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Improving Human Papillomavirus Vaccination Initiation in an Active Duty Clinic: A Process

Improvement Project

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Abstract

Background or Problem/Issue: Human Papillomavirus (HPV) is the second most common sexually transmitted infection in the military. There is no cure for HPV-related cancers, only prevention. HPV can lead to cancers of the cervix, oropharynx, anus, vulva, vagina, and penis. HPV vaccines cover ninety-two percent of HPV-related cancers. HPV is not a required vaccination in the military system.

Clinical Question or Purpose: In a primary care clinic, does the combination of a video plus focused provider approach with a standardized clinic screening process increase the HPV vaccine's initiation within a two-week window post-appointment?

Materials and Methods Forty-five active-duty Navy service members age 18-26 with no history of HPV vaccination who presented for an in-person appointment received an educational video and focused provider recommendation. Participants completed Modified Carolina HPV Immunization Attitudes and Beliefs Scale pre/post intervention. Additionally, the clinic's chart tagging process was expanded to include HPV vaccination status to improve overall HPV vaccination rates.

Results: Intention to receive HPV vaccination was significantly increased ($p = 0.004$). Intention to never vaccinate significantly decreased ($p = 0.003$). Positive vaccine perceptions significantly improved related to cancer prevention effectiveness ($p = <0.001$) and provider approval ($p = 0.017$). Negative vaccine perceptions significantly decreased related to delay due to "newness" ($p = 0.040$) and health problem causation ($p = 0.003$). Based on retrospective chart reviews, overall numbers of HPV vaccination status did increase (Dose 2 and 3 in series). However, Zero initiated the HPV series in the 2 weeks post intervention.

Conclusion: Combining an educational video, a strong recommendation from the patient's provider, and an electronic health record reminder may improve Navy service members' attitudes towards the HPV vaccine. Improving processes to facilitate access to immunizations may also be beneficial in improving HPV vaccination rates.

Improving Human Papillomavirus Vaccination Initiation in an Active Duty Clinic: A Process Improvement Project

The Center for Disease Control and Prevention (CDC) (2019) estimated from 2012-2016 data that as many as 24,900 women and 19,100 men were diagnosed with Human Papillomavirus (HPV) associated cancers. There is no cure for HPV-related cancers making prevention the best approach to tackling this issue. HPV is a common infection, as it is estimated to infect eighty percent of the population at some point throughout a person's lifetime (Chesson, 2014). In some people, the virus resolves on its own. This clearance may have little to do with the immune system but with the virus's unpredictability (Ryser, Myers, & Durrett, 2015). If the HPV infection does not resolve, the virus is harbored and causes changes on the cellular level, leading to cancers of the cervix, oropharynx, anus, vulva, vagina, and penis later in life (Lama et al., 2019). HPV vaccines cover ninety-two percent of HPV-related cancers (Senkomago, 2019). In a study conducted by McClung et al. (2019), when comparing pre-vaccination era women and post-vaccination women, there has been an eighty-six percent decrease in HPV infections in 14-19-year olds and a seventy-one percent decrease in 20-24-year-olds. These significant declines highlight the success of the HPV vaccine and ignite the need to improve vaccination rates.

Significance of the Problem

HPV is the second most common sexually transmitted infection in the military population (Stahlman, Seliga, & Oetting, 2019). Nonetheless, the rates of HPV vaccine completion for eligible service members are only fifty percent for women and thirty percent for males (Clark et al., 2018). The military population is not meeting The Healthy People 2030 goal of an eighty percent completion rate for both men and women (U.S. Department of Health and Human Services, 2020). The rates for initiating the HPV vaccine are similarly dismal as the Department of Defense (DOD) has only 3.1% of eligible members initiating (receiving the first dose) the

vaccine (Clark et al., 2018). Amongst all services, the Navy and Marine Corps rank last for initiation rates at 2% and 1.1%, respectively, for eligible candidates (Clark et al., 2018).

Although much of the focus of HPV vaccination is on vaccinating boys and girls ages 11-12, new military accessions are prime candidates for catch-up vaccination (Clark et al., 2018). In June of 2019, the Advisory Committee on Immunization Practices (ACIP) of the CDC announced a push for catch-up vaccination for all eligible individuals up to age 26 (Meites et al., 2019).

Relevance to Military Nursing

Addressing HPV vaccination is in line with the Defense Health Agency's (DHA) strategic objective of creating optimal outcomes for health, well-being, and readiness (Defense Health Agency [DHA], 2017). The DHA calls for primary care utilization to the fullest and a proactive prevention mindset rather than a reactive treatment one (DHA, 2017). To achieve this goal, the DHA guides the Military Health System (MHS) to deliver the Quadruple Aim: better health, better care, increased readiness, and lower cost. HPV vaccination touches all of the arms of the Quadruple Aim. Reducing infections and HPV-related cancers provides better health and better care. Readiness is enhanced from herd immunity for the military/beneficiary community from HPV infection (Bayefsky, 2018). HPV vaccination lowers cost by reducing the time and cost needed for cervical dysplasia biopsies and treatments (Bayefsky, 2018). Lastly, by reducing HPV-related cancers, the financial burden of disease is reduced, as HPV-related cancer and illness cost the United States up to \$9.8 billion annually (Chesson, Meites, Ekwueme, & Saraiya, 2019).

This project's literature review revealed critical touchpoints for military advanced practice nurses to address regarding HPV vaccination in the Navy. Buechel and Connelly (2018)

explored the possible factors influencing HPV vaccination status in the United States Navy. The authors found that the determinants influencing HPV vaccination for sailors included receiving recommendations about HPV vaccination from a healthcare provider, influence from media or the internet, a belief their chain of command strongly recommended the vaccine, and higher HPV self-knowledge (Buechel & Connelly, 2018). Addressing these determinants serves as a possible target for implementations to increase HPV vaccination amongst the military population.

