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Investigating Stakeholder Attitudes and Opinions on School-Based Human Papillomavirus Vaccination Programs

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Abstract

BACKGROUND—In several countries worldwide, school-based human papillomavirus (HPV) vaccination programs have been successful; however, little research has explored US stakeholders' acceptance toward school-based HPV vaccination programs.

METHODS—A total of 13 focus groups and 12 key informant interviews (N = 117; 85% females; 66% racial/ethnic minority) were conducted with 5 groups of stakeholders: parents of adolescent girls, parents of adolescent boys, adolescent girls, middle school nurses, and middle school administrators throughout the 5 public health regions of New Mexico.

RESULTS—All groups of stakeholders lacked knowledge on HPV and HPV vaccines. Stakeholders were interested in—but apprehensive about—the benefits of HPV vaccination. Despite previous literature showing the benefits of using middle schools as an HPV vaccination site, stakeholders did not deem middle schools as a viable site for vaccination. Nurses reported that using the school as an HPV vaccination site had not occurred to them; parents and adolescents

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stated they were uncertain about using this type of program. School administrators indicated that they lacked implementation authority.

CONCLUSIONS—Our study uncovered barriers to using middle schools as a site of HPV vaccination. Resources should be directed toward increased support and education for middle school nurses who function as opinion leaders relevant to the uptake of HPV vaccination.

Keywords

HPV; HPV vaccination; school-based clinics; child and adolescent health; nurses

The regulatory approval of vaccines (Gardasil and Cervarix) to reduce human papillomavirus (HPV) infections among females and males is an important medical innovation with the potential to make a significant reduction in the incidence of HPV-related diseases. HPV is the most common sexually transmitted infection (STI) in the United States, and according to the Centers for Disease Control and Prevention (CDC), HPV is so common that nearly all sexually active men and women will get at least 1 type of HPV at some point in their lives.¹ The CDC recommends routine vaccination of adolescent boys and girls ages 11–12 years prior to their initiating sexual activity. The Advisory Committee on Immunization Practices (ACIP) additionally recommends HPV vaccines for teen boys and girls who did not get the vaccine when they were younger or who have not completed the 3-dose series; moreover, this recommendation is extended to girls and women through age 26 and boys and men ages 13–21. A permissive recommendation also was made early on by ACIP for men ages 22 through 26 years.^{2,3} According to a 2013 report from the CDC, only one third of 13- to 17-year-old girls and less than 7% of adolescent boys have received the full 3-dose series of either HPV vaccine. Furthermore, HPV vaccination coverage (3 or more doses of an HPV vaccine) failed to increase between 2011 and 2012.⁴ Completion of the 3-dose series among those who had 1 or more HPV vaccine dose is even lower for minority populations despite having higher cervical cancer rates.⁵ *Healthy People 2020*⁶ has set a goal of 80% coverage of 3 doses of HPV vaccine among 13–15 year-old girls. Despite the importance of prevention,⁷ safety monitoring data⁴ indicating that HPV vaccines are safe, and ample opportunities for vaccination (eg, clinics, pharmacies, and other health centers), HPV coverage continues to lag behind that of other vaccines recommended for adolescents.⁸

One strategy to help meet HPV vaccination goals would be to implement school-based HPV vaccination programs.⁹ Research on school-based vaccination programs in the United States documents the successful impact of these programs on H1N1, measles, and hepatitis B.^{10–12} Within a historical context, compulsory childhood vaccination against contagious disease is one of the most significant public health interventions of the 20th century, having helped control the spread of various deadly diseases.¹³ Indeed, school-based vaccination mandates are currently the most successful strategy to achieve widespread childhood vaccination in the United States.¹⁴

Research on school-based HPV vaccination programs outside of the United States has been shown to increase HPV vaccine coverage among adolescents.^{8,15–19} Similar to other school-based vaccination programs, school-based HPV programs streamline the organizational and logistical challenges inherent in starting and finishing the 3-dose HPV vaccine series,

provide easy access to health care providers, and are cost effective.^{17,20,21} However, in the United States, research investigating the feasibility of, and interest in, school-based HPV vaccination clinics has been limited and published literature on school-based HPV vaccination is scarce. Paul and Fabio's literature review of school-based HPV vaccination programs did not find any school-based HPV vaccination programs conducted in the United States.²² Following an HPV educational campaign with parents, school staff, and health care staff in North Carolina,²³ Stubbs et al²⁴ evaluated temporary school-located clinics in partnership with a local health department to provide HPV vaccination to middle school girls. Unfortunately, HPV vaccine initiation in schools that provided the vaccine was only 6% (110/1781 girls). However, of girls who initiated the HPV vaccine series, 80% completed the 3-dose series. Most US research on this topic has predominately focused on parental attitude toward school-based HPV vaccination programs. US parents report being most comfortable with HPV vaccination occurring at a physician's office and with a provider's recommendation;²⁵ however, parents do consider school-based vaccination clinics acceptable vaccination sites and express some willingness to use this option—particularly among public middle school parents and when parents have previous experience using a school-based vaccination program.^{26–29} Bartlett and Peterson³⁰ promote the role of school nurses for HPV vaccination. They call on school nurses to promote the HPV vaccine to stakeholders, open discussions about the vaccine, encourage parents and adolescents to communicate with their health care provider about vaccine adoption, and take the lead in creating innovative ways to increase vaccine adoption.

