FACTORS INFLUENCING HPV VACCINATION RECOMMENDATIONS AMONG NURSES IN THE AMBULATORY SETTING

A DISSERTATION

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE

DEGREE OF DOCTORATE OF PHILOSOPHY IN NURSING SCIENCE

IN THE GRADUATE SCHOOL OF THE

TEXAS WOMAN'S UNIVERSITY

COLLEGE OF NURSING

BY

SHANNON RICHARD CHOPP, MS, BS

DENTON, TEXAS

DECEMBER 2016

DEDICATION

I can do all things through Christ, who strengthens me (Philippians 4:13).

To my family, for whom I am completing this degree. Thank you for all your support throughout this process. WE DID IT!

To my children, Ceasear and Brennan, with hard work, patience, and perseverance, you can do anything you put your mind to.

ACKNOWLEDGEMENTS

To my husband and children, thank you, thank you, thank you for all the support and prayers that enabled me to keep working toward completing this arduous process. Without you, I would not have been able to complete this.

I would like to formally acknowledge other people involved in assisting me to complete this dissertation. To my friend Kristen, thank you for allowing me to share my ideas, frustrations, and happy moments with you. To my friend Chmyra, thank you for pushing me down the path to begin the program.

Cynthia Bailey-Delesbore, thank you for suggesting the topic of cervical cancer prevention and being a supporter on the journey for both of my graduate degrees. Dr. Sandra Cesario, thank you for helping me to narrow the focus of my study and assisting me to navigate through this process.

To my parents, you have worked extremely hard to help me complete this study. Mother, you have proofread, critiqued, edited, and babysat throughout both graduate degrees. Father, you have reminded me throughout that "I can DO this." I do not have enough words to express my gratitude.

ABSTRACT

SHANNON RICHARD CHOPP

FACTORS INFLUENCING HPV VACCINATION RECOMMENDATIONS AMONG NURSES IN THE AMBULATORY SETTING

DECEMBER 2016

The human papillomavirus (HPV) vaccination rates for adolescent males and females is well below the Healthy People 2020 goals of 80% vaccination rate. In the ambulatory care setting, licensed nurses of all educational levels have the ability to counsel and recommend the HPV vaccine. Prior to determining the impact of nurses within the ambulatory care setting on HPV vaccine uptake, the knowledge, attitude, self-efficacy, and intent to recommend the HPV vaccine to preteen males and females should be measured.

An anonymous, secure, online survey was conducted via PsychData® using the Shared Decision Making Inventory-Revised (SDMI-R). The recruitment and reminder letters with embedded link to the survey was placed on the discussion boards of nursing organizations. Snowball sampling was encouraged in the recruitment and reminder letters.

A total of 208 participants responded to the survey. Four multiple linear regressions with eight predictor variables were used to address the two research questions. For the first research question, which examined the effect of HPV knowledge

level and clinician education level on clinician attitude, it was found that HPV knowledge level was a significant predictor for attitudes toward recommending the HPV vaccine to preteen males and females. This finding lends support to previous studies. The differences in the results of the regression equations noted between males and females suggest that overall HPV knowledge for males may be lower than for females, which may influence clinician attitude. No significant relationships were found between clinician education level and attitude for males or females in this study, or in previous research.

Research Question 2 examined the effect of clinician attitude and self-efficacy on intent to recommend the HPV vaccine. For females, it was found that both attitude and self-efficacy were significant predictors of intent. For males, self-efficacy was found to be a significant predictor of intent, but attitude was not. As knowledge levels affect attitudes, the differences in the results of the regression equations may be attributed to lower HPV knowledge levels for males.

TABLE OF CONTENTS

Page

LIST OF TABLES

Table Page

LIST OF FIGURES

Figure Page

CHAPTER I

INTRODUCTION

Following the release of the human papillomavirus (HPV) vaccine in 2006, there has been considerable debate regarding the human papillomavirus (HPV) vaccine. The debate has focused on whether or not the HPV vaccine should be a required vaccine in the United States. Although the HPV vaccine is recommended by the Advisory Committee on Immunization Practices ([ACIP]; Markowitz et al., 2007), very few states have issued mandates making the HPV vaccine a requirement. In addition, only a few states require HPV vaccine information to be provided to parents or preteens.

Other developed countries, such as Australia, the United Kingdom, and Canada, have launched effective HPV vaccination programs to increase uptake (President's Cancer Panel, n. d.). Comparatively, the U. S. has achieved a lower threshold for HPV vaccine uptake than other developed countries. The President's Cancer Panel suggested that, while working with developing countries to increase HPV vaccine uptake, different strategies can be learned to help increase HPV vaccine uptake here in the U. S.

In Australia, a government-funded HPV vaccination program was introduced in 2006. In 2014, it was noted that approximately 70% of females and greater than 50% of males had completed the three-dose series (Victorian Cytology Service [VCS], 2015). In addition, following implementation of the school-based HPV vaccine program, there was

a notable decrease in the incidence of genital warts reported between 2008 and 2011 among heterosexual women (reduction from 18.6% to 1.9%) and heterosexual men (reduction from 22.9% to 2.9%) under the age of 21 years (Read et al., 2011). In Denmark, a free HPV vaccination program has been in existence since 2009 (Baldur-Felskov, Dehlendorff, Junge, Munk, & Kjaer, 2014). In 2012, it was found that, for females born between 1996 through 1999, 87-90% had received the first HPV vaccine, 83-86% received the second HPV vaccine, and 74-82% received the third HPV vaccine (Statens Serum Institut, 2013). In most countries within the European Union, and in Iceland and Norway, the HPV vaccine is recommended, not mandatory (Haverkate et al., 2012). However, it has been found that many of the immunization programs have been found to be effective, just with recommendation from a healthcare clinician for vaccines (Haverkate et al., 2012).

Similarly, in the U. S., parents and adolescents have reported that the most common mediator to receiving the HPV vaccine has been counseling and recommendation for the HPV vaccine (Grimes, Benjamins, & Williams, 2013; Hopkins & Wood, 2013; Small, Sampselle, Martyn, & Dempsey, 2014; Staras, Vadaparampil, Patel, & Shenkman, 2014; Ylitalo, Lee, & Mehta, 2013; Zimet, Rosberger, Fisher, Perez, & Stupiansky, 2013). For preteens aged 11-12, the vaccines recommended by ACIP include the tetanus-diphtheria-acellular pertussis (Tdap) vaccine, meningococcal conjugate vaccine, and HPV vaccine. However, the HPV vaccination coverage levels continues to be lower for males (41.7% have received ≥ 1 dose; 21.6% have received ≥ 3

doses) and females (60% have received ≥ 1 dose; 39.7 have received ≥ 3 doses) than the coverage levels for both Tdap (86.3% of both males and females have received ≥ 1 dose) and meningococcal vaccines (79.3% of both males and females have received ≥ 1 dose; Reagan-Steiner et al., 2015). Recommended strategies to improve HPV vaccination receipt include clinician educational sessions to underscore the importance of strong recommendations for the HPV vaccine for preteens aged 11-12, propose methods to improve HPV vaccine recommendations, and prevent missed opportunities to educate both clinicians and parents about the importance of timely HPV vaccination (Reagan-Steiner et al., 2015).

Definition of Human Papillomavirus (HPV)

HPV is believed to be the causative agent in most cases of cervical cancer (Baseman & Koutsky, 2005; Centers for Disease Control and Prevention [CDC], 2014a; Hopkins & Wood, 2013; National Comprehensive Cancer Network [NCCN], 2010). In addition, HPV is believed to cause the majority of anal, oropharynx, penile, vaginal, and vulvar cancers (CDC, 2014a). HPV is a group of more than 100 viruses (CDC, 2015; U. S. National Library of Medicine [NLM], 2015). More than 40 types have been found to infect the genital area in both men and women (CDC, 2015). The virus is mostly transmitted via skin-to-skin contact, usually during sex (CDC, 2015). However, nonsexual transmissions of HPV have been reported, such as from mother to child during childbirth (Burd, 2003; Rintala et al., 2005) or from either parent to the child during infancy (Rintala et al., 2005).

Basal epithelial cells of the skin or the inner lining of tissues can become infected with HPV (Burd, 2003). The cutaneous HPV types affect the skin of the hands and feet (Burd, 2003). Mucosal types of HPV target the oral, respiratory, or anogenital epithelium (Burd, 2003).

Modes of Transmission

HPV is the most common sexually transmitted infection (Burd, 2003; National Institute of Health [NIH], 2015a; Teitelman, Stringer, Averbuch, & Witkoski, 2009). HPV infection is most common in adolescents and young adults (Burd, 2003), with almost half of new infections occurring in persons aged 15-24 (Markowitz et al., 2014). It is believed that HPV has or will infect most sexually active men and women at some point in time (Baseman & Koutsky, 2005; CDC, 2015; NIH, 2015a). HPV infection occurs soon after first sexual encounter (Baseman & Koutsky, 2005; NIH, 2015a; Winer et al., 2008). The infection can be transient (Baseman & Koutsky, 2005), making it difficult to determine if the presence of HPV infection is due to persistence or reinfection (Grimes et al., 2013). In addition, a person may be infected with HPV but may be completely asymptomatic (Baseman & Koutsky, 2005; NIH, 2015a).

Risk Factors for HPV

The risk factors for females for acquiring HPV infection include sexual debut at a young age (American Cancer Society [ACS], 2016b; Burd, 2003), number of sex partners (ACS, 2016b; Baseman & Koutsky, 2005; Burd, 2003; NIH, 2015a), and promiscuous sex partners (ACS, 2016b; Burd, 2003; NIH, 2015a; Winer et al., 2008). As HPV

infections tend to be more prominent in adolescents and young adults aged 15-24 (Markowitz et al., 2014), being of age younger than 25 years is a risk factor (ACS, 2016b). In addition, persons having sex with uncircumcised male partners is also a risk factor (ACS, 2016b). The risk factors for males for acquiring HPV infection include having many sex partners and being uncircumcised (ACS, 2016b). These risk factors are the same for both heterosexual, homosexual, and bisexual individuals.

HPV Types

The different HPV types are classified into high-risk (oncogenic) or low-risk (non-oncogenic). Low-risk HPV types, such as types 6 and 11, do not cause cancer. However, these two types cause 90% of condylomata acuminatum (skin warts) to develop in areas such as the genitals, mouth, anus, or throat (Burd, 2003; NIH, 2015a). Low-risk HPV types 6 and 11 can also be found in the respiratory tract, producing benign tumors in the air passages (NIH, 2015a).

Alternatively, cancer can be the result of persistent and untreated HPV infection by any of the high-risk types. HPV types 16 and 18 are two of the most well-known carcinogenic types, causing the majority of cancers (NIH, 2015a).

Cancer Types and Incidences

Cervical Cancer

HPV types 16 and 18 are believed to be responsible for about 70% of all cervical cancers (NIH, 2015a). In 2016, it is estimated that 12,990 new cases of invasive disease will be diagnosed, and 4,120 deaths will occur (ACS, 2016d). Most cervical cancer

diagnoses occur in women under the age of 50 (ACS, 2016d). Although the incidence of diagnosis and death has declined in the United States, cervical cancer remains a health threat (ACS, 2016d; NIH, 2014). The use of the Papanicolau (Pap) test has contributed to the decline, but disparities exist in the cervical cancer incidence and mortality rates across geographical locations, racial/ethnic, and socioeconomic groups (NIH, 2014; U. S. Department of Health and Human Services, National Institute of Health, 2013).

Vaginal/Vulvar Cancer

HPV type 16 has been implicated as the cause of about 65% of vaginal cancers and 50% of vulvar cancers (NIH, 2015a). Although rare, it is estimated that 4,620 new cases of vaginal cancer and 950 deaths will be reported in 2016 (ACS, 2016g). For vulvar cancer, about 5,950 new cases will be diagnosed and about 1,110 women will die (ACS, 2016h).

Penile Cancer

HPV type 16 has also been implicated in penile cancer, suspected to cause 35% of penile cancers (NIH, 2015a). Considered to be rare in North America, penile cancer accounts for less than 1% of cancers in men in the United States. (ACS, 2016f). For 2016, it is estimated that approximately 2,030 men will be diagnosed and about 340 will die (ACS, 2016f).

Anal Cancer

The majority (95%) of anal cancers are linked to HPV type 16 (NCI, 2015a). Affecting both men and women, the average age of diagnosis is in the early 60s (ACS,

2016c). Anal cancer diagnosis has been on the rise, even though it is also considered to be rare. The estimates of incidence of new cases in 2016 were 5,160 women and 2,920 men. The estimated death rate in 2016 from anal cancer is 640 women and 440 men.

Oral Cavity and Oropharyngeal Cancer

HPV causes about 70% of oropharyngeal cancers (NCI, 2015a). In the United States, about half of the diagnoses are associated with HPV type 16 (NCI, 2015a). Although oropharyngeal cancers affect both sexes, males are affected more often than females (ACS, 2016e; President's Cancer Panel, n. d.). There has also been a recent rise in new diagnoses of oropharyngeal cancers linked to HPV (ACS, 2016e), from 16.3% in the 1980s to 72.7% in the 2000s (Chaturvedi et al., 2011). The estimated number of new cases for 2016 are that 48,330 will be affected by oral or oropharyngeal cancer and 9,570 deaths will occur (ACS, 2016e). By 2020, it is highly likely that the number of oropharyngeal cancers linked to HPV will surpass the number of cervical cancers (President's Cancer Panel, n. d.).

HPV Prevention

There is no known cure for HPV infection. Practicing abstinence by refraining from any type of genital contact with another person is the surest way to prevent genital HPV infection (Markowitz et al., 2014). The risk of becoming infected with HPV can be decreased by being in a monogamous relationship, limiting the number of sex partners, and having partners with limited numbers of previous sex partners. Consistent condom usage may help to reduce the risk of HPV infection (Markowitz et al., 2014). However,

consistent condom usage may not provide adequate protection against transmission of HPV, because HPV infection can be acquired through contact with infected labial, scrotal, or anal tissues that are not covered by a condom (Burd, 2003).

Vaccines have been developed to help prevent the transmission of HPV, and to ultimately prevent cancers caused by HPV. Like other vaccinations, the HPV vaccine is a method of primary prevention, producing antibodies against specific HPV types. Therefore, to be most effective, the vaccines should be administered before sexual initiation occurs and during the recommended age of administration, which is when antibody responses are the highest (American Academy of Pediatrics [AAP], 2012). The HPV vaccine is still recommended for those who have already been exposed to HPV (Teitelman et al., 2009). However, it is ineffective against HPV types that have already been acquired (AAP, 2012). Considerable numbers of cancer morbidities and deaths can be prevented through vaccination with HPV (Daley et al., 2010).

Cervarix®

Cervarix® is a bivalent vaccine designed to prevent HPV types 16 and 18 (GlaxoSmithKline, Incorporated [GSK], 2014). It is approved for use in females who are 9 to 25 years of age to help provide almost 100% of persistent HPV infections (NCI, 2015b). It is not currently approved for use in males. Cervarix® can be administered as a two or three dose series, at zero and six months or zero, one, and six months, respectively (GSK, 2014).

There are limited data on the efficaciousness of the two dose series (GSK, 2014). However, Kreimer et al. (2015) performed a post hoc analysis to evaluate the efficacy of fewer than three doses of the HPV-16/18 AS04-adjuvanted vaccine. The analysis consisted of combining data from the Costa Rica Vaccine Trial (CVT) and the Papilloma Trial against Cancer in Young Adults (PATRICIA) Trial. The HPV-naïve group consisted of those who were negative for any of the 14 high-risk HPV types, or HPV 16/18 seropositive. Those testing ASCUS-positive (atypical squamous cells of underdetermined significance) were considered high-risk HPV negative and also included in the HPV-naïve cohort. The primary outcome of the CVT and PATRICIA trials was the incident of one-time detection of HPV 16/18 during observation every six months (for the PATRICIA trial) or annually (for the CVT) for a period of up to four years. In each trial, the women were randomly assigned to receive the HPV 16/18 AS04-adjuvanted vaccine (experimental group) or hepatitis A vaccine (control group). Each vaccine was administered on a schedule at zero, one, and six months. The analysis of the HPV-naïve cohort consisted of 13,296 women who received three doses of vaccine (6,634 HPV vaccine vs. 6,662 hepatitis vaccine), 549 women receiving two doses of vaccine (273 HPV vs. 276 hepatitis), and 238 only receiving one dose (138 HPV vs. 100 hepatitis). The post hoc analysis of the HPV-naïve group (N=14,083) indicated that the HPV vaccine efficacy was similar in regards to the one-time detection of HPV 16/18 regardless of number of doses of the vaccine. For one HPV dose, efficacy was found to be 87.5% (95% CI, 60.9-97.1). For two HPV vaccine doses, the efficacy was 81.2% (95% CI,

59.5-92.3). For three HPV vaccine doses, the efficacy was 81.4% (95% CI, 78.7-83.8). The results of this study suggest that one dose of the HPV 16/18 AS04-adjuvanted vaccine may provide sufficient immunity against HPV types 16 and 18. However, the limitations of the study included the design (post hoc analysis), which prevented randomization of the participants. Biases introduced could include that the women who only received one dose had a higher immune response or lower risk of infection. In addition, the number of women who only received one dose was relatively small. Therefore, these results must be interpreted cautiously, and more research using randomized-controlled trials should occur.

Gardasil® and Gardasil 9®

The original Gardasil® vaccine, licensed by Merck, is a quadrivalent vaccine designed to prevent HPV types 6, 11, 16, and 18 (NIH, 2015b). It is believed to provide protection against cervical, vulvar, and vaginal cancers in females (Merck & Company, Incorporated, 2015). For males, Gardasil® protects against anal cancer and genital warts. Gardasil® is approved for use in females and males aged 9 to 26. The original Gardasil® vaccine is also believed to prevent almost 100% of cervical cancers (NIH, 2015b). It is administered as a three dose series over a six month period, at zero, two, and six months (Merck & Company, Incorporated, 2015).

Gardasil 9® provides protection against the same four HPV types in the original Gardasil®, with additional coverage provided for HPV types 31, 33, 45, 52, and 58 (NIH, 2015b). Gardasil 9® is approved for females aged 9 to 26 and males aged 9 to 15. The

Advisory Committee on Immunization Practices (ACIP) recommends routine vaccination with Gardasil 9® for ages 11-12 (Petrosky et al., 2015). In addition, the Gardasil 9® vaccine is recommended for females aged 13-26 and males aged 13-21 if not vaccinated previously (Petrosky et al., 2015).

