

**Let's Talk About It: Shared Clinical Decision-Making Around HPV Vaccination
in Mid-Adults**

Whitney Martin

Oregon Health & Science University

March 3, 2023

Abstract

Human papillomavirus (HPV) is the most common sexually transmitted infection in the United States, causing more than 37,000 cases of cancer each year; over 90% of these cancers could be prevented with the HPV vaccine (Centers for Disease Control and Prevention [CDC], 2023). In 2019, The CDC's Advisory Committee on Immunization Practices (ACIP) recommended catch-up vaccination to all adults up to age 26. For adults aged 27-45 (mid-adult), the ACIP advised providers to engage patients in shared clinical decision-making (SCDM) conversations about the vaccine while considering an individual patient's needs and lifestyle (Meites et al., 2019).

This study aimed to find what percentage of licensed nurse practitioners (NPs) in Oregon were aware of the vaccine's expanded age approval, how often those NPs were discussing the vaccine with their mid-adult patients, and what barriers exist that prevent NPs from engaging in SCDM conversations around HPV vaccination with their mid-adult patients. To achieve these aims, an online survey was developed and distributed to 1,081 NPs in Oregon. Data from 147 completed surveys were used to answer the research questions.

This project identified several themes. First, 70% of NPs within primary care settings (family practice and internal medicine) reported knowing about the expanded age approval before the survey. Next, of all providers aware of the change, 78.3% reported having had at least one SCDM conversation about the HPV vaccine with a mid-adult patient in the prior three months. Finally, NPs not being sure if a patient's insurance would cover the vaccination was the most reported reason for not engaging in SCDM conversations about the vaccine. This study's limitations and implications for future quality improvement projects were discussed.

Keywords: HPV, human papillomavirus vaccine, mid-adult, provider awareness

Problem Description

By the time they are 50 years of age, 80% of adults will have been exposed to or infected with at least one strain of HPV. Most infections are asymptomatic and benign; a healthy immune system can clear most infections in 1-2 years. However, infections persist in 10% of cases and can lead to the development of cancers or genital warts (CDCa, 2022). Between 2015-2019, HPV caused roughly 37,300 cancers each year in the United States, including oropharyngeal, cervical, anal, vaginal, and penile cancers (CDCb, 2022). Over 90% of those cancers could have been prevented with the HPV vaccine, which is most effective when given before the onset of sexual activity (CDCc, 2022). However, recent trials have demonstrated evidence that the vaccine provides protection against vaccine-type HPV for older individuals as well (Joura et al., 2018).

In 2018, the FDA approved the HPV vaccine for adults up to age 45. In June 2019, the Advisory Committee on Immunization Practices (ACIP) recommended catch-up HPV vaccinations for all adults to age 26. However, for adults aged 27-45, the ACIP advised shared clinical decision-making (SCDM) and cited eight considerations (see Appendix B) for use in this age group (Meites et al., 2019). The ACIP recommends SCDM when some, but not all, people within a particular group may benefit from an intervention; an individual's life circumstances must be considered when deciding whether vaccination is appropriate for them (CDC, 2020). This approach saves healthcare dollars by not recommending vaccines for all people within an age range. However, this approach leaves the provider to decide whether HPV vaccination should be discussed, potentially leaving many mid-adults uninformed about how the HPV vaccine could protect them from cancer or genital warts.

Available Knowledge

It is unclear how often providers discuss the HPV vaccine with their mid-adult patients. Research conducted amongst physician providers in the first two years following the ACIP's recommendation demonstrated a widespread lack of awareness of the expanded age approval. When surveying physician providers on knowledge and practices around HPV vaccination for adults, Petrusek and colleagues (2020) found that just 26% of providers polled would recommend the vaccine for people assigned female at birth (AFAB) over 26 and only 17% would recommend it for people assigned male at birth (AMAB) over 26, causing authors to speculate that respondents were unaware of the expanded age approval. Further demonstrating this trend, a survey found that 42% of polled internists and primary care physicians were unaware of the approval for adults aged 27-45 (Hurley et al., 2021). In addition, Hurley and colleagues (2021) found that of the physicians who were aware of the change, more than 60% described uncertainty about what to emphasize in SCDM conversations with adults in this age group. Based on these gaps in provider awareness and apparent uncertainty in discussing the vaccine, it is surmised that providers are not often engaging in SCDM conversations with their mid-adult patients about HPV vaccination.