Although international research on school-based HPV vaccination programs has demonstrated benefits, little to no scholarship within the United States has investigated major stakeholder opinions on this issue. We investigated 5 stakeholder groups' knowledge and attitudes on HPV and HPV vaccines and acceptance of school-based HPV vaccination programs. If the United States is to consider implementation of school-based HPV vaccination programs, it is crucial that stakeholder knowledge and opinions on these issues are well understood. This study provides the first in-depth investigation into feasibility and acceptance of a school-based HPV program in the state of New Mexico.

METHODS

Participants

Data for this study come from in-depth interviews and focus groups conducted in New Mexico in 2010. In-depth interviews were conducted with 7 middle school nurses and 5 middle school administrators (N = 12). Focus groups of 6–10 participants each were comprised of (1) parents of adolescent girls, (2) parents of adolescent boys, and (3) adolescent girls age 11–12 years. Four focus groups were conducted with parents of adolescent girls in 4 cities in New Mexico with a total of 26 mothers and 6 fathers participating (N = 32). Four focus groups were conducted with parents of adolescent boys in the same cities with a total of 26 mothers and 9 fathers participating (N = 35). Five focus groups of adolescent girls ages 11–12 years (N = 38) were conducted. Because this study was funded before the CDC recommended routine administration of HPV vaccine to boys,³ the research was focused on exploring stakeholder attitudes, opinions, and beliefs regarding

school-based HPV vaccination among adolescent girls. However, in an attempt to be responsive to male HPV vaccination, focus groups with parents of adolescent boys were added.

Instruments

We employed focus group and interview guides based on previous research findings^{31,32} and in accordance with the Health Belief Model (Table 1).³³ Guides concentrated on 7 areas: (1) existing knowledge of HPV and HPV vaccines, (2) HPV severity and perceived susceptibility, (3) HPV vaccine benefits and risks, (4) HPV vaccination logistics, (5) HPV intentions to vaccinate, (6) existing and desired HPV curriculum, and (7) desired HPV website design.³⁴ Sample focus group and interview questions included: “Whom do you talk to when you have a question about your daughter’s health? What makes them good sources of information?” “How would you feel about your daughter getting an HPV vaccine?” “Do you think kids your age should be involved in the decision to get an HPV vaccine? Why?” and “Can you tell me about the challenges of administering vaccines in school?” With the exception of questions on existing and desired HPV curriculum—which were predominately asked only to school nurses—generally the same questions were used for all participants, but wording was adjusted to increase suitability for each group. At the end of the focus group or interview, questions about HPV or HPV vaccines were solicited from the participants and discussed.

Procedure

Purposeful, convenience sampling was used to acquire information-rich participants (those that can provide deep insights into the topic of interest) throughout the 5 public health regions in New Mexico.³⁵ A member of the research team went to middle school health education classes in cities throughout New Mexico to recruit English-speaking parents of adolescent girls. Students were asked to bring an informational letter explaining the study and a consent form home to their parents. Adolescent girls ages 11–12 years were recruited simultaneously to participate in the focus groups comprised of adolescents. A member of the research team contacted school nurses and school administrators and invited them to participate. Interested nurses and administrators were sent informational letters explaining the study and consent forms via e-mail or fax. Nurses and administrators were selected based on their replies to our informational letter and location within New Mexico’s public health regions. Trained members of the research team conducted one-on-one interviews of the nurses and administrators, and solely facilitated the focus groups. Focus groups and interviews were approximately 90 minutes to 2 hours long. All focus groups and interviews were audio-recorded and transcribed. Prior to participation, participants completed a short demographic survey. All participants were consented/assented and received \$30 for their time.

Data Analysis

Using NVivo 8 qualitative data analysis program software, a thematic analysis using a grounded theory approach was conducted.³⁶ According to Braun and Clarke,³⁷ a “thematic analysis is a method for identifying, analyzing, and reporting patterns (themes) within data.” Transcripts were read, analyzed, and coded for patterns by an expert in qualitative methods.

A constant-comparison method was used throughout the coding process to create and refine themes. A second team member with expertise in health education assisted with this iterative process to generate preliminary themes to the rest of the team that included an adolescent medicine physician, 2 health communication specialists, and a health psychologist. The themes were then discussed, reviewed, and agreed upon by these team members. Discrepancies were discussed and transcripts were re-reviewed when appropriate for clarification to reach consensus that the full range of interpretive themes had been identified.

RESULTS

Tables 2 through 4 display the themes uncovered with representative quotes from each group of stakeholders; however, the following report of results will focus on issues relevant to school-based HPV vaccination. The results are presented in 3 categories: (1) existing knowledge of HPV and HPV vaccines, (2) existing and desired HPV curriculum (exclusively for nurses with some clarification from administrators), and (3) school-based vaccination program logistics. A total of 117 individuals participated in 13 focus groups and 12 key informant interviews. Overall, 85% of the participants were females and most participants (66%) self-identified as a racial/ethnic minority (Table 5). Approximately 54% of the participants self-identified as Hispanic.

Existing Knowledge of HPV and HPV Vaccines

Knowledge of HPV—The majority of parents, adolescents, and school administrators' lacked knowledge about HPV. They reported being confused or unclear on what HPV is, how it is transmitted, and the severity and susceptibility of infections. Surprisingly, school nurses were uncertain about their knowledge about HPV as well. Although most of the nurses answered correctly when asked what HPV is and what illness it can cause, many of them were hesitant about their answers. Nurses did not report that they proactively keep up with HPV information; rather they access information when they need to or when it is presented to them in a mailing or class.

