

ESTABLISHING A STANDARDIZED PROCESS TO IMPROVE IDENTIFICATION AND  
RECOMMENDATION PRACTICES OF PATIENTS ELIGIBLE TO RECEIVE THE HPV  
VACCINE SERIES IN A RURAL PRIMARY CARE CLINIC

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partial fulfillment of the requirements for the degree of Doctor of Nursing Practice.

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Establishing a Standardized Process to Improve Identification and Recommendation Practices of Patients Eligible to Receive the HPV Vaccine Series in a Rural Primary Care Clinic

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## Abstract

**Problem:** Human Papillomavirus (HPV) is a common sexually transmitted infection that will affect over 80% of sexually active men and women in their lifetime. HPV is the primary cause of cervical cancer in women and is linked to oropharyngeal and anal cancers in both men and women. The HPV vaccine can be given as early as 11 years of age to both boys and girls. If administered before exposure to the virus, the vaccine can protect against the cancer-causing strains of HPV. Despite this cancer prevention, there remains a low rate of HPV vaccine coverage among adolescents across the U.S.

**Project Aim:** The aim of this quality improvement project is to implement a standardized process for identifying patients in need of the vaccine and providing consistent recommendation for vaccination in a rural primary health care clinic.

**Project Method:** The project was implemented in a rural Kansas family practice clinic. Lewin's theory of change and three-step change model was used as a theoretical framework to guide the implementation of this project. The project began with a discussion with clinic providers and staff on barriers and current practices for identifying and recommending HPV vaccination. A process map for identification was created utilizing staff input. An educational in-service was provided to educate on the new process for identification of eligible patients, updated HPV-related information, and strategies for recommendation practices. After education, the identification and recommendation standardized process was followed and tracked for approximately 4 weeks.

**Results/Conclusion:** Themes were identified and evaluated based on feedback from clinic staff and a process map was created for the clinic as a standardized process for practice change. Overall, 44 patients were identified as age-eligible to receive recommendation for the HPV

vaccine. Over half of these patient encounters were for acute or sick visits. These patients would have otherwise been missed opportunities prior to the clinic practice change. Although there was no impact on vaccine administration rates observed, the results support standardized processes to screen eligible patients at every visit as an effective way for improving identification and recommendation for age-eligible patients in need of the HPV vaccine.

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## Establishing a Standardized Process to Improve Identification and Recommendation Practices of Patients Eligible to Receive the HPV Vaccine Series in a Rural Primary Care Clinic

Human papillomavirus (HPV) is a common sexually transmitted infection that can cause different types of cancers in both men and women. According to the Center for Disease Control and Prevention (CDC, 2018a), there are nearly 14 million new HPV infections that occur each year in the United States. The HPV vaccine is comprised of a two-dose or three-dose series, depending on a person's age at the time of initiation. The CDC (2018b) recommends the vaccine for boys and girls age 11 or 12 years old but can be given as early as age 9. It is the only vaccination that provides the opportunity to reduce the risk of HPV-related cancers, but the vaccine series must be completed before becoming sexually active to provide full protection. Barriers to vaccination that have been identified may include cost, access, lack of education, concerns about vaccine safety, as well as negative connotation with sexual activity (Cole, Thomas, Straup & Savage, 2017).

Since the introduction of the HPV vaccine, there has been a 64% decrease in the prevalence of the cancer-causing types of HPV infection among girls age 14-19 (Markowitz et al., 2017). Despite this evidence supporting the significant impact on public health, there remains a low level of vaccine coverage both in the state of Kansas and nationally. Efforts should be undertaken to increase HPV vaccine coverage to meet the goals set by The Department of Health and Human Services (2018). The *Healthy People* initiative aims to increase the rate of HPV vaccinations among adolescents to 80% by the year 2020. By increasing provider knowledge and standardizing the delivery of HPV vaccine information, there is high potential for increasing parental knowledge and therefore impacting vaccination rates.

## Statement of Problem

Unfortunately, there remains a low-level of vaccination coverage among adolescents nation-wide, with only an estimated 53% of girls and 44% of boys age 13 to 17 years receiving the full two- or three-dose HPV vaccine series based on a national survey (Walker et al., 2018). Based on this same survey of adolescents, in the state of Kansas only 34% of adolescents are up to date on the vaccine (Walker et al., 2018). In 2014, most rural counties in Kansas had less than 29% vaccine coverage among adolescents receiving the completed three-dose vaccine series (Immunize Kansas Coalition, 2014).

Patient-provider interactions and conversations at initiation of the HPV vaccine is imperative in influencing decisions to increase HPV vaccine uptake (Clark, Cowan, Filipp, Fisher, & Stokley, 2016). With primary care clinics as a common area for these conversations to take place, there is opportunity to improve HPV-related conversations with adolescents, parents, and young adults by increasing provider knowledge. In addition, the CDC (2018c) recommends implementing systems and/or clinic policies to decrease missed opportunities to vaccinate. These systems include creating a systematic process for checking immunization status and recommending the vaccine at every patient visit (CDC, 2018c).

Providing standardized HPV vaccine information and recommendation for eligible patients and parents during all types of patient encounters can help to overcome barriers, address patient and parental knowledge gaps, and increase vaccine rates (Bernstein & Bocchini, 2017). Provider recommendation practices should focus on (a) highlighting that HPV vaccine prevents cancer, (b) reviewing the HPV vaccine dosing schedule, (c) emphasizing to not delay the vaccine until sexually active, (d) point out that HPV vaccine is part of recommended routine immunizations for males and females, (e) reviewing the safety profile of the HPV vaccine, and

finally, (f) the provider should be prepared to clarify parental concerns of the vaccine promoting sexual promiscuity (Bernstein & Bocchini, 2017). In a retrospective study reviewing the electronic medical record of male and female adolescents age 11-18 years old from 2006-2011, 82% of visits were identified as missed opportunities for an eligible patient to receive the first dose of the HPV vaccine (Wong, Taylor, Wright, Opel & Katzenellenbogen, 2013). There were 94% missed opportunities for the first doses of the HPV vaccine identified for sick or non-preventive type of visits compared to 61% missed opportunities for preventive visits (Wong et al., 2013). The findings of this study display that all clinical encounters for patients age-eligible to receive the HPV vaccine should be viewed as potential opportunities to provide HPV vaccination recommendation (Wong et al., 2013).

In 2017, the state of Kansas was among the lowest ranking group of 12 other states that had a greater than one dose of HPV vaccine coverage rate less than 60% (Walker et al., 2018). In addition, as of 2017 there was an 11% lower rate of adolescents who received the first doses of the HPV vaccine in rural areas compared to urban areas (CDC, 2018d). The aim of this project was to improve identification and recommendation practices of male and female patients age 11 to 26 years in need of the HPV vaccine for all visit types in a rural primary care clinic by creating a standardized process to identify patients eligible to receive the vaccine and provide consistent recommendation.