Objectives/Specific Aims/Clinical Questions:

1. Objectives

The objectives of this quality improvement project are:

- 1 Identify if a combined video and strong provider recommendation with standardized clinic screening process intervention correlate with following through on getting the HPV vaccination initiated within a two-week window post-appointment.
 - 2 Identify pre and post intervention changes between a video plus focused provider approach on beliefs/attitudes of HPV vaccination, and intention to initiate the HPV vaccination. Beliefs and attitudes will be measured in 3 domains: Harms/Vaccine safety, Barriers to vaccination, and Social Norms.
 - 3 Initiate a screening process to determine the eligible population for HPV vaccine.
2. Clinical Question: The initial background question was “What intervention can increase HPV vaccination in the 18-26 age group?”. The refined clinical question was “what intervention in an outpatient setting will increase HPV vaccination initiation for adults ages 18-26?”. After initial review of the literature, the clinical question was further refined to “In a primary care clinic, does the combination of a video plus focused

provider approach with a standardized clinic screening process increase the HPV vaccine's initiation within a two-week window post-appointment?"

Focus Areas

After reviewing the literature, the Health Belief Model was used to help guide the assessment tool used for the pre/post-assessments. The Health Belief Model focuses on the concepts on how people take action to prevent, to screen for, or to control illness conditions; these include susceptibility, seriousness, benefits, and barriers to a behavior, cues to action, and self-efficacy (Glanz, Rimer, & Viswanath, 2008). Dempsey, Fuhrel-Forbis, and Konrath (2014) provided an assessment tool with questions that focus on attitudes, beliefs, and cues to action. By focusing on attitudes, beliefs, and cues to action, this project will measure how a video and a strong recommendation from the provider will affect a patient's determinants for initiating the HPV vaccine.

Organizing Framework

The Iowa Model Revised (2017) was used as the evidence-based project model to help guide the project's implementation. This model has been widely used to help direct EBP implementation since its inception in the 1990s and was recently revised to meet current practice needs through a more simplistic, streamlined structure. It provides a direct and practical approach that is easy to follow and aligns with the project's deployment. Data identifying HPV vaccination completion rates are at a suboptimal level making this a "triggering issue," with which a clinical question was created. The Iowa model provides a visual expectation of what may be encountered as this change process occurs and allows for redesign at the conclusion of the project. Alternative strategies can be explored to fine-tune the process and realize a

sustainable practice. The ultimate goal is to leave the clinic with a lasting change that has been integrated into the fundamental system.

Project Design

This project was a quality improvement project that used retrospective chart review and pre/post surveys to assess the effect of a HPV informational video, strong provider recommendation, and “sticky-note” electronic health record reminder on HPV vaccination intent and utilization at a single, active duty clinic.

Methods

Setting and Population

The project was conducted at a single active duty clinic on Naval Base Bangor. This clinic serves a population of around 3,000 active duty personnel dispersed between 55 tenant commands. This site was chosen because of the availability of active duty sailors within the ages of 18-26.

Participants

Utilizing a pre-screening process, potential participants meeting inclusionary criteria (active duty, age between 18-26 years and with no documentation of HPV vaccine in either Joint Legacy Viewer (JLV) or MHS Genesis) were identified. Sample size was 45 participants who met the above inclusionary criteria.

The “sticky note” function of MHS Genesis was used to flag providers with a notation about HPV vaccination status. An example of notation was “Patient due for HPV vaccination”

or “Due for next HPV dose.” A list of identified subjects was generated for the front desk staff to assist in directing potential participants to the investigator.

HIPAA Concerns/Ethical Considerations

The primary outcome of this project is HPV vaccination initiation rates and not individual patient outcomes. All information for the project was stored on a database on a common-access-card (CAC) enabled computer in a locked office. Assessment materials were shredded.

Retrospective Chart Reviews

Currently, MHS Genesis is unable to generate reports or extract data related to HPV vaccination status. To obtain pre-intervention/post-intervention clinic vaccination rates, a retrospective chart review was completed for a one month time frame prior to beginning the intervention and also completed after the intervention for a one month time frame. These data sets served as “snapshots” of the clinic’s HPV vaccination status for comparison. Each day’s schedule within the one month snapshot for three specific providers were screened for service members in the intended age-group. Once an individual was identified as within the target age group, the patient’s chart was assessed. The immunization module and Joint Legacy Viewer Immunization section were examined to determine the patient’s HPV vaccine status. A similar retrospective chart review was performed during the implementation phase. See below for the decision tree used for documentation of HPV status.

- If no recorded doses in MHS Genesis or Joint Legacy Viewer = “Unvaccinated”
- If three documented doses (2 doses if vaccine given prior to age 15) = “Completed series”
- If 1 dose documented within 14 days of the screening day = “Initiated”

- If more than 1 dose AND none given past 14 days of the screening day = “Incomplete”
- If more than 1 dose AND dose given within 14 days of the screening day = “Initiated, and in process of completing series”.

Procedure

Prior to the implementation phase of the project, providers were individually briefed on the plan. Providers were instructed on a focused approach centering on treating the HPV vaccination as a routine vaccination using an announcement method identified by Brewer et al. (2017). Providers were asked to state to patients that they were due for their HPV vaccination and that it was recommended. Non-provider staff were educated on procedures, measurements and intended outcomes.

During implementation, potential participants were directed by front desk staff to the investigator positioned in a private provider room. The investigator explained the assessment to the participant and answered any questions. Participants choosing to participate were provided a pre-assessment. After completion of the pre-assessment, the HPV video was played for the participant. The participant was then given a post-assessment with instructions to complete it AFTER the provider encounter and return it to the front desk staff.

Measures

Demographic Data

Each pre-assessment survey asked the participant’s age, rank, and gender.

Modified Carolina HPV Immunization Attitudes and Beliefs Scale (M-CHIAS)

To measure attitudes and beliefs about HPV immunization and intention to get the HPV vaccine, this project used the Modified Carolina HPV Immunization Attitudes and Beliefs Scale (M-CHIAS) (Dempsey, Fuhrel-Forbis, & Konrath, 2014). The M-CHIAS used in this study is a

modified version of an original CHIAS version validated by McRee et al. (2009) on parents of adolescents. It consisted of 16 items measuring three domains: attitudes on harms/vaccine safety, barriers to obtaining the vaccine, and the social norms of HPV vaccination. Items were measured on a Likert scale ranging from (-2) Strongly Disagree, (-1) Disagree, (1) Agree, and (2) Strongly Agree. In addition to the Likert scale described above, two questions (15 & 16) had a “neither” response option and were coded as a (0).