The research surrounding how often patients and providers discuss the vaccine is minimal, but there is evidence that vaccine coverage in this age cohort is low. Using data from a 2017 national survey, Kasting and colleagues (2020) estimated that of young adults (19-26), only 36% had been vaccinated against HPV. The proportion of mid-adults vaccinated against HPV was less than 10% (Kasting et al., 2020). Most mid-adults were previously left out of HPV immunization campaigns due to age constraints. Before the age expansion in 2019, people AMAB who were born between 1973 through 1990 and people AFAB who were born from 1973

through 1980 were only eligible for the vaccine if considered high-risk (Daniels et al., 2021). Given that nearly a quarter of HPV infections occur after age 34 (Daniels et al., 2021), certain mid-adults, particularly those with new sex partners, may benefit from the vaccine's protection against HPV-related cancers and warts.

Though some mid-adults are likely to benefit from vaccination, patients being unaware of their eligibility to receive the HPV vaccine is commonplace, as the vaccine has been traditionally marketed toward adolescents. A 2022 study of focus groups addressing HPV vaccine knowledge, attitudes, and beliefs amongst people AFAB aged 27-45 demonstrated that few patients knew they were eligible for the vaccine. In addition, many participants harbored misunderstandings about the vaccine and its protection against HPV-related cancers and genital warts (Polonijo et al., 2022), demonstrating the need for a SCDM conversation with a well-informed provider. Mid-adult patients desire trustworthy information about vaccine safety, efficacy, risks, and benefits; they prefer to decide on their own after considering the facts and their provider's opinion (Wheldon et al., 2021). This makes the provider's knowledge of who is appropriate to vaccinate especially important as they help patients determine whether the vaccine is right for them.

Rationale

A literature review demonstrated that some adults aged 27-45 are at risk of contracting HPV and may benefit from vaccination. However, little evidence exists regarding how often mid-adult patients are being vaccinated against HPV since the FDA expanded approval for vaccination to adults up to age 45 in 2018; what research has been done measured responses of physician providers on a national or state level (Hurley et al., 2021; Petrussek et al., 2020). Even less is known about how often SCDM conversations about HPV vaccination occur between

patients and their providers or what factors may prevent these conversations from occurring. Specifically, there have been no studies of these measures among Oregon nurse practitioners (NPs) providing care to mid-adults.

Specific Aims

The overarching goal of this project is to gather data to support NPs as they counsel their mid-adult patients on the HPV vaccine as a preventative health decision. Three aims were identified for this project. First, it aimed to determine what percentage of NPs caring for adults in Oregon are aware of the expanded age approval for the vaccine. Second, it aimed to determine how often NPs engage in HPV vaccine related SCDM conversations with mid-adults. The third aim was to assess NP-reported barriers to vaccination in this age group, thereby identifying key topics for education and later intervention.

Methods

Setting

This study was not site-specific but was designed to survey NPs in Oregon who provide primary care or reproductive health services for mid-adults. Licensed NPs were invited to participate in a web-based survey distributed to email addresses registered to individual providers. Contact information for licensed NPs was obtained through the Oregon State Board of Nursing (OSBN).

Interventions

The first step was to request a determination from the Oregon Health & Science University (OHSU) Institutional Review Board (IRB), which waived this project as non-research on July 25, 2022. Next, this author contacted Dr. Laura Hurley, the lead author of a survey of physician providers (Hurley et al., 2021), for permission to model this project from her team's

research. With Dr. Hurley and her team's written permission, questions from her team's survey were incorporated into this survey, which was created using Qualtrics software. Next, a team of OHSU nurse practitioners reviewed the questionnaire for content, flow, and validity.

