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Implementation of a postpartum HPV vaccination program in a Southeast Texas hospital: a qualitative study evaluating health care provider acceptance

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Abstract

Introduction—The objective of this qualitative study was to assess healthcare providers' acceptability of an ongoing postpartum human papillomavirus (HPV) vaccination program in Southeast Texas and its integration into everyday clinical care.

Methods—In 2012, the Department of Obstetrics & Gynecology at University of Texas Medical Branch (UTMB) began offering HPV vaccination as part of standard postpartum care to increase vaccination rates among young women in Galveston County. Initial vaccine doses were offered on the postpartum unit while subsequent doses were coordinated with postpartum and well-baby visits. Thirty months after project initiation, semi-structured interviews of physicians (n=12) and nurses (n=6) involved in postpartum and pediatric care at UTMB were conducted. Interview transcripts were analyzed using thematic analysis in Nvivo10.

Results—Overall, providers demonstrated “pro-vaccine” attitudes and stated the program was an effective strategy for vaccinating hard-to-reach women. Cancer prevention was the main perceived benefit while follow-up compliance was the primary perceived patient barrier. The initial challenges with integrating postpartum HPV vaccination included miscommunication between providers regarding vaccine orders and coordination issues with well-baby visits for follow-up doses. One novel finding was providers' beliefs that women's personal HPV vaccine practices may positively impact their decisions about later vaccinating their children against HPV. Providers' suggestions to improve the program included: enhancing postpartum HPV vaccine education for patients, offering more continuing education for providers, and increasing community awareness of HPV vaccination.

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Discussion—These findings can help providers of postpartum care understand how to integrate postpartum HPV vaccination into their current practices and how to overcome perceived vaccination barriers.

Keywords

HPV vaccination; postpartum care; qualitative; women's health

Introduction

Human papillomavirus (HPV) is the main cause of several types of genital cancer as well as genital warts (Dunne et al., 2007). To prevent these diseases, HPV vaccination is now routinely recommended at 11–12 years of age for both females and males, with catch-up vaccination for girls and women 13–26 years old and boys and men 13–21 years old who have not completed the series (Markowitz et al. 2014). However, HPV vaccine uptake among young adult women in the United States remains low. Of a nationally representative sample of women ages 18–26 years, only 23.2% reported receiving 1 dose of the 3-dose HPV vaccine (Williams et al., 2013). Furthermore, women who are Black or Hispanic or have low socio-economic status are less likely to complete the vaccine series (Williams et al. 2013). This is especially problematic as women from these same populations experience a greater burden of cervical cancer (Zhan & Lin 2014).

One solution to increase HPV vaccination is to administer the vaccine during the postpartum period while the woman is in the hospital (Rama et al. 2010; Wright et al. 2012). Although not recommended during pregnancy, the HPV vaccine is recommended postpartum for patients 26 years of age or younger if not already immunized (Gall & Poland 2011). The vaccine is not contraindicated during breastfeeding (Markowitz et al. 2007).

The University of Texas Medical Branch at Galveston (UTMB) serves a large population of women of diverse racial backgrounds, of which most have a family income of \$30,000 or less. A large percentage of our patient population receives financial assistance through Medicaid or other public insurance programs for their prenatal, childbirth, and postpartum care. To increase HPV vaccine initiation and completion rates among low-income women from Galveston County, TX, the Department of Obstetrics & Gynecology (OB/GYN) at UTMB began offering HPV vaccination as part of standard postpartum care in 2012 with the support of a grant from the Cancer Prevention & Research Institute of Texas (CPRIT). In this program, women were counseled and offered the HPV vaccine while on the postpartum unit and follow-up doses were coordinated with the mother's checkups or her infant's checkups (Berenson et al. 2016). The purpose of this qualitative study was to assess provider acceptability and how well the vaccination strategy was embedded into everyday clinical work. Semi-structured interviews were conducted among 18 UTMB providers involved in the care of postpartum women or their infants.