## **Background and Significance**

### **History of HPV Vaccine**

The HPV vaccine was first introduced to several countries in 2006 as a quadrivalent vaccine in a three-dose series (Cutts et al., 2007). In 2016, the CDC began recommending the two-dose series if given to patients before their 15<sup>th</sup> birthday. Quadrivalent HPV vaccines protect

against high-risk genotypes 16 and 18, as well as low-risk genotypes 6 and 11. There is also a 9-valent HPV vaccine, which was introduced in 2014, and targets the 4 original genotypes and five additional HPV genotypes (Meites, Kempe, & Markowitz, 2016). The United States currently only distributes the 9-valent HPV vaccine (Meites, Kempe, & Markowitz, 2016). The high-risk HPV types 16 and 18 have been linked to certain cancers and are targeted in all the HPV vaccine types and HPV types 16 and 18 are linked to approximately 70% of all cervical cancers (Castle and Maza, 2016). It is estimated that cervical cancer is the cause of 91% of HPV-related deaths globally (Cutts et al., 2007). According to the CDC (2018b), the vaccine can be given as early as age 9, but it should be recommended to start the series at age 11 or 12 years.

### **Impact of the HPV Vaccine on Outcomes**

In vaccine trials, one month after completion of the HPV vaccine three-dose series, 100% of women age 15 to 26 years have detectable antibody to each HPV genotype (Cutts et al., 2007). Additionally, the antibody levels achieved after vaccination were found to be inversely related to age (Cutts et al., 2007). Therefore, the vaccine produces the greatest immune response the earlier it is given. According to Markowitz et al. (2016), within six years of the vaccine introduction in the United States there was a 64% decrease in the quadrivalent HPV types in females age 14 to 19 years old and 34% in females age 20 to 24 years old.

### **Literature Review**

A literature review for this quality improvement project was conducted using the following databases: PubMed, CINAHL, and Google Scholar. Key words used in the literature search included HPV vaccine, human papillomavirus vaccine, rates, uptake, strategies, adherence, barriers, provider recommendation, beliefs, and knowledge. Additionally, articles were evaluated from the reference list of other relevant published articles and systematic reviews

as part of the literature review. Articles in the English language and published within the last 10 years were used as references. Textbooks were used as supportive material for the theoretical framework. Reputable websites such as the CDC were used to gather pertinent information and additional resources.

### **HPV Vaccination Practice Barriers Among Providers**

There are many reasons why a provider may have barriers for recommending the vaccine and these reasons may differ across different organizations and patient populations that are served (Holman et al., 2014; Cole et al., 2017; & Vollrath, Thul & Holcombe, 2017). In an interview study of providers, they report recommending the vaccine based on perceived risk and potential for sexual activity and preferred vaccinating older female children compared to younger children (Hughes, Jones, Feemster & Fiks, 2011; Goff et al., 2011). This may be related to the vaccine's negative association with sexual activity and promoting sexual activity, particularly as a concern among parents regarding the potential for discussion of sexual activity when recommending the vaccine (Cole et al., 2017). Providers also forget to offer the vaccine due to time constraints (Holman et al., 2014). In an integrative review of the literature investigating methods for increasing HPV vaccine rates, providers that self-reported greater HPV vaccine knowledge were more likely to recommend the vaccine (Vollrath, Thul & Holcombe, 2017).

In a survey of primary care providers, 64% report using a HPV vaccine communication tool during visits most of the time (Dempsey, et al., 2016). In a cross-sectional survey measuring predictors of provider recommendation for the HPV vaccine, women were over 10 times more likely to receive a HPV vaccination recommendation than men (Gerend, Shepherd, Lustria & Shepherd, 2016). Also, white participants with health insurance were more likely to report receiving recommendation for the vaccine (Gerend et al., 2016). With these findings, the authors

concluded that a possibility is that providers have limited time and may be more likely to recommending the HPV vaccine to those they perceive to be most accepting (Gerend et al., 2015).

### **HPV Vaccination Barriers Among Patients and Parents**

Like provider barriers, there are many factors that may cause barriers for vaccinating for HPV among patients and parents (Dorell et al., 2014; Cole et al., 2017; & McBride & Singh, 2018). Dorell et al. (2014) studied the delay and refusal of the HPV vaccine for girls, which revealed that 30% of parents reported having refused or delayed the HPV vaccine for reasons that included doubts about safety, effectiveness and if the vaccine is necessary. Additionally, lack of knowledge and understanding of the vaccine has been reported in literature as being a primary reason parents do not vaccinate their children (Cole et al., 2017). McBride and Singh (2018) reported that men were less likely than women to report having a conversation with a provider regarding the HPV infection and vaccine. There is also very low understanding and knowledge of the other non-cervical cancers caused by HPV (McBride & Singh, 2018). This is a concern due to the high incidence of non-cervical cancers among men and women, and a higher prevalence of oral HPV infection in men (Taylor, Bunge, Bakker, & Castellsague, 2016). The belief that only sexually active adolescents should be immunized has also been identified as a reason that a parent may want to refuse or delay the vaccination for their child at a younger age (Holman et al., 2014). Finally, the vaccine series completion requires multiple return visits and may contribute to decreased rates of completion among both males and females. Studies have found that younger patients are more likely to complete the vaccine series than older adolescents (Holman et al., 2014).

Cost has also been identified as a potential barrier for patients and parents. In general, each immunization dose may cost around \$130-\$150. However, most health insurances pay for the cost of all three doses and the HPV vaccine is included in the Vaccines for Children (VFC) program up to the age of 18 years (Association of Reproductive Health Professionals (ARHP), n.d.).

### **Strategies for Increasing HPV Vaccination**

There are many strategies identified in the literature that may assist in increasing HPV vaccination adherence. These interventions include provider education, patient and family education, and automated reminders. The CDC (2018c) recommends implementing systems, such as establishing policies or creating processes to check immunization status at every visit. Also, all staff within the practice site should be included when establishing awareness of the HPV vaccine's benefits, so that any clinic personnel feels comfortable answering patient and parent questions. One identified strategy to identify vaccine need via an electronic health record included an alert where there was a significant improvement in captured opportunities to receive the vaccine for acute visit types (Mayne et al., 2014).

Roncancio et al. (2017) found that Hispanic mothers were first introduced to the vaccine and would learn about the HPV vaccine in the primary care clinic, which lead them to proceed with vaccinating their child. In another study, parents reported an increase in knowledge of the HPV vaccine after utilizing a computer-based learning PowerPoint™ to provide information on the vaccine (Ciparino, Scoloveno & Kelly, 2018). These examples support the essential role that primary care providers play in clinic to initiate conversations regarding the vaccine. It is important to provide consistent education to all patients and parents who are eligible to receive the HPV vaccine.

In these education conversations, it is necessary to relieve any concerns regarding negative connotations of the HPV vaccine in connection to sexual activity. In a study of Haitian parents and female patients, it was found that provider recommendation styles varied among providers, which was contributed as a crucial step leading to the decision for getting the HPV vaccine or not (Pierre-Victor, Stephens, Clarke, Gabbidon, & Madhivanan, 2017). When a provider framed the vaccine conversation in a way that referenced it as a cervical cancer prevention vaccine, this was reported as well-received. However, when the conversation was framed around sexual activity, the vaccine recommendation was poorly received and likely lead to missed opportunities (Pierre-Victor et al., 2017). While first identifying patients in need of the vaccine is vital, once these patients are identified it is equally imperative that effective recommendation techniques are utilized to impact HPV vaccine adherence.

