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Assessing the Effectiveness of a Quality Improvement Intervention to Decrease Missed Opportunities for Human Papillomavirus Vaccination at a Nurse Managed Health Center

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ASSESS THE EFFECTIVENESS OF A QUALITY IMPROVEMENT INTERVENTION TO DECREASE MISSED OPPORTUNITIES FOR HUMAN PAPILLOMAVIRUS VACCINATION AT A NURSE MANAGED HEALTH CENTER

by

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Abstract

Purpose: To decrease the number of missed opportunities for human papillomavirus vaccine eligible patients seeking healthcare in a Nurse Managed Health Center. **Background & Significance:** Human papillomavirus genital infection has inflicted nearly 79 million Americans. Annually, about 14 million newly infected individuals are identified, with noted predominance in teens and young adults, and of this number approximately 19,200 females and 11,600 males receive a cancer diagnosis as a result of the human papillomavirus infection. The incidence of infections can be reduced with a human papillomavirus vaccine, but only about 63% of females and even fewer males initiate the human papillomavirus vaccine. **Methods:** A Nurse Managed Health Center assisting the underserved population, in a major southwestern metropolitan city was chosen to implement a Qualified Patient Prompter tool used to screen for human papillomavirus eligibility in all patients seeking healthcare in this Nurse Managed Health Center. A reminder card strategy was used at the end of the accepted human papillomavirus vaccine visit. **Results:** 334 patient records were reviewed and 135 were eligible to receive the human papillomavirus vaccine; 60 opted to receive it and 75 declined. **Conclusion:** A 100% of all patients seen were evaluated for human papillomavirus vaccine eligibility. The intervention decreased missed opportunities by 100%. Continued efforts will focus on increasing human papillomavirus vaccine acceptance rates. The Nurse Managed Health Center fully support the continued use of the Qualified Patient Prompter, which was effective within this population.

Keywords: HPV, HPV Vaccine, HPV Guidelines, Provider reminder, HPV intervention

The human papillomaviruses (HPV) are classified as typical and have as many as 120 various strains. The bulk of the different kinds of HPV strains have been detected as infecting the body's cutaneous and mucosal epithelial cells. The warts that occur on the cutaneous surfaces of hands and feet have been linked with most HPV infections. An estimated 40 HPVs infections have been associated with infecting the genitals, mouth, plus the throat's mucosal epithelial cells. The majority of these HPV infections are categorized as asymptomatic, undetectable and/or spontaneously dissolving (Centers for Disease Control and Prevention, 2016b; Khan, 2017). Yet, some persistent HPV infections can lead to cancer, which are predominately the HPV forms 16, 18, 31, 33,45, 52, and 58 (Centers for Disease Control and Prevention, 2016b; Khan, 2017; Saraiya et al., 2015).

The HPV 16 and 18 are forms commonly associated with recurrent, high-risk (oncogenic) infections. These HPV 16 and 18 types are affiliated with cervical, vaginal, as well as vulvar cancers in women plus penile cancers among men; and in both males and females, malignancies within the oropharyngeal and anal cancers have been identified with the HPV 16 and18 forms (Centers for Disease Control and Prevention, 2016b; Khan, 2017; Saraiya et al., 2015).

The HPV 6 and 11 are common low-risk (non-oncogenic) forms associated with genital warts and infrequent laryngeal papillomas. HPV 6 and 11 may also produce benign and/or low-grade cervical cell irregularities. Within the United States, the most frequently shared sexually transmitted infection, remains HPV (Centers for Disease Control and Prevention, 2016b, 2014; Saraiya et al., 2015).

HPV genital infections have inflicted nearly 79 million Americans. Every year individuals that are recognized as newly infected amount to roughly 14 million, and the prevalence is particularly high in teens and young adults. The United States, yearly estimation

results are that 30,800 individuals (11,600 males and 19,200 females) are diagnosed with cancer caused by an HPV infection (Centers for Disease Control and Prevention, 2016b). Seventy percent of all cervical cancer cases are the results of HPV variants 16 and 18, with roughly 12,000 females being newly diagnosed and 4,400 deaths associated with this cancer occurring yearly within the United States. For our nation's men with HPV 16, diagnoses of oropharyngeal cancer are common. Anogenital cancer is another cancer linked with HPV 16 form (Centers for Disease Control and Prevention, 2016c, 2017c; Khan, 2017; Saraiya et al., 2015). A focus on the prevention of the HPV infection is vital. In this southwestern state, the yearly expense for HPV-linked diseases among males and females approached $170 million (The University of Texas MD Anderson Cancer Center, 2017).

Statement of the Problem

HPV is recognized as the most frequently occurring sexually transmitted infection. Almost all individuals engaging in sexual activity and/or intimately touching skin to skin will be exposed at some point within their lifetime to HPV (Centers for Disease Control and Prevention, 2017c). HPV has multiple strains, of which genital warts (HPV 6 and 11) and various cancers (HPV 16 and 18) have been associated. Vaccines are available to combat these viruses, but vaccination rates remain low (Centers for Disease Control and Prevention, 2017c; Saraiya et al., 2015, The University of Texas MD Anderson Cancer Center, 2017).

