

IMPROVING HPV VACCINE COMPLIANCE

By

Mei Suen, BSN

University of Kansas School of Nursing

Submitted to the School of Nursing and The Graduate Faculty of the University of Kansas in
partial fulfillment of the requirements for the degree of Doctor of Nursing Practice.

Cara Busenhardt, Ph.D, CNM, APRN

Faculty Project Committee, Chair

JoAnn Peterson, DNP, APRN, FNP-BC

Faculty Project Committee, Member

19 June 2018

Date Project Proposal Accepted

The DNP Project committee for Mei Suen certifies that this is the approved version of the following DNP Project:

IMPROVING HPV VACCINE COMPLIANCE

Cara Busenhart, Ph.D, CNM,

APRN

Chair

JoAnn Peterson, DNP,

APRN, FNP-BC

Co-Chair

Date Approved: 8 March 2019

Abstract

Introduction: Human papilloma virus (HPV) is a sexually transmitted infection that is known to cause genital warts and cervical, oropharyngeal, anal, vulvar, penile, vaginal, and rectal cancers. There are vaccines available to prevent HPV infections. Primary prevention is our best strategy to combat the spread of HPV.

Project Aim: The purpose of this quality improvement project is to determine if a provider recommendation will increase human papilloma virus (HPV) vaccine uptake in adolescents.

Project Method: Using the Model for Improvement as the conceptual framework, the providers at a private pediatric practice were taught to use a presumptive presentation for HPV vaccine and co-administration with Tdap and meningococcal vaccine. This practice change required parents to opt out of HPV vaccine rather than opting into HPV vaccine. Providers also provided education on HPV and benefits of HPV vaccine to parents and adolescents.

Data Collection and Analysis: Prior to initiation of the intervention, retrospective data was collected on HPV acceptance rate in the clinic. One month and two months after the introduction of the intervention, data was collected to determine if there was a significant change in HPV vaccine uptake. Data was obtained from the patients' electronic medical records.

Results: This quality improvement change determined that provider recommendation alone was not effective in increasing HPV vaccine acceptance with the addition of parental awareness measures, HPV compliance rate increased approximately 15%.

Keywords: human papillomavirus, human papillomavirus vaccine, immunization, immunization rates, provider recommendation

Table of Contents

Introduction.....	4
Literature Review.....	5
Barriers to HPV Vaccine Uptake.....	5
Factors that Increase HPV Vaccine Uptake.....	7
Previous Interventions to Promote HPV Vaccine.....	8
Limitations of Previous Studies.....	10
Conclusions From Literature Review.....	11
Purpose and Research Question.....	11
Setting.....	12
Methods.....	13
Theoretical Framework.....	13
Author’s Assumptions.....	13
Project Design and Rationale.....	14
Project Sample and Selection Process.....	15
Data Collection.....	15
Results.....	16
Discussion.....	19
Limitations.....	20
Implications for Practice.....	20
Conclusion.....	20
References.....	22

Appendix A.....	26
Appendix B.....	27

Introduction

Human papillomavirus (HPV) is the most common sexually transmitted infection worldwide and is known to cause genital warts and cervical, oropharyngeal, anal, vulvar, penile, vaginal, and rectal cancers (Dayal, Robinson, Schoening, Smith, & Kim, 2016; Gerend, Shepherd, Lustria, & Shepherd, 2016; Scott & Batty, 2016). There are 14 million new HPV infections every year, with a lifetime disease probability of greater than 80% for women and 90% for men (Dayal et al., 2016). HPV vaccine offers protection against at least 70% of cervical cancer incidence and 90% of genital warts incidence (Rahman Laz, McGrath, & Berenson, 2015). The only HPV vaccine on the market in the United States is Gardasil 9®; this vaccine is a 9-valent vaccine that protects against two strains that cause genital warts and nine oncogenic HPV genotypes (National Cancer Institute, 2018).

Healthy People 2020 has a target of an 80% series completion rate for HPV vaccine (Office of Disease Prevention and Health Promotion [ODPHP], 2017). Statistics from the Centers for Disease Control and Prevention (CDC) (2016) reported that six out of ten parents nationwide are getting the HPV vaccine for their children; Kansas' compliance rate is only 50-59%. HPV vaccine is approved for males and females ages 9-45 years and it is recommended to initiate the series at age 11 or 12 (American Academy of Pediatrics [AAP], 2017; CDC, 2016). Two additional vaccines are recommended at these ages, tetanus/diphtheria/pertussis (Tdap) and a meningococcal vaccine (AAP, 2017; CDC 2016). The rate of compliance for Tdap is 87.6%, meningococcal vaccine is 79.3%, and HPV vaccine is 60% (Ogunbajo, Hansen, North, Okoloko, & Niccolai, 2016). There is a clear difference in vaccine uptake and a need to increase HPV vaccine compliance rates.

To understand why HPV vaccine rates are so low and what providers can do to increase acceptance of HPV vaccine, a literature review was conducted to determine the factors that influence parents to accept or decline the vaccine and methods to increase uptake. Using this knowledge, a quality improvement project has been created and introduced at a private practice pediatric office in Prairie Village, Kansas (see Appendix A).

Literature Review

To recognize why parents accept or decline HPV vaccine, this author conducted a literature review to discover the barriers to HPV vaccine uptake, factors that increase HPV vaccine acceptance, and strategies to promote vaccine acceptance. Databases utilized were Pub Med and CINAHL. Search terms were “HPV vaccine”, “human papillomavirus vaccine”, and “provider recommendation”. Journal articles were excluded if they were published prior to 2012 and if primary research was not conducted.