PROJECT RESULTS

This project employed a double entry method for data entry. Errors were adjudicated for the final data set that was used for data analysis. Data analysis was performed with IBM SPSS Statistics 24 for Windows. P-values less than 0.05 were considered significant.

Demographics

Table 1
Demographic Frequencies and Percentages

Demographics	N	%
Rank		
E2	4	8.9
E3	11	24.4
E4	23	51.1
E5	7	15.6
Gender		
Male	27	60
Female	18	40

The age range of the participants was 18-26 years old, with a median age of 22 years old (SD 2.005). The ranks were between Seaman apprentice (E2) to Petty Officer 2nd class (E5). Male participants were 60 percent, to females at 40 percent.

HPV Vaccination Attitudes and Beliefs

Table 2
Wilcoxon-Signed Rank Test of Pre/Post Assessments

Question	Pre	PreSD	Post	PostSD	n	p-value	Domain
VSTP	2.1	0.8	2.0	0.8	45	0.102	Harms/Vaccine Safety
DCM	1.9	0.7	1.7	0.7	45	0.071	Harms/Vaccine Safety
FHP	2.0	0.7	1.7	0.6	45	0.003*	Harms/Vaccine Safety
VS	1.7	0.5	1.6	0.6	45	0.366	Harms/Vaccine Safety
STI	1.6	0.5	1.4	0.5	45	0.132	Harms/Vaccine Safety
NV	2.2	0.8	1.9	0.8	44	0.040*	Harms/Vaccine Safety
PE	2.0	0.8	1.9	0.8	45	0.115	Harms/Vaccine Safety
SC	1.9	0.6	1.8	0.6	45	0.109	Harms/Vaccine Safety
VPC	2.6	0.7	2.1	0.9	45	<0.001**	Harms/Vaccine Safety
VA	1.7	0.6	1.7	0.6	45	0.705	Barriers
PCA	1.7	0.6	1.7	0.7	45	0.480	Barriers
WLT	1.8	0.7	1.7	0.6	45	0.109	Barriers
PR	2.3	0.8	2.0	0.7	45	0.017*	Social Norms
SMV	2.5	0.8	2.5	0.8	45	0.842	Social Norms
VI	3.0	0.9	3.4	1.1	45	0.004*	Intention
NGV	3.7	0.8	4.0	0.8	45	0.003*	Intention

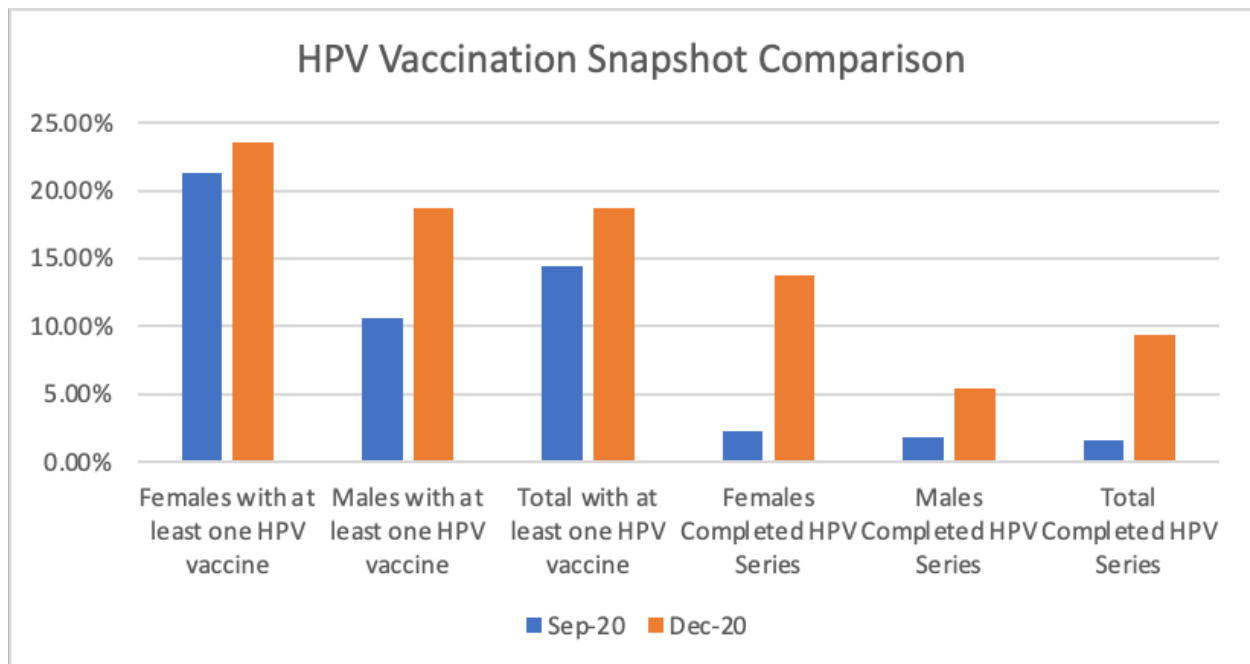
Questions. VSTP: I worry that the HPV vaccine might cause short term problems like fever or discomfort. DCM: I worry that the HPV vaccine is being pushed to make money for drug companies and/or doctors. FHP: I worry the HPV vaccine may cause me health problems in the future. VS: I think that the HPV vaccine is unsafe. STI: I think that I am too young to get a vaccine for a sexually transmitted infection like HPV. NV: The HPV vaccine is so new that I want to wait a while before deciding to get it. PE: I think that getting a new vaccine is like performing an experiment on myself. SC: HPV vaccination is not really necessary because screening can be done to make sure cancers do not develop. VPC: The HPV vaccine is effective in preventing cancer. VA: It is hard to find a clinic where I can afford the HPV vaccine. PCA: It is hard to find a provider or clinic that would provide the vaccine for myself. WLT: It is hard to find a provider or clinic where I don't have to wait for a long time to get an appointment to get vaccinated. PR: My provider recommends the HPV vaccine. SMV: Other service members are getting the HPV vaccine. VI: I intend to get vaccinated against HPV in the next 2 weeks. NGV: I will never get vaccinated against HPV. * $p < 0.05$, ** $p < 0.001$.