In the major metropolitan city in Texas selected as the site for this project, the estimated vaccination coverage with greater than 1 dose of HPV vaccine for females, 13-17 years of age presented approximation of 47.7% and 50.7 % for the state. The male adolescents within the same age bracket have an estimated vaccine coverage for greater than 1 dose of HPV immunization of approximately 35.6% at the county level and 36.6% at the state level (Centers

for Disease Control and Prevention, 2015). The HPV vaccine rate for the Nurse Manage Health Center (NMHC), site of the proposed project, is 14.1% for males and 19.2% for females, for an overall total of 33.3% for patients 9-26 years of age. These figures indicate that local and state HPV vaccine rates are well below the Healthy People 2020 target goal of 80% for females and males 13 to 15 years old (Healthy People 2020, 2017b, 2017c).

Background and Significance

During a 4-year period (2009–2013), 29,800 HPV16 and 18 related cancer cases were identified (Centers for Disease Control and Prevention, 2017a; Hariri et al., 2015). Yet, an HPV vaccine approved by the U. S. Food and Drug Administration (FDA) has been available since 2006 (FDA, 2016).

The vaccine was originally developed as a HPV bivalent vaccine targeting the HPV forms 16 and 18 for females ages 9 through 25 years. The present day, human papillomavirus 9-valent vaccine, known as Gardasil 9, is effective in preventing conditions caused by HPV types 16,18,31,33,45,52, and 58; all prevalent oncogenic viruses identified in cervical vulvar, vaginal, and anal cancers. In addition, the vaccine is effective against HPV types 6 and 11, identified in genital warts (condyloma acuminata). The vaccine is designated for girls, women, boys, and men from 9 to 26 years of age (FDA, 2016).

A national 2015 survey, established that 13 to 17-year-old females had a rate of 63% for initiating the HPV vaccine dose number one; but only 42% of these individuals completed the three-dose series. The males' HPV initiation was lower. The uptake rate in 13-17-year-old males was 50%, with merely 25% receiving the recommended 3-dose series (Centers for Disease Control and Prevention, 2016a).

The literature provides clear evidence for the efficacy of the HPV vaccine in reducing high grade cervical lesions and emphasizes the importance of recommending and providing the vaccine to all patients falling within the parameters for eligibility. Importantly, investigators have found that the greatest uptake of the vaccine occurs when it is recommended by healthcare providers, initiating the HPV vaccine at a younger age, along with making use of educational and reminder strategies with parents whose children are eligible for HPV vaccine initiation (Cassidy, Braxter, Charron-Prochownik, & Schlenk, 2014; Perkins et al., 2015; Rahman, Laz, McGrath, & Berenson, 2015; St. Sauver et al., 2016).

Organizational Assessment

The NMHC is a non-profit organization in a major southwestern metropolitan city in the United States. The NMHC's location is within a section associated with unemployment plus unstable economic security. Poverty, limited educational opportunities, unreasonable housing market costs, and public safety concerns are all identifiable within the community surrounding the clinic (City of San Antonio, 2016). The clinic had just observed its one year anniversary of operations. The NMHC has successfully positioned itself to provide healthcare services to the vulnerable populations within its community.

This NMHC's healthcare organization is an extension of a meso-system of a larger, respected leader in education and established learning institute. The patients' healthcare is delivered with adherence to the standards of care guidelines, along with following the set guidelines and the mission statement for the institution's mesosystem aspect targeting a healing ministry aspect (University of the Incarnate Word, 2016).

The purpose of the needs assessment is to determine an organization's readiness for change, the need for change, and clarify resources and alternatives. The assessment helps to

identify gaps in the institution's current versus intended state. The needs assessment sets the foundation for establishing goals and the necessary stages for system improvements (Moran, Burson, and Conrad 2017). The clinical issue being assessed was the need to increase coverage for HPV vaccines aimed at patients meeting eligibility criteria and reducing the missed opportunities for vaccine initiation for those qualified patients seeking healthcare within the NMHC.

The community, employees, and educational institution are the stakeholders that trust and hold the NMHC accountable in that the care being provided correlates with the educational institute's established mission statement. The NMHC is also responsible for adhering to the recommended standards of care guidelines that are in place for delivering safe and evidence-based healthcare for the population of patients being served within this organization. The population of patients rely on the institution to provide the necessary care that is being sought for their goals of safe, affordable, and quality healthcare. The individuals seeking healthcare at the NMHC have varied levels of healthcare needs.

The wide age range of patients which are serviced throughout this NMHC span from infant to ninety-years of age, with a predominance of Hispanic, Spanish-speaking patients. Table 1 provides a pre-intervention example of the individuals seeking and receiving healthcare services at this NMHC within a given three-month period.

Table 1

Estimated Age Distribution of Pre-Intervention Patients (n = 248)

Characteristic	Frequency	Percent
Infant to 8 yrs. old	39	15.7
9 to 14 yrs. old	39	15.7
15 to 26 yrs. old	41	16.5
>26 yrs old	129	52.0
Total	248	100.0

The patients' healthcare needs being met through the NMHC include Texas Health Steps well-child examinations, sports physicals, and immunization services for adherence aimed at the recommended Centers for Disease Control and Prevention (CDC) 2017 immunization schedule (2017e). The immunization service requested may be for fulfilling the state mandated recommended immunizations for school attendance and/or day-care attending purposes, as well as satisfying immigration vaccine requirements. The NMHC works in conjunction with several different programs geared towards helping individuals reach their healthcare goals, which may include resources used for referral services.

