevention and interacts with policy makers that implement policies and programs within the healthcare delivery and utilization system.
Health Behavior	Health behavior refers to the actions of people and communities that result in social change, policy development, and health improvement. It aims either to prevent disease or to detect health problems.
Primary Prevention	Primary prevention is the ability to change an individual's susceptibility to a health problem and also reduce the exposure to a causal agent. Public health is the primary prevention agency that is involved in epidemiological study in finding risk factors associated to the health of a population in general and possibly preventing or eliminating infections.
Population-at-risk	Population-at-risk includes cohorts or persons who may contract a disease or develop a health problem. In this study adolescent males are the cohort or prospective population at risk.
Quality of Care	The Institute of Medicine (IOM) defines quality of care as safe, effective, patient-centered, timely, efficient, and equitable for individuals and populations. This research may improve access to preventive care by

providing a better understanding of healthcare providers' HPV vaccine recommendations.

Research Setting

Albany Area Primary Health Care, Inc. is an affiliate of the Georgia Association for Primary Health Care (GAPHC) and also a Federally Qualified Health Center (FQHC). It is located in Albany, GA, and provides healthcare services to rural and underserved communities in Southwest GA.

Research Questions/Hypotheses

The focus of this study will be on providers' tendency to recommend HPV vaccine to early male adolescents (ages 11-12), as evidence indicates that this is the best age to introduce the HPV vaccine to ensure long-term effectiveness.

Research Question A

Are healthcare providers' rates of recommending HPV vaccination for males aged 11 to 12 years old higher than those of males aged 13 to 17 years old?

Null Hypothesis

No difference exists between healthcare providers' prevalence of recommending HPV vaccines to either early (ages 11-12) adolescent or middle (ages 13-17) adolescent males.

Alternate Hypothesis

A difference exists between the healthcare providers' prevalence of recommending HPV vaccines to early (ages 11-12) adolescent and middle (ages 13-17) adolescent males.

Research Question B

Are healthcare providers' rates of recommending HPV vaccination for middle adolescent males (ages 13-17) higher than those of late adolescent (ages 18–26 years) males?

Null Hypothesis

No difference exists between healthcare providers' prevalence of recommending HPV vaccines to either middle adolescent or late adolescent males.

Alternate Hypothesis

Differences exist between healthcare providers' prevalence of recommending HPV vaccines to middle adolescent and late adolescent males.

Research Question C

Are healthcare providers' rates of recommending HPV vaccination for early adolescent males (ages 11-12) higher than those of late adolescent males (ages 18-26)?

Null Hypothesis

No difference exists between healthcare providers' prevalence of recommending HPV vaccines to either early adolescent (ages 11 -12) or late male adolescent males (ages 18-26).

Alternate Hypothesis

Differences exist between healthcare providers' prevalence of recommending HPV vaccines to early adolescence (ages 11-12) and late adolescence males (ages 18-26).

Research Question D

Is there a variation in rates at which specialist healthcare providers' (FPs, NPs, Peds) recommend HPV vaccines?

Null Hypothesis

No difference exists between specialist healthcare providers in their prevalence of recommending HPV vaccines to patients.

Alternate Hypothesis

Differences exist between specialist healthcare providers in their prevalence of recommending HPV vaccines to patients.

Research Question E

Are healthcare providers' encountering perceived barriers in recommending HPV vaccine to adolescent males?

Null Hypothesis

No perceived barriers exist among healthcare providers' prevalence of recommending HPV vaccines to adolescents males

Alternate Hypothesis

Perceived barriers exist among healthcare providers' prevalence of recommending HPV vaccines to adolescents males

Research Question F

Is there variation in recommending rates by demographic characteristics of the provider?

Null Hypothesis

There is no variation in recommending rates by demographic characteristics of the provider.

Alternate Hypothesis

There is variation in recommending rates by demographic characteristics of the provider.

Delimitations

This study uses secondary data obtained from a local federally qualified health center (Albany Area Primary Care-AAPC) that operates in several counties in Southwest Georgia. The

sample size is small and the responses may be based on regional socio-cultural and socio-economic factors, along with other regional factors.

Significance of the Study

The quest to develop social awareness of the dangers of HPV has been assumed by different health organizations in the United States. The lack of awareness concerning the danger of HPV to men has led to the deaths of many unsuspecting people who succumb to various forms of HPV-related infections (Jemal et al., 2011). The burden of HPV-related illnesses among males is associated with primary care healthcare providers such as pediatricians (Peds), nurse practitioners (NPs), and family physicians (FPs) missing clinical opportunities to recommend HPV vaccination (Sudenga, Royse, & Shrestha, 2011).

Because HPV can be the causative agent for many illnesses in males such as cancers of the anus and oropharynx, this study examines the relationship between missed vaccination opportunities and the prevalence of the various HPV-linked illnesses. The virus is highly transmissible directly through the skin, especially during sexual intercourse. Vaccination has proved to be an effective method by which development of HPV-related illnesses can be prevented. Therefore, individuals who receive the HPV vaccine are expected to have low probability of contracting HPV-related illnesses.

The study also helps to compare the effectiveness of various HPV vaccines with that of other methods of HPV prevention. These methods include use of condoms, abstinence, and monogamy. According to the Youth Risk Behavior Survey (YRBS), in 2013, 46.8% of high school teenagers were sexually active, with 15% of these reporting four or more partners (CDC, 2014). With the study revealing the various adverse consequences of missed vaccination opportunities, adequate measures will be taken to reduce instances of missed vaccination

opportunities. The study provides relevant information that can be used to curb HPV-linked illnesses (Gamble et al., 2010). Mandatory HPV vaccination in Australia has greatly reduced the prevalence of genital warts in teenagers (Ali et al., 2013). Following this logic, it is likely that implementing HPV vaccination for adolescents in southwest Georgia would immediately begin to reduce the incidence of adolescent genital warts here as well. However, the benefits of reducing HPV-related penile, anal, and cervical cancers may take decades to be revealed (CDC, 2013).

Barriers that contribute to missed medical opportunities will be identified. The barriers to be examined include health workers attitudes, cultural barriers, compliance barriers, cost barriers, psychological barriers, and information barriers. Identification of these various barriers serves as the starting point in solving problems arising from missed vaccinations. The study will also identify ways through which these barriers can be overcome. Such solutions include adoption of relevant legislation and government policies, financial support from the government, and health workers informational drills (Goldstein, 2010). As such, the study directly suggests the solution to missed medical opportunities by identifying support that will enhance the goal of increasing primary healthcare providers' rate of recommending HPV vaccination among adolescent males.

By revealing the relationship between the likelihood of the healthcare providers to recommend HPV vaccine and the prevalence of HPV-related diseases in a rural community of southwest Georgia, this study can help to accomplish the public health goal of preventing poor health outcomes among the subject population (Gostin & DeAngelis, 2007). Basically, intervening and seeking to prevent a disease is the foundation of public primary health. In

addition, the study will generate knowledge which when disseminated to all the stakeholders could help bring about a healthier society (Gudeman, 2007).

This research aligns with the functions of public health that are necessary to deliver essential health services. The study will therefore be important in monitoring the general health status of the community. It will identify community health problems by evaluating effectiveness, accessibility, and quality of both personal and population-based health services.

The study also reinforces the need to develop policies and plans that will support individual and community health efforts. It will also inform, educate, and empower the community regarding HPV-related diseases. As such the study will add to the knowledge base regarding the HPV vaccine that is already available. This will help reduce the burden of HPV-linked diseases which includes mortality, morbidity, and high financial costs. In the US, HPV-related diseases are the most common sexually transmitted disorders. The CDC estimates that approximately \$4 billion is expended annually to prevent and treat HPV-related diseases (CDC, 2012).

By revealing problems associated with missed vaccination opportunities, the study will enable public health authorities to actively promote the adoption of a preventive healthcare approach in dealing with HPV-related diseases. These efforts by public health authorities will create awareness in the community, and the number of young men seeking the HPV vaccine will increase. The public health authority will also encourage public health providers to administer the HPV vaccine to all young men seeking medical attention at their health centers.

The study will be used as a road map that will set a guide for the development, implementation, and evaluation of HPV-related health issues. In addition, the study will be used

to understand the current behavior of healthcare providers in recommending HPV vaccines to young patients (Hoover, Carfioli, & Moench, 2000).

CHAPTER 2

LITERATURE REVIEW

Introduction

HPV infection is considered the most common sexually transmitted infection, with half of the US population contracting it at some point in their lives. As it is transmitted through sexual contact, its incidence is very high in sexually active people, especially among men who have sex with other men. Statistically, 50% or less of heterosexual men, 61% of HIV-negative homosexual men, and 93% of HIV-positive homosexual men have HPV infection (Brewer, Ng, McRee, & Reiter, 2010).

Human papilloma virus (HPV) replicates in the squamous epithelial cells of the cervix, anus, and tonsils. It can establish infection only in the keratinocytes of the skin and the mucous layer. Most infections are asymptomatic; however, in a few cases infection can lead to warts and/or cancers of the cervix, vagina, vulva, penis, oropharynx, and anus. Risk factors for infection include more than one sexual partner, use of oral contraceptives, smoking, and alcohol consumption. Use of condoms and circumcision can reduce HPV infections (Crosignani et al., 2013).

The majority of anal and penile cancers in men worldwide are associated with HPV infection. Gay men infected with HPV are 44 times more likely to get anal cancer. Gay men who are both infected with HPV and HIV positive are 60 times more likely to develop anal cancer (Newman, Logie, Doukas, & Asakura, 2013). Heterosexual men infected with HPV can increase their sexual partner's risk of developing cervical cancer. Hence, protection from HPV for men in the form of vaccination becomes essential. However, for a number of reasons, vaccination is recommended only for females and not much priority is given to vaccination for males. A

number of school-based immunization programs have been put in place due to the alarming rates of cervical cancer; however, all of these programs are targeted to adolescent girls. Including boys in school-based vaccination programs is presently considered cost-ineffective and unnecessary (Newman et al., 2013).

Preventing HPV infection can be accomplished largely through the use of two vaccines – the quadrivalent vaccine Gardasil (Merck), and the bivalent vaccine Cervarix (GlaxoSmithKline). The HPV risk-types that are targeted by Gardasil are HPV-16, -18, -6, and -11, whereas Cervarix targets only HPV-16 and -18.

Both of the vaccines have proven highly effective in preventing adenocarcinoma in-situ (AIS) in women; additionally, Gardasil also prevents genital warts, vulvar and vaginal intraepithelial neoplasia grades 1-3, and high-grade anal disease in men. However, Cervarix is cheaper compared to Gardasil and also offers longer protection – 8.4 years, compared to 6.4 years for Gardasil. Studies have also found that Cervarix can generate higher antibody titers compared to Gardasil. Despite all this data in favor of Cervarix, Gardasil is preferred due to its wider range of protection (Ma et al., 2012). The safety and efficacy of both vaccines has been very well documented, and both afford protection against 80% of all cervical cancers (Hung, Ma, Monie, Tsen, & Wu, 2008).

Critical factors in HPV vaccination include immunogenicity, safety, and clinical significance (Crosignani et al., 2013). The current option for HPV vaccination in men is the quadrivalent vaccine, Gardasil, which has been licensed for use in men since 2009. In 2011, Gardasil was approved by the ACIP for use in male adolescents aged 11-21 years for the prevention of genital warts and anal cancer. This vaccine has been proven to be more than 90% effective in the prevention of HPV infection (Newman et al., 2013).

The literature review on HPV vaccine uptake in male adolescents shows the important association between barriers and supports within primary prevention. Research shows that the primary prevention of HPV among adolescent males largely depends on the attitudes and behaviors of primary healthcare professionals, parents, and the adolescent males themselves. Barriers in any form at any level can lead to hindrances in the proper use of HPV vaccination for men. The primary challenges that exist for healthcare professionals include individual, ecological, and cognitive barriers such as doubt, confusion, and concerns regarding vaccine uptake. In addition, organizational barriers might also exist due to ignorance or financial restrictions. Restrictions can also come from the society at large in terms of capital and financial support. Primary healthcare professionals play a very important role in vaccine uptake by providing appropriate knowledge, recommendations, and resources.

As the nature and extent of these barriers has become apparent through a number of surveys conducted by various public health organizations, a number of organizations have extended their support to overcome these barriers. The greatest and most important barrier is cost, and so support in this direction has resulted in a lot of countries offering the HPV vaccine free of charge to the target population. Primary healthcare providers also play a very important role in recommending the vaccine to eligible patients and addressing their questions regarding HPV infection and vaccination. Other sources of support include state policies, regulatory bodies, and the U.S. National Vaccine Plan. In the age of technology, maintenance of electronic health records and ensuring their security and privacy also go a long way in encouraging HPV vaccination.

