HPV Vaccine Uptake in Young Adolescents at a Primary Care Clinic

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Abstract

Background: Human papilloma virus (HPV) is estimated to have a lifetime cancer risk of 80%. The current HPV vaccine has a 90% prevention rate at preventing cancers when the vaccine series is completed prior to age 13. Parents of 9-and10-year-olds are the strongest positive influence in immunization initiation of adolescents.

Problem: A local primary care clinic has a goal to increase series completion of the HPV vaccine by age 13 and is below their target goal rate.

Methods: An education intervention to increase knowledge regarding the benefits of early HPV vaccination was presented to medical assistants at the clinic. The intervention included a role-play opportunity to practice evidence-based strategies for recommending the HPV vaccine to parents of 9-year-old patients and address vaccine hesitancy. A pre- and post-intervention survey measured HPV vaccine knowledge, and comfort and confidence recommending the HPV vaccine to parents.

Results: HPV knowledge was significantly increased on one post-survey question by 56% (p = 0.01). Comfort recommending the vaccine increased by 169% post-intervention (p = 0.03), but confidence recommending the vaccine did not significantly increase from pre-survey (p = 0.17).

Conclusions: This project suggests that HPV education with a simulated role-play activity increases the strength of recommendation when clinic staff offer the HPV vaccine to parents of patients at age 9. Further research may elucidate the effect of this approach on HPV vaccine completion rates by age 13.

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Problem Description

In the United States (US), overall prevalence of human papilloma virus (HPV) infection is 40% in ages 15 to 59, but lifetime prevalence has been estimated as high as 80% (Center for Disease Control [CDC], 2023; Lewis et al., 2021). Nationally, there is an 80% lifetime risk of developing cancer from HPV in the United States (US) and 28% of women aged 18 to 39 had an HPV related cervical dysplasia during cervical cancer screenings in Oregon (NIH, 2022; OHA, 2020). In 2006, the Federal Drug Administration (FDA) approved an HPV vaccine for females ages 9 through 26 to prevent infection of HPV alpha subtypes 6, 11, 16 and 18, which cause cervical, oropharyngeal, perianal, vaginal, penile, rectal, vulvar mucosal cancers among other cancers as well as warts. Subtypes 6 and 11 are thought to cause 85-95% of anogenital warts, subtypes 16 and 18 are thought to cause most high-risk cervical dysplasia (CIN2+) (Drolet et al., 2019).

An updated Gardasil-9 vaccine has been available since 2014, is the only HPV vaccine that protects against HPV alpha subtypes 6, 11, 16, 18, 31, 33, 45, 52, and 58 in the US, and is available as a two-dose series before age 15 and a three-dose series for completion of the series at age 15 and older (CDC, 2021). The FDA has approved the 9 valent HPV vaccine irrespective of gender in adolescents as early as age 9, but it is not officially recommended until age 11 (CDC, 2021).

HPV vaccination is strongly associated with a decrease in genital warts and low- and high-risk cervical dysplasia (Dilley et al., 2019). Drolet et al. (2019) reported that after HPV vaccination, the prevalence of high-risk subtypes 16 and 18 decreased by 83% in 13–19-year-old girls, anogenital warts decreased by 48% in men, and high-risk cervical dysplasia lesions (CIN2+) decreased by 51% in 15-19-year-olds. Research has shown the HPV vaccine prevents

infection from other subtypes that cause cancer in people without cervixes, but cultural attitudes towards the vaccine have continued to focus on giving the vaccine to people with cervixes (Dykens et al., 2023; Mansfield et al., 2021).

Although the vaccine is available for 9–11-year-olds, due to previous recommendations and current CDC guidelines that do not recommend HPV vaccination until 11 years old, many providers continue to offer the vaccine starting at age 11 (Lake et al., 2023). Saxena et al. (2023) found that HPV vaccination series completion was higher in adolescents who initiate the first dose between age 9 to 14 than in teens who initiate the vaccine later. Ellingson et al. (2023) also found that the HPV vaccine confers greater protection from complications from HPV infection when given in age 9 to 14 than when given from age 15 to 18. The Healthy People 2030 goal for HPV vaccine completion at 13-15 years is 80% but completion rate has been measured at less than half this rate in 13-year-olds (Bednarczyk et al., 2023).

This project will provide an educational intervention to clinic staff regarding efficacy of HPV vaccine; it will highlight the rollout of the new EHR alert for MAs to offer the HPV vaccine starting at age 9, and it will provide an evidence-based workshop in recommending the HPV vaccine to parents of adolescents.

