

ASSESSING PARENTAL KNOWLEDGE AND ATTITUDES TOWARDS HUMAN  
PAPILLOMAVIRUS VACCINATION IN A RURAL PRIMARY CARE CLINIC

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Title

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TOWARDS HUMAN PAPILLOMAVIRUS VACCINATION IN A  
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**DOCTOR OF NURSING PRACTICE**

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## ABSTRACT

Human Papillomavirus (HPV) is the most common sexually transmitted infection worldwide. The complications from HPV can be deadly and yet some of the most dangerous serotypes can be prevented with a vaccine. Unfortunately, HPV vaccine initiation and completion rates remain significantly below that of other adolescent vaccines in North Dakota as well as throughout the United States. Low HPV vaccine uptake may be due to a number of factors including lack of knowledge, misconceptions and myths, and healthcare barriers, such as weak or missed provider recommendation and lack of vaccine availability.

This practice improvement project assessed parents' attitudes, knowledge, and intent to vaccinate in McKenzie County, North Dakota, where HPV vaccine rates are amongst the lowest in North Dakota. A validated survey was provided to parents before and after watching a short video on HPV vaccination. Additionally, providers at Anova Family Health Clinic in Watford City, North Dakota, were educated on parental survey results and given suggestions to improve intent to vaccinate.

The results of the project demonstrated some improvements in parental knowledge related to HPV infections; however, improvements in parental knowledge were not noted related to HPV vaccination, demonstrating gaps still exist. Parental attitudes towards the HPV vaccine did improve related to vaccine efficacy, but there was no increased intent to vaccinate among parents after the video education. The majority of parents also reported they do not have enough information about the vaccine to give it to their child, demonstrating a need for further parent education. As a result of the practice improvement project, providers reported understanding education needs amongst parents and the ability to identify additional barriers to HPV vaccination.

In conclusion, more research is needed to better understand parents' attitudes, knowledge, and intent to vaccinate in McKenzie County, North Dakota. With additional research, healthcare professionals can change their practice to reflect these needs. Furthermore, outreach at other clinics in McKenzie County, North Dakota need to occur to target a more representative sample. Through improved knowledge of parental education needs and barriers to HPV vaccination, healthcare providers can help increase HPV vaccination uptake and improve health outcomes.

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“Keep your eyes open to your mercies. The man who forgets to be thankful has fallen asleep in life.”

-Robert Louis Stevenson

## **DEDICATION**

I would like to dedicate this disquisition to my family. To my husband, Blake, you have made sacrifices beyond measure. It is because of you that I did not fail. To my daughter, Maria, you have taught me the true meaning of life. I had not known the kind of love a mother has for their children, you have opened my eyes to this love. I promise to be the best role model for you and to love you always.

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## **CHAPTER ONE. INTRODUCTION**

### **Background and Significance**

The movement known as “Anti-Vax” has gained a foothold in the American psyche and diseases like polio, measles, mumps, and rubella could once again be a common occurrence. Not only should America worry about the reemergence of vaccine-preventable diseases, they should focus their attention on the most common sexually transmitted infection (STI) affecting millions of people today, human papillomavirus (HPV) (Centers for Disease Control and Prevention [CDC], 2016). HPV is a group of more than 150 related viruses, some of which cause cancer and warts. There are both low and high-risk HPV serotypes. Low-risk serotypes can lead to genital warts, whereas high-risk serotypes can cause cancer. There is a vaccine available to protect against nine different HPV serotypes, yet with the rise of the anti-science, anti-vaccination movement, the number of parents choosing to leave their children vulnerable is increasing at an alarming rate (CDC, 2016).

HPV is the most common viral infection and, in fact, 80% of people will be infected in their lifetime (CDC, 2017). Roughly 79 million Americans are currently infected with HPV while another 14 million become newly infected annually. HPV can be transmitted through vaginal, anal, or oral sex, and symptoms may take years to appear after infection. Some of the cancers that can be identified and linked with HPV include vaginal, vulvar, penile, anal, oropharyngeal, and cervical cancer (American Cancer Society [ACS], 2016). In fact, almost all cervical cancer cases are linked to HPV. According to Kasting et al. (2016), “in the U.S. an estimated 360,000 people will be diagnosed with genital warts, 12,000 women will be diagnosed with cervical cancer, and over 4,000 will die from cervical cancer this year” (para. 1).

HPV-related cancers are potentially preventable with a simple vaccine. Unfortunately, vaccination rates have been inadequate. According to Walker et al. (2018), in the United States, only 65.5% of all adolescents received one or more doses of the HPV vaccine, which means approximately 35% of adolescents do not have protection against the virus. The estimated percentages of boys and girls who completed the series and were considered fully vaccinated were even lower at 48.6%.

The newest HPV vaccine was introduced in 2014 and is a 9-valent vaccine (Printz, 2015). The vaccine protects against cancers caused by high-risk HPV serotypes 16, 18, 31, 33, 45, 52, and 58 and also prevents genital warts caused by low-risk HPV serotypes 6 and 11. This vaccine has the potential to prevent roughly 90% of cervical, vulvar, vaginal, and anal cancers. Other developed countries like Australia and the United Kingdom have much higher vaccination rates between 80% and 90% and have seen lower rates of HPV-related complications. Clearly, not all serotypes of HPV can be prevented by vaccination since there are over 150 different strains; however, the 9-valent vaccine is highly efficacious in reducing HPV-related cancers and genital warts, which demonstrates the importance of implementing strategies to improve HPV vaccination rates among adolescents.

The HPV vaccine is recommended to be administered during adolescence, and there are approximately 42 million adolescents in the United States, which is defined as ages 10-19 (United States Census Bureau, 2018; United States Department of Health & Human Services, 2014). The adolescent population is easy to identify, but because of the unique growth and development that occurs during this time period, successful health education and interventions may be challenging at times. Additionally, proper communication must be ensured with their parents, and therefore, parents of adolescents are included for educational purposes to enhance

HPV vaccination rates. In fact, Mansfield, Onsomu, Merwin, Hall, and Harper-Harrison (2018) found that parents who were knowledgeable about HPV were more likely to initiate the vaccine process.

### **Problem Statement & Purpose**

HPV is the most common STI, and HPV-related cancers may be reduced or prevented by the vaccine. Unfortunately, rates of HPV vaccination continue to be low, and one reason may be due to parental misconceptions. According to Cheruvu, Bhatta, and Drinkard (2017), the education needs of parents are not being met when it comes to HPV vaccine knowledge. One of the key findings from the 2008-2012 National Immunization Survey-Teen was that older mothers, Black non-Hispanic, Hispanic, and parents of “other” ethnicity were more likely to divulge that lack of knowledge about the vaccine was a component for not intending to vaccinate their children with the HPV vaccine (Cheruvu et al., 2017). Additionally, vaccine misinformation was associated with lack of intent to vaccinate among parents of adolescents. Parental concerns included that the HPV vaccine was not needed or necessary due to lack of sexual activity. Parents also reported having concerns about the recommended age for vaccination and the possibility that the vaccine will increase sexual activity among adolescents (Cheruvu et al., 2017).

When discussing intent to vaccinate, provider recommendation was identified as a significant influential factor (Cheruvu et al., 2017). With parents who reported “no-intent” to vaccinate against HPV, only 21.6% of those parents had received a recommendation for the HPV vaccine from their provider. Therefore, a strong recommendation for the HPV vaccine by healthcare providers, whether that be through video education or in person, is crucial to improve parental knowledge and increase vaccination rates among adolescents.

The need for more education regarding HPV vaccination is a common theme identified by both parents and healthcare providers. Clinicians and parents were engaged to discuss perspectives for increasing adolescent HPV vaccination, and Widman, Rodrigues, Saad-Harfouche, Twarozek, Erwin, and Mahoney (2016) found that healthcare providers identified an educational need in the parent population. The main areas clinicians felt parents needed education included the recommended age of vaccination, goals of vaccination, side effects, and vaccine risks. Healthcare providers also recognized that it is very important to recommend the vaccine as a trusted practitioner. In fact, Gilkey, Calo, Moss, Shah, Marciniak, and Brewer (2016) found that providing a strong, high quality recommendation to parents compared to no recommendation was found to have a nine-fold increase in HPV vaccination initiation.

Parents reported lack of education as the number one barrier to HPV vaccination (Widman et al., 2016). Areas in which parents felt they needed additional education from their healthcare providers include the following: HPV-related diseases, HPV vaccine safety, sexual concerns, and misinformation on social media. Parents also discerned that education would help increase the uptake of HPV vaccine, as it would alleviate some of their concerns. Parents also felt that cancer prevention should be the primary link to HPV education. Additionally, Kester, Shedd-Steele, Dotson-Roberts, Smith, and Zimet (2014) found that individuals who received educational interventions had higher HPV vaccination intent than those who did not receive education.

## **Purpose**

The purpose of this practice improvement project is to identify the knowledge and attitudes of parents in rural McKenzie County, North Dakota in regard to HPV vaccination and provide education to improve HPV vaccination intent. Therefore, the project will include a pre-



survey and post-survey to assess parents' attitude, knowledge, and intent to vaccinate prior to and after receiving HPV education. HPV education was provided via video, as prior research has demonstrated this route of education may be superior to parent handout education (Gross, Tran, Sutherland, Castagno, & Amdur, 2014). The parental survey results were also disseminated to the healthcare providers at a primary care clinic in rural McKenzie County, North Dakota. The coinvestigator also surveyed the healthcare providers to assess the effectiveness of the project and if the healthcare providers plan on changing their practice based on the information gained from the parental surveys.

### **Objectives**

The first objective of this practice improvement project was to improve HPV knowledge and attitude among parents of adolescents in McKenzie County, North Dakota. The second objective was to improve intent to vaccinate among parents of adolescents in McKenzie County, North Dakota. The third objective was to educate healthcare providers on the parental knowledge and attitudes towards HPV in McKenzie County, North Dakota and assess changes providers would like to implement at Anova Family Health Clinic. Enhanced parental HPV knowledge and improved health professional awareness of parental attitudes towards HPV vaccination has the potential to improve HPV vaccination rates over time, although this was not evaluated during the practice improvement project.

## CHAPTER TWO. REVIEW OF LITERATURE

### Literature Review Methods

Data was collected in this literature review by using the North Dakota State University (NDSU) library database, internet government sites, and national health internet sites. Specifically, Health Source, PubMed, and Cochrane Library were used when utilizing the NDSU library database. Scholarly articles were compiled in relationship to HPV prevalence, education barriers, and policies. Key terms when searching for material included *HPV*, *HPV vaccination*, *parental education*, *barriers*, *cancer*, *McKenzie County*, and *policy*. Data was then analyzed and placed in a logical order throughout the paper. Inclusion criteria for this literature review was peer-reviewed material, and data from the last ten years only. Studies of a qualitative and quantitative nature were included. Exclusion criteria were that of populations other than adolescents and parents, and articles with no health outcomes.

### HPV Vaccine

The HPV vaccine is recommended for adolescents starting at age 11-12 but can be administered as early as age 9 (CDC, 2019). If an adolescent does not start the vaccination until age 15, three doses will be needed instead of the typical two doses. In the two-dose series, the second dose is recommended to be administered 6 to 12 months after the initial dose. In the three-dose series, an initial dose is given with the second dose administered one to two months later, and the third dose is administered six months after the first dose. The HPV vaccine can be given to both males and females up to the age of 45 years old.

Parents report feeling that vaccinating an 11-year old against HPV may seem too early, but according to the Youth Risk Behavior Survey, 5.9% of adolescents reported having sexual intercourse before the age of 13 (Tulloch & Kaufman, 2013). Additionally, older youth between

the ages of 15 and 19 are more likely to engage in risky sexual behavior, including multiple sexual partners, which increases the risk for exposure to HPV. Given the ages of sexual activity initiation, vaccination should occur prior to exposure as adolescents would be protected against certain HPV serotypes that put them at risk for cancer and genital warts. Furthermore, age at vaccination initiation is crucial, as immune responses are higher in younger adolescents than older adolescents (Smolen et al., 2012).

### **HPV Vaccine Efficacy**

The HPV vaccine was made available and licensed in 2006 after years in clinical trials (Garland et al., 2016). There is a significant amount of data on the effectiveness of the HPV vaccine, as the vaccine has been available for more than a decade. A large reduction of genital warts and HPV-specific infections of up to 90% was observed in Australia, Europe, North America, and New Zealand after introduction of the HPV vaccine. Specifically, HPV 16 and 18 infections declined 75-80% among adolescents and women younger than 25 years old in Australia after the vaccine was introduced compared to the pre-vaccine era. This finding is significant, as HPV 16 and 18 are responsible for up to 70% of cervical cancers. A 90% reduction in genital warts was also observed in the post-vaccine era. Additionally, Hildesheim, Wacholder, Catteau, Struyf, Dubin, and Herrero (2014) found that the vaccine was 89.8% efficacious against HPV serotypes 16 and 18 in vaccinated females. Giuliano et al. (2019) found similar results with a 94.9% efficacy with respect to HPV serotypes 6, 11, 16, and 18 among HPV vaccinated females.

### **HPV Vaccine Safety**

Vichnin et al. (2015) studied over one million preadolescents, adolescents, and adults over nine years post-HPV vaccination and found the most common adverse effects associated

with HPV administration were syncope and skin infections. Syncope has been found more often with HPV vaccine administration than other vaccines given to females in the same age range, which is thought to be caused by a vagal nerve stimulation. Therefore, recommendations include to have the adolescent sit for the vaccination and remain sitting with health professional observation for at least 15 minutes after vaccine administration. Common misconceptions of serious adverse effects like deep vein thrombosis, autoimmune conditions, multiple sclerosis, and Guillain-Barre syndrome were extensively studied and found to have no increased incidence in HPV vaccinated adolescents. Arnheim-Dahlström (2013) found no association between the incidence of autoimmune diseases, neurological diseases, and thromboembolic events in over 900,000 adolescent females who received the HPV vaccine. Furthermore, Scheller et al. (2015), studied over three million girls and women in two different Scandinavian countries finding that HPV vaccination was not associated with development of multiple sclerosis or other demyelinating diseases.

### **HPV Vaccination Coverage**

Results from the National Immunization Survey revealed that 51.1% of the 18,700 U.S. adolescents who were surveyed were up to date on the HPV vaccine (Jenco, 2019). On the other hand, up-to-date vaccine rates for the varicella, hepatitis B, and measles, mumps, rubella (MMR) vaccines were 94.9%, 92.1%, and 91.9% respectively. Tdap and meningococcal vaccination is recommended at the same age as the HPV vaccination; however, rates for these adolescent vaccines are significantly higher than HPV vaccination rates at 88.9% and 86.6% respectively. There is quite a large disparity between HPV vaccine rates and the other standard childhood and adolescent vaccines, which demonstrates HPV vaccination is declined more often compared to other vaccinations. HPV vaccination rates have also been found to be lower in rural areas.

