

Educating Future Providers About Human Papillomavirus

Blaire A. Cote, MD¹; Sarvika Bommakanti, BS²; Janelle Torres, DO³; Monica Tromer, DO⁴

¹University of Florida Pediatric Residency Program, Shands Children's Hospital, Gainesville, FL

²Florida Atlantic University Charles E Schmidt College of Medicine, Boca Raton, FL

³Nicklaus Children's Hospital Pediatric Residency Program, Miami, FL

⁴Johns Hopkins All Children's Hospital Pediatric Residency Program, St. Petersburg, FL

ABSTRACT

Objectives/Background

This project aims to address the lack of knowledge regarding human papillomavirus (HPV) and the HPV vaccine in Florida by creating an educational webinar and educational materials to distribute to current and future healthcare providers. The goal is that these efforts will increase current and future providers' knowledge of HPV, which can one day be translated into greater public knowledge and improved Florida HPV vaccination rates.

Methods

An educational webinar and pamphlet on HPV and HPV vaccines were created and distributed to Florida's medical and dental schools and the Florida Chapter of the American Academy of Pediatrics. Twenty participants completed a webinar survey that asked them to answer content questions about HPV after watching the webinar and self-report their HPV knowledge before and after the webinar.

Results

11 of the 12 HPV knowledge questions were answered correctly by all 20 participants after viewing the webinar. There was a statistically significant increase in self-reported knowledge after viewing the webinar regarding HPV and HPV vaccine hesitancy using the Wilcoxon Signed Rank test with an alpha level of 0.05.

Conclusions

This project's goals were realized, as results indicated a statistically significant difference between self-reported knowledge before and after viewing the webinar. This suggests that short webinars improve current and future providers' knowledge base. Future goals include expanding HPV education efforts into school curriculums to increase provider HPV knowledge and vaccination counseling efficacy.

INTRODUCTION

Background

Human papillomavirus (HPV) and its manifestations impact multidisciplinary health fields, including pediatrics, family medicine, gynecology, and dentistry. Many patients with HPV have no clinical consequences. However, HPV infections with high-risk strains may develop serious clinical sequelae, including genital warts, oropharyngeal cancer, and genitourinary cancer. Over 30,000 Americans will be diagnosed with oropharyngeal cancer this year.¹

Statement of Problem / Rationale

Florida has the 9th highest incidence of oral cancers in the United States but ranks near the bottom for HPV vaccination rates among both males and females. One study suggests a lack of public knowledge regarding HPV's manifestations, with about 70% of US adults not knowing that HPV causes oral, anal, and penile cancers.² Another study indicates that educating healthcare providers on the importance of HPV vaccination and effective communication with patients about HPV may increase the number of quality recommendations for HPV vaccination.³

Project Aims

This project aims to address the lack of knowledge regarding human papillomavirus (HPV) and the HPV vaccine in Florida by creating an educational webinar and educational materials to distribute to current and future medical and dental providers. The goal is that these efforts will increase current and future providers' knowledge base of HPV, which can one day be translated into greater public knowledge and improved Florida HPV vaccination rates.

METHODS

The HPV Team of the Medical Student Committee (MSC) of Florida's Chapter of the American Academy of Pediatrics (FCAAP) collected data for this project from spring 2021 – spring 2022.

The first step was creating an educational webinar about various topics related to HPV using a collaborative approach with medical and dental students on the HPV Team. The webinar featured medical student speakers from medical schools across Florida. The webinar length was 37 minutes. Final approval of the webinar, including the script and slide set, was provided by the FCAAP Immunizations Committee. The objectives of the webinar are enumerated in Table 1. The HPV Team also created an educational pamphlet to be used in the clinical setting to teach patients about HPV, HPV-related cancers, HPV prevention, and HPV vaccine access, as seen in Figure 1.