Search Strategy

A PubMed literature search using MeSH terms *health personnel*, *child*, and *papillomavirus vaccines* published in English from 2019 to 2024 yielded 66 results and 15 of those were included. An additional literature search using MeSH terms *nurs** or *medical assistant,* or *primary care clinic staff,* or *nurses+,* or *primary health care,* and *patient education* or *health education* or *parents+/ED* and *hpv vaccine* or *human papillomavirus* or *papillomavirus infections* and *survey* or *surveys+* yielded 152 studies published in English from 2019 to 2024

and three of those were included. An additional 13 studies were found searching through citations.

Available Knowledge

Do et al. (2021) reviewed 25 studies on HPV vaccine uptake to assess cultural and geographical differences in vaccine initiation and completion. They found that states that mandated sex education and vaccination had higher rates of completion while states with greater percentage of religious adults were associated with lower completion rates. They additionally found that rates were higher among non-white persons and those living in poverty, and rates were higher in boys living in urban areas than rural areas. Berdancyzk et al. (2023) reviewed articles on factors influencing HPV vaccine uptake in adolescents and found three major points: initiating an alert to prompt HPV vaccination at age 9 increased vaccine initiation from 4.6% to 35.7% at 6 months and to 60.8% at 18-months, early initiation at 9-10-years-old increased completion compared to initiation at 11-12-year-old (97.5% vs 78%), and interventions targeted at providers increased initiation by 27% and increased completion at 13-years-old by 26%. However, Wilkinson et al. (2019) did a randomized control trial where medical record alerts were implemented with 29 providers across 1285 clinical encounters over 13 months and did not find a statistically significant difference in HPV vaccine uptake in 11-12-year-olds. Fenton et al. (2020) measured 113 adolescents aged 9-17 and found that only 5% of adolescents influenced their parents' decisions about initiating or deferring the HPV vaccine, so approaches that target adolescent vaccine hesitancy do not significantly increase HPV vaccine uptake. Agana-Norman et al. (2024) conducted 40-minute interviews with 21 parent participants to understand what barriers parents of adolescents' face when seeking the HPV vaccine for their children and found lack of knowledge was a main factor even after one-on-one education with a patient navigator.

Jin et al (2023) similarly found that greater knowledge of the benefits of HPV vaccination decreased hesitancy in 497 parents of adolescents.

Provider Recommendation

Meadows et al. (2024) implemented an on-demand video training for providers combined with clinic audits on HPV vaccine uptake for patients 9-26-years-old in a quasi-experimental design observing 60,328 encounters, finding that this type of training and feedback did not significantly increase HPV vaccine uptake. Kong et al. (2024) assessed health care providers in an online survey and found increased self-efficacy in ability to recommend HPV vaccine using a presumptive recommendation approach rather than asking parents how they feel about shots. Brewer et al. (2023) recommended providers use the Announcement Method to educate parents by stating child is now age 9, that they are due for HPV vaccine, and that you will vaccinate today. If a parent is hesitant, they recommend re-educating and counseling, and if they refuse, to try again at the next visit. Beasley et al. (2023) noted that they had to address vaccine hesitancy in 10-30% of parents, but that parents were more likely to accept the HPV vaccine at 9 because it meant fewer shots and it was less associated with sexual activity. Zahn et al. (2023) found that providers stating that the HPV vaccine is recommended starting at age 11 or 12 led to lower initiation, stating that the vaccine is recommended from 9-12 increased initiation, and stating the vaccination starts at age 9 increased initiation further. Biancarelli et al. (2020) reported that providers who offered the HPV vaccine to parents of children younger than 11 years found that framing the need for the vaccine without needing to address sexual activity in this age group may increase parents' acceptance of the vaccine and that the need for only two doses to complete the series at this age decreases barriers to completion.

Clinic Staff Recommendation

Maynard et al. (2024) used software called Communicating about HPV Vaccination to Adults and Teens (HPV CHAT) to increase knowledge about HPV vaccination, confidence in discussing safety concerns, and comfort recommending the vaccine in healthcare workers in nine clinics and assessed knowledge using a pre- and post-intervention survey. The study found that within the clinical staff group there was a 20% increase in knowledge about HPV-related cancer and a 20% increase in knowledge about the age of the first dose of the HPV vaccine after the intervention (Maynard et al., 2024). Clinical staff showed an 18.2% increase in discussing safety concerns about the vaccine and a 37.7% increase in confidence answering questions when recommending the vaccine (Maynard et al., 2024).

Rosen et al. (2021) implemented a 60-minute role-play activity for school-based nurses where study participants recommended HPV vaccination for children of hesitant parents with safety concerns, questions about age, sex, gender, and school requirements. The authors state that participants were able to successfully use at least three out of four of the following evidence-based recommendation strategies: using the Announcement Method to inform parents their child is due for the HPV vaccine, using positive communication, using strong recommendations, and addressing questions without using medical jargon (Rosen et al., 2021). Most study participants (86%) rated the role-play activity highly (Rosen et al., 2021).