Of the 16 items included in the M-CHIAS, six items showed a statistically significant change when measured after the intervention. Intent to vaccinate increased significantly. Post intervention more people planned to get the vaccine in the next 2 weeks ($p = 0.003$) and more people disagreed they would never get the vaccine ($p = 0.004$). Support for the vaccine also significantly increased. More people recognized the HPV vaccine as effective against preventing cancer ($p < 0.001$) and agreed the HPV vaccine was recommended by their healthcare provider

(p=0.017). There was decreased worry that the vaccine will cause future health problems (p=0.003) and a decreased belief that the vaccine was so new they wanted to wait before getting it (p=0.040).

HPV Vaccination Snapshot Comparison

A retrospective chart review for the month of September (prior to intervention) and December (after intervention) was completed identifying the below “snapshot” of numbers. Total completion rate of the vaccine series increased from 1.52% to 9.35%. Total rates of at least one vaccine increased from 14.39% to 18.69%. Males increased in completion of the vaccine series from 1.18% to 5.36%. Males increased in having at least once vaccine from 10.59% to 14.29%. Females increased in completion of the vaccine series from 2.13% to 13.73%. Females increased in having at least once vaccine from 21.28% to 23.53%.



ANALYSIS

The decision to use a multimodal approach was supported by multiple studies which identified a multifaceted approach to HPV promotions was superior to one particular approach (Rodriguez, 2019; Hendrickson et al., 2018, Dempsey et al., 2018; Kim et al., 2020). Three components made up our multimodal intervention:

- 1) Informational Video provided to patients on the HPV vaccine.
- 2) Announcement Approach by Provider to communicate HPV vaccination needs to patients.
- 3) Tagging Method in Electronic Health Record (EHR) to identify HPV vaccination needs.

The use of an informative video in this project's intervention was included because results of prior existing studies suggest the use of videos resulted in a higher likelihood of vaccinating compared to more traditional methods such as written pamphlets alone (Hopfer, 2012; Kim et al., 2020; Vanderpool et al., 2013). The particular video chosen, HPV: It's not too Late from the Healthy Teen Network, was selected due to its target audience being those individuals qualifying for the catchup recommendations issued by the CDC in the young adult age range. The announcement based approach for providers was included in this project's intervention. The evidence reviewed supported that HPV vaccine announcements normalize HPV vaccination for both providers and parents leading to clinically significant increases in vaccination (Brewer et al., 2017). A conversation approach, where parents and providers openly participate in a discussion, has not been shown to be as effective (Brewer et al., 2017; Henrickson et al., 2015). Lastly, this project used the "sticky note" function of MHS Genesis to state their HPV vaccination status ("Patient due for HPV vaccination" or "Due for next HPV dose"). While

only the “no vaccine” individuals participated in our intervention, the project team thought it was important to still identify individuals needing to complete the vaccine. This provided the healthcare provider with the information to still provide a strong recommendation to the individual.

Objective 1

Objective one was to identify if a combined video and strong provider recommendation with standardized clinic screening process intervention correlated with **following through** on getting the HPV vaccination initiated within a two-week window post-appointment.

While HPV vaccination rates did increase in the clinic snapshot from September to December in all categories, it is important to remember this is just a snapshot. Due to the limitations of data computation at this particular site, only the snapshot method of monitoring could be used and cannot be directly tied to the intervention.

No one initiated the HPV series during the intervention. Though a significant number of participants (42%) increased their intent to get the vaccination both in the next two weeks ($p = .004$) and without a time frame ($p = .003$). This identified a significant shift towards intention for these individuals to get vaccinated. Zero out of forty-five participants reported they would “never” receive the vaccine.

The narrow window of two weeks could have contributed greatly to the lack of uptake in initiating the HPV vaccine. Only one article measured HPV vaccination uptake within the two week mark (Dixon, 2019) increasing HPV vaccination from the control group by only approximately 15% with their digital vaccine education video. Other studies spanned from 2-6

months (Brewer, 2017; Kim,2020; Bennet, 2015; Hendrickson et al., 2018); significantly longer than our 2 week time frame.

Objective 2

This project's second objective sought to identify changes from a video plus focused provider approach on the beliefs/attitude of HPV vaccination and intention to initiate the HPV vaccination. Of the questions in this project's tool that measured harms and vaccine safety, all showed decreased views that the HPV vaccine was unsafe or could cause harm suggesting the intervention improved participant's perspective in this domain. These findings are consistent with current evidence that emphasized increasing knowledge about the risks, benefits, and safety of health behaviors improved implementation of the behavior (Brewer et al., 2017; Dempsey et al., 2018; Dixon et al., 2019; Henrikson et al., 2015). Dixon et al. (2019), for example, reported a three-times more likelihood of HPV vaccination utilization based on their video-based intervention specifically focused on the benefits and safety of the HPV vaccination. Similarly, the provider recommendation intervention that stressed vaccine safety as a required discussion component in the study by Brewer et al. (2017) resulted in a 5.4% increase in vaccination initiation compared to control.

The questions measuring access to vaccination showed little to no change, and none were statistically significant (See Table 2 for barrier domain questions). The lack of change in this domain is consistent with findings in the study by Valdez et al. (2018), as the authors report that participants in their study did not show a change in perception of cost or access to a clinic from their intervention. The authors suggest that the simple act of presenting to the clinic meant barriers to cost or access were addressed prior to their intervention (Valdez et al., 2018). A similar effect may account for the findings of this project's intervention. In the study by Valdez

et al. (2018), the setting was a community health clinic offering low-cost health care, suggesting that cost may not have been an issue. This project's population, likewise, were active-duty personnel presenting to a military health clinic on base. Active duty military are required to have no-cost and relatively easy access to healthcare as stated in Department of Defense (DoD) Directive 6010.04, meaning cost or access to providers/clinics is not a barrier (Department of Defense, 2015). The M-CHIAS specifically queried cost and access to a clinic but did not provide specific definitions for the term "cost." Time away from other activities, actual dollar amounts, or fuel expenses related to transit to the clinic can mean cost for some service members. A recommendation for the future is better defining cost and access in measurements to better assess this domain.