Readiness for Change

The NMHC s staff was provided with a Micro-Assessment Tool (Nelson, Bataldan, Godfrey, & Lazar, 2011) to evaluate their readiness for change and staff's viewpoint on their present performance throughout the NMHC pre-intervention time frame. The information obtained from six returned MATs indicated a need and desire for providing care directed to a community and market focus, evaluating performance results, and utilizing an integration of data from patients, providers, as well as staff.

The NMHC's readiness for change was evident among the provider's and professional staff. The three doctoral and the one master's prepared providers, along with the doctoral-prepared pharmacist and registered nurse understood and agreed with the importance aimed towards increasing the HPV vaccine rates for this organization's population of eligible patients. When talking with these professionals, their eagerness to begin a quality improvement project aimed at HPV vaccine rates was evident and well received, along with their buy-in of working with the set of measures to ensure improvements target HPV vaccine rates. The NMHC staff's cooperation and agreement to incorporate the culturally sensitive educational resources can be a

factor in generating a positive outcome in the startup of the quality improvement project (Cassidy et al., 2014). These highly educated professionals all agreed that the fundamental task of starting up the HPV vaccine project would play a significant role in meeting the aim of decreased cervical, anal, as well as oral HPV infections (Beachler et al., 2015).

Table 2 displays detailed information regarding the educational accomplishments and licensures for the Nurse Managed Health Center personnel, who are involved in delivering the healthcare being sought.

The professional staff are highly educated and recognize the importance of increasing vaccine rates among the eligible population of patients meeting criteria within the NMHC. The NMHC provides children with Texas Health Steps examination, as well as immunizations. The adults in this low-income community are also offered immunization services. This is an essential service that the NMHC provides for this vulnerable population of patients; recognizing that increasing the immunization rates can reduce the incidences of immunization-preventable diseases that are linked with morbidity and mortality, such as HPV infections. The NMHC's offered services, place it as a prime candidate for implementing this quality improvement project (Healthy People 2020, 2017a).

Project Identification

Purpose

The purpose of this quality improvement project was to reduce the missed opportunities by 40% for HPV vaccines initiation in girls and boys nine to twenty-six-year-old men and women seeking healthcare at the NMHC and improve HPV vaccine initiation rates to 80%.

Table 2

NMHC Providers With Degrees, Licenses, and Certification

Healthcare Providers	Degrees
Physician	Doctor of Medicine (MD)
Clinical Director-Family Nurse Practitioner	Doctor of Philosophy in Nursing (PhD) (Registered Nurse (RN), Family Nurse Practitioner (FNP)-Board Certified (BC)
Family Nurse Practitioner	Doctor of Nursing Practice (DNP), Master of Science in Nursing (MSN), RN, FNP
Family Nurse Practitioner	PhD, Registered Nurse (RN), FNP-Board Certified (BC)
Family Nurse Practitioner	MSN, RN, FNP-BC
Pharmacist	Doctor of Pharmacy (Pharm. D).
Registered Nurse	Doctor of Public Health (DrPh), MSN, RN, Public Health Nursing Association (PHNA)-BC
Family Nurse Practitioner, Doctor of Nursing Practice Student.	BSN, RN
Student Seeking FNP, DNP degree	
Pharmacist Student	Seeking Pharmacy degree
Under-Graduate Nursing Student	Seeking Bachelor of Science in Nursing Degree (BSN)
Administrative Assistant	Experience in office work.

Objectives

The need to increase HPV vaccine rates for the patient population meeting the set criteria is crucial, as the HPV vaccine has demonstrated efficacy against HPV type cancers (Saraiya et al., 2015). Therefore, the aim of this project was to increase the HPV vaccine rates by 40% among the eligible patient population within the NMHC. The objectives were focused on reducing the missed opportunities for HPV initiation. A missed opportunity was defined as each encounter with an eligible vaccine patient that resulted in an unvaccinated status (Mayne et al., 2014).

Baseline data for the project were gathered from a retrospective study, conducted from October 1, 2016 to December 31, 2016, of patients' hardcopy charts seeking healthcare from the NMHC. The pre-intervention information data for the NMHC indicated the need to increase the HPV vaccine rates in eligible patients meeting set age requirements per Centers for Disease Control and Prevention, (2017f) guideline measures. The following objectives were established:

- All eligible patients would be assessed using the QPP.
- The QPP tool would be applied as an element of the patient appointment.
- All staff would receive training on the QPP.

Anticipated Outcomes

The anticipated outcomes for the QI project were to (a) reduce missed opportunities for qualified HPV patients using provider focus intervention, (b) increase HPV vaccine initiation rates for NMHC, (c) increase strong, consistent provider recommendations, (d) increase qualified patients' HPV vaccine facts with recommended evidence-based educational material in the patient's preferred language (English or Spanish), and (e) increase reminder card strategy for return of HPV qualified patients. Therefore, the incorporation of these outcomes can correspond

towards increasing HPV immunization rates in the NMHC (Cassidy et al., 2014; Perkins et al., 2015; Rahman et al., 2015).

Summary and Strength of the Evidence

The HPV vaccine can be used to protect an individual from the oncogenic forms of HPV most frequently associated with precancers and cancers linked with cervical, vaginal, vulvar, plus anal malignancies; along with HPV forms 6 and 11 identified in causing most genital warts. Yet, in the United States, the HPV vaccine initiation stands below the goal of Healthy People 2020 recommendation of 80% coverage (Centers for Disease Control and Prevention, 2017b; 2016a).