### **Project Aims**

This quality improvement project conducted at a primary care clinic in rural Kansas consisted of three aims: (1) to assess system barriers for identifying patients in need of the HPV vaccine and providing information for effective recommendation to receive the HPV vaccine; (2) use stakeholder input to develop a standardized process for identification and delivery of HPV vaccine information; and (3) to improve identification of patients in need of the HPV vaccine and decrease missed opportunities.

### **Project Questions**

1. What is the current process for identifying patients in need and recommending the vaccine?
2. What are the barriers for identification and recommendation of the vaccine in the patient population that is served?

3. Does the standardized process for identifying patients in need decrease missed opportunities?
4. Is there an increase in HPV vaccine injections administered at the county health department by standardizing the process in the clinic for identification and recommendation at every patient visit?

### **Theoretical Framework**

Lewin's change theory model was used as the theoretical framework to guide the project. Lewin's was a behavioral scientist who published work in the 1940s applying social theory to group process and action research within the social sciences which was used as a model for change among industries in this era (Lewin, 1997). Lewin described a force field model which involves achieving an equilibrium of group dynamics and group decision to influence change (Butts & Rich, 2015). Lewin theorized if group decision is involved in the process of change, this displays an advantage because if a group member uses an individual procedure this creates a driving negative force and acts as a resistance to change (Lewin, 1997). However, if group standards are changed this may influence the individual and therefore stabilize or equilibrate the individual to work on the new group level (Lewin, 1997). Individuals are often influenced by group norms within their environment, therefore change should target group behavior and support group decision-making in order to create not only a process change but a culture change as well (Batras, Duff, & Smith, 2014). Following the elements of Lewin's change theory model, all clinic staff will play an active role in decision-making for the process change at the clinic in order to impact the group dynamic within the clinic environment and impact lasting change.

Lewin described a three-step model for successful change to achieve higher level of group performance and permanency among group standards (Lewin, 1997). These steps include:

(a) unfreezing, (b) moving, and (c) refreezing (Lewin, 1997). The “unfreezing” step can involve identifying problems or issues, benchmarking, analyzing internal performance, or performance barriers (Batras, Duff & Smith, 2014). The next step of “moving” is the process of taking action through implementing or trialing a change within a group which may include redesigning roles or responsibilities and providing additional training (Batras, Duff & Smith, 2014). The last step of ‘refreezing’ in the process of redistributing group norms, organizational culture, practices and policies to be able to maintain the change (Batras, Duff & Smith, 2014). The three steps in Lewin’s model for change were addressed in this project and conceptualized to be used as a guide to meet the project aims (see Figure 1.)



*Figure 1.* Process change to improve identification and recommendation practices for patients eligible to receive the HPV vaccine series in a primary care clinic using Lewin’s model for change.

## Methods

### Setting

This project was conducted at a privately-owned, rural primary care clinic in rural eastern Kansas. Staff at the clinic include a front desk receptionist, certified nursing assistant, and an advanced practice registered nurse. This clinic is unique because the provider does not administer vaccines in the clinic. Instead, the provider refers patients to the county health department to obtain vaccines. In the case of the HPV vaccine only, the provider can send a prescription to the local pharmacy based on the patients’ health insurance status. Therefore, the local health departments and local pharmacy were utilized as resources for vaccine availability

and administration to achieve vaccine uptake. The clinic sees patients across the lifespan and accepts all types of health insurance, including Medicaid and Medicare. The clinic also offers payment plans established for the uninsured.

### **Sample**

Male and female patients ages 11 to 26 years old were included in this project. The intervention was provided to all patients within the identified age range for all patient encounters including a well child check, physicals, well woman exams, sports physicals, follow-ups, or acute/sick visits.

### **Design**

#### **Timeline**

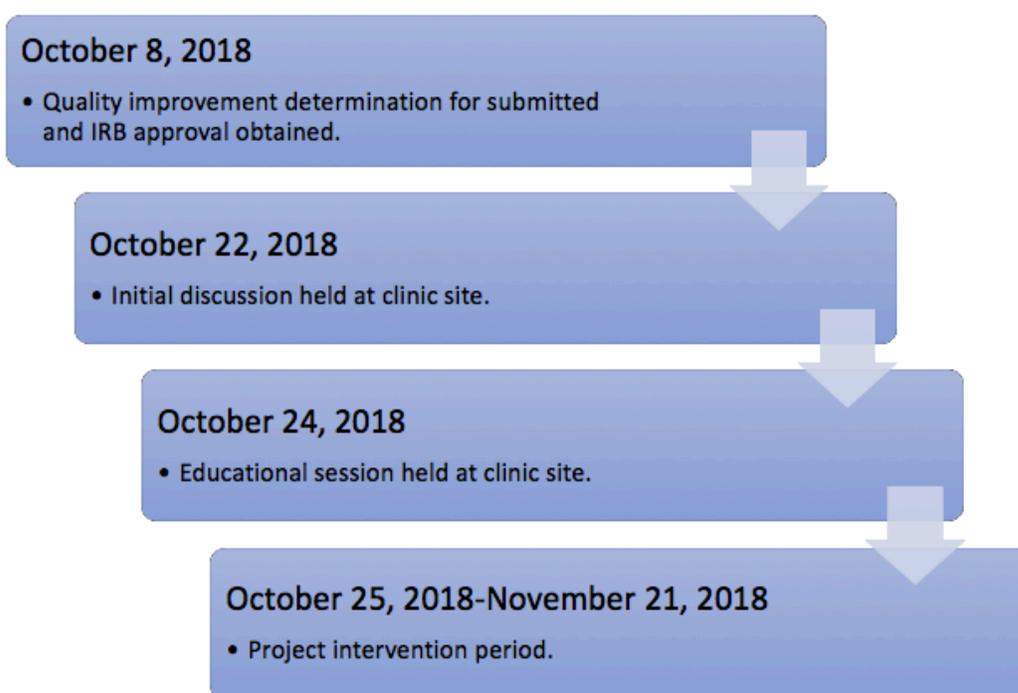
The first phase of the project lasted from June to September 2018 and involved creation of the project proposal and defense of the proposal. After obtaining faculty approval to begin the project, the project director (PD) submitted IRB approval application and obtained agency approval from the clinic management to begin the project.

The second phase of the project began in October 2018. The PD held an initial meeting at the clinic to assess barriers, current practices for identifying appropriate candidates for immunizing, and worked with the clinic team to create a standardized process for identification and recommendation. Next, an educational session to review the process change and determine each member's role in the implementation of the process was conducted. Prior to the intervention period, the PD obtained the pre-intervention data for the number of HPV injections administered at the county health department.

After discussing and coordinating with the clinic staff, the intervention period began and lasted for 4 weeks. The PD visited the clinic the second day of implementation and periodically

thereafter to check in with the staff, provide support in the implementation process, and review the daily log of eligible patient encounters. Additionally, the PD kept open communication through email and phone for the staff to report any barriers, issues, or concerns.

The final phase of the project was from January to March of 2019. This time was dedicated to obtaining post-intervention data for HPV injections administered at the county health department for data analysis and interpretation and analyzing the project results. Detailed project dates up to the project intervention period can be seen in Figure 2.