According to Swiecki-Sikora, Henry, and Kepka (2019), rural adolescents were less likely to initiate and complete the HPV vaccine compared to urban adolescents. The assumption behind the lower rates in rural adolescents are travel distances, transportation problems, inability to take time off work, and difficulty in accessing preventative health care. Additionally, rural populations traditionally have lower incomes, less educational attainment, and higher rates of being uninsured than urban individuals.

### **HPV Vaccination Rates in North Dakota**

Compared to the United States, North Dakota currently has higher rates of HPV vaccine series completion. The current HPV vaccine series completion rate for girls and boys in North Dakota is at 55.6% and 51.3% respectively (North Dakota Department of Health, 2019). The HPV vaccination series completion rate for adolescents throughout the United States is 48.6% (CDC, 2018). Initiation rates of the HPV vaccine series in North Dakota are 76.7%, whereas the HPV initiation rate is 65.5% throughout the United States.

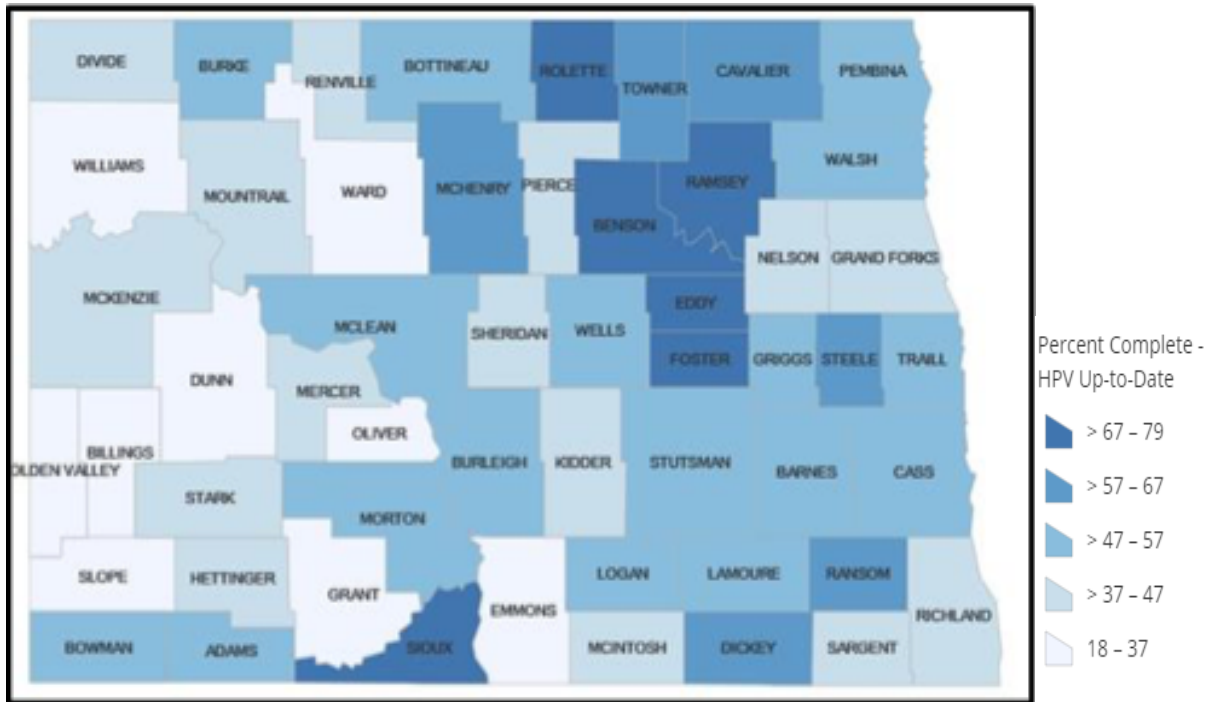
### **HPV Vaccination Rates McKenzie County**

McKenzie County is located in northwest North Dakota and is the proposed site for the practice improvement project. McKenzie County has a population of 2.3 people per square mile, which classifies this as a rural county (United States Census Bureau, 2010). The total population in McKenzie County consists of 12,724 people. According to the United States Census Bureau (2017), 30.8% of McKenzie County's population is under the age of 18. Comparative to most of North Dakota, McKenzie County HPV up to date vaccination rates range between 37% and 47% (North Dakota Department of Health, 2018). This is not ideal, as this means that anywhere from 53%-63% of the adolescent population in McKenzie County is not up to date with their HPV vaccination. In counties with the highest HPV vaccination rates in North Dakota, approximately

67%-79% of all adolescents are up to date on HPV vaccination. This leaves 21%-33% of all adolescents not fully covered against HPV. Please see Figure 1 for further information on HPV vaccination rates throughout North Dakota, including McKenzie County.

**Figure 1**

*HPV Up-to-date Coverage by County, Female and Male Adolescents, Quarter 1, 2018*



*Note: Adapted from Geographic Distribution of HPV Vaccination Coverage Among Adolescents in North Dakota by North Dakota Department of Health, 2018. (<https://repository.immregistries.org/files/resources/5b98b4d884ba2/e5-dfitzsimmonsdistributionofadolescenthpv.pdf>).*

### HPV Vaccination Barriers

To improve HPV vaccination rates, barriers must be identified. The HPV vaccine already has stigma associated with it due to the fact the virus is transmitted through sexual contact (CDC, 2016). Additional barriers include lack of knowledge, misconceptions and myths, healthcare provider views, and lack of standardized policies regarding HPV vaccination (Hendry, Lewis, Clements, Damery, & Wilkinson, 2013).

## **Lack of Knowledge**

A growing concern in today's population should be HPV; however, parents may be unaware of just how detrimental not obtaining the vaccine can be. According to Hendry et al. (2013), one of the most common reasons why parents do not vaccinate their children was found to be poor knowledge and misconceptions concerning what HPV is and how the virus is transmitted. Roughly half of participants interviewed were aware that HPV infection could lead to the development of cervical cancer; however, the participants were confused about whether cancer could actually be prevented. Additionally, parents of adolescents were unaware of the recommended age at which the HPV vaccination should be given, and three out of ten parents who declined the vaccine said they did not have enough knowledge to make an informed decision.

Dilley, Peral, Straughn, and Scarinci (2018) found that many parents thought the HPV vaccine did not prevent disease in males, used social media and resources for information about the disease, and had believed rumors of negative side effects from their peers. Parents also reported desiring more education from providers, identifying social media as a potential avenue to use. Furthermore, parents believed education that is easier to understand, as well as quick or short educational interventions would be more beneficial. Mohanty, Leader, Gibeau, and Johnson (2018) explored social media as an avenue for HPV vaccine education and found increases in reach and engagement with the public. Additionally, Lyson et al. (2019) also found that brief messages on social media can be an effective tool to raise awareness of health information.

## **Misconceptions and Myths Regarding HPV Vaccination**

There are numerous misconceptions and myths regarding HPV vaccination that may result in reluctance or refusal to receive the vaccine among adolescents and parents. Common misconceptions include the increased risk for sexual activity, lack of vaccine necessity due to abstinence, and concerns regarding cervical cancer screening and adverse effects. Social media stories may also influence parental intent to vaccinate. Additionally, some parents have reported that their children should be part of the decision-making process in regard to HPV, so they believed the vaccine should be offered when adolescents are of age to decide for themselves (Hendry et al., 2013).

### ***Increased Risk of Sexual Activity***

The fact that HPV is an STI can also lead to receiving the vaccine to be seen as condoning sexual activity and promoting promiscuity by some parents and even some healthcare providers. Parents have reported they do not feel their children will be sexually active before marriage and have expressed concerns that the vaccine may promote sexual activity (Dilley, 2018). Zimet, Rosberger, Fisher, Perez, and Stupiansky (2013) found no evidence of increased sexual activity in vaccinated compared to unvaccinated females between the ages of 15 and 24 in their cross-sectional study. Additionally, HPV vaccination has not been found to increase high-risk sexual behaviors, as Vazquez-Otero et al. (2016) found no association between HPV vaccination and inconsistent condom use with college women. Additionally, HPV-vaccinated males were less likely to report inconsistent condom use compared to unvaccinated males.

### ***Lack of Vaccine Necessity Due to Abstinence***

Hendry et al. (2013) found that many parents questioned if the vaccine should be given if their children are not sexually active. Gilman, Gilman, and Johns (2009) discussed how this



thought process can be detrimental, as children who claim to be abstinent still are likely to engage in oral and anal intercourse and often do not view these behaviors as intercourse. Cohen and Head (2013) also found knowledge gaps related to abstinence and HPV. Some of the participants reported postponing vaccine initiation until after finding a serious partner due to current abstinence. Unfortunately, full immunity is not achieved until six months post-vaccination, which places patients who postpone vaccination at risk for HPV-related diseases.

### ***Misconceptions Regarding Cervical Cancer Screening***

Another barrier to HPV vaccination was found to be parental misconceptions regarding cervical cancer screening. According to Hendry et al. (2013), parents questioned if screening methods were effective enough to identify cancer prior to progression and therefore, did not feel HPV vaccination was beneficial for their children. However, evidence has demonstrated that cervical cancer screening with Papanicolaou (Pap) smears and HPV deoxyribonucleic acid (DNA) testing has a high sensitivity and specificity (Pankaj et al., 2018). The specificity of Pap smears and HPV DNA testing was found to be 98.1% and 98.0% respectively, whereas the sensitivity was found to be 75.8% and 89.9% respectively.

### ***Safety Concerns***

Thompson, Rosen, Vamos, Kadono, and Daley (2017) found that some parents still believe the vaccine to be unsafe and worry about potential side effects. Parents of female adolescents were twice as likely to select this reason compared to parents of male adolescents. Caregivers expressed that “newer” vaccines are less trustworthy than they received in their childhood (Katz et al., 2016). Parents also identified that they believe administration of these “newer” vaccines is experimentation on their children.

Large scale studies have been conducted showing the safety of the HPV vaccine, and the most frequently reported side effects have been pain at injection site, bruising, and syncope. In fact, Klein et al. (2012) conducted a large-scale study with over 44,000 females who completed the three-dose HPV vaccination series and concluded the most common adverse events associated with HPV vaccination were same-day syncope and skin infections post-vaccination. The CDC (2019) also reports that monitoring and research has occurred over 12 years and has shown the most common side effects are dizziness, syncope, pain at injection site, and headache. Other studies similarly found pain at injection site, bruising, dizziness, and headaches as the most common adverse effects (Goncalves et al., 2014; Nichol et al., 2015; Rojas et al., 2011).

### ***Social Media Influences***

Social media and news stories have also led to some of the fear associated with vaccines, as they misreport vaccine adverse events (Zimet et al., 2013). In fact, HPV vaccination was incorrectly reported to cause death in Maclean's magazine in Canada in 2007. Media was also responsible in a decline in HPV vaccination in Denmark. Prior to negative media coverage, the HPV vaccination rate in Denmark was 90%; however, this decreased to 54% after the media covered inaccurate stories regarding HPV vaccination adverse events, such as relationships between complex pain and disability related to the vaccine (Suppli, Hansen, Rasmussen, Valentiner-Branth, Krause, & Mølbak, 2018).

### **Healthcare Providers' Views**

Paige Lake, Kasting, Malo, Giuliano, and Vadaparampil (2018) examined healthcare providers' and public health professionals' opinions on why vaccination rates against HPV are suboptimal. The participants felt that families did not understand HPV is linked to cancer and did not realize the vaccine is a two-dose or three-dose series. Therefore, parents may not understand

if the full series is not administered, adolescents are not fully protected and may be at risk for HPV-related cancers.

Healthcare providers also cited that if parents gave adolescents a voice in deciding to accept or decline HPV vaccination, adolescents often declined due to a fear of needles or multiple injections (Paige Lake et al., 2018). The fact that HPV vaccination is not mandated also gives providers and parents a perception that the vaccine is optional, which may result in weak or no recommendations from providers and lower uptake by parents. Parents may view the HPV vaccination as not important since children and adolescents are required to receive multiple vaccinations prior to entry into public and private schools, but the HPV vaccination is not included in these requirements in many states. In fact, Virginia, Rhode Island, Hawaii, and the District of Columbia (D.C.) are the only places in the United States where the vaccine is mandated for school enrollment (Immunization Action Coalition, 2019). Additionally, Rhode Island and Hawaii mandate both males and females obtain the vaccine, whereas Virginia and D.C. mandate only females to obtain the vaccine.

Healthcare providers also have reported being reluctant to discuss the vaccine because they have difficulty discussing sexual matters with young people or they anticipated parental disapproval (Paige Lake et al., 2018). Providers cited the fact that they wanted to avert conflict, so they felt not mentioning HPV vaccination when they thought parents would disprove was easier. This specific barrier was also mentioned by Hendry et al. (2013) who found that “personal reluctance to discuss sexuality with patients and low self-efficacy to convince parents [regarding] the need for vaccination” led to lower HPV acceptance rates (p. 5163). Therefore, provider communication training focusing on parent/patient engagement in the discussion, establishing relationships, initiating the conversation, conveying the importance of vaccination,

and addressing the misconceptions is essential to improving HPV vaccination rates (Paige Lake et al., 2018).

### **Healthcare Barriers**

There are numerous healthcare-related barriers that have been identified in poor HPV vaccination initiation. Among the most frequently identified are lack of strong recommendations from providers, vaccine availability, financial concerns, and HPV vaccine policy concerns.

Barriers need to be identified as proper interventions can then be formulated.

#### ***Lack of Strong Recommendations***

Healthcare provider recommendation is a significant factor to improving HPV vaccination uptake; however, many parents report not receiving a recommendation for adolescent vaccination or lack a strong recommendation from their healthcare providers (Cheruvu et al., 2017). Some areas identified as reasons for lack of strong recommendation include lack of healthcare provider awareness of guidelines, provider discomfort about the topic, and lack of time to recommend HPV vaccination (Cartmell et al., 2018). Many healthcare providers do not need to know HPV vaccination guidelines, as they do not specialize in pediatrics and see a variety of patients in different stages of life. Discussions about the HPV vaccine may make healthcare providers uncomfortable, as they feel some parents do not believe in vaccination and having a conversation about vaccination would create a difficult relationship with their patients. Providers have also been found to be hesitant to recommend the vaccine because they already have limited time with the patient and do not want to engage in a long conversation about the vaccine.

Rosenthal et al. (2011) also found that healthcare provider recommendations strongly impacted HPV vaccination uptake. In fact, women between the ages of 19 and 26 were

overwhelmingly more likely to receive the vaccine if their provider had recommended it. Additionally, the strength of the recommendation played a large role, as women who received a stronger recommendation were more likely to be vaccinated. Provider recommendation was the strongest predictor of HPV vaccination. Therefore, healthcare providers should be educated about the importance of making a strong recommendation, which has the potential to improve HPV vaccination rates.