Available Tools to Increase Recommendation Effectiveness

Fiorito et al. (2021) tested role-play training activity to increase provider comfortability in recommending the HPV vaccine in 9-12-year-olds in 28 participants and found that quality of provider knowledge of HPV lifetime risk of infection, vaccine serotypes, cancers prevented, and reason for administration starting at 9-years-old increased after a didactic learning session. The studies by Rosen et al. (2022) and Maynard et al. (2024) indicate that educational interventions

have a positive impact on comfortability of school nurses recommending the HPV vaccine to adolescents and parents of adolescents. Maynard et al. (2024) showed that an educational intervention increases healthcare worker knowledge of HPV vaccination. Neither study fully addressed the question of whether an educational intervention would increase HPV vaccination knowledge and comfortability recommending the vaccine in young adolescents aged 9-to-10-years-old and neither study addressed whether an educational intervention would be effective specifically in medical assistants (Maynard et al., 2024; Rosen et al., 2022).

Rationale

This project will utilize The Model for Improvement and Plan, Do, Study, Act cycles to address concern of late vaccination for HPV (Langley et al., 2009). A PDSA cycle was expected to be the best strategy for improving HPV vaccine initiation in this clinic setting because improvements from each cycle could be measured in a dynamic work setting and because in this setting it would not be feasible to conduct a true cause and effect experimental trial in the target population of medical assistant for this education intervention. This clinic has a quality improvement team and has a history of using PDAS cycles for quality improvement projects (QIPs).

Specific Aims

Created and facilitated an educational session for medical assistants (MAs) about initiating the HPV vaccine and using the new shared decision-making Smart Set in the EHR that alerts MAs to offer HPV vaccination starting at age 9 on October 30, 2024.

MAs at a primary care clinic completed the didactic training on December 31, 2024, with goals to show an increase in overall HPV vaccine knowledge and comfort level and confidence talking to parents about initiating the HPV vaccine in their adolescent children.

Methods

Context

A local clinic has a performance target of 36.9% of both male and female adolescents receiving one dose of meningococcal (ACWY), one dose of tetanus-diphtheria-pertussis (TDaP), and series completion of HPV vaccines by age 13 based on Oregon Health Authority guidelines set by Healthcare Effectiveness Data and Information Set (HEDIS) MY2024 Technical Specifications for Health Plans (OHA, 2022). In July of 2024, the healthcare organization that the clinic is run by rolled out a new shared decision-making smart tool in the electronic health record (EHR) that will prompt medical assistants and providers to offer HPV vaccines at age 9 (K. Mills, personal communication, June 28, 2024). The site of this quality improvement project is a Federally Qualified Health Center (FQHC) that serves lower-income patients. The clinic uses an electronic health record system called EPIC. Clinical staff have received training on efficacy of early HPV vaccine initiation in the target age group. There are 34 primary care providers at the clinic comprised of twenty-five physicians, three nurse practitioners, and six physician assistants. An MA works with each provider, and they are responsible for rooming patients, taking vital signs, conducting lab draws during the visit, and administering vaccines. Between 8am and 5pm, a clinical pharmacist is available who can assist with medication questions. The clinic medical staff are overseen by a medical director and there is a quality improvement committee made up of staff that oversees quality improvement projects and consists of a nurse practitioner at the clinic, and two administrative quality program managers who are staff members at the clinic. The project team for this HPV educational intervention includes the DNP student, chairperson who is a nurse practitioner at the DNP student's school, a nurse practitioner at the clinic site who is on the quality improvement team, and two additional members of the quality improvement team who are staff members at the clinic.

Interventions

The intervention occurred over 2 phases. Phase 1 was completed during a clinic-wide education session and implementation of a new Smart Set in the EHR to alert MAs that patients are eligible starting at age 9 in July of 2024. Phase 2 of the project was the adaptation and delivery of an educational intervention to the MAs on the new Smart Set introduction to the workflow, benefits of HPV vaccination, and an opportunity to practice recommending the vaccine through a guided role-play activity (Appendix A). The project team used a survey tool adapted by Fiorito et al. (2021) and Rosen et al. (2021) with pre- and post-intervention survey and a role-play activity (Appendix B). The same survey was used before and after the education module. Additional survey questions were used to gain more feedback from participants and improve future PDSA cycles. The intervention was a ten-minute PowerPoint presentation that provides background information on HPV prevalence, transmission risk, HPV vaccine efficacy, evidence-based recommendations for initiating the vaccine at 9-years-old, and evidence-based strategies for recommending the vaccine to parents of 9-10-year-old patients and comes from Fiorito et al. (2021) and Rosen et al. (2022).