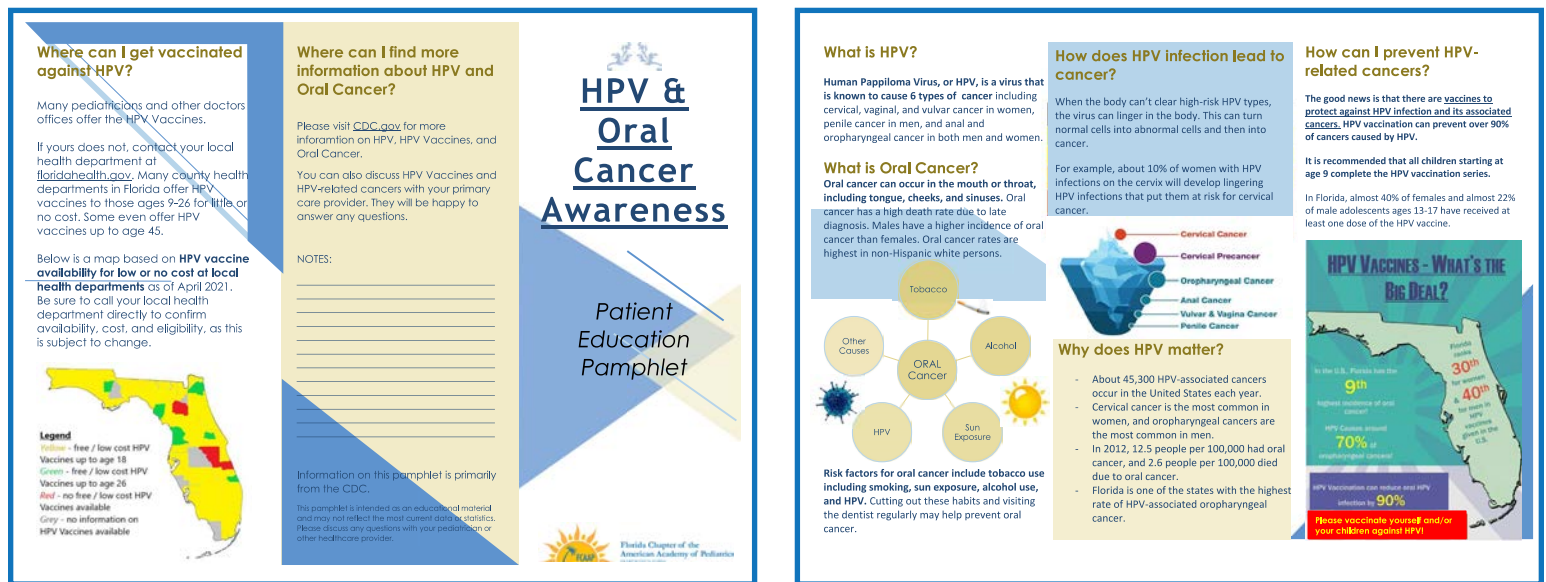


Figure 1: Educational Pamphlet about Human Papillomavirus

A crucial component of this project, displayed within the webinar and on the educational pamphlet, was a map of Florida with HPV vaccine access locations. To obtain this data, each county health department in Florida was contacted by phone and/or email up to three times in spring 2021 to acquire information regarding department availability, eligibility, and cost of HPV vaccines. This task aimed to show areas of free or low-cost HPV access across Florida that future and current healthcare providers could recommend to patients as necessary. At the time of data collection, 77.6% of Florida county health departments offered HPV vaccines at no/low cost for patients up to age 18. 10.4% offered no/low-cost HPV vaccines for patients up to age 26. 4.5% did not currently offer HPV

Human Papillomavirus Webinar Goals	
1.	Understand the general disease course of human papillomavirus, including risk factors, manifestations, and prevention.
2.	Learn how to address general vaccine hesitancy in the pediatric population.
3.	Learn how to address Human papillomavirus vaccine-specific hesitancy in the pediatric population.
4.	Learn about financial resources available to provide human papillomavirus vaccines for those who are un- or under-insured.
5.	Understand recommendations for future screenings for human papillomavirus-related cancers.
6.	Understand the multidisciplinary role that family medicine physicians, obstetrics-gynecologist physicians, dentists, and other health care providers play in human papillomavirus-related screening and prevention.
7.	Understand the role of dental professionals in the detection of human papillomavirus-associated oropharyngeal cancers.
8.	Practice scenarios advising patients based on content discussed in the webinar.