### ***Vaccine Availability***

Cheruvu et al. (2017) identified a barrier to HPV vaccination as inadequate access or unavailability of the vaccine. This holds true in McKenzie County, as vaccines are only offered at the public health clinic. Therefore, patients cannot receive the vaccine at the primary care clinic. This may create a burden for parents, as they have to take time off work for the well child visit and then make another appointment at the public health clinic for the actual vaccination.

Vaccine availability has also been identified by various healthcare facilities as a barrier to vaccination. The facilities report upfront costs, inadequate reimbursement, and low or uneven insurance coverage as reasons for not offering the HPV vaccination (Keating et al., 2008). Private clinics are funded by the owner, which is typically the healthcare provider, and this creates a financial burden for healthcare providers. Healthcare services are also limited in rural areas, making accessing the vaccine problematic.

### ***Financial Concerns***

Healthcare providers reported parents raised concerns about HPV vaccine cost as one of the barriers to accepting HPV vaccination for their adolescent children (Walling et al., 2019). In fact, a systematic review of 72 studies reported vaccine cost was mentioned by parents

consistently (Hendry et al., 2013). The cost of the vaccine did not impact the participants' views about the vaccine but was reported as a barrier to obtaining the vaccine.

The cost of the HPV vaccine is listed at roughly \$228 (CDC, 2020). The Federal Vaccines for Children program covers the cost for eligible youth up to 18 years old, and some private insurances also cover the vaccine as well. Eligible youth consist of uninsured or underinsured individuals, Medicaid-eligible, or American Indian/Alaska Native adolescents.

### ***Policy***

According to the Immunization Action Coalition (2019), HPV vaccination in the United States is only a recommendation at this time, and there is no formal national policy. HPV is mandated in Virginia, Rhode Island, Hawaii, and Washington D.C. for school enrollment but there are no requirements for home-schooled children or any other states. When discussing policy and making immunizations mandatory, one needs to look at the controversy surrounding such requirements.

Colgrove, Abiola, and Mello (2010) discussed opponents' views of mandatory HPV vaccination and some of the areas opponents identify as factors against a mandated vaccine. The first factor was newness of the vaccine. When the mandate was initially proposed in 2006 the HPV vaccine had only been on the market for a few months. Many people felt as though the efficacy and safety should be proven by long-term data (Colgrove et al., 2010). As with any new immunization, the Federal Drug Administration (FDA) has approved the HPV vaccine, which is a lengthy process with three phases of premarket trials (The College of Physicians of Philadelphia, 2018). The first phase includes safety and immunogenicity studies that are performed in a small number of closely monitored subjects. Phase two enrolls hundreds of subjects and includes dose-ranging studies, and phase three enrolls thousands of individuals,

providing critical documentation of effectiveness and safety data for licensing. Vaccine development typically takes anywhere from 10-15 years. This disproves the opponents' claims of not having long term data to support the safety and efficacy of the HPV vaccine.

Social conservatives voiced concern about the fact that the HPV vaccine protects against STIs, and they didn't want abstinence messages to be under-minded (Colgrove et al., 2010). Recognizing that the mandated age would be 11-12 years old, opponents' express concerns that parents would have to discuss sex at an early age. Another barrier for the mandate was the non-transmissibility of HPV in a classroom setting. The respondents felt the point of vaccination is to prevent spread of contagious disease in schools, not to use school as an entry into public health goals (Colgrove et al., 2010). If proponents had framed HPV vaccination as cancer preventative, the opponents may be more accepting of the vaccine in a classroom setting.

### **Evidence-Based Interventions to Improve Vaccination**

Because parents identify many barriers to HPV vaccination, evidence-based interventions are constantly being identified to improve HPV vaccination uptake. Some of the evidence-based interventions to improve HPV vaccination uptake include incorporating additional non-clinic areas to obtain vaccines, changing policy to add more HPV education for parents, improving provider communication with parents, sending reminders to parents, and establishing different strategies to educate parents. Education is a common evidence-based intervention to improve vaccination rates and includes both education for healthcare providers and parents (Zimet et al., 2013).

### **Alternative Sites for Vaccination**

To address HPV vaccination reluctance, Zimet et al. (2013) proposed establishing alternative venues for vaccination, such as schools and pharmacies. A survey by Rand et al.

(2011) found that approximately 20% of parents were willing to have their child vaccinated in pharmacies; however, a larger portion of the adolescents, at 35%, were willing to be vaccinated in pharmacies. The majority of parents and adolescents in the study reported being willing to have the vaccine in the emergency room, and almost 40% of parents reported they would accept HPV vaccination for their adolescents within a school setting.

### **Policy**

In June 2008, Louisiana enacted a policy that required the Department of Health and Hospitals to provide HPV and HPV vaccine information to the Department of Education, who would then provide this information to the city, parish, and school boards (Pierre-Victor et al., 2017). School boards were then required to distribute the information to parents of students in grades 6 through 12. Louisiana's approach to awareness involved creating a policy to increase education in parents of adolescents. This intervention demonstrated that increasing education among parents can be a good policy to set forth amongst states who would like to see an uptake in vaccination rates.

Pierre-Victor et al. (2017) examined the vaccination data after the policy was enacted, as well as provider recommendations during the same period. The pre-policy period in 2008 showed vaccination rates for at least one dose of the HPV vaccine at 28.8% among adolescent females in Louisiana, 25.7% in Alabama, and 18.5% in Mississippi. The post-policy period in 2012 showed vaccination rates of 53.6% in Louisiana, 42.7% in Alabama, and 38.9% in Mississippi. Additionally, the provider recommendations during that period increased from 38.7% in 2008 in Louisiana to 59.5% in 2012. Pierre-Victor et al. (2017) interpreted these results as the policy may not have resulted in a significant increase in vaccination rates, as provider recommendation may have played a bigger role. For instance, Alabama's largest vaccination



uptake was from 2008-2009 and the largest increase in physician recommendation was in the same period. These trends stayed consistent throughout the study. While policies may be helpful, vaccine promotion through media and provider recommendation play a significant role, and interventions to facilitate provider recommendation are key.

### **Communication Strategies**

Research has demonstrated certain communication strategies utilized by healthcare providers can improve HPV vaccination uptake among parents and adolescents (Dempsey et al., 2019; Zimet et al. 2013). Opel et al. (2013) found presumptive communication enhanced HPV vaccination uptake rates among parents of adolescents. Zimet et al. (2013) recommended providing accurate or credible sources that can address concerns. Additionally, acknowledgement of the known minor risks of pain at injection site, bruising, syncope, dizziness, and mild fever was also recommended, as parents may view the vaccine as riskier if the healthcare provider simply states there is no risk.

Dempsey et al. (2019) found that providing a clear and strong provider recommendation was associated with greater urgency, trust in the information received, decreased vaccine hesitance, and increased vaccine uptake. Furthermore, parents that were initially “very hesitant” or “somewhat hesitant” had changed their stance on HPV vaccination after receiving a very strong provider recommendation. Parents who received a strong provider HPV vaccination recommendation were significantly more likely to have their adolescent vaccinated and reported they were “very likely” to have their adolescent vaccinated in the future compared to those who did not receive a strong recommendation.

Dempsey (2019) examined HPV vaccination uptake rates with presumptive communication compared to shared decision-making with parents and adolescents. Presumptive

communication was described as the provider identifying the adolescent was due for the vaccine and informing parents and patients that the vaccine would be administered that day, whereas shared decision-making was described as asking how the parent felt about HPV vaccination and followed by discussion. Presumptive recommendations from providers resulted in higher HPV vaccination uptake rates, and parents were less likely to have concerns regarding the vaccine's safety. A shared decision-making style was found to be less successful and not recommended as a communication style for providers to use when recommending HPV vaccination.

Presumptive communication is also effective when increasing acceptance of other vaccines. Hofstetter et al. (2017) found that influenza vaccine acceptance was increased by using presumptive communication. This was compared to participatory formats where parents make more decisions based on the statement. Statements like "Today we are going to do the influenza vaccine" were coded as presumptive and "Are we going to do the influenza vaccine today" was coded as participatory. Participants accepted the influenza vaccine at a rate of 72% with presumptive communication compared to 17% with participatory communication.

### ***Reminders Sent to Patients***

Interventions that clinics can implement to promote HPV vaccine initiation and completion include email, text, phone call, and mailed letters. Coley, Hoefler, and Rausch-Phung (2018) studied how the New York State Department of Health (NYSDOH) utilized reminder letters to inform parents that adolescents were due for the HPV vaccine. The NYSDOH identified 303,965 adolescents who had no record of HPV vaccination. Of those, they mailed 81,558 HPV vaccine reminder letters to parents/guardians of eligible adolescents, and the remaining adolescents were considered the control group. An increase of 2% in vaccine initiation was observed in the intervention group over the control group in the next six months following

the mailings. This was statistically significant, and the researchers concluded that large scale reminders may work to increase HPV vaccination rates. Additionally, Matheson, Derouin, Gagliano, Thompson, and Blood-Siegfried (2014) found that text message reminders were very effective in on-time receipt of patients receiving the full vaccination series.

### ***Methods to Educate***

Parental and adolescent education regarding HPV and the HPV vaccine is important to improve knowledge, reduce misconceptions, and potentially enhance HPV vaccine uptake. Barnard, Cole, Ward, Gravlee, Cole, and Compretta (2019) sought to define what educational interventions worked best to increase HPV vaccine uptake. Video education produced the greatest difference in HPV vaccination initiation with a 10% difference between the group that watched an educational video and the group that did not. While video education produced a statistically significant increase in HPV vaccination, paper handouts, leaflets, or pamphlets did result in a slight increase in vaccine rates. Ultimately, video education was found to be superior to paper education in increasing HPV vaccination uptake.

Chapman (2010) also looked at the impact of video education on HPV vaccination and found that implementation of an HPV educational video significantly increased overall HPV vaccine acceptability, endorsement, and perception of HPV vaccination among participants. Prior to the educational video, 56.5% of participants reported willingness to vaccinate their child against HPV. After the educational video, 94.1% approved of vaccination and reported willingness to vaccinate their child. Interestingly, 72.6% of participants also supported mandatory HPV vaccination after watching the educational video.

Krawczyk, Lau, Perez, Delisle, Amsel, and Rosberger (2012) also sought to compare written and video HPV education interventions. College students received HPV education in one

of three groups: written, video, or control. Both the HPV pamphlet group and video group demonstrated an increase in knowledge and intent. Additionally, Gross et al. (2014) found that 26% of participants who listened to a PowerPoint lecture given by a gynecologist and engaged in a face-to-face discussion with a cervical cancer patient made an appointment for HPV vaccination immediately post-intervention. Ultimately, a variety of patient education strategies have the potential to improve HPV vaccine intent and uptake.

### **Theoretical Framework**

Ajzen's Theory of Planned Behavior (TPB) provided the theoretical framework for this project. The Theory of Planned Behavior was developed in 1985 by Icek Ajzen to explain and predict health behavior in specific contexts (Ajzen, 1991). Ajzen began researching attitude and behavior in the late 1960s with Professor Martin Fishbein. Together, they developed the Theory of Reasoned Action in 1967, which later was expanded into the Theory of Planned Behavior. They formulated the first theory to help predict behavior in a wide variety of situations, upon which Ajzen later elaborated.

Attitude, subjective norm, and perceived behavioral control predicts intention and subsequently, behavior in the TPB model (Catalano, Knowlden, Birch, Leeper, Paschal, & Usdan, 2017). In order to predict an individuals' intentions, one must first know whether the person is in favor of doing the behavior ('attitude'), how much social pressure to perform/not perform a behavior exists ('subjective norm'), and the extent at which a person believes their ability to perform the behavior ('perceived behavioral control'). Please see Appendix A for a diagram of the TPB. The TPB has been used in other studies looking at HPV knowledge and vaccination. For example, a cross-sectional study by Catalano et al. (2017) reviewed whether the TPB is a valid model in foretelling obtaining HPV vaccine by college men. Through utilization

of the TPB, nearly one-third of the college sample were found to be unaware of HPV, and this led the researchers to conclude that the TPB model proved to be a valuable means of data collection when trying to obtain information to increase HPV vaccine awareness.

Kim and Choi (2016) used the TPB model to examine mothers' intention to vaccinate their children against HPV. They configured questions that measured the mothers' attitudes, subjective norms, intent to vaccinate, and perceived behavioral control using a seven-point Likert scale based on the TPB model. When evaluating attitude, mothers of adolescents were asked whether vaccinating is necessary, beneficial, and a good idea. Subjective norms were evaluated by asking the mothers if most people think they should vaccinate their child, if it is expected of them to vaccinate, and if the people in their life would want them to vaccinate. Perceived behavioral control was assessed by questioning if vaccinating was in their control. The mothers' intention was analyzed by inquiring if the mother planned to vaccinate her child or children in the near future.

The results revealed that the intention to vaccinate against HPV significantly correlated with attitude, subjective norms, and planned behavioral control, proving the benefit of the TPB to the project of educational needs of parents regarding vaccination (Kim & Choi, 2016). The proposed practice improvement project assesses parents' intent to vaccinate, as well as attitudes and knowledge regarding HPV. The validated survey was utilized during the practice improvement project incorporates questions related to parental attitude, subjective norm, and control. The TPB assisted in guiding the project to provide information on parents' attitudes toward vaccination and determine whether parents intended on vaccinating their children against HPV (Ajken, 2002).

## **PDSA Model**

The Plan Do Study Act (PDSA) was utilized to guide this practice improvement project. The PDSA model is a way to test changes that would be executed to improve a process (Institute for Healthcare Improvement, 2012). The PDSA tests change by planning the change, implementing the change, observing results, and acting on results. The model is cyclic and is meant to be repeated to refine the changes suggested. The model is broken down into four steps that is based on a scientific method. The four stages include *Plan*, *Do*, *Study*, and *Act*.

### ***Plan***

According to the PDSA model, the first step or phase is *Plan*. The planning phase includes preparation for proposed change and identification of how the intervention or change will be implemented (Institute for Healthcare Improvement, 2012). The planning phase of the practice improvement project included organizing a committee and identifying the setting of the proposed project. Additionally, necessary resources were identified to aid in implementing the project.

### ***Do***

The second step of the PDSA model is *Do*. During this step, the project was implemented, and data was gathered. Demographic questions and a pre- and post-survey were distributed to parents of adolescents who present to the clinic. After the pre-survey, parents watched an educational video on HPV and HPV vaccination. After the video was completed, the parents completed the post-survey.

### ***Study***

The third step of the PDSA is *Study*. In this step of the PDSA, the data was fully analyzed. Data analysis occurred over a few days and compiled in a word table. The data was summarized to determine if the interventions improved parental intent and knowledge of HPV.