The theoretical framework used in this study includes the social cognitive theory (SCT), social ecological model (SEM), and the public health model. The SCT helps generate an

interpersonal collective effort in producing the desired result (Bandura, 2001). In the SEM, health-related behaviors are studied with respect to physical, social, and policy aspects (Baral, Logie, Grosso, Wirtz, & Beyrer, 2013). The public health model promotes assessment, policy development, and assurance of public health programs such as vaccination. In addition, it takes into consideration the host, the agent causing the infection, and the environment in which the agent thrives (Horvath, Misra, Epner, & Cooper, 2014). A combination of these models has been used as an evidence-based framework for prevention of HPV infections.

Guiding Theory and Framework

Health behavior theories are pertinent in offering a framework for guiding the development of such an intervention. The SCM were selected to guide this intervention within interpersonal level within the social ecological model. With the findings of this research, public health authorities will be in a position to develop outreach programs, campaigns, and policies that will eliminate the factors identified and so enhance the efficiency of public health organizations in delivering the HPV vaccine to male adolescents (Dunne et al., 2011).

It is ethical for primary healthcare providers to create awareness in their workplace to help to prevent HPV-related morbidity and mortality among adolescent males. Previous studies have focused on the roles of healthcare providers in helping young women to understand the preventive healthcare they require (Weiss et al., 1997). This study highlights these past findings and adds to the information already available.

These theories were used as roadmaps that help in guiding the development, implementation, and evaluation of this research study. In addition, they aid in comprehending current behavior of healthcare providers regarding their inclination toward HPV vaccine recommendation to adolescent males (Glanz, Rimer, & Viswanath, 2008). The social cognitive

theory was used to understand the interpersonal level of healthcare providers' inclinations in recommending the HPV vaccine for adolescent male clients. These theories are embedded within the public health framework and context.

The Social Cognitive Theory (SCT) and the Social Ecological Model (SEM)

The SCT (Rotter & Bandura, 1996 as cited in Glanz, Rimer, & Viswanath, 2008) is built on the earlier social learning theory (Miller, Dollard, & Rotter, 1954 as cited in Glanz, Rimer, & Viswanath, 2008). The SCT is a dynamic theory that emphasizes reciprocal determinism—a concept that recognizes that primary healthcare providers, the healthcare industry, and the regulatory environment are all interconnected. According to Bandura, the primary healthcare provider's behavior will be influenced by vicarious experience or observing the behavior of other healthcare providers (Andresen et al., 2010 as cited in Glanz, Rimer, & Viswanath, 2008).

The SEM also suggests that there are associations among healthcare providers, community organizations, and societal policies. Therefore, providers' inclinations in recommending vaccination among male adolescents can be influenced by various constructs such as collective efficacy, observational learning, incentive motivation, facilitation, self-regulation, and policies (Glanz et al., 2008). As such, this intervention will also seek to identify support that will enhance the goals of primary healthcare providers in recommending HPV vaccination among adolescent males.

Employing the Public Health Framework in the Research

Understanding the relationship between a healthcare provider's inclinations in recommending HPV vaccines and the rural community they serve is important within this research and could be used to accomplish the public health goal of preventing poor health outcomes among underserved and rural communities in southwest Georgia. Public health's

primary prevention objective is to intervene and seek to prevent disease before it begins. That is a core tenet of this research in missed clinical opportunities for providers to recommend HPV vaccination in southwest Georgia.

This study is pertinent to the public health framework because it aligns with public health's core functions that are necessary to maintain public health (assessment, policy development, assurance) and the deliver essential public health services that include:

- Monitoring health status to identify community health problems
- Diagnosing and investigating health problems and health hazards in the community
- Informing, educating and empowering people about health issues
- Mobilizing community partnerships to identify and solve health problems
- Developing policies and plans that support individual and community health efforts
- Enforcing laws and regulations that protect health and ensure safety
- Linking people to needed personal health services and assuring the provision of health care when it might otherwise be unavailable
- Assuring a competent public and personal healthcare workforce
- Evaluating the effectiveness, accessibility, and quality of personal- and population-based health services.

(CDC, 2013)

The study also will add to the knowledge base concerning HPV vaccinations that will help to reduce the burden of HPV-related diseases in terms of mortality, morbidity, and financial cost. Human papilloma virus is the most common sexually transmitted disease in the US and causes an estimated 26,000 HPV-cancer related illnesses in the each year. The CDC estimates the US spends \$8 billion on the prevention and treatment of HPV-related diseases (CDC, 2013).

Public health authorities are actively targeting the adoption of a preventive healthcare approach to deal with serious diseases such as HPV-related cancers. The campaign to create awareness about HPV and its effects on human health has received a great response in terms of the number of males looking to get HPV vaccinations. Primary healthcare providers are encouraged to ensure that they recommend the vaccine to all young males who seek medical attention in their facilities. Greater awareness about the virus and HPV-related cancers is one of the most reinforced messages in the campaign for cancer prevention. The Centers for Disease Control's Advisory Committee on Immunization Practices (ACIP) is keen to promote the delivery of the vaccine for all young adolescents in the United States. Cancer is not selective based on social class; thus, an effective program must be developed to solve the numerous barriers to reaching people in these rural areas with the HPV vaccine (Caskey, Lindau, & Alexander, 2009).

This research provides a framework with which to identify barriers and support the increase of provider recommendations of HPV vaccination in rural areas (Brewer et al., 2011). It is important for primary healthcare providers to create relevant awareness in their workplace to help to prevent HPV-related infections among adolescent males. Previous studies have focused on the roles of providers in helping young women to understand the preventive healthcare they require (Weiss et al., 1997). This study will highlight these past findings and aims to add to the information already available.

Although two HPV vaccines (Gardasil and Cervarix) entered clinical trials in the 1990s, literature on the subject of this research remains inadequate. Most of the literature available concentrates on vaccine uptake in females. One reason for this could be that female vaccination is given higher priority than male vaccination. This study concentrates on the attitudes and

barriers perceived by healthcare professionals and parents that hinder HPV vaccination of adolescent males, and the supports available for overcoming these barriers.

Barriers Related to HPV Vaccination

The various barriers related to HPV vaccination in adolescent males are listed below.

Informational Barriers

The greatest barrier to HPV vaccination is ignorance – lack of information and education among adolescent males, their parents, and healthcare professionals (Chan, Cheung, & Chung, 2007; Hoover et al, 2000). Most people are unaware that HPV infections can be dangerous and are directly associated with cancers such as penile, oropharyngeal, and rectal.

In one study, Chinese mothers of adolescent children were given an information pamphlet to analyze if there was a change of opinion towards HPV vaccination after obtaining the information from the pamphlet. Before reading the information pamphlet, 32% of women were found to support HPV vaccination for their children. After reading the pamphlet, however, 56% of the women surveyed changed their minds about HPV vaccination from disagreement or indecision to agreement. Out of these women, 79% accepted that their earlier indecision or disagreement towards HPV vaccination was due to a lack of knowledge about HPV infection and its potential risks. The second most common reason for not being supportive of HPV vaccination was due to fearing the potential side effects of the vaccine which indirectly stem from lack of information (Chan et al, 2007).

In another study among French women, 76.2% were aware of HPV vaccination; however, only 16.9% were aware that HPV infection in women could lead to cervical cancer. (In France, cervical cancer is the tenth most common cancer in women.) Among the women surveyed, only 54.3% were in favor of HPV vaccination, 0.9% were against it, and 37.2% were

undecided about the necessity for vaccination. Also, 14.1% of the participants said that they would rely on their healthcare provider's judgment. The survey showed that few people were aware of the recommended ages and the target population for HPV vaccination. Further, only 16% said that they had obtained information about the vaccine from their physician; 54.7% had heard about it on television (Haesebaert et al., 2012).

In southern Australia, out of 2,000 people questioned, only 40 people were aware of the cause of HPV infections (Marshall, Ryan, Robertson, & Baghurst, 2007). Another study found that about 33% of parents in the Netherlands were aware of HPV, and only 15% were aware of the link between HPV and cancer (Lenselink et al., 2008). A survey of 37 healthcare professionals in New Mexico found that lack of knowledge about HPV prevented them from counseling parents about HPV vaccination.

In the rural setting of Appalachian Ohio, among 25% of the people surveyed in this region, lack of knowledge was a very important barrier to HPV vaccination (Oldach & Katz, 2012).

Among 10th grade students in Germany, 63.6% of the children knew that HPV infection was sexually transmitted. However, only 41% of the children had received the recommended three doses of HPV vaccine. It was observed that children who had received at least one dose of the vaccine were more supportive of HPV vaccination than children who had not received even one of the three doses of HPV vaccine. The study also found that the information status about HPV vaccination was lower among boys than girls. This was thought to be due to the fact that educational campaigns about HPV vaccination are targeted towards girls rather than boys and hence boys were unaware of the dangers and risks of HPV infection. It was also seen that vaccinated individuals were more knowledgeable about HPV infections than unvaccinated

children, and this was thought to be due to information provided to the child and his/her parents about HPV infections prior to vaccination. The preferred sources of information about HPV infections among the children surveyed were their healthcare provider and their parents. It is ironic to note that the most common reason for not being vaccinated was reported to be dissuasion coming from their physicians and/or parents. Hence, educational campaigns should be targeted towards healthcare providers and parents of adolescent children (Stocker, Dehnert, Schuster, Wichman, & Delere, 2013).

A study among male college students found that most relied on information about HPV from commercials or advertisements or obtained information from their friends, or relied on news programs and health education programs. The most common sources were considered to be the television and the internet. Hence, the sources of information for most people about HPV infection and potential risks are not reliable. The college students were found to be highly uninformed about HPV and only 4.5% expressed concerns about acquiring HPV infection (Katz, Krieger, & Roberto, 2011).

In a study conducted among females attending Florida State University, knowledge about HPV infection was found to be moderate. Factors that affected the variation in HPV knowledge among these people were found to be Latin ethnicity, incidence of premarital sex, number of sexual partners, HIV testing, and history of cervical dysplasia. Sexually active people with more than one sexual partner had more knowledge about HPV than those who are opposed to premarital sex. Television commercials also worked positively to provide information about HPV vaccination. It was observed that 84% of the participants were aware of the link between HPV infection and cervical cancer. However, only 30% of the participants were aware that HPV

infection could also lead to genital warts. Sixty percent of the participants also incorrectly thought that HPV infection could lead to ovarian cancer (Gerend & Shepherd, 2011).

The acceptability levels of HPV vaccination among people in sub-Saharan African countries were found to be high in a study conducted there; however, knowledge about HPV infection and vaccination was low. Given that cervical cancer in women is among the leading causes of mortality in this region, the reach of vaccination programs is surprisingly low (Perlman et al., 2014). A lack of knowledge among the people in this region has resulted in an overall negative opinion regarding the safety of the vaccine, along with concerns regarding possible side effects. Due to serious concerns about the health of women in this region, a number of strategies have been proposed to educate the people in this region thereby increasing acceptability levels. Some of the proposed methods include HPV vaccination pilot programs, clinic- and school-based vaccination programs, community outreach programs in churches, sensitization campaigns, educational campaigns to targeted groups such as doctors, nurses, midwives, and healthcare workers, and awareness through social media and mass media (Perlman et al., 2014).

It is heartening to note that, according to a study conducted in Vietnam, a large portion of the population there is supportive and convinced that HPV vaccination is beneficial. The study also found that the people largely trusted information provided by educational campaigns conducted by the government, as they believe that the government would do nothing to harm people's health (Cover et al., 2012).

According to a 2012 study conducted by Bartolini, Winkler, Penny and LaMontagne in Peru, if adequate information was available to the people from credible sources, most of the parents did get their adolescent children vaccinated. Sources that had the most effect on the parents' decision-making process were teachers and healthcare providers. This clearly

demonstrates that information campaigns will go a long way in ensuring HPV vaccination of the entire target population (Bartolini et al., 2012).

Research has shown that a very important factor in changing the mindset regarding HPV vaccination is community sensitization meetings with parents. This has been proven to work better in rural areas than in urban areas. These meetings were found to be intense educational sessions for the parents, and they also found good information in the consent forms. These meetings also allowed them to ask questions, and to voice their fears and concerns. Some people said that they heard about the vaccine for the first time in these meetings. A few others also reported that they had made a decision to get their children vaccinated against HPV based on the discussion that took place in the meeting (Bartolini et al., 2012).

Another example of an information campaign about HPV vaccination is a multi-level, multimedia communication campaign implemented in Peru via radio stations, the local Catholic Church, press, television, and posters and banners used in health facilities and schools. Many people reported that, after having seen or heard these news items, they decided to go ahead and have their children vaccinated (Bartolini et al., 2012).

Lack of proper information about HPV vaccination can hugely affect the efforts of the government and health organizations to protect against HPV infections. Thus, educational campaigns and interventions about HPV have been highly recommended for parents and healthcare professionals.

