

Human Papillomavirus Vaccine Hesitancy in the United States



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KEYWORDS

- Adolescent • Human papillomavirus • Parental • Provider • Vaccination
- Vaccine hesitancy • Vaccine beliefs

KEY POINTS

- Misconceptions that contribute to parental vaccine hesitancy include that the human papillomavirus (HPV) vaccine is only relevant for girls/women, leads to promiscuity or sexual activity, and is unsafe.
- Safety concerns/side effects and lack of provider recommendation are the most common reasons for parental vaccine hesitancy.
- Health care providers, public health organizations, and others should address parental HPV vaccine hesitancy on many levels, incorporating discussion of vaccine misinformation currently circulating in the media (as needed by the specific parent) and addressing the historical context in racial/ethnic communities.
- Health care providers play a critical role in addressing HPV vaccine hesitancy because their recommendations influence hesitant parents.
- The presumptive recommendation approach has been found to be the most effective communication method to increase HPV vaccination uptake, but it may or may not address parental hesitancy in all cases.

INTRODUCTION

The first approved human papillomavirus (HPV) vaccine, a 4-valent vaccine targeting HPV types 6, 11, 16, and 18 (4vHPV), was licensed by the US Food and Drug Administration (FDA) in 2006 for use in females ages 9 through 26 years. The Advisory

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Committee on Immunization Practices (ACIP) issued a routine recommendation for female vaccination, with the targeted age range of 11 to 12 years to create a standardized platform for the tetanus, diphtheria, and pertussis (Tdap) booster; meningococcal ACWY; and HPV vaccines. In 2009 a 2-valent vaccine (2vHPV) targeting HPV types 16 and 18 was licensed for females and 4vHPV was licensed for males ages 9 through 26 years. In 2011 the ACIP recommended routine vaccination of males ages 9 through 21 years with 4vHPV. The vaccine was only routinely recommended for males ages 22 through 26 years who were immunocompromised or identified as men who have sex with men.¹ In 2014 a 9-valent vaccine was licensed by the FDA (9vHPV), replacing 4vHPV. Since 2016, 2vHPV has not been available in the United States. In 2019 the male and female age recommendations were harmonized so that routine vaccination was recommended for all individuals ages 9 through 26 years.² In 2022, the ACIP emphasized that routinely recommended HPV vaccination could begin at age 9 years.³

Currently, the only vaccine licensed and available in the United States is the 9-valent vaccine (9vHPV). Both 4vHPV and 9vHPV protect against HPV types 6 and 11, which are responsible for about 90% of genital warts. 9vHPV protects against 7 additional HPV types that have been causally associated with approximately 90% of cervical, anal, vaginal, vulvar, penile, and oropharyngeal cancers (types 16, 18, 31, 33, 45, 52, and 58).⁴

For this article, the authors define HPV vaccine hesitancy broadly as including attitudes or beliefs of doubt or concern about HPV vaccination, rather than only as HPV vaccine acceptance, delay, or rejection.⁵ Hesitancy can lead to vaccination delay or refusal but can be present even when HPV vaccination is accepted at the recommended ages. Complete refusal to accept HPV vaccination, we would argue, is not an example of hesitancy, but reflects certainty, as misguided as it may be. Furthermore, a lack of hesitancy about HPV vaccination does not necessarily translate to HPV vaccine confidence. Many parents unhesitatingly accept HPV vaccination for their children/adolescents simply because a clinician has recommended it and these parents routinely follow the health care provider's recommendation regarding vaccination (Fig. 1). It is important to emphasize that assessment of hesitancy typically occurs at a single point in time and that persons all along the spectrum of HPV vaccine attitudes may change their stances with new information (or misinformation) or changing circumstances; this means that clinicians should not give up on confident rejectors and should not take confident acceptors for granted. Providers should check in with all parents regarding vaccination attitudes and need for information at every well-child and well-adolescent visit.

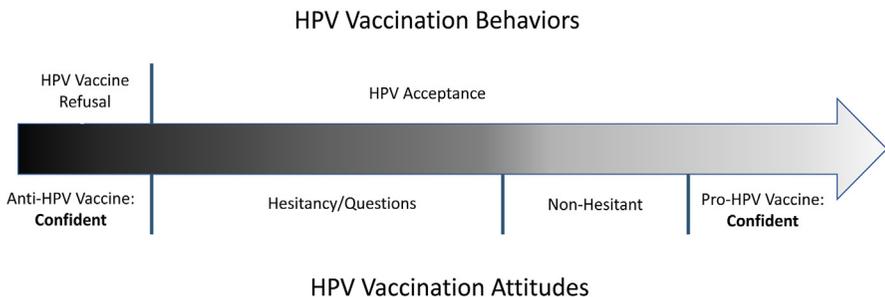


Fig. 1. HPV vaccination continuum.