Methods

A detailed description of the postpartum HPV vaccination program has been previously published (Berenson et al. 2016). Briefly, the medical records and State of Texas

immunization records of patients residing in Galveston County, TX, who delivered a liveborn infant at UTMB were reviewed daily. Patients eligible for HPV vaccination were approached on the postpartum unit by program staff and educated about HPV and its vaccine. Non-UTMB medical records were checked, as possible, for those who reported prior HPV vaccination. The thorough review of medical records and state vaccination records ensured that the project staff had an accurate HPV vaccination history for each patient. Patients were then offered the initial injection of the HPV vaccine if previously unvaccinated. If patients had previously begun but not completed the vaccination series, they were offered the next injection. In addition to the consent for treatment and diagnosis required of all UTMB patients, written consent was obtained from postpartum patients using a Texas Department of State Health Services form that is specific to the HPV vaccine. Follow-up injections were coordinated with women's postpartum visits or their infant's pediatric visits. Injections not covered by insurance were paid for by CPRIT. Women were reminded about follow-up appointments by phone calls and text messages.

A semi-structured interview design was used for this study because it allowed us to gain individual perspectives of healthcare providers who served postpartum women in different capacities (Ayres, 2008). In this design, researchers use a predefined set of interview questions for each participant, yet allow for flexibility in the conversation. Between April and June 2015, individual interviews were conducted with nurses and physicians (faculty and residents) working in either the OB/GYN or pediatric departments at UTMB who had participated in the postpartum HPV vaccination program.

Purposive sampling strategies were used to identify participants who could best answer questions assessing the effectiveness of the postpartum HPV vaccination program (Palys 2008). Healthcare providers at UTMB who had participated in the postpartum HPV vaccination program were invited via email or face-to-face contact to participate in individual interviews. To be eligible, providers had to care for postpartum women from Galveston County or their infants in either an OB/GYN setting or pediatric clinic. All providers who were invited to participate (n=18) accepted.

We developed an interview guide along with a short demographic questionnaire with approval from the UTMB Institutional Review Board. This guide included questions pertaining to providers' recent experiences with counseling or administering the HPV vaccine to patients, providers' acceptance of incorporating this vaccine into the system of care, perceived concerns with the postpartum vaccination program at UTMB, and future challenges. Other topics included perceptions of patients' acceptance and providers' and patients' barriers to vaccination, and suggestions for further improvement. As interviews progressed, new insights were incorporated into the interview guide (e.g., HPV awareness, community outreach, education and communication).

Individual face-to-face interviews were conducted with a total of 18 participants. Before each interview, participants were asked to complete a short de-identified demographic survey. Each interview was facilitated by an interviewer (a postdoctoral fellow) and a research assistant (master's level graduate student), neither of whom was affiliated with the vaccination program. The interviewer led the discussion while the research assistant

observed, took notes during each interview, and recorded the conversation. Each interview lasted approximately 30 minutes and was held in a conference room or the participant's office in the hospital or clinics. Using an oral script, the interviewer described the study purpose and procedures and informed participants that their audio-recorded responses would be anonymous and that participation was voluntary. Participants' verbal consent was obtained before proceeding. The interviewer and research assistant reviewed the discussion and field notes and then compiled a summary at the end of each interview. The research assistant transcribed each interview while the interviewer checked the accuracy of each transcript against the original audio file. Audio files were deleted at the conclusion of the study. As reimbursement for their time and efforts, participants were offered a small gift (valued at \$3) at the end of the interview.

Data were analyzed using thematic analysis techniques (Braun & Clarke 2006). The interview guide and field notes were used to develop an initial codebook which included code names and descriptions. To improve intercoder agreement, a percent agreement exercise was conducted following methods outlined by Guest, Macqueen & Namey (2012) during coder training. After coding a sample of the transcripts, the interviewer and research assistant revised the codebook. Transcripts were then imported into Nvivo 10 software and independently coded by both the interviewer and research assistant. The interviewer and research assistant met weekly to compare coding using Nvivo generated node reports, discuss changes to the codebook, and reach consensus about the categories. To establish credibility of the data, several strategies were used. Researchers spent time in the healthcare setting where the vaccination project took place, met with program staff, and observed the vaccination program process. Researchers also maintained field notes and conducted peer debriefings with co-authors and colleagues outside of the project. Member checking was conducted with participants within and across interviews to ensure accurate interpretations of participants' words. Lastly, there were two data analysts to verify coding and analysis (Lincoln & Guba 1985).