Knowledge and trust of HPV vaccines—Knowledge and trust of HPV vaccines was limited among the participants. Whereas school nurses thought it was important to promote HPV prevention for girls, they only hesitantly agreed that HPV vaccines prevent HPV. For example, "I guess" or "I imagine" were common responses when nurses were asked about vaccine efficacy. Thematic analysis results revealed that the major barrier to their acceptance of the HPV vaccine was lack of knowledge. Nurses were unaware that there are 2 HPV vaccines and admitted they were not as knowledgeable on the topic as they would like to be. Likewise, school administrators were apprehensive about endorsing HPV vaccines. School administrators felt HPV vaccines provided positive consequences such as the opportunity to decrease the chance of transmitting an HPV infection, but they were split between believing that vaccines prevented HPV and not knowing if they were truly effective.

Many parents of girls did not believe that the vaccine had been studied sufficiently and/or they wanted to know more about the vaccine before they allowed their daughters to be vaccinated. As one mother said:

“And part of it is not wanting to rush into it, give a little more time for it to be studied, tested, proven.”

Although parents of girls generally did not believe that the vaccine would encourage their daughters to be sexually active, some parents did not think the vaccine was necessary because, according to them, their daughters are too young to be thinking about sex and/or are not sexually active. One parent explained:

“Like I don’t see my daughter being sexually active or thinking about intercourse or anything.”

Most parents of girls were apprehensive to support vaccination because they felt uninformed about the benefits and risks, and/or they felt their daughters were too young to be vaccinated against a STI.

Parents of adolescent boys also were apprehensive about their sons receiving the vaccine but not to the same degree as parents of adolescent girls. For the most part, parents of boys felt it was important for their sons to be vaccinated because it would help protect sons and their future female sexual partners. One parent said:

“I see it more for my son to protect future girlfriends or wives from getting it. You know, hopefully he would never get any symptoms if he did have it, so I think it’s pretty good.”

However, although parents of boys were more supportive of their sons getting vaccinated than parents of girls, they also admitted they were apprehensive because they felt they did not know enough about HPV and the vaccine. Parents of boys, then, generally agreed that the benefits of the vaccine made them interested in getting their son vaccinated. At the same time, they needed more information because as several expressed “we don’t know enough about it.”

Adolescents agreed that HPV vaccines are beneficial because they could prevent HPV infections. The girls were not convinced that the vaccines completely prevent infection, but for the most part they thought it would be a wise decision to get vaccinated “in order to be protected.” However, the adolescents also had barriers to accepting the efficacy of the vaccine. Girls were concerned about the efficacy and potential side effects of the vaccine. For example, one girl was under the assumption that her aunt “got HPV from the shot,” and others wondered if the vaccine really would prevent an HPV infection.

Existing and Desired HPV Curriculum

School nurses expressed some ambivalence when asked about HPV vaccines. Nurses generally believed information about HPV should be covered within the middle school health curriculum. However, nurses and administrators explained, unless HPV is included in the state’s curriculum standards, there is no guarantee that health teachers will cover information about HPV. A school administrator explained:

“We would follow the state standards of sorts, so if [information about HPV] are plugged in there, then I would say more than likely we are utilizing conversations around HPV.”

Nurses were unaware if their schools had a current HPV curriculum and uncertain if their school's general health curriculum covered information about HPV and HPV vaccines. A common response from nurses was:

“I don't know to what extent that HPV and HPV vaccines are covered [in health class].”

Nurses also reported that they do not have any standard, formalized discussions with girls about HPV prevention or HPV vaccines. Some nurses said they may discuss HPV on a case-by-case basis if they see a student who may be in need of this information. Generally, school nurses felt it is important to educate students about HPV and HPV vaccines, and some nurses even expressed regret that they do not have the time or resources to provide this service to their schools. Although the majority of the school nurses did not have access to administer the HPV vaccine at their school, the nurses do serve as an information clearinghouse about the vaccine. Because the HPV vaccine is listed as a “recommended” vaccine on the immunizations notices they send home with students, the nurses said they sometimes will field calls from parents having questions about the vaccine or spend time making sure students having started the HPV vaccine receive all 3 doses when reviewing the students' records for other school required vaccines. For students having not received all 3 doses of the vaccine, school nurses reported that they encourage these students to visit their primary-care provider or to complete the HPV series through the New Mexico Public Health Department.

School-based Vaccination Program Logistics

Although school nurses agreed that students should be vaccinated for HPV, they raised important concerns and challenges in regards to school-based HPV vaccination programs. Of the 7 nurses interviewed, only 1 was working at a school that currently provided the HPV vaccine to students at its school-based health center (a primary-care clinic that is located on school grounds). This nurse estimated that only 10% of students had obtained an HPV vaccination from the center. Most nurses acknowledged that whereas HPV and HPV vaccination are a “high priority” and they should “go in the direction” of working with parents and students to educate and prevent HPV, they generally do not.