Table 1: HPV Webinar Goals

vaccines for various reasons, including the impact of COVID-19 and Hepatitis A outbreaks, funding, and vaccine availability. 7.5% of health departments were unable to be successfully contacted.

The educational webinar and pamphlet were distributed to Pediatric Interest Groups in Florida medical schools, student organizations at Florida dental schools, and the FCAAP Medical Student Committee members. Participants volunteered to view the webinar and complete the survey within those distribution groups. The 20 participants included 17 medical students from four medical schools, two dental students, and one physician (Figure 2).

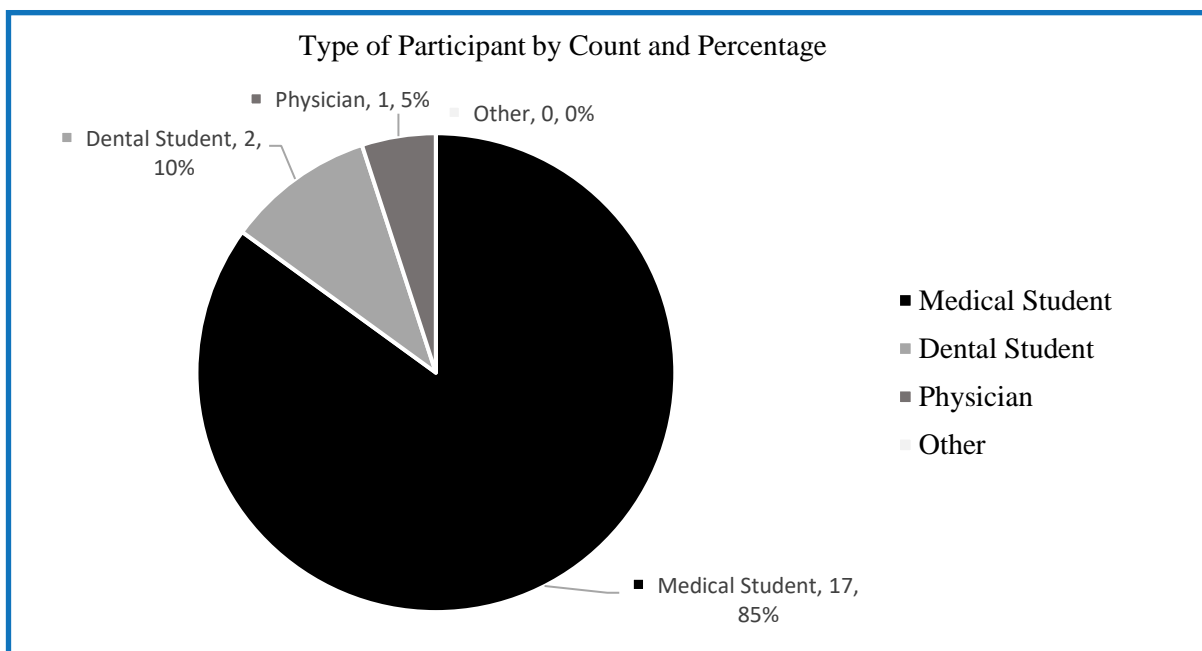


Figure 2: Type of Participant by Count and Percentage

The medical student participant type accounted for 85% of the 20 participants, or a count of 17.

The dental student participant type accounted for 10% of the 20 participants, or a count of 2.

The physician participant type accounted for 5% of the 20 participants, or a count of 1.

There were no other participant types.

After watching the webinar and reviewing the educational pamphlet, each participant was asked to complete a survey created by the HPV Team. The survey included background questions about the participant, a content quiz utilizing multiple-choice questions, and questions regarding self-reported knowledge about HPV before and after viewing the webinar using a sliding scale from 0 (least knowledgeable) to 5 (most knowledgeable). The survey utilized in this project can be seen in Table 2.

Several months after the webinar was distributed, the FCAAP offered a Live question-and-answer session online conference for those who viewed the webinar and wanted to participate in a discussion or ask questions about the topics presented.