Safety and Efficacy Barriers

Safety concerns about the HPV vaccine are another important barrier for both parents and healthcare workers. In a study conducted in the Netherlands, 1,367 participants had concerns about the safety and efficacy of the vaccine. This concern acts as a huge barrier to vaccine uptake

(Korfage, Essink-Bot, Daamen, Mols, & van Ballegooijen, 2008). Another study involving pediatricians found that the same concern prevented them from providing appropriate counseling to parents (Kahn & Bernstein, 2005). This concern could also be a byproduct of a lack of information as studies sufficiently prove the safety of HPV vaccines such as Gardasil (Gudeman, 2007). Concerns about the vaccine are also centered on potential side effects (Gerend, Lee, & Shepherd, 2007; Marshall et al., 2007; Woodhall et al., 2007).

It is readily apparent that these concerns indirectly stem from lack of information. This is true because the safety and efficacy of both HPV vaccines (Gardasil and Cervarix) have been proven time and again through studies and clinical trials. It has been shown that both of these vaccines prevent infection with HPV types 16 and 18, which are responsible for 70% of all cervical cancers. Data from clinical trials show that these vaccines are 90-100% effective in preventing the formation of precancerous cervical lesions due to infection with HPV types 16 and 18 (Fernandez, Allen, Mistry, & Kahn, 2010).

Clinical trials of both vaccines conducted in different parts of the world have shown that the clinical endpoints include cervical intraepithelial neoplasia (CIN) 2/3, adenocarcinoma in-situ (AIS), and anogenital warts, which are considered to be precursors to cervical cancer. Data from a large number of international, randomized clinical trials prove the immunogenicity and efficacy of both these vaccines. Gardasil is also shown to prevent anogenital disease caused by HPV types 6 and 11. Clinical trials and post-marketing safety monitoring measures have shown that both the vaccines are reasonably safe and well-tolerated. This has been further supported by data from the Center for Disease Control and Prevention (CDC) in the US, and the World Health Organization (WHO) Global Advisory Committee on Vaccine Safety. The CDC has also conducted post-licensing studies to evaluate the safety of Gardasil, and no adverse events have

been seen to occur due to the vaccine. Despite these studies and trials, there are still a great number of people who have concerns about the safety of these vaccines, and hence refrain from having their children vaccinated (Fernandez et al., 2010).

Studies have effectively shown that because both of the HPV vaccines, Gardasil and Cervarix, are comprised of non-infectious virus particles, the vaccine in turn is non-infectious and safe. Both vaccines have been shown to elicit strong antibody responses, thus proving their efficacy. It has been noted, however, that the vaccines are not very effective in people who have already acquired HPV infection through sexual contact. Hence, it is important that children get vaccinated against HPV before they reach sexual maturity. Regarding safety of the vaccine, studies show that the most common side-effects after HPV vaccination include erythema, pain at the injection site, and swelling. One serious consequence of HPV vaccination was that a small number of women who became pregnant within 30 days of vaccination underwent spontaneous abortion. If a woman gave birth after conceiving within 30 days of vaccination, the children were found to have congenital abnormalities. This further reinforces the fact that adolescents should get vaccinated against HPV before commencing sexual intercourse (Moscicki, 2008).

Another concern for parents was that it would send the wrong message to their children regarding sexual practices or age for initiation. A study conducted among healthcare providers in Texas found that about 50% parents were averse to HPV vaccination due to concerns regarding safety, negative media reports, and the concern that vaccination would encourage premarital intercourse (Fernandez et al., 2010).

Among 10th grade students in Germany, about 30.8% of the participants were unvaccinated due to concerns about the vaccine's safety and potential side effects. About 9% of the participants also considered the HPV vaccine to be relatively new and that more research was

needed to explore its safety (Stocker et al., 2013). In France, almost 55% of the participants were averse to HPV vaccination due to concerns about possible side effects and the newness of the vaccine. Another factor was distrust that stemmed from a controversy, also in France, regarding a link between hepatitis B vaccination and multiple sclerosis after a mass hepatitis B immunization campaign in 1994 (Haesebaert et al., 2012). Similar trends are observed in high-income countries such as the UK and the US where people have trust issues regarding a vaccine's safety in addition to questioning the motives of pharmaceutical companies and governmental health agencies in promoting vaccination. People also fear that the vaccine will not be effective long term. These people tend to have issues with all vaccines and find it difficult to come to terms with the fact that a vaccine is an inactive form of an infectious organism (Ferrer, Trotter, Hickman, & Audrey, 2014).

On the bright side, among the people of Denmark, attitudes towards HPV vaccination were mostly positive and arose from a general confidence in the safety and efficacy of the vaccine. However, a lot of parents expressed the need to have more information about the action and safety of the vaccine before proceeding with vaccination. A majority of the parents were not worried about vaccination encouraging unsafe sexual practices as they believed that both men and women were responsible for taking care of their health and protecting themselves from sexually transmitted diseases (STDs) (Mortensen, 2010).

In Hong Kong, 51.2% of the people regarded vaccine safety as an important criterion for choosing a vaccine. The other criteria were strength of protection, life-long immunity, and a good antibody response. Even among physicians, the same trend was observed. As many as 78.6% of adolescents reported that their parents refused to get them vaccinated against HPV due to safety concerns (Wong, Lee, Ngai, Chor, & Chan, 2013).

In Canada, only 65.1% of parents agreed to have their children vaccinated against HPV, as opposed to 85% who agreed to vaccination for hepatitis B and meningitis C. Almost 50% of those who had agreed to HPV vaccination said that their main reason for consent was belief in the effectiveness of the vaccine. On the other hand, about 33% of the parents who were against HPV vaccination said that their main reason for not agreeing to have their children vaccinated was concerns regarding the safety of the vaccine. About 46.3% of the parents who were against vaccination also said that if they had more data about the safety of the HPV vaccines, they would be able to make an informed decision regarding vaccination (Ogilvie et al., 2010).

This barrier has a lot of implications for HPV vaccine policies, as it is not a financial or organizational barrier that can be dealt with on a single level. Although vaccine programs are fully funded as a part of school-based immunization programs in many countries, almost 35% of the parents choose not to have their children vaccinated due to safety and efficacy concerns. In a study conducted in Manchester, UK, parents identified vaccine safety as a major factor for not supporting HPV vaccination. This trend is true for a large number of regions around the world according to studies conducted in these places (Ogilvie et al., 2010).

Efforts to overcome this barrier have been implemented in a number of places. One example is British Columbia, Canada, where vaccine education programs were conducted to address vaccine safety and efficacy issues via a number of platforms such as the www.immunizeBC.ca website, distribution of two sets of DVDs highlighting the safety of HPV vaccines—one set for parents and the other set for adolescents—and pamphlets, brochures, and local information sessions for both parents and healthcare providers emphasizing the safety and efficacy of both HPV vaccines. Also, the Canadian National Advisory Committee on Immunizations was involved in strongly recommending this vaccination for adolescents. Despite

these efforts, it is distressing to note that a lot of parents were undecided about HPV vaccination and reported that they needed more information to come to a decision (Ogilvie et al., 2010).

Psychological Barriers

Psychological barriers are comprised of personal or emotional discomfort regarding HPV vaccination. These barriers can be from the side of the healthcare professionals regarding interactions with parents or guardians (Dempsey & Davis, 2006; Kahn & Bernstein, 2005; Sussman et al., 2007), or from the side of parents and adolescent males regarding the encouragement of promiscuity due to HPV vaccination (Marshall et al., 2007; Woodhall et al., 2007). Such barriers could also arise from lack of knowledge or cultural barriers of the patients.

In Ireland, an attempt to understand the general practitioners' and nurses' attitudes towards recommending the HPV vaccine to their patients found that a number of concerns inhibited them from doing so. Some of those concerns included starting a discussion about HPV infection with their female patients, appropriateness of the situation in which to offer HPV vaccination, and addressing patients' questions regarding HPV. This can hugely affect the attitudes of the patients towards HPV vaccination for women. Their GP's attitude influences their own prevention behaviors. Most healthcare providers surveyed said that it was easier to talk about HPV with their patients if the discussion was indirectly started by them in terms of Pap smear testing or risk factors for cervical cancer. These providers rarely performed a routine HPV tests on their patients. Also, the providers seemed to be influenced by gender differences, thinking that only women should perform an HPV test for another woman (McSherry et al., 2012).

According to a study, a lot of practitioners consider the topic of HPV to be "sensitive" and "awkward" because it relates to sexual practices and the prevention of STDs. There were

concerns about embarrassment and awkwardness with their patients. This made the practitioners beat around the bush with regards to this topic or avoid it altogether. Another factor was patients' reluctance to discuss the topic due to social influences. They were also worried about the consequences if the topic of HPV was raised and the patients might subsequently avoid Pap smear testing altogether. A number of nurses said that if they raised the topic of HPV with their patients, they would consider it as passing judgment on their sexual practices and this would be considered professionally inappropriate. The providers' concerns about the appropriateness of the topic might not be completely without reason as a survey conducted in Ireland found that women were reluctant to go for Pap smear testing as they considered it a sign that they were sexually active. Also, when women found out about the link between HPV and cervical cancer, they "were shocked, angry, and felt that this was a 'secret' that the medical community had kept from them" (McSherry et al., 2012).

A study that aimed to examine the effects of gender bias on the decision to go for HPV vaccination found that women who are less educated, older, uninsured, homeless, migrants, lesbians, obese, or have language problems are less likely to go for Pap smear testing. In China, a woman is considered inferior to a man, and so women are generally deprived of medical health facilities and regular checkups. Also, women who are lesbians often have to deal with the fear of discrimination and hence, shy away from taking medical advice or initiating discussions about the risks of unhealthy sexual practices. A survey in Canada found that lesbians have a much poorer health status as compared to heterosexual women. This result is true for the US and the UK as well: "In the UK, lesbian women are more likely to avoid screening than heterosexual women, and more likely to have never attended screening than American lesbian women." In the UK, it has been seen that negative Pap smear test results can lead to stigma, guilt, and

embarrassment, and might work negatively in having the patient go for treatment (Brankovic, Verdonk, & Klinge, 2013).

Another study analyzed the perceptions and beliefs of mothers of 11 to 12-year-old children had concerning whether or not to get an HPV vaccination. Factors influencing this decision included parents' experiences and beliefs regarding vaccination in general, discussions with healthcare providers, friends, and family members regarding HPV infection and vaccination, and information provided by media about HPV vaccination. However, it was found that "mother's health-related beliefs and experiences were the most frequently noted factors in the decision to vaccinate daughters." Regarding the age group for which the vaccination is most appropriate, one mother noted that "I feel if it's gonna protect her when she becomes sexually active, do it now. Because with today's day and age you never know when they're going to start having sex." Other positive influences came from a family history of cancer, HPV infection, or other STDs (Griffioen et al., 2012).

Factors that affected the uptake of HPV vaccination included perceptions about what others thought about HPV vaccination, discussion with adolescents regarding HPV infection and its mode of transmission, knowledge about a patient's sexual history, and discomfort in talking about HPV with female patients. The study found that about 10% of pediatricians were unlikely to recommend the vaccine to their patients, and only 46% of the providers were ready to administer the vaccine to their patients. Factors that help patients choose to get vaccinated against HPV include HIV testing in the past, having multiple sexual partners either in the past or present, a family member suffering from cancer, and level of acceptance of the vaccine in the family (Gamble et al., 2010).

Another study found a relationship between emotional responses and societal influences and the decision to get vaccinated against HPV. Most of the participants said that their emotional responses on hearing about HPV varied from shock to concern, depending on how the information was given to them. They seemed to think that talking about vaccination against HPV was more likely to invoke positive reactions than dwelling on the link between HPV and cervical cancer. They thought that the general perceptions and beliefs of the society regarding HPV vaccination also depended on how the information was put across to them. This was because talking about vaccination provided them with a way to prevent cervical cancer in the future rather than judging their current sexual practices and scaring them about HPV infections, STDs and cervical cancer (McRae, Martin, O’Leary, & Sharp, 2014).

Other factors that were important in having the practitioners discuss HPV with their patients included their concerns about the safety of the vaccines, having or not having daughters, negative media publicity about HPV, personal thoughts and beliefs about vaccination in general and HPV vaccination in particular, embarrassment in not being able to answer patients’ questions correctly, and considering it inappropriate to talk about sexual issues with their patients (McSherry et al., 2012).

Among the Dutch, the attitudes and perceptions towards HPV vaccination were influenced by factors that included religious beliefs, perception of risks associated with vaccination, expectations of either positive or negative outcomes, anticipation of regret after vaccination, opinions about alternative medicine, and confidence levels in the authorities promoting HPV vaccination. Beliefs such as “The HPV vaccination was only introduced because the pharmaceutical industry will earn a lot of money from it,” “My daughter is too young to receive the HPV vaccination,” and “My daughter does not need to get the HPV vaccination if she

is already sexually active” had a very strong influence on peoples’ decision regarding HPV vaccination. The perceptions and beliefs of friends, general practitioners, physicians, nurses, people from the municipal health service and the Ministry of Health, spouses, parents, and other family members mattered when deciding whether or not to vaccinate children against HPV (Keulen et al., 2013).