*Figure 2.* Establishing a standardized process to improve identification and recommendation practices of patients eligible to receive the HPV vaccine series in a rural primary care clinic project dates.

**Initial assessment.** This quality improvement project aimed to establish a practice change in a primary care setting for improving identification and recommendation for patients eligible to receive the HPV vaccine and decrease missed opportunities. First, the PD conducted a face-to face, key informant interview with the clinic staff to identify barriers that are exclusive

to the clinic and clinic provider, as well as specific questions related to the patient population that is served. The initial discussion included all clinic staff: a front desk receptionist, a certified nursing assistant (CNA), and a nurse practitioner (NP). The PD had established a trusting relationship with each clinic staff member after spending a previous semester there for clinical training which helped to foster an open and honest discussion. Open-ended questions were asked to engage staff to participate in the discussion to evaluate current identification and recommendation practices. The PD facilitated the interview by utilizing an interview guide (see Appendix A) as a script which was created with a focus on common barriers among patients and providers identified in literature and previously discussed. The PD recorded the interview electronically as well as took detailed notes.

**Educational session.** The PD conducted an educational in-service using a PowerPoint presentation to formally review the HPV vaccine identification and recommendation process map created with the input from clinic staff during the initial discussion. Also, further discussion for the roles and responsibilities of clinic staff during the project, and strategies for effective recommendation was reviewed. The process map incorporated the use of the CDC HPV vaccine decision tree as a guide (see Appendix B) as well as the CDC conversations tip sheet (see Appendix C) to be used as a guide (CDC, 2018a). Therefore, these documents were reviewed with staff as well. Updated HPV vaccine uptake rates for the county, project purpose, cost and access specific to the clinic's patient population, vaccine safety, recommendation strategies, HPV vaccine talking points, and additional project details including contact information for the PD were also presented.

The CDC (2018c) recommends that all clinic staff, from the front desk receptionist to the primary care provider, should be aware of HPV vaccine's importance and current

recommendations. All individuals should be prepared to answer patient or parent's questions in order to improve vaccine uptake (CDC, 2018c). All clinic staff were present for the educational session which was conducted over a one-hour period. The implementation of the practice change for identifying patients eligible to receive the vaccine and providing recommendation for the vaccine was conducted over a 4-week period.

### **Data Collection**

The purpose of the data collection was to evaluate for improvement of identification and recommendation of male and female patients age 11 to 26 years old eligible to receive the HPV vaccine for all visit types including well child checks, well woman exams, physicals, acute visits, and sports physicals. In addition, pre-intervention and post-intervention data was collected based on communication with the nursing director at the county health department to report the number of HPV injections given over a 78-day period preceding the clinic practice change start date, collected from the Kansas Immunization Registry.

During the project period, daily tracking occurred on a patient log recorded by the CNA or the NP for all encounters with patients between the age of 11-26 years (see Appendix D). The log contained the following information: (a) visit date, (b) patients' gender, (c) patient's age, (d) type of visit, (e) vaccine status (f) provider recommendation completed, (g) type of referral, and (g) vaccine information card received. There was also a section on the log for each patient encounter to include any comments that were pertinent to the specific patient encounter and project outcomes, including patient or parent vaccine refusal. The PD checked in with staff at the clinic periodically to review data entry in the daily patient log.

## **Human Subjects Protection**

There is no need for informed consent from the participants because the decision to obtain the vaccine is voluntary and recommendation practices are being followed according to best practice guidelines. Personal health information was protected in data collection; only pertinent information was obtained and recorded on the data collection log and no patient identifiers were used in project data. In addition, there was no interaction between the project director and the patients. All data collection was conducted at the clinic site and electronically through the Kansas Immunization Registry provided by the nursing director at the county health department. The PD obtained a signed letter of support to conduct the project from the clinic owner and nurse practitioner at the clinic site which was included in the submission for IRB approval. The PD obtained IRB designation for quality improvement from the University of Kansas Medical Center after obtaining faculty approval and prior to starting the project.

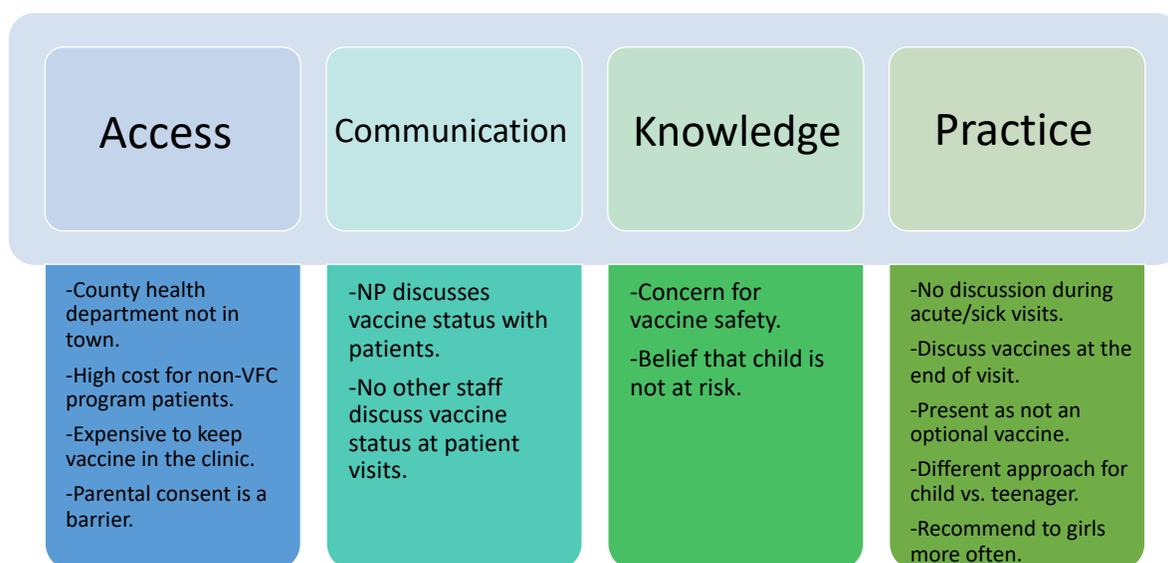
## **Results**

### **Initial Assessment**

Themes were identified and evaluated based on participant feedback and group consensus from the initial discussion. An affinity diagram was used to evaluate perceived themes regarding barriers in current practice for identifying and recommending the vaccine after completing the initial discussion (see Figure 3). These themes from the discussion were interpreted and later reviewed with clinic staff during the education session.

According to the CDC (2018c), a strategy for increasing vaccine uptake is to create a standard procedure to follow in order to increase or maintain vaccination rates including reviewing vaccination history at every visit. From the feedback identified in the initial discussion, a process map for identifying patients that need the HPV vaccination at every visit

was created to establish a standard workflow for identifying eligible patients that is unique to the clinic. An example process map with actions taken by each staff member was introduced at the end of the discussion and edited to create the final process map with the clinic staff's input based on their expertise with clinic workflow. Additionally, in the initial discussion the clinic staff had a chance to address barriers to recommending the vaccine as well as the current practice in the clinic. Each staff member were active participants in the discussion and had thoughts and ideas to contribute.