Barriers to HPV Vaccine Uptake

To understand why HPV vaccine has a lower compliance rate compared to other vaccines, this author reviewed literature and found the four main barriers toward initiation. The barriers include: (a) concerns about side effects of HPV vaccine; (b) insufficient or no knowledge about HPV and HPV vaccine; (c) lack of provider recommendation; and (d) adolescent is not sexually active and parental concern that receiving HPV vaccine will initiate sexual debut (Argones et al, 2016; Dayal et al., 2016; Gerend et al., 2016, Sanderson et al., 2017, Shay et al., 2016; Wilson et al., 2013).

Concerns about side effects of HPV vaccine. Multiple studies revealed that parents were concerned about the side effects of HPV vaccines (Dayal et al, 2016; Sanderson et al., 2017; Wilson et al, 2016). Sanderson et al. (2017) found that parents had multiple hesitations

toward the initiation of HPV vaccine, with concerns for safety and side effects ranked as the number one reason (Sanderson et al., 2017). Wilson et al. (2016) put together a focus group of ethnically diverse black woman and discovered similar results. These participants stated that they did not accept HPV vaccine for their children because they were concerned about side effects such as autism and had a general distrust of vaccines all together (Wilson et al, 2016). Dayal et al. (2016) found if parents perceived HPV vaccine to be harmful, they were less likely to vaccinate their child.

Lack of recommendation. Many vaccines are presented using a presumptive presentation making the parents opt out of the vaccine versus opting in; HPV vaccine on the other hand is often offered as an optional vaccine (Shay et al., 2016). A lack of provider recommendation greatly decreases the chance that parents are going to accept HPV vaccine (Aragones et al., 2016; Gerend et al., 2016; Shay et al., 2016). HPV vaccine is recommended at age 11-12, Tdap and a meningococcal vaccine are also recommended at this time; the presumptive style of vaccine discussion for Tdap and meningococcal vaccine creates a much greater acceptance rate (Shay et al., 2016). Some providers discuss HPV vaccine with parents but use passive and weak language; common weak recommendations include: (a) emphasizing that is parental choice whether or not their child receives HPV vaccine, (b) advising parents that HPV vaccine is not a school requirement, and (c) explaining that vaccinating today is not necessary (Shay et al., 2016). Gerend et al. (2016) found many participants received no recommendation from their provider for HPV vaccine during their visits.

Insufficient knowledge about HPV and HPV vaccine. Another barrier to not receiving HPV vaccine is lack of knowledge. The populations studied varied from no knowledge about HPV and HPV vaccine to limited knowledge, which made the decision makers hesitant to

receive HPV vaccine (Aragones et al., 2016; Dayal et al., 2016; Sanderson et al., 2017; Wilson et al., 2016). Study participants were unsure of the vaccine efficacy (Dayal et al., 2016), what the vaccine was protecting against (Aragones et al., 2016; Wilson et al., 2016), and consequences of contracting HPV (Aragones et al., 2016; Wilson et al., 2016). When providers are not providing knowledge about HPV and sequelae, the first step toward primary prevention is lost. Most of the decision makers stated that if a provider had offered as much information about HPV and the vaccine as the focus group provided, HPV vaccine would have been accepted at their visit (Aragones et al., 2016; Wilson et al., 2016).

Sexual activity. Another main concern about initiation of HPV vaccine involved sexual activity. Some parents believed that their child did not need to receive the vaccine because their child was not sexually active (Sanderson et al., 2017). Other parents feared that giving them the vaccine would cause an earlier sexual debut or make the child feel safe to engage in riskier sexual behaviors (Wilson et al., 2016).

Factors that Increase HPV Vaccine Uptake

The three main factors that increase HPV vaccine uptake are: (a) discussing HPV and HPV vaccine; (b) parental awareness and acceptance; and (c) provider recommendation (Aragones et al., 2016; Dayal et al., 2016; Gerend et al., 2016, Sanderson et al., 2017, Shay et al., 2016; Wilson et al., 2013). The strongest predictor of HPV vaccine uptake is provider recommendation (Dayal et al., 2016; Gerend et al., 2016, Sanderson et al., 2017, Shay et al., 2016; Wilson et al., 2013).

Discussing HPV and HPV vaccine. To increase parental consent of HPV vaccine for their child, the parent must be knowledgeable about HPV and what HPV vaccine protects against (Aragones et al., 2016; Dayal et al., 2016; Shay et al., 2016; Wilson et al., 2016). When parents

learned that HPV is associated with cancers, they stated that they were going to get eligible children vaccinated as soon as possible (Aragones et al., 2016; Wilson et al., 2016). Many parents have limited knowledge about HPV and when HPV vaccine is appropriate, thus it is the provider's role to present parents with this information and answer questions so they can make an informed decision (Aragones et al., 2016; Wilson et al., 2016).

Parental acceptance. Initiation of HPV vaccine is recommended at age 11-12 (AAP, 2017; CDC, 2016). At this age, the parents must consent to vaccines; therefore, parental acceptance is important. Aragones et al. (2016) and Dayal et al. (2016) both discussed how empowering the parents will increase acceptance of HPV vaccine leading to initiation of the HPV vaccination.