A major cause for concern is parental beliefs that getting their child vaccinated against HPV will encourage risky sexual behaviors. Apart from this, conservative religious views, moral issues about sexuality, not considering their child to be at risk for acquiring HPV infection, previous negative experience(s) with vaccination, and parent-child communication about safe sexual practices also influence parents’ decision to get their children vaccinated against HPV (Gamble et al., 2010).

All these studies point toward an emerging need to provide support to healthcare providers in discussing HPV infection and vaccination with their patients. Efforts should be targeted towards both male and female healthcare providers and should help them in discussing HPV with their female patients, recommending HPV vaccination in appropriate cases, and answering patients’ questions about HPV (McSherry et al., 2012).

Cultural Barriers

Cultural barriers such as race, ethnicity, socioeconomic status, education levels and health insurance status can stand in the way of HPV vaccination (Sussman et al., 2007). According to Daley, “Across racial/ethnic groups, factors associated with vaccine acceptance among men include knowledge of HPV, perceived threat, and perceived barriers to HPV vaccine” (Daley et al., 2011).

This barrier is important because studies show that Black and Hispanic people are more often diagnosed with HPV-related cancers than people belonging to other ethnicities. It has been noted that Hispanic people have stronger intention to go for HPV vaccination than non-Hispanic people; however, very few Hispanic people have access to a healthcare facility where they could actually get vaccinated. Also, after informational sessions, about 43% of the people belonging to minority groups said that they were unable to grasp or comprehend the information completely. A survey conducted in 2007 showed that only 1% of Hispanic women had acquired at least one dose of the vaccine (Daley et al., 2011).

A study of people of Hispanic origin in New Mexico showed that healthcare professionals had to consider cultural beliefs of the patient with respect to HPV infections and vaccination before recommending the vaccination to them (Vanslyke et al., 2008). For example, most Hispanics, as a result of their cultural beliefs, do not use condoms during sexual intercourse and thus can expose their partner to the risk of HPV infection. Another study found that healthcare professionals also had concerns regarding their patients' strong religious views or beliefs about healing or general distrust of healthcare facilities (Tissot et al., 2007).

A very important factor that can serve as a barrier to HPV vaccination is social beliefs and values, particularly those relating to sexual practices and behaviors. These concerns were found to influence healthcare providers in recommending the vaccine to parents of adolescent children. On one hand, they were more inclined to recommend the vaccine if they suspected people of belonging to a group where sexual intercourse with multiple partners was common; however, they seemed to be reluctant to discuss sexual issues with their more conservative patients. This also acted as a deterrent to many parents who did not want to discuss sexual issues with their children or who did not want to accept that their children will soon become sexually

active and the importance of protecting them against sexually transmitted diseases (STDs) (Ferrer et al., 2014).

An interview with a school nurse in Sweden revealed that when people belonged to a strict cultural background where premarital sex is taboo, it was difficult to talk to them about the dangers of intercourse with multiple partners. They felt that if this vaccination was given to their children, they would get the wrong signal regarding sexual practices and this would encourage them to try intercourse before marriage. This is also true for religious faiths that are strictly against premarital sex and hence do not consider this vaccination necessary. In these scenarios, a concern for adolescents is that if they talk about this vaccination, their parents and family members might think that they are having illicit sexual relations (Ferrer et al., 2014).

Women in Hong Kong also have similar concerns about HPV vaccination and premarital sex. They also see the HPV vaccine as a potential threat to the health of their children and consider it unnecessary. This attitude also arose due to the lack of fruitful discussions regarding the necessity and efficacy of the vaccines with their healthcare providers (Siu, 2014).

The perceptions of African Americans toward HPV vaccination included a number of barriers that prevented them from taking the step. However, the fear of their children initiating sexual intercourse after vaccination was not very prominent. They believed that children will engage in sexual relations whenever they feel ready and it has nothing to do with their vaccination status. Religious issues were also not a problem here as they felt that religion had its own place in one's life; however, it should not bear upon the decision to take care of one's health (Thompson, Arnold, & Notaro, 2012).

The attitudes of Latinas towards HPV vaccination are important because Latinas usually present with higher rates and severity of cervical cancer compared to non-Latinas. It was found

that only 59% of the participants thought that HPV vaccination could effectively prevent HPV infection. The Latinas' lack of knowledge and awareness about HPV could be attributed to "lower education, low English language acculturation, and lack of exposure to media messages" (Luque et al., 2010).

Among girls belonging to ethnic minority groups, ethnic differences played a very important role in awareness about HPV and other beliefs regarding immunization. Only 63% of the surveyed people had even heard about HPV and only 12% had been vaccinated against HPV. It was also seen that African Americans and Chinese participants were not very supportive of including the HPV vaccine in a school-based immunization program. A huge barrier for these people was lack of information about HPV and its associated risks. A few participants also had concerns that it would negatively damage their child's health or lead to fertility problems in the future (Bastani et al., 2011).

The prevalence of HPV vaccination among minority groups in the UK showed that the uptake of vaccination varied by ethnicity – the highest rates were observed among Asians, followed by White people and finally Black people. The rate of acceptability of the vaccine was 76% among White people compared to 61% among non-White people. The lowest levels of acceptance (11-24%) were seen among South Asian parents. Religious beliefs about not having premarital sex also played a role in influencing parents' decision regarding HPV vaccination (Marlow, 2011).

Another study found differences in HPV vaccination status vary with ethnicity. This study showed that the chances of African American women going for vaccination were much lower than those of White women. Also, Asian women were less inclined towards HPV

vaccination compared to White women (Fisher, Trotter, Audrey, MacDonald-Wallis, & Hickman, 2013).

Some healthcare providers feel reluctant to talk to ethnic minority groups about vaccination if they feel it would go against the patient's culture. There is additional resistance due to the Tuskegee syphilis experiment in which African Americans in the USA were used for studying the progression of syphilis without their knowledge or consent. Hence, a number of minority groups mistrust the motives of healthcare professionals in recommending vaccination (Ferrer et al., 2014).

Studies also show that women coming from low-family-income households are less likely to complete their HPV vaccination course. Also, women coming from deprived households were more often not HPV vaccinated (Fisher et al., 2013).

Barriers are not seen only in the low-income groups or people who do not have access to information. A low level of compliance for HPV vaccination is also observed among people who have a high income and access to good educational facilities. These people have been observed to give little importance to the risk of acquiring HPV infection and hence they do not consider it necessary to go for vaccination (Hopenhayn, A. Christian, Christian, & Schoenberg, 2007; Woodhall et al., 2007). Some healthcare professionals in the US feel that HPV is not an infection that could be transmitted or prove dangerous in a school setting and hence believe it is not necessary to introduce HPV vaccination as part of school-based immunization programs. According to a pediatrician in US, "It would not be a school or a public-health issue, but more of an individual issue." This further reduces the convictions of parents that HPV vaccination is necessary for their children (Ferrer et al., 2014).

Gender is another issue as most of the marketing strategies and informational campaigns have concentrated on women, making men feel unsure about the necessity of the vaccination. Most people feel that HPV infection is a “woman’s disease” and is not relevant to men, and so do not think about the vaccination for their adolescent male children (Daley et al., 2011).

Healthcare providers have taken a number of measures to overcome these cultural barriers by bringing in more bilingual and bicultural staff, concentrating on recruitment of diverse staff, and reaching out to minority groups through their community organizations (Daley et al., 2011).

Financial Barriers

Gardasil, which is an HPV quadrivalent (types 6, 11, 16 and 18) recombinant vaccine, is the most expensive vaccine recommended for genital warts, being priced at \$360 for the total regimen (Gudeman, 2007). Research shows that health insurance does not cover the entire cost of the vaccine (Hopenhayn et al., 2007). Hence, the financial constraint coupled with lack of information makes it difficult for people to make an informed decision.

Although low-income women are more likely to develop cervical cancer, they are much less likely to complete the HPV vaccination course than high-income women (Vadaparampil et al., 2013). A study of low-income participants found that only 58% of them could afford the entire cost of the vaccine. Thus, most of the women would go for the first dose after an intense discussion with a practitioner or an informational session about HPV vaccination; however, the high cost of the vaccine slowly eats away the motivation to go for the second and third doses (Kahn et al., 2008). Another study found that cost was a huge barrier to vaccination. Participants in the 18-22 age group said they were unlikely to go for vaccination if they had to bear the costs. Most of them only got vaccinated because their parents paid for it (Mortensen, 2010).

The same trend was seen even in high-income countries like the US. Participants in U.S. said that the cost of HPV vaccination was \$135 for each of the three injections and this was either partially covered or not covered by insurance (Ferrer et al., 2014). Another study found that about 24.4% of people considered insurance coverage and 14.6% considered cost to be a deciding factor in the decision to acquire vaccination against HPV (Zimet, Weiss, Rosenthal, Good, & Vichnin, 2010).

The financial burden also falls on the healthcare providers in buying the vaccine because of the chance that patients might not buy the vaccines from them (Dempsey & Davis, 2006). In the US, healthcare providers face a huge financial burden in providing HPV vaccines to their patients in terms of money as well as time. According to a practitioner in the US, “There is no way vaccines are cost-effective for us. It costs the US an incredible amount of money in terms of time.” Other financial concerns include high costs of buying vaccines in bulk, lack of healthcare insurance, and insufficient reimbursement by the insurance companies (Ferrer et al., 2014). One study found that 36.5% of the physicians considered cost of stocking vaccines as a barrier, 47.4% considered inadequate reimbursement a barrier, and 40.2% considered lack of timely reimbursement a barrier in buying and recommending HPV vaccines (Malo et al., 2013).

Practitioners in Sweden were reluctant to bring up the topic of HPV vaccination with their patients if they felt that the patients couldn’t afford it. They considered it an ethical issue and against their morals to put their patients in a position where they were forced to spend a large amount of their money on something their practitioner thought was important, but not immediately vital. This hugely deterred practitioners from talking about HPV infection and vaccination with their patients (Ferrer et al., 2014).

Most people are not ready to pay more than \$100 for the HPV vaccine. About 70% of the participants reported cost to be a barrier for HPV vaccination (Daley et al., 2011). Another study found that about 41.3% of the participants were less likely to go for HPV vaccination due to the high costs (Patel et al., 2012).

In the US, only 56% of the people who took the first dose of the HPV vaccine went on to complete the course. The reasons for not completing the series included lack of insurance and low family income. About 76.4% of the participants said that they wanted it at a lower cost or at no cost, compared to only 20% of the participants who were ready to pay the entire cost of the vaccination (Laz, Rahman, & Berenson, 2013).

In India, Gardasil has been introduced at a cost of \$171 for three injections and thus it remains largely out of reach of most middle- and low-income families. Countries such as India have considered the possibility of local production of the vaccines at reduced costs. However, issues such as patents and technology can become a hurdle for this kind of advancement (Padmanabhan, Amin, Sampat, Cook-Deegan, & Chandrasekhran, 2010).

Many people in Hong Kong are deterred by the high cost of the vaccine. In Hong Kong, the vaccine costs between \$321 and \$514 US. The fact that the vaccine was not included in the government's child vaccination scheme influenced people to think that it was an unnecessary expense. People in Hong Kong are of the mindset that the extremely important vaccines would be available free-of-cost (Siu, 2014).

As most of the marketing efforts of pharmaceutical companies manufacturing HPV vaccines have been targeted to women, it is not surprising to note that a number of immunization programs are available only for girls. A very important reason for this gender difference is financial constraints. A study conducted by Pearson et al. in 2014 in the US found that including

adolescent boys in school-based immunization programs would be extremely cost-ineffective. This could only work if the costs of the vaccine and its administration were extremely low. An initiative by the Australian health authorities in 2013 made HPV vaccination free and available to boys, and this step has attracted a lot of criticism with regards to its cost-effectiveness (Pearson et al., 2014).

In Florida, if more physicians participated in the Vaccines for Children (VFC) program, their financial burdens regarding HPV vaccination would be significantly reduced. A survey conducted in 2007 found that the amount of reimbursement received for the cost of a vaccine plays a very important role in recommending the vaccine to a patient, with inadequate reimbursement resulting in a 55% less likelihood of recommending the vaccine. The VFC program provides free-of-cost vaccines for children who are eligible for Medicaid, Native American or Alaskan, or uninsured. This program allows even private practitioners to administer the vaccine to their patients (Malo et al., 2013)

Statistics show that about 80% of cervical cancer cases are reported from the poorer nations, and this is due to unavailability of vaccination due to financial constraints (Katz et al., 2010). A number of countries have begun offering the HPV vaccination free-of-cost as part of school-based programs or other immunization programs. Australia was the first country to start a school-based vaccination program for children ages 12-13 years in 2007 (Ferrer et al., 2014). The Danish National Board of Health started a childhood-immunization program in 2009 for 12-year-old girls, and a catch-up vaccination program in 2008 for girls ages 13-15. Women ages 16-26 years had to pay 470 euros to get vaccinated (Mortensen, 2010). Similar programs have also been introduced in the US, the UK, Sweden, and Canada (Ferrer et al., 2014).