Nurses cited many advantages and challenges of a school-based HPV vaccine program. On the plus side, nurses felt it would improve accessibility, convenience, ability to keep students on a vaccination schedule, and be cost-efficient. However, nurses also listed many challenges that could arise. Some challenges were based on previous experience administering immunizations in the school setting such as, difficulty getting consent forms back from parents. Most of the challenges discussed by nurses revolved around time management. Nurses expressed concern over organizing and executing vaccination events because they would need to secure and train volunteers, an increase in their amount of paperwork, the need to “chase down records” to check students' vaccination history, which can be made even more difficult when students are new immigrants to the United States, and an increased time with each student because parents are not present. As the nurse whose school offers the HPV vaccine explained:

“You’re not only the administrator of [the vaccine], you’re educating them. So it’s everything from what it is, what are the possible side effects, the scheduling when they come back, and then monitoring for adverse effects.”

Overall, nurses reported benefits and challenges to school-based HPV vaccination programs; however, with the exception of the nurse whose school had a school-based health center that delivered the HPV vaccine, nurses reported that developing and implementing such a program had never occurred to them or had “never been brought up” by school administration.

Many parents were uncomfortable with the idea of school nurses administering the vaccine to their children. Several parents did not want nurses to control vaccine administration because they felt their child could then decide to get vaccinated without their permission. Some parents would “prefer a professional [administer the vaccine].” Likewise, whereas adolescents reported wanting to be involved in the decision to vaccinate, they did not see school nurses as options for vaccine administration. When asked if school nurses could administer the HPV vaccine, all adolescents replied “no.” Adolescents believed that school nurses lack power to administer over-the-counter medicine to students, such as Tylenol; therefore, none felt that school nurses would have the authority to provide a vaccine. School administrators were not familiar with limitations on providing HPV vaccines in school; however, they explained that they do not control this decision. Administrators mentioned that other entities, such as the school board or other administrators, would need to make that decision because it is a “policy decision.”

DISCUSSION

This study provided insight into stakeholder knowledge and attitudes on HPV, HPV vaccines, and school-based HPV vaccination programs. All groups of stakeholders felt uncertain about their knowledge regarding HPV and felt conflicted about HPV severity and susceptibility. Participants’ lack of knowledge about HPV and confusion over the severity of an infection and who is at risk for being infected is consistent with past research on HPV vaccines.^{38,39} This finding adds support for *Healthy People 2020*’s objective to educate parents and adolescents about HPV infections. Although it was not entirely surprising that parents and adolescents were uncertain and confused about HPV, it was unexpected that many school nurses were not confident of their knowledge about HPV. Nurses reported that they frequently serve as opinion leaders regarding HPV vaccines for parents so increasing educational offerings to school nurses on HPV and the vaccines would be important.

All stakeholders were somewhat apprehensive about the benefits of an HPV vaccine and concerned about the potential risks of the vaccine. Whereas all groups believed that the vaccines protect against HPV infection, groups were uneducated about the vaccines and feared potential immediate or long-term side effects of the vaccines. We were encouraged that the parents who participated in this study were not concerned that vaccination would cause promiscuity, which has been shown to be a barrier around vaccine acceptability.⁴⁰ However, parents felt they just did not know enough about the vaccine, suggesting that if

parents did have more information about the success and safety of the HPV vaccines, they might elect to vaccinate their adolescent children.

We investigated stakeholder knowledge and opinions on HPV and HPV vaccines because they form the foundation to our larger research interest—the feasibility and acceptance of implementing school-based HPV programs. Based on previous research,^{30,41,42} we believe school nurses and school administrators are important stakeholders in implementing school-based HPV vaccination programs. However, our results suggest that implementing this type of program has rarely occurred to school nurses and most administrators note that they lack the authority to make this decision. HPV education and vaccination does not appear to be a priority for school nurses. Whereas they support the idea of students learning about HPV prevention and vaccines, they do not know if this information is taught to students. Although nurses feel it would be beneficial for students to be vaccinated during school hours, parents are generally uncomfortable with this prospect; and adolescents do not deem school nurses as viable vaccination providers, despite school nurses being qualified health care professionals. These results are not consistent with the Health4Chicago program⁴³ where school administrators generally welcomed a school-based vaccination program and parents did not express serious concerns about vaccinations occurring within a school or by school nurses. Interestingly, that particular study found a challenge in implementation to be a lack of institutional memory due to school personnel turnover. This suggests the public needs further education on the qualifications of school nurses and the success of international school-based HPV vaccination programs.

Although existing school-based health centers have the capacity to provide immunizations, including the HPV vaccines,⁴⁴ only about 6% of school districts in the United States have at least 1 school-based health center.⁴⁵ Therefore, to meet *Healthy People 2020*'s goal of having 80% coverage of 3 doses of HPV vaccine among 13- to 15-year-old girls, schools that do not have school-based health centers need to be supported with resources to deliver the HPV immunization. Countries such as the United Kingdom, Canada, and Australia have extramural HPV vaccination programs, which is one of the reasons for their high rates of HPV vaccine uptake.⁴⁶

Limitations

Although this exploratory study is significant because it provides insight into understudied issues regarding HPV vaccination, it contains limitations. We did recruit from all 5 public health regions in New Mexico, but the results may at best apply to areas that are similar to the southwestern United States. In addition, focus group and interview participants were a convenience sample and should not be considered representative. Last, the majority of our participants were females. Whereas the scope of our research was limited to the HPV vaccine for adolescent girls, hearing from more fathers of adolescent girls may have provided different and useful insights; however, mothers continue to be the primary decision makers of HPV vaccinations with their daughters.^{47,48} Still, the study evaluated a wide range of stakeholders from students to parents to school personnel and investigated the application of the HPV vaccine in the US school setting, which begins to fill this gap in the literature.