Analysis/Measurement Used

Survey data was collected from each participant who completed the post-webinar survey. Analysis of these data was specifically focused on participants' self-reported knowledge about HPV, HPV vaccine hesitancy, and confidence to address patient's concerns regarding the HPV vaccine in the future (Question #13 vs. Question #14 and Question #15 vs. Question #16 on the survey. Table 2). The content quiz was also graded for each participant. Note that the entirety of the survey was completed after viewing the webinar and that before vs. after webinar knowledge questions were self-reported by each participant.

RESULTS

All 20 participants completed the post-webinar multiple-choice content questions. All participants answered 11 of the 12 questions correctly. Question #11 (Table 2) was correctly answered by 18 of the 20 participants (90%).

Because the data about self-reported knowledge before and after viewing the webinar was ordinal matched data that was not normally distributed, the Wilcoxon Signed Rank Test was used instead of Paired T-Tests. The Wilcoxon Signed Rank Test is a statistical test comparing two sets of scores from the same participants. The conditions for the use of the Wilcoxon Signed Rank Test include dependent observation (before and after measurements accounting for individual differences from baseline), assumed independence (even distribution of webinar to schools and Florida Chapter of AAP), continuous variable (survey questions sliding scale with maximum score of 5), and ordinal measurement (values compared on same scale or ranking system) were met.

There was a statistically significant difference in the mean self-reported score before and after viewing the HPV educational webinar using the Wilcoxon Signed Rank Test with an alpha level of 0.05 for both knowledge of HPV and HPV vaccination and confidence in addressing concerns about HPV vaccination. These data can be seen in Figure 3. The statistical analysis explanation for these data can be found in Table 3.

DISCUSSION

Summary

The goal of this project, which was to increase current and future providers' knowledge base of HPV, was to use an educational webinar, which was successful. Survey data indicated a statistically significant difference between self-reported knowledge before and after viewing the webinar.

Interpretation

The results of this project show that increasing provider education with methods such as short webinars is effective. The purpose of increased provider knowledge regarding HPV and the HPV vaccine was to encourage and enable more effective communication with patients, which may ultimately increase Florida's vaccination rates and public knowledge of HPV.

Project Strengths

A strength of this project was the multidisciplinary and state-wide collaboration within the HPV Team, which created the project. This allowed greater collaboration and experience as many hands were involved in making the material easy to understand and the webinar successful. When asked about the strengths of the webinar, participants commented on concise information addressing many HPV-related topics, the speakers, the helpful visuals, and the science-backed data to address common reasons for vaccine hesitancy.

Project Limitations

A limitation was the low number of webinar viewers. With the target audience of busy healthcare students and healthcare providers, few possible participants viewed the webinar and completed the survey. This could be changed if the webinar is incorporated into the curricula of medical and dental schools in Florida or if it became part of a continuing medical education or other similar conference. Another limitation is that the survey quality improvement questions relied on self-reported before and after approximations of how comfortable the participants were with HPV and related topics. It would be more accurate to use multiple surveys of HPV content-based questions completed over various time points, a lengthier quiz, and a scored patient interaction scenario in which the participant would discuss HPV vaccine hesitancy with a patient and their family. These methods were not possible in this project due to various constraints. Finally, when asked about the weaknesses of the webinar, four participants commented that it was too long, with an ideal length of the webinar being less than 30 minutes. The remaining participants commented that the length of the webinar was appropriate.

Conclusions/ Implications

Webinars are an effective way of providing education regarding HPV to future and current healthcare providers.