The evidence indicates that interventions centered on provider's recommendations of:

- Initiating the HPV vaccine for eligible patients,
- Along with providing education,
- As well as responding to individualized questions, and
- Having reminder strategies in place,

remain as the key factors in generating continual progression for HPV immunization rates (Cassidy et al., 2014; Perkins et al., 2015; Rahman et al., 2015)

NMHC's interaction with the patient population seeking immunizations for various reasons, places it at a crucial point of care. This position can play a role in the recommendation and initiation of the HPV vaccine for individuals meeting the set criteria of the HPV vaccine, therefore supporting the increase of HPV vaccine startup.

Evidence Strength

Perkins et al. (2015) initiated a Performance Improvement Continuing Medical Education (PI CME) project connected with factors used widely to enhance provider practice. The project

included startup strategies aimed at improving provider compliance for best practice guidelines involving personalized education and feedback. These tactics were also paired with Centers for Disease Control and Prevention's Assessment-Feedback-Incentive-eXchange approaches of improving vaccine use. The combination of repeated contacts, education plus personalized feedback, as well as strong quality enhancement incentives contributed to a prospective production of maintaining improvements in HPV immunization rates (Perkins et al., 2015).

Initiation of the HPV immunization at a younger age (9 to 10 years-old), is linked with increased prevalence of on-time completed vaccinations compared with uptake in 11-year-olds to 12 years-olds (St. Sauver et al., 2016; Warner, 2015;). Addressing the appropriate age to initiate and complete the HPV vaccine series is important in that the HPV vaccine's efficacy is greatest before initiating sexual activity and among individuals not previously exposed to HPV (Hansen, Credle, Shapiro, & Niccolai, 2016; St. Sauver et al., 2016). The Advisory Committee on Immunization Practices has recommended the HPV vaccine for persons 9 years of age. Additionally, evidence indicates a stronger immune response is linked with earlier age startup of HPV immunizations (Hansen et al., 2016; St. Sauver et al., 2016).

The evidence also supports the importance of provider recommendations as an effective method in recommending, initiating, and completing the HPV vaccine for adolescent male and female children. Rahman et al. (2014) reported that while parental HPV vaccine awareness was important to uptake and completion rates, the connection involving HPV immunization awareness plus HPV immunization initiation was associated to the provider's recommendation. Therefore, considerations aimed at increasing the provider's recommendation could stimulate improvements aimed at startups for HPV vaccinations and dose completion.

The literature points to the importance of education for initiating the HPV vaccine in eligible patients in addition to a reminder system (Cassidy et al., 2014; Perkins et al., 2015; Warner et al., 2015). An implemented quality improvement study by Cassidy et al. (2014) was to validate the use of an evidence-based educational pamphlet, along with a reminder system for increasing the HPV immunization initiation and dose series completion. The use of a quasi-experimental design with a sample of qualifying parents of teen females from the study's private pediatric clinic's database was used for this study. The results showed that HPV vaccine uptake did improve once parental concerns, such HPV education, cost, and side effects of the HPV vaccine had been addressed, along with the use of patient reminders. This quality improvement initiative conducted by Cassidy et al. (2014) highlights the importance of educating the parents and/or guardians, and patients on the facts of the HPV vaccine through evidence-based educational resources, along with patient reminders to improve and increase HPV vaccine rates.

The findings indicate the importance of having providers recommend the HPV vaccine, along with educating and answering any question and/or concerns for the parents and/or guardians, in patients eligible for the HPV immunization. Offering evidence-based literature in the culturally and linguistically appropriate language for patients, along with providing reminder strategies for the patients that have initiated the HPV vaccine are key in helping to increase the HPV vaccine rates. These methods and approaches were incorporated in the quality improvement project for the NMHC.

The NMHC services a large portion of Hispanic Spanish-speaking patients, so it is key that the evidence-based resource materials are culturally as well as linguistically suitable for this population. The accessibility of individualized, culturally appropriate materials can increase

conversation between the patients and staff and promote feedback from linguistically diverse staff within the NMHC (Warner et at., 2015).

Methods

Project Plan Intervention

The period of October 1, 2016, to December 31, 2016, was the time frame designated for pre-intervention data collection. A chart review was conducted to identify a pre-intervention baseline for HPV vaccine initiation and missed opportunities of the eligible patients seen within the NMHC during this period. The information was assessed using the Statistical Package for the Social Sciences. Descriptive statistics were obtained for an overview of the missed opportunities of HPV initiation in the NMHC during this time.

At this stage, the providers were informed of the baseline data and a plan for a QI project targeting the reduction of missed opportunities for HPV eligible patients seeking healthcare in the NMHC began to take shape. The intervention would focus on consistent provider recommendations, evidence-based educational resources (in either English or Spanish language), education for parents and young adults, plus individualized feedback, along with the use of a reminder card system, all aimed at increasing the HPV vaccine rates for the clinic (Cassidy et al., 2014; Hansen et al., 2016; Perkins et al., 2015; Rahman et al., 2015).

The QPP tool was designed to capture a patient's age, the determining factor of eligibility for HPV vaccine, per the Centers for Disease Control and Prevention's immunization recommendations Centers for Disease Control and Prevention, 2017e). A neon color-coding cue of eligibility was another important element of the QPP. Green (eligible) and orange (not eligible) neon color scheme sheets were selected because they would stand out among the

standard white sheet documents within the patient record, thus cueing providers of the patient's current eligibility status for the HPV vaccine.