Using the email addresses of licensed Oregon NPs retrieved in September 2022 from OSBN, a Qualtrics survey link was emailed to 1,081 licensed NPs in Oregon on September 29, 2022. The survey closed on October 31, 2022. In addition, one reminder email was sent to recipients who still needed to complete the survey one week before it closed.

Measures

The survey collected demographic information about the respondent, their licensures, and their professional setting. Self-disclosure of practice setting limited the survey to NPs providing reproductive health and primary care services to adult patients. Respondents were provided a prompt containing the SCDM recommendation from the ACIP and asked whether they knew about the expanded age approval before reading the prompt. The survey asked respondents to report their prescribing practices in the last three months. Lastly, respondents were asked to identify whether barriers identified in the literature review were barriers to SCDM conversations with their patients with an option to free-text comments. Finally, the survey provided space for NPs to free-text questions, comments, or request a follow-up email from the study authors.

Analysis

The data was loaded into an Excel spreadsheet. Data were analyzed using pivot tables. Descriptive analysis was used to describe respondent demographics and practice information. The responses were compiled to determine awareness of the expanded age approval, the frequency of SCDM conversations with mid-adult patients, and the most frequently cited barriers

to SCDM conversations with mid-adult patients. The information is presented in tables and narrative format.

Ethical Considerations

The Institutional Review Board waived this project as non-research on July 25, 2022. The primary ethical considerations were obtaining informed consent from participants and protecting respondent confidentiality, including email addresses and responses. Informed consent was obtained at the beginning of the survey. Survey responses and provider contact information from the state board of nursing were stored in OHSU's secure storage cloud. Further, it was necessary to ask Dr. Laura Hurley and her team permission to model this project after their 2021 study of physician providers (Hurley et al., 2021).

Results

During the study period, 236 survey responses were collected. The overall response rate was 21.8%. Eighty-nine responses were excluded from the analysis due to the respondent no longer being licensed in Oregon, reporting their practice site was outside of Oregon, not caring for adults in this age group, or not completing the survey. Of the 236 responses, 147 responses were included in the analysis. The usable response rate was 13.5%.

Demographics

Respondents were asked to report their age, type of licensure, and the number of years they were licensed as a nurse practitioner (Table 1). Most respondents (69.4%) were licensed as Family Nurse Practitioners, 12.2% as Certified Nurse Midwives and 18.3% were licensed as another NP type or held licenses in multiple specialties.

Practice Setting

The survey was designed to be completed by NPs caring for mid-adult patients in a primary care or reproductive health setting. Therefore, the second question in the survey acted as a filter to exclude providers who did not provide care to the target population. Providers who answered “no” to the question, “Do you provide primary care or sexual health services to adults aged 27-45 (or have you in the last two years)?” were immediately directed to the end of the survey to mitigate response bias.

Respondents were asked to describe their practice setting. Respondents were not limited to one selection; for example, they could choose both family practice and urgent care. Respondents could choose “other” and free-text to specify their practice setting. Some free-text responses included palliative care, mental health, occupational medicine, and school-based health centers. NPs in family practice made up the most significant proportion of the respondents (40.8%), followed by NPs working in obstetrical or gynecological (OB/GYN) settings (20.4%). The remaining 38.8% reported working in different settings (Table 2).

Awareness

Respondents were shown the statement from the ACIP and asked if, before reading the statement, they had been aware that adults 27-45 were eligible to receive the HPV vaccine (Table 3). Of the 147 respondents, 106 NPs (72%) indicated they were aware before the survey, 35 (24%) indicated they had not been aware, and 6 (4%) chose “I’m not sure.”