The intervention was conducted during a mandatory lunch meeting for MAs on October 30, 2024. Informed consent and pre-survey were given to participants prior to the intervention and a post-survey was given upon completion of the meeting to assess knowledge about the benefits of HPV vaccine initiation at 9-years-old, comfort with using the Announcement Method to encourage parents to agree to vaccination, self-assessment of staff's own comfortability recommending the vaccine, and suggestions for workflow changes that would support recommendations during these interactions. Based on stakeholder needs, prior provider HPV vaccine training, and the fact that medical assistants in the QIP setting are the first point of contact for recommending the HPV vaccine to all patients, an intervention targeting medical assistants is needed for this project.

Study of the Interventions

Data from survey questionnaires were entered into an Excel spreadsheet and MAs were de-identified with a participant number which was stored in a separate file. No personal health identifiers were collected or stored in the spreadsheet.

Measures

Outcome measure of this project was HPV vaccine knowledge gained from the educational intervention. Process measures were self-assessment of comfort and confidence in recommending the HPV vaccine to parents of eligible adolescent 9-year-old patients after education intervention and role-play activity.

Analysis

A statistician was consulted for analysis of data to determine whether the intervention significantly affects HPV vaccine knowledge and comfort in recommending the vaccine based on pre and post-test responses. Paired t-tests were used to measure statistical significance of pre- and post-surveys ($\alpha = 0.05$).

Ethical Considerations

No patient information was collected for this study. Staff confidentiality was maintained, and all staff information was de-identified to protect anonymity and privacy. Participation in the study was voluntary. The project champion at the clinic signed a letter of support for the project. The project proposal was approved by the Investigational Review Board (IRB) and met exemption criteria as nonhuman research (Appendix C).

Results

There was statistically significant difference in overall survey scores for pre- and post-intervention surveys of HPV knowledge at pre-survey mean of 73.33% (SD 28.28%) and post-survey mean of 90.56% (SD 11.3%) ($p = 0.17$). Of the five knowledge questions on those

surveys, only one question was significantly higher pre-intervention with correct responses 44.44% (SD 52.7%) and post-intervention correct responses of 100% (SD 0%) ($p = 0.01$). One survey question evaluated comfort in recommending the vaccine to parents and one question evaluated confidence in recommending the vaccine to parents using a five-point Likert scale. The mean overall score of comfort and confidence was significantly increased from 1.8 (SD 1.4) to 2.4 (SD 1.4) after intervention ($p = 0.03$). Separately, comfort increased from 1.3 (SD 1.5) to 2.2 (SD 1.6) post-intervention ($p = 0.03$), but confidence did not significantly increase from pre-survey of 2.3 (SD 1.4) to post-survey 2.4 (SD 1.6) ($p = 0.17$). After the education and role-play session was completed, the Adolescent Immunization Metric increased from 27.4% to 32.8% over a five-month period (R. Postman, personal communication, March 14, 2025). See Appendix D, and E for graphical and table representation of the results.

Discussion

Summary

The survey responses showed no significant increase in overall knowledge gained measured by average correct responses before and after the education and role-play intervention. There was a significant increase in knowledge about the number of annual infections caused by HPV prior to the release of the first HPV vaccine. There was a significant increase in self-assessed comfort recommending the HPV vaccine to parents of 9-and10-year-olds after the intervention, but no change in confidence the vaccine. After the education and role-play session, the Adolescent Immunization Metric increased by 5.4% in a five-month period. The discrepancy between comfort and confidence results may be explained by test subjects' different interpretations of comfort versus confidence, where subjects may have interpreted confidence to mean whether they believed parents would heed their recommendation to give their child the vaccine or the subjects' confidence in their own knowledge about the vaccine. Simulated role-

play activity may have increased subjects' comfort with this difficult topic, but did not affect their confidence in giving recommendation because their perception of confidence may only be significantly increased by live experience giving strong recommendations to parents. Strengths of this project include the length of the education intervention and survey time fitting into a 50-minute lunch period that this clinic had available for a training session. Thus, this intervention could be used by other clinics that utilize lunches as a staff training period and want to increase HPV vaccine uptake to meet the Adolescent Immunization metric. Follow-up training, evaluation, and individual feedback should be given to MAs who completed the education intervention to maintain HPV vaccine knowledge and comfort and confidence giving a strong recommendation to parents of adolescents.

Interpretation

This QIP found that an education and role-play intervention increased medical assistants' HPV knowledge and comfort in strongly recommending the HPV vaccine to parents of adolescents. This suggests that an education intervention is an important strategy to increase communication effectiveness between healthcare workers and parents of adolescents about the HPV vaccine, which may increase overall HPV vaccine uptake.