Therefore, having this QPP tool in place would support an intervention aimed at having a consistent provider recommendation for patients meeting HPV vaccine criteria with the hope that missed opportunities would be decreased among patients seeking healthcare at the NMHC contribute to increased HPV vaccine rates for the NMHC (Perkins et al., 2015; Rahman et al., 2015).

The Doctor of Nursing Practice Family Nurse Practitioner student met with the city's health department expert on immunization and coordinated an in-service presentation for the NMHC's providers and staff on May 29, 2016. In addition to this training, the clinic staff were provided with examples of the QPP tool in both neon-green and neon-orange and given detailed instructions on its use as the primary element of the project for reducing missed opportunities of eligible HPV vaccine patients. The clinic staff and providers were also given examples of the evidence-based educational resources in both English and Spanish, along with how the reminder cards can help support the QI project. The providers and staff were given an opportunity to make suggestions, ask questions and receive clarification pertaining to the use of the QPP forms, educational materials, and the reminder card approach.

The primary element of the entire project was the implementation and use of the QPP tool to identify eligible patients, act as reminder for the providers to recommend the HPV vaccination series when appropriate, and ensure follow-through with the immunization, and as well as follow-up visit(s) to complete the series.

Intervention Steps

The project included the following elements:

- Once the patient registered into the clinic at the security guard's desk, the information was immediately seen on the computer screen of the NMHC Administrative Assistance (AA). The patient's age (qualifying factor for vaccination eligibility between 9 to 26 years of age) was then verified.
- The AA or available staff spoke with the patient and verified the needed service and appropriate paperwork, either English or Spanish, and presented it to the patient on a clip board, with instructions for the patient to fill out any necessary elements.
- The QPP tool corresponding to the patient's age at the time of the visit was completed.
- The QPP tool in neon-orange represented that a patient did not meet the age for the HPV vaccine initiation on this visit, but the form captured the patient's age type of visit, and reason that they did not qualify for the HPV vaccine, with age being the identifier for not qualifying.
- The QPP tool in neon-green represented a patient did meet the age for the HPV vaccine initiation on this visit, the patients' preferred language was verified for the appropriate evidence-based resource material, for both parents and young adults.
- The AA checked the patient's current HPV immunization status in the city's Immunization Repository System, and if the patient had already started the HPV vaccine series, then onset date was verified, and the patient was offered the next scheduled HPV vaccine dose corresponding to their time schedule as per Centers for Disease Control and Prevention immunization schedule 2017 (Centers for Disease Control and Prevention, 2017d, 2017e).
- Then the QPP tool with input data, plus the age and language appropriate educational material and Vaccine Information Statement (VIS) (Immunize Act Coalition, 2017), a

reminder strategy card was paper clipped together and placed vertically within the patient's horizontal paperwork on the clip board.

- The clipboard was then ready for the provider and the point of care interaction, at which time the provider recommended the vaccination if the patient was eligible, ensured the patient and parent received the educational resources, VIS, and answered any questions or concerns the patient or parent might have at that time.
- At this given opportunity, the patient decided to receive or decline the HPV vaccine.
- If declination was vocalized, any additional questions or concerns were addressed by the provider, along with encouragement to review the educational resources and recommendation of initiating the HPV vaccine.
- If the patient received the HPV vaccine, the provider would verify any allergies, allergic reactions to vaccines and inform the patient of side-effects. Any questions or concerns the patient had were addressed by the provider.
- Then the provider proceeded to the administration of the HPV vaccine element of the QPP, and a verbal reminder plus a reminder card were provided for the patient for their next scheduled HPV vaccine dose.
- The patient was then escorted by the provider back to the AA, where the patient was then processed for this visit and the services provided.
- The AA then extracted the QPP form from the patient's documents and the principal investigator kept the QPP forms as part of the QI documents.

The NMHC also works with the Vaccine for Children Program, which guarantees that providers will have vaccines accessible free of charge, so that children meeting the set measures for eligibility can be immunized and protected from illness that are vaccine-preventable (Texas

Department of State Health Services, 2017a). The Adult Safety Net Program is another service program which the NMHC works with and that also provides vaccines, which are publicly-paid for adults aged 19 years and older who have no health insurance. These Adult Safety Net cost-free vaccines increase access and delivery of immunization services to adults lacking health insurance, thus helping to reduce or eliminate preventable illnesses (Texas Department of State Health Services, 2017b).

The choice to implement the QI project in the above-mentioned manner was discussed with the advisor and the mentor, then proceeded to presentation to the NMHC coordinator, providers, and clinic staff. Everyone agreed on the process for the QPP tool's smooth implementation in the patient process routine. The process was implemented as planned without deviation.

Setting and Population

The project setting was a NMHC providing healthcare services to a vulnerable population of children, adolescents, and adults. The facility is located in a major metropolitan city in the southwestern United States. It has one physician, one clinic director/ nurse practitioner, three additional nurse practitioners, one pharmacist, one registered nurse, and an administrative assistant. The NMHC also allows students from nursing and pharmacy programs to carry out their clinical rotations within the facility.

Barriers

The organizational barriers noted were the days and time that the NMHC was open for services. The current clinic schedule is Monday and Wednesday from 9:00 am to 1:00 pm; and Friday 9:00 a.m. to 4:30 p.m. The NMHC operates on a part-time basis, but the need for services is growing and may require full-time coverage.