Conclusions

Despite the international success of school-based HPV vaccination programs,^{8,15–19} our results showed that 5 varied groups of stakeholders were hesitant to endorse the school as an HPV vaccination site. In addition to the need for more public education on the safety and efficacy of HPV vaccinations, more resources must be made available to help educate school nurses on HPV and HPV vaccines, and provide them with resources that will increase their readiness to administer the vaccines. Whereas previous research^{49–52} also found that parents and adolescents lack correct information about HPV and HPV vaccines, our results demonstrate that although they are somewhat supportive of HPV vaccination, they express a need for more education about HPV and delivery of HPV vaccines. Although school nurses in our sample generally did not provide formalized HPV training or vaccinations, Bartlett and Peterson³⁰ are correct that they serve as opinion leaders in the HPV vaccination debate. Because parents and adolescents lack knowledge about HPV and HPV vaccination, school nurses could be excellent assets for providing formal or informal education on these issues. Entities such as state departments of health should consider providing continuing education to help improve school nurses' knowledge on HPV-related issues and technical assistance to support them in the delivery of the HPV vaccines.

Whereas policies mandating school-based HPV vaccination have met with public resistance,⁵³ policies focusing more generally on adolescent vaccines may be more acceptable. For example, policies that require all schools to have the ability to provide any vaccination may lead to better coverage of all adolescent vaccines. Collaborating with local health departments for technical assistance and infrastructure support (as was demonstrated in North Carolina²⁴) would allow schools the ability to host vaccination clinics to deliver and administer all vaccines. Thus, school-based efforts to improve HPV vaccine uptake should benefit from implementing both informational campaigns and policy solutions. Moreover, future research should include HPV vaccine acceptance among adolescent boys and methods for increasing HPV vaccine uptake by all, including HPV vaccine educational material presented on a mobile platform.

IMPLICATIONS FOR SCHOOL HEALTH

This investigation suggests a number of immediate next steps. First, the lack of information about the necessity and safety of HPV vaccines needs to be communicated to school administrators, school nurses, parents, and adolescents. An initiative to address these information gaps has demonstrated success in gaining support from parents and school staff for a school-based HPV vaccination program in Guilford, North Carolina.²³ Second, school-based HPV vaccination programs must have support and collaboration from departments of health to provide guidance and technical assistance for vaccine delivery. Last, if school administrators lack the authority to implement HPV vaccination programs, given the perceived barriers from school system leaders (eg, school boards), such perceived barriers need to be addressed.

Human Subjects Approval Statement

All study activities were approved by the University of New Mexico Human Research Protections Office prior to initiating research activities.

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References

- Centers for Disease Control and Prevention. [Accessed November 8, 2013] Human Papillomavirus (HPV). 2013. Available at: <http://www.cdc.gov/std/hpv/default.htm>
- Markowitz LE, Dunne EF, Saraiya M, Lawson HW, Chesson H, Unger ER. Quadrivalent human papillomavirus vaccine: recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR Morb Mortal Wkly Rep.* 2007; 56(RR-2):1–24. [PubMed: 17218934]
- Centers for Disease Control and Prevention. Recommendations on the use of quadrivalent human papillomavirus vaccine in males—Advisory Committee on Immunization Practices (ACIP), 2011. *MMWR Morb Mortal Wkly Rep.* 2011; 60(50):1705–1708. [PubMed: 22189893]
- Centers for Disease Control and Prevention. Human papillomavirus vaccination coverage among adolescent girls, 2007–2012, and postlicensure vaccine safety monitoring, 2006–2013—United States. *MMWR Morb Mortal Wkly Rep.* 2013; 62(29):591–595. [PubMed: 23884346]
- Centers for Disease Control and Prevention. National and state vaccination coverage among adolescents aged 13–17 years—United States, 2012. *MMWR Morb Mortal Wkly Rep.* 2013; 62(34):685–693. [PubMed: 23985496]
- US Department of Health and Human Services, Office of Disease Prevention and Health Promotion. [Accessed November 10, 2013] Healthy People 2020. Available at: <http://www.healthypeople.gov/2020/default.aspx>
- Centers for Disease Control and Prevention. [Accessed January 31, 2015] National Prevention Strategy: America’s Plan for Better Health and Wellness. 2014. Available at: <http://www.cdc.gov/features/preventionstrategy/>
- Centers for Disease Control and Prevention. [Accessed January 31, 2015] Teen Vaccine Coverage: 2012 National Immunization Survey (NIS)—Teen. Available at: <http://www.cdc.gov/vaccins/who/teens/vaccination-coverage.html#summary>
- Department of Health & Human Services (USDHHS). The State of the National Vaccine Plan—2013 Annual Report. Washington, DC: USDHHS; 2013.
- Yoo BK, Humiston SG, Szilagyi PG, Schaffer SJ, Long C, Kolasa M. Cost effectiveness analysis of elementary school-located vaccination against influenza—results from a randomized controlled trial. *Vaccine.* 2013; 31(17):2156–2164. [PubMed: 23499607]
- Briss PA, Zaza S, Pappaioanou M, et al. Developing an evidence-based guide to community preventive services—methods. The task force on community preventive services. *Am J Prev Med.* 2000; 18(1 Suppl):35–43. [PubMed: 10806978]
- Roos, R. [Accessed January 31, 2015] Reports Support Usefulness of School-Based Flu Vaccination. 2010. Available at: <http://www.cidrap.umn.edu/news-perspective/2010/04/reports-support-usefulness-school-based-flu-vaccination>
- Centers for Disease Control and Prevention. Ten great public health achievements—United States, 1900–1999. *MMWR Morb Mortal Wkly Rep.* 1999; 48(12):241–243. [PubMed: 10220250]
- Law S. Human papillomavirus vaccination, private choice, and public health. *UC Davis Law Rev.* 2008; 41(5):1731–1771.
- Brabin L, Roberts SA, Stretch R, et al. Uptake of first two doses of human papillomavirus vaccine by adolescent schoolgirls in Manchester: prospective cohort study. *BMJ.* 2008; 336(7652):1056–1058. [PubMed: 18436917]

