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Supporting Human Papillomavirus Vaccination in Adolescents: Perspectives from Commercial and Medicaid Health Plans

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Abstract

Context—An estimated 79 million Americans are infected with human papillomavirus (HPV). Vaccination can reduce the burden of infection and HPV-associated cancers, yet vaccination rates remain low. Little is known about why some health plans achieve higher vaccination rates.

Objective—This study sought to identify strategies used by higher-performing health plans to support HPV vaccination.

Design—We used 2013 data from the Health Effectiveness Data and Information Set (HEDIS®) *Human Papillomavirus Vaccine for Female Adolescents* measure to identify high-performing plans. The measure examines the percentage of female adolescent plan members who received three doses of HPV vaccine by their 13th birthday. High performers were defined as the subset of commercial plans with the top 10 rates and the subset of Medicaid plans with the top 10 rates. An interview guide was developed to assess activities related to providing HPV vaccination. Interviews were conducted with selected plans and audio-recorded. Transcripts were reviewed independently by two interviewers and analyzed by hand to identify key themes.

Participants—Ten plans agreed to be interviewed, representing a diversity of plan size (range: 5,500 members to over 2.7 million members); plan type (about half were commercial, half were

Conflicts of Interest

The authors have no conflicts of interest to declare, other than employment at the National Committee for Quality Assurance, which administers the Health Effectiveness Data and Information Set measure used in this study.

Medicaid plans); patient population, from predominantly White to predominantly non-White; and geographic region.

Results—Plans highlighted multiple strategies that support HPV vaccination, particularly the “normalizing” of the vaccine. Plans’ efforts highlighted patient and provider education, reminders, feedback loops, community collaborations, immunization registries and use of medical home concepts—including team-driven efforts and coordination.

Conclusions—Although HPV immunization rates are low nationally, health plans can employ multiple efforts to encourage vaccination by implementing activities that involve the patient, provider and community.

INTRODUCTION

Human papillomavirus (HPV) remains the most common sexually transmitted infection in the United States. Nearly all sexually active men and women will get HPV at some point. An estimated 79 million Americans are infected with HPV and 14 million new infections occur each year.¹ HPV infection is associated with cervical, anal and oropharyngeal cancers, and accounts for approximately 27,000 new cancer cases in the U.S. each year.²

An HPV vaccine has been available since 2006 and can reduce the risk of HPV infection and associated cancers.³ Currently, there are three licensed HPV vaccines; all are given as a three-dose series and protect against infection from the HPV types that cause the majority of HPV related cancers.³ The recommended age for vaccination is 11–12 years.² Within four years of its introduction, the prevalence of infections due to vaccine-type HPV was reduced by 56% among females aged 14–19 years.⁴ An estimated 21,000 cancers each year may be prevented by HPV vaccination.⁵

Despite its effectiveness, HPV vaccination rates remain low. Based on 2013 data from the Health Effectiveness Data and Information Set (HEDIS[®]),⁶ a median of 12% of female adolescents in commercial health plans and 19% in Medicaid plans completed the HPV vaccination series by age 13.⁷ Although there is evidence that HPV vaccination rates have improved, uptake remains substantially lower than that of two other vaccines routinely recommended for adolescents: meningococcal conjugate and tetanus-diphtheria-acellular pertussis.^{8,9}

Improving HPV vaccination is critical for reducing HPV-associated infections and cancers. Studies have established parental concern, lack of knowledge and mixed opinions regarding HPV vaccination—including opinions that the vaccine encourages risky sexual behaviors or should be administered after onset of sexual activity (when it is no longer as effective)—as major barriers.^{10,11,12} Efforts to address these barriers may improve vaccine uptake, but little is known about their effectiveness specifically for HPV vaccination or why some health plans have higher HPV vaccination rates. One systematic review found that reminder systems for vaccination and feedback to physicians were two common methods for improving HPV vaccination rates.¹³

This study assessed use of activities to support or improve HPV vaccination by higher-performing commercial and Medicaid health plans and identified plans' barriers and opportunities to improving HPV vaccine uptake.

METHODS

Sample and Recruitment

The study team recruited health plans that reported the highest rates on the HEDIS *Human Papillomavirus Vaccine for Female Adolescents* measure for 2013. The HEDIS measure examines the percentage of female adolescent plan members who received three doses of HPV vaccine between their 9th and 13th birthdays. The measure follows the Advisory Committee on Immunization Practices (ACIP) recommendations for timing of routine HPV vaccination,¹⁴ although catch-up vaccination is recommended for older adolescents who have not been vaccinated.