Provider recommendation. Provider recommendation has the most significant influence on HPV vaccine uptake (Dayal et al., 2016; Gerend et al., 2016, Sanderson et al., 2017, Shay et al., 2016; Wilson et al., 2013). Patients and parents have built a relationship with their providers and that bond creates trust (Aragones et al., 2016). Families that received a provider recommendation were four times more likely to receive the HPV vaccine at that visit (Sanderson et al., 2017). A strong provider recommendation will increase the acceptance of HPV vaccine. A strong provider recommendation of HPV vaccine includes explaining why it is the optimal time to vaccinate, providing rationale why HPV vaccination is important, and presumptive presentation of HPV vaccine (Shay et al., 2016).

Previous Interventions to Promote HPV Vaccine

Sanderson et al. (2017) designed an intervention using four clinics that provided healthcare for the underserved in Tennessee; two clinics continued with usual care and two clinics received provider/staff training sessions and provisions of patient education materials.

The focus of the intervention was on patient education materials, provider and staff training, and intervention protocol. The patient education material group had one team create educational videos with four three- to five-minute versions of age specific videos (Sanderson et al., 2017). The provider and staff training was taught by a lead investigator who delivered a one-hour training session to the pediatric providers, nurses, and medical assistants; the training session that covered factual information on HPV associated cancers, HPV vaccination guidelines, and how to follow the intervention protocols (Sanderson et al., 2017). The intervention protocol starts with the nurse/medical assistant giving the family the informational flyer and having them fill out the questionnaire listed at the top. Based on the answers, the appropriate version of the video is played for them while waiting for the provider. The provider, during the visit, is to answer any questions the family may have and provide a strong recommendation for getting HPV vaccine (Sanderson et al., 2017). After twelve months of intervention, the intervention site had a higher vaccination rate at 45.4% versus the usual care site with a 32.9% vaccination rate (Sanderson et al., 2017).

Brewer et al. (2017) conducted a parallel group randomized clinical trial with thirty pediatric and family medicine clinics in North Carolina; the clinics were randomized to receive no training, announcement training, or conversational training. The no training group was the control group, the announcement group used brief statements that assume parents are ready to vaccinate, and the conversation group engaged parents in conversation and open-ended discussion (Brewer et al., 2017). After six months, HPV vaccination coverage was larger for patients in clinics that received announcement training compared to the control clinic; and clinics that received conversation training did not differ from the control clinics (Brewer et al., 2017).

Cassidy, Braxter, Charron-Prochownik, and Schienk (2014) conducted a quality improvement initiative to increase HPV vaccine rates in a small pediatric practice. Their intervention included an education brochure for the families that included frequently asked questions and culturally sensitive pictures of mothers and grandmothers of varied races with their daughters, a script for providers to follow when discussing HPV vaccine with families, and training for staff that included general information about HPV and HPV vaccine, as well as the protocol for the use of the brochure and script (Cassidy et al., 2014). At the end of the thirteen-month prospective review the HPV vaccine rates were compared between the groups; the intervention group had a 75% uptake rate while the control group had a rate of 24.1%, indicating a significantly greater rate of HPV vaccine acceptance in the intervention group (Cassidy et al., 2014).

Limitations of Previous Studies

A common limitation of the previous studies on HPV vaccine uptake was small sample size and limited population diversity. Studies that included limited diversity and sample size included one that conducted a focus group with only ethnically diverse black women (Wilson et al., 2013) and one that only studied female uptake of HPV vaccine (Dayal et al., 2016). The influence of only studying one gender may be because of biased parental views on increased importance of vaccinating daughters over sons. Cassidy et al. (2014) and Dayal et al. (2016) focused their demographics to only the female population. Many parents that know about HPV and HPV vaccine associate the HPV vaccine to preventing cervical cancer and do not understand the need to vaccinate their sons (Dayal et al., 2016). Argones et al. (2016) was also limited in diversity; their study only focused on Latino immigrant parents. Another limitation of the Argones et al. (2016) study was the use of parental report on their child's HPV vaccine status.

To reduce recall bias, this author obtained HPV vaccine status through the patients' electronic health record. Lastly, Sanderson et al. (2017) found that their limitations were non-random assignment and limited diversity in patient population. Matching patients or randomized control trials would allow the results to be more reliable and generalizable.

Conclusions From Literature Review

The literature reviewed allowed this author to determine factors that increased and decreased the acceptance of HPV vaccine, that a provider recommendation was the strongest indicator for HPV vaccine acceptance, and successful strategies from previous studies on increasing HPV vaccine compliance. Using this information, this author created a quality improvement plan combining successful strategies and indicators, while avoiding factors that decrease HPV vaccine compliance. Pitfalls of previous studies included small sample size, limited diversity, and non-randomized control trials. While some of these were unavoidable this author included both genders and attempted to match control and intervention population demographics.

Purpose and Research Question

The purpose of this doctor of nursing practice (DNP) project is to determine if a provider recommendation increased HPV vaccine uptake. Primary prevention is the key to decreasing the spread of HPV (Scott & Batty, 2016). HPV has high lifetime incidence probability and HPV vaccine is safe and effective (Dayal et al., 2016; Rahman et al., 2015). Barriers to HPV vaccine acceptance include lack of awareness of vaccine benefits, perceived harm from the vaccine, and concerns of increased sexual activity or debut of sexual activity (Dayal et al., 2016; Sanderson et al., 2017; Wilson, Brown, Booth, & Harris, 2013). Factors that increase vaccine acceptance include discussion of HPV and HPV vaccine, increasing knowledge of the disease and sequelae,

benefits of HPV vaccine, effectiveness of HPV vaccine, and a provider recommendation (Dayal et al., 2016; Gerends et al., 2016; Sanderson et al., 2017; Wilson et al., 2013). Using knowledge gained from the literature review, this quality improvement project will focus on the question: “In pediatric patients, does a provider recommendation, compared to HPV vaccine as an optional vaccine, increase vaccine uptake?”