Results

Of the 18 participants in this study, 6 were nurses and 12 were physicians (MD or DO) specializing in either OB/GYN or pediatrics (Table 1). The mean age of participants was 38.7 years, and 94% were female. Data saturation occurred after the fourteenth interview, meaning no new patterns emerged from the interview data. However, since an additional 4 interviews were previously scheduled with providers from both departments, the research team decided to conduct these interviews to ensure no new information was gleaned from both OB/GYN and pediatric providers. From our thematic analysis, three themes emerged from the interview data. Under each theme, sub-themes and quotes are included which represent the recurring ideas expressed in the interviews (Table 2–4).

Provider support for postpartum HPV vaccination

Pro-vaccine attitudes—Providers overall had a positive view of the HPV vaccine. For example, an OB/GYN resident stated, “I think the more people we can vaccinate the better.” All 18 providers felt positively about vaccinating eligible postpartum women. From a public

health perspective, several providers described the vaccine as “cost-effective” and noted that it could provide “herd immunity” for the general population by preventing HPV transmission. Providers did not have any concerns regarding vaccine side effects or efficacy, nor discussing sexuality in terms of the vaccine. There was some uncertainty regarding the vaccine’s duration of effectiveness given its novelty and limited long-term data. Six providers, primarily from OB/GYN, wondered “how long the immunity lasts” and whether patients will later require “booster[s].” Nevertheless, the perceived benefits of the vaccine “outweigh[ed]” any concerns providers had about effectiveness.

The impact of vaccinating hard-to-reach women—HPV vaccination was perceived as beneficial to women’s health in general, particularly for the diverse patient population of postpartum women served by UTMB. It was recognized that many postpartum patients do not have health insurance coverage outside of pregnancy and costs would pose a barrier to vaccination. Providers described their postpartum population as being primarily Hispanic and African-American, having low educational attainment, having Medicaid insurance, and not regularly accessing preventive healthcare outside of pregnancy. Since these women do not obtain regular well-women exams, they are at increased risk for cervical cancer later in life. Because 3 doses are needed to complete the HPV vaccine series, providers felt that HPV vaccination provided multiple opportunities to encourage postpartum women to focus on their own health as well as that of their infant. One novel finding is that vaccinating postpartum women was believed to have a chain effect and increase the number of women who would later vaccinate their own children against HPV.

“I think if we were vaccinating more women...then those women are more likely to get their children the vaccine. So I think we are overcoming a numbers barrier there.” (DO, Resident, Pediatrics)

“If the parent is someone that has had a bad pap smear or has friends that have had cervical cancer they’re more aware of it. Then they’re also more likely to encourage their children to get it.” (MD, Resident, OB/GYN)

Perceived patient benefits—Providers from both the OB/GYN and pediatrics departments described perceived benefits of the HPV vaccine for their postpartum patients. This included preventing the “stigma” that comes from a sexually transmitted virus, as described by 4 providers. The most important benefit cited by providers was cancer prevention. All 18 mentioned some aspect of cervical cancer prevention as a goal of the HPV vaccine. They believed that this was also the most important benefit to their postpartum patients since some women presented with “bad Pap smears or cervical dysplasia” during pregnancy. Nine providers expressed that prevention of genital warts was also an important benefit to patients. Prevention of maternal-to-child transmission of HPV and future adverse pregnancy outcomes was also discussed as a benefit. Two pediatricians discussed encountering cases of congenital HPV infections and one OB/GYN resident discussed how cervical dysplasia could lead to high-risk pregnancies.

Perceived patient barriers—Although providers generally described postpartum patients as being receptive to the HPV vaccine, they also mentioned perceived patient barriers to

HPV vaccination. The first was a knowledge barrier, or “lack of education” about the HPV vaccine, as well as fear of vaccine-related side effects. Although fifteen providers (from both OB/GYN and Pediatrics) agreed that it was important for postpartum women to be aware of HPV, a few providers (all OB/GYN) expressed doubt that postpartum women actually were aware or concerned about HPV. Only 3 providers mentioned breastfeeding concerns as a barrier. OB/GYN providers stated that they reinforced the safety of the vaccine when patients were resistant. OB/GYN providers also noted that patients’ concerns were not unique to the HPV vaccine and applied to other postpartum vaccinations as well.