Practices

Respondents reported how often in the prior three months their patients had requested the vaccine without provider prompting and how many SCDM conversations the provider had engaged in (Table 4). For these questions, respondents could answer with “none” or “never”, “1-3 times,” “4-6 times,” “6-10 times,” or “more than ten times.” Most (69.8%) respondents

reported that a patient had never requested the vaccine unprompted; 24.6% reported that 1-3 patients had requested it, and only 5% of respondents reported more than four patients had requested it. Overall, many NPs (37.4%) reported that they had not engaged in a SCDM conversation with a mid-adult patient in the last three months; 33% reported 1-3 SCDM conversations, 10.8% reported 4-6 SCDM conversations, 6% reported 6-10 SCDM conversations, and 12.2% reported having more than ten SCDM conversations in the last three months. However, of the providers who had already been aware of the expanded age approval, 78.3% reported having discussed the vaccine at least once with a mid-adult patient in the three months leading up to the survey.

Barriers

Respondents were asked to identify whether barriers identified in the literature review were “never,” “sometimes,” or “always” a barrier to SCDM conversations (Table 5). To determine the most reported barriers, a weighted score was calculated for each listed barrier. Answers of “not a barrier” received zero points toward the aggregate score, while “sometimes a barrier” received one point, and “always a barrier” received two points toward the aggregate score. The sum of the weighted scores for each barrier became the Aggregate Barrier Score, which was used to determine the most frequently cited barriers to SCDM around HPV vaccination. The highest-scoring barrier *was* “cost: I am unsure whether this vaccine would be covered by my patient’s insurance,” followed by “short appointment times” and “facility policies.” Respondents could enter free-text barriers within the “patient factors” and “other” categories. Barriers free-texted by respondents were not included in the aggregate scoring.

Summary

This project analyzed the responses of 147 Oregon NPs' overall awareness of the expanded age approval for the HPV vaccine. NPs reported how often they engaged their patients in SCDM conversations about the vaccine. The responses were used to ascertain the barriers NPs face to discussing this important vaccine with their mid-adult patients. This information may help create targeted interventions to improve appropriate vaccination within this age cohort.

Interpretation

Several themes of provider awareness emerged from the data. Of the survey respondents, 72% were aware of the age expansion, 4% were not sure, and 24% of respondents were unaware that their mid-adult patients could receive the vaccine. Despite efforts to curtail the survey toward primary care and reproductive health providers caring for adults aged 27-45, nearly a quarter of respondents reported their workplace as an acute care, inpatient, or highly specialized clinic setting. It was neither unusual nor unexpected for NPs working in those settings to be unaware of the expanded age approval for the HPV vaccine, as preventative vaccines are not often a priority in those settings. Rather, primary care providers are generally responsible for ensuring that patients are up to date on vaccinations. However, the data collected here did not reflect that providers in family practice or internal medicine settings where patients receive primary care services were exceptionally well-informed of the expanded age approval for HPV vaccination in adults. 28.8% of the family practice survey respondents were unsure or unaware of the expanded age approval, and 40% of respondents from internal medicine practices were unaware. Between these primary care settings, 70% of NPs were aware that their mid-adult patients could receive the vaccine. This finding reinforces the need for education efforts for primary care providers around HPV vaccines in mid-adults. Notably, NPs who reported working

in two settings (i.e., family practice and urgent care) were not included in the above calculation, and 50% were unaware of the expanded age approval.

Survey respondents working within reproductive health (n=9) and OB/GYN (n=30) settings were the most well-informed about the expanded age approval. In addition, they were most likely to have discussed the vaccine with their patients. While these impressive efforts must be acknowledged, many survey respondents in those settings may primarily see people AFAB for gynecological care. Therefore, they may not have opportunities to discuss this vaccine with patients AMAB. This discrepancy further highlights the importance of providers in primary care settings being well-informed, as they are likely to encounter more people AMAB than their reproductive health and OB/GYN counterparts. The lack of a standardized screening tool for HPV-associated cancers and traditionally low vaccination rates in people AMAB in make them particularly vulnerable to HPV-related cancers. To this point, the incidence of HPV-related oropharyngeal cancer in people AMAB has recently surpassed cervical cancer in people AFAB in the United States (Lechner et al., 2022). NPs who provide primary care services for mid-adult patients should bear these discrepancies in mind when deciding whether to engage in SCDM conversations about HPV vaccination.