*Figure 3.* Affinity diagram to evaluate perceived themes and subgroups regarding barriers and current practice for identifying and recommending the vaccine after completing the initial discussion.

**Access.** Barriers to accessing the HPV vaccine was a prominent finding in the initial discussion. When asked about adequate coverage of the HPV vaccine in the population served at the clinic, staff reported that there was probably not adequate coverage however reported the vaccine is encouraged by the provider especially during well-child checks. Staff discussed that the local county health department where HPV vaccines are available for patients in the vaccine

for children (VFC) program was approximately 7 miles from town which might be too far of a distance for some people. Additionally, the high cost of the vaccine for non-VFC program patients or uninsured patients was also identified as a potential barrier. The clinic NP discussed that she felt it was expensive to keep the vaccine in the clinic. Another staff member discussed that she was concerned about parental consent as a barrier. This staff member brought up the concern that some adolescents might be hesitant to ask their parent about the HPV vaccine in fear that their parent might think they are sexually active.

**Communication.** During the initial discussion the staff talked through their current process. The front desk receptionist and certified nurse assistant did not have an active role identifying or screening patients in need of the vaccine or recommending vaccines to patients. The NP would be the primary person to discuss vaccine status with a patient or parent.

**Knowledge.** Barriers to knowledge discussed by the clinic staff included lack of general public knowledge regarding the safety of the vaccine which is sometimes pre-determined by patients or parents. Additionally, the parental belief that children aren't at risk, especially younger children, was brought up as a knowledge gap among the patient population served at the clinic.

**Practice.** The NP provided most of the information for current practice as she was the primary person involved in identifying patients in need of the vaccine and providing the recommendation. The NP discussed that her current practice for recommending is consistent for physicals and well child checks and typically discussion of vaccine status occurs towards the end of a visit. The NP reported that she typically would not discuss vaccine status during a sick or acute visit. The NP felt that she may have a different approach in recommending for a child vs. an adolescent and felt she recommended to girls more often. An example was that for a younger

child the conversation might be around the vaccine protecting against a virus and for an older patient the conversation might be that the vaccine helps protect against a sexually transmitted disease. The NP further discussed that a recommendation strategy currently used in her practice was to present the HPV vaccine as a vaccine that is not an optional one. If the patient is wanting the vaccine, they are given a patient education handout and referred to the county health department or a prescription is sent to the local pharmacy.

### **Implementation of the Practice Change**

The final process map (see Figure 4) was created with the help of clinic staff. It began with the front desk receptionist flagging all eligible patients visits. The front desk receptionist would then print the patient's encounter sheet on a pink piece of paper if the patient was eligible to receive the vaccine (between the ages of 11-26 years old) for all clinic visit types. This encounter sheet would then be handed off to the CNA that rooms the patient. For verification of vaccine status, it was recommended to the CNA to utilize the CDC HPV vaccine decision tree to provide additional information when rooming the patient. The CNA would then notify the provider of their status and need for vaccination when presenting the patient's vital signs and chief complaint. Additionally, it was recommended for the NP to utilize the techniques reviewed in the educational session as well as from the CDC's "Tips and Timesavers for Talking with Parents" to facilitate a conversation with the patient or parent as part of the patient's plan of care (CDC, 2018a). If it was established that the patient needed the HPV vaccine, the provider would recommend the vaccine and appropriate dose series. Depending on the patient's insurance status, the NP would send a prescription to the local pharmacy which was in close proximity to the clinic or would refer the patient to the county health department for vaccine administration. The NP would then provide the patient with the vaccine information card as well as HPV vaccine

patient education that the NP agreed to use. The vaccine information card was also created with the input from staff during the initial discussion and included the number of doses depending on the patients age as well as frequency of doses. On the back of the vaccine information card was contact information for the county health department and the local pharmacy. The NP would circle whichever option the patient was referred to for the vaccine. After each eligible patient encounter, the CNA or the NP recorded the patient visit in the daily patient log.

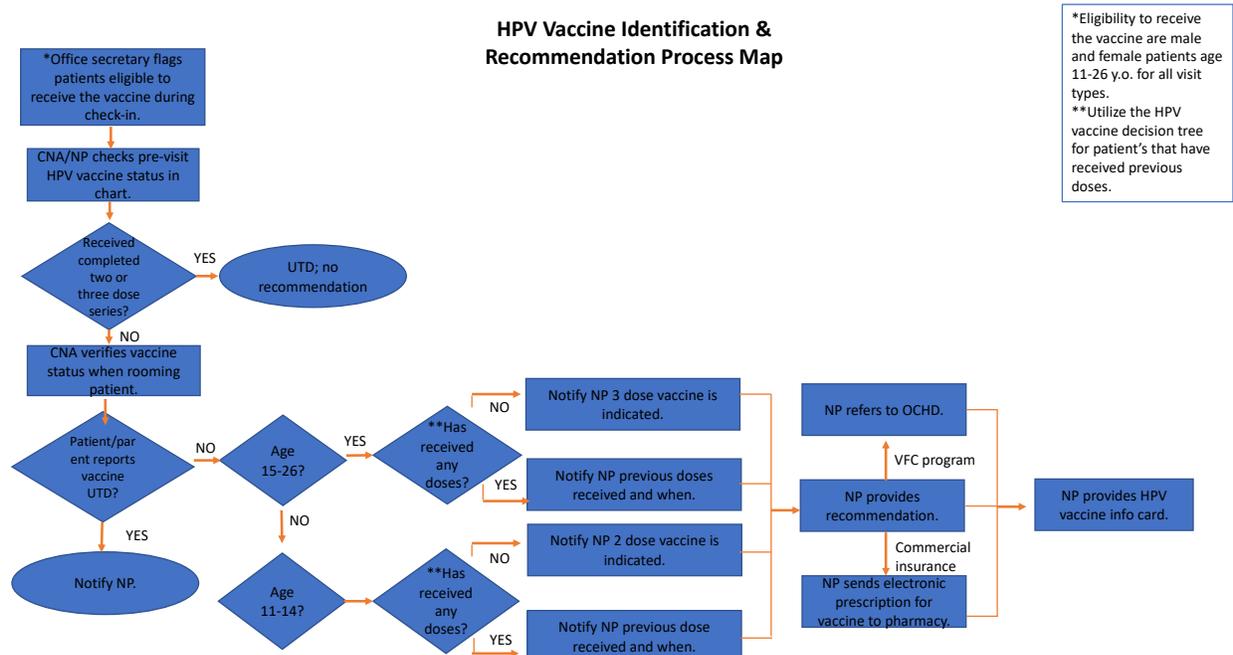


Figure 4. Clinic process map for identifying patients eligible to receive the vaccine and providing recommendation for the vaccine.

## Data Analysis

There were 44 patients that visited the clinic during the 4-week project period that were identified as age-eligible to receive the HPV vaccine and recommendation provided, if appropriate. Descriptive statistics were used for data analysis to show the percentage of patients identified to need the HPV vaccine out of the total patient encounters between the ages 11-26 years during the project period stratified by age, gender, and type of visit (see Table 1).