16. Brotherton JM, Deeks SL, Campbell-Lloyd S, et al. Interim estimates of human papillomavirus vaccination coverage in the school-based program in Australia. *Commun Dis Intell Q Rep.* 2008; 32(4):457–461. [PubMed: 19374275]
17. Fregnani JH, Carvalho AL, Eluf-Neto J, et al. A school-based human papillomavirus vaccination program in barretos, Brazil: final results of a demonstrative study. *PLoS One.* 2013; 8(4):e62647. [PubMed: 23638130]
18. Ogilvie G, Anderson M, Marra F, et al. A population-based evaluation of a publicly funded, school-based HPV vaccine program in British Columbia, Canada: parental factors associated with HPV vaccine receipt. *PLoS Med.* 2010; 7(5):e1000270. [PubMed: 20454567]
19. Wilson SE, Harris T, Sethi P, Fediurek J, Macdonald L, Deeks SL. Coverage from Ontario, Canada's school-based HPV vaccine program: the first three years. *Vaccine.* 2013; 31(5):757–762. [PubMed: 23246265]
20. Cawley J, Hull HF, Rousculp MD. Strategies for implementing school-located influenza vaccination of children: a systematic literature review. *J Sch Health.* 2010; 80(4):167–175. [PubMed: 20433642]
21. Cooper Robbins SC, Ward K, Skinner SR. School-based vaccination: a systematic review of process evaluations. *Vaccine.* 2011; 29(52):9588–9599. [PubMed: 22033031]
22. Paul P, Fabio A. Literature review of HPV vaccine delivery strategies: considerations for school and non-school based immunization program. *Vaccine.* 2014; 32(3):320–326. [PubMed: 24295804]
23. Reiter PL, Stubbs B, Panozzo CA, Whitesell D, Brewer NT. HPV and HPV vaccine education intervention: effects on parents, healthcare staff, and school staff. *Cancer Epidemiol Biomarkers Prev.* 2011; 20(11):2354–2361. [PubMed: 21949110]
24. Stubbs BW, Panozzo CA, Moss JL, Reiter PL, Whitesell DH, Brewer NT. Evaluation of an intervention providing HPV vaccine in schools. *Am J Health Behav.* 2014; 38(1):92–102. [PubMed: 24034684]
25. Fernandez ME, Allen JD, Mistry R, Kahn JA. Integrating clinical, community, and policy perspectives on human papillomavirus vaccination. *Annu Rev Public Health.* 2010; 31:235–252. [PubMed: 20001821]
26. Venkatesh SR, Acosta AB, Middleman AB. Private middle school parents' perspectives regarding school-located immunization programs (SLIPs). *J Sch Nurs.* 2013; 29(4):315–319. [PubMed: 23598568]
27. Clevenger LM, Pyrzanowski J, Curtis CR, et al. Parents' acceptance of adolescent immunizations outside of the traditional medical home. *J Adolesc Health.* 2011; 49(2):133–140. [PubMed: 21783044]
28. Kadis JA, McRee AL, Gottlieb SL, et al. Mothers' support for voluntary provision of HPV vaccine in schools. *Vaccine.* 2011; 29(14):2542–2547. [PubMed: 21300097]
29. Middleman AB, Tung JS. Urban middle school parent perspectives: the vaccines they are willing to have their children receive using school-based immunization programs. *J Adolesc Health.* 2010; 47(3):249–253. [PubMed: 20708563]
30. Bartlett JA, Peterson JA. The uptake of human papillomavirus (HPV) vaccine among adolescent females in the United States: a review of the literature. *J Sch Nurs.* 2011; 27(6):434–446. [PubMed: 21750234]
31. Bryan A, Ray LA, Cooper ML. Alcohol use and protective sexual behaviors among high-risk adolescents. *J Stud Alcohol Drugs.* 2007; 68(3):327–335. [PubMed: 17446971]
32. Schmiede SJ, Broaddus MR, Levin M, Bryan AD. Randomized trial of group interventions to reduce HIV/STD risk and change theoretical mediators among detained adolescents. *J Consult Clin Psychol.* 2009; 77(1):38–50. [PubMed: 19170452]
33. Rosenstock IM, Strecher VJ, Becker MH. Social learning theory and the health belief model. *Health Educ Q.* 1988; 15(2):175–183. [PubMed: 3378902]
34. Starling R, Nodulman JA, Kong AS, Wheeler CM, Buller DB, Woodall WG. Usability testing of an HPV information website for parents and adolescents. *J Comm Media Tech.* In press.
35. Patton, M. *Qualitative Evaluation and Research Methods.* Newbury Park, CA: Sage Publications, Inc; 1990.