Participants' perception that health providers recommended the HPV vaccine significantly increased ($p=0.017$) suggesting participants were more likely to view that providers recommended vaccination after the intervention than before the intervention. This increase may result from the project design as providers were explicitly encouraged to present an announcement approach to recommending the vaccination and using an electronic health record reminder to help cue providers. There was a higher chance that project participants received a provider recommendation and answered the assessment question accordingly compared to non-participants. Although this project did not have a comparative control group, the results of this question suggest the providers followed through on the HPV recommendation. The interventions implemented and subsequent results of this project are consistent with findings in the literature supporting provider announcements and prompts/reminders on improving vaccinations (Brewer et al., 2017; Dempsey et al., 2018; Rodriguez et al., 2019).

Participant perceptions in how they viewed colleagues getting the HPV vaccination did not significantly change ($p = 0.0842$). This finding may be explained by the intervention's video

choice. This project's video was a generic HPV informational video readily obtained from a public website (<https://www.youtube.com/watch?v=3AGwRdMlw2g>). In contrast, Kim et al. (2020) utilized a specifically tailored storytelling video to deliver their information, emphasizing evoking emotions, memories, and imagination to engage their population. The tailored video facilitated personal identification between the participant and those in the video, creating a sense of shared experience and subsequently translated into improved attitudes and beliefs on HPV vaccination (Kim et al., 2020). This project's participants, all active duty, may not have been as engaged or as able to closely identify with the subjects of the public-oriented video resulting in no significant change in the question investigating social norms of fellow service members.

The last part of objective two measured the intervention's influence on a participant's intent to vaccinate. Intent to vaccinate in the next two weeks ($p = 0.004$) significantly increased as well as intent to vaccinate without a time frame ($p = 0.003$). Results are consistent with the study by Kim et al. (2020) that specifically measured changes in intention to vaccinate after a video intervention. Kim et al. (2020) found a 144% increase in intent to receive the HPV vaccination due to their specifically tailored video. Contrastingly, Bennett et al. (2015) found that an online tool alone did not have a significant change in intent compared to a more traditional CDC-based written factsheet. Although this study did not show improvement of intent, it provided support that a media approach alone is insufficient to garner a significant change in intent. The studies by Bennet et al. (2015) and Dempsey et al. (2018) served as evidence supporting this project's multi-faceted approach – video plus provider recommendation plus reminder/prompt system. Additional evidence in the literature also endorsed this approach to improving HPV vaccinations and intent (Bennett et al., 2015; Henrikson et al., 2015; Kim et al., 2020).

Although the individual impact of each component (video, provider recommendation, or EHR prompt) on attitudes/beliefs and intention to vaccinate was not determined, results show a

significant improvement towards participants attitudes related to harms and vaccine safety. Specifically, participants' perception that the vaccine may cause health problems in the future ($p = 0.003$), perception that they would like to delay getting the vaccine due to “newness” ($p = 0.04$), and perception that the vaccine is effective in preventing cancer ($p = <0.001$). This result is in line with evidence suggesting that improving the perception of vaccines' harms and safety improves vaccination uptake (Gerend et al., 2013; Henrikson et al., 2015; Hopfer, 2012). This project's specific population nuances may explain why perceived cost and access to HPV vaccinations did not change, suggesting this domain may not be influential for an active duty service member in vaccine acceptance. Perceptions on the social norms of HPV vaccination were also not affected by the intervention but may be explained by the project's specific video choice not being tailored toward the military. Lastly, the intent to vaccinate improved, likely explained by the summation of the project's individual modalities used in the intervention.

Objective 3

Objective three involved developing a screening process to determine the eligible population for HPV vaccine. Upon initial review, it was found that there was a discrepancy in the EHR and current CDC catch-up HPV vaccination guidelines. Those eligible for the catch-up HPV vaccination were tagged in the EHR under HPV vaccination as “Aged Out”. Throughout the review of the literature, prompts to healthcare providers and reminders to address vaccination status (Rodriguez, 2019; Hendrickson et al, 2018; Brewer, 2017) were found to be an important and effective strategy to improve HPV vaccination rates. This allows for a cue to remind the provider to give a strong recommendation that also holds strong value in improving HPV vaccination rates (Brewer, 2017). It was found that a tagging method was being used in the charts to identify other health promotion needs, but not being scrubbed for HPV vaccinations

specifically. Adding the HPV vaccine to this scrub was easily implemented and can continue to be maintained.

Completion of the HPV series did occur within the two week period. Of those receiving their 2nd or 3rd dose of the HPV vaccine, rates increased from two individuals to eleven individuals (18%). This could be attributed to the intervention of “tagging” the records of individuals needing the 2nd/3rd dose. This tagging method may have triggered the provider discussion with the patient and influenced these patients to get these doses creating an overall impact in vaccination.

It was also identified that not all individuals were aware of their vaccination status. Some individuals who qualified for the intervention due to not having the vaccination in their EHR believed they received the vaccination prior to entering the military as a child or adolescent. These individuals were encouraged to get their vaccination records to be added to their current EHR and received this project’s intervention. However, may have not had a reason to follow through with the vaccine once documentation was produced. Current CDC (2017) guidelines advise to vaccinate if documents cannot be produced. .

ORGANIZATIONAL IMPACT / IMPLICATIONS TO PRACTICE AND POLICY

This project clearly identified that intention does not equate to action. No one initiated the HPV series during the intervention and in the 2 weeks post intervention, even though 42% answered they intended to vaccinate in the next two week period. Accessibility issues were identified that may have made getting the vaccination more difficult. In this clinic, immunizations is a separate entity not fully integrated into primary care, nor is it continuously manned. If someone was not manning immunizations when someone wished to get a vaccine, the immunization staff would have to be found, open immunizations, and proceed with the

individual's immunization. During this project's four week intervention there was another compounding barrier. The immunizations clinic was closed for one week to support the base-wide influenza shot exercise for all active duty patients. Systemic barriers such as hours of operation, appointment policies, and wait times have been shown to have effects on immunizations (Haley, 2014). With HPV not being a mandatory vaccination, participants are less likely to feel obligated to initiate the vaccine series.