### ***Act***

The last step in the PDSA is *Act*. During this step, potential necessary changes may be identified and implemented if the process need to be altered to achieve the objectives. The modifications assist in plans to prepare for the next step. *Act* was implemented when the process was repeated with educating healthcare providers on the results from parental surveys and determining if they planned to make changes to their practice.

### **Conclusion**

HPV vaccination rates continue to remain lower compared to other childhood and adolescent vaccines, and one reason for this may be related to common misconceptions and lack of knowledge related to HPV vaccination. In fact, vaccine misinformation has been found to be associated with lack of intent to vaccinate among parents of adolescents; however, strong recommendations for vaccination from providers and parent education have been shown to improve HPV vaccine uptake (Cheruvu et al., 2017). Additionally, Barnard et al. (2019) found HPV video education significantly improved intent to vaccinate. Therefore, further interventions involving HPV video education have the potential to reduce common misconceptions and improve knowledge among parents of adolescents, which may ultimately improve HPV vaccination rates and reduce HPV-related complications.

## **CHAPTER III. METHODS**

### **Project Design**

The design of this project was a practice improvement with an educational intervention aimed at parents and guardians of adolescents. The overall project goals are to improve parental attitudes, knowledge, and HPV vaccination intent, as well as educate health professionals in a rural primary care clinic in North Dakota about parental HPV attitudes and knowledge.

Additionally, the practice improvement project looks at video education as an approach to HPV vaccination education with parents and guardians of adolescents. Parents or guardians who brought their adolescent children to the Anova Family Health Center (AFHC) were provided a pre-survey with questions regarding HPV attitude and knowledge. A short HPV educational video was played, and parents completed the post-survey. Dissemination of the results occurred during an education session with healthcare providers at the rural clinic. Healthcare providers completed a short survey after reviewing the results of the parental surveys. Descriptive statistics will be used to communicate results.

### **Setting**

The implementation period for the practice improvement project was from June 2020 through August 2020 at AFHC, which is located in Watford City, North Dakota (Anova Family Health Center, 2020). There are approximately 6,523 residents in Watford City, North Dakota, which is in McKenzie County where there are 12,724 total residents (United States Census Bureau, 2017). The clinic is roughly one mile from the hospital in Watford City. AFHC is a nurse practitioner owned and operated clinic that was founded in 2012 by Dr. Anita Pedersen, DNP, FNP-BC and Vonnie Johnson, FNP-BC. The clinic is comprised of three nurse practitioners, one registered nurse, two licensed practical nurses, two certified nurse assistants,



two billing staff, one office manager, and two registration/reception staff. AFHC serves every age and stage of life, from newborn to end-of-life. Some of the services provided include same day urgent care visits, well child exams, sports physicals, chronic care management, and department of transportation physicals.

### **Sample/Recruitment**

Parents of adolescents and healthcare professionals from AFHC were identified for inclusion in this project. For this project, the target population included parents or guardians of adolescents between ages 9-17 who presented to AFHC during the implementation period and agreed to participate in the project. An informed consent was given to parents prior to beginning the survey (please see Appendix B). A convenience sample was utilized, as parents or guardians were chosen to participate if they brought an adolescent child to the clinic for an appointment during the scheduled time frame for survey disbursement.

Additional participants in the project include health professionals and staff at AFHC. The receptionist was recruited with a verbal invitation to be responsible for handing out the surveys. The three nurse practitioners were recruited by verbally asking the clinic owner and inquiring if the providers at AFHC would be interested in this PIP. The educational session was then offered to all providers who were willing to participate at the scheduled meeting on October 27, 2020. The three nurse practitioners consisted of one doctorally-prepared nurse practitioner and two masters-prepared nurse practitioners.

### **Interventions**

Parents meeting inclusion criteria and agreeing to participate in the project began by completing demographic information and the pre-survey questions (Appendix C and D). These questions were in paper format and distributed by the receptionist at AFHC upon arrival to the

clinic. While in the waiting room, parents were invited to fill out the survey and returned the survey to the nurses prior to the healthcare provider visit. Participants were shown an educational video on HPV vaccination in an effort to promote enhanced vaccination uptake. Please see Appendix E for a transcript of the education video.

After completion of the video, participants were asked to complete the post-survey, which contained the same questions as the pre-survey. The surveys were kept at the nurses' station in a locked cabinet in a folder to maintain privacy. Surveys were numbered and did not contain identifying information. After collecting data from parental surveys for a two-month period, the information was analyzed, and results were shared with healthcare providers at AFHC via PowerPoint presentation on October 27, 2020 via Zoom due to the worldwide COVID pandemic. Please see Appendix F for the PowerPoint presentation. The healthcare providers then completed a short evaluation survey regarding the benefit and quality of information received during the presentation. This was emailed to the providers following the presentation and was returned by the receptionist with no names attached to the surveys to allow for anonymity.

### ***Instrument for Data Collection***

Demographic information was collected from parents and guardians and is included in Appendix C. The parental pre- and post-survey, or questionnaire, can be found in Appendix D and was developed by Potts and Southard (2019). The survey is divided into three domains to assess attitude, knowledge, and intent. There are 10 attitude questions, 9 knowledge questions, and 1 intent question. A 4-point Likert scale is used to assess attitude questions, and these questions come from the Carolina HPV Immunization, Attitudes, and Beliefs Scale (CHIAS). The CHIAS demonstrated an acceptable Cronbach's alpha and 1-year test-retest reliability (McRee et al., 2010). The knowledge questions consist of true/false and multiple-choice

questions and were adapted from the Caregiver's Survey used in the Carolina HPV immunization Measurement and Evaluation (CHIME) project (Reiter et al., 2009). In this study, bivariate and multivariate logistic regressions were used to compare vaccine initiation and beliefs.

For the provider survey, a qualitative survey was created by the co-investigator with the assistance of the committee members. The provider survey can be found in Appendix G and is comprised of five open-ended questions. This survey allowed the co-investigator to assess changes providers would like to commit at AFHC and what education was gained by the presentation.

### ***Video***

A four-minute educational video from the Houston Health Department was used in the practice improvement project for parental and guardian education. The video was viewed on an IPAD provided by the NDSU nursing department with an easily accessible link for nursing staff to the video. This video included information regarding HPV serotypes, HPV-related cancers, and rates of HPV infection, as well as information on HPV vaccination, including age at vaccination initiation, number of doses, safety information, and who can receive the vaccine. Please see Appendix E for a transcript of the video.

### ***Provider Education***

Provider education was completed on October 27, 2020 via Zoom. The education was completed over the lunch hour and took approximately 20 minutes to complete. Statistics on vaccine completion rates were given, the survey results, an interpretation of the results, and suggestions to increase vaccination. This PowerPoint presentation can be found in Appendix F.

## Data Analysis

Both quantitative and qualitative data were analyzed from surveys and the post project questions with providers. Descriptive statistics were utilized to describe participant demographics and survey results. The post-intervention questions with providers contained qualitative data, as the health care providers were asked to provide open-ended feedback and if they perceived that the information would change their practice. Themes were identified for the qualitative feedback to reduce participant identification. Please see Appendix G for post-intervention healthcare provider questions.

**Table 1**

### *Project Implementation*

Completion Date	Pre-Implementation	Implementation	Evaluation
5/20/2019	Meet with stakeholders to identify support		
1/2020	Develop dissertation proposal		
4/2020	NDSU committee proposal meeting		
5/2020	Obtain NDSU IRB approval		
6/2020-8/2020		Surveyed parents of children in McKenzie County about HPV vaccine intent and HPV knowledge	
9/2020			Analyzed data collected from survey
10/2020		Provided education to healthcare providers on parental survey results. Collected post-implementation surveys from healthcare providers.	
11/2020			Analyzed post-implementation questions
3/2021			Disseminated results and defended PIP

## **Resources**

### **Personnel**

Implementation of the practice improvement project required the help of multiple stakeholders. The data analysis would not be possible without the survey results obtained from parents in the community. Successful completion of the survey yielded valuable results for this practice improvement project. The healthcare providers at Anova Clinic were instrumental, as they allowed the project to be completed at their facility and answered questions as to if they will change their practice based on the interventions used. The nursing staff at the clinic also played an important role in keeping the surveys together and playing the educational video for the parents. The front desk staff distributed the survey, ensuring the survey went to parents of adolescents. The chair of the dissertation project, as well as committee members at North Dakota State University (NDSU), were equally important as they provided guidance throughout the project.

### **Technology**

Microsoft Excel and Word software was used to analyze and display the data. No identifying information was included in the data, as the information was analyzed in aggregate form. The internet was used to email the provider questions. An iPad with the link to the video was used for the education portion in between surveys. Zoom was used to remotely display the PowerPoint Presentation for providers to be educated on the results of the parental surveys.

### **Budget**

The cost of implementing this project was economical. To thank the staff at AFHC, donuts were provided after completion of the practice improvement project. This was a cost of \$20. Fuel cost to drive to Watford City was roughly \$40 each visit, with two separate occasions.

The first occasion was in June 2020 and the second in September 2020 after completion of the parental/guardian surveys.

**Table 2**

*Costs for Project*

Activity/Materials	Cost per unit	Estimated number	Totals
Fuel	\$40	2	\$80
Food	\$20	1	\$20
Total			\$100

**Protection of Human Subjects**

The human subjects who were directly involved in this practice improvement project were parents or guardians of adolescents and health professionals. The co-investigator did not have direct contact with patients, as parents were asked by staff at AFHC to complete the survey. The co-investigator did not have direct contact with the providers, as the survey was completed in the privacy of their office and returned anonymously by the receptionist. The risk to participants was minimal. Additionally, the surveys were completed with no identifiers, and data was analyzed in aggregate form. Survey data was kept confidential and anonymous, as names were not included, and surveys were numbered and kept in a folder at the nurses' station. For the provider survey, this was sent digitally and was confidential, as well as anonymous. Institutional Review Board exemption status was obtained through NDSU on May 27, 2020, prior to project implementation. Please see Appendix H for IRB exemption.

## CHAPTER IV. RESULTS

After implementation of the practice improvement project, the results were evaluated. Data from the pre- and post-education surveys included the parents' demographics, knowledge, intent, and attitudes towards the HPV vaccine. Feedback from healthcare providers regarding the changes to their practice post survey completion was also analyzed.

### **Demographics of Participating Parents**

Thirteen parents completed the pre- and post-education surveys. Of the respondents, 69.2% (n=9) were mothers, 23.1% (n=3) fathers, and one participant (7.7%) did not answer. The majority of participants were between the ages of 30-39 (n=6, 46.2%) and 40-49 (n=6, 46.2%). One participant (n=1, 7.7%) was between 20 and 29 years old. Participants reported various levels of education, including 38.5% (n=5) of participants with a college degree, 30.8% (n=4) with a high school diploma/GED, 23.1% (n=3) with some college credit, and 7.7% (n=1) with a postgraduate degree. Twelve (92.3%) of the participants identified their ethnicity as white, and one (7.7%) of the participants identified as 'other.' Please see Table 3 for additional information on participant demographics.

**Table 3***Demographics Questions*

Question	Response (N=13)	Percentage (%)
<b>Parent</b>		
Mother	9	69.2%
Father	3	23.1%
Guardian	0	0.0%
No answer	1	7.7%
<b>Age</b>		
20-29	1	7.7%
30-39	6	46.2%
40-49	6	46.2%
50 or older	0	0.0%
<b>Education</b>		
Some High School, no diploma	0	0.0%
High school graduate, diploma, or Graduate Educational Development	4	30.8%
Some college credit, no degree	3	23.1%
Trade/technical/vocational training	0	0.0%
College graduate	5	38.5%
Some postgraduate work	0	0.0%
Postgraduate degree	1	7.7%
<b>Race/Ethnicity</b>		
Arab	0	0.0%
Asian/Pacific Islander	0	0.0%
African American/Black	0	0.0%
White	12	92.3%
Hispanic/Latino	0	0.0%
Multiracial	0	0.0%
Other	1	7.7%

**Objective One: Improving Parental Attitudes and Knowledge****Attitudes**

There were 10 attitudes questions that assessed parents' attitudes towards HPV and HPV vaccination. When asked if participants thought other parents in their community were vaccinating their children, a little over half (n=7, 53.8%) responded somewhat to strongly agree on the pre- education survey. Two participants did not answer this question on the post-education survey, so the statistics were difficult to interpret for the 'somewhat agree' answer. However, on the 'strongly agree' portion, this statistic increased from 15.4% (n=2) to 23.1% (n=3) post video education.



An additional question on the parental survey was utilized to assess if participants thought the HPV vaccine led to lasting health problems. The education did not appear to change parental attitudes, as responses remained similar on the pre- and post-education survey with the exception of one participant not answering on the post-survey. Prior to the HPV video education, 23.1% (n=3) and 38.5% (n=5) of the participants reported they ‘strongly agree’ and ‘somewhat agree’ with this statement respectively, whereas 38.5% (n=5) reported they either ‘somewhat disagree’ or ‘strongly disagree’ with the statement. After the education, there was no change in participants reporting ‘strongly agree’ or ‘somewhat agree,’ while a decrease to 30.1% (n=4) occurred in those reporting they ‘somewhat disagree’ or ‘strongly disagree.’