Initiatives have also been taken by the World Health Organization (WHO) through its Cervical Cancer Prevention and Control Costing (C4P) tool that was developed to improve accessibility to the HPV vaccine in middle- and low-income countries. This tool has helped countries get financially prepared for expenses such as service delivery strategies, and large-scale transportation of vaccines and health workers in establishing a nation-wide immunization program. This tool was developed in response to a request for assistance from the Ministry of Health and Social Welfare (MOHSW) in Tanzania for the estimation of the cost for the introduction of HPV vaccination in the country. This tool provides a country-specific report on the estimated costs of additional resources for the incorporation of HPV vaccine to existing immunization programs over a 5-year time period. Based on estimates obtained from this tool, 1.6 million of the 2.4 million girls in Tanzania had received the complete series of HPV vaccination over a period of five years. This is similar to other initiatives such as Program for Appropriate Technology in Health (PATH) in India, Uganda, Peru, and Vietnam, and a program that the London School of Hygiene and Tropical Medicine (LSHTM) implemented in Mwanza province in Tanzania (Hutubessy et al., 2012).

Compliance Barriers

The highly recommended HPV vaccine, Gardasil, is a three-dose vaccine requiring the first, second, and third doses at zero, two, and six months, respectively (McIntosh, Sturpe, & Khanna, 2008). This often becomes a challenge for people with limited access to transportation and little ability to take time off work (Herzog, Huh, Downs, Smith, & Monk, 2008). In a study analyzing the attitudes of people living in Denmark towards HPV vaccination, one of the reasons that came up for not getting vaccinated was that it was “too inconvenient to have three injections within six months” (Mortensen, 2010).

The fact that the vaccine must be kept in cold storage and the number of doses required were a huge barrier to vaccination programs. According to one of the participants, “reducing doses and reducing our reliance on the cold chain, those are the general directions we would like to see it go.” The healthcare providers also seemed reluctant in transporting staff and vaccines every few days for vaccination programs. The problems they faced were insufficient human resources in terms of limited health workers and capacity of the staff. According to the providers, it often becomes a challenge to cover three doses for an entire population (Wigle, Coast, & Watson-Jones, 2013). Problems also arise at the physician’s end in terms of availability and scheduling a patient three times for HPV vaccination (McIntosh et al., 2008).

Reaching eligible girls to deliver HPV vaccination is often quoted as a challenge by most healthcare providers. In the case of school-based vaccination programs, poor planning strategies, and proper documentation were major hurdles in achieving 100% vaccination rates. According to one of the people involved in a school-based vaccination program, “It is a big challenge to adequately and effectively document the accepted names and the numbers of girls who received dose one, who received dose two, and who received dose three.” A further challenge was to make sure that even those children who were absent on the day the program took place in the school get covered (Wigle et al., 2013).

School-based vaccination programs do not work in countries where school enrollment and attendance are very low. In Uganda, although school-based vaccination programs were carried out in combination with existing child public health days, only 52.6% coverage was achieved. In Vietnam, community health-center-based immunization programs proved to work better than school-based immunization programs (Wigle et al., 2013).

A small percentage of the people faced problems in going to the health center for three injections, getting a leave of absence from work or school, and lack of adequate transportation facilities. Also, only 50% of the participants said that they had a place where they could go to get vaccinated (Daley et al., 2011). Another study found that women who are at high risk for cervical cancer do not have access to healthcare facilities mainly due to lack of transportation (Scarinci et al., 2010).

A disturbing study in Somalia found that most of the patients who initiate HPV vaccination do not complete it. Also, those who do return for the second and third doses do not do so in the recommended time interval. The reasons for this have been postulated to be lack of access to the healthcare system and language barriers (Pruitt, Reese, Grossardt, Shire, & Creedon, 2013).

Another study conducted in 2013 evaluated the accessibility of healthcare centers for children living in Los Angeles and if proximity to safety-net clinics had any influence on the decision to get vaccinated against HPV. This study was inspired by previous studies showing that lack of access to healthcare services can be an important factor in dissuading people from undergoing vaccination. The study found that about 90% of Latina girls had easy access to a healthcare center, compared to 68% of Chinese girls and 70% of Korean girls. Also, it would take three times longer to go to a healthcare center by public transportation than in a personal vehicle. Hence, not owning a vehicle and relying on public transport can work negatively in making a decision to get vaccinated against HPV (Tsui et al., 2013). About 58% of physicians in Hong Kong reported that it was very difficult to get the patients to visit the clinic for their second and third doses of HPV vaccination, and 51.8% of the physicians said that the patients considered it time-consuming to come for multiple doses (Wong et al., 2013).

Among the people of Appalachian Kentucky, lack of transportation and prioritizing work and school over health are major barriers to HPV vaccination. According to a participant, “Me and my fiancé, neither one have a driver’s license, so we don’t have a car... We’re dependent on my mother to take us [places].” Even people who had access to transportation facilities considered lack of transportation to be a major barrier. Many women tend to place other responsibilities like caring for a newborn child over HPV vaccination. Also, full-time work can take up a lot of time in a person’s life and can lead to neglect of one’s health – “I work six days a week... from 9 a.m. until 8 p.m. in the evening, so it’s hard to make time for HPV vaccination” (Mills, Head, & Vanderpool, 2013).

A study conducted in 2011 examined the levels of adherence to the HPV vaccine dosing schedule. The study found that very few people stuck to the recommended time interval for the second or third doses; most of them were either early or late for their scheduled visits. The reasons for not completing the vaccination course were adverse events or side effects after the first dose of vaccine, and the influence of the attitudes and beliefs of general practitioners or family members. Other common factors included forgetting about the appointment for subsequent doses of vaccination, lack of insurance, and inability to take time off work or other responsibilities (Widdice, Bernstein, Leonard, Marsolo, & Kahn, 2011).

Most practitioners did not find the time during a routine consultation to explain in detail about the risks of HPV infection and the availability of HPV vaccination to their patients. According to one general practitioner, “You know, we’re asked to promote diabetes management and we’re asked to promote smoking cessation and things like that so there’s so many other things that we’re trying to fit in.” As reported with other studies, practitioners found it difficult to encourage patients to complete the three-dose schedule of HPV vaccination. Patients often

simply forgot to return to the clinic for subsequent doses or didn't have the time to do so (Mazza, Petrovic, Grech, & Harris, 2014).

One surprising barrier that was found to affect a general practitioners willingness to talk about HPV vaccination with a patient was the practitioners' physical work environment. This included issues such as vaccine availability in the clinic, established routines for vaccine administration, and availability of nurses for vaccine administration. If the vaccine was not available on site, it usually became difficult to encourage patients to purchase the vaccine and come back for another appointment to have it administered (Mazza et al., 2014).

Among college students in Taiwan, situational influences could affect a person's decision to go for HPV vaccination (Kuo, Yeh, Sheu, & Wang, 2014). Results from the National Immunization Survey-Teen conducted in 2009 showed that only 26.7% of the participants had completed the course of HPV vaccination. Initiatives have been taken to encourage vaccine-only visits among patients, along with reminders to visit the clinic for the second or third dose of vaccination (Sudenga, Royse, & Shrestha, 2011).

Initiatives such as making the vaccine available at community locations such as Walmart and community colleges have been considered. A lot of people seemed supportive and thought that it could do away with barriers such as access to transportation and everyday responsibilities (Mills et al., 2013). In order to address the issue of patients not returning for subsequent doses of HPV vaccination, efforts to establish a recall system or contact patients via practice nurses are under way (Mazza et al., 2014).

Supports Related to HPV Vaccination

The following supports are available for HPV vaccination in adolescent males.

Financial Supports

In accordance with the recommendations for HPV vaccination and faced with alarming rates of HPV infection and cervical cancer, many countries have taken steps to encourage people to go for HPV vaccination. The first step was taken by Australia, when it started offering a school-based vaccination program in 2007 for all girls age 12-13 years. This was soon followed by other countries including the UK, Sweden, and Canada. In the US, young women who are eligible for insurance through Medicaid, are uninsured, or underinsured can get vaccinated against HPV free-of-charge. However, school-based immunization programs are still in the discussion phase in the US as, according to Ferrer, “policy makers in the USA were not clear that a school-based mandate for the HPV vaccine was appropriate” (Ferrer et al., 2014).

The cost of the vaccine not only affects the patient’s decision, but it also affects the physician’s decision to buy and recommend the vaccine. The Vaccines for Children (VFC) program has been developed to “remove cost as a barrier for the immunization of children.” This program is federally funded and it offers free vaccines for Medicaid-eligible children, Native American or Alaskan children, and uninsured or underinsured children. Vaccines are bought from the manufacturers at a very low cost and distributed among physicians free-of-charge to encourage them to vaccinate all their eligible patients (Malo et al., 2013).

In Denmark, the quadrivalent vaccine is offered free-of-charge to 12-year-old girls, and to girls ages 13-15 under the catch-up immunization program. The Danish National Board of Health has also taken the initiative to inform all eligible girls by mail to encourage maximum

coverage of vaccination. This has ensured about 67-76% rates of vaccination among girls born from 1993 to 1995 (Mortensen, 2010).

Provider Encouragement and Recommendations

It has been shown that the success of HPV vaccine in controlling the incidence of cervical cancer in women largely depends upon the rate at which pediatricians recommend the vaccine to parents of their eligible patients. Overall, physicians' attitudes towards the vaccine seem positive, and in a number of places they are found to actively recommend the vaccine to their patients (Krieger, Katz, Kam, & Roberto, 2012).

There are three types of healthcare providers who routinely recommend the vaccine to patients aged 9 – 26 years; pediatricians, family physicians, and obstetricians. Data obtained from this survey showed that 34.6% of physicians recommended the vaccine to early adolescents, 52.7% recommended to middle adolescents, and 50.2% recommended the vaccine to late adolescents. Also, according to this study, "Pediatricians were significantly more likely than family physicians and obstetricians to "always" recommend HPV vaccination for almost all female age groups" (Vadaparampil et al, 2011).

It is well known that provider recommendation is a strong predictor of whether a parent decides to vaccinate a child against HPV. Studies show that 55% of parents who have received a physician's recommendation vaccinate their sons against HPV, as compared to only 1% of parents who had their son vaccinated but had not received a physician's recommendation. According to this study, "Physician recommendation and education about HPV vaccine for males may be key strategies for improving vaccination" (Reiter et al., 2013). According to another study, "Recommendation of HPV immunization by primary care physicians (PCPs) has

been recognized as one of the most influential factors in the individual's willingness to receive the vaccine" (Wong et al., 2013).

Support from EHRs and Health Information Systems

The importance of health information systems in vaccination is the "timely availability of sound data." These systems are responsible for the generation, analysis, and dissemination of such data to the concerned people for appropriate action. This data can also be used to influence research, policy making, and program generation. It uses data-generation methods such as household surveys, censuses, and administrative returns to identify the number of children who have not been vaccinated. This data is then analyzed for research purposes, to find out the prevalence of vaccination in a certain population and to identify trends and/or barriers. This information can then be used to improve the uptake of vaccines (AbouZahr & Boerma, 2005).

In the US, technologies including text messaging, email, social media, and electronic health records are used improve immunization rates. Improvements in the field of Health Information Technology help in the identification of children who have not been vaccinated and alert their parents of their child's immunization schedule. According to current data, "The Health Information Technology for Economic and Clinical Health (HITECH) Act, part of the American Reinvestment and Recovery Act of 2009, included monetary incentives tied to meaningful use of Electronic Health Records (EHRs)" (Stockwell & Fiks, 2013).

A number of interventions have been put in place to aid immunization uptake by the target population. One of the interventions involves electronic health record-derived immunization prompts that alert the physician when an unimmunized patient visits the clinic. Another intervention involves sending quarterly reports to the physician regarding the

immunization status of his/her patients, enabling the physician to send reminders to the unimmunized patients (Bundy et al., 2013).

Support from Healthcare Information Security and Privacy

Using electronic means to document patient data requires the collection of extensive personal and health-related patient information. This kind of data collection and storage can compromise privacy and can be used against him/her in insurance, employment, and government programs. For these reasons, the Model State Public Health Privacy Act provides guidelines to protect public health data, at the same time allowing state and local public health departments to use the data for the common good (Gostin, Hodge, & Valdiserri, 2001).

In particular, the American Recovery and Reinvestment Act (ARRA) of 2009 significantly focused on the issues of security and privacy of healthcare information. Before the enactment of the ARRA, the topic of information privacy had been stressed by the U.S. Government Accountability Office (GAO) and its efforts have led to stricter guidelines. This Act has increased the control an individual has over his/her health information and the individual can also restrict disclosure of this information. It also requires the signing of business associate contracts if the health information of a person needs to be shared with business associates for research purposes (Goldstein, 2010).

The fear of breach of privacy resides not only with the patients, but also with the provider. Providers are often wary of revealing their patients' data to third parties for fear of misuse of the information. According to a study, "Providers under-report notifiable disease cases to public health agencies." These concerns have been taken care of by the Canadian jurisdiction and the U.S. Health Insurance Portability and Accountability Act (HIPAA) Privacy rule (Emam et al., 2011).