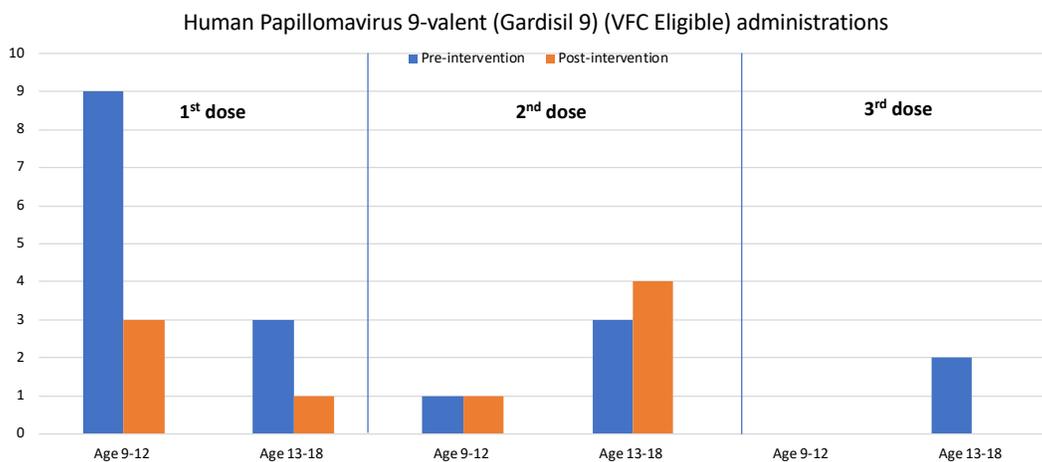
Table 1  
 Characteristics of patient encounters at a rural primary care clinic for identification and recommendation of the HPV vaccine.

Characteristics	Patient Encounters, <i>N</i> = 44 <u>n</u> (%)
Age	
9-12 years	5 (11.4%)
13-18 years	29 (65.9%)
19-26 years	10 (22.7%)
Sex	
Male	17 (38.6%)
Female	27 (61.4%)
Type of visit	
Acute/sick visit	29 (65.9%)
WCC	6 (13.6%)
Physical	2 (4.5%)
Adolescent sports physical	1 (2.3%)
Misc. follow-up	6 (13.6%)

The type of visit was separated into acute/sick visit, well child checks, physical exam, adolescent sport physicals, and miscellaneous follow-ups. The miscellaneous follow-up visits included patient visits to the clinic for follow ups on blood pressure, diabetes, emergency room visits, or visits for medication refills. Overall, 20.5% of patients reported completion of the HPV vaccine series. Additionally, 18.2% of the age-eligible patients were referred to the health department and 31.8% had a prescription for the HPV vaccine sent to the local pharmacy that carried it. This was indicated in the process map based on if the patient had insurance or not, as the health department provides vaccinations for patients that are part of the VFC program. Finally, 20.5% of patients refused or reported to the provider that they wanted to read about the vaccine more and review the educational information she had provided to them before sending the prescription to the pharmacy or deciding to obtain the vaccine. The age range for those patients or parents of patients that refused or wanted more time to decide were 11-16 years old.

Finally, two age-eligible patients were uninsured and did not receive any kind of referral. One of these patients was beyond the range to be covered under the VFC program and for other patient the reason for no referral was not documented in the comments section of the log. However, recommendation was provided to these patients as well as the HPV vaccine information card.

The number of post-intervention HPV vaccine injections administered over a 78-day period following the clinic practice change was compared to the pre-intervention data. There was no improvement in the amount of HPV vaccines administered at the county health department as there were 18 total vaccine administrations pre-intervention, and only 9 total vaccine administrations post-intervention. Additionally, because no patient identifiers were used in data analysis, it was not possible to differentiate if the same patient received the first dose and then a subsequent second or third dose to complete the series during the pre and post-intervention timeframes (see Figure 5).



*Figure 5.* Human Papillomavirus 9-valent vaccine administrations provided to patients eligible for the vaccine for children (VFC) program at the county health department, organized by age range and dose. The pre-intervention data time period was from August 1, 2018 to October 22, 2018. The project intervention began at the clinic on October 25, 2018 and ended on November 21, 2018. The post-intervention data time period was from October 25, 2018 to January 10, 2019.

## Discussion

Utilizing resources and training to educate and prepare providers to consistently recommend the vaccine can increase HPV vaccine uptake (Cole et al., 2017). This quality improvement project aimed to standardize vaccine identification processes and recommendation practices. This was done by creating a process map to identify patients eligible to receive the vaccine during every patient visit and educating on recommendation practices to all clinic staff members. Although provider recommendation has clearly been identified as a way to increase HPV vaccine uptake, this recommendation is something that should be provided during every patient visit, and not just well-child checks. It is plausible that identification and recommendation should go hand-in-hand as an approach to increase HPV vaccine uptake and decrease missed opportunities. The effectiveness of the intervention was evaluated by analyzing the number of patients identified as being eligible to receive the vaccine during the project period for every visit type.

During the planning of this quality improvement project it was communicated by the owner of the clinic, the NP, to the PD and the project committee chair that closure of the clinic site was imminent. It was decided by the PD and the project committee chair to push the project timeline ahead of schedule so that the project could be completed. It was not possible to provide a final discussion with clinic staff or disseminate the findings to the clinic staff after the project was complete as the post-intervention data had not yet been collected by the time the clinic closed on January 11, 2019.

The project results yielded a 4-fold increase in identification and recommendation for acute/sick visits compared to well-child check visits as 65.9% of eligible patients that visited the clinic for acute or sick visits during the project period were identified as needing the vaccine and

recommendation was provided as well as a prescription sent or referral to the health department. These patient encounters would have otherwise been missed opportunities prior to the clinic practice change. This result, as well as the results from Wong et al. (2013) which showed high rates of missed opportunities for sick or non-preventive types of visits, provides evidence that all patient encounters should be viewed as opportunities to provide vaccine recommendation and education for age-eligible patients. This opportunity does not only pertain to the HPV vaccine, but other optional vaccines, such as the flu vaccine and the meningococcal B vaccine.

Although HPV vaccine administration rates were not impacted by this quality improvement project, four times more patients were provided recommendation during acute visits as compared to well-child check visits. Also, this project helped to address gaps in parental and patient knowledge concerning safety, effectiveness, and necessity for the HPV vaccine that is described in the literature and was identified in the initial discussion from clinic staff as a barrier to increasing rates of HPV vaccination. Studies by Roncancio et al. (2017) and Ciparino, Scloveno, and Kelly (2018) showed initial conversations and education in the primary care clinic would lead to proceeding with obtaining the HPV vaccine and an increase knowledge of the vaccine when parents were introduced to the HPV vaccine in the primary care clinic. During the project period it was documented that 20.5% of the patient encounters were provided recommendation and educational material as the parent wanted to learn more about the vaccine. With the recommendation and education alone, this might have piqued the parents' interest in learning more about the vaccine, which would not have happened had they not received the initial recommendation in the primary care clinic.

The results for male and female identification and recommendation were comparable to other studies that show that men are less likely to be provided recommendation for the HPV

vaccine than women (Gerend et al., 2016). The results revealed 38.6% of age-eligible patients identified and recommendation provided were males and 61.4% were females.

