RESEARCH PAPER

Parents' and providers' attitudes toward school-located provision and school-entry requirements for HPV vaccines

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ABSTRACT

Objective: To determine parents' and providers' attitudes toward school-located provision and school-entry requirements for HPV vaccination. **Methods:** Parents/guardians of 11–17 y old girls and pediatric healthcare providers at one inner-city public clinic and three private practices completed semi-structured interviews in 2012–2013. Participants were asked open-ended questions regarding their attitudes toward school-located provision and school-entry requirements for HPV vaccination. Parents' answers were analyzed with relationship to whether their daughters had not initiated, initiated but not completed, or completed the HPV vaccine series. Qualitative analysis was used to identify themes related to shared views. **Results:** 129 parents/guardians and 34 providers participated. 61% of parents supported providing HPV vaccinations in schools, citing reasons of convenience, improved access, and positive peer pressure. Those who opposed school-located provision raised concerns related to privacy and the capacity of school nurses to manage vaccine-related reactions. Parents whose daughters had not completed the series were more likely to intend to vaccinate their daughters in schools (70%) and support requirements (64%) than parents who had not initiated vaccination (42% would vaccinate at school, 46% support requirements) or completed the series (42% would vaccinate at school, 32% support requirements; $p < 0.05$ for all comparisons). 81% of providers supported offering vaccination in schools, wanting to take advantage of the captive audience, improve vaccine completion rates, and decrease the administrative burden on medical office staff, but were concerned about adequate information transfer between schools and medical offices. Only 32% of providers supported school-entry requirements, largely because they felt that a requirement might provoke a public backlash that could further hinder vaccination efforts. **Conclusions:** School-located provision of HPV vaccination was widely accepted by healthcare providers and parents whose children have not completed the series, indicating that this venue might be a valuable addition to improve completion rates. Support for school-entry requirements was limited among both parents and healthcare providers.

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Introduction

HPV vaccination rates in the United States lag behind those of other industrialized nations. National data indicate that as of 2014, 60% of 13–17 y old girls and 42% of boys have initiated the HPV vaccination, and 40% and 22% have completed the series.¹ Vaccination in the United States is provided in medical offices, and is dependent upon adolescents visiting their healthcare providers three times to complete the series. However, in other countries such as Australia, Canada, and the United Kingdom, where HPV vaccination is provided within the school setting, rates of complete HPV vaccination exceed 70%.^{2–4} Some countries with high vaccination rates have already documented population-wide declines in cervical dysplasia and genital warts.^{5,6} School-located vaccination within the US has therefore been proposed as a means of improving vaccination coverage.⁷ Most US parents express support for school-located adolescent vaccines,⁸ though support for HPV vaccination specifically ranged widely from 6% to 72%.^{9,10} Approximately 60% of providers support school-located vaccinations in general,¹¹ though

data are lacking on acceptability of HPV vaccination specifically. School-entry requirements for vaccines, or mandates, have also demonstrated effectiveness for achieving high vaccine population coverage and have been suggested as a means of increasing the number of adolescents receiving HPV vaccination.^{12–14} Parents' attitudes toward school-entry requirements for HPV vaccination are mixed, ranging from a low of 11% support to a high of 92% when opt-out provisions are included.^{15–17} Data on providers' attitudes are limited, but indicate that fewer than half support school-entry requirements.^{18,19} Policymakers are considering both school-located HPV vaccination and school-entry requirements for HPV vaccination to address persistently low coverage rates, yet the public response is difficult to predict as existing data are limited and parents' and providers' attitudes may have evolved over time. To address these limitations, we performed a qualitative interview study in 2012–2013 with parents/guardians and healthcare providers to understand their attitudes toward school-located provision and school-entry requirements related to HPV vaccination.

Results

Parents' demographics

One hundred and twenty-nine parents participated in the study. Participants were asked to recall the number of HPV vaccinations their daughters had received. Fifty-one parents reported that their daughters had not initiated vaccination (Not Initiated Group), 27 reported that their daughters had completed the series (Complete group), 37 reported that their daughters had received one or two doses, and 14 were unsure of the number of doses (Incomplete/Unsure Group). The percentage of respondents supporting school-located immunization and school-entry requirements were similar ($\pm 3\%$) among parents who were unsure of their daughters' vaccination status and those whose daughters had not completed vaccination, so these groups were combined for statistical analyses. Demographics characteristics of parents differed between groups. Parents in the Incomplete/Unsure group were more often younger, non-White, foreign-born, had lower income and lower educational attainment, and received care in the public clinic than parents whose daughters had either not started or completed the vaccine series (Table 1).