Support from Regulatory Environment

Legislative action has worked positively towards increasing awareness about HPV vaccination among parents and the general public. In a study, about 63.5% of the women said that they were more inclined to follow a law that made HPV vaccination mandatory for children. According to the study, “A majority expressed a high intent to comply with a hypothetical law mandating adolescent HPV vaccination for school attendance” (Carlos et al., 2011).

In the US, the Centers for Disease Control and Prevention (CDC) and the World Health Organization (WHO) have published safety reports on the HPV vaccine. The CDC has also conducted post-licensing studies to assess the safety of the quadrivalent vaccine, Gardasil (Fernandez et al., 2012). With the involvement of the Advisory Committee on Immunization Practices (ACIP) of the CDC in recommending vaccination for girls ages 11-12 and catch-up vaccination for girls ages 13-26, a number of bills have been passed making the HPV vaccine mandatory for school children (Mello, Abiola, & Colgrove, 2012).

A national, non-profit organization called Women in Government (WIG) has been involved in the legislation pertaining to HPV vaccination. Upon receiving educational grants from Merck, WIG conducted a number of educational conferences attracting a number of legislators involved in the work relating to HPV vaccination. According to one remark, “WIG bit off hook, line, and sinker the need to have mandated this vaccination across America” (Mello et al., 2012).

In Europe, the European Medicines Agency (EMA) has allowed for the use of the quadrivalent vaccine in females up to 46 years old and in males up to age 26. This recommendation is the “basis for vaccine approval for males and male vaccination recommendations by EMA (Crosignani et al., 2013).

Support from State Policies

State policies and other regulatory activities have been highly instrumental in improving the uptake of the HPV vaccine. The efforts usually deal with financing HPV vaccination through the Vaccines for Children (VFC) program, Medicaid and private insurance, laws relating to mandatory HPV vaccination, and educational campaigns about HPV vaccination. According to a study, “To increase coverage, many states have introduced legislation to require private insurance companies to cover the HPV vaccine.” Some states have also supplemented federal funds and started providing the vaccine at very little or no cost. Another policy to increase uptake of the vaccine is to introduce mandates for school children and immigrants. Some states have also made it compulsory that information about HPV vaccines should be included as part of the curriculum of sex education in schools (Fernandez et al., 2010).

Policies with respect to vaccination usually focus on the target age group for the particular vaccine, the age group that can be considered for a catch-up program, revisions of screening policies with respect to HPV DNA testing, and inclusion of boys for HPV vaccination programs (Kim, Brisson, Edmunds, & Goldie, 2008). “Cost-effectiveness evaluations are designed to assist in population-level decision-making at a government or policy-maker perspective” (Canfell et al., 2012).

Some states have also incorporated default policies to allow individuals to opt-in or opt-out of health services. Such policies have had a very positive effect on influenza vaccination and organ donation in the past. According to a study, default policies were found to make the parents more likely to get their children vaccinated against HPV (Reiter et al., 2012).

Support from the U.S. National Vaccine Plan

The U.S. National Vaccine Plan was implemented with the aim of achieving five goals – to develop new and better vaccines, to improve the safety profiles of the existing vaccines, to improve decision-making to enhance vaccines, to provide access to all vaccines within the US, and to help combat global diseases better through vaccination. The National Vaccine Plan implemented in 2010 aimed to build a stronger health system by improving the uptake of preventative vaccines. In following the guidelines of the National Vaccine Plan, a child can be protected against 17 diseases through vaccination, and a number of financial barriers that earlier restricted the uptake of vaccines, have now been removed (US Department of Health and Human Services, 2010).

The priorities in the National Vaccine Plan implementation guidelines include developing a list of all important vaccines, enabling easier development and licensing of new vaccines, encouraging studies on vaccine safety, improving awareness of important vaccines among the public, working on removing financial barriers for the physicians and the public, encouraging the use of health information technology and electronic health records (EHRs), and encouraging the global introduction of important vaccines to help eradicate diseases (US Department of Health and Human Services, 2010).

As of 2014, leaders involved in decisions regarding implementation of the National Vaccine Plan are looking for areas that need intervention in the current context. Some of the priorities include improving communication with the providers, improving access to health insurance and other measures taken to protect public health, improving the rates of adult immunization, and in improving coverage of HPV vaccination among adolescents.

Future Directions for Research

This literature review has thrown light upon the various barriers and the supports that exist for healthcare professionals in recommending HPV vaccination. There are many classes of hindrances and supports that exist for healthcare workers, parents, and young men in terms of knowledge, safety and efficacy, financial matters, cultural issues, and psychological barriers. Very little is known about the prevalence of physician recommendations and organizational encouragements.

Future research in this field needs to focus on capturing better data concerning unhealthy behaviors among people. Major challenges include small sample sizes, low response rates, convenience samples, lack of appropriate evidence-based theories, and hypothetical story lines. Hence, it is important to analyze the healthcare professionals' current outlook on HPV vaccination, the uptake of these vaccines by male adolescents, and the introduction of new state policies concerning HPV vaccine for increasing knowledge in this domain. It is also important to determine the actual behaviors of the healthcare professionals involved with respect to HPV vaccination, especially for pre-adolescent and adolescent males.

Future research should also focus on the attitudes of the adolescents as well as their parents concerning HPV vaccination. In order to decrease the prevalence of HPV, adolescents will need motivation from parents or other role models to change their attitude towards vaccination.

Conclusions on Literature Review

This literature review has summarized commonly identified barriers people might face in getting themselves or their children vaccinated against HPV, and barriers that might prevent primary healthcare providers from recommending the vaccine to their patients. As expected, the

barriers vary with geographical location, ethnicity, gender, age group, financial status, societal influences, religious beliefs, and family or peer pressure.

The governments of various countries have not been blind to these barriers, and a number of steps have been taken to make it easier for healthcare providers and patients to decide to acquire vaccination against HPV. For example, the National Vaccine Plan was developed in 1994 to spread awareness about the benefits of acquiring vaccines. With assistance from the National Institute of Health (NIH), more than 20 new vaccines have gained approval from the Food and Drug Administration (FDA). These include vaccines against pediatric pneumococcal disease, meningococcal disease, and HPV (Teitelbaum & Wilensky, 2012).

Vaccines for Children (VFC) is a federally funded program that has been implemented to provide essential vaccines for free to children (Katz et al., 2009). The CDC and the WHO Global Advisory Committee on Vaccine Safety have taken a number of measures to assess the safety of the HPV vaccines. The CDC has also conducted post-licensing studies to evaluate the safety of the quadrivalent vaccine, Gardasil (Fernandez et al., 2010). Other organizations that work hard to ensure maximum coverage of important vaccines include the Institute of Medicine (IOM), the U.S. Advisory Committee on Immunization Practices, the Department of Health and Human Services (HHS), the National Vaccine Program Office (NVPO), and the Health Resources and Services Administration (Chesson, Bladford, Gift, Tao, & Irwin, 2008; Thaul, 2005).

Thus, although barriers are many, efforts to overcome them are constantly being initiated and modified to ensure optimum health for all citizens. The US health departments in particular have taken many initiatives such as publicly available insurance policies and school-based immunization programs to provide the maximum protection against infectious diseases at the

least inconvenience to the public. It is highly plausible that the listed barriers against HPV vaccination will soon be overcome in the ongoing effort to create healthy lives and environment.

CHAPTER 3

RESEARCH METHODS

Nature of Research Study

The study design for this research is cross-sectional and observational, based on secondary source of data.

Data

Clinical specialty data for HPV vaccine recommendation among adolescent males were drawn from the 2014 profile of rural healthcare providers of all 10 affiliates of Albany Area Primary Health Care, Inc.. Albany Area Primary Health Care, Inc. is an affiliate of the Georgia Association for Primary Health Care (GAPHC) and also a Federally Qualified Health Center (FQHC). It is located in Albany, GA, and provides healthcare services to rural and underserved communities in southwest GA. Questions on perceived barriers and rates of HPV vaccination recommendations were administered as a paper-based survey instrument to a representative sample of 70 clinical specialists (family practice, pediatricians, and nurse practitioners) and completed by 51 healthcare providers. The response rate for the healthcare providers was 76%.

Albany Area Primary Health Care adopted a previously validated survey tool developed by researchers from the Moffitt Cancer Center and tested by Susan Vadaparampil (2009) from a nationwide survey. The research study conducted by Susan Vadaparampil was on HPV intervention. The researchers validated the instrument through two rounds of expert panel review with HPV researchers and clinicians, as well as through interviews with physicians (n = 7) and a pilot study with randomly selected physicians (n = 16) with expertise in this field (Vadaparampil et al., 2011).

The purpose of this study was to examine the healthcare provider's inclinations regarding recommendation of HPV vaccine for male adolescents, especially those ages 11–12, 13–17, and 18–26. The secondary data was drawn from data provided to the researcher that was obtained through a survey taken by a sample of medical practitioners based on their experiences in dealing with the target sample of male patients between the ages of 11 and 26 years old. Based on the responses obtained from this target sample of healthcare providers in the Albany Area Primary Care, inferences will be made on the entire population of patients in these age groups. The Institutional Review Board of Georgia Southern University approved exemption status for this research.

Variables

The research study used variables such as age of male patients, clinical specialties of the respondent health workers, frequency of recommendation for vaccine uptake, frequency of vaccine administration, parent's fears and concerns on the effects of the vaccine being administered. Paired *t* tests and analysis of variance (ANOVA) were used to determine the relationships between provider recommendations to patients and vaccine uptake completion. The primary variables in this research study were the specialty of practice, age of target patients, gender of the practitioners, and race. These variables were analyzed against each other with the independent variable being age, gender, and specialty of medical practice. The main dependent variables were the frequency with which health providers to recommend the HPV vaccine as well as the frequency of administration of this vaccine to the target population of male patients in the chosen age groups.

General Demographics of the Target Population

In accordance to Federal Regulations Title 45 Part 46, this research study was determined not to require full review and was exempted by the Georgia Southern University Institutional

Review Board (GSU-IRB). This was due to the fact that the study involved the use of publicly available data as well as participants who cannot be identified. Upon subsequent approval by the GSU-IRB, the publicly available secondary data ($N = 51$) was obtained from Albany Area Primary Health Care (AAPC), Incorporated. AAPC is a FQHC, headquartered in Albany, Georgia and has clinics in several surrounding rural counties in southwest Georgia providing care to 35,000 diverse individuals and seeing 120,000 patient visits per annum. The facilities deliver services to children and adults through primary healthcare providers such as family physicians, pediatricians, and nurse practitioners. According AAPC, out of this population, data was randomly collected pertaining to adolescents in the age groups of 11-12 years, 13-17 years, and 17 – 26 years. A total representative sample of 15 family practitioners, 17 nurses, and 19 pediatricians were used in this study to collect data on the frequency of HPV vaccine recommendation to their patients in the varying age categories.

Statistical Analysis

Paired t tests and ANOVA were carried out in investigating the statistical differences that exist between the clinical specialties. The research revolves around the recommendation of the HPV vaccine among the various age groups, which in effect means that the primary response in this analysis was health provider recommendations of HPV vaccination. The dependent variables obtained in this research study were based on the Likert-type scale, offered in the questionnaires administered to the various health providers. An assumption was made that responses by the health sector service providers in the sample were representative of the general approach by each of the medical practitioners in dealing with all his/her clients in as far as recommending the HPV vaccine. This recoding was selected as most appropriate as it reflects best practices employed by health providers in recommending the vaccine.

CHAPTER 4

RESULTS

This section presents the results of our analyses in responses to the questions listed in Chapter 1. All analyses were performed in SPSS, version 23. This study explored providers' tendency to recommend HPV vaccine to early male adolescents (age 11–12); as evidence indicates that this is the most preferred age to introduce the HPV vaccine to ensure long-term effectiveness. The frequencies and percentages for the healthcare providers' demographic characteristics can be found in Table 1. There were 54 healthcare providers that data was gathered from in the study. The majority were nurses ($N = 33$, 64.7%) followed by family medicine workers ($N = 12$, 23.5%) and the smallest group was pediatrics ($N = 6$, 11.8%). Three of the providers did not indicate their field of specialty.

Provider age varied. The majority were 24-32 years of age ($N = 22$, 41.5%). Next in respective order were 42-50 years of age ($N = 14$, 26.4%), 33-41 years of age ($N = 12$, 22.6%) and 51 years of age or older ($N = 5$, 9.4%). One provider did not indicate their age.

Gender representation was not balanced among providers. The majority were female ($N = 44$, 84.6%) and the rest male ($N = 8$, 15.4%). Two providers did not indicate their gender. Race was varied among providers with white being the majority ($N = 29$, 55.8%) of this sample. Respectively followed by black ($N = 18$, 34.6%), prefer not to answer ($N = 2$, 3.8%), Asian ($N = 1$, 1.9%), native Hawaiian/pacific islander ($N = 1$, 1.9%), and mixed race ($N = 1$, 1.9%). Two providers did not identify and racial category.