The biggest barrier for postpartum women, which was mentioned by 16 providers, was complying with the HPV vaccine follow-up schedule. Pediatric providers added that this barrier was not unique to postpartum women, but rather a barrier for HPV vaccination in general since it requires 3 doses for full protection. The follow-up barrier was seen as related to other barriers, such as difficulty in financing the vaccine with Medicaid coverage, which expires 8 weeks postpartum for women who gain coverage with pregnancy, lacking adequate transportation, and accessing healthcare for treatment but not prevention.

Integration into the system of care

Gradual adaptation—Providers, namely nurses and OB/GYN residents, addressed the initial “trial and error” challenges of implementing this program and described how it became routine care over time. OB/GYN nurses initially had limited knowledge about HPV and the HPV vaccine and were somewhat apprehensive about giving patients a “new” vaccine. These OB/GYN nurses also described the “nuisance” of having to administer “another shot.” They initially reported some miscommunication with program staff and doctors regarding vaccine orders, which resulted in a few patients missing their injections or “wasted” vaccine doses. However, both OB/GYN nurses and physicians also reported that vaccinating postpartum women against HPV is now “routine” and that “communication is good.”

Coordination of follow-up vaccine doses—Pediatric nurses also described initial challenges in vaccinating postpartum women during well child visits because their main focus is on the infant. Thus, some postpartum women initially were “missing” their scheduled follow-up doses. These nurses described that registration staff and other nurses in pediatrics were not “mindful...of postpartum moms coming in to receive the vaccine.” In contrast, pediatricians described a “smooth” process with implementing the vaccine program and experienced few problems. Since program staff counseled women and scheduled visits for follow-up doses, pediatricians noted their roles in the program were often limited to placing HPV vaccine orders. They stated that they seldom needed to counsel postpartum women when they came in for vaccination, and typically only praised their decisions to vaccinate. Pediatric providers did note however, the innovation in coordinating follow-up vaccine doses with well-baby visits as a way to continue care for postpartum women.

“The thing about postpartum, they're bringing their babies in anyway, ...for their little 2 day follow up...a 2-week, a 2-month, for a 6-month. So that makes it easier for them as well given the schedule for Gardasil.” (MD, Pediatrics)

“I think that having a site where we take care of the mothers as well as their babies speaks very, very strongly to this being a place where we care about both of you. I wonder if that has a little bit of impact on post-partum depression because women are coming in and they're being cared for, as well as their baby. Um, the importance of a mother who can take care of her own health, it speaks loudly to that.” (MD, Pediatrics)

Perceived provider barriers—Providers were asked what barriers they experienced in integrating HPV vaccination into postpartum care. The main barrier mentioned was lack of time to personally counsel patients on HPV vaccination. Providers also mentioned that having a treatment focus in the clinical setting, rather than a prevention focus, was a barrier. Finally, since the HPV vaccine was not routinely administered postpartum like the “varicella or the MMR vaccine,” many providers forgot to personally educate women on HPV vaccination or offer the opportunity to initiate vaccination.

Perceived program outcomes—At the time of this manuscript’s preparation, the postpartum HPV vaccination program at UTMB had been in effect for approximately 2.5 years. All 18 providers reported positive changes in their work environments. These included expanding provider awareness of the vaccine, improving HPV vaccine discussions with postpartum women, and increasing the number of women vaccinated against HPV. Seventeen providers confirmed their support of continuing to offer the vaccine postpartum and agreed that postpartum HPV vaccination should be the standard of care in the hospital. One provider wanted to see more program “data” before deciding if HPV vaccination should be standard postpartum care.

Areas for improvement

Expanding postpartum education—Providers discussed at length the importance of increasing postpartum women’s awareness of HPV and its vaccine. All 18 providers mentioned that handouts, such as the Vaccine Information Statement (VIS) developed by the Centers for Disease Control and Prevention (CDC) and available in multiple languages, were useful as educational materials on the HPV vaccine. However, several providers mentioned that patients did not always read them and that they lack pictures. Providers suggested disseminating “colorful” fact sheets in simple language rather than using the CDC handouts. Several OB/GYN providers mentioned possibly using technology, such as the UTMB in-hospital “baby channel,” which is offered in all patient rooms as a medium to further educate postpartum patients. Other forms of media suggested included “Facebook” and “YouTube” promotional ads. Providers also suggested a “postpartum packet” of preventive health information for maternal health, including HPV vaccination materials, similar to UTMB’s prenatal packet.