Limitations

Limitations of this project are small sample size, MAs may not have understood the distinction between comfort and confidence in the survey questions, MAs had prior HPV vaccine education at this clinic, some MAs joined the training remotely and their role-play activity was unmonitored, and some MAs did not fill out all survey questions. Whether the questions were inadvertently missed or not answered because the participant did not know the answer is unknown and because of this, the lack of a survey response was not factored into calculations. Individual bias against vaccines, against the HPV vaccine, or individual discomfort in offering

recommendations to parents of young adolescents not reported in the survey feedback may have decreased the effectiveness of the education intervention. The survey was designed to elicit personal responses, and time was given for MAs to give feedback during the learning session and on the survey.

Conclusions

This QIP showed that an HPV education intervention targeted towards MAs increased one area of HPV knowledge by 56%, and increased comfort but not confidence in recommending the HPV vaccine to parents of 9-and-10-year-olds. This intervention can be used during lunch-hour staff meetings in other primary care clinic sites to increase the strength of recommendation when clinic staff offer the HPV vaccine to parents of patients starting at age 9. This suggests that interactive HPV vaccine education for MAs is a beneficial strategy for increasing HPV vaccine completion.

Funding

None

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Appendix A

Facilitator Instructions

Venue: Any group of staff, 50 minutes
Facilitators: 1-2 staff

Schedule:

Activity	**Time**
Introduction - Assign participants into pairs, designate one as the "medical assistant" and one as the "parent"	5 minutes
Distribute and complete pre-intervention knowledge and skills self-assessment (evaluate HPV knowledge and self-perceived communication skills)	5 minutes
Didactic Lecture (PowerPoint presentation)	10 minutes
Role-play (skills assessment) with four scenarios	10 minutes
Participants to switch roles of "provider" and "concerned parent," and role-play with same four scenarios	10 minutes
Distribute and complete post-intervention knowledge and skills self-assessment (re-evaluate HPV knowledge and self-perceived communication skills)	5 minutes
Debrief and answer any questions	5 minutes

Procedures

Introduction of moderators and statement of learning objectives.
Review evidence-based practices for providing parents information about the vaccine
Introduce activity instructions.
To ensure the audience understand the role-playing activity, complete a demonstration of the role-playing activity (can have assistance from audience)
Participants break into groups of two participants

Practical instructions:

Introduction:

Introduce the workshop as a fun exercise for learners to improve their HPV knowledge base. Participants will be at different levels of training, which is expected.

Distribute and complete pre-intervention knowledge and skills self-assessment:

Advise participants that this assessment is only to increase their awareness of potential knowledge gaps.

Assign participants into pairs for pre-didactic role-play:

Distribute role-play script among pairs. Clarify that role-play questions were written based on true scenarios and common barriers identified by providers in giving the HPV vaccine. While the participants have different levels of training, you do not need to pair them up by level. Have participants get in groups of two (you may have one group of three if there is an odd number, but timing above is for groups of two). One participant will be the "provider." The other participant will play the "concerned parent" -- this person will get the role-play script.

Role-play:

Instruct groups to complete the first four questions only. Set a timer for 10 minutes. The "concerned parent" may take notes on the "provider's" responses to questions if desired.

After 10 minutes, instruct groups to switch roles. The new "concerned parent" will get the role-play script and may take notes on the provider's responses to questions if desired. Instruct groups to complete the remaining four questions. Set a timer for 10 minutes.

When the timer goes off, facilitator may collect the role-play scripts from each group.

Debriefing

Distribute and complete post-intervention knowledge and skills self-assessment:

Advise participants that this assessment is the same as the first one, and hopefully an improvement in scores will be appreciated.

Wrap-up and questions

Answer any other questions that participants may have. Assure them they will not be graded and ask for feedback on any other gaps they have identified.

Materials: PowerPoint presentation, role-play script (can supply one set per group; back-up copies available in case one participant takes notes on the script), pre- and post-workshop quizzes.

SCENARIO 1

Discuss evidence-based approaches for basic skills:
Recommend co-administration of HPV with routine and required vaccines
Provide strong recommendation
Begin scenario 1: Basic Skills
Participants will practice the two evidence-based approaches for the basic skills scenario
Scenario 1: Caregiver of 9-year-old girl calls asking which vaccines the child needs
Debrief with participants on basic skills:
What were some of the ways they phrased:
Recommending co-administration of HPV with routine and required vaccines
Providing strong recommendation

SCENARIO 2

Discuss evidence-based approaches for addressing safety concerns:
Recommend co-administration
Parent: Hesitation regarding safety and side effects
Ask open ended questions to understand hesitation source
Provide accurate information
The HPV vaccine is safe. Two hundred forty million doses have been administered over the last 10 years with no serious safety concerns.
Side effects can include: pain, swelling, or redness, which is normal and should go away in a day or two.
Sometimes kids faint after they get shots – we make sure kids don't fall and get injured by having them stay seated after the shot for 15 minutes.
Begin scenario 2: Safety Concerns
Participants will practice the evidence-based approaches for the safety concerns scenario
Scenario 2: Caregiver of 9-year-old non-binary child calls asking which vaccines the child needs. After providing the recommended vaccines for this age, caregiver provides concerns about safety and side effects
Debrief with participants on evidence-based strategies for safety concerns:
What were some of the ways they phrased:
The HPV vaccine is safe
The various minor side effects