Current Vaccination Rates

Healthy People 2020 goals include to have 80% of females and males ages 13-15 receive three doses of the HPV vaccine (Office of Disease Prevention and Health Promotion, 2015). This goal is in alignment with the United Nations Sustainable Development Goal 3, which is focused on improving health status and promoting wellbeing (United Nations, 2015). However, in 2012, it was reported that only 28.1% of females and 6.9% of males had received three doses of the HPV vaccine (Office of Disease Prevention and Health Promotion, 2015). According to Elam-Evans et al. (2014), data analyzed from the National Immunization Survey-Teen (NIS-Teen) indicated that the vaccination rate for three doses of HPV vaccine amongst females increased from 2012 to 2013, from 33.4% to 37.6%. For males, the increase from 2012-2013 for one or more HPV vaccine was from 6.8% to 13.9% (Elam-Evans et al., 2014). Although, HPV vaccination rates vary among sources, it is evident that the vaccination rates remain below the Healthy People 2020 goals. Considering the ubiquitous and highly infectious nature of HPV, it is imperative to promote and support HPV vaccination.

Problem of Study

As stated above, the HPV vaccination uptake of adolescent males and females is well below the Healthy People 2020 goals of 80% vaccination rate. According to the CDC (2016b), it was reported that approximately 79 million people in the United States are infected with HPV. Considering the large number of people affected by HPV, it was proposed by the President's Cancer Panel (n. d.) that widespread HPV vaccination could dramatically reduce the incidences of HPV-related cancers. Estimates from the CDC (2014b) indicated that if missed clinical opportunities to provide HPV vaccination to adolescent males and females were eliminated, then 91% of adolescent females would have protection against HPV-related cancers. The President's Cancer Panel (n. d.) concurred, indicating that thousands of other HPV-related cancers, mainly oropharyngeal cancers which could occur in males, would also be eliminated.

In their report, the President's Cancer Panel (n. d.) proposed three overarching goals to help increase uptake of the HPV vaccine in the United States: (a) decrease overlooked opportunities during visits to recommend and administer the HPV vaccines, (b) increase acceptance of HPV vaccines by parents and adolescents, and (c) maximize access to the HPV vaccine by offering it in alternative healthcare settings. Each goal has specific objectives designed to ensure goal attainment. The first two goals of reducing missed opportunities to recommend the HPV vaccine and increasing acceptance of the HPV vaccine were reverberated through parents' and adolescents' reflections of their perceived barriers preventing HPV vaccination and also the reasons for receipt of the

HPV vaccine. Historically, for the adolescents and parents, concerns reported regarding the HPV vaccine have included lack of knowledge about HPV or incomplete knowledge (Hopkins & Wood, 2013; Kessels et al., 2012; Laz, Rahnam, & Berenson, 2012; Millen, Ginde, Anderson, Fang, & Camargo, 2009; Reynolds, 2014); the belief that the child is at low risk for infection (Small et al., 2014; Zimet et al., 2013; Zimet & Rosenthal, 2010), child too young for vaccine (Kahn et al., 2009; Kessels et al., 2012; Laz et al., 2012), concerns about vaccine safety (Hopkins & Wood, 2013; Laz et al., 2012), and the need to return for additional vaccines (Head, Vanderpool, & Mills, 2013; Laz et al., 2012). The most commonly reported facilitators to HPV vaccine uptake reported by parents and adolescents were provider counseling and recommendation for the HPV vaccine (Grimes et al., 2013; Hopkins & Wood, 2013; Small et al., 2014; Staras, Vadaparampil, Patel, & Shenkman, 2014; Ylitalo et al., 2013; Zimet et al., 2013); higher knowledge levels about HPV and the HPV vaccine (Kahn et al., 2009; Small et al., 2014); belief that HPV vaccination is a health-promoting activity (Kahn et al., 2009; Staras et al., 2014); insurance status (Staras et al., 2014; Ylitalo et al., 2013); and belief that the HPV vaccine is safe (Staras et al., 2014).

The third goal proposed by the President's Cancer Panel (n. d.) was to maximize access to the HPV vaccine by offering it in more convenient alternative settings outside of an office visit, such as in schools, pharmacies, health departments, urgent care centers, and emergency centers/departments. This would help to eliminate a barrier reported by parents and adolescents, which was the need to return for additional vaccines (Head et al.,

2013; Laz et al., 2012). However, the AAP (2002) and the American Academy of Family Physicians ([AAFP]; 2008) recommend vaccinations to be administered in the medical home under the care of a primary physician. Therefore, similar to other preventative vaccines, the HPV vaccine is typically offered in the medical home, or primary care center.

The medical home is one component of ambulatory care, which is healthcare that is performed in outpatient settings rather than through admission to a hospital or other healthcare facility (The Medicare Payment Advisory Committee, n. d.). The medical home concept was first proposed by the AAP (2002) as a method to provide comprehensive care to children. It is a team-based healthcare model that is led by the primary care physician to provide continuous and coordinated care throughout the lifespan (American College of Physicians, 2015). The characteristics of the medical home include being accessible, family-centered, continuous, comprehensive, coordinated, compassionate, and culturally competent (AAP, 2002). The medical home is the clinical site for primary care, including acute, chronic, and preventative services. The preventative services provided are comprised of immunizations, physical assessments, screening, counseling, and health promotion services.

Nurses in Ambulatory Care

Advanced practice registered nurse (APRN) is a broad term that describes registered nurses who have met the educational and clinical practice requirements to function independently in a provider role (American Nurses Association [ANA], 2011).

APRNs consist of nurse practitioners (NP), certified nurse-midwives (CNM), clinical nurse specialists (CNS), and certified registered nurse anesthetists (CRNA). In the medical home, the APRN supplements the physician role by improving access to primary care. The APRN provides a diagnosis and facilitates management of acute and chronic disease, while simultaneously emphasizing health promotion and disease prevention (American Academy of Nurse Practitioners [AANP], n. d.). According to the AANP (n. d.), the number of NPs working in primary care is increasing rapidly. In 2010, it was estimated that about 52% of nurse practitioners (NP) were employed in primary care (Agency for Healthcare Quality and Research [AHRQ], 2014).

The registered nurses (RN) who provide care in the ambulatory care setting are responsible for: (a) ensuring patient safety and the quality of healthcare delivery, (b) the design, implementation, and evaluation of nursing services, (c) leadership when collaborating and coordinating services, and (d) maintaining full accountability for all nursing services and related patient outcomes (American Academy of Ambulatory Care Nursing [AAACN], 2012). When providing comprehensive care to patients, the RN demonstrates leadership that emphasizes health promotion, health education, preventing disease, efficient transitions of care, and managing disease to help prevent secondary complications. In 2008, approximately 25% of the RN workforce were employed in an ambulatory healthcare setting, with 10.5% employed in medical or physician practices, health centers, or clinics (U. S. Department of Health and Human Services, Health Resources and Services Administration [HRSA], 2010).

The licensed vocational/practical nurse (LVN/LPN) employed in the medical home setting functions under the purview of APRNs, RNs, and physicians to provide safe and effective care for patients. The role of the LVN/LPN includes performing focused nursing assessments, communicating and collaborating with healthcare professionals to ensure optimal patient outcomes, implementing nursing interventions, assisting with evaluation of nursing interventions, and provides patient education (National Council of State Boards of Nursing [NCSBN®], 2012). In a survey study conducted in 2012, it was found that 25.2% of the LVN/LPN workforce reported employment in an ambulatory setting (NCSBN®, 2013).

Preventing Missed Opportunities

The medical home healthcare setting is patient-focused and requires collaboration between multiple healthcare clinicians to provide efficient and effective treatment for patients. To attain the goal of health promotion, active participation from all healthcare clinicians is required. Recommendation of the HPV vaccine is a primary prevention method to help decrease the incidence of HPV-related cancers and should be practiced by all members of the healthcare team. Ambulatory care nurses in the medical home setting have the ability to provide counseling and education regarding HPV and the HPV vaccine. Including ambulatory care nurses at all levels of practice to counsel and recommend the HPV vaccine will assist in reaching the goals of the President's Cancer Panel (n. d.) to reduce missed clinical opportunities to educate and recommend the vaccine as well as increase adolescent and parental acceptance of the HPV vaccine. In

turn, HPV vaccine uptake may improve, increasing the probability of attaining the Healthy People 2020 goals of 80% HPV vaccination rate for adolescent males and females.

Rationale for the Study

HPV is the most common STI in the United States (CDC, 2013). Of the 110 million cases of STIs, HPV accounts for over 79 million cases (CDC, 2013). The Centers for Disease Control and Prevention (2014a) estimates that approximately 33,000 new cases of cancer are diagnosed each year in parts of the body where HPV is typically found, and 26,900 of these cases are attributable to HPV. With vaccination against HPV, it has been estimated that 91% of cervical cancers could be prevented (CDC, 2014b), as well as many cases of other cancer types (President's Cancer Panel, n. d.).

The estimated cost for the HPV vaccine is about $140 per dose, not including the cost for administration or the office visit (ACS, 2016a). HPV vaccines are covered under the Vaccines for Children (VFC) program, which provides immunizations that are recommended by the Advisory Committee on Immunization Practices (ACIP) at low or no cost for eligible patients (CDC, 2014c). Family assistance with HPV vaccination costs is also available through the Immunization Grant Program sponsored by the CDC, as well as the Children's Health Insurance Program (CHIP), which is state-sponsored, for those children who are not eligible for the VFC program (Kaiser Family Foundation, 2015). For those with private insurance, the Affordable Care Act requires that all new

health insurance plans must cover all recommended preventative services at no cost to the consumer, including vaccinations (Kaiser Family Foundation, 2015).

Chesson et al. (2012) completed a study to estimate the direct medical costs of preventing and treating infection with all HPV types that cause anogenital disease, oropharyngeal disease, and respiratory disease. Based on the data, it was estimated that the cost of preventing and treating HPV-associated cancers is about $8 billion. Approximately 82% of the cost was attributable to cervical cancer screening ($5.4 billion) and follow-up ($1.2 billion). An estimated 12% was for treating cancer ($1 billion), with $441 million for treating cervical cancer and $306 million for treating oropharyngeal cancer. The expenditure for treatment of non-oncogenic disease (genital warts and recurrent respiratory papillomatosis) was about $288 million and $171 million, respectively. Chesson et al. proposed that HPV vaccination could be more cost-effective with modified cervical cancer screening guidelines. In addition, the follow-up costs of cervical cancer screening and the costs of treating genital warts and recurrent respiratory papillomatosis could be reduced through HPV vaccination.

In addition to the financial burden of HPV-related disease is the possibility of decreased quality of life. Fleurence, Dixon, Milanova, and Beusterien (2007) completed a systematic review in which the health-related quality of life implications among women with HPV infection were examined. Specific to HPV infection, the authors found that the women reported changes to their emotional functions (more anger, anxiety, concern, depression, distress, and shame), altered body image (felt less desirable and lower social

activity), and reduced sexual functions (reduced sexual contact and interest). Changes in psychosocial functioning may lead to increases in the use of other health resources. The authors concluded that vaccination with HPV may not only decrease the costs for treatment of HPV-related disease, but may also increase the quality of life associated with HPV infection.

Stokley et al. (2014) asserted that the reasons reported by parents and adolescents for not receiving the HPV vaccine highlight the need to educate parents and adolescents to increase their knowledge about HPV and HPV vaccines, as well as the need to increase healthcare clinicians' rates of HPV vaccine recommendation. The authors also pointed out the concern that, in 2013, about one-third of the parents of females and over half of the parents of males reported that they did not receive a recommendation for the HPV vaccine from a healthcare clinician. The current study is designed to delineate the current role that ambulatory care nurses of all educational levels engage in to promote HPV vaccine uptake. As a relevant part of the healthcare team, ambulatory care nurses should be employed to provide pertinent counseling and education regarding HPV and the HPV vaccines. Considering the tremendous burden of HPV infection and HPV-related disease, recommendation for the HPV vaccines from all licensed healthcare clinicians is necessary to decrease the financial and psychosocial impact of HPV infections.

Conceptual Framework

Informed Decision Making and Shared Decision-Making

To address the importance of including patients in healthcare management that were reflected in the Healthy People 2010 goals, Briss et al. (2004) developed a framework to describe the components that affected patient outcomes. The authors defined informed decision-making (IDM) as a process in which the patient gains an understanding of the disease progression, clinical treatment, and outcomes, including risk, limitations, and benefits of treatment. The patient also has the opportunity to determine his or her preferences, participate in the decision-making process as desired, and has the opportunity to make a decision or defer the decision to a later time. IDM can be any intervention that occurs within a community or healthcare setting that promotes individuals to make informed decisions regarding their health. It is not necessary to include a healthcare provider during IDM interventions. These interventions tend to be more general, providing a basic overview of disease processes and treatments.

In contrast, shared decision-making (SDM), which could be a part of IDM or a separate interaction, includes the patient and healthcare provider (Briss et al., 2004; Rimer, Briss, Zeller, Chan, & Woolf, 2004). SDM was defined as having occurred when, within the clinical setting, patients and healthcare providers have both expressed their preferences and participated in the decision-making process (Briss et al., 2004). SDM encounters tend to be more comprehensive and individualized, as they are usually face-to-face interactions in which more intimate discussions can occur (Briss et al., 2004;

Rimer et al., 2004). Application of the SDM process encourages patient involvement and possibly a greater commitment to the treatment plan, leading to improved patient outcomes.

Within the framework, Briss et al. (2004) asserted that IDM interventions would result in improved patient knowledge and conceptions about the disease process and options for treatment; allow for patient participation in the decision-making process at the level they desire; and enable a decision to be made that is consistent with patient preferences. In addition, SDM interventions oriented to the providers and healthcare system would ensure greater adherence to policies that promote SDM. These interventions are necessary to help ensure that there is an improvement in provider knowledge, self-efficacy, attitudes and intentions regarding SDM, which would lead to increased provider participation in SDM and improved patient outcomes.

Charles, Gafni, and Whelan (1997) argued that, in order for SDM to occur, there are characteristics included in the process that allow for a two-way exchange of information as well as treatment preferences. The first element is the inclusion of at least two participants, the patient and the healthcare clinician. The clinician must ensure a conducive atmosphere to encourage the patient to share their views and preferences regarding the treatment. Acknowledgement of preferences can be predictive of patient behavior, which affects outcomes. The clinician should also share accurate and up-to-date resources and evidence to advise the patient on the treatment options, including risks, benefits, and limitations in an unbiased manner. As patients may approach this

encounter with the clinician having pre-conceived notions or ideas about the disease process or treatments, it is imperative that the clinician is knowledgeable about treatment options. The clinician is responsible for ensuring that the patient preferences for treatment is based on facts and not erroneous conceptions. The clinician will also share their own preferences and recommendations for treatment, while reaffirming the patient's preferences. A treatment decision would then be made, which does not mean that both parties agree that it is the best decision for the patient. Most importantly, as both parties have a vested interest in the outcome, there is mutual acceptance and responsibility for the treatment plan.

The Healthy People 2020 goals continue to include the importance of obtaining optimal health communication between patients and clinicians using appropriate communication strategies and health information technology (Office of Disease Prevention and Health Promotion, 2015). Use of the Internet has allowed for massive amounts of health information to be available to consumers, patients, and healthcare clinicians (Rimer et al., 2004). The positive impact on public health that would occur with effective health communication include shared decision-making between patients and clinicians, personalized self-management resources and tailored health education, establishing social support networks, increasing health literacy of the population, promoting quick and informed decision-making in response to disease, and assisting in the development of programs and interventions that promote healthy behaviors. In turn, these positive impacts will result in improvements in healthcare quality and safety,

improved efficacy of healthcare delivery, and effective patient decision-making through building skills and knowledge related to health and health promotion.

One challenge identified related to health information technology is the use of social media and other forums for patient health information (Office of Disease Prevention and Health Promotion, 2015). This could be problematic for healthcare, because not all of the information that can be found online has been verified or validated by a healthcare professional. In a survey of U. S. adults, Perrin and Duggan (2015) found that 87% of U. S. adults use the internet, with 72% of internet users reporting that they searched online for health information within the last year (Pew Research Center, 2015). Of concern, 77% of these respondents reported that they began their search using a search engine; 13% began their search on a website that specializes in health information; 2% stated that they began researching on general sites; and 1% stated that they began their health information search on a social media site. In addition, 35% of participants stated that they have gone online at some point in time specifically to try to determine what medical condition they or someone they know may have had.

In contrast, when asked about the last serious health issue and from whom they relied on for information, 70% of respondents indicated that they relied on information, care or support from a healthcare professional (Pew Research Center, 2015). This indicates that healthcare clinicians remain key to providing information and resources in regards to educating the public regarding health information. Thus, it is essential to ensure that healthcare clinicians possess the resources to provide timely and accurate

information regarding health and health promotion to aid patients during the SDM process.

The Nurse's Role in Encouraging SDM during the Office Encounter

The perception of time constraints during the physician encounter is a challenge that may interfere with the SDM process (Bruno, Wilson, Gany, & Aragones, 2014; Charles et al., 1997; Daley et al., 2010; McRee, Gilkey, & Dempsey, 2014; Rimer et al., 2004; Sussman et al., 2007; Vadaparampil et al., 2011; Zimet et al., 2013). These constraints may lead to the belief that efforts for SDM should be devoted to treatment decisions that are more difficult (Rimer et al., 2004). Thus, routine preventive care measures may not receive appropriate attention during the face-to-face encounter to encourage SDM to occur, leading to missed opportunities. In a recent study, Farmar et al. (2016) concurred, stating that missed opportunities for the HPV vaccine occur when healthcare clinicians do not treat every acute or preventive encounter as an occasion for vaccination.

To counteract this challenge, Rimer et al. (2004) proposed that providers must employ resources outside of the provider encounter, such as engaging other healthcare clinicians who are trained to promote SDM. Nurses of all educational levels have the ability to engage and counsel patients on health promoting activities and behaviors. In the ambulatory care setting, nurses can apply the SDM process to help patients reach decisions regarding their health, including the use of preventive measures.

Considering the framework proposed by Briss et al. (2004), the knowledge, attitudes, self-efficacy, and intentions of the healthcare clinician influence the implementation of SDM. Acknowledging this influence, a modified version of Briss et al.'s framework was conceptualized by Bartlett (2012) to aid in the development of an instrument to measure the latent variables of knowledge, attitudes, self-efficacy, and intentions regarding the HPV vaccine (Figure 1). When determining how ambulatory care nurses can influence the HPV vaccine uptake by adolescent males and females, it is critical to evaluate the knowledge, attitudes, self-efficacy, and intentions of nurses to recommend the HPV vaccine to their patients.