One nurse stated that patients should be encouraged to “teach back” to check whether they understood the information provided about the HPV vaccine. Since through this project postpartum women are offered the initial vaccine injection after delivery, providers stated it was important to re-educate them during their visits for follow-up doses.

Continuing provider education—Due to resident turnover every year, some of the newer residents were unaware of “how the program works” including eligibility criteria for the postpartum HPV vaccination program. Physicians and nurses suggested that more “face-to-face” visits should be scheduled by program staff with the providers to update and re-educate them on the program’s progress. One OB/GYN resident suggested putting flyers in the “resident room” as a prompt to offer HPV vaccination to eligible postpartum women. Across the board, all providers wanted more information on the program’s effectiveness, including the “number” of women initiating and completing the HPV vaccine.

Increasing community awareness—To reach a broader audience, providers felt that the general public of Southeast Texas could be targeted with television commercials on HPV vaccination and the importance of preventive health. The former “One Less” campaign from Merck and the “Let’s Move” campaign from the US government were seen as effective models. A few providers suggested extending education and vaccination opportunities to male partners as well. It was suggested that “waiting room counseling” could promote the importance of the HPV vaccine to both postpartum women and their families. This could include “posters,” videos, or health education from “students.”

Improving care coordination—To improve care coordination, OB/GYN residents recommended “flagging” the charts of eligible patients to help with discharge planning. They thought that including HPV vaccination in the routine “postpartum order set” would help the vaccine to be administered in a similar fashion to rubella, varicella, and influenza vaccines. Additionally, they asked if they could receive a daily “list” of patients eligible for the program.

To remove patient barriers to vaccination, several providers proposed offering transportation “incentives,” and “workshops” to both educate and vaccinate groups of women at convenient times. A few also thought that testing women for HPV at postpartum checkups would further emphasize the importance of postpartum HPV vaccination.

Discussion

This qualitative study examined healthcare providers’ perspectives on integrating postpartum HPV vaccination into standard care. Previously, it was reported that a postpartum HPV vaccination program, in which follow-up doses are coordinated with infant and women’s wellness visits, increased HPV vaccine uptake among young women (Berenson et al. 2016). The current study demonstrates that providers approve of the integration of HPV vaccination into routine postpartum care; in fact, most recommended this practice. In the future, standing orders may further facilitate such a program, as standing orders have been reported to increase HPV vaccination administration by OB/GYN providers (Dempsey et al. 2015) as well as postpartum uptake of pertussis vaccination (Healy, Rench & Baker 2011; Yeh et al. 2014).

Additionally, we found that providers support coordinating follow-up injections with infant and women’s post-delivery wellness visits to help patients complete the entire series. In particular, pediatric providers, including nurses and physicians, reported that coordinating

care for both infants and mothers eventually became a routine process, despite the program's novelty and initial challenges. Although novel for HPV vaccination, other studies have discussed involving pediatricians to coordinate women's postpartum care including for postpartum depression (Liberto 2012), nutrition and physical activity (Taveras et al. 2011), breastfeeding (Geraghty, Riddle, & Shaikh 2008), family planning (Caskey et al 2016), and management of gestational diabetes (Ortiz et al. 2016). Our study provides evidence that such programs can be accepted by providers and embedded into clinical practice.

Providers in our study felt that patient education was critical; previous studies support this given the reported association between low HPV vaccine awareness and lack of vaccination (Williams et al. 2013), and known gaps in HPV knowledge in the United States (Blake et al. 2015). A prior qualitative study of providers' perspectives on low HPV vaccine uptake in Appalachia also identified the need for HPV education to improve vaccination rates (Head, Vanderpool & Mills 2013). Some of the suggestions for patient education, such as videos and printed materials, have been previously explored, including the feasibility of clinic-based educational videos to address healthy literacy barriers to cervical cancer prevention (Montealegre et al. 2014). Another study showed that videos and written materials are both effective at increasing young adults' HPV vaccination awareness and intentions (Krawczyk et al. 2012).