Setting

The setting for this DNP project was a private pediatric practice in Prairie Village, KS. There are three partners at this practice, two are medical doctors and one is a doctor of osteopathic medicine. Additionally, there are five nurse practitioners, two with a focus in pediatrics and three who are family nurse practitioners. This practice offers care to patients from birth through college. The demographic of the patients are primarily Caucasian and privately insured. This practice does not accept Medicaid; therefore, the remaining patients are self-pay. This practice collaborates with Children’s Mercy Hospital, which allows providers to easily access their patient notes from a Children’s Mercy Hospital electronic system. Children’s Mercy Hospital has requirements for collaboration and one of the requirements mandated to this practice was increasing HPV vaccine compliance rates. Routine practice at this practice site prior to intervention was to start the discussion of HPV vaccine at the patient’s 11-year well child visit. Providers discussed with parents that recommended vaccines at the visit are Tdap, meningococcal, and HPV vaccine; school requires Tdap and meningococcal vaccines, while HPV vaccine is an optional vaccine and not required by schools.

Methods

Theoretical Framework

The model that guided this project is the Model for Improvement. The Model for Improvement has two parts: three fundamental questions and the Plan-Do-Study-Act (PDSA) cycle (see Figure 1) (Institute for Healthcare Improvement [IHI], 2017). The three questions are: (a) what are we trying to accomplish? (setting aims); (b) how will we know that a change is an improvement? (establishing measures); and (c) what change can we make that will result in improvement? (selecting changes). The next step is to proceed to the PDSA cycle to test the change in the work setting this cycle allows for action-oriented learning (IHI, 2017).

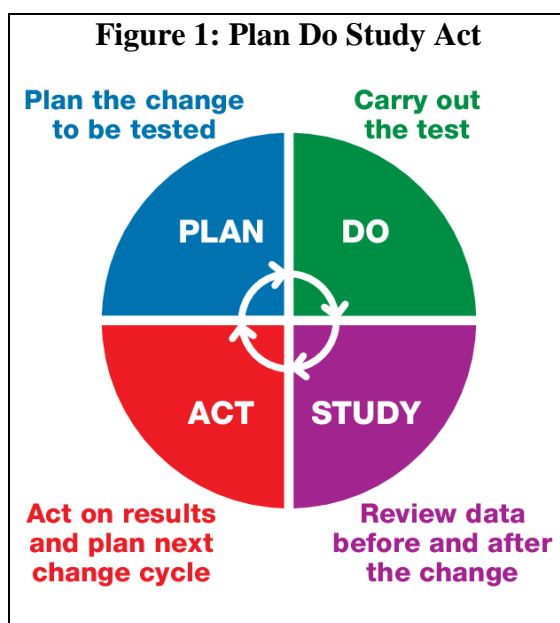


Figure 1: This cycle allows a change to be tested and improved before it is initiated on a large scale. Adapted from Barbe et al. (2018).

Author's Assumptions

This author's assumptions, based on information obtained from the literature review, were that parents are not well-informed about HPV and HPV vaccine. Many parents have expressed that they did not know about HPV, the consequences of HPV infection, and that there is a vaccine available to prevent cancers and warts. When participants were presented with the

knowledge and were provided reassurance that HPV vaccine is not harmful, most parents were interested in vaccinating their children and disseminating the importance of HPV vaccine with friends and family members. Studies have shown that with increased knowledge about HPV and HPV vaccine and announcing the need to vaccinate, parents will have an increased rate of acceptance. Combining strategies of previous studies, this author assumed that increasing parental awareness about HPV and HPV vaccine, co-administration with Tdap and meningococcal vaccine, provider reassurance, and provider recommendation would increase parental acceptance of HPV vaccine for their child.

Project Design and Rationale

The aim of this project was to increase the proportion of parents that consented to HPV vaccine at the visit. To evaluate the effectiveness of the intervention, data collection, analysis, and evaluation was conducted one month after intervention initiation to determine if there was at least a 10% increase in HPV vaccine acceptance; if a 10% increase did not occur additional an additional intervention will be added.

Protocol. All the providers consented to participate in the intervention and attended a training session. The training session discussed HPV infection, HPV vaccine benefits, the importance of educating patients and parents on HPV infection and HPV vaccine, presumptive presentation of HPV vaccine, and co-administration with Tdap and meningococcal vaccine. The training session instructed providers to recommend the first dose of HPV vaccine at the 11-year well child visit in addition to recommending Tdap and Menactra®, the meningococcal vaccine. The most effective way to increase vaccine uptake is provider recommendation and this presumptive style of recommendation increases the likelihood of acceptance because parents must opt out of the vaccine versus opting in (Dayal et al., 2016; Gerend et al., 2016, Sanderson et

al., 2017, Shay et al., 2016; Wilson et al., 2013). The providers were reminded to educate parents why the visit was the optimal time for HPV vaccination and education on benefits and safety of the vaccine. Parental awareness and knowledge increases parental acceptance and desire to vaccinate their child (Aragones et al., 2016; Dayal et al., 2016; Shay et al., 2016; Wilson et al., 2016). The providers were instructed to educate parents that declined Gardasil 9® that it only requires a two-dose series versus a three-dose series if the vaccine is initiated before age 15 (Merck, 2017). There was also a practice change for patients receiving a well child exam other than the 11-year check that had not initiated or completed the HPV series. The provider will remind patient and parent that they are due for an HPV vaccine and recommend administration at the visit. See Figure 2 for a step-wise algorithm for HPV discussion and education initiated by the pediatric provider.