HPV vaccine hesitancy is multifaceted. Individuals who are hesitant about all vaccines will certainly be hesitant about HPV vaccine. However, HPV vaccine hesitancy also has several unique features related to its history and to the fact that most HPV infections are sexually transmitted. There may be general hesitancy issues that take on salience with HPV vaccine (eg, questions about vaccine safety and/or effectiveness), but in this article the authors focus primarily on aspects of hesitancy that are unique to HPV vaccination.

They do not focus on the direct effect of policy approaches on vaccine coverage, such as school-entry requirements or school-located vaccination. These types of policies can have a profoundly positive impact on HPV vaccine uptake but are not designed to directly address hesitancy. At the same time, it is important to acknowledge that vaccination policy can indirectly affect hesitancy, and these potential indirect effects of policy are addressed here. This article largely addresses HPV vaccine hesitancy in the United States, although many of the issues that we identify may be relevant throughout North America and across other countries as well. Countries such as Canada, the United Kingdom, and Australia (among others) have approached HPV vaccination with very different implementation policies from those used by the United States. These HPV vaccination policy differences may have differential indirect effects on hesitancy.

The purpose of this review is to examine sources of HPV vaccine hesitancy among parents and providers to better understand and develop strategies to address them. In the following discussion the authors have organized their approach based on the 2014 report of the SAGE Working Group on Vaccine Hesitancy, which proposes 3 broad categories of determinants of hesitancy: contextual influences, individual and group influences, and vaccine/vaccination-specific issues.⁶ Contextual influences include media, influential leaders, historical issues, and politics. Individual and group influences include beliefs, knowledge, social norms, and prior vaccination experiences. Vaccine/vaccination-specific issues include the strength and content of HPV vaccine recommendations by health care providers, the target of vaccination (ie, how the pathogen is transmitted; the lag time between infection and disease; and the severity of disease), and HPV vaccine policy (Table 1).

CONTEXTUAL INFLUENCES ON HUMAN PAPILLOMAVIRUS VACCINE HESITANCY

History of human papillomavirus vaccine hesitancy. Research on HPV vaccine acceptability just before and following licensure indicated high levels of acceptability, with approximately 80% of parents indicating that they would vaccinate their children, and with acceptance higher for older versus younger daughters and daughters versus sons.⁷ Opposition to HPV vaccination was relatively muted, with even conservative religious groups not opposing vaccination but rejecting school-entry requirements. However, not long after the FDA-licensed 4vHPV and the ACIP recommended it in 2006, several states began to consider legislation that would require HPV vaccination for girls entering middle school.^{8–10} These efforts, which were highlighted by Texas governor Rick Perry's executive order in 2007 to require HPV vaccination (an order that was overruled by the state legislature), generated a great deal of controversy. The controversy grew more intense when it was revealed that the manufacturer of 4vHPV was involved in working with state legislators to pass school-entry requirements. Ultimately, these issues led to a backlash against HPV vaccination and may have significantly increased hesitancy around the vaccine, due in part to the negative media coverage that ensued.

Contextual Influences Influences arising due to historical, sociocultural, environmental, or political factors	<ul style="list-style-type: none"> • Communication and media environment • Influential leaders, immunization program gatekeepers and anti- or pro-vaccination lobbies. • Historical influences • Religion/culture/gender/socio-economic • Politics/policies • Perception of the pharmaceutical industry
Individual and Group Influences Influences arising from personal perception of the vaccine or influences of the social/peer environment	<ul style="list-style-type: none"> • Personal, family, and/or community members' experience with vaccination, including pain • Beliefs, attitudes about health and prevention • Beliefs related to a child's sexual behavior • Knowledge/awareness • Health system and provider's trust and personal experience • Risk/benefit (perceived, heuristic)
Vaccine/Vaccination-Specific Issues Directly related to vaccine or vaccination	<ul style="list-style-type: none"> • Effectiveness of the vaccine • Concerns about vaccine safety • Risk/Benefit (epidemiologic and scientific evidence) • The strength of the recommendation and/or knowledge base and/or attitude of health care professionals