SCENARIO 3

Discuss evidence-based approaches for addressing age and sex:
Recommend co-administration
Parent: Hesitation regarding young age and sex

Ask open ended questions to understand hesitation source
Provide accurate information:
Prevents cancer
Fourteen million people are infected with HPV each year.
Thirty-one thousand men and women are diagnosed each year with a cancer caused by HPV.
Vaccinate earlier rather than later
Like all vaccines, we want to vaccinate earlier than later
If families wait, a child may need 3 shots instead of 2 shots.
Not linked with sex
Studies tell us that getting HPV vaccine doesn't make kids more likely to start having sex.
We want to give the vaccine before he/she becomes sexually active so that they can be protected.
Begin scenario 3: Age and Sex Concerns
Participants will practice the evidence-based approaches for the age and sex concerns scenario
Scenario 3: Caregiver of 9-year-old boy calls asking which vaccines the child needs. After providing the recommended vaccines for this age, caregiver provides concerns about young age of daughter and the message that giving the HPV vaccine sends the message that it is OK to have sex
Debrief with participants on evidence-based strategies for safety concerns:
What were some of the ways they phrased:
The HPV vaccine prevents cancer
The need for vaccinating early
HPV vaccine is not linked with sex

SCENARIO 4

Discuss evidence-based approaches for addressing boys and HPV:
Recommend co-administration
Parent: Hesitation regarding boys not needing the HPV vaccine
Ask open ended questions to understand hesitation source
Provide accurate information:
Prevents future infection
HPV vaccine can help prevent future infections that can lead to cancers of the penis, anus, and back of the throat in men.
Begin scenario 4: Boys and HPV Concerns
Participants will practice the evidence-based approaches for the boys and HPV concerns scenario

Scenario 4: Caregiver of 9-year-old boy calls asking which vaccines the child needs. After providing the recommended vaccines for this age, caregiver provides concerns about if boys really need the HPV vaccine
Debrief with participants on evidence-based strategies for boys and HPV concerns: What were some of the ways they phrased:
Preventing HPV in boys

Appendix B

Pre and Post Participation Survey

Prior to the introduction of the HPV vaccine, what was the annual incidence of HPV in 15-24 year olds?

a. 7 million infections/year
b. 1 million infections/year
c. 500,000 infections/year
d. 100,000 infections/year

What is the lifetime risk of acquiring HPV infection?

a. 80%
b. 50%
c. 25%
d. 10%

Which of the following serotypes is not included in the Gardasil-9 HPV vaccine? (Not a high-risk serotype)

a. 16
b. 18
c. 11
d. 15

What type(s) of cancer does the HPV vaccine prevent?

a. Cervical cancer
b. Penile cancer
c. Oropharyngeal cancer
d. A + B
e. All of the above

Why is the HPV vaccine preferentially given at ages 9-12?

a. It is before they are likely to engage in sexual activity
b. There is a stronger immunogenicity of the vaccine in this age group
c. Children require other vaccines around this age, and it is effective to "bundle" the vaccines together.
d. All of the above

On a scale of 1-5 (1 being not at all comfortable, 5 being extremely comfortable), how comfortable are you talking about sexuality with parents?

○	○	○	○	○
Not at all comfortable	Slightly comfortable	Moderately comfortable	Quite comfortable	Extremely comfortable

On a scale of 1-5 (1 being not at all confident, 5 being extremely confident), how confident are you in your ability to promote the HPV vaccine when talking to parents?

○	○	○	○	○
Not at all confident	Slightly confident	Moderately confident	Quite confident	Extremely confident

Post-participation Evaluation

1. The information presented in this workshop was:
a) Extremely useful
b) Somewhat useful
c) A little useful
d) Not at all useful