Project Sample and Selection Process

The participants for the study were any pediatric patient, aged 11 or 12 years, receiving a well exam that had not completed their HPV vaccine series. Patients under 11 years were excluded based on AAP (2017) and CDC (2016) recommendations to begin HPV vaccine series at 11 to 12 years. The electronic health record was used to determine if HPV vaccine was ordered and given at the visit.

Data Collection

The DNP student conducted a retrospective chart review to collect data using the electronic health record system. This system determined how many patients in the sample population received or declined HPV vaccine in the two months prior to intervention. Demographic information was also collected to include, age, race, and gender (see Appendix B for data collection form). Finally, visit provider was determined and recorded. The same data

was collected at the one- and two-month mark after initiating the intervention to determine the HPV compliance rates.

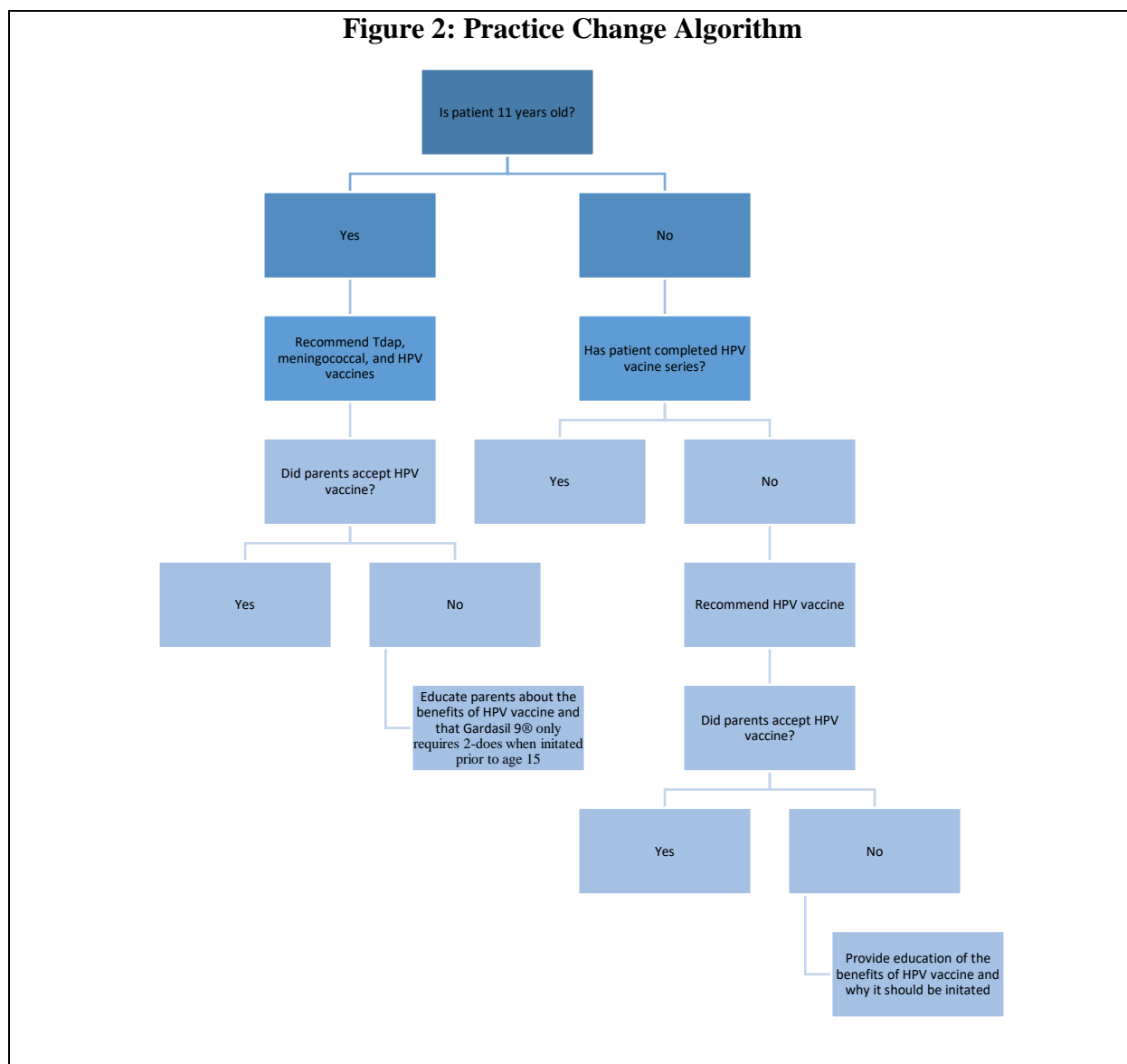


Figure 2: This algorithm provides a stepwise approach on how to discuss HPV vaccine with patients and parents.

Results

A total of 262 adolescents were analyzed after excluding patient visits for individuals that had completed their HPV vaccine series. HPV vaccine acceptance rates increased from 41.25% pre-intervention to 47.8% post-intervention. After the one-month mark there was not a 10% increase in HPV vaccine acceptance rate, therefore an additional intervention was added. Based

on the literature review, the DNP student decided to increase parental awareness using a bulletin board that provided facts about HPV infection and HPV vaccine (see Figure 3).