We characterized the top-performing commercial and Medicaid plans as those with the top 10 rates measured in 2013. Rates for the top-performing commercial plans ranged from a high of 34% to 24%; rates for the top-performing Medicaid plans ranged from a high of 52% to 31%. Because HPV vaccination rates were low generally, we did not recruit plans below the top-10 performance rates.

We approached a total of 12 plans by email, with telephone follow-up (6 of the top 10 commercial plans, 6 of the top 10 Medicaid plans). The email invitation provided background on the project and inquired about the plan's interest in participating in the study. Of 12 plans, 5 responded on the first attempt (email), 5 on the second attempt (follow-up telephone call), and 2 on the third or fourth attempt. Recruitment ended once 10 plans agreed to be interviewed. These 10 plans represented a diversity of size, product line, patient population and location (Table 1).

Interviews

NCQA developed a semi-structured interview guide to learn about current activities related to HPV vaccination, care strategies, and understand barriers and facilitators affecting HPV vaccination. The guide was based on guides used in prior NCQA assessments. Medical directors and quality improvement staff from recruited plans were invited to participate. Interviews lasted one hour and were conducted over the telephone by three members of the research team between March and June 2015. Interviews were audio-recorded and transcribed with participant consent.

Analysis

Two members of the research team independently reviewed interview transcripts and conducted a thematic analysis by hand. Key concepts were identified and then organized into main thematic categories. All inconsistencies were resolved through discussion. The study was determined to be exempt from Institutional Review Board (IRB) review.

RESULTS

In general, although plans were among the top 10 performers, most acknowledged their low HPV vaccination rates. Plans identified several barriers that hindered the provision of HPV vaccination. All plans highlighted common strategies in achieving higher vaccination rates, particularly “normalizing” the vaccine, in addition to education, reminders, and provider feedback. Table 2 summarizes these results.

Barriers to Vaccination

Vaccine refusal and stigma regarding sexual activity—Overall, many plans cited general vaccine refusal and vaccine safety concerns among plan members as an important barrier to HPV vaccination. Plans reported challenges in countering media coverage regarding HPV vaccine safety (e.g., reports of adverse reactions to the vaccine), and overcoming the stigma of the vaccine’s connection to sexually transmitted disease. Some plans suggested that providers may not mention the vaccine until adolescents are older because of parents’ discomfort with the implication that their child would soon become sexually active. One plan stated that mentioning sexually transmitted disease when offering the vaccine makes parents “...*instantly cautious, and they will choose what they think is the most prudent path at that point, which is to stall and wait and think about it some more.*” A few plans also suggested that the risk for HPV is not immediately apparent (i.e., cervical cancer develops many years later), so the reward for providers or patients is not immediately apparent, which may contribute to delay. Multiple plans suggested improving general messaging about the HPV vaccine to the public, to better communicate the vaccine’s safety, efficacy and role in cancer prevention.

Administering three doses—Many plans reported difficulty in getting adolescents to come in for all three doses of the vaccine. Plans noted it is typically challenging to get adolescents to the clinic even for a single wellness visit, and more difficult to get adolescents to return on two additional occasions before their thirteenth birthday.

Strategies to Improve HPV Vaccination

“Normalize” the vaccine—To improve HPV vaccination rates, multiple plans emphasized “normalizing” HPV immunization as part of an adolescent well-visit. This involves helping patients and parents understand that the HPV vaccine is a normal part of adolescent immunization (rather than an optional vaccine administered separately from other recommended adolescent vaccines). This strategy was consistently mentioned by every plan interviewed and was often identified as critical for improving HPV vaccination rates and for addressing parental concerns about the vaccine.

Plans acknowledged that efforts were not always consistent and that some providers presented the HPV vaccine as optional. One plan found that a critical approach to improving the HPV vaccination rate was simply to “...*routinely give all three teen vaccinations at one time; if they offer the Tdap, give the HPV and the Menactra [meningococcal conjugate vaccine] at the same time.*” Another plan suggested that the language used to present the vaccine is critical; for example, asking a patient, “*Would you like an HPV vaccine?*”

produced potentially less effective results than, “*You’re due for your HPV vaccine today—do you want it in your right arm or your left arm?*” In both cases, clinicians would recommend the HPV vaccine in the same way and on the same day that other adolescent vaccines are recommended.