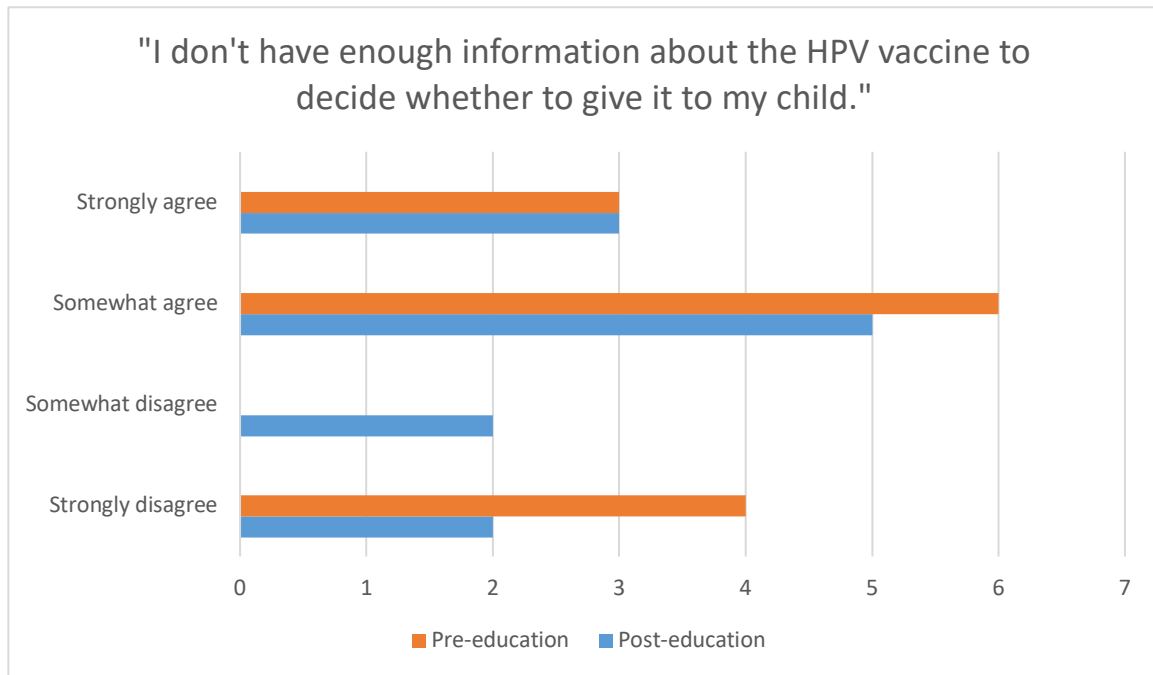
The parental survey also included a question to assess parents’ attitudes related to the HPV vaccine and sexual activity among adolescents. The statement was as follows: “if a teenager gets the HPV vaccine, he/she may be more likely to have sex.” Approximately 76.9% (n=10) of the participants reported they ‘somewhat disagree’ to ‘strongly disagree’ with this statement prior to the video education compared to 69.2% (n=9) after the education. One participant (7.7%) did not answer this question on the post-survey, which may have contributed to a lower percentage of participants somewhat or strongly disagreeing with this statement after the education. Three participants (23.1%) ‘somewhat agreed’ or ‘strongly agreed’ with the statement that adolescents are more likely to have sex after receiving the HPV vaccine on both the pre-education and post-education survey.

The majority of parents (n=9, 69.2%) reported they do not have enough information about the HPV vaccine to decide whether to give it to their child prior to the educational video. After completion of the video, 61.5% (n=8) of the participants reported feeling they do not have enough information on the HPV vaccine. Please see figure 1 for additional information on

parental attitudes regarding having adequate information to assist them in making a decision on HPV vaccination for their child or children.

**Figure 2**

*Attitude Question*



Parents were also asked if they believed the HPV vaccine to be unsafe. On the pre-education survey, a combined 46.2% (n=6) answered ‘somewhat’ to ‘strongly’ agree. After video education, the number of participants reporting that the HPV vaccine is not safe declined, with 38.5% (n=5) of parents answering ‘somewhat’ to ‘strongly’ agree. A combined 53.8% (n=7) of participants answered they ‘somewhat’ or ‘strongly’ disagreed that HPV vaccines are unsafe prior to and after watching the educational video. One participant (7.7%) did not fill out the post-survey.

Attitude about vaccine newness was also assessed by asking if the HPV vaccine is so new that the participant should wait before deciding if their child should get it. On the pre-education survey, 30.8% (n=4) participants answered ‘strongly disagree,’ 15.4% (n=2) answered

‘somewhat disagree,’ 23.1% (n=3) answered ‘somewhat agree’ and 30.8% (n=4) answered ‘strongly agree.’ After watching the video education, 30.8% (n=4) answered ‘strongly disagree,’ 0.0% (n=0) answered ‘somewhat disagree,’ 30.8% (n=4) answered ‘somewhat agree,’ and 30.8% (n=4) answered ‘strongly agree.’ One participant (7.7%) did not answer the post-education survey. Ultimately, the majority of participants (n=7, 53.8%) on the pre-education survey and the majority of participants (n=8, 61.5%) on the post-education survey felt the vaccine was too new to decide whether their child should obtain it.

Parents were also asked about their thoughts on the HPV vaccine preventing genital warts and cervical cancer. Prior to the education, 30.8% (n=4) felt the vaccine was ‘very’ or ‘extremely’ effective at preventing genital warts and 46.2% (n=6) felt the vaccine was ‘very’ or ‘extremely’ effective at preventing cervical cancer. After the education video, 38.5% (n=5) felt the vaccine was ‘very’ or ‘extremely’ effective at preventing genital warts. In answering effectiveness of the vaccine at preventing cervical cancer, the number of participants who answered ‘very’ or ‘extremely’ effective remained the same at 46.2% (n=6). One participant (7.7%) changed their answer of ‘very effective’ to ‘extremely effective’ at preventing cervical cancer after watching the video. Please see Table 4 for additional data regarding the pre- and post-education survey responses.

**Table 4***Pre- and Post- Education Survey Data: Attitude Questions*

Question	Response to pre-test (N=13)	Mean (%)	Response to post-test (N=13)	Mean (%)
The HPV vaccine might cause short-term problems, like fever or discomfort.				
Unanswered	0	0.0%	1	7.7%
Strongly Disagree	0	0.0%	1	7.7%
Somewhat Disagree	4	30.8%	2	15.4%
Somewhat Agree	5	38.5%	7	53.8%
Strongly Agree	4	30.8%	2	15.4%
The HPV vaccine might cause lasting health problems.				
Unanswered	0	0.0%	1	7.7%
Strongly Disagree	2	15.4%	1	7.7%
Somewhat Disagree	3	23.1%	3	23.1%
Somewhat Agree	5	38.5%	5	38.5%
Strongly Agree	3	23.1%	3	23.1%
If a teenager gets the HPV vaccine, he/she may be more likely to have sex.				
Unanswered	0	0.0%	1	7.7%
Strongly Disagree	8	61.5%	6	46.2%
Somewhat Disagree	2	15.4%	3	23.1%
Somewhat Agree	1	7.7%	1	7.7%
Strongly Agree	2	15.4%	2	15.4%
I think the HPV vaccine is unsafe.				
Unanswered	0	0.0%	1	7.7%
Strongly Disagree	2	15.4%	2	15.4%
Somewhat Disagree	5	38.5%	5	38.5%
Somewhat Agree	4	30.8%	3	23.1%
Strongly Agree	2	15.4%	2	15.4%
My child is too young to get a vaccine for a sexually transmitted infection like HPV.				
Unanswered	0	0.0%	1	7.7%
Strongly Disagree	5	38.5%	6	46.2%
Somewhat Disagree	4	30.8%	3	23.1%
Somewhat Agree	1	7.7%	1	7.7%
Strongly Agree	3	23.1%	2	15.4%
I don't have enough information about the HPV vaccine to decide whether to give it to my child.				
Unanswered	0	0.0%	1	7.7%
Strongly Disagree	4	30.8%	2	15.4%
Somewhat Disagree	0	0.0%	2	15.4%
Somewhat Agree	6	46.2%	5	38.5%
Strongly Agree	3	23.1%	3	23.1%

**Table 4. Pre- and Post- Education Survey Data: Attitude Questions (continued)**

Question	Response to pre-test (N=13)	Mean (%)	Response to post-test (N=13)	Mean (%)
The HPV vaccine is so new that I want to wait a while before deciding whether my child should get it.				
Unanswered	0	0.0%	1	7.7%
Strongly Disagree	4	30.8%	4	30.8%
Somewhat Disagree	2	15.4%	0	0.0%
Somewhat Agree	3	23.1%	4	30.8%
Strongly Agree	4	30.8%	4	30.8%
Other parents in my community are getting their children the HPV vaccine				
Unanswered	0	0.0%	2	15.4%
Strongly Disagree	3	23.1%	3	23.1%
Somewhat Disagree	3	23.1%	3	23.1%
Somewhat Agree	5	38.5%	2	15.4%
Strongly Agree	2	15.4%	3	23.1%
How effective do you think the HPV vaccine is in preventing genital warts?				
Unanswered	0	0.0%	1	7.7%
Slightly effective	4	30.8%	3	23.1%
Moderately effective	5	38.5%	4	30.8%
Very effective	3	23.1%	3	23.1%
Extremely effective	1	7.7%	2	15.4%
How effective do you think the HPV vaccine is in preventing cervical cancer?				
Unanswered	0	0.0%	1	7.7%
Slightly effective	2	15.4%	1	7.7%
Moderately effective	5	38.5%	5	38.5%
Very effective	4	30.8%	3	23.1%
Extremely effective	2	15.4%	3	23.1%

## Knowledge

Knowledge disparities related to HPV and the HPV vaccine were identified from survey results. Two parents (15.4%) did not believe HPV causes cervical cancer, and this remained the same after the educational video. Parents were also asked to define what HPV is. Six participants (46.2%) reported the incorrect answer that HPV is not a sexually transmitted disease prior to the video. After the education, 38.5% (n=5) of the participants chose this incorrect answer, while one participant (7.7%) did not answer. Seven participants (53.8%) chose the correct answer that HPV is a sexually transmitted disease on the pre- and post-education surveys.

Knowledge deficits were also noted related to potential complications associated with HPV infection. For example, six participants (46.2%) incorrectly reported that HPV can cause herpes prior to the HPV education video, and this number remained unchanged after the education. Three participants (23.0%) were also unaware that HPV can cause genital warts prior to receiving education on HPV vaccination. No change in responses were noted on the post-education survey.

Participants were also asked if HPV causes cervical cancer. The number of participants who incorrectly answered 'false' to HPV causing cervical cancer did not change despite video education and remained at 15.4% (n=2) before and after the education. One question where participants knowledge did increase was 'HPV infections can go away without any treatment.' The answer is 'true,' to which 23.1% (n=3) of respondents had answered correctly on the pre-education survey, and 46.2% (n=6) answered correctly after video education. One question that 100% of respondents answered correctly on both the pre- and post-education surveys was regarding who the vaccine should be given to. The respondents answered 'both females and males.' The correct answers have been italicized in the table. Please see Table 4 for additional information on parental HPV knowledge survey results.

**Table 5***Pre- and Post- Education Survey Data: Knowledge Questions*

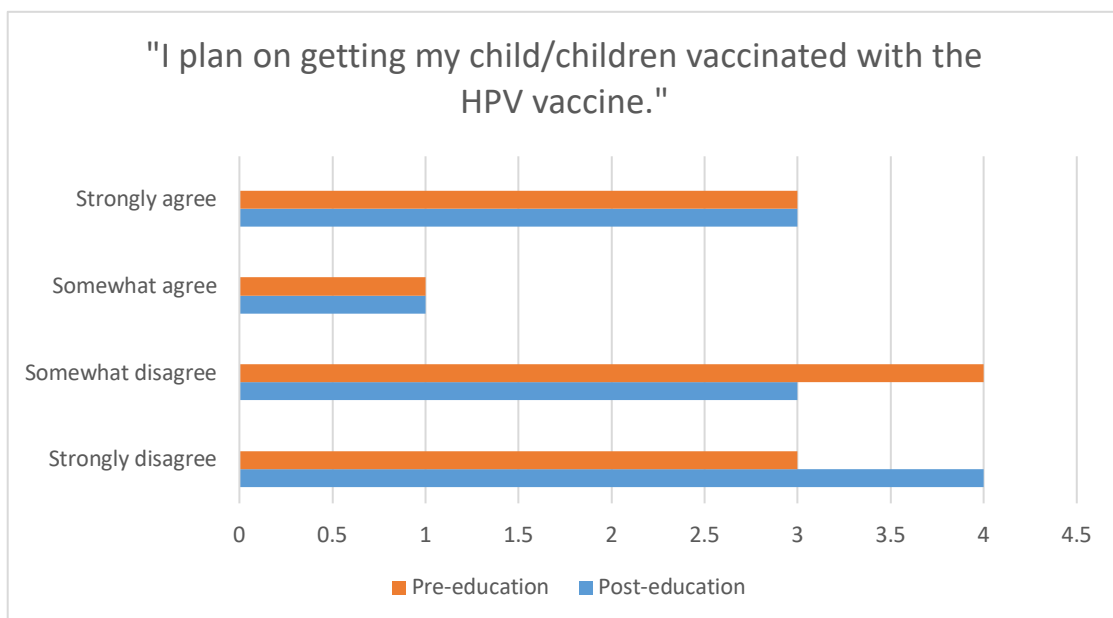
Question	Response to pre-test (N=13)	Mean (%)	Response to post-test (N=13)	Mean (%)
Human Papillomavirus (HPV) causes cervical cancer.				
Unanswered	0	0.0%	1	7.7%
<i>True</i>	11	84.6%	10	76.9%
<i>False</i>	2	15.4%	2	15.4%
Human Papillomavirus (HPV) is				
Unanswered	0	0.0%	1	7.7%
<i>A sexually transmitted disease</i>	7	53.8%	7	53.8%
<i>Not a sexually transmitted disease</i>	6	46.2%	5	38.5%
<i>Only a virus females can get</i>	0	0.0%	0	0.0%
<i>Only a virus males can get</i>	0	0.0%	0	0.0%
HPV infections can go away without any treatment.				
Unanswered	0	0.0%	1	7.7%
<i>True</i>	3	23.1%	6	46.2%
<i>False</i>	10	76.9%	6	46.2%
HPV can cause:				
Unanswered	0	0.0%	1	7.7%
<i>Lung cancer</i>	0	0.0%	0	0.0%
<i>Breast cancer</i>	0	0.0%	1	7.7%
<i>Prostate cancer</i>	4	30.8%	4	30.8%
<i>Cervical cancer</i>	13	100.0%	12	92.3%
Genital Warts are caused by HPV.				
Unanswered	0	0.0%	1	7.7%
<i>True</i>	10	76.9%	9	69.2%
<i>False</i>	3	23.1%	3	23.1%
HPV can cause herpes.				
Unanswered	0	0.0%	1	7.7%
<i>True</i>	6	46.2%	6	46.2%
<i>False</i>	7	53.8%	6	46.2%
The HPV vaccine should be given to:				
Unanswered	0	0.0%	0	0.0%
<i>Only females</i>	0	0.0%	0	0.0%
<i>Only males</i>	0	0.0%	0	0.0%
<i>Both females and males</i>	13	100.0%	13	100.0%
<i>Neither females nor males</i>	0	0.0%	0	0.0%
The HPV vaccine can be given to children between the ages of 9 and 17 years of age				
Unanswered	1	7.7%	0	0.0%
<i>True</i>	8	61.5%	8	61.5%
<i>False</i>	4	30.8%	5	38.5%
The HPV vaccine consists of:				
Unanswered	0	0.0%	1	7.7%
<i>Only a one-time injection</i>	5	38.5%	2	15.4%
<i>A series of two injections over 1 year</i>	4	30.8%	4	30.8%
<i>A series of three injections over 6 months</i>	3	23.1%	7	53.8%
<i>None of the above</i>	1	7.7%	0	0.0%

## Objective Two: Improving Intent

One question on the pre- and post-education survey was utilized to assess parental intent to vaccinate. Parents were asked if they planned to get their child or children vaccinated with the HPV vaccine. There was no increase in intent to vaccinate among parents after the educational video. Three (23.1%) of the participants ‘strongly agreed’ and one (7.7%) participant ‘somewhat agreed’ in intending to vaccinate their child or children against HPV prior to the education, and this remained unchanged after watching the video. Three (23.1%) of the participants ‘strongly disagreed’ and four (30.8%) ‘somewhat disagreed’ in intending to vaccinate their child or children against HPV in the pre-education survey. After the video education, four (30.8%) of participants ‘strongly disagreed’ and three (23.1%) ‘somewhat disagreed’ in intending to vaccinate their child or children against HPV. Two (15.4%) of the participants did not answer this question on both the pre- and post-education survey. Please see Figure 2 for additional information on parental intent to vaccination against HPV.