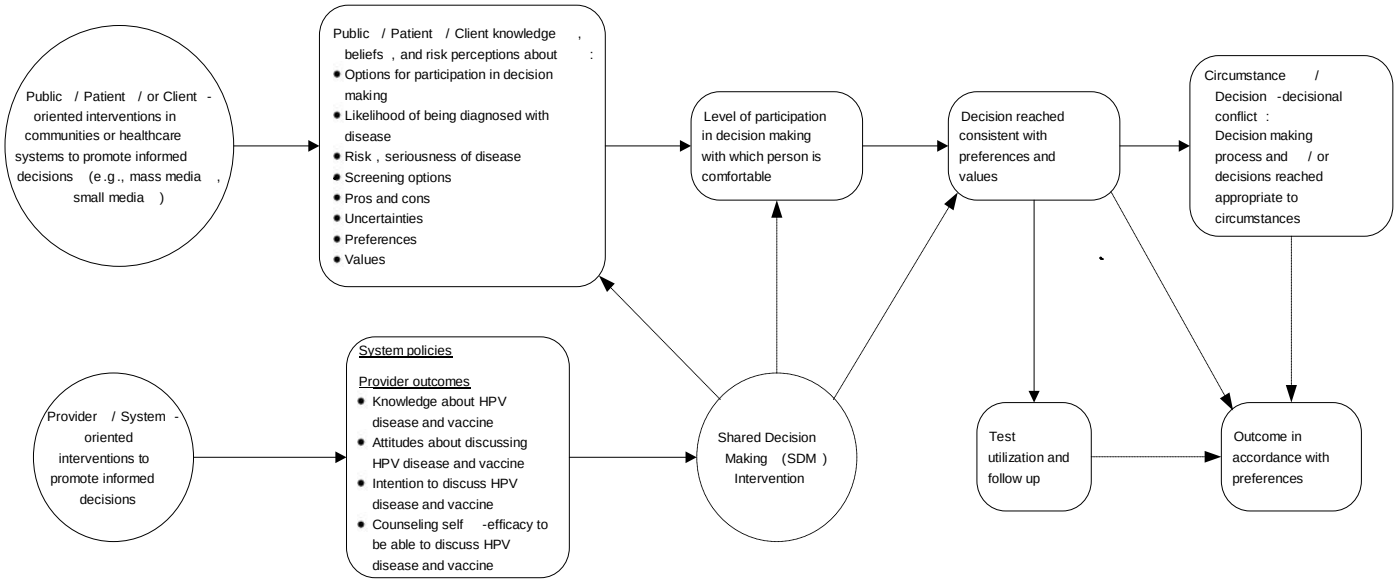

Figure 1. Informed and Shared Decision-Making Framework as Conceptualized by J. A. Bartlett, for The Development and Psychometric Testing of the Shared Decision-Making Inventory Instrument. Adapted from Bartlett (2012).

Assumptions

This study is based on the following assumptions:

1. All participants will be licensed nurses employed in an ambulatory care setting.
2. The participants will possess at least a minimal awareness of the HPV vaccine, to be able to perform a self-evaluation of their personal knowledge, attitudes, self-efficacy, and intent to recommend the HPV vaccine to preteen males and females.
3. Assessment of the participants' knowledge, attitudes, self-efficacy, and intent to recommend the HPV vaccine to preteen males and females will determine their ability to implement SDM during the patient encounter.

Research Questions

In addition to measuring the knowledge, attitudes, self-efficacy, and intentions to recommend the HPV vaccine to preteen males and females, relationships that may exist between these variables will also be studied. Therefore, the research questions guiding the study are:

1. In ambulatory nursing staff, what is the effect of knowledge about the HPV disease and vaccine and the education level on clinician attitude toward recommending the vaccine to preteen males and females?

2. In ambulatory nursing staff, does attitude and self-efficacy about the HPV vaccine affect the clinician's intent to offer the vaccine to preteen males and females?

Definition of Terms

Knowledge

Knowledge is a latent variable that can be conceptually defined as possessing accurate information on a topic (Ajzen, Joyce, Sheikh, & Cote, 2011). The degree of knowledge, or knowledge level, is determined by counting the number of correct responses as measured by an objective standard (Ajzen et al., 2011). Knowledge will be measured using two subscales consisting of 10 questions each, one which measures disease knowledge and one which measures vaccine knowledge. For each statement, the participant will answer "true," "false," or "don't know/not sure." Five points will be given for each correct answer, zero points for incorrect answers, and one point for "don't know/not sure," for a total knowledge score ranging from 0-100.

Attitude

Attitude, as a latent variable, has been conceptually defined as a consistent, learned predisposition to respond to a situation or object in a certain way (Kothandapani, 1971). It is a reaction to a preexisting stimulus that includes the components of affect, behavior, and cognition (Breckler, 1984). Attitude toward the HPV vaccine will be measured using one Likert-type subscale consisting of six questions with the answer

choices of “strongly agree,” “agree,” “neutral/not sure,” “disagree,” and “strongly disagree,” for a score ranging from 6-30.

Self-Efficacy

As a latent variable, self-efficacy toward a behavior is one’s belief regarding the capability to perform the behavior (de Vries, Dijkstra, & Kuhlman, 1988). The level of self-efficacy is not determined by proficiency, but rather by one’s beliefs of their ability to perform using the skills they possess (de Vries et al., 1988). Self-efficacy toward the HPV vaccine will be assessed using one Likert-type subscale of 10 questions with the answer choices of “extremely confident,” “very confident,” “confident,” “somewhat confident,” and “not at all confident,” for a score ranging from 10-50.

Intent

Intent is conceptually defined as the behavior one expects to perform or achieve (“Intent”, n. d.). The intention to act in a certain way is believed to be extremely predictive of behavior (Kothandapani, 1971), and is a latent variable. Intent to offer the HPV vaccine will be analyzed using one Likert-type subscale of two questions, with the answer choices of “strongly agree,” “agree,” “neutral/not sure,” “disagree,” and “strongly disagree,” for a score ranging from 2-10.

Preteen

Preteen is conceptually defined as a male or female younger than 13 years of age (“Preteen”, n. d.). For the purposes of the study, preteen is defined as a male or female

who is 11-12 years of age, which is the recommended age for receipt of the HPV vaccination.

Adolescent/Adolescence

An adolescent is conceptually defined as a young male or female who is going through adolescence ("Adolescent", n. d.). Adolescence is conceptually defined as the stage of growth and development that typically occurs between the ages of 10 and 19, with appreciation of the fact that the length of time of the adolescent period may vary across time, cultures, and socioeconomic circumstances (World Health Organization [WHO], 2016). For the purposes of this study, use of the term "adolescent" is inclusive of "preteen," with the use of the term "preteen" to be specific to the ages defined previously.

Limitations

This study has several limitations. The sampling method employed included placement of the invitation and reminder letters on the discussion boards of nursing organizations and encouraged snowball sampling. Although the vast majority of respondents were from the U. S., there is a possibility that a small percentage of respondents may reside outside the U. S.

The use of a web-based survey limits the number of participants in that the respondents must have access to the Internet in order to participate. There may be other eligible nurses without ready access to the Internet, and who may have different responses that could affect the data analysis.

The measurement tool chosen to assess the variables was only recently developed, with limited testing to determine the psychometric properties. In addition, the use of a structured self-report tool introduces the possibility of social desirability response bias, in which the participants may represent themselves by responding based on the prevailing societal beliefs (Polit & Beck, 2012). Attempts were made to minimize this bias through the inclusion of a social desirability item (Polit & Beck, 2012). Acquiescence response set bias was also a possibility (Polit & Beck, 2012), for which the instrument developer attempted to minimize through the use of reverse coding of some of the questions/statements.

Summary

Considering the ubiquitous nature of HPV, the advent of the HPV vaccine has provided an effective approach to combating the potential costly and devastating effects. To help promote positive outcomes regarding HPV disease progression, Healthy People 2020 goals include that 80% of females and males ages 13-15 should complete the three-dose HPV vaccine series. Although the percentage of preteens vaccinated has increased, HPV vaccine series completion remains well below the Healthy People 2020 goals. The three overarching goals set forth by the President's Cancer Panel (n. d.) emphasize the significance of preventing missed opportunities and increasing acceptance through patient education to increase uptake. These goals can be accomplished through implementation of shared decision-making in all patient interactions. As part of the collaborative team, nurses of all education levels who care for preteens in the ambulatory

setting have the ability to counsel and recommend the HPV vaccine to their preteen patients and parents/guardians. Therefore, through eliciting the knowledge, attitudes, self-efficacy, and intent, the impact of nurses within the ambulatory setting on shared decision-making and the HPV vaccine uptake can be established.

CHAPTER II

REVIEW OF LITERATURE

The current literature review was designed to delineate a possible solution to low HPV vaccine uptake. First, the perceived barriers and facilitators to HPV recommendation that have been reported by healthcare providers will be reviewed. Following this discussion, the intent of nurses to recommend the HPV vaccine will be addressed. The remainder of the chapter will focus on analyzing the evidence from prior research and uncovering the gaps in knowledge that remain.

Literature Search Strategy

Literature searches were conducted in the databases PubMed, CINAHL, Scopus, and EBSCOHost. The search was also limited to English language, and conducted in the United States. Since the HPV vaccines were not approved for use until 2006, and to ensure adequate review, no date limits were set. The search terms used were "human papillomavirus (or HPV) vaccine," "human papillomavirus (or HPV) vaccination recommendation(s)," "attitude(s)," "knowledge," "self-efficacy," "intent(ion)," "healthcare provider(s)," "healthcare professional(s)," "physician(s)," "nurse practitioner(s)," and "nurse(s)." The searches were performed with both single terms and combinations of terms. Articles were included if they examined the knowledge, attitudes, self-efficacy, intent, or actual behavior regarding HPV and the HPV vaccine, and perceived barriers to recommending the HPV vaccine. Articles were excluded if they

were not conducted in the United States. As the Healthy People 2020 goals of 80% HPV vaccination rate for adolescent males and females are being utilized as the benchmark to measure goal attainment, studies conducted in other countries would not be appropriate to include when analyzing the status of HPV recommendation rates in the United States. Articles were also excluded if the focus was primarily on suggestions to counteract the commonly reported barriers to HPV recommendation, with little review or discussion of the barriers.

Healthcare Provider Intent to Recommend HPV Vaccination

Sussman et al. (2007) completed a qualitative study to examine the current counseling about HPV and cervical cancer among primary care providers. The purposive sample of providers consisted of physicians and nurse practitioners practicing in New Mexico and who cared for the adolescent population. The specialties of the 37 participants were family physicians (13), obstetrics/gynecology (12), pediatricians (5), and other (7). Semi-structured interviews were conducted, and the results analyzed to identify themes. Although the providers presumed that most adolescents engage in risky sexual behaviors, they reported not providing HPV counseling due to the complexity of the topic, low knowledge levels of the adolescents regarding HPV, their discomfort with their own knowledge base about HPV, and time constraints. Instead, providers were more likely to counsel about HPV related to situational influences, such as during an exam for genital warts. The providers also reported that the degree of trust and rapport with the patient influenced the types of conversations between provider and patient. For example, those adolescents demonstrating greater trust tended to be more willing to

discuss their questions or concerns regarding sexuality. In regards to receptivity of the HPV vaccine, providers were concerned with parental hesitancy and the possibility of increased sexual promiscuity. A limitation of the study was that it was completed prior to the release of the HPV vaccines. However, the study provides a historical context from which comparisons can be made to assess changes in perceptions of providers regarding HPV vaccines.

In a qualitative study by Kahn et al. (2007), 31 pediatricians purposefully sampled from Ohio, Kentucky, and Indiana were invited to explain and describe attitudes about recommending the HPV vaccine, key factors influencing their intention to recommend the HPV vaccine, and to provide support for a conceptual model designed to explain pediatricians' decision-making in regards to HPV vaccine recommendation. The semi-structured interviews were conducted one-on-one using open-ended questions to determine their knowledge about HPV and the HPV vaccine, attitudes toward recommending the HPV vaccine, intent to recommend the HPV vaccine, and motives for their intentions. The authors found that pediatricians' attitudes were strongly associated with their intention to recommend the HPV vaccines. Several barriers affecting the pediatricians' attitudes were reported, such as the efficacy and safety of the HPV vaccines, challenges ensuring series completion, lack of parental knowledge about the HPV vaccine, parental hesitancy in regards to adolescent sexual activity, and low self-efficacy to convince parents of the necessity of the HPV vaccine. Nonetheless, the majority of respondents indicated that they had high intentions of recommending the HPV vaccine. However, provider intentions fluctuated according to adolescents' age,

gender, and vaccine type (bivalent vs. quadrivalent). About one-half of the participants preferred to vaccinate older adolescents (> 15 years). Only about two-thirds indicated that they would recommend the HPV vaccine to both males and females. However, for those that would recommend to both genders, their motive was the idea of herd immunity—vaccinating males should protect females by preventing HPV transmission. It was also found that knowledge of the HPV vaccines and endorsement by professional organizations influenced intention to recommend the HPV vaccine. A limitation of this study was that it also was completed prior to approval and release of the HPV vaccines, but provides a historical context for comparison. The noted similarities to the Sussman et al. (2007) study include the perceived barriers of knowledge levels of both providers and adolescents/parents and perceptions of parental hesitancy.

Leddy, Anderson, Gall, and Schulkin (2009) conducted a survey study to examine the knowledge, beliefs, and practices regarding the HPV vaccine. Three samples of obstetrician/gynecologists were recruited from the American College of Obstetricians and Gynecologists ([ACOG]; *N* = 952, 30.5% response rate) District V region, the Collaborative Ambulatory Research Network ([CARN]; *N* = 390, 50.6% response rate), and another sample from ACOG (*N* = 295, 28.3% response rate) District V region. The two samples from ACOG District V were used to prevent overlap—those ACOG District V members who were also CARN members were included with the CARN data to be able to determine representativeness of the ACOG District V cohort. The ACOG District V respondents' geographical location was in Ohio, Indiana, Kentucky, Michigan, and Ontario, Canada, and the CARN members were nationally representative. The results

showed that males who graduated from medical school prior to 1983 were significantly less likely to administer HPV vaccines ($p < .001$). Females had the same trend, but was not significant ($p = .08$). Knowledge level also impacted willingness to vaccinate ($p = .01$). Another identified challenge was the perception of 90.3% of physicians that cost was a barrier to patients ($p < .05$). Identified limitations of the study included that the surveys were completed retrospectively, possibly causing errors in recall and use of an investigator-developed survey, for which psychometrics were not reported. Similar to the previously mentioned studies, knowledge level and cost were perceived barriers influencing the intention to vaccinate.

Another survey study by Daley et al. (2010) was conducted to assess the HPV-related attitudes, actual HPV vaccination practices, perceived barriers to vaccination, and facilitators to strongly recommending the HPV vaccine to 11-12-year-old females. A total of 680 physicians recruited from the American Academy of Pediatrics and the American Academy of Family Physicians completed the survey (349 pediatricians, 81% response rate; 331 family physicians, 79% response rate). The data identified significant differences between pediatricians and family physicians related to knowledge about HPV and cervical cancer ($p < .01$). Only 58% of family physicians and 43% of pediatricians knew that genital warts are not caused by the same HPV types as those causing cervical cancer ($p < .01$). There was a significant difference between physicians noted regarding whether or not sexually active women should be tested prior to HPV vaccine initiation (85% family physicians and 91% pediatricians responded correctly, $p < .05$). A significant difference between physicians was also noted regarding whether or not

pregnancy tests should be performed on sexually active women prior to administration (69% family physicians and 86% pediatricians responded correctly, $p < .01$). Additionally, the barriers to HPV vaccine recommendation that were identified were concerns about financial reimbursement, perceptions of parental opposition, and concerns about vaccine safety. Nonetheless, 98% of pediatricians and 88% of family physicians ($p < .001$) reported giving the HPV vaccine in their office.

Vadaparampil et al. (2011) evaluated the prevalence of HPV vaccine recommendation to females of different age groups by providers of different primary care specialties. The age groups were early adolescence (11-12 years), middle adolescence (13-17 years), and late adolescent/young adult (18-26 years). The nationally representative sample consisted of 500 family physicians, 226 obstetric/gynecologists, and 287 pediatricians ($N = 1013$, 67.8% response rate). The results indicated that pediatricians are more likely to consistently recommend HPV vaccination to 11-12- year-olds (odds ratio [*OR*] = 2.6, 95% confidence interval [CI], 1.9-3.7), 13-17-year olds (*OR* = 4.7, 95% CI, 3.4-6.6) and 18-26-year olds (*OR* = 5.3, 95% CI, 3.6-7.7) compared to the physicians of other specialties. In addition, those providers who reported fewer perceived barriers were significantly more likely to recommend the HPV vaccine ($p < .001$). The specific barriers reported to impact HPV vaccine recommendation were discussing sex or sexually transmitted infections ($p = .009$), perception of teens practicing riskier sexual behaviors ($p = .01$), administering the HPV vaccine with limited safety data ($p < .001$), adding another vaccine to the immunization schedule ($p < .001$), lack of information about the vaccine ($p = .01$), cost of purchase and stocking ($p < .001$), lack of adequate

reimbursement (p = .05), insurance not covering the vaccine (p = .009), time to discuss the HPV vaccine with adolescents/parents (p = .004), and difficulty ensuring vaccine series completion (p = .001).

A literature review by Zimet, Rosberger, Fisher, Perez, and Stupiansky (2013) focused on the more common concerns and barriers identified in the research literature and popular media that are typically correlated with HPV vaccine non-acceptance. The review examined the reported fears about the possibility of increased sexual activity, concerns about vaccine safety, inadequate HPV vaccine recommendations, and the wariness and stigma related to the HPV vaccine. Specifically related to low HPV vaccine recommendation rates, the authors identified the reported barriers of lack of time during the encounter, perceptions of parental hesitancy, and inadequate provider knowledge, which led to unwillingness to recommend the HPV vaccine. A limitation of this literature review was that it only focused on specific barriers selected by the investigators. Thus, other potential barriers may have not been discussed.