Plans suggested emphasizing that the HPV vaccine is “*recommended for good health*” and important for cancer prevention in educational materials and in conversations with patients. Presenting the vaccine as part of standard recommended practices for preventive health may help reduce the stigma of its connection to sexual activity. One plan stated that using terms that place people in a “*state of cognitive ease... ‘prevention,’ ‘prevention of cancer’...is a highly persuasive technique*” and that it strives to “*label this as an anticancer vaccine...and get away from the perception that it’s a sex vaccine.*”

Educate patients and providers—Plans regarded patient and provider education as integral to supporting HPV vaccination, citing a variety of resources used to disseminate information to patients, including Web sites, written materials, newsletters or other regular communication. Plans emphasized the importance of referencing community organizations when creating educational materials for patients. For example, one plan mentioned that educational materials were more meaningful to patients when they cited recognized sources outside the plan (e.g., the CDC), and suggested that patients may mistrust recommendations from the plan because of fears that the plan may have financial or other motives perceived to be less trustworthy.

As one plan put it, collaborating with other organizations allows the message to become more persuasive, and “*...not just the health plan telling people ‘this is what you should do.’*” Reducing perceived bias may improve uptake of educational materials and facilitate HPV vaccine uptake. One plan conducted “*...research looking at uptake of education information and [found] that it was...stronger when the health plan partnered with a non-profit entity that was recognizable, like the American Cancer Society.*”

Plans also mentioned provider outreach as critical. Some plans specifically conducted outreach to engage providers and convey the importance of presenting the HPV vaccine as routine and to facilitate consistent messaging about the HPV vaccine. Plans pointed out that, without provider buy-in and advocacy, there is a risk that adolescents may not be immunized or may not be immunized early enough for the vaccine to be effective. One plan described reviewing notations in patient charts—“*... ‘Discussed HPV. Parent deferred’ or ‘Will discuss again at next visit’*”—and concluded, “*...if the providers aren’t into it, it doesn’t really matter what the plan does.*”

Plans also described the importance of provider-to-provider outreach, including use of provider immunization groups and “physician champions”. One plan described physician champions as an important “*knowledge base*” and “*peer group*” to help drive improvement. Some plans took advantage of grant funding or developed partnerships with community organizations to facilitate provider education in clinics. One plan used grant funding to assess current physician attitudes and improve provider education.

Provide reminders to patients and providers—Plans reported that patient and provider reminders helped support vaccination. For example, plans used automated phone calls to remind patients of subsequent doses of vaccine after the initial dose, or sent postcards and letters stating the next vaccination due date. Some plans used automated reminders for providers, or sent providers reports of patients who had not yet completed or received the vaccine. Plans also mentioned the importance of varying their approach. At one plan, staff were encouraged to make manual reminder phone calls to patients who had not responded to automated reminders. Other plans sent birthday cards or messages with reminders about the vaccine, in addition to regular reminders to patients.

Increase care opportunities—Plans discussed the importance of increasing care opportunities to provide HPV vaccinations, particularly the need to minimize missed opportunities and to streamline processes. One plan took a “total health” approach: when patients come in for a visit, *“they can look at any of their care gaps,”* including seeing *“what vaccines they need, and [if] HPV is one of them...so [the plan] can vaccinate them.”* Another plan mentioned speaking to female obstetric/gynecologic patients who come in for a visit, and who *“will eventually have a daughter or son reaching the age where he or she is due for their HPV vaccine.”* This plan mentioned using the visit as an opportunity to *“speak about the significance of HPV... to talk up the vaccine and inquire whether they have daughters [who have] gotten the vaccine. Or if they have young children who are going to be aging into needing the vaccine.”*

Other plans discussed streamlining processes to encourage HPV vaccination. One plan mentioned making the process as *“user-friendly”* as possible, including *“walk-in shot clinics [where]...you don’t need an appointment”* and a *“doctor visit isn’t required for the member to get a vaccine,”* as well as ensuring *“there’s no co-pay.”* Plans emphasized the value of standing orders for HPV vaccination, allowing members of the care team (besides the physician) to administer the vaccine. As one plan put it, *“I think most providers would agree there are certain things that should be taken out of their hands, and immunizations are one of them.”* Additionally, some health plans reported that their integrated electronic health record system facilitates collaboration across specialties and ensures that standardized messaging about the vaccine is communicated to patients and providers.