Another unique set of issues particularly relevant to HPV vaccination were the frequent changes in licensure indications and recommendations over the years since the vaccine was first approved in the United States in 2006 (Table 2). HPV vaccination was first approved and routinely recommended for females only. After multiple changes in guidance over the intervening years, the recommendations for females and males were not fully harmonized until 2019, 13 years after initial approval. The frequent changes in licensure and recommendations, although driven by emerging research, may have confused primary care clinicians, resulting in decreased confidence (increased hesitancy) in recommending HPV vaccination. The delay in harmonizing the recommendations for men and females also created confusion about the nature of HPV infection, disease, and vaccination, with many parents believing HPV to be mainly a female issue (ie, what has been called the feminization of HPV).¹¹ As a result, some parents, to this day, do not realize that HPV vaccination has direct benefit for their sons.¹²

Communication and media environment. Many research articles have focused on the way in which information about HPV vaccines is presented on social media sites and the influence of social media on attitudes about HPV vaccination.¹³ Studies^{12,14–17} of the association between media and HPV vaccine hesitancy indicate that parents rely on the media for information but also recognize it may contain misinformation and note that messaging must be tailored to address specific concerns. Using national immunization data (2015–2018), Sonawane and colleagues¹⁸ showed an increase in

Table 2
History of human papillomavirus vaccine policies

Year	Authorization	Recommendations for Females	Recommendations for Males
2006	Three-dose series of <i>4vHPV</i> indicated for females ages 9–26 y for prevention of cervical, vulvar, and vaginal cancers and genital warts	Three-dose series of <i>4vHPV</i> routinely recommended for females ages 11–12 y. Routine catch-up recommendation for females ages 13–26 y. “Permissive” recommendation for females ages 9–10 y	
2009	Three-dose series of <i>2vHPV</i> indicated for females ages 9–26 y for prevention of cervical cancers and precancers	Three-dose series of <i>2vHPV</i> routinely recommended for females ages 11–12 y. Routine catch-up recommendation for females ages 13–26 y. “Permissive” recommendation for females ages 9–10 y	
2009	Three-dose series of <i>4vHPV</i> indicated for males ages 9–26 y for prevention of genital warts	Unchanged	“Permissive” recommendation of three-dose series of <i>4vHPV</i> for males
2011	Three-dose series of <i>4vHPV</i> indicated for females and males ages 9–26 y for prevention of anal cancers and precancers	Unchanged	Three-dose series of <i>4vHPV</i> routinely recommended for males ages 11–12 y. Routine catch-up vaccination for males ages 13–21 y. Permissive recommendation for males ages 9–10 and 22–26 y. Routine recommendation for males ages 22–26 y who are immunocompromised or are men who have sex with men (MSM)
2014	Three-dose series of <i>9vHPV</i> indicated for females and males ages 9–26 y for prevention of cervical, vulvar, vaginal, and anal cancers and genital warts. Gradually replaces <i>4vHPV</i>	Unchanged	Unchanged

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Table 2
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Year	Authorization	Recommendations for Females	Recommendations for Males
2016	—	Two-dose series of 9vHPV and 2vHPV recommended if the first dose is given before age 15 y. When the first dose is given at age 15 y or older, the three-dose is still recommended	Two-dose series of 9vHPV recommended if the first dose is given before age 15 y. When the first dose is given at ages 15–21 y, the three-dose is still recommended for routine catch-up vaccination. Routine recommendation only for males ages 22–26 y who are immunocompromised, are MSM, or are transgender persons
2016	2vHPV withdrawn from the US market by the manufacturer	—	—
2019	—	Unchanged	Recommendations of 9vHPV for males through age 26 y harmonized with recommendations for females
2019	9vHPV indicated for use in persons ages 27–45 y	Shared clinical decision-making recommendation of 9vHPV for ages 27–45 y	Shared clinical decision-making recommendation of 9vHPV for ages 27–45 y
2020	9vHPV indicated for prevention of HPV-related oropharyngeal and other head and neck cancers	Unchanged	Unchanged
2021	—	Can begin routine recommendation of 9vHPV at ages 9–10 y	Can begin routine recommendation of 9vHPV at ages 9–10 y