By the end of the project conclusion, an adjustment in the EHR to automatically identify those individuals who qualified for the HPV catch up vaccine with the "Aged Out" tag was changed to "Needs Vaccine". This helps at least identify patients who qualify for the vaccine creating a standardized automatic system to help staff identify patients needing the HPV vaccine.

FUTURE DIRECTIONS FOR RESEARCH AND PRACTICE

One area for future research is the type of video used in promoting health behaviors for the military. The results of the randomized controlled trial run by Kim et al. (2020) and Dixon et al. (2019) support the use of a video modality used in the project's intervention. The population for Kim et al. (2020) was college-aged women (ages 18 - 26) and closely matched the project's 19-26 age group. The authors found a 144% increase in intention to vaccinate compared to the control group, in addition to a higher percentage of participants who received the vaccination (15.4% intervention vs. 7.1% comparison group)(Kim et al., 2020). Although this project found an increase in intention, it did not see an increase in receiving the vaccine. The style of video used may explain the difference in results between the projects. Kim et al. (2020) utilized an originally produced video tailored explicitly for their population. The video featured a storytelling approach to deliver their information, emphasizing evoking emotions, memories, and imagination to engage their population (Kim et al., 2020). This project used a generic HPV

informational video for our video, readily obtained from a public website and tailored for the general public. Kim et al. (2020) acknowledge that leveraging culturally relevant storytelling through a narrative method was a goal in developing their video tailored for Korean-American college women. A purposeful, specifically produced narrative video tailored for military culture may benefit future interventions targeting the military community. Future research is needed to determine the style, content, and delivery of such video.

Another opportunity for future research is determining how effective an announcement approach by providers is in the military population. A study appraised for this project's intervention by Brewer et al. (2017) utilized a population of parents of children and adolescents of a single southeastern state in the United States. The highly specific population makes it difficult to generalize their results to this project's intervention. Still, Brewer et al. (2017) found clinically significant increases in HPV vaccination for their study in children ages 11-13, but no significant increases in adolescents 13-17. This project's results were similar to the Brewer et al. (2017) study, whereas none of this project's population actually received the vaccination despite a statistically significant increase in reported intention. Differences in age-specific autonomy may be why this project's population closely matched the results of the adolescents noted in the study by Brewer et al. (2017). The authors propose that adolescents have more autonomy in decision-making and could better influence their parents than younger-aged children. Similarly, this project's older participant age may mean they have more autonomy over their health-related decisions despite recommendations of a provider. It is reasonable to suggest that providers' announcement approach may be successful in the military population because many vaccines are mandatory. Further research is needed specific to the military population about announcement versus conversation discussion on elective or voluntary health behaviors.

Lastly, the timeframe best suited for enacting health change after an intervention is a point for future research. Dixon et al. (2019) provided evidence supporting an educational intervention in a clinical setting that improves vaccine behaviors. Dixon et al. (2019) utilized a software called THEO that stratified participants based on pre-existing favor for the HPV vaccination before the video intervention. For example, participants with a higher pre-existing favor for vaccination received a video message tailored toward a reinforcement message. Participants who had lower favor received a different video message emphasizing risks, safety, and vaccination benefits. In total, the intervention arm that received a video intervention showed higher HPV vaccine utilization compared to the control. This project did not perform a similar pre-stratification of the subjects instead each subject received the same intervention regardless of pre-existing attitudes. Dixon et al. (2019) notes that the variability in wait times from check-in to provider entering the room may also affect results. Some individuals may have more time to reflect and process the video compared to others. The appropriate time frame for influencing health behaviors and the utility of pre-sorting or stratifying individuals to determine a video's specific message are targets for future research.

Conclusion

HPV-related cancers are a significant disease with an established safe and effective preventative treatment. In order for the military to meet recommendations by the CDC, meet Healthy People Goal 2030, and to stay in line with DHA mission objectives, HPV-related disease must be prevented with vaccinations. The challenge remains, however, that the HPV vaccination is not mandatory for service members. After reviewing current literature, the project found evidence that a combination of a strong provider recommendation, the information presented in a video, and an electronic health record prompt was the best evidence-based method to improve

vaccination for an active duty clinic. This process improvement project showed statistically significant changes in the intention to receive the HPV vaccination and improved attitudes toward vaccine harm and safety. The intervention utilized a practical approach of a short video, provider announcement recommendation, and screening prompt. Although the intervention increased intention to vaccinate, vaccination initiation did not occur possibly due to process barriers. Process barriers included access to the immunization clinic, the vaccination being non-mandatory, and the process of having to go to a separate immunization clinic for the vaccination. While these process barriers may be difficult to overcome in the setting of short-staffing and a pandemic, the intervention can be a novel piece to practical changes that can improve HPV vaccination.

This project may provide insight for encouraging and improving rates of other non-mandatory health behaviors such as vaccinations, colonoscopies, or mammograms. This project's results could also be translated to the current COVID-19 pandemic. Project insights regarding increasing intent to vaccinate among non-mandatory vaccines may help increase the number of service members choosing to get the COVID-19 vaccination in light of the pandemic. As of April 8, 2021, Rear Admiral Gayle Shaffer, Deputy Surgeon General, states 35% of the Navy Active Duty force is vaccinated (R. J. Place, J. K. Faris, G. Shaffer, & R. Miller, official transcript, 2021). In the hope to increase the Navy's vaccinated numbers, the lesson learned through this process improvement project can help Navy commands worldwide.