2. What percentage of the content in the workshop was new to you?
a) 0%
b) 25%
c) 50%
d) 75%
e) 100%

3. The length of this workshop was:
a) Too long
b) Just right
c) Too short

4. What changes to your practices do you plan to make as a result of this workshop?

5. Please use the space below to list any suggestions that may improve this workshop for the future:

Appendix C

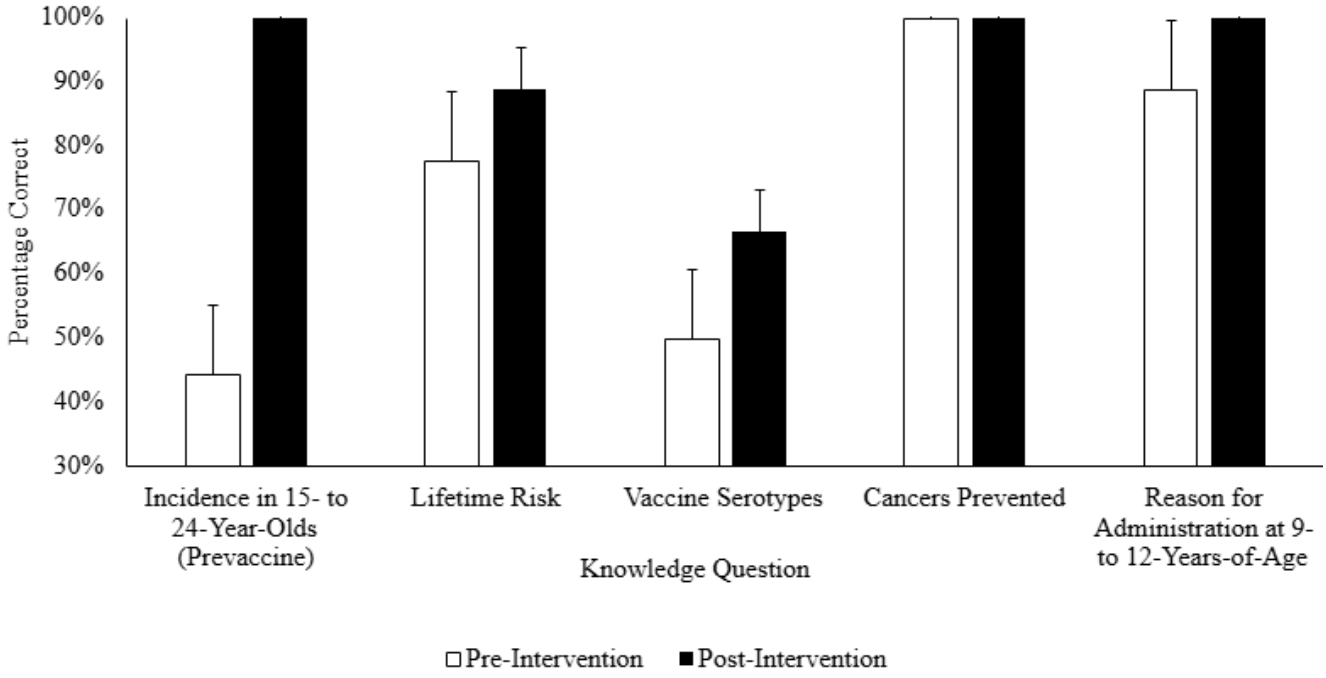
Notification of Not Human Research Determination

To:	Tahisha Buck
Link:	STUDY00027780
P.I.:	Rebecca Martinez
Title:	HPV Vaccine Knowledge Primary Care Staff
Description:	The committee reviewed this submission and assigned a determination of Not Human Research. For additional details, click on the link above to access the project workspace.

Appendix C

Figure 1

Proportion of Knowledge Questions 1-5 Answered Correctly

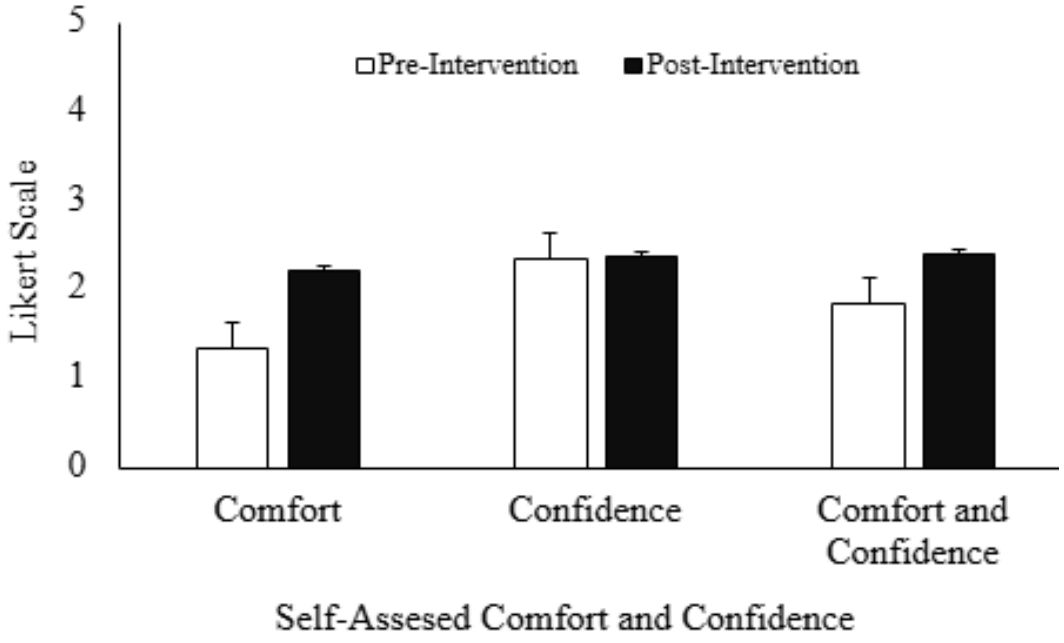


Note. $N = 8$. Values are displayed as mean and standard error proportion answered correctly of each survey question. Only the first question showed a significant increase after the education intervention.