Another barrier was patients' lack of knowledge about the NMHC and the services offered. Such as its availability to offer low cost immunizations, through resources like Vaccine for Children and Adult Safety Net vaccine programs, for patients meeting criteria. The concerns over maintaining appropriate vaccine levels could be another barrier for this NMHC. An additional obstacle was the clinic's location, which patients may have not been familiar with.

Facilitators

The facilitators are the highly educated providers and staff, along with their ability to utilize the Vaccine for Children and Adult Safety Net immunization programs that provide vaccine assistance to qualifying patients. Additional facilitators are the meso-system that supports the work being done by this NMHC for this community. The collaboration with city programs, such as head-start programs, out-reach services providing vaccines at health promotion events through the city, local school districts teaming up with the outreach immunization services provided by the NMHC are vital.

Ethical Considerations

The ethical considerations for this quality improvement project were limited. The plans for the project included elements to maintain patient confidentiality. The QPP tool was designed to capture data needed for the study results but it did not contain any patient identifiable information beyond a birth date. Following immunization, information was placed into the city immunization repository system, thus providing an up-to-date HPV vaccine information for any clinic needing to verify a patient's vaccine status. All data collected for the purposes of the study were maintained in a password protected dataset. All data were de-identified.

Results

The study sample included all patients seen at the NMHC during the period of the intervention. The entire sample was 334 patients ranging in ages from 1 to 26 years of age. Table 3 provides a breakdown of ages and other demographic information. The sample was fairly even in gender distribution with males making up 47.9% of the sample and females 50.3%. So, when assessing language preference, the patients' preferred language (English versus Spanish) was a 50% split. In terms of the reasons given for the scheduled visit for those seeking healthcare at the NMHC, 4% of the visits were for physicals, 57% for immigration vaccines, 18% for school vaccines, and 20% were seen for wellness visits (Table 3).

Table 3

Characteristics of Study Sample (n=334)

Characteristic	*n* (%)
Age Category	
1 - 8 yrs	28 (8%)
9 - 14 yrs- (HPV vaccine eligible- 2-dose series)	18 (5%)
15 - 26 yrs- (HPV vaccine eligible- 3-dose series)	119 (36%)
>26 yrs	169 (51%)
Gender	
Male	166 (49.7%)
Female	168 (50.3%)
Preferred Language	
English	167 (50%)
Spanish	167 (50%)
Scheduled Visit Type	
Physical	14 (4%)
Immigration Vaccine Visit	191 (57%)
School Vaccine	61 (18%)
Wellness	68 (20%)

There were 334 patients that sought care at the NMHC during the project implementation. One-hundred percent of the eligible patients were identified and offered the

HPV vaccine as applicable. Forty percent of the patients assessed were identified as eligible for the HPV vaccine recommendation, and 60% of the assessed individuals did not qualify due to age. Of the people that were qualified, 53% accepted the HPV vaccine recommendation on their visit to the NMHC (Table 4).

Table 4

HPV Vaccine Eligibility Within Intervention (n= 334)

Characteristic	*n* (%)
Age Category	
2= 9 - 14 yrs- (HPV vaccine eligible= 2-dose series)	18 (5%)
3= 15 - 26 yrs- (HPV vaccine eligible=3-dose series)	119 (36%)
Gender	
Male	166 (49.7%)
Female	168 (50.3%)
HPV Vaccine	
Eligible	135 (40%)
Non-Eligible	199 (60%)
HPV Vaccine Offer	135 (40%)
Accepted	71 (53%)
Declined	64 (47%)

A Pearson chi-square was used to assess the relationship of the likelihood of accepting the recommendation for vaccination and whether the patient was eligible for the 2-dose or 3-dose HPV series. There was no significant association between the dosing series (based on age) and whether the patient accepted the recommendation of initiating the HPV vaccination series, X^2 (1) = 1.90, p = .168.

Only 35 patients received an HPV recommendation in the pre-intervention data. One-hundred and thirty-five patients received a recommendation during the intervention indicating a 55% increase in HPV vaccine recommendation. When assessing differences between pre- and post- intervention data for acceptance of the HPV vaccine, there was a significant difference X^2

(1) = 5.33, p = .022. The percentage of patients accepting an HPV recommendation pre-intervention was 74% versus 53% in the post-intervention data.

When the HPV vaccine was recommended pre-intervention, there was a higher percentage of acceptance. However, the HPV vaccine was offered at a much lower percentage and the intervention was focused on reducing missed opportunities, not on increasing acceptance of the HPV vaccine.

Discussion

The patients that were eligible for the HPV vaccine were identified and offered the vaccine 100% of the time. Of those offered the vaccine, 53% accepted the recommendation and opted to have the vaccination. However, only 85% of these individuals received the vaccination prior to leaving the NMHC primarily due to vaccine availability. Notably, the QPP was used to assess eligibility for every patient accessing care at the NMHC, but because the QPP focused on evaluating eligibility based on the patient's date of birth, it did not distinguish those individuals that had already received the series and were therefore not eligible to receive the vaccination. This created the large difference between those identified as being eligible and those opting to receive the vaccination.

Additionally, acceptance rates were higher in the pre-intervention group. However, the numbers were quite low for HPV recommendation. The focus of the QPP tool and the intervention was on decreasing missed opportunities. The intervention increased recommendations but additional work was needed to increase acceptance of the HPV vaccine.