36. Charmaz, K. *Constructing Grounded Theory: A Practical Guide through Qualitative Analysis*. London, UK: Sage Publications, Ltd; 2006.
37. Braun V, Clark VP. Using thematic analysis in psychology. *Qual Res Psychol*. 2006; 3(2):77–101.
38. Katz ML, Reiter PL, Heaner S, Ruffin MT, Post DM, Paskett ED. Acceptance of the HPV vaccine among women, parents, community leaders, and healthcare providers in Ohio Appalachia. *Vaccine*. 2009; 27(30):3945–3952. [PubMed: 19389447]
39. Vanslyke JG, Baum J, Plaza V, Otero M, Wheeler C, Helitzer DL. HPV and cervical cancer testing and prevention: knowledge, beliefs, and attitudes among Hispanic women. *Qual Health Res*. 2008; 18(5):584–596. [PubMed: 18337618]
40. Kahn JA, Rosenthal SL, Jin Y, Huang B, Namakydoust A, Zimet GD. Rates of human papillomavirus vaccination, attitudes about vaccination, and human papillomavirus prevalence in young women. *Obstet Gynecol*. 2008; 111(5):1103–1110. [PubMed: 18448742]
41. Boyce T, Holmes A. Addressing health inequalities in the delivery of the human papillomavirus vaccination programme: examining the role of the school nurse. *PLoS One*. 2012; 7(9):e43416. [PubMed: 23028452]
42. Brabin L, Stretch R, Roberts SA, Elton P, Baxter D, McCann R. The school nurse, the school and HPV vaccination: a qualitative study of factors affecting HPV vaccine uptake. *Vaccine*. 2011; 29(17):3192–3196. [PubMed: 21354481]
43. Caskey RN, Macario E, Johnson DC, Hamlish T, Alexander KA. A school-located vaccination adolescent pilot initiative in Chicago: lessons learned. *J Pediatric Infect Dis Soc*. 2013; 2(3):198–204. [PubMed: 24009983]
44. Daley MF, Curtis CR, Pyrzanowski J, et al. Adolescent immunization delivery in school-based health centers: a national survey. *J Adolesc Health*. 2009; 45(5):445–452. [PubMed: 19837350]
45. Brener ND, Wheeler L, Wolfe LC, Vernon-Smiley M, Caldart-Olson L. Health services: results from the School Health Policies and Programs Study 2006. *J Sch Health*. 2007; 77(8):464–485. [PubMed: 17908103]
46. Hayes KA, Entzel P, Berger W, et al. Early lessons learned from extramural school programs that offer HPV vaccine. *J Sch Health*. 2013; 83(2):119–126. [PubMed: 23331272]
47. McRee AL, Reiter PL, Brewer NT. Vaccinating adolescent girls against human papillomavirus—who decides? *Prev Med*. 2010; 50(4):213–214. [PubMed: 20153358]
48. Getrich CM, Broidy LM, Kleymann E, Helitzer DL, Kong AS, Sussman AL. Different models of HPV vaccine decision-making among adolescent girls, parents, and health-care clinicians in New Mexico. *Ethn Health*. 2014; 19(1):47–63. [PubMed: 24261842]
49. Cooper Robbins SC, Bernard D, McCaffery K, Brotherton J, Garland S, Skinner SR. “Is cancer contagious?” Australian adolescent girls and their parents: making the most of limited information about HPV and HPV vaccination. *Vaccine*. 2010; 28(19):3398–3408. [PubMed: 20199758]
50. Henderson L, Clements A, Damery S, Wilkinson C, Austoker J, Wilson S. ‘A false sense of security’? Understanding the role of the HPV vaccine on future cervical screening behaviour: a qualitative study of UK parents and girls of vaccination age. *J Med Screen*. 2011; 18(1):41–45. [PubMed: 21536816]
51. Williams K, Forster A, Marlow L, Waller J. Attitudes towards human papillomavirus vaccination: a qualitative study of vaccinated and unvaccinated girls aged 17–18 years. *J Fam Plann Reprod Health Care*. 2011; 37(1):22–25. [PubMed: 21367699]
52. Klug SJ, Hukelmann M, Blettner M. Knowledge about infection with human papillomavirus: a systematic review. *Prev Med*. 2008; 46(2):87–98. [PubMed: 17942147]
53. Pitts MJ, Adams TK. Implications of the Virginia human papillomavirus vaccine mandate for parental vaccine acceptance. *Qual Health Res*. 2013; 23(5):605–617. [PubMed: 23275459]

Table 1

Constructs of Health Belief Model Used in Focus Group and Interview Protocol

Concept	Examples of Questions
Perceived susceptibility	If you got HPV, how likely do you think it is that you would get genital warts? What about cervical cancer? Why? (Adolescent Girl Focus Group Protocol)
Perceived severity	Are HPV infections a serious concern for your daughter? (Parents of Adolescent Girls Focus Group Protocol)
Perceived benefits	What are the good things about having vaccines, like the HPV vaccine, available at your school? (School Nurse Interview Protocol)
Perceived barriers	Can you think of reasons why schools should <i>not</i> make HPV vaccines available at school? Tell me about them. (Middle School Administrator Interview Protocol)
Cues to action	What methods do you use to address HPV vaccination/HPV prevention with your female student population? (School Nurse Interview Protocol)
Self-efficacy	How easy or difficult would it be to find a doctor who gives the HPV vaccine? Why? Could a school nurse give it? Why? (Parents of Adolescent Girls Focus Group)

HPV, human papillomavirus.