Provide feedback to providers—Many plans emphasized the importance of sharing performance data with providers. Plans suggested that giving reports to providers about their population’s immunization rates and allowing them to view their performance relative to other providers in the plan inspires healthy competition that increases vaccination rates overall. *“Everyone is tuned in to this data...there is basically an internal competition that just happens. People don’t ever want to come in last, and especially doctors.”*

Plans used different approaches to provide feedback: some provided written reports, others granted access to interactive Web sites to view and compare performance. Plans could also use data to reach out to divisions, practices or providers that were not performing as well. One plan found that an area with a lower HPV vaccination rate was a *“big hotspot of refusers,”* and encouraged use of persuasive techniques (e.g., normalizing the vaccine, linking the vaccine to health) to counter the refusals. Regardless of the approach, many plans

felt that data transparency was critical to enhanced performance. One plan said, *“The... underlying concept that happens is...if someone is doing well on a metric, any quality metric...that basically tells you that it can be done.”*

Increase access to registry data—Multiple plans stated that access to a state immunization information system (IIS), also called an immunization registry, is useful for tracking vaccinated patients. IIS are confidential, population-based, computerized databases that record all immunization doses administered by participating providers to persons residing within a given geopolitical area.¹⁵ Plans reported varying levels of access to IIS data: some health plans could submit data to an IIS, but could not request data; some plans could both request data from and submit data to their IIS. Some plans operated in states that did not require vaccine doses to be reported to IIS. To the extent it was available, this supplemental source of data was regarded as an important contributor to reported vaccination rates, although it is not clear how much of the measured HEDIS vaccination rate was accounted for by IIS data (i.e., from capturing data on vaccines provided outside the plan’s network). One plan identified access to IIS data as the largest contributor to success: *“...Not only are we able to capture the information that comes from our currently assigned primary care sites, but if a member goes anywhere within the county to get that test or that immunization, we’re able to capture it.”*

Special Considerations for Medicaid Plans

Medicaid plans cautioned that their populations are dramatically different from commercial populations, and that their members generally need more assistance in accessing care, although plans we spoke with also had resources devoted to addressing this problem. For example, care managers for these plans were active in patient outreach (e.g., tracking vaccination schedules, coordinating appointments, arranging for transportation).

A few Medicaid plans speculated that their vaccination rates might be higher than commercial plans because parental refusal may be less of an issue for some Medicaid populations with first-hand experience of diseases (e.g., immigrant populations, lower socioeconomic status populations), who may therefore be less resistant to vaccines. One plan stated: *“We...have a fairly high population that is either foreign-born or first-generation-born here, and they’ve actually seen some of these diseases that have been eradicated in the United States... They don’t play around with it the way some of our American counterparts do that think, ‘Oh, the disease isn’t here, I don’t have to worry about it.’”* Another plan stated, *“Our analysis of who refuses the vaccines seems to show there is some socio-economic aspect. Basically, people who are poor or have known hardship in their lives tend to be more realistic about risks and benefits, and seem to be very reluctant to refuse vaccines, whereas those who have known wealth and luxury and are far from the grim realities of hardship tend to be more susceptible to those arguments that would persuade them not to get vaccines.”*

DISCUSSION

Despite low national HPV vaccination, all health plans we spoke with described common strategies for achieving their relatively higher HPV vaccination rates. Plans consistently

identified parental concern and requiring three vaccine doses as key barriers to vaccination. However, all plans described actionable steps to address these barriers. The most common strategy was “normalizing” the HPV vaccine and emphasizing its preventive health and “anti-cancer” aspects. Other efforts to improve vaccination involved patient and provider education, reminders, increased care opportunities, feedback to providers, use of community collaborators and use of immunization registries. Of note, there was little difference in approach between commercial and Medicaid plans, besides consideration for the higher needs of Medicaid populations.

Plan strategies were largely consistent with recommended strategies to improve vaccination coverage from The Guide to Community Preventive Services¹⁶ and from published systematic literature reviews, including the importance of patient and provider reminders and provider feedback.⁸ This study also underscores the importance of other strategies, including the importance of normalizing the vaccine, and increasing care opportunities or streamlining processes.^{12, 17}

Plan strategies to improve HPV vaccination also aligned with attributes of the “medical home” model of care, which has gained prominence as a way to improve primary care.¹⁸ This included reliance on team-driven efforts (rather than on a single physician), increased opportunities for improving immunizations (e.g., use of standing orders, use of care managers) and care coordination.

Plans also described strategies involving multiple levels of the health system: patient, provider, community. Many plans employed these strategies simultaneously – also consistent with published recommendations¹³ – which has implications for how other organizations may want to approach efforts to improve HPV vaccination.

Even considering current low vaccination rates, plans were optimistic that their efforts will improve HPV vaccination over time. Many planned future activities to increase patient and provider outreach. Several plans, for example, mentioned sending providers to training “... *on general vaccine acceptance and how to present it in a positive way to families.*” Plans are also exploring options for facilitating access to vaccines in pharmacies—which may be more convenient for patients than scheduling a visit with their provider—or financial incentives (e.g., bonus payments to providers, gift cards to patients) to improve HPV vaccine uptake.