Figure 3: Bulletin Board of HPV and HPV Vaccine Facts

The bulletin board is divided into several sections:

- 6 REASONS TO GET HPV VACCINE FOR YOUR CHILD:**
 - HPV is a common virus that infects teens and adults. 80% of people will get an HPV infection in their lifetime.
 - HPV vaccination works. Infections with HPV types that cause most HPV cancers and genital warts have dropped 71 percent among teen girls.
 - HPV vaccination prevents cancer. 31,200 cases of cancer could be prevented with HPV vaccination each year. Same as the average attendance for a baseball game.
 - Preventing cancer is better than treating it. HPV infections can cause six types of cancer, but doctors only routinely screen for several cancers. The other five types may not be detected until they cause health problems.
 - Your child can get protection from HPV cancers during the same visit they are protected against other serious diseases.
 - HPV vaccination provides safe, effective, and long-lasting protection. With over 100 million doses distributed in the U.S., data continues to show HPV vaccine is safe and effective.
- Did you know?**
 - There are 14 million new HPV infections every year (Dayal et al., 2016).
 - The lifetime disease probability for HPV is greater than 80% for women and 90% for men (Dayal et al., 2018).
- JUST 2 DOSES OF HPV VACCINE AT AGE 11 OR 12 PREVENTS HPV CANCERS** (with a 'LEARN MORE >' button).
- Don't Wait to Vaccinate** (with a clock icon and the text: 'Doctors recommend that girls and boys get vaccinated against HPV at age 11 or 12. The series should be completed by age 13.').
- Age Matters:** When you vaccinate your child on time, you help protect them from HPV cancers. The HPV vaccine is most effective when given at age 11 or 12. Cancer protection decreases as age at vaccination increases.
- Cancer Prevention Goes Down with Delayed Vaccination** (with a bar chart showing a downward trend).
- 5 reasons why the HPV vaccination is recommended for pre-teens:**
 - Better immunity:** After receiving HPV vaccine pre-teens make more infection-fighting antibodies than older teens. That's why they need only 2 doses of the vaccine, not 3 as recommended at age 16-18.
 - More chances to vaccinate:** Every visit on or after the 9th birthday is an opportunity to provide the vaccine.
 - Low risk of exposure:** HPV vaccine only works if the person is completely before a person is infected. Almost no 9-12 year olds have HPV.
 - Long lasting:** Current evidence shows that the HPV vaccination does not wear off!
 - More effective:** Early vaccination prevents substantially more pre-cancer than late vaccination.
- Timeline:**
 - Early:** Ages 9-10, 2 doses, 6-12 months apart.
 - On Time:** Ages 11-12, 2 doses, 6-12 months apart.
 - Critical:** Ages 13-14, 2 doses, 6-12 months apart.
 - Last Chance:** Ages 15-26, 3 doses, 0-14 days, 3-5 months, 4-6 months apart.

Figure 3: This bulletin board was added to all seventeen exam rooms to increase parental knowledge and awareness about HPV and HPV vaccine. Parents could read information at their own pace

The use of a bulletin board increased HPV vaccine acceptance rate from 43.88% after the first month of intervention, to 60.47% two months post intervention (see Figure 4).

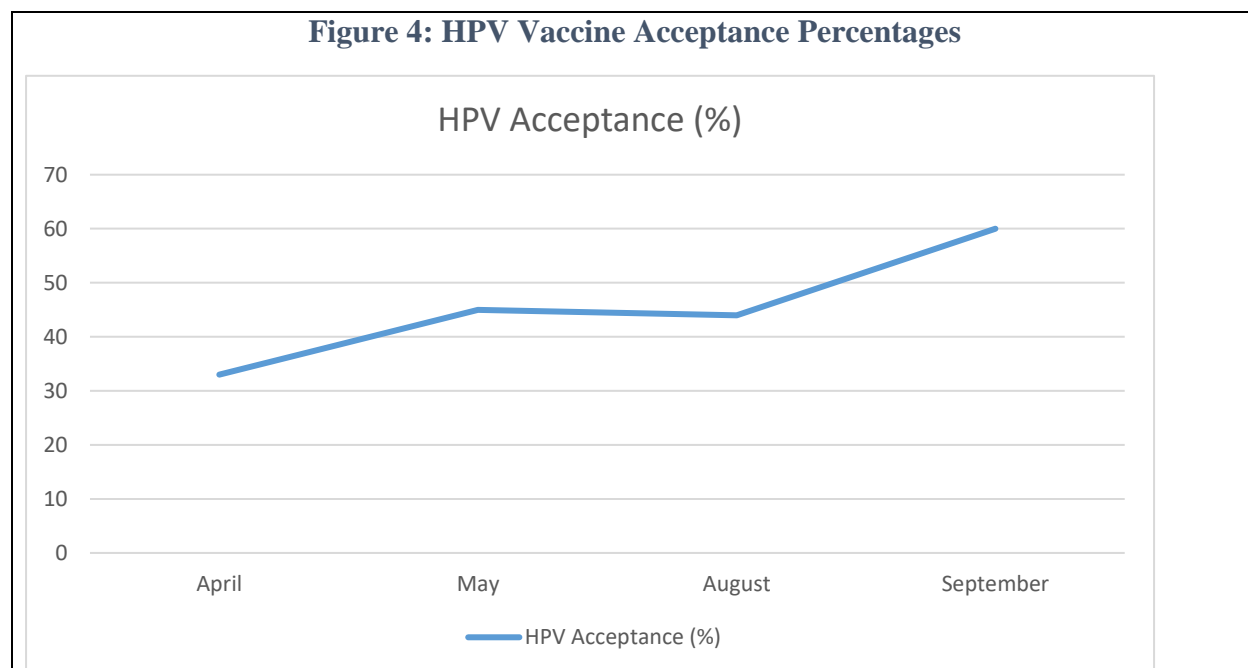


Figure 4: Line graph depicting HPV vaccine acceptance percentages. April and May were pre-intervention, August was post-intervention with provider recommendation only, and September was post-intervention with provider recommendation and bulletin board placement.