### **Strengths and Limitations**

Current process and barriers were discussed and evaluated during the initial discussion and aided in creating the clinic process map for identifying and recommending the HPV vaccine. The standardized process did decrease missed opportunities for identification and provider recommendation where a referral was provided for acute or sick visits. Unfortunately, there was no increase in HPV vaccine injections administered at the county health department.

The number of vaccines administered at the pharmacy was not captured. However, it was reported out to the PD at one of the clinic check-ins during the project period that the other local pharmacy had reached out to the clinic NP and was also going to start carrying the HPV vaccine. This was a strength outside of the intended project results, as insured patients were now able to get the choice of which pharmacy they preferred to have their prescription sent to. Thus, increased access to vaccines for patients in the community was realized. The PD had completed a previous clinical experience in this clinic which served as another project strength. The relationship developed beforehand between the PD and the clinic helped to gain buy-in from the staff, thus impacting the willingness to adopt the clinic practice change.

A limitation to this project, after reflecting on these results, might have been related to the timeframe for the pre and post- intervention data. The pre-intervention data included vaccine injections administered starting in the month of August, which is possible that this is a time when the health department sees a higher influx of patients needing updated on vaccines due to school starting. Also, the county health department only provided the HPV vaccine to VFC's eligible patients.

A primary limitation to not having an impact on vaccine administration rates is that the primary care clinic in which the project was completed did not provide and administer the HPV vaccine. Therefore, after identifying and recommending the vaccine it was still up to the patient or parent to follow-through with obtaining the vaccine once leaving the clinic. Other project limitations included the inability to verify that all patients age 11-26 seen in clinic during the project period were logged as being identified and recommendation provided. This was because as part of the project the plan, the PD did not have access to the electronic health record, patient encounter lists, or any kind of patient identifiers.

A final limitation for this quality improvement project could have been attributed to the impending closure of this clinic. Although the project intervention period did not need to be shortened, it is plausible to conclude that there might have been outside stressors and distractions for staff when implementing the practice change. Additionally, this development during the project might shed light on the barriers that primary care providers face in rural communities in regard to access to care for their patients as well as financial and practice resources.

### **Implications for Future Practice**

One strategy identified in the literature to provide significant increases in capturing opportunities to receive the vaccine for acute type of visits is electronic health record alerts (Mayne et al., 2014). Due to time constraints for clinic providers, this strategy might be more effective and impactful in the project clinic. For this practice change, all patients were asked for their vaccine status if chart was not up-to-date or checked prior to the visit. By having an alert in the electronic medical record that was filtered to age eligible patients and counted for a documented vaccine series completion in the electronic chart, this would defer the need to have a discussion with patients that have already completed the vaccine series. Also, it would help to

decrease communication barriers between clinic staff. The clinic did use electronic medical record and charting system so this was discussed as a possibility for future state. Other studies and quality improvement projects should be conducted within small, rural clinics to create standardized processes utilizing recommendation tools, as well as using every patient encounter as an opportunity to identify need and provide recommendation. These standardized processes should focus on adapting to specific workflow within clinics, staff, and resources available while including all clinic staff members in the process to assist in improving HPV vaccination rates as well as public knowledge.

Dissemination of project results to clinic staff was not possible due to the closure of the clinic. However, the PD did communicate via email with the clinic NP for project follow-up questions. The questions that were asked were as follows: 1. What barriers, if any, did you find when implementing the intervention for identifying and recommending the HPV vaccine for every patient visit age 11-26 years old? 2. What do you feel went well with the process map for identifying and recommending the HPV vaccine for all patient visits at your clinic? 3. Would there be anything that you would change with the process going forward? The clinic NP stated “I felt the biggest barrier was preconceived ideas about vaccines that the parents had. They already had their mind made up about vaccines before even hearing about it” (personal communication, January 7, 2019). Additionally, the clinic NP felt that the practice change was not difficult once all the staff got into a routine with it. Based on this feedback, it is plausible that extending the project period beyond 4 weeks might have yielded more patients being identified, as the clinic staff may needed more time to acclimate to the practice change. Finally, the NP stated that changes she would make after trialing the practice change in the clinic would be to make the HPV vaccine education with the patient more of the clinic nurses’ responsibility at check-in.

Future research should focus on looking at perceptions of adolescents' receiving parental consent for the HPV vaccine and how this might impact vaccine rates. This topic was brought up as a barrier from clinic staff during the initial discussion. Also, the findings showed that patients or parents were hesitant to move forward with obtaining the vaccine after recommendation and receiving patient education. Therefore, future research should also consider strategies to effectively address hesitancy from parents and patients. Finally, additional studies looking at framing conversations to ensure clear, consistent messaging in regard to recommendations from providers.

Future practice improvement looking at developing team-based approaches or standardized processes to screen and educate patients on the HPV vaccine at every patient visit is imperative. Rural area practices should also consider gaining better partnership with county health departments to make improvements on vaccine rates. Finally, providing programs, information, and resources for the HPV vaccine to be more accessible for privately-owned clinics, especially those in rural areas, is of crucial benefit to support the public health of communities such as this one.

### **Conclusion**

The three aims of this project were met as system barriers were assessed and stakeholder input was utilized to create a standardized process for identifying age-eligible patients and recommending the HPV vaccine in a rural primary care clinic. Additionally, the third aim of this project was met as the results showed that missed opportunities were decreased by implementing the standardized process of identifying need and recommending for every patient visit type. Although standardizing the process for identifying patients in need did decrease missed

opportunities, there was not an increase in vaccine administrations at the county health department.

The results of this project support the notion that creating standardized processes within organizations large and small is an effective way to improve health and quality of care. In addition, standardized processes can be effective to potentially improve vaccine uptake by screening patients eligible for the vaccine at every patient visit, not just during a well woman or well-child check. However, clinics need to have the ability to administer the vaccine to have optimal impact on vaccine uptake.

This project displayed what is consistent in research; acute and sick visit types in primary care clinics present as missed opportunities for identifying patients in need for the HPV vaccine and providing recommendation. Creating a standardized process for clinics to identify, screen, and recommend the HPV vaccine in an efficient and effective way to help decrease missed opportunities, initiate provider to patient vaccine related conversations, improve knowledge gaps within rural communities, improve HPV vaccination rates, and make reducing HPV related diseases for future generations a priority.