Limitations

This study had several limitations. Although we selected plans to represent diverse size, patient population and geography, the generalizability of our results is limited because plans were not randomly selected. Plans in this study may have been more highly motivated to improve HPV vaccination. Further, the information is self-reported and should be interpreted with caution. Interview participants consisted primarily of quality improvement staff and there may be potential for information bias because such staff represent a specific perspective. Next, although interviewed plans were the highest performers, their HPV vaccination rates were low, suggesting that additional actions beyond those described here may be required to achieve high coverage with three doses of HPV vaccine. Finally, this

study was not designed to make causal inferences regarding the effectiveness of the reported strategies.

CONCLUSIONS

Plans that achieve higher HPV vaccine rates employ multiple strategies to support HPV vaccination. Challenges remain in overcoming parental concerns regarding the vaccine and the stigma surrounding its connection to sexual activity, as well as the vaccine's three-dose schedule. Although plans implement numerous evidence-based strategies to support HPV vaccination, additional actions are needed to achieve optimal coverage. These findings suggest a starting point for a larger discussion about strategies to support HPV vaccination for all adolescents in health plans.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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provider organizations) and 83.6% in Medicaid plans had received one dose of Tdap vaccine by their 13th birthday; 69.5% in commercial health maintenance organizations (60.6% in commercial preferred provider organizations) and 71.9% in Medicaid plans had received one dose of meningococcal vaccine by their 13th birthday.

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Table 1

Descriptive Characteristics of Participating Health Plans

Plan	Commercial, Medicaid, or Both	Number of Members	Percent of Non-White Pediatric Members (if known)	Census Region ^a	Urban, Rural, or Both	Plan Type and Model (Group/Staff, IPA/Network/Mixed, Other) ^b	Interview Participants ^c
1	Medicaid	Not reported	Unknown	West	Urban	HMO: IPA/Network/Mixed	QI Staff
2	Medicaid	5,479	95%	Northeast	Urban	HMO: IPA/Network/Mixed	QI Staff
3	Both: Commercial Medicaid	10,410 53,200	Unknown	West	Urban	HMO/POS: Group/Staff HMO: Group/Staff	QI, Immunization & Pediatric Program Staff QI, Immunization & Pediatric Program Staff
4	Medicaid	16,793	33%	Midwest	Both	HMO: IPA/Network/Mixed	QI Staff
5	Commercial	81,086	Unknown	Northeast	Both	HMO: IPA/Network/Mixed	QI Staff
6	Commercial	126,878	8%	Midwest	Both	HMO/POS:IPA/Network/Mixed	QI & Immunization Program Staff
7	Both: Commercial Medicaid	159,416 24,411	79% 89%	West	Urban	HMO: IPA/Network/Mixed HMO: IPA/Network/Mixed	QI, Immunization & Pediatric Program Staff ^d QI, Immunization & Pediatric Program Staff ^d
8	Medicaid	161,336	Unknown	Northeast	Not reported	HMO (model not reported)	QI Staff
9	Commercial	2,541,871	Unknown	West	Both	HMO: Other ^e	QI & Immunization Program Staff
10	Commercial	2,734,938	63%	West	Both	HMO: Other ^e	Pediatric Program & Other Practice Staff

^aU.S. Census Bureau. Geographic Terms and Concepts – Census Divisions and Census Regions. There are four census regions—Northeast, Midwest, South, and West. Available at: https://www.census.gov/reference/gtc/gtc_census_divreg.html.

^bHMO=Health Maintenance Organization; POS=Point of Service; IPA=Independent Practice Association.

Quality Improvement.
Plan #7 interview participants also included OB/GYN staff.

Indicates that the plan defined itself as an Integrated Healthcare Delivery System.

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Human Papillomavirus (HPV) Vaccination among Female Adolescents in Commercial and Medicaid Health Plans: Key Facilitators and Barriers

Table 2

Facilitators	Barriers
<ul style="list-style-type: none"> • "Normalize" the vaccine - present it as part of a routine immunization schedule with other recommended adolescent vaccines and emphasize the health aspects of the vaccine (e.g. cancer prevention) • Educate patients and providers • Provide reminders to patients and providers • Increase care opportunities • Provide feedback to providers about their performance • Ensure widespread access to registry data 	<ul style="list-style-type: none"> • Vaccine refusal and stigma regarding sexual activity • Challenges in scheduling and administering the full three doses of the vaccine