More recently, a cross-sectional survey study was completed by Bruno, Wilson, Gany, and Aragones (2014) to define the practices, beliefs, and barriers that affect physician utilization of the HPV vaccine among racial/ethnic minorities. A stratified random sampling technique was employed to recruit pediatricians, family practitioners, and internal medicine specialists practicing in New York (N = 121, 78% response rate). Only 41 (34%) of the respondents reported recommending the HPV vaccine routinely. Of those providers routinely recommending the HPV vaccine, most were pediatricians (66% compared to 27% family practitioners and 7% internists; p = .005). One identified

barrier for some providers was that they were unsure about the efficacy of the HPV vaccine and were thus less likely to routinely recommend the vaccine. Another barrier identified was the lack of time to educate adolescents and parents (70% pediatricians vs. 47% family practitioners vs. 45% internists; $p = .049$). The challenges of parental hesitancy due to the affiliation of the HPV vaccine with sexual activity and concerns with ensuring series completion was also reported. A limitation of this study was that it used unverified, self-reported data. Additionally, the sample was limited to a specific geographical location, decreasing the generalizability of the findings. Nonetheless, this study highlighted similar barriers that have been previously reported by providers.

McRee, Gilkey, and Dempsey (2014) completed a study to determine the HPV vaccine recommendation practices of healthcare providers practicing in Minnesota. The researchers also sought to explore the providers' perceptions of HPV vaccine hesitancy among parents of 11-12-year-olds, as well as the provider approaches to addressing them. The sample (N=575, adjusted response rate=28%) consisted of pediatricians (20%), family medicine physicians (47%), and nurse practitioners (33%). The cross-sectional, online survey revealed that, although the majority of respondents (91%) agreed that providers are highly influential in the parental decision to vaccine their preteen(s), only 76% of the providers reported that they recommended the HPV vaccine to preteen females routinely, which was defined as greater than 75% of the time. In contrast, only 46% reported routinely offering the HPV vaccine to males ($p < .001$). Pediatricians reported routinely recommending the HPV vaccine to males more than family physicians and nurse practitioners, 67% vs. 42% and 41%, respectively ($p < .001$). Furthermore,

almost two-thirds responded that they preferred to offer the HPV vaccine as *optional* for preteen girls or boys. This discordance between the providers' perceptions about the importance of their recommendation of the HPV vaccine and their actual behavior was perhaps addressed by the providers' perceived barriers. The providers perceived that parents were often hesitant for various reasons, such as the belief that their child was not at high risk for contracting HPV or parental discomfort when talking about adolescent sexual activity. Relatedly, the survey results indicated that the provider's level of self-efficacy to address these parental concerns about the HPV vaccine was a direct indicator of HPV vaccine recommendation. For example, confidence in the ability to address parental concerns about the belief that HPV vaccination would increase adolescent sexual activity led to a higher likelihood of recommending the HPV vaccine (for girls, odds ratio [*OR*] = 1.5, 1.2-2.0, $p < .01$; for boys, *OR* = 1.4, 1.1-1.8, $p < .01$). Alternatively, those with lower confidence levels to address HPV vaccine hesitancy were also less likely to recommend the HPV vaccine. In addition, nearly half of the providers reported that they lacked the time required to adequately address parental hesitancy, which could discourage providers from recommending the HPV vaccine. Although there was a low response rate and bias possibly introduced due to self-report measures, the results suggest that effectual and pragmatic approaches to address barriers to increase HPV vaccine recommendations are necessitous.

Nurses' Intent to Recommend HPV Vaccination

Prior to the approval and release of the HPV vaccines, Mays and Zimet (2004) conducted a survey study to determine the factors that affect the attitudes of nurse

practitioners (NPs) toward recommending sexually transmitted infection (STI) vaccinations to adolescents. The specific factors evaluated were the age and gender of the patient, type of infection prevented, and endorsement by a professional organization. The hypothetical STI vaccinations used to evaluate the intent to recommend vaccination were for herpes and human immunodeficiency virus (HIV). A hypothetical vaccine for mononucleosis was included as a non-STI vaccine to evaluate differences in intent. The convenience sample of 224 participants (96% female) were recruited from professional conferences in two Midwestern states. The findings showed that those NPs who spent more than 25% of their time caring for adolescent patients had higher intent to recommend STI vaccinations than those who spent less than 25% of their time caring for adolescent patients ($p < .02$). NPs reported a preference for vaccinating older vs. younger adolescents (part-worth utilities = 4.6 and -5.7, respectively). The adolescent's gender did not play a role in intent to recommend vaccination (part-worth utilities = 0.6 and -0.6, respectively). There was a higher preference to recommend vaccination against HIV than the intent to recommend mononucleosis vaccine (part-worth utilities = 2.6 and -2.4, respectively). Endorsement by a professional organization also influenced intent to vaccinate—there was a preference for recommending those vaccinations endorsed by a professional organization rather than those that were not (part-worth utilities = 9.8 and -9.8, respectively). Limitations of the study included a small, non-random, convenience sample and the use of hypothetical scenarios, which cannot accurately predict actual behavior.

Following HPV vaccine release, Kahn et al. (2009) conducted a survey study of nurses, who were also mothers, to determine the attitudes about HPV vaccinations and intention to vaccinate their daughters. The study also elicited the intentions for participants to receive a vaccination if recommended, and examined the demographic, behavioral, and attitudinal factors linked to the intention to vaccinate daughters in different age groups (9-12 years, 13-15 years, and 16-18 years). The 7,207 participants (84% response rate) were the mothers of children already enrolled in a different national, longitudinal study. The variables significantly linked to intention to vaccinate were demographics factors (age, income, and race/ethnicity); mother's history of HPV and Papanicolau (Pap) testing; intention to receive a Pap test; smoking status; communication with daughter about Pap testing; belief in regular Pap testing for daughter; beliefs about outcomes of Pap testing; and beliefs about the HPV vaccine (all $p < .05$). The intention to vaccinate a younger daughter (9-12 year) were associated with beliefs that the HPV vaccine would provide protection against cervical cancer (adjusted odds ratio [*OR*] = 4.90, 95% CI, 4.42-5.43). These same beliefs about the HPV vaccine were also associated with intention to vaccinate an older (16-18 years) but not younger daughter (9-12 years) and intention to vaccinate both older and younger daughters (adjusted *OR* 14.7, 95% CI, 12.2-18.2 vs. adjusted *OR* 50.0, 95% CI, 40.0-62.5, respectively). These mothers also reported a preference of vaccinating older (16-18 years, 86%) vs. younger daughters (9-12 years, 48%). In addition, 48% of the participants reported intent to receive the HPV vaccination themselves, if recommended. Limitations of this study

included that the participants were all nurses, mostly white, with a relatively high mean income.

In Kahn et al.'s (2009) study, the inclusion of mothers, who were also nurses, introduces the idea of the unique perspective of those persons who routinely make healthcare decisions for themselves and their children while considering their dual roles of parent and healthcare clinician. In addition, the intention to receive the HPV vaccine suggests the idea that those who are more willing to receive the HPV vaccine have better attitudes toward HPV vaccination, and thus will be more likely to recommend the HPV vaccine to others.

Head, Vanderpool, and Mills (2013) conducted a qualitative study on healthcare professionals practicing in Appalachian Kentucky. The aim of the study was to identify healthcare professionals' perceptions of why uptake and adherence to the HPV vaccine schedule was low amongst the 18-26-year-old population when cost was not a barrier. The authors also queried the participants for suggestions that could positively impact the HPV vaccination rates in their community. Private semi-structured interviews were conducted with eight healthcare professionals (four Licensed Practical Nurses [LPN], three NPs, and one physician) and the transcripts analyzed constant-comparative methods. The reported healthcare professional perceptions were that patients did not want to endure the pain associated with vaccination, did not believe HPV vaccination to be a health-promoting behavior, there was inadequate HPV vaccine knowledge and education, challenges adhering to the HPV vaccine schedule, and clinic communication and education deficiencies amongst healthcare professionals. The suggestions provided

by the healthcare clinicians were to recommend the HPV vaccine, use tailored and age-appropriate materials for public education, employ effective reminder systems for use by clinicians, and educate patients that the return clinic visits for the subsequent doses of the HPV vaccine are nurse visits (meaning that they take less time to complete).

Rosen, Goodson, Thompson, and Wilson (2015) conducted a study of school nurses using an online survey to assess the knowledge, attitudes, perceptions of their roles as opinion leaders, and behaviors regarding promotion of the HPV vaccine; and to determine if the knowledge, attitudes and perceptions of being an opinion leader affect their behaviors regarding promotion of the HPV vaccine. In this study, an opinion leader was one who educated and promoted positive health behaviors. According to the authors, the perception of the role as opinion leader would be influenced by knowledge and attitude regarding the HPV vaccine. The participants (N = 413, 28.6% response rate) were members of the National Association of School Nurses. The data showed that knowledge influenced attitudes ($p < .05$); attitudes influenced the perceptions of their roles as opinion leaders as well as practice behaviors ($p < .05$); and the perceptions of their roles as opinion leaders also affected practice behaviors ($p < .05$). Knowledge did not significantly affect perceptions of roles as opinion leaders or practice behaviors ($p > .05$). In addition, the nurses reported mediocre perceptions of their roles as opinion leaders (mean scale score = 26.5; standard deviation [SD] = 8.4, scale range 8-48) and low practice behaviors in regards to recommending the HPV vaccine, with mean scale scores of 11.7 (SD = 4.8, scale range 7-28). The authors proposed that, although knowledge affected attitudes and attitudes affected the perceived roles as opinion leaders,

those perceptions of being an opinion leader had a strong influence on reported practice behaviors.

Summary

Barriers to HPV Vaccination

Since approval and recommendation of the vaccine in 2006, the uptake of the HPV vaccine has been lower than other vaccines (Elam-Evans et al., 2014). The low uptake of the HPV vaccine among females and males is concerning. As such, research has been completed to determine the influential factors that affect healthcare professionals' intention to recommend the HPV vaccine. Most importantly, identification of perceived barriers to HPV vaccination highlight opportunities for education and other clinical interventions that may improve HPV vaccine uptake among the target population.

Healthcare professional perceived barriers. For healthcare professionals, the perceived barriers reported included the presence of situational influences such as the degree of trust and rapport with the patient and parent or during examination for the presence of an STI (Sussman et al., 2007); low provider knowledge of HPV (Leddy et al., 2009; Sussman et al., 2007; Zimet et al., 2013); low self-efficacy and discomfort in engaging in discussions of sexuality and HPV with adolescents and parents (Kahn et al., 2007; McRee et al., 2014; Sussman et al., 2007; Vadaparampil et al., 2011; Zimet et al., 2013); perceptions of teens becoming more sexually promiscuous (Kahn et al., 2007; Vadaparampil et al., 2011); perceptions of parental hesitancy (Daley et al., 2010; Kahn et al., 2007; McRee et al., 2014); concern of cost or adequate reimbursement (Bruno et al., 2014; Daley et al., 2010; Leddy et al., 2009; Vadaparampil et al., 2011); difficulty in

ensuring vaccine series completion (Bruno et al., 2014; Head et al., 2013; Kahn et al., 2007; Vadaparampil et al., 2011); vaccine safety (Kahn et al., 2007; Vadaparampil et al., 2011); and lack of time to provide counseling (Bruno et al., 2014; Daley et al., 2010; McRee et al., 2014; Sussman et al., 2007; Vadaparampil et al., 2011; Zimet et al., 2013).

Facilitators to HPV Vaccination

In addition to the perceived barriers, research has also identified the facilitators reported by healthcare professionals that support HPV vaccination. Ascertaining and focusing on methods to promote the facilitators of HPV vaccine initiation and completion will encourage and ultimately increase HPV vaccine uptake.

Healthcare professional perceived facilitators. The reported facilitators that encourage providers to recommend and support HPV vaccine initiation and completion include time (McRee et al., 2014; Sussman et al., 2007); adequate resources and educational messages regarding safety information (Kahn et al., 2007; Vadaparampil et al., 2011; Zimet et al., 2013); higher self-efficacy regarding discussion of sexuality, HPV and HPV vaccine (McRee et al., 2014); and endorsement by a professional organization (Mays & Zimet, 2004; Zimet & Rosenthal, 2010).

Relationship of the Factors Influencing Intention to Recommend the HPV Vaccine

As discussed in Chapter 1, according to the Shared Decision-Making (SDM) framework, implementing strategies to improve healthcare clinician knowledge, self-efficacy, attitudes, and intentions will lead to increased clinician participation in SDM and improved patient outcomes.

Knowledge levels. As described above, knowledge level of HPV and the HPV vaccines are influential in the intention to recommend the HPV vaccine (Daley et al., 2010; Kahn et al., 2007; Leddy et al., 2009; Rosen et al., 2015; Sussman et al., 2007; Vadaparampil et al., 2011; Zimet et al., 2013). The assessment of knowledge levels in regards to HPV and the HPV vaccines is a critical step that provides rationale for prior and current behaviors, as well as attitudes. Three of the reviewed studies assessed knowledge of the healthcare clinician. Leddy et al. (2009) found an association between knowledge and intention. In their study, those physicians with higher knowledge levels about the HPV vaccines were more likely to administer the HPV vaccines ($p = .01$; Leddy et al., 2009). Daley et al. (2010) assessed the knowledge of physicians and Rosen et al. (2015) assessed the knowledge of nurses. However, the study by Daley et al. (2010) did not correlate knowledge to attitudes. The study by Rosen et al. (2015) demonstrated a significant impact of knowledge about HPV vaccine on attitudes toward recommending HPV vaccines ($p < .05$). The data also showed that attitudes regarding the HPV vaccine had a significant impact on intention to recommend ($p < .05$). In Kahn et al.'s (2007) study, the providers who indicated that they were not likely to recommend the HPV vaccine stated that they lacked knowledge on the safety and efficacy of the vaccine. The remaining studies (Leddy et al., 2009; Sussman et al., 2007; Vadaparampil et al., 2011; Zimet et al., 2013) all described healthcare professionals' perceptions that inadequate knowledge about the HPV vaccine was a barrier.

Attitudes. Several researchers reviewed the effect of perceived barriers on attitudes about the HPV vaccine as a variable that influenced HPV recommendation rates

(Bruno et al., 2014; Daley et al., 2010; Head et al.,2013; Kahn et al., 2007; Kahn et al., 2009; Leddy et al., 2009; McRee et al., 2014; Sussman et al., 2007; Vadaparampil et al., 2011). Kahn et al.'s (2007) study of pediatricians' attitudes about the HPV vaccine demonstrated a strong link to the intention to recommend the HPV vaccine. The authors also found that endorsement by a professional organization to have a positive impact on the intention to recommend the HPV vaccine. In 2009, Kahn et al. specifically researched the attitudes of mothers who were also nurses, and found that intention to vaccinate were significantly affected by attitudes toward the HPV vaccine. Although this study evaluated the intention to *receive* rather than *recommend* HPV vaccination, it proposed the idea that those nurses intending to receive the HPV vaccination for themselves or their daughters have a more positive attitude about the HPV vaccine and may be more likely to recommend the HPV vaccine. Vadaparampil et al. (2011) also found that those with fewer perceived barriers were more likely to recommend the HPV vaccine ($p < .001$). Overall, the evidence indicated that those healthcare professionals with fewer perceived barriers demonstrated more positive attitudes toward recommending the HPV vaccine.

Self-Efficacy. Several of the reviewed studies (Kahn et al., 2007; McRee et al., 2014; Sussman et al., 2007; Vadaparampil et al., 2011; Zimet et al., 2013) identified self-efficacy as both a barrier and a facilitator to HPV recommendation. McRee et al. (2014) found that those providers who reported more confidence in addressing parental hesitancy regarding the HPV vaccine were more likely to recommend the HPV vaccine compared to those reporting less confidence ($p < .01$). Kahn et al. (2007) also found that

physicians reported low self-efficacy to alleviate parental hesitancy as a barrier to HPV vaccine recommendation.

Gaps in Knowledge

Given that the HPV vaccination rates remain low, identification of healthcare professionals' knowledge, attitudes, and self-efficacy as they relate to intention to recommend HPV vaccination is imperative. However, few studies address nurses' intention to recommend HPV vaccination. This is alarming, as nurses have a fundamental role on the healthcare team. Particularly, in the ambulatory care setting, nurses focus on primary prevention, which includes educating and promoting wellness (AAACN, 2012). Consequently, assessing the knowledge, attitudes, and self-efficacy of ambulatory care nurses, and the relationship between the variables is critical to defining how ambulatory care nurses can contribute to promoting the uptake of the HPV vaccines.

CHAPTER III

PROCEDURE FOR COLLECTION AND TREATMENT OF DATA

Considering the ubiquitous nature of the HPV virus and the detrimental effects of HPV disease, it is imperative to endorse and encourage the uptake of the HPV vaccine. As discussed previously, perceived barriers to HPV recommendation reported by healthcare professionals included low provider knowledge of HPV (Leddy et al., 2009; Sussman et al., 2007; Zimet et al., 2013); low self-efficacy and discomfort in engaging in discussions of sexuality and HPV with adolescents and parents (Kahn et al., 2007; McRee et al., 2014; Sussman et al., 2007; Vadaparampil et al., 2011; Zimet et al., 2013); perceptions of teens becoming more sexually promiscuous (Kahn et al., 2007; Vadaparampil et al., 2011); perceptions of parental hesitancy (Daley et al., 2010; Kahn et al., 2007; McRee et al., 2014); and lack of time to provide counseling (Bruno et al., 2014; Daley et al., 2010; McRee et al., 2014; Sussman et al., 2007; Vadaparampil et al., 2011; Zimet et al., 2013). It was also noted that the number of perceived barriers was inversely related to attitude toward recommending the HPV vaccine. Healthcare professionals with fewer perceived barriers exhibited a more positive attitude toward HPV vaccine recommendation.

To address the challenge of time constraints, Rimer et al. (2004) advocated for the use of other healthcare clinicians who are trained to promote SDM. Use of the nurses working in the ambulatory care setting is a viable option to facilitate and augment HPV vaccine uptake. Prior to ascertaining the potentially greater role that ambulatory care

nurses can perform in enhancing HPV vaccine uptake rates, current knowledge, attitudes, self-efficacy and intentions should be measured.

Setting

The setting was an anonymous, secure, online survey delivered via PsychData®. This method enabled the respondents to complete the questionnaire at their convenience, in their preferred environment. The questionnaire could be completed via any device with Internet access, such as a computer, tablet, or cellphone.

Participants

The sample was drawn from a population of Registered Nurses, Advanced Practice Registered Nurses, and Licensed Vocational Nurses that are employed in the ambulatory care setting and care for the preteen population. The participants were licensed nurses employed in the U.S.; males and females; had the ability to read and understand English; and were18 years of age or older.

The participants for the study were recruited via placement of the recruitment letter with embedded link onto discussion boards of nursing organizations such as the American Nurses Association (ANA), Texas Nurses Association (TNA), and the American Academy of Ambulatory Care Nurses (AAACN). In addition, snowball sampling was utilized by encouraging participants to forward the recruitment letter with embedded link to other potential participants.