There were not clinically significant differences in acceptance rates when comparing age, gender, or race/ethnicity (see Table 1).

Table 1

Adolescent Characteristics as a Percentage that Received or Did Not Receive HPV Vaccine

Characteristics	<u>Received HPV Vaccine</u>		<u>Did Not Receive HPV Vaccine</u>	
	Pre-intervention	Post-intervention	Pre-intervention	Post-intervention
Age				
11 years	48.48	49.43	51.06	44.21
12 years	51.52	50.57	48.94	55.79
Gender				
Male	57.58	56.32	65.96	56.84
Female	42.42	43.68	34.04	42.16
Race				
White	84.85	87.36	85.11	86.32
Black	12.12	11.49	10.64	6.32
Asian	0	1.15	4.26	2.11
Other	3.03	0	0	5.26

Note. Numbers reported are percentages of the total for those that received HPV vaccine and those that did not receive vaccine.

However, there was quite a bit of variability of acceptance rates with each provider (see Table 2). This variability could be due to a variety of reasons including provider remembering to recommend HPV vaccine, parental acceptance of knowledge provided at the visit, parental thoughts about adolescent's possibility of being or becoming sexually active and/or potential to contract HPV, and parental views on vaccines.

Table 2

Provider Pre- versus Post-Intervention Percentages of Adolescents that Received or Did Not Receive HPV Vaccine

Provider	<u>Received HPV Vaccine</u>		<u>Did Not Receive HPV Vaccine</u>	
	Pre-intervention	Post-intervention	Pre-intervention	Post-intervention
1	23.53	56.76	76.47	43.24
2	50	50	50	50
3	41.67	35	58.33	65
4	0	41.18	100	58.82
5	0	66.67	0	33.33
6	33.33	38.46	66.67	61.54
7	100	64.71	0	35.29
8	50	25	50	75

Note. Numbers reported are percentages of the total for those that received HPV vaccine and those that did not receive vaccine.

Discussion

Previous studies determined provider recommendation to be the most effective method to increase HPV vaccine uptake. Other methods included parental awareness and acceptance. This study found that provider recommendation alone did not increase HPV vaccine uptake. The addition of a bulletin board to increase parental awareness about HPV infection and HPV vaccine did create clinically significant increase in HPV vaccine acceptance.

Limitations

This study did not have much racial/ethnic diversity, creating a limitation in generalizability for other populations. This practice also tends to care for patients of a higher socioeconomic status because they only accept private insurance and do not accept Medicaid.

Implications for Practice

The use of provider recommendation and parental awareness could be used in other clinics to increase HPV vaccine uptake. This strategy should be used with different populations to determine the generalizability of this study. The implementation could also be used for a longer duration and target when adolescents are most likely to come in for exams. This study noted an increase of well visits over the summer when adolescents are not in school and need well checks to be able to participate in sports the following year.

Conclusion

The quality improvement measure was effective for an affluent, well-educated population that was mostly Caucasian, but it still did not raise the uptake rate to meet the acceptance rates of Tdap and meningococcal vaccines. To further increase HPV vaccine acceptance rates future studies should be conducted on why parents accept vaccines.

This study determined that adding the element of parental awareness increased parental acceptance of HPV vaccine. Future studies could conduct focus groups on how patients and parents prefer learning. During the study period, it was observed that families had to wait in exam rooms allowing them time to read the bulletin boards. This suggests that future studies could use this time to educate patients on topics the practice deems necessary. Could it have been possible that the adolescent learned more about HPV infection and HPV vaccine from the bulletin board and asked their parent to accept HPV vaccine? There are many possible reasons

that this method was effective, therefore future studies should be conducted at additional practices using provider recommendation in addition to bulletin board.

References

- American Academy of Pediatrics. (2017). Immunizations schedules. Retrieved from <https://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/immunizations/Pages/Immunization-Schedule.aspx>
- Aragones, A., Genoff, M., Gonzalez, C., Shuk, E., & Gany, F. (2016). HPV vaccine and Latino immigrant parents: If they offer it, we will get it. *Journal of Immigrant & Minority Health, 18*(5), 1060-1065. doi:10.1007/s10903-015-0225-x
- Barbe, C., Jolly, D., Morrone, I., Wolak-Thierry, A., Dramé, M., Novella, J. L., & Mahmoudi, R. (2018). Factors associated with quality of life in patients with alzheimer's disease. *BMC geriatrics, 18*(1), 159. Retrieved from <https://bmcgeriatr.biomedcentral.com/articles/10.1186/s12877-018-0855-7>
- Brewer, N. T., Hall, M. E., Malo, T. L., Gilkey, M. B., Quinn, B., & Lathren, C. (2017). Announcements versus conversations to improve HPV vaccination coverage: A randomized trial. *Pediatrics, 139*(1), 25. doi:10.1542/peds.2016-1764
- Cassidy, B., Braxter, B., Charron-Prochownik, D., & Schlenk, E. A. (2014). A quality improvement initiative to increase HPV vaccine rates using an educational and reminder strategy with parents of preteen girls. *Journal of Pediatric Healthcare, 28*(2), 155-164. doi:10.1016/j.pedhc.2013.01.002
- Centers for Disease Control and Prevention. (2016). HPV vaccine coverage maps – infographic. Retrieved from <https://www.cdc.gov/hpv/infographics/vacc-coverage.html>
- Centers for Disease Control and Prevention. (2016). Immunization schedules for preteens and teens. Retrieved from <https://www.cdc.gov/vaccines/schedules/easy-to-read/preteen-teen.html>