Appendix D

Figure 2

Medical Assistants' Comfort and Confidence Levels Recommending the HPV Vaccine to Parents Pre- and Post-Intervention



Note. $N = 8$. Values are displayed as mean Likert scale with standard error by comfort, confidence, and combined comfort and confidence. Only self-assessed comfort significantly increased after role-play activity.

Appendix E

Table 1

Proportion Correct by Knowledge Question Before and After Intervention

	Q1	Q2	Q3	Q4	Q5	Overall Q1-5	Q6	Q7	Overall Q6-7
Pre (N=9)	44.44%	77.78%	50.00%	100.00%	88.89%	0.73	1.3	2.3	1.8
Post (N=9)	100.00%	88.89%	66.67%	100.00%	100.00%	0.91	2.2	2.4	2.3
P-value	0.01	0.59	0.60	-	0.35	0.17	0.04	0.17	0.03

Note. $N = 8$. Overall, there was no significant change between pre- and post-intervention knowledge-based questions ($\alpha = 0.05$). The only significant increase observed in knowledge-based questions was on question 1 with a 56% increase in correct responses after the intervention. There was an overall significant increase in the comfort and confidence in recommending the HPV vaccine during role-play activity, though when assessing the two Likert-scale questions separately only question 6 had a significant increase of 0.9 on the Likert-scale in comfort in recommending the vaccine while there was no change in confidence in recommending the vaccine.

Appendix F

Letter of Support from Clinical Agency

Date: ***June 14, 2024***

Dear Tahisha Buck,

This letter confirms that I, Rachael Postman DNP, allow Tahisha Buck (OHSU (Doctor of Nursing Practice Student) access to complete her DNP Final Project at our clinical site. The project will take place from approximately June 20, 2024 to December 31, 2024.

This letter summarizes the core elements of the project proposal, already reviewed by the DNP Project Preceptor and clinical liaison (if applicable):

- **Project Site(s)**: OHSU Richmond Clinic
- **Project Plan: Use the following guidance to describe your project in a brief paragraph.**
    - Identified Clinical Problem: target adolescent immunization rate of 36.9% for TDaP, MCWY and HPV at clinic. Rate has been at 26% on average
    - Rationale: To increase the rate of adolescent vaccines, we will focus on increasing early initiation of HPV vaccines. We will utilize PDSA framework with survey analysis to increase staff knowledge about benefits of initiating HPV vaccine at 9-10-years-old and increase staff confidence in conversing with parents of adolescents
    - Specific Aims: By December 31, 2024, among staff who have completed the training there will be 50% increase in HPV vaccine knowledge and 50% increase in confidence making recommendation to parents of adolescents
    - Methods/Interventions/Measures: Didactic education session involving presentation
    - and a role-play learning activity coupled with self-assessment survey
    - Data Management: Names and role of participants in the clinic will be collected as well as survey data before and after learning session. Data will be deidentified and participants will be assigned random numbers. Number assignments will be stored securly in separate location. Data will be managed in Excel and secured on cloud based server.
    - Site(s) Support: Use of conference room for didactic learning session
    - Other: N/A

During the project implementation and evaluation, Tahisha will provide regular updates and communicate any necessary changes to the DNP Project Preceptor.

Our organization looks forward to working with this student to complete their DNP project. If we have any concerns related to this project, we will contact Tahisha Buck and Rebecca Martinez DNP (student's DNP Project Chairperson).

Regards,

DNP Project Preceptor (Name, Job Title, Email, Phone:
Rachael Postman DNP postmanr@ohsu.edu 503-418-3785

Rachael Postman — Signature

6/21/24 — Date Signed

Appendix G

Adolescent HPV Vaccine Project Timeline

	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec-Mar
Finalize project design and approach (703A)				X				
Complete IRB determination or approval (703A)					X			
PDSA Cycle 1 (703B)			X					
PDSA Cycle 2 (703B)						X		
PDSA Cycle 3 (703B)							X	
Final data analysis (703B)							X	X
Write sections 13-17 of final paper (703B)								X
Prepare for project dissemination (703B)								X

Appendix H

Root Cause Analysis