**Figure 3**

*Intent Question*





### **Objective Three: Educating Healthcare Providers**

A presentation was created based on the data compiled from the parent surveys and evidence-based recommendations to improve HPV vaccination uptake were reviewed. Three healthcare providers participated in the dissemination of parental survey results and presentation of evidence-based recommendations. These providers are all employed by AFHC. One is doctorally-prepared and two are masters-prepared nurse practitioners. The providers have 10 years, 5 years, and 1 year of experience as nurse practitioners.

Participating healthcare providers completed a survey following the presentation with questions assessing intent to change their practice based on parental survey results, identifying barriers to HPV vaccination, and application of information to clinical practice. Providers reported plans to change their practice based on information from the parent surveys that included providing further education on the vaccine and on vaccines in general. Providers also reported being able to identify additional barriers to HPV vaccination, as the parental surveys identified that knowledge gaps exist among parents in the community related to HPV and cervical cancer. A provider also disclosed having more knowledge of parental understanding and concerns regarding the diagnosis and vaccination as a result of the presentation and parental surveys. Education for parents was consistently described as a way to help the providers' clinical practice. Overall, the participants found the information to be helpful in guiding their practice and further education with parents. Please see Table 5 for themes identified from healthcare provider survey results.

**Table 6***Provider Survey Themes*

<b>Needs</b>	Further parental education	Resources for parents	Provider education on parent education needs
<b>Barriers</b>	Parental misconceptions on HPV	Parental beliefs that HPV doesn't cause cancer	Parental fears about safety

## CHAPTER V. DISCUSSION AND RECOMMENDATIONS

### Summary

Objective one was to improve parental knowledge and attitudes through HPV video education, which was partially met. While participants did demonstrate improved attitudes towards HPV vaccination efficacy, knowledge gaps and parental attitudes related to vaccine safety persisted even after receiving the video education. Disparities between parental knowledge and the type of education received is a common theme throughout this PIP. A study completed by Wischer et al. (2018) showed 98.1% of participants felt video education improved their knowledge. Also, video education has proven effective in increasing knowledge amongst patients (Barnard et al., 2019; Denny et al., 2017; Krawczyk et al., 2012). Overall, video education was not effective in this practice improvement project in improving HPV or HPV vaccine knowledge. Unfortunately, despite public and patient education, many providers are seeing increased vaccine hesitancy among patients, particularly related to the HPV vaccination, which may be due to a number of reasons, such as loss of public confidence in vaccination, rarity of certain diseases, misconceptions and myths, and lack of strong provider recommendations (Cheruvu et al., 2017; Hendry et al., 2013; Jacobson et al., 2015).

According to Jacobson et al. (2015), the more successful health professionals are at reducing disease occurrence with vaccination, the increase in complacency. If the diseases are rare, people are not seeing the consequences of vaccine preventable diseases. Some argue that it is more natural to develop immunity from the disease itself instead of obtaining an ‘unnatural’ vaccine. However, HPV infection has the potential to lead to multiple complications, such as genital warts and many cancers, including cervical, anal, oropharyngeal, vulvar, and penile cancers (ACS, 2016). Additionally, the antibody response to HPV immunization is stronger than

wild-type infections, demonstrating the importance of vaccination and education to reduce misconceptions leading to vaccine hesitancy (Schwarz et al., 2011).

Another finding leading to vaccine hesitancy was that people fear vaccination side effects because of unscientific claims of vaccine dangers (Jacobson et al., 2015; Thompson et al., 2017). HPV vaccination has been inaccurately reported to cause a number of adverse effects, such as venous thromboembolism, autoimmune diseases, multiple sclerosis, complex regional pain syndrome, and death. However, in multiple large studies in numerous countries, no difference was found in the rate of these disease states in those who have and have not been vaccinated against HPV (Geoghegan et al., 2020).

The second objective of this PIP was to improve intent to vaccinate among participants, which was not met. Intent to vaccinate is determinate on various beliefs and attitudes towards HPV vaccination. In this PIP, the attitude of participating parents in McKenzie County tended to be mistrusting of the vaccine's safety, long-term health problems, and newness. At the conclusion of this project, there was no increase in intent to vaccinate. Similar barriers to HPV vaccination have also been identified in the literature, including lack of knowledge, misconceptions, and safety issues (Hendry et al., 2013). While video education did not improve intent to vaccinate in this PIP, further interventions should be implemented to address misconceptions and safety concerns related to HPV vaccination.

The third objective of this PIP was to educate healthcare providers regarding parental knowledge and attitudes related to HPV vaccination and assess potential changes to clinical practice, which was met. Participating healthcare providers in this PIP found the education received was helpful to their practice and furthermore, the providers reported a better understanding of parental concerns with HPV vaccination as a result of the parental surveys.

Cheruvu et al. (2017) reviewed the importance of educating providers on barriers to vaccination and education needs of parents, which is consistent with the findings of this practice improvement project. A strong provider recommendation was identified as a way to increase HPV vaccination, and one intervention to increase provider recommendation is through enhancing provider knowledge. Cartmell et al. (2018) interviewed providers and found that the reasons why there were a lack of recommendations for HPV vaccination stem from lack of provider awareness, discomfort about the topic, and lack of time.

### **Discussion**

One of the key findings of this project was a majority of respondents reported they do not have enough information to choose whether or not to give this vaccine to their child/children. Lack of knowledge of HPV and HPV vaccination has been found in numerous studies (Hendry et al., 2013; Halista et al., 2020; Zimet et al., 2013) In a study completed by Halista et al. (2020), 60% of all respondents to an HPV knowledge survey were unaware of the link between genital warts and HPV. Knowledge deficits were consistently noted throughout the study, leading authors to conclude that further educational campaigns should focus on these educational deficits.

Another key finding of this PIP was that the video did not appear to change parent attitudes related to certain aspects of the vaccine, while changing attitudes in other aspects. Many parents reported the vaccine has lasting side effects even after watching the educational video. Implementation of the educational video did not result in any increased positive perception of the HPV vaccine safety among parents in the practice improvement project. Vaccine safety has been a parental concern that has been reported in many studies (Geoghegan et al., 2020; Katz et al., 2016; Thompson et al., 2017). According to Katz et al. (2016), ‘newer’ vaccines were cited as

being less trustworthy. Furthermore, Geoghegan et al. (2020) sought to address this misinformation and refute these concerns with multiple safety studies. The study addressed the most common safety concerns of causing autism, volume of vaccines, weakened immune system, neurodevelopment concerns, preservatives, pregnancy safety, and autoimmune concerns. It is possible that a model such as this could have addressed parental concerns in this PIP and improved attitudes towards the vaccine.

The percentage of parents with positive attitudes towards the HPV vaccine's efficacy increased as a result of the video education given. The results demonstrate that parents believed the HPV vaccine to be more effective at preventing cervical cancer compared to genital warts. HPV vaccine efficacy has been proven through multiple studies over the years (Garland et al., 2016; Hildesheim et al., 2014; Giuliano et al., 2019). According to Giuliano et al. (2019), the effectiveness of the vaccine was found to be as high as 94.9% against HPV serotypes 6, 11, 16, and 18.

Ultimately, the HPV education video did not appear to increase parental knowledge related to the link between HPV and cervical cancer or the fact that HPV is a sexually transmitted disease. Also, the educational video was not effective in improving knowledge related to HPV-related complications like genital warts. According to McBride (2017), HPV knowledge and awareness are highly variable and influenced by sociodemographic characteristics. Of those interviewed, only 60% of women and 40% of men reported having heard of HPV. Positive predictors of HPV vaccine knowledge were being female, a college graduate, never married, having a child under age 18 in the household, and an annual income between \$50,000 to 99,999 or over \$100,000.

Wailing et al. (2016) performed a systematic review and identified interventions that can be taken to increase HPV vaccination uptake. Factors associated with increased uptake included having increased HPV vaccine availability in schools, decreased financial barriers, and interventions targeting both providers and patients. Provider-targeted interventions were the most successful for HPV series initiation. These interventions included provider education, provider reminders to talk to the patient about HPV vaccine and using education tools given to the provider. Therefore, one strategy to increase HPV vaccine uptake at AFHC in the future may be through the provider. Developing and disseminating provider education on methods to increase vaccination may help promote vaccine acceptance in a rural community. Primary care providers in rural communities have a close relationship with their patients as their kids play sports together, are seen in the community often, and provide care for community members.

An increase in provider knowledge of parental education barriers and evidence-based recommendations to use when initiating HPV vaccine discussions occurred as a result of the PIP. This may help improve intent to vaccinate, as providers can now address parental concerns with the knowledge gained from the survey data. The recommendation of using a presumptive communication style interested the providers during the education presentation. Presumptive communication has been found in several studies to increase HPV vaccine intent and uptake (Dempsey et al., 2018, 2019; Hofstetter et al., 2017; Zimet et al., 2013). The video education did not seem to improve intent to vaccinate, which brings up the inquiry that maybe further research should focus on provider education instead of patient education, as this has been shown to improve intent to vaccinate and vaccination rates (Cheruvu et al., 2017; Dempsey et al., 2019; Pierre-Victor et al., 2017; Rosenthal et al., 2011).

## Limitations

Limitations were identified throughout this project and include the COVID-19 pandemic leading to smaller sample sizes, lack of in-person health visits, and the need for Zoom visits to disseminate results. The plan was to perform this PIP during sports physical season to allow for a greater sample size since there was a short implementation period. Due to the COVID-19 pandemic, sports physicals were not required in order to play sports and coaches were accepting physicals that were completed in the year prior. The North Dakota High School Activities Association (2020) added this regulation amidst the sports physical season. A longer implementation period may have resulted in increased participant volume.

The COVID-19 pandemic created less in-person visits as patients cancelled appointments, providers and staff became sick, and more people opted for telehealth visits. At one point during the PIP implementation period, the clinic was closed for a week due to staff illnesses. Due to fear, family members being ill with COVID-19, or quarantine periods, face-to-face visits were cancelled. Also, patients were opting into telehealth visits to limit possible COVID-19 exposure.

As a result of the COVID-19 pandemic and time constraints with the implementation period, the PIP included a sample size of 13 parents and 3 healthcare providers. With the small sample size, limited statistical analysis could be performed. Some limitations with small sample sizes include misinterpretation of results and over-estimation of associations (Hacksaw, 2008). Strategies to increase sample size include providing incentives for participation (Yancey et al., 2006; Young et al., 2015; Zweben et al., 2009). These incentives can be financial, vouchers, or credits. Adding to small sample size could be the potential for sampling or participant bias, as vaccine hesitant or vaccine resistant parents may be more inclined to participate.



Participants did not fill out the post-education survey completely, leaving questions unanswered. This resulted in difficult to analyze data and makes it challenging to draw any conclusions. The co-investigator was not in person to answer questions after the educational video, which may have reduced barriers to vaccination or misconceptions about HPV vaccination. The presence of a co-investigator could have increased intent to vaccinate and assisted in answering questions that may have come up during the educational video.

### **Recommendations**

HPV vaccination continues to have lower completion and initiation rates than any other childhood vaccines (Jenco, 2019). Given this fact, there is a great likelihood that future DNP students will create a project focusing on HPV and HPV vaccination. For future practice improvement projects, recommendations include increasing the survey handouts to more than one clinic to increase participant sample, providing both written and video education to parents, and obtaining feedback from both healthcare providers and nurses at the clinic sites. Suggestions for project site include offering continuing education (CE) hours for further education on how to improve HPV education with parents and having the vaccine available on site.

### **Future Practice Improvement Projects**

Survey disbursement to multiple clinic sites in McKenzie County may increase participant sample. There are three primary care clinics in McKenzie County, so increasing sites may have allowed for a parent population that is representative of the general population in this area. Additionally, a larger sample size may have led to more generalizable results. Increasing the geographic area to include other rural areas in North Dakota would also allow for a larger sample size.

Video education was used in this PIP based on literature recommendations (Barnard et al., 2019; Denny et al., 2017; Krawczyk et al., 2012). Enhancing education to parents with paper handouts and video education would be ideal, as this can target different learning types. Paper handouts would also provide for a reference when patients leave the clinic, as distraction can occur when watching a video.

Allowing for feedback from multiple stakeholders would enhance the qualitative data collected. Having the nurses participate in the completion of the PIP would give them better understanding of HPV and HPV education. This is an important intervention because parents may ask nurses questions directly, as well as providers. Nurses might also appreciate being included in the completion of a project they assisted with throughout the survey disbursement period. Additionally, nurses have been ranked by the Gallop Poll as the most trusted profession for the last 19 years in a row, which makes their thoughts important to patients (Gaines, 2021). Hoekstra and Margolis (2016) explain that nurses have a combination of knowledge, trust, time, and empathy to help contribute to addressing parental concerns about vaccines. The authors suggested that including nurses would strengthen compliance with immunizations.

Another consideration would be to find a tool with more neutral language in the survey. In the parental survey used in this PIP, wording included ‘the HPV vaccine is unsafe,’ this may contribute to associations of negative attitudes towards the vaccine. Finding, or modifying, a survey or tool that uses more neutral language like ‘the HPV vaccine is safe’ may contribute to a more positive perception of the vaccine.

Kaul et al. (2019) found that education on the community level may help with increased intent to vaccinate as well. Going through the public health department to help initiate more advertising in the rural community to include posters, pamphlets, or billboards is a suggestion on

the community level. This would help reach parents of adolescents who are not taking their child in for health checks or sports physicals.

### **Practice and Project Site**

A recommendation for healthcare providers at AFHC is to require all providers to complete a set portion of their CEs to further education of HPV and how to recommend HPV vaccination to parents. Requiring CEs on this topic may lead to enhanced knowledge and competence when discussing HPV with parents. Continued education may assist providers in remaining up-to-date on the current guidelines and recommendations. Education programs have proven efficacy in enhancing knowledge, as can be seen in multiple studies (Borim et al., 2017; Branco et al., 2020; Lin et al., 2014). Borim et al. (2017) developed a continuing education program in a developing country resulting in knowledge development and improvement in theoretical knowledge after implementation.

The HPV vaccine is not available at most clinics in McKenzie County. Increasing vaccine availability would increase initiation and completion rates, as parents would have the opportunity at the well child visit to complete the vaccine that same day. Parents who do not have the ease of completing the vaccine at the same visit may miss future visits for vaccination due to cost, missed work, and schedule conflicts.