Table 1

Frequencies and Percentages for Healthcare Providers' Background Characteristics

Provider Characteristic	Frequency	Percent
Type of Healthcare Provider		
Pediatrics	6	11.8
Family Medicine	12	23.5
Nurses	33	64.7
Total	51	100.0
Provider Age		
24 - 32 years	22	41.5
33 - 41 years	12	22.6
42 - 50 years	14	26.4
51+	5	9.4
Total	53	100.0
Provider Gender		
Male	8	15.4
Female	44	84.6
Total	52	100.0
Provider Race		
White / Caucasian	29	55.8
Asian	1	1.9
Native Hawaiian / Pacific Islander	1	1.9
Black / Black American	18	34.6
Mixed race	1	1.9
Prefer not to answer	2	3.8
Total	52	100.0

Research Question A

Research Question A was, are healthcare providers' rates of recommending HPV vaccination for males aged 11 to 12 years old higher than those of males aged 13 to 17 years old?

Null Hypothesis: No difference exists between healthcare providers' prevalence of recommending HPV vaccines to either early (ages 11-12) adolescent or middle (ages 13-17) adolescent males.

Alternate Hypothesis: A difference exists between the healthcare providers' prevalence of recommending HPV vaccines to early (ages 11-12) adolescent and middle (ages 13-17) adolescent males.

A paired samples t test was used to address the hypotheses. The null hypothesis was retained ($t(46) = -1.771, p = .083$). There was no significant difference found between healthcare providers' prevalence of recommending HPV vaccines to either early (ages 11-12) adolescents ($M = 2.51, SD = 1.988$) or middle (ages 13-17) adolescent males ($M = 2.64, SD = 1.983$). See Table 2.

Table 2

Paired Samples T Test for Recommending HPV Vaccines to Either Early (Ages 11-12)

Adolescent or Middle (Aged 13-17) Adolescent Males

	Paired Differences					<i>t</i>	<i>df</i>	Sig.
	Mean	Std. Deviation	SE Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
recommend								
vaccine to 11- 12yrs versus 13-17yrs	-.128	.494	.072	-.273	.017	-1.771	46	.083

Research Question B

Research Question B was, are healthcare providers' rates of recommending HPV vaccination for middle adolescent males (ages 13-17) higher than those of late adolescent (ages 18-26 years) males?

Null Hypothesis: No difference exists between healthcare providers' prevalence of recommending HPV vaccines to either middle adolescent or late adolescent males.

Alternate Hypothesis: Differences exist between healthcare providers' prevalence of recommending HPV vaccines to middle adolescent and late adolescent males.

A paired samples *t* test was used to address the hypotheses. The null hypothesis was retained ($t(46) = 1.499, p = .141$). There was no significant difference found exists between healthcare providers' prevalence of recommending HPV vaccines to either middle adolescents ($M = 2.64, SD = 1.983$) or late adolescent males adolescents ($M = 2.45, SD = 1.851$). See Table 3.

Table 3

Paired Samples T Test for Recommending HPV Vaccines to Either Middle Adolescent or Late Adolescent Males

	Paired Differences					<i>t</i>	<i>df</i>	Sig.
	Mean	Std. Deviation	SE Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
recommend vaccine to 13- 17yrs versus 18-26yrs	.191	.876	.128	-.066	.449	1.499	46	.141

Research Question C

Research Question C was, are healthcare providers' rates of recommending HPV vaccination for late adolescent males (aged 11-12) higher than those of early adolescent males (aged 18-26)?

Null Hypothesis: No difference exists between healthcare providers' prevalence of recommending HPV vaccines to either late adolescent (aged 11 -12) or early male adolescent males (aged 18-26).

Alternate Hypothesis: Differences exist between healthcare providers' prevalence of recommending HPV vaccines to late adolescence (aged 11-12) and early adolescence males (aged 18-26).

A paired samples t test was used to address the hypotheses. The null hypothesis was retained ($t(46) = .443, p = .660$). There was no significant difference found between healthcare providers' prevalence of recommending HPV vaccines to adolescent ($M = 2.45, SD = 1.851$) late adolescence (aged 13-17) and adolescent ($M = 2.64, SD = 1.983$) early adolescence males (aged 18-26). See Table 4.

Table 4

Paired Samples Test for Healthcare Providers' Prevalence of Recommending HPV Vaccines to Late Adolescence (Ages 11-12) and Early Adolescence Males (Ages 18-26)

Paired Differences								
	Mean	Std. Deviation	SE Mean	95% Confidence Interval of the Difference		t	df	Sig.
				Lower	Upper			
recommend vaccine to 11-12yrs - versus 18-26yrs	.064	.987	.144	-.226	.354	.443	46	.660

Research Question D

Research Question D was, is there a variation in rates at which specialist healthcare providers' (FPs, NPs, Peds) recommend HPV vaccines?

Null Hypothesis: No difference exists between specialist healthcare providers in their prevalence of recommending HPV vaccines to patients.

Alternate Hypothesis: Differences exist between specialist healthcare providers in their prevalence of recommending HPV vaccines to patients.

ANOVA was used to address the hypotheses. The null hypothesis was retained for patients 11-12 years old ($F(2,44) = 1.456, p = .244$), as there were no difference in pediatric, family medicine, and nurse healthcare providers' prevalence of recommending HPV vaccines to patients in this age group. The null hypothesis was retained for patients 13-17 years old ($F(2,43) = 2.328, p = .110$) as there were no difference in pediatric, family medicine, and nurse healthcare providers' prevalence of recommending HPV vaccines to patients in this age group. Finally, null hypothesis was retained for patients 18-26 years old ($F(2,43) = 1.511, p = .232$) as there were no difference in pediatric, family medicine, and nurse healthcare providers' prevalence of recommending HPV vaccines to patients in this age group. There are no difference exists between specialist healthcare providers in their prevalence of recommending HPV vaccines to patients (see Table 5 and 6).

Table 5

Group Means for Healthcare Provider Recommendation Rates

Type of Healthcare Provider		recommend vaccine to 11- 12yrs	recommend vaccine to 13- 17yrs	recommend vaccine to 18- 26yrs
Pediatrics	<i>M</i>	1.50	1.67	1.50
	<i>N</i>	6	6	6
	<i>SD</i>	0.837	0.816	0.837
Family medicine	<i>M</i>	3.08	3.50	3.00
	<i>N</i>	12	12	12
	<i>SD</i>	1.730	1.567	1.537
Nurses	<i>M</i>	2.34	2.36	2.29
	<i>N</i>	29	28	28
	<i>SD</i>	2.092	2.129	1.979
Total	<i>M</i>	2.43	2.57	2.37
	<i>N</i>	47	46	46
	<i>SD</i>	1.920	1.940	1.793

Table 6

ANOVAs for Specialist Healthcare Providers in Their Prevalence of Recommending HPV

Vaccines to Patients

Age Group		Sum of	<i>df</i>	Mean	<i>F</i>	Sig.
		Squares		Square		
recommend vaccine to 11-12yrs	Between	10.521	2	5.260	1.456	.244
	Groups					
	Within Groups	158.968	44	3.613		
	Total	169.489	46			
recommend vaccine to 13-17yrs	Between	16.542	2	8.271	2.328	.110
	Groups					
	Within Groups	152.762	43	3.553		
	Total	169.304	45			
recommend vaccine to 18-26yrs	Between	9.503	2	4.752	1.511	.232
	Groups					
	Within Groups	135.214	43	3.145		
	Total	144.717	45			

Research Question E

Research Question E was, are healthcare providers' encountering perceived barriers in recommending HPV vaccine to adolescent males?

Null Hypothesis: No perceived barriers exist among healthcare providers' prevalence of recommending HPV vaccines to adolescents males.

Alternate Hypothesis: Perceived barriers exist among healthcare providers' prevalence of recommending HPV vaccines to adolescents males.

Frequencies and percentages were used to address the hypotheses. The null hypothesis is rejected because perceived barriers were reported among healthcare providers' prevalence of recommending HPV vaccines to adolescents males in discussing sexuality, vaccinating teens with riskier sexual behavior, adding another vaccine to the vaccine schedule, and when vaccination is not required for school attendance (see Table 7).

Providers were asked five questions about perceived barriers were reported among healthcare providers' prevalence of recommending HPV vaccines to adolescents males. In the first question, discussing sexuality, the majority answered ($N = 17$, 32.1%), followed by strongly agree ($N = 16$, 30.2%), strongly disagree ($N = 11$, 20.8%), somewhat disagree ($N = 11$, 20.8%), and neutral ($N = 3$, 5.7%). The second question was about vaccinating teens with riskier sexual behavior. The majority answered strongly agree ($N = 21$, 40.4%), somewhat agree ($N = 13$, 25.0%), somewhat disagree ($N = 9$, 17.3%), strongly disagree ($N = 5$, 9.6%), and neutral ($N = 4$, 7.7%). The third question was adding another vaccine to vaccine schedule. The majority answered somewhat disagree ($N = 15$, 28.3%) followed by neutral ($N = 13$, 24.5%), somewhat agree ($N = 13$, 24.5%), strongly disagree ($N = 8$, 15.1%), and strongly agree ($N = 4$, 7.5%). The fourth question asked do you take time to discuss HPV with patients/parents. The majority answered both somewhat disagree ($N = 14$, 26.4%) and somewhat agree ($N = 14$, 26.4%) followed by neutral ($N = 12$, 22.6%), strongly disagree ($N = 7$, 13.2%), and strongly agree ($N = 6$, 11.3%). The final question asked should vaccination not required for school attendance. The majority answered somewhat agree ($N = 14$, 26.4%), followed by somewhat disagree ($N = 12$,

22.6%), neutral ($N = 12$, 22.6%), strongly disagree ($N = 10$, 18.9%), and strongly agree ($N = 5$, 9.4%).

Table 7

Frequency and Percentages for Healthcare Providers' Encountering Perceived Barriers in Recommending HPV Vaccine to Adolescent Males

Barriers	Frequency	Percent
Discussing Sexuality		
Strongly disagree	11	20.8
Somewhat disagree	6	11.3
Neutral	3	5.7
Somewhat agree	17	32.1
Strongly agree	16	30.2
Total	53	100.0
Riskier Sexual Behavior		
Strongly disagree	5	9.6
Somewhat disagree	9	17.3
Neutral	4	7.7
Somewhat agree	13	25.0
Strongly agree	21	40.4
Total	52	100.0
Adding Another Vaccine to Vaccine Schedule		
Strongly disagree	8	15.1
Somewhat disagree	15	28.3
Neutral	13	24.5
Somewhat agree	13	24.5
Strongly agree	4	7.5
Total	53	100.0
Takes Time to Discuss HPV with Patients/Parents		
Strongly disagree	7	13.2

Somewhat disagree	14	26.4
Neutral	12	22.6
Somewhat agree	14	26.4
Strongly agree	6	11.3
Total	53	100.0
Vaccination is not Required for School Attendance		
Strongly disagree	10	18.9
Somewhat disagree	12	22.6
Neutral	12	22.6
Somewhat agree	14	26.4
Strongly agree	5	9.4
Total	53	100.0

Research Question F

Research Question F was, is there variation in recommending rates by demographic characteristics of the provider?

Null Hypothesis: There is no variation in recommending rates by demographic characteristics of the provider.

Alternate Hypothesis: There is variation in recommending rates by demographic characteristics of the provider.

ANOVAs were used to address the hypothesis.

Provider age. The first set of ANOVAs were used to examine average differences in referral rates by provider age. The null hypothesis was retained for patients 11-12 years old ($F(3,43) = 2.319, p = .088$), 13-17 years old ($F(3,43) = 2.252, p = .096$), and 18-26 years old ($F(3,43) = 2.195, p = .102$) when the independent variable was provider age (see Tables 8 & 9).

Table 8

Recommendation Rates by Age of Provider and Age of Vaccination Recipient

Provider age		recommend vaccine to 11- 12yrs	recommend vaccine to 13- 17yrs	recommend vaccine to 18- 26yrs
24 - 32 years	<i>M</i>	2.21	2.42	2.32
	<i>N</i>	19	19	19
	<i>SD</i>	1.843	1.895	1.797
33 - 41 years	<i>M</i>	3.58	3.67	3.42
	<i>N</i>	12	12	12
	<i>SD</i>	2.021	1.969	2.065
42 - 50 years	<i>M</i>	2.38	2.50	2.17
	<i>N</i>	13	12	12
	<i>SD</i>	2.063	2.111	1.697
51+	<i>M</i>	1.00	1.00	1.00
	<i>N</i>	4	4	4
	<i>SD</i>	.000	.000	.000
Total	<i>M</i>	2.50	2.64	2.45
	<i>N</i>	48	47	47
	<i>SD</i>	1.968	1.983	1.851

Table 9

ANOVAs for Age of Provider and Age of Vaccination Recipient

		Sum of Squares	df	Mean Square	F	Sig.
recommend	Between	24.849	3	8.283	2.319	.088
vaccine to 11-12yrs	Groups					
	Within	157.151	44	3.572		
	Groups					
	Total	182.000	47			
recommend	Between	24.553	3	8.184	2.252	.096
vaccine to 13-17yrs	Groups					
	Within	156.298	43	3.635		
	Groups					
	Total	180.851	46			
recommend	Between	20.928	3	6.976	2.195	.102
vaccine to 18-26yrs	Groups					
	Within	136.689	43	3.179		
	Groups					
	Total	157.617	46			

Provider race. The next set of ANOVAs were used to examine average differences in referral rates by provider race. The null hypothesis was retained for patients 11-12 years old ($F(5,41) = 1.398, p = .245$), 13-17 years old ($F(5,40) = 1.345, p = .226$), and 18-26 years old ($F(5,40) = 1.586, p = .186$) when the independent variable was provider race (see Tables 10 & 11).