Patient education interventions may be particularly powerful among mothers. Providers in our study suggested that postpartum HPV vaccination may later influence a woman's decisions to vaccinate her children against HPV. This is supported by the literature as previous studies have found a correlation between a mother's preventive care utilization (e.g., pap smears, mammograms, influenza vaccinations) and her child's HPV vaccination (Lefevre et al. 2011; Hechter et al. 2013; Spencer nee Pilkington et al. 2013; Markovitz et al. 2014).

Our findings also support the provision of continuing HPV vaccine education to healthcare providers who interact with postpartum women as we observed some gaps in provider knowledge, especially among new residents. Prior studies have shown that nearly a decade after the HPV vaccine's availability, providers still have gaps in HPV vaccine knowledge (Berenson et al. 2015). Other studies have shown that providers may overestimate patients' vaccine concerns (Healy, Montesinos, & Middleman 2014) or may not recommend the vaccine to patients of underserved communities (Ylitalo et al. 2013). Educating providers is critical, as numerous studies have shown that provider recommendation predicts HPV vaccine uptake (Dorell et al. 2013; Kester et al. 2013; Ylitalo et al. 2013).

This study is unique in its exploration of healthcare provider perspectives on factors influencing HPV vaccine uptake in postpartum women and provider experiences with a postpartum HPV vaccination program. Thus, it fills a gap in the literature on the acceptability of interventions to improve HPV vaccine uptake. Another strength of this study is the thorough examination of provider attitudes that qualitative studies allow. Given that the postpartum HPV vaccination program at UTMB required new practices in some clinics, it is critical to understand provider perspectives. Additionally, by including both OB/GYN and pediatric providers, as well as nurses and physicians, we were able to explore the

perspectives of the range of providers that would likely be involved in a postpartum HPV vaccination program.

Our study also had limitations. First, it is based on a small, non-representative sample of healthcare providers in Southeast Texas and thus, may not be generalizable to other populations. Moreover, healthcare providers offered their perspectives on postpartum HPV vaccination at UTMB, which may differ from postpartum care at other institutions. In addition, UTMB is a teaching hospital serving a primarily low socio-economic status and racial/ethnic minority population. Providers serving different populations may report different experiences with a postpartum vaccination program.

Conclusion

In this study, we observed that HPV vaccination can be successfully incorporated into standard postpartum care. The initial process was challenging and resulted in some missed opportunities. Over time, however, these problems were addressed. Coordination of follow-up doses with well-baby visits also became routine, although providers described areas where staff could further improve coordination. Overall, these findings strongly support incorporating HPV vaccination into standard postpartum care.

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Significance

In the United States, HPV vaccination rates among young adult women are low compared to other developed countries. Postpartum HPV vaccination is one strategy to improve uptake rates. Healthcare providers participating in a postpartum HPV vaccination program described their postpartum patients as generally unaware of the HPV vaccine prior to the program and as receptive to HPV information and vaccination. Integrating HPV vaccination into standard postpartum care was perceived as an effective catch-up approach to HPV prevention, especially for hard-to-reach women. Additionally, it was suggested that vaccinating postpartum women may positively influence their future decisions about having their children vaccinated against HPV.

Table 1

Provider Summary Demographics

	n (%)
Gender	
Female	17 (94.4)
Male	1 (5.6)
Race/ethnicity	
White	6 (33.3)
Black	5 (27.8)
Hispanic	3 (16.7)
Asian	4 (22.2)
Average Age (range: 25–62)	38.6
Medical Qualification	
RN	4 (22.2)
NP	1 (5.6)
LVN	1 (5.6)
MD	10 (55.6)
DO	2 (11.1)
Department	
OB/GYN	12 (66.7)
Pediatrics	6 (33.3)