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**Appendix A
CITI Certificates**



Completion Date 25-Aug-2018
Expiration Date 24-Aug-2021
Record ID 28304162

This is to certify that:

Lauren Lazzaro

Has completed the following CITI Program course:

Good Clinical Practice (U.S. FDA Focus)

(Curriculum Group)

GCP for Clinical Trials with Investigational Drugs and Medical Devices (U.S. FDA Focus)

(Course Learner Group)

1 - GCP

(Stage)

Under requirements set by:

Office of the Under Secretary of Defense (Personnel and Readiness)



Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?wd890e823-198f-4ff6-9468-859f8166c728-28304162



Completion Date 27-Aug-2018
Expiration Date 26-Aug-2021
Record ID 28304163

This is to certify that:

Lauren Lazzaro

Has completed the following CITI Program course:

Responsible Conduct of Research (RCR) (Curriculum Group)
Responsible Conduct of Research (RCR) (Course Learner Group)
1 - Basic Course (Stage)

Under requirements set by:

Office of the Under Secretary of Defense (Personnel and Readiness)



Verify at www.citiprogram.org/verify/?w4337e261-7a12-420e-89ad-448bc5917dc4-28304163



Completion Date 25-Aug-2018
Expiration Date 24-Aug-2021
Record ID 28304161

This is to certify that:

Lauren Lazzaro

Has completed the following CITI Program course:

OUSD P&R Human Research	(Curriculum Group)
Biomedical Investigators and Research Study Team	(Course Learner Group)
1 - Biomedical Investigators	(Stage)

Under requirements set by:

Office of the Under Secretary of Defense (Personnel and Readiness)



Verify at www.citiprogram.org/verify/?w7bec136b-d13d-4c8c-9982-1c550bb5377f-28304161



Completion Date 28-Aug-2018
Expiration Date 27-Aug-2021
Record ID 28321949

This is to certify that:

Breda Jenkins

Has completed the following CITI Program course:

OUSD P&R Human Research	(Curriculum Group)
Biomedical Investigators and Research Study Team	(Course Learner Group)
1 - Biomedical Investigators	(Stage)

Under requirements set by:

Office of the Under Secretary of Defense (Personnel and Readiness)



Verify at www.citiprogram.org/verify/?w0336589c-63be-4d70-9738-31bdb104b383-28321949



Completion Date 28-Aug-2018
Expiration Date 27-Aug-2021
Record ID 28321950

This is to certify that:

Breda Jenkins

Has completed the following CITI Program course:

Good Clinical Practice (U.S. FDA Focus)

(Curriculum Group)

GCP for Clinical Trials with Investigational Drugs and Medical Devices (U.S. FDA Focus)

(Course Learner Group)

1 - GCP

(Stage)

Under requirements set by:

Office of the Under Secretary of Defense (Personnel and Readiness)

CITI

Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?w2b3217b7-1307-4b0e-b125-94bce1591a02-28321950



Completion Date 28-Aug-2018
Expiration Date 27-Aug-2021
Record ID 28321951

This is to certify that:

Breda Jenkins

Has completed the following CITI Program course:

Responsible Conduct of Research (RCR) (Curriculum Group)
Responsible Conduct of Research (RCR) (Course Learner Group)
1 - Basic Course (Stage)

Under requirements set by:

Office of the Under Secretary of Defense (Personnel and Readiness)



Verify at www.citiprogram.org/verify/?w90a5d1ef-bd3a-43c5-ac0d-3c6641582305-28321951



Completion Date 27-Aug-2018
Expiration Date 26-Aug-2021
Record ID 28312342

This is to certify that:

Christopher Bunag

Has completed the following CITI Program course:

Responsible Conduct of Research (RCR) (Curriculum Group)
Responsible Conduct of Research (RCR) (Course Learner Group)
1 - Basic Course (Stage)

Under requirements set by:

Office of the Under Secretary of Defense (Personnel and Readiness)



Verify at www.citiprogram.org/verify/?wc4d785f8-4644-4de6-9665-51f639d79b5c-28312342



Completion Date 27-Aug-2018
Expiration Date 26-Aug-2021
Record ID 28312341

This is to certify that:

Christopher Bunag

Has completed the following CITI Program course:

Good Clinical Practice (U.S. FDA Focus)

(Curriculum Group)

GCP for Clinical Trials with Investigational Drugs and Medical Devices (U.S. FDA Focus)

(Course Learner Group)

1 - GCP

(Stage)

Under requirements set by:

Office of the Under Secretary of Defense (Personnel and Readiness)

CITI

Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?w5d0d4a8e-4218-4a5c-b332-99b44ce7e658-28312341



Completion Date 27-Aug-2018
Expiration Date 26-Aug-2021
Record ID 28312340

This is to certify that:

Christopher Bunag

Has completed the following CITI Program course:

OUSD P&R Human Research	(Curriculum Group)
Biomedical Investigators and Research Study Team	(Course Learner Group)
1 - Biomedical Investigators	(Stage)

Under requirements set by:

Office of the Under Secretary of Defense (Personnel and Readiness)



Verify at www.citiprogram.org/verify/?wb38753c0-ea07-4d9f-abab-f19ad5867199-28312340



Appendix B
Notification of Project Approval

OFFICE OF RESEARCH

4301 JONES BRIDGE ROAD
BETHESDA, MARYLAND 20814
PHONE: (301) 295-3303; FAX: (301) 295-6771

NOTICE OF PROJECT APPROVAL

Change Number: Original

VPR Site Number: GSN-61-11730
Principal Investigator: Jenkins, Breda
Department: Graduate School of Nursing
Project Type: Student
Project Title: An Evidence-Based, Process Improvement Project for Improving Human Papillomavirus Vaccination Initiation in an Active Duty Clinic.
Project Period: 11/16/2020 to 12/11/2020

Assurance and Progress Report Information:

Table with 6 columns: Name, Sup, Approval Type, Status, Approved On, Forms Received. Row 1: Progress Report, 0, To be Submitted, N/A

Remarks:
This Notice Of Project Approval has been reviewed and approved. Please remember that you must submit a final Progress Report (Form 3210) upon completion of this project.

Questions regarding this approval should be directed to the following person in the Office of Research:
Sharon McIver, (301) 295-9814.

Toya V. Randolph, Ph.D., MSPH
Asst. Vice President for Research
Uniformed Services University of the Health Sciences

cc: File
Dr. Kennett Radford
Laura, Taylor

Appendix C E-irb Letter of Determination



Bunag, Christopher <christopher.bunag@usuhs.edu>

eIRB determination for HPV Vaccination Initiation EBP project at NH Bremerton

Newnam, Rachel E LCDR USN NAVHOSP BREMERTON WA (USA)

Thu, Nov 12, 2020 at 9:52 AM

To: "Bunag, Christopher" <christopher.bunag@usuhs.edu>, Breda Jenkins [REDACTED], Lauren Lazzaro [REDACTED]

Cc: "Taylor, Laura A CIV (USA)" [REDACTED]

Team,

Here is the original email that I received from the eIRB at San Diego. Please print, scan, and upload this email as your IRB non-research determination letter into Sakai.