the proportion of parents who refused the HPV vaccine for their adolescents due to safety concerns over time. They noted this may have resulted from unsubstantiated HPV vaccine-related adverse event reports on social media and online blogs. Walker and colleagues¹² (2020) interviewed 30 mothers in the Mid-West and found that respondents viewed the media as the main source of HPV vaccination confusion, misinformation, and fear. Interestingly, these same mothers believed the media should address these fears by providing accurate statistics on safety and adverse side effects and information about vaccine benefits, such as protection against cancer. Similarly, Latina mothers in a study conducted by Lindsay and colleagues¹⁹ suggested several strategies to promote uptake of the HPV vaccine, which included social media distribution of personal narratives that reduce parents' HPV vaccination hesitancy. Of note, findings from Argyris and colleagues²⁰ analysis of antivaccine versus provaccine social media posts indicated that antivaccine posts were associated with increased vaccine hesitancy and decreases in their children's HPV vaccination rates, whereas provaccine content had no association with either.

There have been recent efforts^{21–23} to develop strategies to counter online/social media misinformation about HPV vaccination, including training HPV vaccine-confident parents to post supportive comments on their social media accounts. However, much more needs to be done, and other stakeholders, in addition to parents, need to be strategically active on social media, to help neutralize the negative impact of misinformation.^{24,25} These stakeholders include primary care practices and health systems (Please see the article by Hoffman and colleagues “[Social Media and Vaccine Hesitancy: Help Us Move the Needle](#)” in this issue of the journal.)

Religious factors. According to the Pew Research Center,^{26,27} almost 77% of US adults affiliate with a religious faith and 53% state that religion is important to them. Public health efforts aimed at improving vaccination rates need to consider beliefs of different faith groups and tailor interventions appropriately. Religious communities and leaders have often been hesitant to mandate or strongly recommend the vaccine because HPV is sexually transmitted and there is the perception that actively supporting vaccination will be interpreted as condoning premarital sexual activity.²⁷ However, research shows clearly there is no evidence of increased sexual risk outcomes following HPV vaccination among adolescents.^{28,29}

INDIVIDUAL AND GROUP INFLUENCES

Personal, family, and/or community members' experience with vaccination. The social norms and values present within a culture, in addition to the lived experience of an individual and those persons within their close social network, may also affect HPV vaccine hesitancy.³⁰ Callaghan and colleagues³¹ found in their parent survey investigating predictors of delayed vaccination that needle sensitivity was significantly associated with delayed HPV vaccination. Parents who experience high anxiety and discomfort with needles, in extreme cases leading to panic or fainting, may be more likely to experience the same anxiety when having to vaccinate their child. Sundstrom and colleagues²³ also reported that hesitant parents described hearing comments about injuries and deaths related to the HPV vaccine and that these comments influenced their decision to delay.

Parental beliefs and attitudes about health and prevention. Szilagyi and colleagues³² found in their sample of US parents that some did not believe the HPV vaccine was beneficial for their child, protected against HPV-related cancer, or was effective. In all, 23% of the sample were deemed to be hesitant about HPV vaccination, based on their scores on an HPV Vaccine Hesitancy Scale. Pomares and colleagues³³

studied individuals' general cognitive biases (ie, not specific to vaccination), including base rate neglect, conjunction fallacy, sunk cost fallacy, present bias, risk aversion, and information avoidance. They reported that 2 of the cognitive biases may be positively associated with greater parental vaccine hesitancy:

- *Information avoidance* (preference to not to obtain knowledge that is freely available, especially if that knowledge is unwanted or unpleasant, for example, could threaten one's ideas or beliefs)
- *Present bias* (tendency to give stronger weight to more-immediate payoffs than long-term payoffs)

In contrast, their findings indicated an association with *lower* vaccine hesitancy in the presence of individuals prone to 2 other cognitive biases:

- *Conjunction fallacy* (when an individual perceives a specific condition as more likely than a general condition, of which it is a subset)
- *Sunk cost bias* (individuals are compelled to continue a behavior toward a goal, for example, continuing to vaccinate according to the recommended schedule, because they have previously invested resources)

Another cognitive bias, omission bias, has been studied with vaccination in general and may apply, as well, to HPV vaccination.³⁴ Omission bias refers to the tendency to attribute more sense of responsibility for negative outcomes to acts of commission (eg, concern about side effects due to getting one's child vaccinated) than to acts of omission (eg, concern about infection or disease due to not getting one's child vaccinated).³⁴

Francis and colleagues³⁵ surveyed providers to learn more about their experience with vaccine-hesitant parents and providers' confidence in responding to their concerns. The results of the study showed that providers were least confident in responding to parents' religious or personal beliefs.