Table 10

Recommendation Rates by Provider Race and Age of Vaccination Recipient

Provider race/ethnicity		recommend vaccine to 11-12yrs	recommend vaccine to 13- 17yrs	recommend vaccine to 18-26yrs
White / Caucasian	<i>M</i>	2.24	2.32	2.16
	<i>N</i>	25	25	25
	<i>SD</i>	1.964	1.952	1.930
Asian	<i>M</i>	5.00	5.00	5.00
	<i>N</i>	1	1	1
	<i>SD</i>	.	.	.
Native Hawaiian / Pacific Islander	<i>M</i>	1.00	1.00	4.00
	<i>N</i>	1	1	1
	<i>SD</i>	.	.	.
Black / Black American	<i>M</i>	2.82	2.88	2.41
	<i>N</i>	17	17	17
	<i>SD</i>	1.944	1.965	1.583
Mixed race	<i>M</i>	6.00	6.00	6.00
	<i>N</i>	1	1	1

	<i>SD</i>	.	.	.
Prefer not to answer	<i>M</i>	1.50	1.00	1.00
	<i>N</i>	2	1	1
	<i>SD</i>	.707	.	.
Total	<i>M</i>	2.53	2.61	2.41
	<i>N</i>	47	46	46
	<i>SD</i>	1.977	1.994	1.857

Table 11

ANOVAs for Race of Provider and Age of Vaccination Recipient

		Sum of Squares	<i>df</i>	Mean Square	<i>F</i>	Sig.
recommend vaccine to 11-12yrs	Between Groups	26.172	5	5.234	1.398	.245
	Within Groups	153.531	41	3.745		
	Total	179.702	46			
recommend vaccine to 13-17yrs	Between Groups	25.752	5	5.150	1.345	.266
	Within Groups	153.205	40	3.830		
	Total	178.957	45			
recommend vaccine to 18-26yrs	Between Groups	25.675	5	5.135	1.586	.186
	Within Groups	129.478	40	3.237		
	Total	155.152	45			

Provider gender. The next set of ANOVAs were used to examine differences in referral rates by provider gender. The null hypothesis was retained for patients 11-12 years old ($F(1,45) = 0.022, p = .883$), 13-17 years old ($F(1,44) = 0.218, p = .643$), and 18-26 years old ($F(1,44) = 0.020, p = .887$) when the independent variable was provider gender (see Tables 12 & 13).

Table 12

Referral Rates by Gender of Provider and Age of Vaccination Recipient

Provide gender		recommend vaccine to 11- 12yrs	recommend vaccine to 13- 17yrs	recommend vaccine to 18- 26yrs
Male	<i>M</i>	2.43	3.00	2.57
	<i>N</i>	7	7	7
	<i>SD</i>	1.618	1.633	1.397
Female	<i>M</i>	2.55	2.62	2.46
	<i>N</i>	40	39	39
	<i>SD</i>	2.050	2.060	1.945
Total	<i>M</i>	2.53	2.67	2.48
	<i>N</i>	47	46	46
	<i>SD</i>	1.977	1.989	1.859

Table 13

ANOVAs for Gender of Provider and Age of Vaccination Recipient

		Sum of	df	Mean	F	Sig.
		Squares		Square		
recommend vaccine to 11-12yrs	Between	.088	1	0.088	0.022	.883
	Groups					
	Within Groups	179.614	45	3.991		
	Total	179.702	46			
recommend vaccine to 13-17yrs	Between	.878	1	0.878	0.218	.643
	Groups					
	Within Groups	177.231	44	4.028		
	Total	178.109	45			
recommend vaccine to 18-26yrs	Between	.072	1	0.072	0.020	.887
	Groups					
	Within Groups	155.407	44	3.532		
	Total	155.478	45			

Summary

Data were gathered from 54 healthcare providers. The majority were nurses followed by family medicine workers, and providers in pediatrics. Provider age varied, but was on the young side since these were students. The majority of providers were also White and female.

The null hypothesis was retained on four of five research questions. For the Research Question A, there were no statistically significant differences between healthcare providers' prevalence of recommending HPV vaccines to either early (ages 11-12) adolescent or middle (ages 13-17) adolescent males. For Research Question B, there were no statistically significant differences between healthcare providers' prevalence of recommending HPV vaccines to either middle adolescent or late adolescent males. For Research Question C, there were no statistically significant differences between healthcare providers' prevalence of recommending HPV vaccines to either late adolescent (ages 11 -12) or early male adolescent males (ages 18-26).

For Research Question D, there were no statistically significant differences in rates at which specialist healthcare providers recommended HPV vaccines. The null hypothesis was rejected for Research Question E. Perceived barriers were reported among healthcare providers' prevalence of recommending HPV vaccines to adolescents males in discussing sexuality, vaccinating teens with riskier sexual behavior, adding another vaccine to vaccine schedule, and when vaccination is not required for school attendance. For Research Question F, there were no statistically significant differences in recommending rates by demographic characteristics of the provider.

CHAPTER 5

SUMMARY DISCUSSION AND CONCLUSIONS

Discussion

While the CDC clearly recommends the HPV vaccine for boys and girls ages 11-12, the results here and in the literature review show a marked preference by FPs, NPs, Peds, and parents to vaccinate at a later age. There is some uneasiness among healthcare providers and parents regarding the vaccination of pre-teens when it concerns a sexually transmitted disease. Perhaps by educating healthcare providers on how to address these concerns with parents, the rate of HPV vaccination among the younger population will improve. It is also important to increase the awareness of healthcare providers and parents to the role that males play in the spread of HPV so that more of them are vaccinated. While it is true that HPV vaccines at first were only recommended for females, the CDC's current recommendation is that all children should be vaccinated by 11 or 12.

The HPV vaccine is currently not required by many state governments, including that of Georgia. This determination is made by the states themselves and some considerations that are taken into account are support by the community, monetary requirements for implementation, burden on school personnel for enforcement, and supply of the vaccine (CDC, 2014). The CDC (2014) also reported that because the HPV vaccine was first recommended for girls only, many states did not want to put into action a requirement that would only apply to half of their student population. However, since the CDC now currently recommends that all children, male and female, receive a three-dose series of the vaccination starting at 11 or 12 years old, it may be time for the states to revisit their policies of not making HPV vaccination a requirement.

Also, in regards to the three-dose series, many patients and families may not be able to complete all three doses due to financial or logistical reasons. While receiving one or two doses is better than not being vaccinated at all, healthcare providers need to stress the importance of completing the series and should find ways of not making the three-dose sequence a barrier to completion.

HPV-related infections are common in the United States and, it is estimated that up to 79 million people are already infected. It is also estimated that 14 million new infections will occur each year in people ages 15–59. Half of these new infections occur among people ages 15–24, making this a high-risk group. Based on this assertion, it becomes crucial to understand the questions that must be answered in scaling down this enormous infection rate in this group. Since the minimum indicated age in this risk group is 15 years, it is imperative to ascertain the mitigating factors that need to be adopted to avert this scenario.

The HPV vaccine is usually administered in up to three doses over a period of six months to protect against HPV infections. The main HPV vaccines are Cervarix and Gardasil. The Gardasil type protects against anal cancer and genital warts, and is highly recommended for males, but can also be administered to females. These vaccines provide protection for patients who receive all three doses of the vaccine and have adequate time to develop immunity, well before they engage in sexual activities that will expose them to infections. For this reason, the HPV vaccine should be administered to patients in the range of 11 to 12 years of age to mitigate the sexual risk factors associated with the teenage life and later adolescence. For various reasons that may lead to some boys not getting vaccinated during this age bracket, the vaccination is open to other age groups ranging from 13 to 26, although for male patients the HPV vaccination is recommended only up to the age of 21. However, for males who engage in sexual behavior

with other males, or who have weak immune systems (such those suffering from HIV and other ailments that weaken the immune system) the vaccine should be administered up to the age of 26, especially if the required doses have not been administered earlier. Due to the higher risks posed to females by HPV-related infections including cervix cancer, the vaccine is generally preferred for females. But as discussed earlier, the risks for males are equally troublesome. For this reason the research delved into the factors that affect the recommendation and administration of this vaccine specifically for those male patients who had sought the health services of FPs, PEDs, and NPs. The health practitioners were assumed to be the main avenue through which recommendation of the vaccine and its consequent administration would occur. In addition to this, it is assumed that by consenting to administration of the HPV vaccine, all the requisite doses were completed in the required intervals and no non-conformity was evidenced. The research divided the age groups in this form to cover the preferred vaccination age of 11 to 12 years, the high-risk ages of 13 to 17, and the ages of up to 26 years to cover those male patients who may have been left out, as well as those with compromised immune systems. Other assumptions made were on the availability of the HPV vaccine where this research assumed that the vaccine is always available for administration. Furthermore it is assumed that the health providers recommended the vaccine uniformly and sufficiently to all male patients and not just to some. It was also not apparent to this researcher if the health practitioners detailed the individual benefits of getting an HPV vaccination to the male patients, especially in regards to anal cancer and genital warts. Details to this effect would have served to change the perception held by the male patients in accepting the vaccine and having it administered to them. The ACIP has placed its recommendation on administering the vaccine to all girls between the ages of 11 and 12, before they become sexually active. It's been imperative to enlist boys in this schedule to accommodate

the health risks that face them, too. In late 2011, ACIP recommended routine vaccination of males' ages 11 to 12 using the quadrivalent human papillomavirus vaccine (HPV4, Gardasil).

The state of Georgia has engaged in a public awareness campaign aimed at creating awareness of the existence of a vaccine that averts the occurrence of cancer. The campaign is designed by the Georgia Department of Public Health (DPH), and the CDS-funded MARTA organization has come up with awareness campaigns on HPV as a leading cause of cervical cancer. The campaign urges parents to talk to their doctors about vaccinating their sons and daughters. This policy change in approaching HPV vaccination marks a paradigm shift in the manner in which vaccines are administered to the public, though much more is desired such as making compulsory vaccinations a pre-requisite to admission to institutions of learning or access to vocational centers. This approach would ensure a near-100% compliance with this vaccination, although its introduction may face resistance from advocates of civil rights and freedoms. The more subtle approach taken by the Georgia authorities is more of an appeal than a requirement, and this may prompt the population to consider this vaccination as a mere option in life. This is a fact that was evidenced in the report titled "Our Collaborative Course of Action: Georgia's Comprehensive Cancer Control Plan: 2013-2018." This report was prepared jointly by DPH and the Georgia Cancer Control Consortium (GC3), and it called for a change in policy to create provisions for compulsory HPV vaccination.

Conclusion

The national guidelines that prescribe the recommended mode of HPV vaccine administration have a focus on having persons between the ages of 11 and 26 vaccinated against HPV. However, despite this policy requirement, health provider recommendations for this vaccine are low, with an average of 16.2% saying that they recommend the vaccine to their

patients in these age groups. This factor, accompanied by the low scores recorded in the administration of this vaccine and parental barriers, leads to the conclusion that there exists an array of missed clinical opportunities for HPV vaccination for the age groups in this survey. It is therefore crucial that measures be taken to address all the noted barriers to effective vaccination, and instruction provided to the health providers on the need to enhance recommendation of the HPV vaccine to their patients. The results indicate that the measures must target the health providers with respect to their specialty, age, and ethnic background. Emphasis should be made on encouraging the health providers to recommend the vaccine without waiting for recommendations the state authorities or the CDC.

Limitations

This research was conducted using secondary data obtained from Albany Area Primary Health Care System located in southwest Georgia that provides healthcare services in 15 counties in the region. Data from the U.S. Census Bureau indicate that most of these counties are small, rural locations with significant minority populations. Thus, the findings of this research may not represent the entire population of regional primary healthcare providers accurately. The sample size is small and the responses may be based on regional socio-cultural and socio-economic factors, along with other regional factors. For example, religious and cultural beliefs that are prevalent in southwest Georgia may have influenced reporting to the survey questions. In this regard, there is a need for a similar, large-scale study using a larger sample size in order to ascertain whether the findings of this research can be generalized to the entire population.

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