V/R,

LCDR Newnam

From Cook, Wendy A CDR USN NAVMEDCEN SAN CA (USA) [REDACTED]
Sent: Friday, October 23, 2020 3:03 PM
To: Newnam, Rachel E LCDR USN NAVHOSP BR [REDACTED] San Diego NAVMEDCEN SAN CA List NMCS-EDOs [REDACTED]
Subject eIRB application for HPV Vaccination Initiation [REDACTED]

Hello LCDR Newnam,

Congratulation ! Your QI project is approved Your study ID is NMCS-EDOs QI 2020 102301

Please input your study ID into the appropriate place in eIRB and submit according to the SOP

Very Respectfully,

CDR Wendy Cook, NC, USN

PhD, RN, CCNS, NEA BC

Department Head, Nursing Administration

Assistant Specialty Leader, Nursing Research (1900D)

Vice Chair, Institutional Review Board

Naval Medical Center San Diego

Office 619 532 9850



Appendix D

**PLACEHOLDER FOR PAO
CLEARANCE**

Appendix E Data Collection Forms

PRE-Assessment

#

PLEASE COMPLETE THE FOLLOWING QUESTIONS TO THE BEST OF YOUR ABILITY.

AGE _____ RANK _____ GENDER _____ PLACE "X" IN THE BOX TO THE RIGHT TO IDENTIFY YOUR ANSWER.		Strongly Disagree	Disagree	Agree	Strongly Agree
1	I worry that the HPV vaccine might cause short term problems like fever or discomfort.				
2	I worry that the HPV vaccine is being pushed to make money for drug companies and/or doctors.				
3	I worry the HPV vaccine may cause me health problems in the future.				
4	I think that the HPV vaccine is unsafe.				
5	I think that I am too young to get a vaccine for a sexually transmitted infection like HPV.				
6	The HPV vaccine is so new that I want to wait a while before deciding to get it.				
7	I think that getting a new vaccine is like performing an experiment on myself.				
8	HPV vaccination is not really necessary because screening can be done to make sure cancers do not develop.				
9	The HPV vaccine is effective in preventing cancer.				
10	It is hard to find a clinic where I can afford the HPV vaccine				
11	It is hard to find a provider or clinic that would provide the vaccine for myself.				
12	It is hard to find a provider or clinic where I don't have to wait for a long time to get an appointment to get vaccinated.				
13	My provider recommends the HPV vaccine.				
14	Other service members are getting the HPV vaccine.				
		Strongly Disagree	Disagree	Neutral	Agree
15	I intend to get vaccinated against HPV in the next 2 weeks.				
16	I will never get vaccinated against HPV.				

POST-Assessment

PLEASE COMPLETE THE FOLLOWING QUESTIONS TO THE BEST OF YOUR ABILITY.

PLACE "X" IN THE BOX TO THE RIGHT TO IDENTIFY YOUR ANSWER.					
		Strongly Disagree	Disagree	Agree	Strongly Agree
1	I worry that the HPV vaccine might cause short term problems like fever or discomfort.				
2	I worry that the HPV vaccine is being pushed to make money for drug companies and/or doctors.				
3	I worry the HPV vaccine may cause me health problems in the future.				
4	I think that the HPV vaccine is unsafe.				
5	I think that I am too young to get a vaccine for a sexually transmitted infection like HPV.				
6	The HPV vaccine is so new that I want to wait a while before deciding to get it.				
7	I think that getting a new vaccine is like performing an experiment on myself.				
8	HPV vaccination is not really necessary because screening can be done to make sure cancers do not develop.				
9	The HPV vaccine is effective in preventing cancer.				
10	It is hard to find a clinic where I can afford the HPV vaccine				
11	It is hard to find a provider or clinic that would provide the vaccine for myself.				
12	It is hard to find a provider or clinic where I don't have to wait for a long time to get an appointment to get vaccinated.				
13	My provider recommends the HPV vaccine.				
14	Other service members are getting the HPV vaccine.				

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
15	I intend to get vaccinated against HPV in the next 2 weeks.					
16	I will never get vaccinated against HPV.					

To be completed by Assessment Team:

Question #1-14 Total _____ / 56

Question # 15 Total _____ / 5

Question #16 Total _____




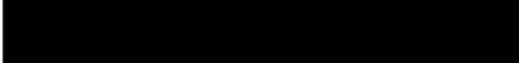

**DOCTOR OF NURSING PRACTICE PROJECT
 Completion Verification Form**

The DNP Project titled:

Improving Human Papillomavirus Vaccination Initiation in an Active Duty Clinic: A Process Improvement Project

was completed at: Naval Branch Clinic Bangor, Silverdale, WA



by the following student(s):

<i>(type student name)</i>	<i>(signature)</i>	<i>(date)</i>
<u>Lauren Lazzaro</u>		<u>04/05/2021</u>
<u>Breda Jenkins</u>		<u>03/30/2021</u>
<u>Christopher Bunag</u>		<u>03/30/2021</u>
_____	_____	_____
_____	_____	_____

The DNP Practice Project Team verifies that the following components of the DNP project, accomplished by the above students, is of sufficient rigor and demonstrates doctoral level scholarship to meet the requirements for USUHS GSN graduation:

- Presentation of DNP project to the leadership/stakeholders at the Phase II Site,
- Abstract/Impact Statement (*Appendix F*), and
- DNP Project written report.

Verified by:

<i>(type name)</i>	<i>(signature)</i>	<i>(date)</i>
Senior Mentor: <u>Jennifer Trautmann</u>		<u>26 Apr 2021</u>
Team Mentor: _____	_____	_____
Team Mentor: _____	_____	_____
Phase II Site Director: <u>LCDR Rachel Newnam</u>		<u>27 Apr 2021</u>

For RNA Students only - add the following additional signature for final verification of project completion:

_____	_____	_____
<i>RNA Project Director (type name)</i>	<i>(Signature)</i>	<i>(Date)</i>