Knowledge and awareness about human papillomavirus and human papillomavirus vaccines. One of the most common reasons for parental HPV vaccine refusal is lack of knowledge regarding the HPV vaccine or awareness of HPV. Lack of knowledge/awareness about the vaccine and the disease may leave parents susceptible to misinformation and misconceptions about vaccines.³⁰ Thompson and colleagues³⁶ examined National Immunization Survey-Teen 2012 to 2015 data and found that parental lack of knowledge was significantly more likely to be the reason for nonvaccination in 2012 to 2013, and parents were significantly less likely to use this reason for female compared with male children; this may be related to the feminization of HPV and late recommendation of the vaccine for men. Khodadadi and colleagues³⁷ found that among Latina mothers higher HPV vaccine awareness was associated with greater willingness to accept vaccination. The study also demonstrated that parents who have more education are more likely to refuse³⁸ or delay³⁹ HPV vaccination than those with less education. Parents with less education may rely on the practitioner to evaluate the risks and benefits of the vaccine.

Providers addressing parental lack of knowledge through follow-up counseling is important because secondary acceptance (vaccinating after initially refusing or delaying) is common.⁴⁰ In a study by Kornides and colleagues,⁴⁰ the investigators analyzed data from a national survey of parents who declined HPV vaccination but accepted the vaccine at a subsequent visit. The parents reported one of their reasons for acceptance was that they learned more about the vaccine through counseling by their provider. According to Patel and colleagues,⁴¹ the knowledge and attitudes of health care providers toward vaccination are reflected in parental

attitudes toward vaccinations; thus, positive engagement between providers and parents is essential. A review by Bratic and colleagues⁴² also showed that HPV vaccine knowledge and acceptance are inconsistent among providers, so better professional training may be needed.

Beliefs related to a child's sexual behavior. Research on HPV vaccine hesitancy suggests that parents' beliefs regarding sexual purity and chastity before marriage—both of which may be related to their religious beliefs—are key to their decisions regarding HPV vaccination. Beliefs related to a child's sexual behavior are important to consider when addressing parents' decisions to refuse or delay vaccination.^{31,38,43} For example, Callaghan and colleagues³¹ define “moral purity” as a belief that leads “persons to avoid perceived bodily contamination and individuals, objects, and experiences that violate sanctity or self-control.” The investigators demonstrated that parents who highly valued “moral purity” were more likely to delay vaccination compared with those who had lower scores. Parents with higher scores were more likely to hold conservative beliefs about sexuality, thus were less likely to believe vaccinating children/preadolescents against HPV was proper³¹ or necessary before sexual activity.³⁸ According to Bratic and colleagues,⁴² hesitancy may stem from parental concerns that the physician's recommendation may lead to discussion with their child about sexual activity in the office. As noted earlier, other parents may be concerned that their vaccinated adolescent would be more inclined to initiate sexual activity but there is no evidence of increased sexual activity among vaccinated adolescents.^{28,29} Butterfield and colleagues³⁸ also noted that parents who had a history of sexually transmitted infections were more likely to agree to vaccinate. In Francis and colleagues³⁵ survey, providers were asked about their level of confidence responding to parents in various settings. More providers (64%) reported feeling very confident in discussing the appropriateness of recommending the HPV vaccine for a child who is *not* sexually active than in other scenarios, for example, the parent has concerns about the vaccine's safety or side effects; it is not mandatory for school. This provider confidence is critical in alleviating parental concerns about a child being too young for HPV vaccine.

Trust in the health system and providers. (Please see the article on culture in this issue of the journal.) Many racial/ethnic groups (eg, African American, Hispanic, Native American) have a history of medical distrust and trauma stemming from negative experiences with the US government and other institutions as well as researchers and physicians. These negative experiences included the Tuskegee study, involuntary sterilization of Latinas in California and Puerto Rico and of Native women, and discriminatory health policies, which may contribute to HPV vaccine hesitancy among these groups.^{44–46} Tsui and colleagues,⁴⁵ for example, reported that in a study of largely Hispanic/Latino parents, there was an association between high levels of medical mistrust and HPV vaccine hesitancy. In a study conducted by Szilagyi and colleagues,³² a high proportion of mixed-race parents reported distrusting the HPV vaccine information they received from their adolescent's health care provider.