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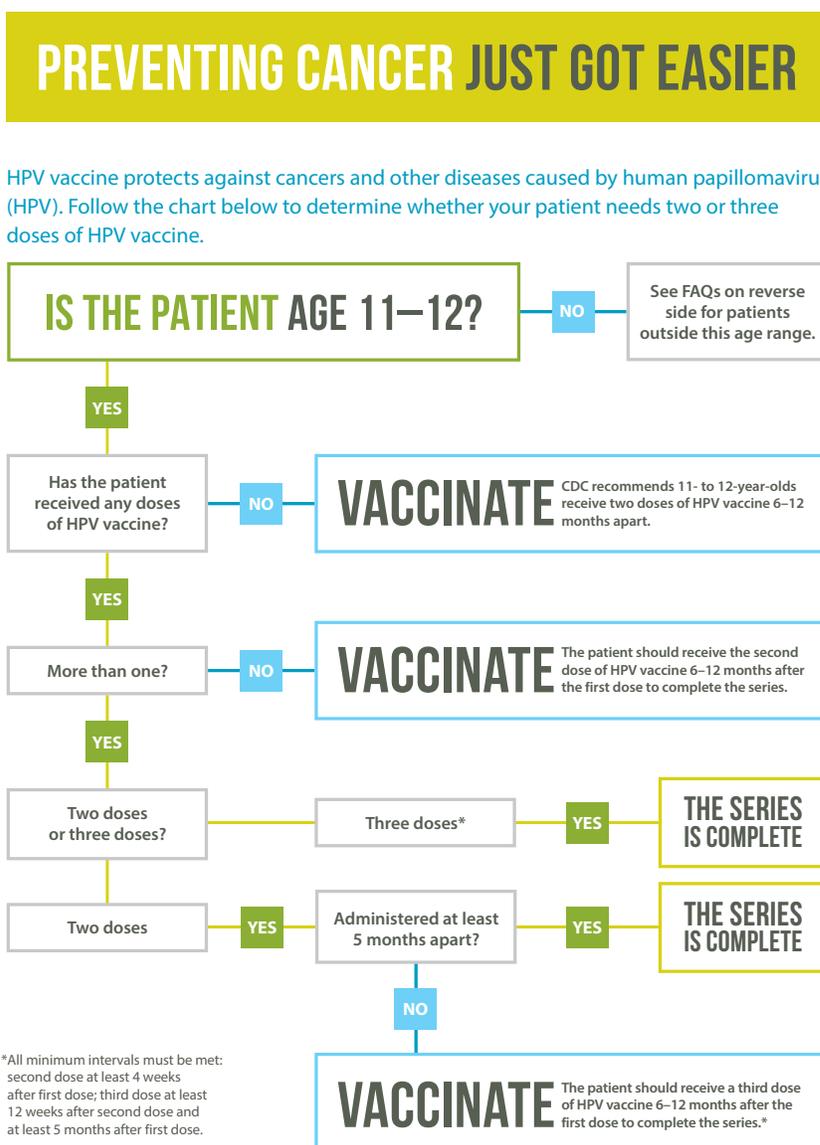
## Appendix A

## Initial Discussion Interview Script

- 1) Do you feel there is adequate coverage of the HPV vaccine among the patient population that you serve?
- 2) Do you feel there is adequate knowledge of the HPV vaccine among the patient population that you serve?
- 3) Do you feel there are barriers to accessing the HPV vaccine in the patient population that you serve?
- 4) Do you feel there is a consistent practice in the clinic for identifying patients that are age-eligible and in need of the vaccine?
- 5) What are the current responsibilities for each clinic staff member in checking a patient's HPV vaccine status?
- 6) Is it common in your practice to recommend the HPV vaccine at every patient visit for age-eligible patients?
- 7) What is your current recommendation style for the HPV vaccine?
- 8) Does your recommendation style change based on the type of patient visit and/or patient characteristics?
- 9) From your perspective, what are common reasons why you may not recommend the vaccine, if any?
- 10) From your perspective, what are common reasons why a parent/patient may not want the vaccine?
- 11) Do you feel there are certain age groups, genders, social and/or ethnic groups that may contribute to recommending the vaccine more often or less often?

## Appendix B

## HPV Vaccine Decision Tree



*Note.* Retrieved from “Human Papillomavirus (HPV): Clinical Factsheets and Guidance” by the Center for Disease Control (CDC), 2017 at <https://www.cdc.gov/hpv/hcp/clinician-factsheet.html>.

## Appendix C

## CDC Talking to Parents About HPV Vaccine Handout

## Talking to Parents about HPV Vaccine



### HPV VACCINE IS CANCER PREVENTION

Recommend HPV vaccination in the **same way** and on the **same day** as all adolescent vaccines. You can say, "Now that your son is 11, he is due for vaccinations today to help protect him from meningitis, HPV cancers, and whooping cough. Do you have any questions?" Remind parents of the follow-up shots their child will need and ask them to make appointments before they leave.

<p><b>Why does my child need HPV vaccine?</b></p>	<p>HPV vaccine is important because it prevents infections that can cause cancer. That's why we need to start the shot series today.</p>	<p><b>What diseases are caused by HPV?</b></p>	<p>Some HPV infections can cause cancer—like cancer of the cervix or in the back of the throat—but we can protect your child from these cancers in the future by getting the first HPV shot today.</p>
<p><b>How do you know the vaccine works?</b></p>	<p>Studies continue to prove HPV vaccination works extremely well, decreasing the number of infections and HPV precancers in young people since it has been available.</p>	<p><b>Is my child really at risk for HPV?</b></p>	<p>HPV is a very common infection in women and men that can cause cancer. Starting the vaccine series today will help protect your child from the cancers and diseases caused by HPV.</p>
<p><b>Why do they need HPV vaccine at such a young age?</b></p>	<p>Like all vaccines, we want to give HPV vaccine earlier rather than later. Getting the vaccine now protects your child long before they are ever exposed. If you wait until your child is older, he/she may end up needing three shots instead of two.</p>	<p><b>I'm worried my child will think that getting this vaccine makes it OK to have sex.</b></p>	<p>Studies tell us that getting HPV vaccine doesn't make kids more likely to start having sex. I made sure my child (or grandchild, etc.) got HPV vaccine, and I recommend we give your child her first HPV shot today.</p>
<p><b>Why do boys need the HPV vaccine?</b></p>	<p>HPV vaccination can help prevent future infections that can lead to cancers of the penis, anus, and back of the throat in men.</p>	<p><b>I'm worried about the safety of HPV vaccine. Do you think it's safe?</b></p>	<p>Yes, HPV vaccination is very safe. Like any medication, vaccines can cause side effects, including pain, swelling, or redness where the shot was given. That's normal for HPV vaccine too and should go away in a day or two. Sometimes kids faint after they get shots and they could be injured if they fall from fainting. We'll have your child stay seated after the shot to help protect him/her.</p>
<p><b>Are all of these vaccines actually required?</b></p>	<p>I strongly recommend each of these vaccines and so do experts at the CDC and major medical organizations. School entry requirements are developed for public health and safety, but don't always reflect the most current medical recommendations for your child's health.</p>	<p><b>Can HPV vaccine cause infertility in my child?</b></p>	<p>There is no evidence available to suggest that getting HPV vaccine will have an effect on future fertility. However, women who develop an HPV precancer or cancer could require treatment that would limit their ability to have children.</p>
<p><b>Would you get HPV vaccine for your kids?</b></p>	<p>Yes, I gave HPV vaccine to my child (or grandchild, etc.) when he was 11, because I wanted to help protect him from cancer in the future.</p>	<p style="text-align: right; font-size: x-small;">CS2694539 Last updated MAY 2018</p>	

*Note.* Retrieved from "Human Papillomavirus (HPV): Clinical Factsheets and Guidance" by the Center for Disease Control (CDC), 2017 at <https://www.cdc.gov/hpv/hcp/clinician-factsheet.html>.