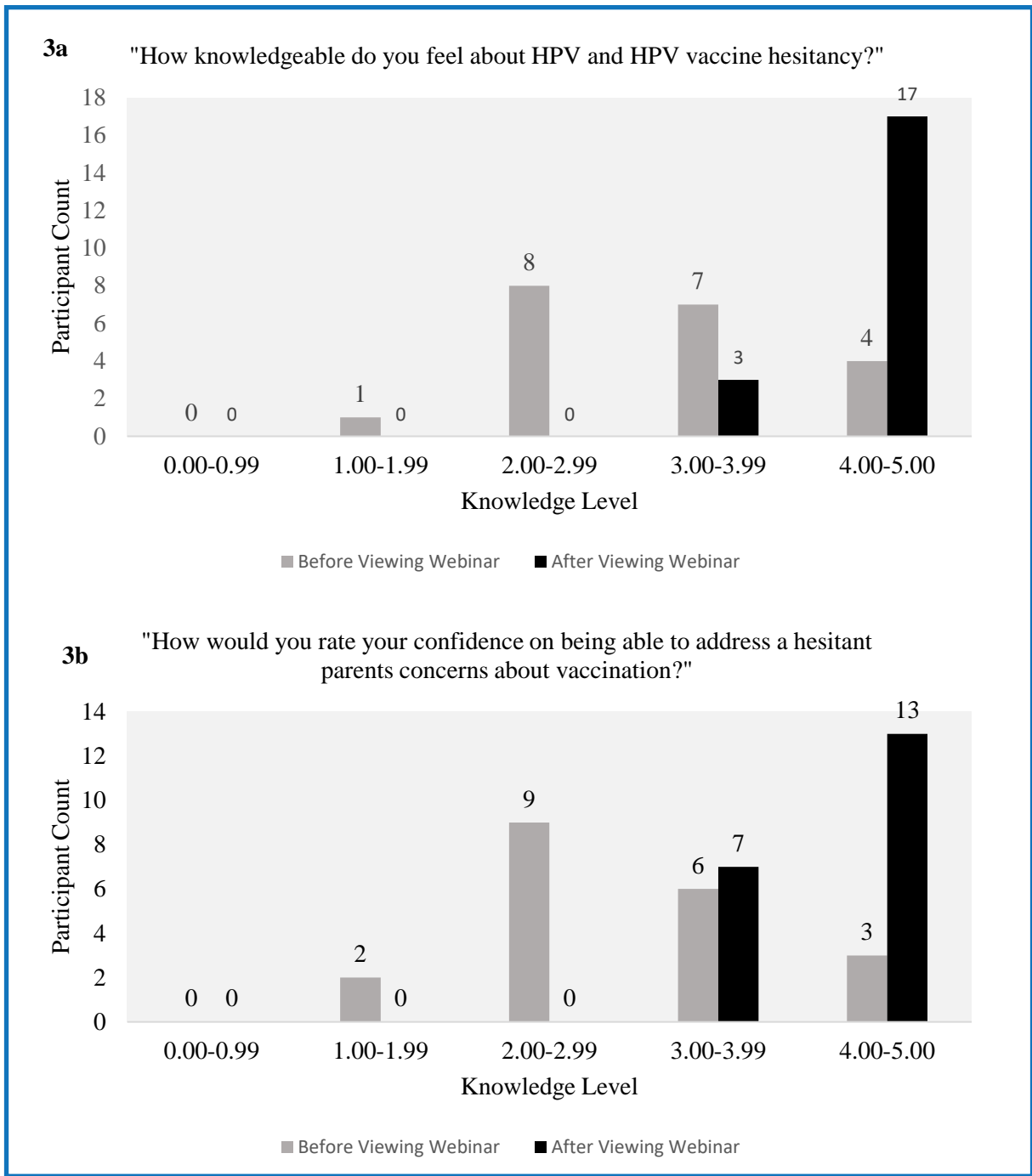


Figure 3: Participant Perceptions of Webinar Usefulness

3a "How knowledgeable do you feel about HPV and HPV vaccine hesitancy?" displays data collected in the survey as the participant was asked to answer this question based on their knowledge before viewing and after viewing the HPV educational webinar. There a statistically significant difference in the mean score before and after viewing the HPV educational webinar using the Wilcoxon Signed Rank Test with an alpha level of 0.05. 3b "How would you rate your confidence on being able to address a hesitant parent's concerns about vaccination?" displays data collected in the survey as the participant was asked to answer this question based on their knowledge before viewing and after viewing the HPV educational webinar. There is a statistically significant difference in the mean score before and after viewing the HPV educational webinar using the Wilcoxon Signed Rank Test with an alpha level of 0.05.

Recommendations / Future Directions

Future projects focusing on HPV provider education may consider in-person sessions as part of a school or residency curriculum or sessions at conferences to increase webinar viewership. This project model could be applied to other topics in pediatrics and other specialties. Tracking changes in Florida's HPV vaccination rates after large-scale HPV educational projects among healthcare students and providers would be an interesting addition to future projects.