Perceived risks and benefits of vaccination. In Khodadadi and colleagues'³⁷ study of Latina mothers, greater HPV vaccine hesitancy was associated with lower perceived self-risk of cervical cancer, lower HPV awareness, lower perceived risk of HPV among daughters, lower perceived self-efficacy score to complete the vaccination series, and having health insurance for their daughter. In a study of providers, Cunningham-Erves and colleagues³⁹ reported that some of the most common reasons for parental vaccine hesitancy as perceived by providers were the child being too young and at low risk of HPV infection through sexual activity.

VACCINE/VACCINATION-SPECIFIC ISSUES

Concerns about vaccine safety and infertility. Despite numerous studies demonstrating that HPV vaccines are safe and well tolerated, many parents are concerned about HPV vaccine safety, especially long-term side effects that may not become apparent until later in life.^{23,32,39,47,48} Thomas and colleagues⁴⁹ demonstrated that in a survey of parents in rural south Florida, 80% believed HPV vaccination could leave their child sterile. Studies also have revealed gender differences regarding concerns about safety and side effects. Thompson and colleagues³⁶ reported that parents of females were more likely to state they were concerned about safety and side effects compared with those of males (odds ratio [OR] = 2.19, 95% confidence interval [CI], 1.98–2.41). Parents tend to turn to their providers with their safety concerns⁵⁰ (eg, the vaccine causing infertility or sudden death), but Francis and colleagues³⁵ reported (when looking at individual items) that providers in their study were less confident responding to parents' concerns regarding lasting than acute health problems thought to be caused by the HPV vaccine.

Risk/Benefit Assessment. Bratic and colleagues⁴² reported that parents may prioritize the HPV vaccine lower than other childhood vaccines because it offers delayed benefits and no perceived short-term benefit for their children. Patel and colleagues⁴¹ found in their review of parental hesitancy that parents were more concerned with potential morbidity and mortality of HPV-associated diseases, rather than the sexually transmitted nature of the HPV infection.

INCREASING HUMAN PAPILLOMAVIRUS VACCINE ACCEPTANCE AND UPTAKE

When parents express vaccine hesitancy, regardless of the reason, it is critical for providers to focus on respectful dialogue, strongly recommend the HPV vaccine, and respond to specific questions or concerns.⁵¹ Butterfield and colleagues³⁸ reported that the following factors correlate with an increased rate of vaccine acceptance: strong HPV vaccine recommendation from a provider; recommendation of concurrently required adolescent vaccines at the same time as the HPV vaccine; discussion of the benefits of vaccination; and discussion of these issues using a positive tone. Shay and colleagues⁵¹ reported that parental vaccine hesitancy was subject to positive influence and that undecided parents, who made assertive statements about their vaccine hesitancy, were still amenable to vaccination when providers responded to hesitancy by endorsing the vaccine with a brief rationale.

Gilkey and colleagues⁵² conducted a study measuring the quality of provider recommendation using 3 indicators with a value of one point each: stating it is important to receive, highlighting that it prevents HPV-related cancers, and stressing the urgency of same day vaccination. The investigators found that high-quality recommendations (2 to 3 points) were associated with an increase in vaccination initiation. In a study by Lockhart and colleagues,⁵³ medical staff reported that learning a presumptive approach (ie, assuming the parent intends to vaccinate) and motivational interviewing skills benefited them in communicating with HPV vaccine-hesitant parent because they were better equipped for these types of challenging conversations. Similarly, medical providers in a mixed methods study by Newcomer and colleagues⁵⁰ identified the following as facilitators of HPV vaccination: using a presumptive style of recommending the vaccine, offering the HPV vaccine with recommended vaccines, and emphasizing the HPV vaccine as a tool for cancer prevention. Dempsey and colleagues⁵⁴ conducted a study of parental report of provider HPV communication strategies used as part of a randomized control trial. The investigators found that receipt of a presumptive recommendation was associated with a lower likelihood of having

concerns about the vaccine's safety, lower vaccine hesitancy, and an increased likelihood of vaccination. Several studies have also found that training clinicians in communication strategies can improve vaccination rates but also reduce missed opportunities.^{55–58} As noted by Opel article in this journal, there are communication strategies clinicians can use for HPV vaccine hesitancy that are important to be aware of and can include motivational interviewing. Following is a table of resources and scripts for clinicians (**Box 1**).