An *a priori* power analysis was conducted using G*Power version 3.1.9 to determine the minimum sample size required to find significance with a desired level of power set at .95, an α-level at .05, and moderate effect size of 0.15 (Faul, Erdfelder,

Lang, & Buckner, 2007). Based on the analysis for four multiple linear regressions with a total of eight predictor variables, it was determined that a minimum of 160 participants were required to ensure adequate power for the multiple linear regression models. The minimum sample sizes of preliminary analysis, including cross tabulation tests were less than 160, which was the sample size needed for the primary analysis (Cohen, 1988; Erdfelder, Faul, & Buchner, 1996; Faul et al., 2007).

Table 1

A Priori Power Analysis with Multiple Regressions

F tests - Linear multiple regression: Fixed model, R^2 deviation from zero		
Analysis:	A priori: Compute required sample size	
Input:	Effect size f^2	= 0.15
	α err prob	= 0.05
	Power (1-β err prob)	= 0.95
	Number of predictors	= 8
Output:	Noncentrality parameter λ	= 24.0000000
	Critical F	= 2.0002077
	Numerator df	= 8
	Denominator df	= 151
	Total sample size	= 160
	Actual power	= 0.9506385

Protection of Human Subjects

Following approval from the Texas Woman's University (TWU) Institutional Review Board (IRB) and agreement from website administrators, data collection began.

Potential risks to the study participants were identified, and included a risk for the loss of anonymity, which was minimized by using a secure, password-protected Internet data collection program. The risk for loss of time was addressed by including the fewest number of questions to decrease the time required to complete the survey. The participants were informed within the instructions that the survey could be stopped at any time should they become fatigued. Due to attempts to minimize the risk of loss of anonymity, participants were not required to register at the start of the survey. Thus, once participants left the survey, they could not return complete it later. However, the survey did not have a time limit for completion.

Instrument

The Shared Decision-Making Inventory-Revised (SDMI-R) developed by Bartlett (2012) was used for data collection (Appendix A). The instrument was made of 39 items divided into four subscales that measured the latent variables of knowledge, attitude, self-efficacy, and intent. The knowledge subscale consisted of 20 items and evaluated two components, HPV disease knowledge and HPV vaccine knowledge. The answer choices were "true," "false," or "don't know/not sure." Correct responses to the statements were provided a score of five, incorrect responses a score of zero, and unsure responses a score of one. The scores of each of the subscales could range from 0-50. The combination of scores from the two subscales provided a total knowledge score that ranged from 0-100. A total of eight items from both subscales were reverse coded to help minimize response set bias (Bartlett, 2012; Polit & Beck, 2012).

The attitude subscale consisted of six Likert-scaled items. The response choices were "strongly agree," "agree," "neutral/not sure," "disagree," and "strongly disagree." The response to each item was scored from one to five, with "strongly agree" receiving a score of five and "strongly disagree" receiving a score of one. There was one reverse coded item, for which a response of "strongly agree" received a score of one, and "strongly disagree" received a score of five. The total attitude score ranged from 6-30.

The self-efficacy subscale consisted of 10 Likert-scales items, for a total self-efficacy score ranging from 10-50. The response choices were "extremely confident," "very confident," "confident," "somewhat confident," and "not at all confident." The response to each item was scored from one to five, with "extremely confident" receiving a score of five and "not at all confident" receiving a score of one.

The intent subscale consisted of two Likert-scaled items, for a total intent score ranging from 2-10. In addition, there was one social desirability item, for a total score ranging from 1-5. The response choices for these items were "strongly agree," "agree," "neutral/not sure," "disagree," and "strongly disagree." The response to each item was scored from one to five, with "strongly agree" receiving a score of five and "strongly disagree" receiving a score of one.

To determine if there was a difference between males and females, 11 items were added to specifically address HPV vaccine knowledge (three items), attitude (three items), self-efficacy (two items), intent (two items), and social desirability (one item) regarding male preteens. For the additional items, the stem of items from the original

SDMI-R was retained, and the word "female" was changed to "male." The response choices, reverse coding, and scoring were identical to the original items.

Validity of the SDMI-R was obtained by the instrument developer (Bartlett, 2012). Infectious disease experts, adolescent health experts, and National Association of School Nurses researchers obtained face validity of the SDMI-R via review of the items. Content validity was obtained through a literature review and consultation with content experts.

Construct validity was measured through exploratory factor analysis. The reliability alphas ranged from 0.794-0.966 on the subscales. The overall Cronbach's alpha for the instrument was 0.871, including the social desirability item. Analysis of the instrument without the social desirability item resulted in a Cronbach's alpha of 0.874. For the added items that pertain to male preteens, reliability and validity were not established.

The demographic data was obtained following completion of the survey. The information gathered included preteens' stated reasons for not wanting the HPV vaccine, current role, age, gender, race/ethnicity, HPV vaccine receipt, HPV vaccine receipt for children, history of abnormal Papanicolau screening, employment status, location of practice, highest level of education, years of experience, description of practice location, type of facility, and the number of preteens cared for on a weekly basis.

Data Collection

Following approval from the Texas Woman's University (TWU) Institutional Review Board (IRB) and agreement from website administrators, data collection began.

The survey was uploaded into the secure electronic platform, Psychdata®. Participants remained anonymous to the researcher and consent to participate in the study was implied by completion of the online survey. The survey was open until adequate sample size was achieved. The participants accessed the survey by clicking on the link in the recruitment letter or copy-and-pasting the link into their browser. Two weeks following the initial placement on the discussion boards, the reminder letter was posted.

Pilot Study

A pilot study was conducted in the Fall semester of 2015. The instrument was uploaded into the secure electronic platform, PsychData®. The survey was open for two weeks. The participants were recruited via email of the recruitment letter with embedded link to the Program Planning Co-Chair of the Houston Area Chapter of the National Association of Pediatric Nurse Practitioners (NAPNAP), who then emailed the survey to the rest of the chapter members. The recruitment letter with embedded link was also placed one discussion board of the Texas Nurses Association. Snowball sampling was encouraged in the recruitment letter.

The research questions guiding the pilot study were:

1. In ambulatory nursing staff, what is the effect of knowledge about the HPV vaccine, education level, and current position on their attitude toward recommending the vaccine to preteen patients?
2. In ambulatory nursing staff, does attitude about the HPV vaccine affect self-efficacy and the decision to offer the vaccine to preteen patients?

3. In ambulatory nursing staff, is there a difference in recommendations for the vaccine dependent on the gender of the preteen?

Data analytic techniques. The completed surveys were exported into the Statistical Package for the Social Sciences (SPSS), Version 23 for analysis. Parametric and nonparametric tests were employed to answer the research questions.

Findings.

Sample description. A total of 26 participants (with 25 complete surveys) responded to the survey. The demographics of the participants can be found in Table 2 below. The principal investigator was unable to obtain information on the number of recruitment letters sent via email or number of returned emails due to invalid email address from the Program Planning Co-Chair of the Houston Area Chapter of NAPNAP. In addition, snowball sampling was encouraged in the recruitment letter. Therefore, the response rate for the survey was unable to be determined.

Table 2
Demographic Data for Participants

Characteristic	**Percentage**
Education Level	
LVN	4%
RN	28%
APRN	60%
PhD/DNP	8%

Race/Ethnicity	
Caucasian	44%
African-American	44%
Hispanic	8%
American Indian	4%
Current Role	
Direct Patient Care	60%
Administrators (<30% of time in patient care)	28%
Patient Educator	**16%**

Research questions. The completed surveys were exported into the Statistical Package for the Social Sciences (SPSS) Version 23 for analysis. Since the sample size was small and the distributions were not normal, nonparametric analysis using Spearman's *rho* was completed. The results of the findings are summarized in Table 3. For the first research question, no significant correlation was found between knowledge or education level on attitude. The correlation between position and attitude was only significant for those in administration. The correlation between position and intent was only significant for those who provided direct patient care.

Table 3

Relationship of Variables Influencing HPV Vaccine Recommendations

	Attitude	Intent
Knowledge	r_s = -0.219, p = 0.281	r_s = -0.471, p = 0.015
Education Level	r_s = -0.244, p = 0.116	r_s = -0.317, p = 0.122
Current Position	r_s = -0.457, p = 0.022[a]	r_s = -0.466, p = 0.019[b]
Self-Efficacy	r_s = 0.147, p = 0.475	
Intent	r_s = 0.369, p = 0.63	
Male Attitude	r_s = 0.437, p = 0.029	
Male Intent		r_s = 0.936, p = 0.000 t = -2.243, p = 0.034

[a] The correlation between position and attitude was only significant for those in administration. [b] The correlation between position and intent was only significant for those who provided direct patient car

For research question two, no significant correlation was demonstrated between attitude and self-efficacy or intent. For research question three, there was a significant difference between attitude regarding female preteens and attitude regarding male preteens. In addition, a significant difference was found between intent to recommend for female preteens and intent to recommend for male preteens.

Discussion of the pilot study. Although the pilot did not demonstrate a significant correlation between knowledge and attitude, Rosen et al. (2015) found that knowledge had a significant impact on attitudes toward recommending the HPV vaccine in a sample of school nurses ($p < .05$). The data also showed that attitudes regarding the HPV vaccine had a significant impact on intention to recommend ($p < .05$). Kahn et al.

(2007) completed a study in which the providers who indicated that they were not likely to recommend the HPV vaccine stated that they lacked knowledge on the safety and efficacy of the vaccine.

Kahn et al.'s (2007) study of pediatricians' attitudes about the HPV vaccine demonstrated a strong link to the intention to recommend the HPV vaccine. In 2009, Kahn et al. specifically researched the attitudes of mothers who were also nurses, and found that intention to vaccinate was significantly affected by attitudes toward the HPV vaccine. McRee et al. (2014) found that those providers who reported more confidence in addressing parental hesitancy regarding the HPV vaccine were more likely to recommend the HPV vaccine compared to those reporting less confidence ($p < .01$). Kahn et al. (2007) also found that physicians reported low self-efficacy to alleviate parental hesitancy as a barrier to HPV vaccine recommendation. In contrast, this pilot study did not find a significant correlation between attitude and self-efficacy or intent. However, significant correlations were found between attitudes toward preteen females and attitudes toward preteen males, as well as intent to recommend to preteen females vs. intent to recommend to preteen males.

Interestingly, even with the small sample, significant correlations were found between attitude and intention based on gender of the preteen. It is highly probable that significant correlations between knowledge, current position, attitude, and intent were not found due to the small sample size, which is also a limitation of the study.

Another limitation of the study was the use of a second party (the Program Planning Co-Chair with the Houston Area Chapter of NAPNAP) to email the recruitment

letter to its members. The recruitment letter was emailed to the second party prior to the survey beginning, but the second party did not indicate that the survey had been emailed out to the remaining members of the chapter until five days into the study (following a subsequent email being sent to the second party on Day 3 of the survey because of no response to the initial email). In addition, as the principal researcher was not included in the email distribution, there was no way to verify that the recruitment letter had been emailed.

Conclusions from the pilot study. The small sample size was a limitation of the pilot study; however, 96% of the participants who began the survey completed it, indicating that the use of the survey would be a reasonable method to collect data regarding the knowledge, attitudes, self-efficacy, and intent of nurses working in ambulatory care.

For the full study, additional methods to access the LVN population were warranted and considered. Instead of relying on a second party to deploy the recruitment letter, the primary researcher attempted to maintain all responsibility for survey deployment. The recruitment methods for the full study included accessing several discussion boards of organizations such as the American Nurses Association (ANA), the Texas Nurses Association (TNA), and the American Academy of Ambulatory Care Nurses (AAACN). A reminder letter was posted on the same member discussion boards within the associations two weeks after the study began. Furthermore, incentives for participation were considered.

For the data analysis for the full study, a statistician was consulted to determine the best analytical method based on the data collected. The choice of analytical methods would allow for appropriate conclusions to be drawn.

Treatment of Data

Following completion of the full study, the data was uploaded into the Statistical Package for the Social Sciences (SPSS) Version 23.0. In consultation with a statistician, each of the research questions was addressed. To determine the effect that HPV vaccine knowledge and education level of the nurse has on the clinician's attitude toward recommending the vaccine to preteen males and females, multiple linear regression was used. Multiple linear regression was also used to determine if attitude and self-efficacy affected the clinician's intent to offer the vaccine to preteen males and females.

CHAPTER IV

ANALYSIS OF DATA

HPV infection and HPV-related disease has been shown to have a tremendous burden on the quality of life of those impacted, as well as the cost of healthcare. Since the advent of the HPV vaccine, research has indicated that there is a need to educate parents and adolescents to increase their knowledge about HPV and HPV vaccines, as well as to increase healthcare clinicians' rates of HPV vaccine recommendation. Engaging nurses who work in ambulatory care settings is a pragmatic option to facilitate and augment this need. To aid in determining how to nurses can be employed to help increase the HPV vaccination rates, this study was completed to ascertain the knowledge, attitude, self-efficacy, and intention to recommend the HPV vaccine for nurses working in ambulatory care settings.

This chapter contains the data analyses with narrative and tables. The description of the sample is provided first, followed by the findings for research question one and research question two. Then, a brief summary of the findings is presented.

Description of the Sample

Following completion of the study, the data was uploaded into the Statistical Package for the Social Sciences (SPSS) Version 23.0. The demographic information was used to describe the study participants. Descriptive statistics were used to analyze the demographic data of the participants.

There were 208 participants in the study with 7 (3.4%) being male and 193 (92.8%) being female. Eight participants (3.8%) did not indicate gender. The majority of the participants were ages 51 to 69 years old (41.3%). Eight of the participants (3.8%) did not report age. The racial identity reported the most by the participants was Caucasian (66.4%). There were five participants (2.4%) who did not indicate race.

The majority of participants were employed in a full-time status (n = 173, 83.2%). Participants reported the following roles in the facility, with most describing their role as providing direct patient care (n = 133), patient educator (n = 54), administrator (n = 50), telephone triage (n = 50) and other (n = 23). Participants were able to select more than one role, dependent on the assigned duties in the facility. The years of experience reported by the participants were fairly well distributed, with most participants having 31 or more years (n = 48, 23.1%). There were 10 participants (4.8%) who did not report the number of years of experience. Most of the participants were RNs (58.2%) and APRNs (25%). Ten participants (4.8%) did not indicate education level. Practice locations were described mainly as urban (n = 173, 83.2%) and public (n = 154, 78.2%) while the rest were described as rural (n = 23, 11.1%) and private (n = 43, 20.7%). The demographics of the sample are described in Table 4.

Table 4

Description of Sample

Gender	*n* (%)
Male	7 (3.4)
Female	193 (92.8)
Age	***n*** **(%)**
25-35 years	47 (22.6)
36-50 years	65 (31.3)
51-69 years	86 (41.3)
70 or older	2 (1)
Race	***n*** **(%)**
Caucasian	138 (66.4)
Black	44 (21.2)
Hispanic	9 (4.3)
Asian	5 (2.4)
American Indian	4 (1.9)
Other	3 (1.4)
Years of Experience	***n*** **(%)**
Less than 1 year	1 (0.5%)
1-5 years	27 (13%)
6-10 years	22 (10.6%)

11-15 years	25 (12%)
16-20 years	25 (12%)
21-25 years	29 (13.9%)
26-30 years	21 (10.1%)
31 or more	48 (23.1)
Education Level	*n* (%)
LVN/LPN	11 (5.3)
RN	121 (58.2)
APRN	52 (25)
DNP/PhD	9 (4.3)
Other	5 (2.4)

Findings

Research Question One

Multiple linear regression was used since the dependent variable of clinician's attitude toward the HPV vaccine was in interval form, the predictor variable of HPV disease and vaccine knowledge was in interval form, and the predictor variable of level of education was in ordinal form (Freedman, Pisani, & Purves, 2011). The first regression used the dependent variable of clinician's attitude toward the HPV vaccine related to preteen females. The next regression used the dependent variable of clinician's attitude toward the HPV vaccine related to preteen males.

Regression one. The regression model for the dependent variable of clinician's attitude toward the HPV vaccine related to preteen females from the predictors of HPV disease and vaccine knowledge related to females and clinician's education level was significant with R^2 =.137 at F (2, 195) = 15.448 ($p < 0.0001$). This means that the regression model accounted for 13.7% of the variance in predicting clinician's attitude toward recommending the HPV vaccine to preteen females (Table 5). HPV disease and vaccine knowledge related to females (t = 5.169, p < 0.0001) was a significant predictor of the clinician's attitude toward the HPV vaccine, while the clinician's education level was not found to be significant (t = -1.649, p = 0.101; Table 6). There was partial support for research question one since HPV disease and vaccine knowledge related to females was a significant predictor of clinician's attitude toward the HPV vaccine related to preteen females, but the clinician's education level was not significant.

Table 5

Regression 1 Model Summary

Model Estimate	R	R^2	Adjusted R^2	Std. Error of the Estimate
1	0.370[a]	0.137	0.128	0.38837

a. Predictors: (Constant), Vaccine Knowledge about Females, Education Level

Table 6

Regression 1 Coefficients Table

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.404	.204		6.895	.000
	Education Level	-.060	.036	-.110	-1.649	.101
	Vaccine Knowledge about Females	.656	.127	.345	5.169	.000

Regression two. The regression model for the dependent variable of clinician's attitude toward the HPV vaccine related to preteen males from the predictors of HPV disease and vaccine knowledge related to males and the clinician's education level was not significant with R^2 =.030 at F (2, 195) = 2.971 (p = 0.054). This means that the model accounted for 3% of the variance in predicting clinician's attitude toward the HPV vaccine related to preteen males (Table 7). HPV disease and vaccine knowledge related to male preteens (t = 2.207, p =0.028) was a significant predictor of the clinician's attitude toward the HPV vaccine related to preteen males, while the clinician's education level was not significant (t = .870, p = 0.385; Table 8). There was partial support for research question one since HPV disease and vaccine knowledge related to males was a significant predictor of clinician's attitude toward the HPV vaccine in regards to preteen males, but the clinician's education level was not significant.

Table 7

Regression 2 Model Summary

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate
	.172	.030	.020	.50525

Table 8

Regression 2 Coefficients Table

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	*t*	Sig.
1	(Constant)	2.232	.212		10.511	.000
	Education Level	.041	.047	.062	.870	.385
	Vaccine Knowledge about Males	.224	.102	.156	2.207	.028

Research Question Two

Multiple linear regression was used since the dependent variable of intent to offer the HPV vaccine, the independent variable of clinician attitude toward the HPV vaccine related to female and male preteens, and the independent variable of self-efficacy related to the HPV vaccine were in interval form. The first regression used the dependent variable of clinician's intent to offer the HPV vaccine to preteen females. The next regression used the dependent variable of clinician's intent to offer the HPV vaccine to preteen males.