The QPP tool implementation was successful due to the providers' buy-in and understanding the importance of offering and providing the HPV vaccine for qualifying patients. The entire QI project was supported by the staff due to their knowledge and understanding of the

need to prevent HPV infections. The entire staff also voiced a desire to establish clinical indicators of care. Assessing eligibility in every patient will continue. Increasing the percentage of vaccinations in eligible patients is an important benchmark for the NMHC.

There was difficulty in obtaining a higher vaccination numbers because of the limited hours of operation for the NMHC. Another difficulty for implementing the program was maintaining the necessary stock of the vaccine. Therefore, highlighting accessibility of the HPV vaccine having been readily available once the patient had accepted the recommendation. Admittedly, the QI project increased the offering of the vaccination and therefore the possibility of increased vaccinations. The NMHC immunization manager will need to determine the new demand versus supply requirements in order to meet the needs of the NMHC patient population. It is also a possibility that providers or patients were in a time crunch that effects the ability to thoroughly discuss the vaccination and/or receive the vaccination requirements. The QPP tool and the implementation process streamlined the evaluation, recommendation and education process. As the QI project evolved, the staff became very efficient and comfortable at assessing eligibility, making recommendations and answering questions related to vaccination.

The main changes observed, since the QI project implementation are that the providers are now self-directing and identifying the patient's age and determining the patients' eligibility status before receiving the complete patient paperwork and corresponding QPP tool. They are instinctively cued to present the HPV vaccine to the qualifying patients.

The strength, again, of the QI project is the providers buy-in for implementation and also their active participation in the project development. The providers acknowledgement of the importance of prevention that the HPV vaccine offers for this community of patients is the true

key to success. Another factor adding to this strength is the VFC and ASN programs that provide the cost-free vaccines for eligible patients.

The study conducted by Perkins et al. (2015) indicated HPV vaccine rates due to a helpful intervention that focused on the provider. A couple of the elements covered were education and individualized feedback for patients, which aimed to help increase HPV awareness and immunization rates. Another study targeted a goal to initiate the HPV vaccine in patients at a younger age (ages 9-10 years), due to a relevance of higher completion rates within this age category (St. Sauver et al., 2016). Provider recommendations linked with parent's understanding of HPV, as well as the importance of completing the HPV immunizations in adolescent children in the United States was also found to be key for increase HPV vaccination rates (Rahman et al., 2015).

The use of the QPP tool focused on cueing providers for consistent recommendations for initiating the HPV vaccine, with evidence-based educational resources in appropriate languages, and personalized feedback for parents and patients understanding of HPV and the HPV vaccine have presented a process that can be used to help increase HPV vaccine rates and completion of dose series for patients meeting the set criteria.

Limitations

One of the limitations for this quality improvement project could be the outlined time frame that the NMHC operates. Also, the four providers each work an individual shift, with Friday being split into two different shifts to accommodate two different providers, one in the morning part of the day and the second one in the afternoon. The AA is there for every shift and the BSN, RN will also come out and help on an as needed basis. The pharmacist will also help to the extent of her licensure. The NMHC can get busy with a stream of patients requiring different

vaccine services. The NMHC has continued to keep providing the needed services for this community of patients. The ability for patients to pay for services can also play a role in limitations, along with patient time constraints and/or transportation obstacles. Another factor can be communication barriers for Spanish speaking patients encountering a provider or staff member who can only communicate in English. An additional limitation would be the availability of the HPV vaccine for patients.

Recommendations

The recommendations for the quality improvement project outcomes favor the continuation of using the QPP tool in identifying HPV vaccine qualifying patients, as well as continuing to cue providers on offering these patients the HPV vaccine. Also, consistent promotion of the evidence-based educational resources in appropriate languages can assist in educating patients. Maintaining the use of the reminder card to help patients follow their HPV vaccine series dose schedule is also an important component for program success. The NMHC coordinator agrees that the QI project has garnered positive results and is easily sustainable. She intends on continuing the program.

Implications for Practice

An implication of increased vaccinations is the need for a greater supply. Sadly, there were 11 eligible patients who had accepted the HPV vaccine, but were unable to receive the vaccine due to the lack of HPV immunization availability in the NMHC. It is unlikely that these patients will return. These type of “misses” impact a program dedicated to decreasing missed opportunities.

Interprofessional collaboration among the clinic coordinator, FNPs, pharmacist, and RN, to include the AA input, would benefit the patients. The teamwork could focus on coordinating

their strengths towards recognizing the peak times for vaccine requests and implement methods to supply vaccines to meet demands, and therefore reduce missed opportunities with patients that have accepted the HPV vaccine.

The NMHC provided an excellent opportunity for the DNP-FNP graduate student to implement this QI project, due to their vaccine immunization services being provided on-site. The immunization program fulfills various requirements such as immigration required vaccines, state mandated vaccines for attendance, child-care immunization requirements, wellness visits, physicals or sports physicals. The NMHC has been in place for over a year in this community and can be trusted to provide safe standards of care for patients. The NMHC also has established the elimination of barriers by securing in place the VFC and ASN vaccine programs for eligible patients' access for preventive health and wellness choices. This NMHC's stock of recommended vaccines to accommodate the Centers for Disease Control and Prevention's 2017 immunization schedule, direct billing to Medicaid for their eligible patients, as well as the providers furnishing education and addressing patients' vaccine concerns, are all essential elements that contribute to the success of this clinic's continued growth and intent to promote safe health wellness and prevention for the community that it serves.