This study aimed to determine how often providers were engaging in SCDM conversations about HPV vaccination with their adult patients, and the results here were reassuring. Of providers aware that adults up to 45 could receive the vaccine, 78.3% reported having at least one SCDM conversation with a mid-adult patient in the last three months, with 18 providers reporting having more than ten conversations with patients.

Finally, this study aimed to examine the barriers facing NPs in discussing the vaccine with their mid-adult patients. Using a weighting methodology described in the results section, the

authors found that “Cost: I am unsure whether this vaccine would be covered by my patient’s insurance” was the most frequent barrier to NPs engaging their patients in SCDM conversations. The 9vHPV vaccine is expensive and requires three doses to complete the series for people over 15 (CDC, 2021). Providers may feel uncomfortable suggesting the vaccine when payor coverage is uncertain, believing that a lack of insurance coverage could leave their patient with a sizable bill. However, except for grandfathered health plans, per the Affordable Care Act, insurance plans are required to cover preventative vaccines, including the HPV vaccine in adults aged 27-45 without imposing cost-sharing requirements (CDC, 2020). Patients without insurance, including undocumented individuals, can apply to receive the vaccine at no cost from the manufacturer.

Survey respondents also cited “short appointment times” and “facility policies” as high-level barriers to discussing the vaccine with their patients. Presently, no screening tool exists to help providers determine who may be an appropriate vaccine candidate. To mitigate time limitations as a barrier, developing an efficient screening tool or methods of encouraging patients to self-identify as appropriate vaccine candidates may be topics of future inquiry (Hurley et al., 2021; Ponolijo et al., 2022, Wheldon et al., 2021). Further, many survey respondents specified that the vaccine was not carried in their clinic; practices that lack the capacity to keep a stock of vaccine available should be aware of resources in their area where mid-adult patients can receive the HPV vaccine, such as county health departments or local pharmacies. Further, well-informed NPs can petition their clinic leadership to prioritize cancer prevention in their community by stocking and administering the HPV vaccine.

Limitations

This study had several limitations. First, the sample size was small, and the usable (completed/in-state) response rate was low at only 13.5% (147 of 1,081 sent surveys). Additionally, a large percentage of the Oregon NP workforce lacked access to this survey; the mailing list with contact information for licensed NPs available for purchase from the OSBN is limited to individuals who opt-in to receive email communications. As of February 2023, there are 6,713 licensed NPs in Oregon (Oregon State Board of Nursing, 2023); this survey was sent to only 1,081 Oregon NPs, a mere 16.1% of Oregon's licensed NP workforce.

Conclusion

The HPV vaccine is a safe and effective way to prevent genital warts and deadly cancers from HPV. Though it is most effective before the onset of sexual activity, it can offer protection to individuals who have not previously encountered vaccine-type HPV strains. Therefore, primary care providers should vaccinate everyone aged 9-26 and engage in SCDM conversations with their patients aged 27-45 to determine whether the vaccine is right for them (Meites et al., 2019).

This study sampled the experiences of 147 Oregon NPs to ascertain their knowledge of the approval to vaccinate adults up to age 45 against HPV, to determine how often NPs engage in SCDM with mid-adult patients about the vaccine, and what factors cause them to hesitate to discuss the HPV vaccine with their patients. Most surveyed NPs were aware of the expanded age approval, and most reported having at least one SCDM conversation with their mid-adult patients about the HPV vaccine in the three months prior to the survey. However, two-thirds of surveyed NPs reported that not being sure whether the vaccine would be covered by their patients' insurance was either "always" or "sometimes" a barrier to discussing it with their patients. This simple barrier can easily be overcome with education, as most health plans must cover the

vaccine under the Affordable Care Act (ACA) (CDC, 2020). Exceptions to this rule are rare; only grandfathered health plans that existed before the creation of the ACA in 2010 are not required to cover preventative healthcare (CDC, 2020). The results of this study suggest that provider-focused education efforts on HPV vaccination in mid-adults may minimize a significant barrier NPs face to engaging patients in SCDM conversations about the vaccine.