Regression three. The regression model for the dependent variable of the clinician's intent to offer the HPV vaccine to preteen females from the predictors of clinician's attitude toward the HPV vaccine in regards to female preteens and the clinician's self-efficacy related to the HPV vaccine was significant with R^2 =.430 at F (2, 198) = 74.539 ($p < 0.0001$). This means that the model accounted for 43.0% of the variance in predicting the clinician's intent to offer the HPV vaccine to preteen females (Table 9). The analysis indicated that the clinician's attitude toward the HPV vaccine related to preteen females ($t = 4.690$, $p < 0.0001$) and self-efficacy related to the HPV vaccine and preteen females ($t = 9.630$, $p < 0.0001$; Table 10) were both significant predictors of the clinician's intent to offer the HPV vaccine to preteen females. These results provide full support for research question two related to female preteens, as self-efficacy related to the HPV vaccine and the clinician's attitude toward the HPV vaccine in regards to preteen females were both significant predictors of the clinician's intent to offer the HPV vaccine to preteen females.

Table 9
Regression 3 Model Summary

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate
	.655	.430	.424	1.02220

Table 10

Regression 3 Coefficients Table

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	*t*	Sig.
1	(Constant)	-.912	.385		-2.369	.019
	Self-Efficacy females	.681	.071	.536	9.630	.000
	Clinician Attitude Toward Females	.829	.177	.261	4.690	.000

Regression four. The regression model for the dependent variable of clinician's intent to offer the HPV vaccine to preteen males from the predictors of the clinician's attitude toward the HPV vaccine related to preteen males and the clinician's self-efficacy related to the HPV vaccine was significant with R^2 =.269 at F (2, 198) = 36.492 ($p <$ 0.0001). The model accounted for 26.9% of the variance in predicting of clinician's intent to offer the HPV vaccine to preteen males (Table 11). The clinician's attitude toward the HPV vaccine in regards to preteen males (t = 1.950, p =0.053) was not a significant predictor of clinician's intent to offer the HPV vaccine to preteen males. However, the clinician's self-efficacy related to the HPV vaccine in regards to preteen males was a significant predictor (t = 8.316, $p <$ 0.0001; Table 12). Thus, there was partial support for the second research question related to male preteens, since self-efficacy toward the HPV vaccine in relation to preteen males was a significant predictor of clinician's intent to offer the HPV vaccine to preteen males, but the clinician's attitude toward the HPV vaccine related to preteen males was not significant.

Table 11

Regression 4 Model Summary

Model	R	R^2	Adjusted R^2	Std Error of the Estimate
	.519	.269	.262	1.15685

Table 12

Regression 4 Coefficients Table

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	*t*	Sig.
1	(Constant)	.296	.470		.629	.530
	Self-Efficacy males	.564	.068	.505	8.316	.000
	Clinician Attitude toward Males	.306	.157	.118	1.950	.053

A *post hoc* power analysis was conducted using G*Power version 3.1.9 to determine the minimum sample size required to find significance with a desired level of power set at .95, an α-level at .05, moderate effect size for four multiple linear regressions. Based on the analysis, it was determined that a minimum of 199 participants were required to ensure adequate power for the total of 8 predictors in the 4 multiple linear regression model. The minimum sample sizes of 199 achieved a power level of 0.98, so the actual sample size of 208 met the criteria and lends validity to the results (Cohen, 1988).

Summary of Findings

Multiple linear regressions were completed to answer both research questions. Research question one was focused on the effect of HPV disease and vaccine knowledge and the clinician's education level on the clinician's attitude toward the HPV vaccine. The analyses reflected that the clinician's attitude toward recommending the HPV vaccine to both preteen females and males was significantly affected by HPV disease and vaccine knowledge. However, the clinician's education level was not found to be a significant predictor of the clinician's attitude toward the HPV vaccine related to preteen females and males.

Research question two aimed to determine the effect of the clinician's attitude toward the HPV vaccine and self-efficacy related to the HPV vaccine on the intent to offer the HPV vaccine to preteen females and males. For female preteens, both the clinician's attitude toward the HPV vaccine and self-efficacy were significant predictors of the clinician's intent to offer the HPV vaccine to preteen females. In contrast, for male preteens, the clinician's attitude toward the HPV vaccine in relation to male preteens was not a significant predictor of intent to offer the HPV vaccine. However, self-efficacy toward the HPV vaccine was determined to significantly predict intent to offer the HPV vaccine to preteen males.

CHAPTER V

SUMMARY OF THE STUDY

Since the introduction of the HPV vaccines in 2006, the HPV vaccination uptake in the U. S. has remained below the HPV vaccination uptake in other developed countries, such as Australia, the United Kingdom, and Canada (President's Cancer Panel, n. d.). In addition, the Tdap, meningococcal conjugate, and HPV vaccines are all recommended by ACIP for preteens aged 11-12, but the HPV vaccination rates remain below the vaccination rates of the Tdap and meningococcal conjugate vaccines (Reagan-Steiner et al., 2015). Furthermore, although the HPV vaccination rates have increased, they remain below the Healthy People 2020 goals (Elam-Evans et al., 2014) to have 80% of females and males ages 13-15 receive three doses of the HPV vaccine (Office of Disease Prevention and Health Promotion, 2015b). To help address this concern, the President's Cancer Panel (n. d.) formulated three overarching goals: (a) decrease overlooked opportunities during healthcare visits to recommend and administer the HPV vaccines, (b) increase acceptance of HPV vaccines by parents and adolescents, and (c) maximize access to the HPV vaccine by offering it in alternative healthcare settings.

Shared decision-making (SDM) is a process that encourages patient involvement and commitment to the treatment plan, leading to improved patient outcomes (Briss et al., 2004; Rimer et al., 2004). SDM encounters are usually face-to-face interactions that are very comprehensive and individualized (Briss et al., 2004; Rimer et al., 2004). Providers have reported the perception of time constraints during the provider encounter as a

challenge that may interfere with the SDM process (Bruno et al., 2014; Charles et al., 1997; Daley et al., 2010; McRee et al., 2014; Rimer et al., 2004; Sussman et al., 2007; Vadaparampil et al., 2011; Zimet et al., 2013). Thus, SDM efforts may solely be devoted to difficult treatment decisions (Rimer et al., 2004), and primary preventive care measures (i. e. HPV vaccination) may not receive appropriate attention during the provider encounter, leading to missed opportunities. According to Farmar et al. (2016), to alleviate missed opportunities, each patient encounter should be regarded as an opportunity to vaccinate.

To counteract this challenge, it has been proposed that engaging other healthcare clinicians outside of the provider encounter may encourage application of the SDM process in regards to health promoting behaviors (Rimer et al., 2004). In the ambulatory care setting, nurses of all educational levels have the ability to engage and counsel patients on health promoting activities and behaviors by applying the SDM process to help patients reach decisions regarding their health.

Implementation of SDM is believed to be influenced by knowledge, attitudes, self-efficacy, and intentions of healthcare clinicians (Briss et al., 2004). Therefore, the research questions guiding this study were:

1. In ambulatory nursing staff, what is the effect of knowledge about the HPV disease and vaccine and the education level on clinician attitude toward recommending the vaccine to preteen males and females?

2. In ambulatory nursing staff, does attitude and self-efficacy about the HPV vaccine affect the clinician's intent to offer the vaccine to preteen males and females?

Before determining the potentially greater role of ambulatory care nurses in enhancing HPV vaccine uptake rates, current knowledge, attitudes, self-efficacy, and intentions should be measured, as well as the relationship between the variables.

Summary

To help establish the potentially greater role that ambulatory care nurses can perform in enhancing HPV vaccine uptake rates, current knowledge, attitudes, self-efficacy and intentions related to the HPV vaccine were measured using the SDMI-R, developed by Bartlett (2012). The anonymous, secure, online survey was delivered via PsychData®. The survey invitation (Appendix C) and reminder letter (Appendix D) with embedded link to the survey were placed on the member discussion boards of the American Nurses Association, Texas Nurses Association, American Academy of Ambulatory Care Nurses, and Sigma Theta Tau, International. Snowball sampling was encouraged in the survey invitation and reminder letter.

Following data collection, a statistician was consulted for data analysis. The data was uploaded into the Statistical Package for the Social Sciences (SPSS) Version 23. Multiple linear regressions were used for data analysis.

Discussion of the Findings

Effect of Knowledge and Education Level on Attitude

For preteen females, the effect of HPV disease and vaccine knowledge on clinician attitude toward recommending the HPV vaccine was significant ($p < 0.0001$), but education level did not have a significant effect ($p = 0.101$) on clinician attitude. The regression model for the effect of HPV disease and vaccine knowledge and education level on clinician attitude was significant ($p < 0.0001$), but only accounted for 13.7% of the variance.

For preteen males, similar results were obtained regarding HPV disease and vaccine knowledge and education level on attitude. HPV disease and vaccine knowledge had a significant effect on clinician attitude ($p = 0.028$), but education level was not significant ($p = 0.385$). However, the regression model for clinician attitude related to HPV disease and vaccine knowledge and clinician education level was not significant ($p = 0.054$), and accounted for only 3% of the variance.

As attitude is conceptually defined as a consistent and learned predisposition to respond to situations in a certain manner (Kothandapani, 1971), and consists of emotions, behaviors, and perceptions (Breckler, 1984), an individual's knowledge about a situation or object is incorporated into his or her attitude toward the situation or object. However, the findings suggest that other variables that were not measured in the study may account for the remainder proportion of clinician attitude. For example, personal variables, such as intention to vaccinate one's own children or religious beliefs (Reynolds, 2014), could potentially affect the clinician's attitude toward recommending the HPV vaccine.

The differences in the results of the regression equations between males and females suggest that overall knowledge of HPV disease and vaccines for male preteens may be lower than HPV disease and vaccine knowledge for females, which influences clinician attitude. A contributing factor may be that the HPV vaccine was not recommended by ACIP for male preteens until 2011 (Dunne et al., 2011), five years after being introduced and recommended for female preteens.

Another contributing factor may be the type of vaccine that is available in the clinician's facility for administration to patients. For example, Cervarix® is currently recommended for preteen females and is not recommended for preteen males. If this is the only HPV vaccine available for administration, clinician's will presumably have knowledge about the HPV vaccine related to preteen females. However, the clinician knowledge related to preteen males and the HPV vaccine may be lower, as an HPV vaccine is not being administered to preteen males.

Although several studies identified low provider knowledge regarding the HPV vaccine as a barrier to recommendation among providers (Leddy et al., 2009; Sussman et al., 2007; Zimet et al., 2013), only one study associated the relationship between HPV knowledge and clinician attitude toward recommending the HPV vaccine. Rosen et al. (2015) assessed the knowledge of nurses and the effect on clinician attitude toward recommending the HPV vaccine. The results indicated a significant impact of knowledge about the HPV vaccine on the nurses' attitudes toward recommending the HPV vaccine ($p < .05$). The findings from the current study lend support to the findings from Rosen et al.'s (2015) study, demonstrating a significant relationship between knowledge levels and

attitude toward recommending the HPV vaccine to preteen females ($p < 0.0001$) and males ($p = 0.028$). Thus, interventions to increase clinician knowledge regarding HPV disease and the available HPV vaccines will result in positive attitudes toward recommending the HPV vaccine to preteen females and males.

Other studies (Daley et al., 2010; Kahn et al., 2007; Leddy et al., 2009; Sussman et al., 2007; Vadaparampil et al., 2011; Zimet et al., 2013) did not determine the effect of HPV knowledge on clinician attitude toward recommending the HPV vaccine. Instead, these studies indicated that there is an influence of HPV disease and vaccine knowledge level on the clinician's intent to recommend the HPV vaccine. According to the SDM framework, knowledge and attitude are both influential in the decision to participate in the SDM process.

In the regression models for both preteen males and females, no significant relationship was found between the clinician's education level and attitude toward recommending the HPV vaccine for preteen females ($p = 0.101$) or males ($p = 0.385$). This finding could possibly be due to the demographic distribution, as the vast majority of participants in this study were RNs (87.5%), reporting an Associate Degree in Nursing or higher. Another contributing factor to this finding may be that, in the ambulatory care setting, all licensed nurses performing patient care are responsible for implementing health promotion interventions, including patient education and counseling (AAACN, 2012; AANP, n. d.; NCSBN®, 2012) regarding vaccinations. For nurses to competently educate and counsel patients, the assumption is that nurses of all education levels who work with the pediatric population have knowledge of the ACIP-recommended vaccines,

including the HPV vaccine. Therefore, the findings from this study suggest that the clinician's attitude toward recommending the HPV vaccine is more likely affected by the clinician's HPV knowledge level rather than the education level. None of the reviewed studies determined the effect of education level on attitude toward recommending the HPV vaccine to preteen females and males.

Effect of Attitude and Self-Efficacy on Intent

The findings from this study indicate that, for preteen females, attitude and self-efficacy toward recommending the HPV vaccine were both significant predictors for intent to recommend the HPV vaccine ($p < 0.0001$). The regression model was also significant ($p < 0.0001$) and accounted for 43% of the variance. In contrast, for preteen males, attitude was not a significant predictor of intent to recommend the HPV vaccine ($p = 0.053$), but self-efficacy was a significant predictor ($p < 0.0001$) of intent. The regression model was significant ($p < 0.0001$), but the model accounted for only 26.9% of the variance in predicting of clinician's intent to offer the HPV vaccine to preteen males. As HPV disease and vaccine knowledge level affects attitude toward recommending the HPV vaccine, the differences in attitude toward recommending the HPV vaccine (as a predictor variable for preteen females and males) and the variance in the regression models that were found between females and males could possibly be attributed to lower knowledge levels related to preteen males.

Previous studies have found that attitude and self-efficacy have a significant effect on intent to offer the HPV vaccine. Kahn et al. (2007) and Kahn et al. (2009) both found that attitude significantly affected intention to recommend the HPV vaccine among

pediatricians and nurses, respectively. McRee et al. (2014) discovered that providers who reported higher self-efficacy were more likely to recommend the HPV vaccine. Moreover, low self-efficacy and discomfort in engaging in discussions of sexuality and HPV with adolescents and parents (Kahn et al., 2007; McRee et al., 2014; Sussman et al., 2007; Vadaparampil et al., 2011; Zimet et al., 2013) has been reported by providers as a barrier to HPV recommendations. The findings from this study are comparable to the results of the previous studies.

Conclusions and Implications

As discussed in Chapter 1, implementation of shared-decision making in patient encounters will result in improved patient outcomes and greater adherence to treatment plans (Briss et al., 2004). To date, there has been scarce research on identifying nurses' knowledge, attitudes, self-efficacy, and intentions to recommend the HPV vaccine. This research study examined each of these variables, which, according to the SDM framework, are all contributing factors to the commitment to participate in the SDM process (Briss et al., 2004). The findings from this study propose that:

1. Clinician HPV disease and vaccine knowledge levels have a significant effect on clinician attitude toward recommending the HPV vaccine.
2. Clinician attitudes and self-efficacy toward recommending the HPV vaccine have a significant effect on intent to recommend the HPV vaccine.
3. Education level of the nurse is not a significant predictor of attitude toward recommending the HPV vaccine and may not be relevant to implementation of the SDM process.

4. There are notable differences between preteen females and males regarding HPV disease and vaccine knowledge levels, which may possibly explain the differences in clinician attitude toward recommending the HPV vaccine between preteen females and males.
5. Each of these variables are interconnected. Thus, improvement in knowledge levels will improve attitude, self-efficacy, and intent to recommend the HPV vaccine.
6. Nurses are able to participate in the SDM process regarding education and counseling on the HPV vaccination.

The implications of the findings from this study are essential when considering the role of the nurse working in ambulatory care settings. The implications from this study are:

1. By using targeted and specific education strategies tailored to improving HPV disease and vaccine knowledge levels of nurses, there will be more positive attitudes toward recommending the HPV vaccine and increased intent to recommend the HPV vaccine.
2. Nurses, as an integral part of the healthcare team, can effectively participate and lead SDM encounters regarding the HPV vaccine.

Recommendations for Further Study

The findings from this study are useful to promote the utilization of nurses working in ambulatory settings to improve HPV vaccination uptake. However, further

studies should be done to maximize the strategies employed to increase knowledge, attitudes, self-efficacy, and intent among nurses to recommend the HPV vaccine to preteen females and males. Thus, the recommendations for future study of the knowledge, attitudes, self-efficacy, and intent of nurses regarding HPV disease and vaccines are as follows:

1. Further study of the LVN/LPN population in the ambulatory care setting should be completed regarding knowledge, attitudes, self-efficacy, and intent to recommend the HPV vaccine. As 25.2% of the LVN/LPN workforce is employed in the ambulatory care setting (NCSBN®, 2012), it is imperative to ascertain the knowledge, attitudes, self-efficacy, and intent of this population as well.
2. Nurses working in inpatient units that care for the pediatric population should also be studied to determine knowledge, attitudes, self-efficacy, and intent to offer the HPV vaccines. Education and recommendation for the HPV vaccine can be discussed during discharge planning/teaching, and the patient and parent/guardian can then request the HPV vaccine at a follow up visit with their provider.
3. Compare age-related differences among nurses' knowledge, attitudes, self-efficacy, and intent to recommend the HPV vaccine. The outcomes could be used to tailor interventions to improve HPV knowledge in consideration of age-related preferences.
4. Compare knowledge, attitudes, self-efficacy, and intent of licensed nurses in the U. S. and licensed nurses in other countries to determine if differences exist. The

addition of a demographic question determining country of residence will enable comparisons to be made.

Other recommendations include that, when making a recommendation for the HPV vaccine to preteen males and females, it is imperative to ensure that the recommendations are strong and consistent, as HPV vaccine receipt has been shown to result from a healthcare clinician recommendation (Small et al., 2014).

With the difficulties in attaining the Healthy People 2020 goals of 80% HPV vaccination rate, there has been a recent recommendation from the CDC and ACIP for a two-dose HPV vaccine schedule for adolescents under the age of 15 (CDC, 2016a). The recommendation has not been formally published, but this is likely to change in the future.