DISCUSSION

This review examined available evidence on HPV vaccine hesitancy among parents and providers, framing results in 3 categories: contextual, individual and group, and vaccine/vaccination-specific issues. The most consistently identified determinants of HPV vaccine hesitancy in the literature include media misinformation, lack of knowledge and awareness about HPV and HPV vaccines, belief that HPV vaccines are not necessary before initiating sexual activity, concerns about adolescents initiating or increasing sexual activity postvaccination (ie, risk compensation), parental concerns about vaccine effectiveness and safety, and lack of strong provider recommendation. Evidence-based strategies to address these determinants include education of parents about HPV and HPV vaccines; education of providers about reliable health resources for parents, ACIP guidelines, and vaccine efficacy; and ensuring that providers offer strong vaccine recommendations at every contact with adolescent patients. Providers' use of a presumptive recommendation approach for HPV vaccination increases uptake of vaccine but may or may not address hesitancy. Strategies to address vaccine hesitancy should consider not only vaccine misinformation but also the broader historical contexts that can result in parental mistrust in providers and health care systems. Of course, lack of access to preventative services in medically underserved areas must be addressed. Coupling high-quality provider recommendations and communication strategies with practice changes has the potential to decrease hesitancy and increase confidence in HPV vaccination, and this may increase HPV vaccination rates so that

Box 1

Clinician resources for communication trainings and example videos with scripts

Free application for iPhones and Android phones called "HPV vaccine: Same Way, Same Day" that provides interactive training in MI techniques

- Android: https://play.google.com/store/apps/details?id=com.kognito.hpv_immunization_update
- Apple: <https://apps.apple.com/us/app/hpv-vaccine-same-way-same-day/id1356847181>

Maintenance of Certification (MOC) training on HPV vaccination available through the Indiana Immunization Coalition that is approved by the American Board of Pediatrics and the American Board of Family Medicine and available to physicians across the United States. <https://vaccinateindiana.org/hpv-moc/>

UNITY United for adolescent vaccination has resources for Healthcare Providers <https://www.unity4teenvax.org/health-care-providers/>

National HPV Vaccination Roundtable Resource for Clinicians. <https://hpvroundtable.org/resource-library/#filter=.clinicians>

Centers for Disease Control and Prevention has clinician video series on effective strategies on recommending HPV vaccination to parents of adolescents. <https://www.cdc.gov/vaccines/howirecommend/adolescent-vacc-videos.html>

we reach the Healthy People 2030 goal and decrease hesitancy and increase confidence in HPV vaccination.

Further research that could guide the development of effective interventions to reduce HPV vaccine hesitancy are as follows:

- Future studies on laws or mandates and recommendation guidelines in different states could provide lessons on how policy drives provider practice and patient actions and influences hesitancy.
- Further examination of the roles of culture, historical context/trauma, and social networks of specific communities would better inform us on how interventions can be designed to decrease vaccine hesitancy.
- Developing and testing interventions to counter online/social media misinformation about HPV vaccination has high potential to reduce vaccine hesitancy.
- Training health care providers to be vaccine advocates and equipping them with facts and scripts to help respond to parent/patient questions and concerns may help to alleviate parental anxiety about the HPV vaccine.
- Further research should address which multistrategy and multilevel interventions are most effective in sustaining increased rates for HPV vaccination and boosting confidence.⁴⁸

CLINICS CARE POINTS

- Pediatricians and other primary care providers should be aware that most parents will accept HPV vaccination for their children and adolescents but that acceptance does not preclude ongoing hesitancy about HPV vaccination.
- For children ages 9 and 10 years and younger adolescents, parents should be the primary (although not sole) focus of HPV vaccination discussions. However, for older adolescents, it is important for clinicians to recognize that these adolescents may have an increased role in HPV vaccine decision-making and may hold unique beliefs, different from their parents, related to vaccine hesitancy and confidence.
- Through anticipatory guidance and vaccine recommendations, primary care providers play a critical role in increasing confidence in—and reducing hesitancy about—HPV vaccination.
- Parents encounter a great deal of misinformation about HPV vaccination on social media sites, and primary care providers should be prepared to ask parents about sources of information and to answer parental questions/concerns about HPV vaccine in a nonjudgmental manner.
- Pediatricians and other primary care providers should be cognizant of their own hesitancy about recommending HPV vaccination and take steps to reduce hesitancy (and increase confidence) in their communications to parents and patients.

DISCLOSURES

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