References

- Centers for Disease Control and Prevention. (2020). *ACIP Shared Clinical Decision-Making Recommendations*. Retrieved June 1, 2022 from <https://www.cdc.gov/vaccines/acip/acip-scdm-faqs.html#covered-insurers>
- Centers for Disease Control and Prevention. (2021). *HPV Vaccination Recommendations*. Retrieved May 7, 2022 from <https://www.cdc.gov/vaccines/vpd/hpv/hcp/recommendations.html>
- Centers for Disease Control and Prevention. [CDCa]. (2022). *Basic information about HPV and cancer*. Retrieved February 20, 2023 from https://www.cdc.gov/cancer/hpv/basic_info/index.htm
- Centers for Disease Control and Prevention. [CDCb]. (2022). *HPV and Cancer. How many cancers are linked with HPV each year?* Retrieved February 15, 2023 from <https://www.cdc.gov/cancer/hpv/statistics/cases.htm>
- Centers for Disease Control and Prevention [CDCc]. (2022). *Cancers Caused by HPV*. Retrieved February 23, 2023 from <https://www.cdc.gov/hpv/parents/cancer.html>
- Centers for Disease Control and Prevention. (2023). *Sexually transmitted diseases: Diseases and related conditions*. Retrieved February 23, 2023 from <https://www.cdc.gov/std/general/default.htm>

Daniels, V., Prabhu., V. S., Palm, C., Samant, S., Kothari, S., Roberts, C., Elbasha, E. (2021).

Public health impact and cost-effectiveness of catch-up 9-valent HPV vaccination of individuals through age 45 years in the United States. *Human Vaccines & Immunotherapeutics*, 17(7), 1943-1951.

<https://doi.org/10.1080/21645515.2020.1852870>

Hurley, L. P., O’Leary, S. T., Markowitz., L. E., Crane, L. A., Cataldi, J. R., Brtnikova, M., Beaty, B. L., Gorman, C., Meites, E., Lindley, M. C., & Kempe, A. (2021). US primary care physicians’ viewpoints on HPV vaccination for adults 27 to 45 years. *Journal of American Board of Family Medicine*, 34(1), 162-170.

<https://doi.org/10.3122/jabfm.2021.01.200408>

Joura, E. A., Ulied, A., Vandermeulen, C., Rua Figueroa, M., Seppä, I., Hernandez Aguado, J. J., Ahonen, A., Reich, O., Virta, M., Perino, A., Peris Tuser, M., Peters, K., Origoni, M., Raspagliesi, F., Tjalma, W. A. A., Tummers, P., Woelber, L., Nieminen, P., van Damme, P., Sehouli, J., ... Wittke, F. (2021). Immunogenicity and safety of a nine-valent human papillomavirus vaccine in women 27-45 years of age compared to women 16-26 years of age: An open-label phase 3 study. *Vaccine*, 39(20), 2800–2809.

<https://doi.org/10.1016/j.vaccine.2021.01.074>

Kasting, M. L., Guiuliano, A. R., Christy, S. M., Rouse, C. E., Robertson, S. E., & Thompson, E. L. (2020). Human papillomavirus vaccination prevalence among adults aged 19-45 years: An analysis of the 2017 National Health Survey. *American Journal of Preventative Medicine*, 59(6), 837-849. <https://doi.org/10.1016/j.amepre.2020.05.031>