- Dayal, K., Robinson, S., Schoening, J., Smith, M. C., & Son Chae, K. (2017). Predictors of human papillomavirus vaccine uptake or intent among parents of preadolescents and adolescents. *Journal of Nursing Education & Practice*, 7(6), 35-42.
doi:10.5430/jnep.v7n6p35
- Gerend, M. A., Shepherd, M. A., Lustria, M. A., & Shepherd, J. E. (2016). Predictors of provider recommendation for HPV vaccine among young adult men and women: Findings from a cross-sectional survey. *Sexually Transmitted Infections*, 92(2), 104-107.
doi:10.1136/sextrans-2015-052088
- Institute for Healthcare Improvement. (2017). How to improve. Retrieved from <http://www.ihl.org/resources/Pages/HowtoImprove/ScienceofImprovementHowtoImprove.aspx>
- Merck. (2017). How is Gardasil 9 given? Retrieved from <https://www.gardasil9.com/about-gardasil9/schedule/>
- National Cancer Institute. (2018). Human papillomavirus (HPV) vaccines. Retrieved from <https://www.cancer.gov/about-cancer/causes-prevention/risk/infectious-agents/hpv-vaccine-fact-sheet>
- Office of Disease Prevention and Health Promotion. (2017). HPV vaccine, adolescents, 2008-2012. Retrieved from <https://www.healthypeople.gov/2020/topics-objectives/national-snapshot/hpv-vaccine-adolescents-2008%E2%80%932012>
- Ogunbajo, A., Hansen, C. E., North, A. L., Okoloko, E., & Niccolai, L. M. (2016). 'I think they're all basically the same': Parents' perceptions of human papilloma virus (HPV) vaccine compared with other adolescent vaccines. *Child: Care, Health & Development*, 42(4), 582-587. doi:10.1111/cch.12331

- Ortiz, R., Coyne-Beasley, T., Cates, J., & Shafer, A. (2017). Entertain them where they are: Testing the feasibility and effectiveness of a facebook intervention to increase HPV vaccine knowledge and vaccination intentions among adolescents. *Journal of Adolescent Health, 60*(S125). doi:10.1016/j.jadohealth.2016.10.425
- Rahman, M., Laz, T. H., McGrath, C. J., & Berenson, A. B. (2015). Provider recommendation mediates the relationship between parental human papillomavirus (HPV) vaccine awareness and HPV vaccine initiation and completion among 13- to 17-year-old US adolescent children. *Clinical Pediatrics, 54*(4), 371-375.
doi:10.1177/0009922814551135
- Sanderson, M., Canedo, J. R., Khabele, D., Fadden, M. K., Harris, C., Beard, K., & ... Hull, P. C. (2017). Pragmatic trial of an intervention to increase human papillomavirus vaccination in safety-net clinics. *BMC Public Health, 17*(1), 1-10. doi:10.1186/s12889-017-4094-1
- Scott, K., & Batty, M. (2016). HPV vaccine uptake among Canadian youth and the role of the nurse practitioner. *Journal of Community Health, 41*(1), 197-205. doi:10.1007/s10900-015-0069-2
- Shay, L. A., Jr., Street, R. L., Baldwin, A. S., Marks, E. G., Lee, S. C., Higashi, R. T., & ... Street, R. J. (2016). Characterizing safety-net providers' HPV vaccine recommendations to undecided parents: A pilot study. *Patient Education & Counseling, 99*(9), 1452-1460.
doi:10.1016/j.pec.2016.06.027
- Warner, E., Lai, D., Carbajal-Salisbury, S., Garza, L., Bodson, J., Mooney, K., & Kepka, D. (2015). Latino parents' perceptions of the HPV vaccine for sons and daughters. *Journal of Community Health, 40*(3), 387-394. doi:10.1007/s10900-014-9949-0
- Wilson, R., Brown, D., Boothe, M., & Harris, C. (2013). Knowledge and acceptability of the

HPV vaccine among ethnically diverse black women. *Journal of Immigrant & Minority Health*, 15(4), 747-757. doi:10.1007/s10903-012-9749-5

Appendix A

Memoranda of Agreement

Village Pediatrics L.L.C., agrees to allow Mei Suen, RN, BSN to conduct a Quality Improvement project at this location. This organization understand the Quality Improvement project is implementing a provider recommendation to attempt to increase human papillomavirus (HPV) vaccine compliance. Mei Suen will be allowed to access the electronic health system to obtain vaccine acceptance vs declination rates and patient demographic information.

This intervention will span over approximately three months and require a brief provider education session. Patient contact will only be with the provider and not the researcher, therefore not requiring a consent form from the patients.

Comparisons will be made using retrospective analysis of vaccine compliance prior to initiation of the intervention, and then again two months after the start of the intervention. Results will be provided to the facility.

Jill Nakayama, RN, BSN

Nurse Manager

Appendix B

Data Collection Form

Provider Name	
Age	
Race	White Black Other (specify):
Gender	Male Female Transgender
Accepted HPV vaccine?	Yes No

Provider Name	
Age	
Race	White Black Other (specify):
Gender	Male Female Transgender
Accepted HPV vaccine?	Yes No

Provider Name	
Age	
Race	White Black Other (specify):
Gender	Male Female Transgender
Accepted HPV vaccine?	Yes No