ACKNOWLEDGMENTS

The authors acknowledge and offer special thanks to past and present members of the FCAAP Medical Student Committee HPV Team who worked on this project, including dental students who joined in the research. Special recognition for their contributions to this project, specifically to creating the educational webinar, goes to Hannah Zwiebel, Jennifer Ferrante, Amber Bulna, Nichole Anderez, and Emilee Flament. Special recognition for those who helped with the distribution of the webinar goes to Ally Fraser, Arielle Sanghvi, Ashley McGrath, Samantha Hicks, Amelia Hartje, Rebecca Ratusnik, Arielle Ashkenazi, and Alyssa Haag.

Thank you to the FCAAP for supporting this project, helping distribute and advertise the webinar, and assisting with technical concerns along the way. Special recognition for their contributions in making this project possible goes to Alicia Adams, Melanie Range, Dana Mykytyn, Dr. Audrey Ofir, and the FCAAP Immunizations Committee. Further thanks to the Department of Health in Florida and to each county health department representative who assisted in providing information and resources regarding HPV vaccination.

IN-TEXT CITATIONS

1. Weinberg MA, Estefan DJ. Assessing oral malignancies. *Am Fam Physician*. 2002;65(7):1379-1384.
2. Suk R, Montealegre JR, Nemitlu GS, et al. Public knowledge of human papillomavirus and receipt of vaccination recommendations. *JAMA Pediatr*. 2019;173(11):1099-1102
3. Gilkey MB, Malo TL, Shah PD, Hall ME, Brewer NT. Quality of physician communication about human papillomavirus vaccine: findings from a national survey. *Cancer Epidemiol Biomarkers Prev*. 2015;24(11):1673-1679.

ADDITIONAL REFERENCES USED IN THE CREATION OF THE WEBINAR

1. Edwards KM, Hackell JM; Committee on Infectious Diseases, The Committee on Practice and Ambulatory Medicine. Countering vaccine hesitancy. *Pediatrics*. 2016;138(3):e20162146.
2. FUTURE II Study Group. Quadrivalent vaccine against human papillomavirus to prevent high-grade cervical lesions *N Engl J Med*. 2007;356(19):1915–1927.
3. Garland SM, Hernandez-Avila M, Wheeler CM, et al.; Females United to Unilaterally Reduce Endo/Ectocervical Disease (FUTURE) I investigators. Quadrivalent vaccine against human papillomavirus to prevent anogenital diseases. *N Engl J Med*. 2007;356(19):1928–1943.
4. Gilkey MB, Malo TL, Shah PD, et al. Quality of physician communication about human papillomavirus vaccine: findings from a national survey. *Cancer Epidemiol Biomarkers Prev*. 2015;24(11):1673-9.
5. Hakeem A, Catalanotto FA. The role of dental professionals in managing HPV infection and oral cancer. *J Cancer Prev Curr Res*. 2019;10(4):82-88.
6. Mohanty S, Carroll-Scott A, Wheeler M, et al. Vaccine Hesitancy In Pediatric Primary Care Practices. *Qual Health Res*. 2018;28(13):2071-2080.
7. Shen SC, Dubey V. Addressing vaccine hesitancy: Clinical guidance for primary care physicians working with parents. *Can Fam Physician*. 2019;65(3):175-181.
8. Suk R, Montealegre JR, Nemitlu GS, et al. Public knowledge of human papillomavirus and receipt of vaccination recommendations. *JAMA Pediatr*. 2019;173(11):1099-1102.