- Lechner, M., Lieu, J., Masterson, L., & Fenton, T. R. (2022) HPV-associated oropharyngeal cancer: epidemiology, molecular biology and clinical management. *Nature Reviews Clinical Oncology*, 19, 306-327. <https://doi.org/10.1038/s41571-022-00603-7>
- Meites, E., Szilagyi, P. G., Chesson, H. W., Unger, E. R., Romero, J. R., Markowitz, L. E. (2019). Human papillomavirus vaccination for adults: Updated recommendations of the advisory committee on immunization practices. *Morbidity and Mortality Weekly Report*, 68(32), 698-702.
- Office of Disease Prevention and Health Promotion. (n.d.) Increase the proportion of adolescents who get recommended doses of the HPV vaccine. *Healthy People 2030*. US Department of Health and Human Services. <https://health.gov/healthypeople/objectives-and-data/browse-objectives/vaccination/increase-proportion-adolescents-who-get-recommended-doses-hpv-vaccine-iid-08>
- Oregon State Board of Nursing. (2023). OSBN reports: Licenses by type. Retrieved February 15, 2023 from <https://osbn.oregon.gov/osbnreports/stat/licenseByType.aspx>
- Ponolijo, A. N., Mahapatra, D., & Brown, B. (2022). “I thought it was just for teenagers”: Knowledge, attitudes, and beliefs about HPV vaccination among women aged 27 to 45. *Women’s Health Issues*, 32(3), 301-308. <https://doi.org/10.1016/j.whi.2022.01.007>
- Wheldon, C. W., Garg, A., Galvin, A. M., Moore, J. D., & Thompson, E. L. (2021). Decision support needs for shared clinical decision-making regarding HPV vaccination among adults 27-45 years of age. *Patient Education and Counseling*, 104, 3079-3085. <https://doi.org/10.1016/j.pec.2021.04.016>

Appendix A

Table 1. Demographic Characteristics of Survey Respondents		No. (% of total N)
Age		N = 147
	25-34	25 (17.0%)
	35-44	52 (35.3%)
	45-54	37 (25.1%)
	55-64	20 (13.6%)
	> 65	12 (8.1%)
	Chose not to disclose	1 (0.6%)
How many years have you been licensed as a nurse practitioner?		N = 147
	5 years or fewer	38 (25.8%)
	6-10 years	35 (23.8%)
	11-20 years	44 (29.9%)
	21-30 years	23 (15.6%)
	> 30 years	7 (4.7%)
Type of NP Licensure Held		N = 147
	FNP	102 (69.4%)
	CNM	18 (12.2%)
	ACNP	2 (1.4%)
	AGACNP	4 (2.7%)
	ANP	6 (4.1%)
	CNS	1 (0.7%)
	WHNP	4 (2.7%)
	Multiple licensures	3 (2.0%)
	Chose not to disclose	7 (4.8%)
Table 2. Practice Setting		No. (% of total N)
Do you provide primary care or sexual health services to adults aged 27-45?		N = 147
	Yes	147 (100%)
	No	0 (0%)
Primary practice setting		N = 147
	Family practice	60 (40.8%)
	Internal medicine	10 (6.8%)
	OB/GYN	30 (20.4%)
	Reproductive health clinic	9 (6.1%)
	Emergency medicine	3 (2.0%)
	Urgent care	14 (9.5%)
	Inpatient	2 (1.3%)
	Other	12 (8.1%)
	<i>Selected two settings</i>	

Family practice/ Urgent care	6 (4.0%)
Urgent care / Emergency medicine	1 (0.6%)

Table 3. Awareness

	No. (% of total N)
Were you aware that adults up to age 45 could receive the HPV vaccine?	N = 147
Yes	106 (72.1%)
No	35 (23.8%)
I'm not sure	6 (4.0%)
	No. (% of practice setting N)
Awareness of expanded age guideline by practice setting	N = 147
Family practice	N = 60
Yes	43 (71.7%)
No	15 (25.0%)
I'm not sure	2 (3.3%)
Internal medicine	N = 10
Yes	6 (60%)
No	4 (40%)
I'm not sure	0 (0%)
OB/GYN	N = 30
Yes	25 (83.3%)
No	2 (6.6%)
I'm not sure	3 (10.0%)
Reproductive health clinic	N = 9
Yes	9 (100%)
No	0 (0%)
I'm not sure	0 (0%)
Emergency medicine	N = 3
Yes	1 (33.3%)
No	1 (33.3%)
I'm not sure	1 (33.3%)
Urgent care	N = 14
Yes	8 (57.1%)
No	6 (42.9%)
I'm not sure	0 (0%)
Inpatient	N = 2