### **Application to the Nurse Practitioner Role**

Nurse practitioners are held to the same standards as any healthcare provider. Ensuring the health of all individuals is the top priority. The health of a person starts in childhood, where vaccination against diseases that once had high mortality rates, are at the forefront of preventative medicine. HPV vaccination initiation and completion rates remain low despite the numerous studies of efficacy and safety over the years (Jenco, 2019).

Goals set forth by the Healthy People initiative (Office of Disease Prevention and Health Promotion [ODPHP, n.d.]) include increasing the percentage of adolescent males and females who receive 2 or 3 doses of the HPV vaccine. The goal is set at 80% for adolescent males and females, to which the rates are much lower at 36.4% and 45.1% respectively. Nurse practitioners can help meet this goal by ensuring primary prevention measures are being utilized. Nurse practitioners can work to increase immunization uptake rates to ensure a healthy population.

Preventative care is a core value of the nurse practitioner. It is anticipated that the knowledge gained by the parental surveys will encourage providers to perform their own research and utilize up-to-date information when educating parents on HPV and HPV vaccination. Providing suggestions on how to educate parents and increase intent may guide the practitioner in these crucial conversations.

### **Dissemination**

Dissemination of the findings is of the utmost importance as this allows for shared knowledge and ability to enhance the provider's practice. Results have been disseminated at AFHC, the rural health clinic, and at the 2020 NDNPA pharmacology conference. Additional avenues for dissemination include the formal presentation and defense of the project with the NDSU dissertation committee. The co-investigator also plans to have the project published on NDSU library database, along with a three-minute video further describing the project. The co-investigator will also search for future opportunities for publication.

### **Conclusion**

The purpose of this practice improvement project was to identify the knowledge and attitudes of parents in rural McKenzie County, North Dakota in regard to HPV vaccination and provide education to improve HPV vaccination intent among parents. Collecting pre- education

and post- education surveys was effective in identifying knowledge and attitudes in a small sample of parents in rural McKenzie County. While the education that was offered did not improve HPV vaccination intent, it did help improve the knowledge and attitudes of participants in some areas. For instance, after watching the educational video, the number of participants doubled in accuracy when answering if HPV infections can go away without treatment. Also, when assessing attitudes, an increase in efficacy in preventing genital warts and cervical cancer was seen. As an outcome of this practice improvement project, participants may reflect on the knowledge gained and have an increased interest in obtaining more information on the HPV vaccine. Also, importantly, providers at AFHC have been educated on ways to improve intent to vaccinate and enhanced education skills. The HPV vaccine is important for the health and future of our children. Finding ways to improve parental acceptance to increase uptake rates ultimately has the potential to improve health outcomes.

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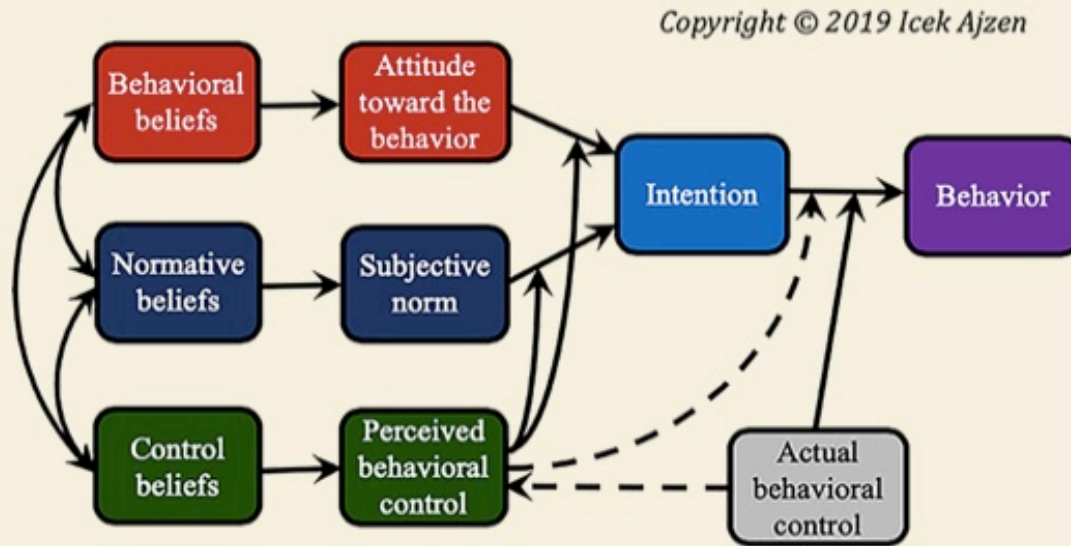
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## APPENDIX A. THEORY OF PLANNED BEHAVIOR DIAGRAM

Click on a construct to obtain more information.



\*You may copy and use this figure free of charge in a thesis, dissertation, presentation, poster, or journal article, so long as you retain the copyright notice. Use of the figure for commercial purposes, such as inclusion in a textbook, professional monograph, or reference work, requires permission and payment of a fee.

## APPENDIX B. INFORMED CONSENT

**NDSU**

**North Dakota State University**

Department of Nursing

Campus Address

NDSU Dept. 2670

PO Box 6050

Fargo, ND 58108-6050

701.231.7395

**Title of Practice Improvement Project: Assessing Parental Knowledge and Attitudes Towards Human Papillomavirus Vaccination in a Rural Primary Care Clinic**

Dear Participants:

My name is Jessica Holman. I am a graduate student in the Doctor of Nursing Practice program at North Dakota State University, and I am conducting a practice improvement project to assess and enhance the knowledge of human papillomavirus (HPV) and HPV vaccination. It is our hope, that with this project, we will improve knowledge of HPV, attitudes of HPV vaccination, and intent to vaccinate against HPV.

Because you are a parent or guardian of an adolescent, you are invited to take part in this project. Your participation is entirely your choice, and you may change your mind or quit participating at any time, with no penalty to you.

It is not possible to identify all potential risks in practice improvement projects, but we have taken reasonable safeguards to minimize any known risks. There are minimal risks associated with this survey and video education.

By taking part in this project, you may benefit by improving your knowledge of HPV and HPV vaccination. However, you may not get any benefit from being in this study.

It should take about five minutes to complete the pre-survey which has questions related to demographics, knowledge, attitudes, and vaccination intent. Prior to starting the video education, the pre-survey questions must be completed. The post-survey will then be taken after completion of the video and contain the same questions as the pre-survey.

This study is anonymous. That means that no one, not even members of my dissertation team, will know that the information given comes from you.

If you have any questions about this project, please contact me at 701-690-0791 or [Jessica.Holman@ndsu.edu](mailto:Jessica.Holman@ndsu.edu). You may also contact my advisor, Dr. Allison Peltier, at 701-224-3820 or [Allison.peltier@ndsu.edu](mailto:Allison.peltier@ndsu.edu).

You have rights as a participant. If you have questions about your rights or complaints about this project, you may talk to the investigator or contact the NDSU Human Research Protection Program at 701.231.8995, by email at [ndsu.irb@ndsu.edu](mailto:ndsu.irb@ndsu.edu), or by mail at: NDSU HRPP Office, NDSU Dept. 4000, P.O. Box 6050, Fargo, ND 58108-6050.

By continuing with the video education, you are giving your consent and are freely making a decision to participate in this practice improvement project. By filling out the survey, it means that:

- You have read and understood the consent form.
- You have had your questions answered, and
- You have decided to participate in this practice improvement project.

Thank you for your taking part in this project. If you wish to receive a copy of the results, please contact me or my advisor.

## APPENDIX C. DEMOGRAPHIC QUESTIONS

### Demographic Survey

Please answer the following questions by either placing an "X" in the area or filling in the blank.

1. You are the:

- 1. Mother
- 2. Father
- 3. Guardian

2. What is your age?

- 1. 20-29
- 2. 30-39
- 3. 40-49
- 4. 50 or older

3. What is the highest level of education you have completed?

- 1. Some high school, no diploma
- 2. High school graduate, diploma, or Graduate Educational Development
- 3. Some college credit, no degree
- 4. Trade/technical/vocational training
- 5. College graduate
- 6. Some postgraduate work
- 7. Postgraduate degree

4. How would you classify yourself?

- 1. Arab
- 2. Asian/Pacific Islander
- 3. African American/Black
- 4. White
- 5. Hispanic/Latino
- 6. Multiracial
- 7. Other



## APPENDIX D. PRE-POST VIDEO QUESTIONNAIRE

### Pre-Post Video Questionnaire

Please mark which best describes your answer about each statement.

	Strongly Disagree	Somewhat Disagree	Somewhat Agree	Strongly Agree
1. The HPV vaccine might cause short-term problems, like fever or discomfort.	1	2	3	4
2. The HPV vaccine might cause lasting health problems.	1	2	3	4
3. If a teenager gets the HPV vaccine, he/she may be more likely to have sex.	1	2	3	4
4. I think the HPV vaccine is unsafe.	1	2	3	4
5. My child is too young to get a vaccine for a sexually transmitted infection like HPV.	1	2	3	4
6. I don't have enough information about the HPV vaccine to decide whether to give it to my child.	1	2	3	4
7. The HPV vaccine is so new that I want to wait a while before deciding whether my child should get it.	1	2	3	4
8. Other parents in my community are getting <u>their children</u> the HPV vaccine.	1	2	3	4
	Slightly Effective	Moderately Effective	Very Effective	Extremely Effective
9. How effective do you think the HPV vaccine is in preventing genital warts?	1	2	3	4
10. How effective do you think the HPV vaccine is in preventing cervical <u>cancer</u> ?	1	2	3	4

Please answer the following multiple-choice or true/false questions.

1. Human papillomavirus (HPV) causes cervical cancer.
  - 1. True
  - 2. False
2. Human papillomavirus (HPV) is:
  - 1. A sexually-transmitted disease
  - 2. Not a sexually-transmitted disease
  - 3. Only a virus females can get
  - 4. Only a virus males can get
3. HPV infections can go away without any treatment.
  - 1. True
  - 2. False
4. HPV can cause:
  - 1. Lung cancer
  - 2. Breast cancer
  - 3. Prostate cancer
  - 4. Cervical cancer
5. Genital warts are caused by HPV.
  - 1. True
  - 2. False
6. HPV can cause herpes.
  - 1. True
  - 2. False

7. The HPV vaccine should be given to
- 1. Only females
  - 2. Only males
  - 3. Both females and males
  - 4. Neither females nor males
8. The HPV vaccine can be given to children between the ages of 9 and 17 years of age.
- 1. True
  - 2. False
9. The HPV vaccine consists of:
- 1. Only a one-time injection
  - 2. A series of two injections over 1 year
  - 3. A series of three injections over 6 months
  - 4. None of the above

	Strongly Disagree	Somewhat Disagree	Somewhat Agree	Strongly Agree
10. I plan on getting my child/children vaccinated with the HPV vaccine.	1	2	3	4

## APPENDIX E. TRANSCRIPT OF HPV EDUCATION VIDEO

My name is dr. David Persse and I'm the public health authority for the city of Houston. Human papilloma virus also known as HPV is a very common infection amongst men and women. HPV is so common that nearly all men and women will get at least one form of the virus at some point in their lives. So HPV or human papilloma virus is really a group of about a hundred and fifty different types, of subtypes, of that virus and they're all over the world. They're all over our skin and some cause problems and some don't. HPV is really almost part of being human to get exposed to it virtually all of us are exposed at some point it's estimated that about 80% of people have been exposed to HPV. So really in one's lifetime it's almost inevitable that you'll be exposed to the HPV virus in many instances the body will naturally clear the infection, but in some cases the infection can persist and cause cancer. HPV can cause cancers of the genitalia and also of the head and neck; in women we most often think of cervical cancer but it can actually cause cancers of the vulva vagina and in both men and women, it can cause the head and neck cancers in the oral pharynx, which is the back of your nose and throat and includes the base of the tongue. The good news is we have a safe and effective vaccine that can prevent nine of the most common types of HPV. The Centers for Disease Control and Prevention recommend that children receive the vaccine between ages 11 and 12 before they can be exposed to HPV. Depending on your child's age they will need either two or three doses of the vaccine. The CDC recommends that children complete the vaccine series by age 13. It's a very safe vaccine, it's been around over ten years which is longer than the iPhone so when people think it's new it's really not new at all. About a hundred million doses of the HPV vaccine have been given so the risks are just really minimal, and the benefits are huge for receiving this cancer preventing vaccine. It's such an incredible opportunity to give my kids an opportunity not to develop these

cancers. If you saw the suffering people undergo when they get treated for tonsil cancer, six weeks of radiation, the lifelong effects of radiation, and chemotherapy, and in surgery as well; you would want to do what you could to prevent your child from developing such a horrible disease later in life. I have three children ages 22, 18, and 12, boys and girls, and I vaccinated all three of them against the HPV virus. As a mother I feel that it's my responsibility to my children, as a pediatrician a responsibility to all my patients, to make sure that they will never get this form of cancer. There is nothing more tragic than diagnosing somebody with a cancer that could have been prevented, and there's probably nothing more tragic than being a parent seeing your child's life change from a cancer diagnosis that you could have prevented by working with your clinician. Don't miss that opportunity, there's no reason to miss the opportunity. It's a safe vaccine, it can prevent your child from getting cancer. HPV vaccination rates remain low when compared to other vaccinations offered to children of the same age. These vaccines include meningococcal, HPV, Tdap, which stands for tetanus diphtheria and pertussis, and of course the annual flu vaccine. You can help protect your child from these vaccine preventable illnesses by getting them vaccinated. You can also protect your child from HPV caused cancers by having a conversation with your doctor about HPV. Do it today.

**APPENDIX F. POWERPOINT PRESENTATION**



1



2

# HPV Survey Data

By: Jessica Holman

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## Introduction

- The following slides include data obtained from the pre- and post- video education surveys completed here in the clinic.
- This will include:
  - Demographics
  - HPV knowledge questions
  - Vaccination intent
- 13 surveys completed

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## HPV Statistics

- Vaccine series completion rate:
  - North Dakota: 66.6% for girls, 62% for boys
  - United States: 48.6% for all adolescents
  - McKenzie County: between 37%-47% of all adolescents.
  - Counties with highest completion rates are at 67%-79%.

(CDC, 2018)(North Dakota Department of Health, 2019)

## Project Objectives

- 1) Improve HPV knowledge and attitude among parents of adolescents in McKenzie County.
- 2) Improve intent to vaccinate among parents of adolescents in McKenzie County.
- 3) Educate health professionals on the parental knowledge and attitudes towards HPV in McKenzie County.