REFERENCES

Adolescent. (n.d.). In *Merriam-Webster's online dictionary* (11th ed.). Retrieved from http://www.merriam-webster.com/dictionary/adolescent

Agency for Healthcare Quality and Research. (2014). *The number of nurse practitioners and physician assistants practicing primary care in the United States*. Retrieved from http://www.ahrq.gov/research/findings/factsheets/primary/pcwork2/

Ajzen, I., Joyce, N., Sheikh, S., & Cote, N. (2011). Knowledge and the prediction of behavior: The role of information accuracy in the theory of planned behavior. *Basic and Applied Social Psychology, 33*, 101-117. www.dx.doi.org/10.1080/01973533.2011.568834

American Academy of Ambulatory Care Nursing. (2012). *American Academy of Ambulatory Care Nursing position paper: The role of the registered nurse in ambulatory care*. Retrieved from http://www.nursingworld.org/aaacnambulatorycare

American Academy of Family Physicians. (2008). *Immunizations*. Retrieved from http://www.aafp.org/about/policies/all/immunizations.html

American Academy of Nurse Practioners. (n. d.). *Nurse practitioners in primary care*. Retrieved from http://www.aanp.org/aanpqa2/images/documents/publications/NPsInPrimaryCare.pdf

American Academy of Pediatrics. (2002). Policy statement: The medical home. *Pediatrics, 110*(1), 184-186. Retrieved from http://pediatrics.aappublications.org/content/110/1/184.long

American Academy of Pediatrics. (2012). Policy statement: HPV vaccine recommendations. *Pediatrics, 129*(3), 602-605. http://www.dx.doi.org/10.1542/peds.2011-3865

American Cancer Society. (2016a). *HPV Vaccines: What is HPV?* Retrieved from http://www.cancer.org/cancer/cancercauses/othercarcinogens/infectiousagents/hpv/hpv-faq

American Cancer Society. (2016b). *HPV and HPV testing*. Retrieved from http://www.cancer.org/cancer/cancercauses/othercarcinogens/infectiousagents/hpv/hpv-and-hpv-testing

American Cancer Society. (2016c). *What are the key statistics about anal cancer?* Retrieved from http://www.cancer.org/cancer/analcancer/detailedguide/anal-cancer-what-is-key-statistics

American Cancer Society. (2016d). *What are the key statistics about cervical cancer?* Retrieved from http://www.cancer.org/cancer/cervicalcancer/detailedguide/cervical-cancer-key-statistics

American Cancer Society. (2016e). *What are the key statistics about oral cavity and oropharyngeal cancer?* Retrieved from

http://www.cancer.org/cancer/oralcavityandoropharyngealcancer/detailedguide/oral-cavity-and-oropharyngeal-cancer-key-statistics

American Cancer Society. (2016f). *What are the key statistics about penile cancer?* Retrieved from http://www.cancer.org/cancer/penilecancer/detailedguide/penile-cancer-key-statistics

American Cancer Society. (2016g). *What are the key statistics about vaginal cancer?* Retrieved from http://www.cancer.org/cancer/vaginalcancer/detailedguide/vaginal-cancer-key-statistics

American Cancer Society. (2016h). What are the key statistics about vulvar cancer? Retrieved from http://www.cancer.org/cancer/vulvarcancer/detailedguide/vulvar-cancer-key-statistics

American College of Physicians. (2015). *Patient-centered medical home.* Retrieved from https://www.acponline.org/running_practice/delivery_and_payment_models/pcmh/

American Nurses Association. (2011). *Advanced practice nursing: A new age in health care.* Retrieved from http://www.nursingworld.org/functionalmenucategories/mediaresources/mediabackgrounders/aprn-a-new-age-in-health-care.pd

Baldur-Felskov, B., Dehlendorff, C., Junge,J., Munk, C., & Kjaer, S. (2014). Incidence of cervical lesions in Danish women before and after implementation of a national

HPV vaccination program. *Cancer Causes Control, 25*, 915-922. http://www.dx.doi.org/10.1007/s10552-014-0392-

Bartlett, J. (2012). *The development and psychometric testing of the Shared Decision-Making Inventory instrument*. (Doctoral dissertation). Retrieved from Proquest Dissertations and Theses Global database. (Dissertation No. 3507901)

Baseman, J. & Koutsky, L. (2005). The epidemiology of human papillomavirus. *Journal of Clinical Virology, 32S*, S16-S24. http://www.dx.doi.org/10.1016/j.jcv.2004.12.008

Breckler, S. (1984). Empirical validation of affect, behavior, and cognition as distinct components of attitude. *Journal of Personality of Social Psychology, 47*(6), 1191-1205.

Briss, P., Rimer, B., Reilley, B., Coates, R., Lee, N., Mullen, P,…Lawrence, R. (2004). Promoting informed decisions about cancer screening in communities and healthcare systems. *American Journal of Preventive Medicine, 26*(1), 67-80. http://www.dx.doi.org/10.1016/j.amepre.2003.09.012

Bruno, D., Wilson, T., Gany, F., & Aragones, A. (2014). Identifying human papillomavirus vaccination practices among primary care providers of minority, low-income and immigrant patient populations. *Vaccine, 32*, 4149-4154. http://www.dx.doi.org/10.1016/j.vaccine.2014.05.058

Burd, E. (2003). Human papillomavirus and cervical cancer. *Clinical Microbiology Reviews, 16*(1), 1-17. http://www.dx.doi.org/10.1128/CMR.16.1.1-17.2003

Centers for Disease Control and Prevention. (2013). *CDC fact sheet: Incidence, prevalence, and cost of sexually transmitted infections in the United States.* Retrieved from http://www.cdc.gov/std/stats/sti-estimates-fact-sheet-feb-2013.pdf

Centers for Disease Control and Prevention. (2014a). *How many cancers are linked with HPV each year?* Retrieved from http://www.cdc.gov/cancer/hpv/statistics/cases.htm

Centers for Disease Control and Prevention. (2014b). *Safe and effective vaccine that prevents cancer continues to be underutilized.* Retrieved from http://www.cdc.gov/media/releases/2014/p0724-nis-teen.html

Centers for Disease Control and Prevention. (2014c). *Vaccines for Children Program (VFC).* Retrieved from http://www.cdc.gov/vaccines/programs/vfc/about/index.html

Centers for Disease Control and Prevention. (2015). *What is HPV?* Retrieved from http://www.cdc.gov/hpv/whatishpv.html

Centers for Disease Control and Prevention. (2016a). *CDC recommends only two HPV shots for younger adolescents.* Retrieved from http://www.cdc.gov/media/releases/2016/p1020-hpv-shots.html

Centers for Disease Control and Prevention. (2016b). *Genital HPV infection--fact sheet.* Retrieved from http://www.cdc.gov/std/hpv/stdfact-hpv.htm

Charles, C., Gafni, A., & Whelan, T. (1997). Shared decision-making in the medical encounter: What does it mean? (Or it takes at least two to tango.) *Social Science*

& Medicine, 44(5), 681-692. http://www.dx.doi.org/10.1016/S0277-9536(96)00221-3

Chaturvedi, A., Engels, E., Pfeiffer, R., Hernandez, B., Xiao, W., Kim, E,…Gillison, M. (2011) Human papillomavirus and rising oropharyngeal cancer incidence in the United States. *Journal of Clinical Oncology, 29*(32), 4294-4301. http://www.dx.doi.org/10.1200/JCO.2011.36.4596

Chesson, H., Ekwueme, D., Saraiya, M., Watson, M., Lowy, D., & Markowitz, L. (2012). Estimates of the annual direct medical costs of th prevention and treatment of disease associated with human papillomavirus in the United States. *Vaccine, 30,* 6016-6019. http://www.dx.doi.org/10.1016/j.vaccine.2012.07.056

Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences* (2nd Ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.

Daley, M., Crane, L., Markowitz, L., Black, S., Beaty, B., Barrow, J,…Kempe, A. (2010). Human papillomavirus vaccination practices: A survey of US physicians 18 months after licensure. *Pediatrics, 126*(3), 425-433. http://www.dx.doi.org/10.1542/peds.2009-3500

de Vries, H., Dijkstra, M., & Kuhlman, P. (1988). Self-efficacy: The third factor besides attitude and subjective norm as a predictor of behavioural intentions. *Health Education Research, 3*(3), 273-282.

Dunne, E., Markowitz, L., Chesson, H., Curtis, C., Saraiya, M., Gee, J., & Unger, E. (2011). Recommendations on the use of quadrivalent human papillomavirus vaccine in males--Advisory Committee on Immunization Practices (ACIP), 2011.

Morbidity and Mortality Weekly Report, 60(50), 1705-1708. Retrieved from https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6050a3.htm

Elam-Evans, L., Yankey, D., Jeyarajah, J., Singleton, J., Curtis, C., MacNeil, J., & Hariri, S. (2014). *National, regional, state, and selected local are vaccination coverage among adolescents aged 13-17 years—United States, 2013*. Retrieved from http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6329a4.htm#fig

Erdfelder, E., Faul, F., & Buchner, A. (1996). G*POWER: A general power analysis program. *Behavior Research Methods, Instruments, & Computers, 28*, 1-11.

Farmar, A., Love-Osborne, K., Chichester, K., Breslin, K., Bronkan, K., Hambidge, S. (2016). Achieving high adolescent HPV vaccination coverage. *Pediatrics 138*(5), e1-e8. http://www.dx.doi.org/10.1542/peds.2015-2653

Faul, F., Erdfelder, E., Lang, A., & Buchner, A. (2007). G*POWER 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39*(2), 175-191.

Fleurence, R., Dixon, J., Milanova, T., & Beusterien, K. (2007). Review of the economic and quality-of-life burden of cervical human papillomavirus disease. *American Journal of Obstetrics and Gynecology*, *196*(3), 206-212. http://www.dx.doi.org/10.1016/j.ajog.2007.01.028

Freedman, D., Pisani, R., & Purves, R. (2011). *Statistics* (4th ed.). New York, NY: W.W. Norton.

GlaxoSmithKline, Incorporated. (2014). Cervarix®: *Human papillomavirus vaccine types 16 and 18 (recombinant, AS04 adjuvanted).* Retrieved from http://www.gsk.ca/english/docs-pdf/product-monographs/Cervarix.pdf

Grimes, R., Benjamins, L, & Williams, K. (2013). Counseling about the HPV vaccine: Desexualize, educate, and advocate. *Journal of Pediatric and Adolescent Gynecology, 26,* 243-248. http://www.dx.doi.org/10.1016/j.jpag.2013.04.002

Haverkate, M., D'Ancona, F., Giambi, C., Johansen, K., Lopalco, P., Cozza, V,…Appelgren, E. (2012). Mandatory and recommended vaccination in the EU, Iceland and Norway: Results of the Venice 2010 survey on the ways of implementing national vaccination programmes. *Eurosurveillance, 17*(22). Retrieved from http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=20183

Head, K., Vanderpool, R., & Mills, L. (2013). Health care providers' perspectives on low HPV vaccine uptake and adherence in Appalachian Kentucky. *Public Health Nursing, 30*(4), 351-360. http://www.dx.doi.org/10.1111/phn.12044

Hopkins, T. & Wood. N. (2013). Female human papillomavirus (HPV) vaccination: Global uptake and the impact of attitudes. *Vaccine, 31,* 1673-1679. http://www.dx.doi.org/10.016/j.vaccine.2013.01.028

Intent. (n.d.). In *Merriam-Webster's online dictionary* (11th ed.). Retrieved from http://www.merriam-webster.com/dictionary/intent

Kahn, J., Ding, L., Huang, B., Zimet, G., Rosenthal, S., & Frazier, L. (2009). Mothers' intention for their daughters and themselves to receive the human papillomavirus

vaccine: A national study of nurses. *Pediatrics, 123*(6), 1439-1445. http://www.dx.doi.org/10.1542/peds.2008-1536

Kahn, J., Rosenthal, S., Tissot, A., Bernstein, D., Wetzel, C., & Zimet, G. (2007). Factors influencing pediatricians' intention to recommend human papillomavirus vaccines. *Ambulatory Pediatrics, 7*(5), 367-373. http://www.dx.doi.org/10.1016/j.ambp.2007.05.010

Kaiser Family Foundation. (2015). *The HPV vaccine: Access and use in the U. S.* Retrieved from http://kff.org/womens-health-policy/fact-sheet/the-hpv-vaccine-access-and-use-in/#endnote_link_141348-57

Kessels, S., Marshall, H., Watson, M., Braunack-Mayer, A., Reuzel, R., & Tooher, R. (2012). Factors associated with HPV vaccine uptake in teenage girls: A systematic review. *Vaccine, 30*, 3546-3556. http://www.dx.doi.org/10.1016/j.vaccine.2012.03.063

Kothanapani, V. (1971). Validation of feeling, belief, and intention to act as three components of attitude and their contribution to prediction of contraceptive behavior. *Journal of Personality and Social Psychology, 19*(3), 321-333.

Kreimer, A., Struyf, F., Del Rosario-Raymundo, M., Hidesheim, A., Skinner, S., Wacholder, S,…Wheeler, C. (2015). Efficacy of fewer than three doses of an HPV-16/18 AS04-adjuvanted vaccine: Combined analysis of data from the Costa Rica Vaccine and PATRICIA trials. *The Lancet Oncology, 16*(7), 775-786. http://dx.doi.org/10.1016/S1470-2045(15)00047-9

Laz, T., Rahnam, M., & Berenson, A. (2012). An update on human papillomavirus vaccine uptake among 11-17 year old girls in the United States: National Health Interview Survey, 2010. *Vaccine, 30*(24), 3534-3540. http://www.dx.doi.org/10.1016/j.vaccine.2012.03.067

Leddy, M., Anderson, B., Gall, S., & Schulkin, J. (2009). Obstetrician-gynecologists and the HPV vacine: Practice patterns, beliefs, and knowledge. *Journal of Pediatric and Adolescent Gynecology, 22,* 239-246. http://www.dx.doi.org/10.1016/j.jpag.2008.09.002

Markowitz, L., Dunne, E., Saraiya, M., Lawson, H., Chesson, H., & Unger, E. (2007). Quadrivalent human papillomavirus vaccine: Recommendations of the Advisory Committee on Immunization Practices (ACIP). *Morbidity and Mortality Weekly Report, 56*(RR02), 1-24. Retrieved from http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5602a1.htm

Mays, R. & Zimet, G. (2004). Recommending STI vaccination to parents of adolescents: The attitudes of nurse practitioners. *Sexually Transmitted Diseases, 31*(7), 428-432. http://www.dx.doi.org/10.1097/01.OLQ.0000130536.71812.E5

McRee, A., Gilkey, M., & Dempsey, A. (2014). HPV vaccine hesitancy: Findings from a statewide survey of health care providers. *Journal of Pediatric Health Care, 28*(6), 541-549. http://www.dx.doi.org/10.1016/j.pedhc.2014.05.003

The Medicare Payment Advisory Commission. (n. d.). *Ambulatory care settings.* Retrieved from http://www.medpac.gov/-research-areas-/ambulatory-care-settings

Merck & Company, Incorporated. (2015). *Gardasil*. Retrieved from https://www.merckvaccines.com/Products/Gardasil/Pages/hom

Millen, J., Ginde, A., Anderson, A., Fang, P., & Camargo, C. (2009). Multicenter study of knowledge about human papilloma virus and attitudes among emergency department patients. *Journal of Pediatric and Adolescent Gynecology, 22*(6), 356-359. http://www.dx.doi.org/10.1016/j.jpag.2009.03.001

National Comprehensive Cancer Network. (2010). *HPV-related cancer not confined to cervix*. Retrieved from http://www.nccn.org/about/news/newsinfo.aspx?NewsID=241

National Council of State Boards of Nursing, Inc. (2012). *NCSBN model act*. Retrieved from https://www.ncsbn.org/14_Model_Act_0914.pdf

National Council of State Boards of Nursing, Inc. (2013). *2012 LPN/VN practice analysis: Linking the NCLEX-PN® examination to practice* (NCSBN Research Brief Vol. 58). Retrieved from https://www.ncsbn.org/13_LPN_Practice_Analysis_Vol58_updated.pdf

National Institute of Health, National Cancer Institute. (2014). *A snapshot of cervical cancer: Incidence and mortality*. Retrieved from http://www.cancer.gov/research/progress/snapshots/cervical

National Institute of Health, National Cancer Institute. (2015a). *HPV and cancer*. Retrieved from http://www.cancer.gov/about-cancer/causes-prevention/risk/infectious-agents/hpv-fact-sheet

National Institute of Health, National Cancer Institute. (2015b). *Human papillomavirus (HPV) vaccines.* Retrieved from http://www.cancer.gov/about-cancer/causes-prevention/risk/infectious-agents/hpv-vaccine-fact-sheet#q7

Office of Disease Prevention and Health Promotion, Healthy People 2020. (2015). *Immunization and infectious diseases*. Retrieved from https://www.healthypeople.gov/2020/topics-objectives/topic/immunization-and-infectious-diseases/objectiv

Perrin, A. & Duggan, M. (2015). *Americans' internet access: 2000-2015.* Retrieved from http://www.pewinternet.org/2015/06/26/americans-internet-access-2000-2015/

Petrosky, E., Bocchini, J., Hariri, S., Chesson, H., Curtis, C., Saraiya, M,…Markowitz, L. (2015). *Use of 9-valent human papillomavirus (HPV) vaccine: Updated HPV vaccination recommendations of the Advisory Committee on Immunization Practices.* Retrieved from http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6411a3.htm

Pew Research Center. (2015). *Health fact sheet*. Retrieved from http://www.pewinternet.org/fact-sheets/health-fact-sheet/

Polit, D. & Beck, C. (2012). *Nursing research: Generating and assessing evidence for nursing practice* (9th ed.). Philadelphia, PA: Wolters Kluwer.

President's Cancer Panel. (n. d.). *Accelerating HPV vaccine uptake: Urgency for action to prevent cancer*. Retrieved from

http://deainfo.nci.nih.gov/advisory/pcp/annualReports/HPV/index.htm#sthash.dSzqiwYI.dpbs

Preteen. (n.d.). In *Merriam-Webster's online dictionary* (11th ed.). Retrieved from http://www.merriam-webster.com/dictionary/preteen

Read, T., Hocking, J., Chen, M., Donavan, B., Bradshaw, C., & Fairley, C. (2011). The near disappearance of genital warts in young women 4 years after commencing a national human papillomavirus (HPV) vaccination programme. *Sexually Transmitted Infections, 87*, 544-547. http://www.dx.doi.org/10.1136/sextrans-2011-050234

Reagan-Steiner, S., Yankey, D., Jeyarajah, J., Elam-Evans, L., Singleton, J., Curtis, C,…Stokley, S. (2015). National, regional, state, and selected local area vaccination coverage among adolescents aged 13-17 years--United States, 2014. *Morbidity and Mortality Weekly Report, 64*(29), 784-792. Retrieved from http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6429a3.htm

Reynolds, D. (2014). Religiosity and parental acceptance of human papillomavirus (HPV) vaccine in 9-18 year-old girls. *Journal of Christian Nursing, 31*(3), 172-177.