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Table 2

Theme 1-Provider support for postpartum HPV vaccination

Sub-theme	Example Quotes
Pro-vaccine attitudes	<p>“I feel very strongly, positively, for the vaccination. I try to promote it a lot.” (DO, Resident, Pediatrics)</p> <p>“I don’t really see any harm with the vaccine.” (RN, OB/GYN)</p> <p>“Considering it’s the first vaccine against cancer. Very little concerns. I mean, if we could do that for everything, that would be awesome.” (MD, Resident, OB/GYN)</p> <p>“I think the benefits outweigh the small uncertainty about... how long it is effective for. I don’t have any hesitation offering it... It’s still a new vaccine. But there’s promise in that it’s effective for a long time.” (MD, Resident, OB/GYN)</p>
The impact of vaccinating hard-to-reach women	<p>“In our hospital, our population is incredibly underserved. None of them have insurance. So all the women we are vaccinating are women that otherwise don’t have access to healthcare. And [would] not otherwise get this vaccine. Most of them only see a doctor when they’re pregnant.” (MD, Resident, OB/GYN)</p> <p>“We have a lot of patients that are immigrants, who only get coverage because they are pregnant, but don’t get any other healthcare outside of pregnancy. So usually if there’s anything that’s elective that they want, we usually can’t do it.” (MD, Resident, OB/GYN)</p> <p>“I know that there’s been a lack of education to moms that are older than 18, between the ages of 18 to 26. Because at that time you’re in your prime, you’re probably not going to the doctor as much. You’re probably not going yearly. Most people aren’t. So, whenever they do have a baby, it’s really good for them to get that education” (RN, Pediatrics)</p>
Perceived patient benefits	<p>“They come in the clinic... like “Oh my God! I am HPV positive!”... So there’s this stigma of that virus is really bad.” (MD, Resident, OB/GYN)</p> <p>“It’s a huge benefit because 1 in 4 women are getting HPV infections. Men are spreading it. Teens are very sexually active and very high risk sexual behaviors... So Just from a transmission standpoint, I think it’s very important.” (DO, Resident, Pediatrics)</p> <p>“Whenever you say, “This vaccine could prevent HPV, which can lead to cervical cancer... They’re like “OH!” I think just saying those words, I think that’s a huge benefit knowing that.” (RN, Pediatrics)</p> <p>“I would probably emphasize that it can prevent some of the warts... Nobody wants to have warts [laughter]... Even if they weren’t worried about cancer, they don’t want warts.” (MD, OB/GYN)</p> <p>I lost a patient to congenital HPV. Vocal cords. So that’s a big one for me.” (MD, Pediatrics)</p>
Perceived patient barriers	<p>“Do they think it’s important to them?... Probably not... because they are so young and I think the misconception is that cancer only happens in older women.” (MD, Resident, OB/GYN)</p> <p>“Thinking they are going to breastfeed that they are going to harm their babies some way. Same kind of resistance I get for influenza.... [and] pertussis vaccination... But they think they’re actually harming their newborn because they feel like it’ll get into the breastmilk.” (MD, OB/GYN)</p> <p>“For the patients that are hard to reach because they can’t complete the vaccine because of transportation or cost issues, then going for routine visits and screening is going to be an issue regardless of if they’ve gotten the vaccine or not.” (MD, Resident, OB/GYN)</p> <p>“I’ve seen some patients who haven’t completed the course. Whether it’s because they didn’t come to any more postpartum visits.... But a lot of times you don’t see them until the next pregnancy.” (MD, Resident, OB/GYN)</p>