# Demographics

- Parent:
  - 69% mothers, 23% fathers, 1 unanswered
- Age:
  - 46% aged 40-49, 8% aged 20-29, 46% aged 30-39
- Level of education:
  - 38% college graduates, 23% had some college credit, 31% high school graduate, diploma, or GED, 8% had a postgraduate degree.
- Race/Ethnicity:
  - 92% white, 8% other



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## Questions 1-7

\*\*\*Notice the large amount of respondents who admit to not having enough information to decide whether to obtain the vaccine for their children pre- and post-video education

HPV Survey

Question	Response to pre-test (N=13)	Mean (%)	Response to post-test (N=13)	Mean (%)
<b>The HPV vaccine might cause short-term problems, like fever or discomfort.</b>				
Unanswered	0	0%	1	8%
Strongly Disagree	0	0%	1	8%
Somewhat Disagree	4	31%	2	15%
Somewhat Agree	5	38%	7	54%
Strongly Agree	4	31%	2	15%
<b>The HPV vaccine might cause lasting health problems.</b>				
Unanswered	0	0%	1	8%
Strongly Disagree	2	15%	1	8%
Somewhat Disagree	3	23%	3	23%
Somewhat Agree	5	38%	5	38%
Strongly Agree	3	23%	3	23%
<b>If a teenager gets the HPV vaccine, he/she may be more likely to have sex.</b>				
Unanswered	0	0%	1	8%
Strongly Disagree	8	62%	6	46%
Somewhat Disagree	2	15%	3	23%
Somewhat Agree	1	8%	1	8%
Strongly Agree	2	15%	2	15%
<b>I think the HPV vaccine is unsafe.</b>				
Unanswered	0	0%	1	8%
Strongly Disagree	2	15%	2	15%
Somewhat Disagree	5	38%	5	38%
Somewhat Agree	4	31%	3	23%
Strongly Agree	2	15%	2	15%
<b>My child is too young to get a vaccine for a sexually transmitted infection like HPV.</b>				
Unanswered	0	0%	1	8%
Strongly Disagree	5	38%	6	46%
Somewhat Disagree	4	31%	3	23%
Somewhat Agree	1	8%	1	8%
Strongly Agree	3	23%	2	15%
<b>I don't have enough information about the HPV vaccine to decide whether to give it to my child.</b>				
Unanswered	0	0%	1	8%
Strongly Disagree	4	31%	2	15%
Somewhat Disagree	0	0%	2	15%
Somewhat Agree	6	46%	5	38%
Strongly Agree	3	23%	3	23%
<b>The HPV vaccine is so new that I want to wait a while before deciding whether my child should get it.</b>				
Unanswered	0	0%	1	8%
Strongly Disagree	4	31%	4	31%
Somewhat Disagree	2	15%	0	0%



8



### Questions 8-16

As you can see here, education would be helpful as a large amount of respondents still answered incorrect after video education.

Other parents in my community are getting their children the HPV vaccine				
Unanswered	0	0%	2	15%
Strongly Disagree	3	23%	3	23%
Somewhat Disagree	3	23%	3	23%
Somewhat Agree	5	38%	2	15%
Strongly Agree	2	15%	3	23%
How effective do you think the HPV vaccine is in preventing genital warts?				
Unanswered	0	0%	1	8%
Slightly effective	4	31%	3	23%
Moderately effective	5	38%	4	31%
Very effective	3	23%	3	23%
Extremely effective	1	8%	2	15%
How effective do you think the HPV vaccine is in preventing cervical cancer?				
Unanswered	0	0%	1	8%
Slightly effective	2	15%	1	8%
Moderately effective	5	38%	5	38%
Very effective	4	31%	3	23%
Extremely effective	2	15%	3	23%
Human Papillomavirus (HPV) causes cervical cancer.				
Unanswered	0	0%	1	8%
True	11	85%	10	77%
False	2	15%	2	15%
Human Papillomavirus (HPV) is				
Unanswered	0	0%	1	8%
A sexually transmitted disease	7	54%	7	54%
Not a sexually transmitted disease	6	46%	5	38%
Only a virus females can get	0	0%	0	0%
Only a virus males can get	0	0%	0	0%
HPV infections can go away without any treatment.				
Unanswered	0	0%	1	8%
True	3	23%	6	46%
False	10	77%	6	46%
HPV can cause:				
Unanswered	0	0%	1	8%
Lung cancer	0	0%	0	0%
Breast cancer	0	0%	1	8%
Prostate cancer	4	31%	4	31%
Cervical cancer	13	100%	12	92%
Genital Warts are caused by HPV.				
Unanswered	0	0%	1	8%
True	10	77%	9	69%
False	3	23%	3	23%
HPV can cause herpes.				
Unanswered	0	0%	1	8%
True	6	46%	6	46%
False	7	54%	6	46%

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### Questions 17-20

Unfortunately, a larger amount of parents reported they intend not to have their child vaccinated both in the pre- and post- video education.

The HPV vaccine should be given to:				
Unanswered	0	0%	0	0%
Only females	0	0%	0	0%
Only males	0	0%	0	0%
Both females and males	13	100%	13	100%
Neither females nor males	0	0%	0	0%
The HPV vaccine can be given to children between the ages of 9 and 17 years of age				
Unanswered	1	8%	0	0%
True	8	62%	8	62%
False	4	31%	5	38%
The HPV vaccine consists of:				
Unanswered	0	0%	1	8%
Only a one-time injection	5	38%	2	15%
A series of two injections over 1 year	4	31%	4	31%
A series of three injections over 6 months	3	23%	7	54%
None of the above	1	8%	0	0%
I plan on getting my child/children vaccinated with the HPV vaccine.				
Unanswered	2	15%	2	15%
Strongly disagree	3	23%	4	31%
Somewhat disagree	4	31%	3	23%
Somewhat agree	1	8%	1	8%
Strongly agree	3	23%	3	23%

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## Interpretation

- Vaccine safety
  - Short-term problems: knowledge increased by 16% in the 'somewhat agree' section.
- Knowledge
  - 69% of parents identified more information is needed in order to make a vaccination decision.
  - 1 parent felt the video education helped her decision, identifying as 'somewhat disagree' vs 'somewhat agree.'

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## Interpretation continued

- Knowledge
  - 46% of parents believe HPV is not an STI.
  - 3 parents learned that HPV infections can go away without any treatment after video education.
- Efficacy:
  - 2 parents increased their efficacy rating of the vaccine post video education.
- Intent:
  - 7 parents reported intent not to vaccinate, 2 choose not to answer, and 4 reported they intend to have their child vaccinated on both the pre- and post-education survey.

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## Increasing Vaccination

- Presumptive communication
  - Accurate sources for concerns
  - Acknowledgement of known minor risks
- Reminders sent to parents
- Video education vs paper handouts

(Matheson, Derouin, Gagliano, Thompson, and Blood-Siegfried, 2014) (Barnard, Cole, Ward, Gravlee, Cole, and Compretta, 2019) (Dempsey et al., 2019; Zimet et al. 2013) (Opel et al., 2013)

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## Questions?

- I will also be sending a survey for you to complete at your earliest convenience.

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## References:

- Bamard, M., Cole, A. C., Ward, L., Gravlee, E., Cole, M. L., & Compretta, C. (2019). Interventions to increase uptake of the human papillomavirus vaccine in unvaccinated college students: A systematic literature review. *Preventive Medicine Reports, 14*, 1-7. <https://doi.org/10.1016/j.pmedr.2019.100884>
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## References:

- North Dakota Department of Health (2019). Geographic distribution of HPV vaccination coverage among adolescents in North Dakota. *North Dakota Immunization Information System (NDIIS)*. Retrieved from [https://repository.immregistries.org/files/resources/5b98b4d884ba2/e5\\_d\\_fitzsimmmons\\_\\_distribution\\_of\\_adolescent\\_hpv.pdf](https://repository.immregistries.org/files/resources/5b98b4d884ba2/e5_d_fitzsimmmons__distribution_of_adolescent_hpv.pdf)
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- Zimet, G. D., Rosberger, Z., Fisher, W. A., Perez, S., & Stupiansky, N. W. (2013). Beliefs, behaviors and HPV vaccine: Correcting the myths and the misinformation. *Preventive Medicine, 57*(5), 414-418. <https://doi.org/10.1016/j.ypmed.2013.05.013>

**APPENDIX G. HEALTHCARE PROVIDER SURVEY**

1. How do you intend to change your practice based on the information gained from the parental surveys regarding HPV vaccination?
2. Did the parental surveys provide any additional information on barriers to HPV vaccination that you were not aware of? If so, what barriers were identified?
3. How did this practice improvement project (PIP) increase your awareness of parental beliefs of HPV or HPV vaccination?
4. How did the information provided today help your clinical practice?
5. Please provide any other feedback regarding the parental surveys or HPV video education. \_\_\_\_\_

---

## APPENDIX H. IRB EXEMPTION



May 27, 2020

Dr. Allison Peltier  
School of Nursing

Re: IRB Determination of Exempt Human Subjects Research:  
Protocol #PH20268, "Assessing Parental Knowledge and Attitudes Towards Human Papillomavirus Vaccination in a Rural Primary Care Clinic"

NDSU Co-investigator(s) and research team: Jessica Holman  
Date of Exempt Determination: 5/27/2020 Expiration Date: 5/26/2023  
Study site(s): Anova Family Health Center in Watford City, ND Funding Agency: n/a  
The above referenced human subjects research project has been determined exempt (category 1, 2(i)) in accordance with federal regulations (Code of Federal Regulations, Title 45, Part 46, Protection of Human Subjects). This determination is based on the original protocol received 5/13/2020 with updated invitation letter received 5/25/2020.

Please also note the following:

- If you wish to continue the research after the expiration, submit a request for recertification several weeks prior to the expiration.
- The study must be conducted as described in the approved protocol. Changes to this protocol must be approved prior to initiating, unless the changes are necessary to eliminate an immediate hazard to subjects.
- Notify the IRB promptly of any adverse events, complaints, or unanticipated problems involving risks to subjects or others related to this project.
- Report any significant new findings that may affect the risks and benefits to the participants and the IRB.

Research records may be subject to a random or directed audit at any time to verify compliance with IRB standard operating procedures.

Thank you for your cooperation with NDSU IRB procedures. Best wishes for a successful study.  
Sincerely,

A handwritten signature in blue ink that reads "Kristy Shirley". The signature is written in a cursive, flowing style.

Kristy Shirley, CIP, Research Compliance Administrator

For more information regarding IRB Office submissions and guidelines, please consult [https://www.ndsu.edu/research/for\\_researchers/research\\_integrity\\_and\\_compliance/institutional\\_review\\_board\\_irb/](https://www.ndsu.edu/research/for_researchers/research_integrity_and_compliance/institutional_review_board_irb/). This Institution has an approved FederalWide Assurance with the Department of Health and Human Services: FWA00002439.

## APPENDIX I. PERMISSION TO USE

**Jean Potts** <jpotts@marian.edu>

Mon, Mar 2, 2020, 10:45 AM

to me ▾

Hi Jessica,

Yes, of course, you can use the Appendix A & B of my article. I just ask that you give me credit where appropriate.

Good luck on your DNP project.

Dr. Potts

...

---

**Jessica Holman** <holmanjessica21@gmail.com>

Mon, Mar 2, 2020, 10:49 AM

to Jean ▾

Dr. Potts,

Thank you, I definitely will! I meant Appendix B and C if that is okay?

I appreciate your help,

Jessica

...

---

**Jean Potts** <jpotts@marian.edu>

Mon, Mar 2, 2020, 10:52 AM

to me ▾

Jessica,

Yes, that was my mistake—you may use Appendix B and C with appropriate credit.

...



## APPENDIX J. EXECUTIVE SUMMARY

# EXECUTIVE SUMMARY

### ASSESSING PARENTAL KNOWLEDGE AND ATTITUDES TOWARDS HUMAN PAPILLOMAVIRUS VACCINATION IN A RURAL PRIMARY CARE CLINIC

#### PARTICIPANTS AND SETTING

Pre- and post- education surveys were given to parents of adolescents who agreed to participate at Anova Family Health Clinic (AFHC) in Watford City, North Dakota.

#### PROJECT FINDINGS

When assessing parental attitudes towards the vaccine, there was an overall decrease in negative attitudes towards the vaccine in the area of efficacy.

The majority of parents also reported they do not have enough information about the vaccine to give it to their child, demonstrating a need for further parent education.

In the area of knowledge, there was an increase in correct answers about HPV infections being able to go away without treatment. There was no overall increase in knowledge of HPV or HPV vaccination.

There was no increase in intent to vaccinate among parents after viewing the educational video.

Providers reported plans to change their practice included providing further education on the HPV vaccine. Providers also reported being able to identify additional barriers to HPV vaccination.

#### Contact Information

Jessica Holman  
NDSU Doctor of Nursing Practice  
Graduate Student  
Jessica.holman@ndus.edu

#### INTRODUCTION

Human papillomavirus (HPV) is the most common sexually transmitted infection and will infect 8 out of 10 people in their lifetime. Roughly 79 million Americans are currently infected with HPV. Some of the cancers associated with HPV infection include vaginal, vulvar, penile, anal, oropharyngeal, and cervical cancer.

While other adolescent vaccines have a high vaccination rate of around 90-95%, the HPV vaccine series completion rate in North Dakota (ND) is 55.6% for girls and 51.3% for boys. Additionally, disparities exist in rural counties, such as McKenzie County, ND, where only 37-47% of all adolescents are vaccinated against HPV.

#### PURPOSE

The purpose of this practice improvement project is to identify the knowledge and attitudes of parents in rural McKenzie County, ND, in regard to HPV vaccination and provide education to improve HPV vaccination intent. Therefore, the project included a pre-survey and post-survey to assess parents' attitude, knowledge, and intent to vaccinate prior to and after receiving HPV education via video format. A survey was also completed with healthcare professionals to increase awareness of parental beliefs and determine if the providers plan on changing their practice based on the information gained.

#### PROJECT DESIGN

The survey was developed by Potts and Southard and consisted of three domains to assess attitudes, knowledge, and intent. There were 10 attitude questions, 9 knowledge questions, and 1 intent question. A demographic portion was also adapted from Potts and Southard and was included in the survey.

- The survey was distributed as a pre-education and post-education survey. The participants viewed a short video prior to completing the post-education portion.
- The distribution of the survey occurred over 2 months and 13 surveys were completed by parents.
- A 20-minute educational PowerPoint was presented to healthcare providers at AFHC in rural Watford City, ND, with the survey results, demographics of participants, and suggestions to improve vaccine intent.

#### RECOMMEDATIONS AND CONCLUSION

- More than one clinical site
- Provide video and written education between surveys
- Obtain feedback from both healthcare providers and nurses

As an outcome of this project, the surveys were effective in identifying knowledge, attitudes, and intent of parents in McKenzie County, ND. Additionally, providers can identify barriers and enhanced education skills due to the findings of this project.