Table 2
 Category 1: Existing Knowledge of HPV and HPV Vaccines: Themes and Representative Quotes

Category	School Nurses	Middle School Administrators	Parents of Girls	Parents of Boys	Adolescent Girls
HPV knowledge	Theme: Hesitation Quote: "Cervical cancer [and] I think there are some HPV's that cause skin lesions, genital warts."	Theme: Limited knowledge Quote: "I know very little."	Theme: Uncertainty Quote: "I am so confused. I don't know if [an HPV infection] is cervical cancer or if it is a sexually transmitted disease."	Theme: Limited knowledge Quote: "I don't know a whole lot."	Theme: Unknowledgeable Quote: "I know nothing about it."
HPV severity and susceptibility	Theme: Serious Quote: "I think it is really important because people die from cervical cancer."	Theme: Serious Quote: "Pretty serious. People die from it. People get cancer from it."	Theme: Reason for concern Quote: "It can be a big deal." "She's not sexually active yet."	Theme: Reason for concern Quote: "It's serious." "It's very likely [he is at risk for an infection]."	Theme: Concerned Quote: "I think [infections] can be serious." "Maybe in high school [HPV infections are common]."
HPV vaccine knowledge	Theme: Uninformed Quote: "There's 2 vaccines? I only know one."	Theme: Limited knowledge Quote: "I've heard of Gardasil."	Theme: Unknowledgeable Quote: "I don't know enough about it."	Theme: Uncertain Quote: "I would need more information."	Theme: Limited knowledge Quote: "I haven't heard anything." Or "I heard about it from my [close female relative, eg, mom, aunt, grandma]."
Trust of HPV vaccines	Theme: Uncertain Quote: "I imagine [they prevent HPV]. I don't think they have been out long enough."	Theme: Tentative support Quote: "Based on what I've heard it works."	Theme: Apprehensive Quote: "I hope [it works], but I'm not convinced."	Theme: Mild support Quote: "I don't know." Or "It reduces the risk."	Theme: Uncertain Quote: "I kind a think it works."
HPV vaccine benefits	Theme: Cautious optimism Quote: "I guess it will help prevent HPV."	Theme: Limited knowledge Quote: "I assume it prevents HPV." Or "I don't know."	Theme: Hopeful Quote: "It prevents HPV supposedly."	Theme: Supportive Quote: "I see it more for my son to protect future girlfriends or wives."	Theme: Optimistic Quote: "It could prevent you from getting HPV."
HPV vaccine risks	Theme: Uncertain Quote: "I don't know if we have enough information on it."	Theme: Limited knowledge Quote: "I need to know more about it."	Theme: Serious concern about side effects Quote: "It hurts!"	Theme: Uncertain and curious Quote: "I just have not heard anything at all!" Or "There could be side effects."	Theme: Cautiousness Quote: "It might not work."

HPV, human papillomavirus.

Table 3

Category 2: Existing and Desired HPV Curriculum: Themes and Representative Quotes

Category	School Nurses
Importance of HPV prevention education for female students	Theme: Mild support Quote: "Yes, the information should be there."
Discussion of HPV vaccine with female students	Theme: Indirectly and occasionally Quote: "Mostly what I do is I send home the letters to parents about the recommended vaccine for kids. I give the man information sheet letting them know it is available for their students." Or "I would discuss it with them on a one-on-one basis."
Discussion of HPV vaccination or prevention with parents	Theme: No discussion or occasionally Quote: "I actually can't remember having a discussion with parents about it." Or "Parents might call me about it."
Current curriculum about HPV and HPV vaccine in middle school	Theme: Unknowledgeable Quote: "It might be included in health class. I'm not sure."

HPV, human papillomavirus.

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Table 4

Category 3: School-Based Vaccination Program Logistics: Themes and Representative Quotes*

Category	School Nurses	Middle School Administrators
Advantages of school-based HPV vaccination program	Theme: Accessibility and convenience Quote: "The parents don't have to get off work, and students don't have to be out of school. You give them a shot and they stay a few minutes and go back to class."	Theme: Increased accessibility Quote: "A great opportunity to provide access to vaccine for lower income and rural communities."
Challenges of school-based HPV vaccination program	Theme: Logistical organization (time, consent forms, and space) Quote: "It's the hardest part of the process, getting that parent consent in writing."	Theme: Possible concerns Quote: "Moral or religious objections."
Interest in implementing a school-based HPV vaccination program	Theme: Never suggested Quote: "It's never been brought up."	Theme: Not their decision Quote: "School board would need to make a policy regarding it."
	Parents of girls and boys	Adolescent girls
Interest in using a school-based HPV vaccination program	Theme: Not interested Quote: "I would not want the school nurse to do it." (Parents of girls and boys answered similarly.)	Theme: Not an option Quote: "The school nurse wouldn't be able to. She can't even give you Tylenol."

HPV, human papillomavirus.

* Questions to stakeholders varied based on interview and/or focus group protocol.

Table 5

Participant Demographic Data

	Nurses/Administrators (N =12)	Parents (N =67)	Adolescent Girls (N =38)
Sex			
Females	10	52	38
Males:	2	15	
Ethnicity			
African American	0	2	2
American Indian	0	2	3
Hispanic	8	35	20
Non-Hispanic white	3	24	13
Other	1	3	0
Unreported	0	1	0

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