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Table 3

Theme 2-Integration into the system of care

Sub-theme	Example Quotes
Gradual adaptation	<p>“In the beginning, it was like ‘Golly, we gotta give another shot?’ I think it was just more of nuisance and we just got something extra to do... We have been doing it for a couple of years or whatever... It’s in our routine. (RN, OB/GYN)</p> <p>“Because at first, all of these moms were supposed to get the vaccine, we got busy. And nobody received the vaccine. But now, communication is good.” (RN, OB/GYN)</p> <p>“I feel like the nurses are better than we are. Just because we tend to forget sometimes. But they are really good about catching the ones that are recently discharged that maybe like had their first shot here and they need their follow-up shots.” (MD, Resident, OB/GYN)</p>
Integration of follow-up vaccine dose	<p>“I think just with this being a pediatric clinic, I think the main change is getting used to having an adult coming in, to receive the vaccine. I think in the beginning, it was a little harder for the nurses to remember. “Okay, I am going to be giving this child a vaccine. Plus, I have to remember to give their mom a vaccine.” RN, Pediatrics)</p> <p>“The only change that I see is that I see a mom on the list of patients for the day.” DO, Pediatrics)</p> <p>“I think it makes it convenient for the mom because you know, you get it done at the same time. And they don’t have to think about it as much. They don’t have to worry about, “Oh, I have to bring my child to their appointment here and then I’ve got to go to my OB/GYN or wherever to receive this vaccine.” They can just get it all at once, which is better. Better for them.” RN, Pediatrics)</p>
Perceived provider barriers	<p>“You only have a certain amount of time to spend with each patient in the clinic. By the time you’ve gone over their history and physical, provide any additional education on something like that. If that takes a while, they have a lot of questions.... Sometimes it gets too complicated for some people.” MD, OB/GYN)</p> <p>“I have a set of things I usually say. But then afterwards, we usually have to go onto their main complaint. And we spend so much time charting. We spend like 10 minutes with the patient, 20 minutes charting the encounter. So, that’s the biggest barrier. There’s just no time.” MD, Resident, Ob/GYN)</p> <p>“I thinking knowing about it and remembering to talk about it to your patients are different things.” MD, Resident, OB/GYN)</p>
Perceived program outcomes	<p>“I’m pretty sure before this program that lots of people weren’t, you know, getting postpartum Gardasil vaccine. So you know, I think that’s just a positive change.” MD, Resident, OB/GYN)</p> <p>“Vaccination just in general probably has saved more lives than any other medical program or any other drugs we have developed. And at a lower cost. So I think this is all part of the direction medicine is moving. We need to be more proactive and prevention. And this is actually really good model for that.” MD, OB/GYN)</p> <p>“Just decreasing the amount of rampant HPV that’s out there. It’s the herd immunity thing.” MD, Pediatrics)</p> <p>“It’s a great program for them. Because otherwise they wouldn’t be able to complete their series. Or even start it in some instances.” RN, Pediatrics)</p> <p>“I think they’re much more open to it for themselves than our parents of our teens are open to it for their children.” MD, Pediatrics)</p>

Table 4

Theme 3- Areas for improvements as perceived by the providers

Sub-theme	Example Quotes
Expanding postpartum education	<p>“They are overwhelmed with just having a baby...They’ll say, “I know they gave it to me after I had the baby, but what is it for again?”... You have to re-educate them a lot of times...It’s our job to give them as much information on it as they need.” (RN, Pediatrics)</p> <p>“I actually don’t know that the patients ever get a postpartum packet... But I don’t recall ever seeing a nice packet about the stuff that they could get that’s preventative. That could be given at that time.” (MD, OB/GYN)</p> <p>“Teach back all, ‘Do you know what this is for? Can you tell me?’ I could see if they have any knowledge about it and if they have any other questions, I’ll try to answer their questions to the best of my ability or get the appropriate resources for them.” (RN, OB/GYN)</p>
Continuing provider education	<p>“I promise you my residents don’t remember half of the data that she told them... They would be lucky to know one quarter of the stuff she told them. So this is part of the education process and have to be repeated over and over throughout the providers.” (MD, OB/GYN)</p> <p>“Do the face-to-face, let us know ‘Hey, what you’re doing is really making a difference.’ This is the improvements we made. I mean, I have no data; I have no clue.” (RN, Pediatrics)</p>
Increasing community awareness	<p>“Maybe do like a community education. I don’t know what you guys do regarding reaching the masses, but we serve a really big population. And we have a lot of clinics in Southeast Texas, and I’m not sure how much they’re advocating this vaccine and the completion of the series and targeting the right age groups.” (MD, Resident, OB/GYN)</p> <p>“Your physicians could branch out into the community. And make it public. I think, you know, it would be that visiting churches, be that lecturing to large groups of people. I think that would be an advantage.” (MD, Pediatrics)</p>
Improving care coordination	<p>“We have that big gap between the clinics and the hospital setting. We have no contact with them.... Did they get received or not and we go from there. But we don’t have much connection there.” (NP, OB/GYN)</p> <p>“Compliance for follow-up. Because when I get the report, most of them will receive them here. Then the numbers drop off for the second and third doses.” (RN, OB/GYN)</p> <p>“And part of the problem is the subsequent follow-up is provided by different providers involved. And they may not be, they should know, not as educated as the initial recruitment of people.” (MD, OB/GYN)</p>