Yes	1 (50.0%)
No	1 (50.0%)
I'm not sure	0 (%)
Other	N = 12
Yes	10 (83.3%)
No	2 (16.6%)
I'm not sure	0 (0%)
<i>Selected two settings</i>	
Family practice/ Urgent care	N = 6
Yes	3 (50.0%)
No	3 (50.0%)
I'm not sure	0 (0%)
Urgent care / Emergency medicine	N = 1
Yes	0 (0%)
No	1 (100%)
I'm not sure	0 (0%)

Table 4. Practices in the last 3 months

	No. (% of total N)
How many of your patients aged 27-45 have requested the HPV vaccine (unprompted)?	N = 146
None	102 (69.9%)
1-3 patients	36 (24.7%)
4-6 patients	8 (5.4%)
6-10 patients	0 (0%)
More than 10 patients	0 (0%)
How many times have you engaged in SCDM conversations with mid-adults?	N = 147
Never	55 (37.4%)
1-3 times	49 (33.3%)
4-6 times	16 (10.9%)
6-10 times	9 (6.1%)
More than 10 times	18 (12.2%)

Table 5. What barriers prevent you from engaging your patients in SCDM conversation around HPV vaccination?

	No. (% of total N)
Short appointment times	N = 147
Not a barrier	48 (32.7%)
Sometimes a barrier	70 (47.6%)
Always a barrier	29 (19.7%)
Calculated aggregate barrier score	128
I am unsure if vaccination is appropriate	N = 147
Not a barrier	78 (52.7%)
Sometimes a barrier	58 (39.9%)
Always a barrier	11 (7.4%)
Calculated aggregate barrier score	81
Patient factors (free text option)	N = 145
Not a barrier	79 (54.5%)
Sometimes a barrier	56 (38.6%)
Always a barrier	10 (6.9%)
Calculated aggregate barrier score	76
Lack of evidence of vaccine efficacy in this age group	N = 143
Not a barrier	98 (68.5%)
Sometimes a barrier	40 (28.0%)
Always a barrier	5 (3.5%)
Calculated aggregate barrier score	50
Cost: I'm unsure whether the vaccine would be covered by my patient's insurance	N = 147
Not a barrier	49 (33.3%)
Sometimes a barrier	51 (34.7%)
Always a barrier	47 (32.0%)
Calculated aggregate barrier score	145
Facility Policies around vaccination	N = 147
Not a barrier	71 (48.3%)
Sometimes a barrier	49 (33.3%)
Always a barrier	27 (18.4%)
Calculated aggregate barrier score	103

Appendix B

ACIP considerations for shared clinical decision-making regarding human papillomavirus (HPV) vaccination of adults aged 27 through 45.

Ideally, HPV vaccination should be given in early adolescence because vaccination is most effective before exposure to HPV through sexual activity. For adults aged 27 through 45 years who are not adequately vaccinated, clinicians can consider discussing HPV vaccination with persons who are most likely to benefit. HPV vaccination does not need to be discussed with most adults aged >26 years.

- HPV is a very common sexually transmitted infection. Most HPV infections are transient and asymptomatic and cause no clinical problems.
- Although new HPV infections are most commonly acquired in adolescence and young adulthood, some adults are at risk for acquiring new HPV infections. At any age, having a new sex partner is a risk factor for acquiring a new HPV infection.
- Persons who are in a long-term, mutually monogamous sexual partnership are not likely to acquire a new HPV infection.
- Most sexually active adults have been exposed to some HPV types, although not necessarily all of the HPV types targeted by vaccination.
- No clinical antibody test can determine whether a person is already immune or still susceptible to any given HPV type.
- HPV vaccine efficacy is high among persons who have not been exposed to vaccine-type HPV before vaccination.

- Vaccine effectiveness might be low among persons with risk factors for HPV infection or disease (e.g., adults with multiple lifetime sex partners and likely previous infection with vaccine-type HPV), as well as among persons with certain immunocompromising conditions.
- HPV vaccines are prophylactic (i.e., they prevent new HPV infections). They do not prevent progression of HPV infection to disease, decrease time to clearance of HPV infection, or treat HPV-related disease.

(Meites et al, 2019)