Rimer, B., Briss, P., Zeller, P., Chan, E., & Woolf, S. (2004). Informed decision making: What is its role in cancer screening? *Cancer Supplement, 101*(5), 1214-1228. http://www.dx.doi.org/10.1002/cncr.20512

Rintala, M., Grénman, S., Puranen, M., Isolauri, E., Ekblad, U., Kero, P., & Syrjänen, S. (2005). Transmission of high-risk human papillomavirus (HPV) between parents

and infant: A prospective study of HPV in families in Finland. *Journal of Clinical Microbiology*, *43*(1), 376-381. http://www.dx.doi.org/10.1128/JCM.43.1.376-381.2005

Rosen, B., Goodson, P., Thompson, B., & Wilson, K. (2015). School nurses' knowledge, attitudes, perceptions of role as opinion leader, and professional practice regarding human papillomavirus vaccine for youth. *Journal of School Health*, *85*(2), 73-81. http://www.dx.doi.org/10.1111/josh.12229

Small, S., Sampselle, C., Martyn, K., & Dempsey, A. (2014). Modifiable influences on female HPV vaccine uptake at the clinic encounter level: A literature review. *Journal of the American Association of Nurse Practitioners, 26,* 519-525. http://www.dx.doi.org/10.1002/2327-6924.12057

Staras, S., Vadaparampil, S., Patel, R., & Shenkman, E. (2014). Parent perceptions important for HPV vaccine initiation among low income adolescent girls. *Vaccine, 32,* 6163-6169. http://www.dx.doi.org/10.1016/j.vaccine.2014.08.054

Statens Serum Institut. (2013). *HPV vaccination--coverage 2012*. Retrieved from http://www.ssi.dk/English/News/EPI-NEWS/2013/No%2020%20-%202013.aspx

Stokley, S., Jeyarajah, J., Yankey,D., Cano, M., Gee, J., Roark, J,...Markowitz, L. (2014). Human papillomavirus vaccination coverage among adolescents, 2007–2013, and postlicensure vaccine safety monitoring, 2006–2014 — United States. *Morbidity and Mortality Weekly Report, 63*(29), 620-624. Retrieved from https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6329a3.htm

Sussman, A., Helitzer, D., Sanders, M., Urquieta, B., Salvador, M. & Ndiaye, K. (2007). HPV and cervical cancer prevention counseling with younger adolescents: Implications for primary care. *Annals of Family Medicine, 5*(4), 298-304. http://www.dx.doi.org/10.1370/afm.723

Teitelman, A., Stringer, M., Averbuch, T., & Witkoski, A. (2009). Human papillomavirus, current vaccines, and cervical cancer prevention. *Journal of Obstetric, Gynecologic, & Neonatal Nursing, 38*, 69-80. http://www.dx.doi.org/j.1552-6909.2008.00304.x

United Nations, Department of Economic and Social Affairs. (2015). *Transforming our world: The 2030 agenda for sustainable development*. Retrieved from https://sustainabledevelopment.un.org/post2015/transformingourworld

U. S. Department of Health and Human Services, Health Resources and Services Administration. (2010). *The registered nurse population: Initial findings from the 2008 national sample survey of registered nurses*. Retrieved from http://bhpr.hrsa.gov/healthworkforce/rnsurveys/rnsurveyinitial2008.pdf

U. S. Department of Health and Human Services, National Institute of Health. (2013). *Cervical cancer*. Retrieved from http://report.nih.gov/nihfactsheets/viewfactsheet.aspx?csid=76

U. S. National Library of Medicine, National Institute of Health, MedlinePlus. (2015). *Human papillomavirus*. Retrieved from http://www.nlm.nih.gov/medlineplus/hpv.html

Vadaparampil, S., Kahn, J., Salmon, D., Lee, J., Quinn, G., Roetzheim, R,…Giuliano, A. (2011). Missed clinical opportunities: Provider recommendations for HPV vaccination for 11-12 year old girls is limited. *Vaccine, 29*(47), 8634-8641. http://www.dx.doi.org/10.1016/j.vaccine.2011.09.006

Victorian Cytology Service. (2015). *National (Australia) HPV 3 dose vaccination coverage for adolescents turning 15 years of age.* Retrieved from http://www.hpvregister.org.au/research/coverage-data

Winer, R., Feng, Q., Hughes, J., O'Reilly, S., Kiviat, N., & Koutsky, L. (2008). Risk of female human papillomavirus acquisition associated with first male sex partner. *The Journal of Infectious Diseases, 197*, 279-282. http://www.dx.doi.org/10.1086/524875

World Health Organization. (2016). *Adolescent development*. Retrieved from http://www.who.int/maternal_child_adolescent/topics/adolescence/dev/en/

Ylitalo, K., Lee, H., & Mehta, N. (2013). Health care provider recommendation, human papillomavirus vaccination, and race/ethnicity in the US National Immunization Survey. *American Journal of Public Health*, *103*(1), 164-169. http:///www.dx.doi.org/10.2105/AJPH.2011.300600

Zimet, G. & Rosenthal, S. (2010). HPV vaccine and males: Issues and challenges. *Gynecologic Oncology, 117*, S26-S31. http://www.dx.doi.org/10.1016/j.ygyno.2010.01.028

Zimet, G., Rosberger, Z., Fisher, W., Perez, S., & Stupiansky, N. (2013). Beliefs, behaviors and hpv vaccine: Correcting the myths and the misinformation.

Preventive Medicine, *57*, 414-418.

http://www.dx.doi.org/10.1016/j.ypmed.2013.05.013

APPENDIX A

Shared Decision-Making Inventory, Revised (SDMI-R)

SHARED DECISION MAKING INVENTORY--
REVISED FOR HUMAN PAPILLOMAVIRUS
(HPV) VACCINATION

Please mark only ONE answer for each statement.

The following statements are about the Human Papillomavirus (HPV).

	True	False	Don't know / Not sure
DK1. HPV is a sexually transmitted infection (STI).			
DK2. The primary cause of cervical cancer is HPV.			
DK3. Genital HPV infections tend to be symptomatic.*			
DK4. The same HPV genotypes that cause cervical cancer cause genital warts.*			
DK5. The most common STI among adolescents is HPV.			
DK6. HPV status, determined by testing, should occur before a HPV vaccine is given.*			
DK7. Preteens who have been diagnosed with HPV should not be given the HPV vaccine.*			
DK8. Condoms may reduce the risk of HPV infection.			
DK9. Risk factors associated with HPV infections include: infected with other STIs, being immunocompromised, and the age at first sexual activity.			
DK10. A pregnancy test should be performed prior to giving HPV vaccine.*			

The following statements are about the HPV vaccines (Gardasil™ and Cervarix™).

	True	False	Don't know / Not sure
VK1. The HPV vaccine is recommended for females 11-12 years of age.			
VK2. The HPV vaccines protect against cervical cancer.			
VK3. Both HPV vaccines require a series of three injections to be given over a six-month period.			
VK4. Both HPV vaccines protect against genital warts.*			
VK5. Even though the HPV vaccine was obtained, Pap tests should be obtained every three years if a female has been sexually active for three years or more, or they are over 21 years old.			
VK6. HPV vaccines only protect against specific HPV genotypes.			
VK7. HPV vaccines are not a HPV treatment.			

VK8. HPV vaccines are most effective if completed before any sexual activity.			
VK9. HPV vaccines could cause a female to acquire HPV.*			
VK10. HPV vaccines could cause a female to become sterile.*			

How strongly do you agree or disagree with the following statements regarding the vaccines available?

	Strongly Agree	Agree	Neutral Not Sure	Disagree	Strongly Disagre
A1. Vaccinations are an important part of pre-teen‘s healthcare.					
A2. The FDA approved the HPV vaccines, they are safe to administer.					
A3. If a preteen receives the HPV vaccine they are more likely to have sex at an earlier age.*					
A4. It is important to keep preteens up-to-date on their vaccinations.					
A5. Vaccinating a preteen against HPV will prevent them from acquiring HPV.					
A6. If preteens do not ever receive the HPV vaccine, it is likely that they will acquire the HPV infection someday.					

How confident are you that you can:

	Extremely confident	Very Confident	Confident	Somewhat confident	Not at all confident
SE1. I can complete a HPV vaccine assessment at each preteen encounter.					
SE2. I can teach the preteen and her parents/guardians about behavioral messages and skills that will reduce their risk for HPV.					
SE3. I can discuss with the parents/guardians how the two vaccines are interchangeable.					
SE4. I can access written materials (i.e. brochure) on how to prevent the HPV disease for parents and preteens to review.					
SE5. I can access written materials (i.e. brochure) about the HPV vaccine for parents and preteens to review.					

	Extremely confident	Very Confident	Confident	Somewhat confident	Not at all confident
SE6. I can provide parents one-on-one education about their preteen's risk of HPV.					
SE7. I can provide parents one-on-one education about their preteen's risk of HPV aided by computer-generated decision aids (i.e. video or program).					
SE8. I can provide parent group education about preteens' risk of HPV.					
SE9. I can provide parent group education about preteens' risk of HPV aided by computer-generated decision aids (i.e. video or program).					
SE10. I can provide a HPV vaccine report to the preteen's primary care provider.					

Thinking about your practice:

	Strongly Agree	Agree	Neutral/ Not Sure	Disagree	Strongly Disagree
I1. In the last 60 days, I did regularly encourage the parents of 11-12 year old females to get their daughters vaccinated against HPV.					
I2. In the next 60 days, I intend to regularly encourage the parents of 11-12 year old females to get their daughters vaccinated against HPV					
SD1. No matter who I am talking with, I am always a good listener.					

The following items pertain to male preteens:

	True	False	Don't know/ Not sure

VK1. The HPV vaccine is recommended for males 11-12 years of age.			
VK2. HPV vaccines could cause a male to acquire HPV.*			
VK3. HPV vaccines could cause a male to become sterile.*			

The following items pertain to male preteens:

	Strongly Agree	Agree	Neutral/ Not sure	Disagree	Strongly Disagree
A1. Vaccinations are an important part of a male preteen's healthcare.					
A2. If a male preteen receives the HPV vaccine they are more likely to have sex at an earlier age.*					
A3. Vaccinating a male preteen against HPV will prevent them from acquiring HPV.					

The following items pertain to male preteens:

	Extremely confident	Very confident	Confident	Somewhat confident	Not at all confident
SE1. I can teach the preteen and his parents/ guardians about behavioral messages and skills that will reduce their risk for HPV.					
SE2. I can provide parents one-on-one education about					

their preteen's risk of HPV.					

Thinking about your practice:

	Strongly Agree	Agree	Neutral/ Not sure	Disagree	Strongly Disagree
I1. In the last 60 days, I did regularly encourage the parents of 11-12 year old males to get their sons vaccinated against HPV.					
I2. In the next 60 days, I intend to regularly encourage the parents of 11-12 year old males to get their sons vaccinated against HPV.					
SD1. No matter who I am talking with, I am always a good listener.					

*Denotes reverse scored items

In your practice, what have been preteens' reasons for not wanting the HPV vaccine?

(Check all that apply.)

- ☐ Fear of pain
- ☐ Inconvenient (multiple visits)
- ☐ Does not understand risks/benefits
- ☐ Vaccine effectiveness not long enough
- ☐ Too young
- ☐ Fear of parents' reaction about being sexually active
- ☐ Other (please specify): _____

What is your current position?

- ☐ Primary Practitioner/Provider (APRN)

☐ Clinical Nurse (RN, LVN)

☐ Educator (Patient Educator)

☐ Administrator (< 30% of time spent on patient care)

☐ Other (please specify) _____

Do you provide direct care to preteens?

☐ Yes
☐ No

Demographic data:

Age:

☐ 70 or older
☐ 51-69
☐ 36-50
☐ 25-35
☐ 18-24

Gender:

☐ Male
☐ Female

Race/Ethnicity:

☐ Hispanic/Latino/Spanish
☐ Caucasian or White
☐ Black or African American
☐ Asian
☐ American Indian or Native Hawaiian

Have you initiated/completed the HPV vaccine series?

☐ Yes
☐ No

•**If not, why?**

☐ Older than recommended age
☐ Personal preference (i. e. I do not believe in it)
☐ Cost/financial

Have you been diagnosed with an abnormal Pap?

- ☐ Yes
- ☐ No

Have any of your relatives, or friends, been diagnosed with an abnormal Pap?

- ☐ Yes
- ☐ No
- ☐ Don‘t know

Employment Status:

- ☐ Full time
- ☐ Part time

Please specify the state in which you work:

Please describe your highest level of education:

- ☐ LPN/LVN
- ☐ Registered Nurse (AD, Diploma, BSN)
- ☐ Advanced Practice Nurse (MS, MSN, PNP, FNP, NNP, CNS, etc.)
- ☐ DNP, PhD
- ☐ Other (please specify): _____

Please provide how many years you have been a nurse:

- ☐ 1-5
- ☐ 6-10
- ☐ 11-15
- ☐ 16-20
- ☐ 21-25
- ☐ 26-30
- ☐ 31 or more

Please describe your practice location:

- ☐ Urban/Suburban
- ☐ Rural

Please provide an approximate number of preteen males and females you see each week.

- ☐ 1-25
- ☐ 26-50
- ☐ 51-75

☐ 76-100
☐ > 100

APPENDIX B

Permission to use the SDMI-R

Shannon,
Of course I would be willing for you to use my instrument. I agree that some of the items would need to expand. I don't see intent within your email, were you planning on using these items too? If yes, I would recommend to separate out female and male so you would have four intent items then.
As stated previously, I would be more than willing for you to use my instrument. If you are willing:
For me to review the revised instrument with your changes prior to testing.
Share your de-identified data with me so I can continue to test the instrument? (I would not be publishing your data except if the the psychometrics of the instrument changes comparing my school nurse population and your adolescent nursing population. I would then extend joint authorship to you.)
I look forward to hearing from you.
Jacqueline Bartlett, PhD, RN
On Wed, Apr 29, 2015 at 4:36 PM, Shannon Chopp <shannon.chopp@hotmail.com> wrote:
Hello,
I am a Nursing PhD student at Texas Woman's University in Houston, TX. I am writing to ask permission to use your instrument, the Shared Decision Making Inventory-Revised. The purpose of my (as-yet-untitled) dissertation is to discover the knowledge, attitudes, and self-efficacy of ambulatory nurses on recommending the human papilloma virus vaccine to their adolescent patients. I have read your article on the psychometric evaluation and reviewed your dissertation, and your instrument fits the constructs that I would like to measure. My research questions are:

1. In ambulatory nursing staff (RNs and LVNs), what is the effect of knowledge about the HPV vaccine, education level (LVN, ADN, BSN, MSN, PhD), and current position (clinical--direct vs. indirect, administrative, educator, etc.) on their attitude toward recommending the vaccine to adolescent patients?
2. In ambulatory nursing staff, does attitude about the HPV vaccine affect self-efficacy and the decision to offer the vaccine to adolescent patients?
3. In ambulatory nursing staff, is there a difference in recommendations for the vaccine dependent on the sex of the preteen?

Based on my third research question, I would need to modify a few items to allow consideration for both sexes. Please let me know if you will allow permission for me to use and slightly modify your instrument.
Thank you for your consideration,
Shannon Chopp, MS, BS, RNC-OB
Sent from Surface

APPENDIX C

Invitation Letter to Participate in the Research Study

Subject Line: Nurses in Ambulatory Care, Please Respond!

Hello!

Are you a nurse working in an ambulatory setting that cares for the pediatric and adolescent population? If so, you are invited to provide your valuable input by participating in a research study.

I am a PhD Nursing student at Texas Woman's University in Houston, Texas. I am conducting this study for my dissertation, entitled "Getting to the Bottom of It: Determining the Factors That Influence HPV Vaccination Recommendations among Nurses in the Ambulatory Setting". Data for the study will be obtained via a secure and anonymous online survey. The outcomes of the study will highlight opportunities to increase recommendation of the HPV vaccine to adolescents and their parents, as well as to enhance nursing knowledge.

The survey takes about 15 minutes to complete and provides you with the opportunity to share your valuable thoughts, perceptions, and experiences. Your participation in this research study is completely voluntary. Completion of the survey implies your informed consent to participate. Responses are entirely confidential and no identifiable information will be obtained.

There are no known serious risks for completing this survey. However, as in all internet transactions, there is a risk of loss of anonymity. You have the right to choose not to participate or discontinue your participation at any time.

Here is the link to the survey https://www.psychdata.com/s.asp?SID=167941 If the direct link does not work, please copy and paste it into your browser.

If you know of other nurses working in ambulatory settings that care for the pediatric and adolescent population, please forward this letter!

If you have any questions or concerns, please contact Shannon Richard Chopp at srichard1@twu.edu.

Thank you very much for providing your vital input!

Shannon Richard Chopp, MS, BS, RNC-OB

Texas Woman's University

PhD Nursing Student

APPENDIX D

Reminder Letter to Participate in the Research Study

Subject Line: Nurses in Ambulatory Care, There is Still Time!

Hello!

If you have not already provided your valuable input for this study on HPV vaccination recommendations, you still have time!

Are you a nurse working in an ambulatory setting that cares for the pediatric and adolescent population? If so, you are invited to provide your valuable input by participating in a research study.

I am a PhD Nursing student at Texas Woman's University in Houston, Texas. I am conducting this study for my dissertation, entitled "Getting to the Bottom of It: Determining the Factors That Influence HPV Vaccination Recommendations among Nurses in the Ambulatory Setting". Data for the study will be obtained via a secure and anonymous online survey. The outcomes of the study will highlight opportunities to increase recommendation of the HPV vaccine to adolescents and their parents, as well as to enhance nursing knowledge.

The survey takes about 15 minutes to complete and provides you with the opportunity to share your valuable thoughts, perceptions, and experiences. Your participation in this research study is completely voluntary. Completion of the survey implies your informed consent to participate. Responses are entirely confidential and no identifiable information will be obtained.

There are no known serious risks for completing this survey. However, as in all internet transactions, there is a risk of loss of anonymity. You have the right to choose not to participate or discontinue your participation at any time.

Here is the link to the survey https://www.psychdata.com/s.asp?SID=167941 If the direct link does not work, please copy and paste it into your browser.

If you know of other nurses working in ambulatory settings that care for the pediatric and adolescent population, please forward this letter!

If you have any questions or concerns, please contact Shannon Richard Chopp at srichard1@twu.edu.

Thank you very much for providing your vital input!

Shannon Richard Chopp, MS, BS, RNC-OB
Texas Woman's University
PhD Nursing Student