The DNP's role is key in evaluating, creating, and implementing an intervention that will help a diverse population of patients reach their attainable and optimal healthcare needs. Therefore, striving to achieve clinical prevention, which is identified as promoting health and wellness, in addition to decreasing and/or preventing risks for individuals and families is key to the prospective changes effecting patients' outcomes, for improving population health. The role of a doctoral-prepared nurse practitioner to lead project development and implementation places

the individual as a guide, mentor, and an advocate for superior nursing practice. (American Association of Colleges of Nursing, 2006).

Conclusion

The QI intervention was effective in decreasing missed opportunities for HPV immunization qualified patients at the NMHC, thus helping to increase HPV vaccine rates for the clinic, as well as the city in which this clinic resides. The city's immunization expert indicated that the initiation and/or completion of HPV vaccine for the NMHC patients ranging between 13 to 18 years, impacted the city's goal to increase HPV immunization rates towards the Healthy People 2020 goal of 80%. The city has struggled with HPV vaccination improvement rates. The QPP tool identifies eligibility and then provides a systematic process in which eligible patients are given recommendations and education regarding the HPV vaccine. The QI project resulted in 60 patients receiving the HPV vaccine. This an impressive number of patients given the results QPP tool and all elements of the project process are likely to greatly improve HPV vaccination rates.

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Appendix A

NURSING
UIW
CARDINAL WELLNESS CENTER
UIW Nursing Cardinal Wellness Center
2547 E. Commerce Street, Suite 300
San Antonio, TX 78023
210-283-6331

March 1, 2017

To whom it may concern,

As the clinic director for the University of the Incarnate Word Nursing Cardinal Wellness Center, I, Holly DiLeo, PhD, RN, FNP-BC, grant permission for Maria Medina-Calvo, BSN, RN to access the UIW Nursing Cardinal Wellness Center medical records in order to collect data relative to the DNP Project on Assessing the effectiveness of an intervention to reduce missed opportunities for HPV eligible patients seeking healthcare at a Nurse Managed Health Clinic (NMHC) being conducted at the UIW Nursing Cardinal Wellness Center.

Maria Medina-Calvo, BSN, RN has permission to access the medical records both pre-intervention and post-intervention. The data elements to be collected have been discussed and agreed upon. Leticia Ybarra, MSN, RN, FNP-BC, mentor for Maria Medina-Calvo, BSN, RN, will provide oversight of the project in addition to her/his faculty advisor.

Sincerely,

Holly DiLeo PhD, RN, FNP-BC

Holly DiLeo, PhD, RN, FNP-BC

Appendix B

May 1 2017

PI: Ms. Maria Medina-Calvo

Protocol title: Assess the effectiveness of an intervention to decrease missed opportunities for Human Papilloma Virus (HPV) vaccination at a nurse managed health center (NMHC).

Maria:

Your request to conduct the study titled "Assess the effectiveness of an intervention to decrease missed opportunities for Human Papilloma Virus (HPV) vaccination at a nurse managed health center (NMHC)." was approved by Exempt review on 05/01/2017. Your IRB approval number is 17-05-004.

Please keep in mind these additional IRB requirements:

- This approval will expire **one year** from 05/01/2017.
- Request for continuing review must be completed for projects extending past one year. Use the **IRB Continuing Review Request form**.
- Changes in protocol procedures must be approved by the IRB prior to implementation except when necessary to eliminate apparent immediate hazards to the subjects. Use the **IRB Amendment Request form**.

Any unanticipated problems involving risks to subjects or others must be reported immediately.

Approved protocols are filed by their number. Please refer to this number when communicating about this protocol.

Approval may be suspended or terminated if there is evidence of a) noncompliance with federal regulations or university policy or b) any aberration from the current, approved protocol.

Congratulations and best wishes for successful completion of your research. If you need any assistance, please contact the UIW IRB representative for your college/school or the Office of Research Development.

Sincerely,

Ana Wandless-Hagendorf, PhD, CPRA

Ana Wandless-Hagendorf, PhD, CPRA

Research Officer, Office of Research Development

University of the Incarnate Word

(210) 805-
3036
wandless
uiwtx.edu

Appendix C

Qualified Patient Prompter (QPP)

Date **9-26 (1991-2008)**	**Age**					
Gender						
Spanish English		**Yes**	**No**			
Vaccine Record Reviewed	**New File**			**1**	**2**	**3**
HPV Pamphlet Provided						
HPV Offered						
HPV Accepted						
HPV Denied **Reason:**						
HPV Vaccine Given						
Scheduled Visit **Reason:**						
• **Physical**						
• **Sports Physical**						
Vaccine Visit **Reason:**						
• **Immigration Requirement**						
• **School Referral**						
• **Wellness Visit**						
Reminder provided						
Zip						

Appendix D

Non-Qualified Patient Prompter (QPP)

Date: **9-26 (1991-2008)**	**Age**					
Gender						
Spanish **English**		**Yes**	**No**			
Vaccine Record Reviewed	New File			1	2	3
Scheduled Visit Reason:						
• Physical						
• Sports Physical						
Vaccine Visit						
Immigration Requirement						
• School Referral						
• Wellness Visit						
• Reason not qualified:						
Zip						