Question	Response Options
Background Information	
1. Which of these best classify you?	Medical Student, Dental Student, Physician, Dentist, or Other
2. If you are a student, please indicate your year.	1st year, 2nd year, 3rd year, or 4th year
3. If you are a student, which school do you attend?	(free text)
Webinar Quiz	
4. Which of the following is a manifestation of an HPV infection?	A Genital Warts B Oropharyngeal Cancer C Genitourinary Cancer D All of the Above
5. Which of the following is a risk factor for HPV infection?	A Smoking B Alcohol C High Number of Sexual Partners D Lack of Birth Control Use
6. What is one way we can lower the risk of HPV infection?	A Exercise B Condom Use C Stop Smoking D Stop Drinking Alcohol
7. Which one of the following is ~90% effective in preventing an HPV infection?	A HPV Vaccine B Abstinence C Antibiotics D There is No Way to Prevent an HPV Infection
8. Which of the following is true about vaccine hesitancy in the pediatric population?	A Most hesitant parents are not completely opposed to vaccines but may have concerns that result in under- or delayed- immunization of their children B More than 20% of parents are completely opposed to vaccination C There has been a rise in vaccine delays and refusals in recent years D Both A and C
9. Which of the following concerns some parents may have about vaccination?	A They cause the disease they are meant to prevent B Development of Autism C Long-term effects of the vaccine D All of the above
10. Which of the following are concerns held by those who are hesitant to receive/let their children get the HPV vaccine?	A The vaccine will lead to an earlier onset of sexual activity B Only girls need the vaccine because HPV causes cervical cancer C The vaccine is new and, therefore not effective D All of the above
11. What program in the state of Florida helps cover vaccines, including the HPV vaccine?	A Boys and Girls Club B Vaccines for Children C Program 17 D Both B and C
12. Which providers are essential in detecting and treating HPV infections?	A Dentists B Obstetrician-Gynecologists C Family Medicine Practitioners D All of the Above

Table 2: Survey Completed by Participants After Viewing HPV Webinar

Webinar Quality Improvement Survey	
13. Before watching the webinar, how knowledgeable were you about HPV and HPV vaccine hesitancy?	Rank on a sliding scale, 0 (least knowledgeable) to 5 (most knowledgeable)
14. After watching the webinar, how knowledgeable do you feel about HPV and HPV vaccine hesitancy?	Rank on a sliding scale, 0 (least knowledgeable) to 5 (most knowledgeable)
15. Before watching the webinar, how would you rate your confidence in your ability to address a hesitant parent's concerns about vaccination?	Rank on sliding scale, 0 (least knowledgeable) to 5 (most knowledgeable)
16. After watching the webinar, how would you rate your confidence in your ability to address a hesitant parent's concerns about vaccination?	Rank on a sliding scale, 0 (least knowledgeable) to 5 (most knowledgeable)
17. Overall, how would you rate this webinar?	Excellent, Very Good, Good, Fair, Poor
18. What did you like about this webinar?	(free text)
19. Is there anything that you disliked about the webinar/think needed improvement?	(free text)
20. Was the link of the webinar too long, too short, or just right?	Too long, Too Short, or Just Right
21. In your opinion, what would be the ideal length of a webinar?	(free text)
22. Are there any other topics within HPV and HPV vaccine hesitancy that you wish to see addressed?	(free text)

Table 2: Survey Completed by Participants After Viewing HPV Webinar

Question #13 vs Question #14 Statistical Analysis Before vs After Viewing the Webinar – “How knowledgeable did you feel about HPV and HPV vaccine hesitancy?”		
Statistics Values Used	Statistics Explanation	Simple Explanation
W-test statistic = 5.5 Critical value = 29 Alpha value = .05	Because W-test statistic is less than the critical value, there is a statistically significant difference in the reported knowledge level before versus after watching the webinar. The null hypothesis of no difference is rejected.	There was a statistically significant increase in knowledge after viewing the webinar with regards to HPV and HPV vaccine hesitancy.
Question #15 vs Question #16 Statistical Analysis Before vs After Viewing the Webinar– “How would you rate your confidence on being able to address a hesitant parent’s concerns about vaccination?”		
Statistics Values Used	Statistics Explanation	Simple Explanation
W-test statistic = 0 Critical value = 25 Alpha value = .05	Because W-test statistic is less than the critical value, there is a statistically significant difference in the reported knowledge level before versus after watching the webinar. The null hypothesis of no difference is rejected.	There was a statistically significant increase in knowledge after viewing the webinar with regards to addressing hesitant parent’s concerns about vaccination.

Table 3: Statistical Analysis of Self-Reported HPV Knowledge

The statistical values, statistical explanation, and simple explanation of the analysis of the data using Wilcoxon Signed Rank Test is found in this table for the two questions listed. There was a statistically significant increase in knowledge after viewing the educational webinar for each of the questions with alpha value 0.05.