Parents' views on school-located vaccination

Most parents (61.6%) supported school-located provision of HPV vaccination, and no difference was noted between groups (Table 2). The primary reasons parents supported school-located vaccination (Table 3) were the convenience ($n = 21$) and the improved access the site would offer ($n = 9$): "It would definitely be easier... than getting her out of school and driving her the 20 minutes each way." Three parents cited the benefit of having a captive audience, and three others mentioned that vaccinating in school could create positive peer pressure: "Some kids if they see other kids do things, they'll do it too."

Parents who opposed offering school-located vaccination voiced many different concerns (Table 3). Twenty-two parents expressed less trust in the competence of school nurses compared to their children's healthcare providers, and an additional seven voiced concerns about the safety of vaccination in non-medical settings: "I know the doctor more and I have more faith in the doctor... I trust him more. I mean school nurses I don't know how far her education has gone, and if she's ever given shots before." Other parents felt that schools' roles should be limited to education, not medical care ($n = 8$), or that HPV vaccination was a private issue that should be kept between the parent and provider, not the school ($n = 4$). Ten parents were concerned that school-located HPV vaccination could promote promiscuity or stigmatize girls: "You don't want kids to be stigmatized like, 'Oh she's going to get the sex shot.'" Four parents wanted to be present when their daughters were vaccinated, and three were concerned about information transfer between medical offices and schools.

Although the majority of parents in all groups supported providing HPV vaccines in schools, more parents in the Incomplete/Unsure group (70%) stated that they would utilize school-located provision if available compared with 42% of those in the Not Initiated group and 44.5% of those in the Complete group ($p = 0.012$; Table 2). Most parents who said they would use school-

Table 1. Demographic information of parents/guardians and daughters.

Variables	Vaccination Status		
	Not-initiated ($n = 51$) n (%)	Incomplete/Unsure ($n = 51$) n (%)	Complete ($n = 27$) n (%)
Age of daughter			
Mean	13.0	13.7	15.4
Range	11–17	11–17	12–17
Age of parent/guardian			
Mean	43.7	42.2	49.9
Range	26–65	27–58	40–65
Race*			
White	27 (52.9)	12 (23.5)	18 (66.7)
Black	12 (23.5)	24 (47.1)	4 (14.8)
Hispanic	8 (15.7)	8 (15.7)	4 (14.8)
Other	4 (7.84)	7 (13.7)	1 (3.70)
Relationship to daughter			
Mother	44 (86.3)	40 (78.4)	22 (81.5)
Father	6 (11.8)	8 (15.7)	3 (11.1)
Guardian	1 (1.96)	3 (5.88)	2 (7.04)
Gender			
Female	45 (88.2)	43 (84.3)	24 (88.9)
Male	6 (11.8)	8 (15.7)	3 (11.1)
Country of origin			
US	34 (66.7)	31 (60.8)	25 (92.6)
Other	17 (33.3)	20 (39.2)	2 (7.41)
Religious affiliation			
Yes	33 (64.7)	28 (54.9)	15 (55.6)
No	18 (35.3)	23 (45.1)	12 (44.4)
Marital status			
Married	32 (62.7)	20 (39.2)	18 (66.7)
Single/Divorced/ widowed	19 (37.2)	26 (51.0)	9 (33.3)
Non-marriage partnership	1 (1.96)	5 (9.8)	0
Education			
High school graduate or less	16 (31.3)	26 (50.9)	7 (25.9)
Some college	9 (17.6)	12 (23.5)	8 (29.6)
College graduate or higher	29 (56.8)	13 (25.48)	12 (44.4)
Household income			
<\$20,000	9 (17.6)	20 (39.2)	3 (11.1)
\$21,000– \$60,000	15 (29.4)	18 (35.2)	10 (37.0)
\$61,000– \$100,000	12 (33.5)	6 (11.8)	2 (7.4)
>\$100,000	15 (29.4)	6 (11.8)	11 (40.7)
Location of care			
Public clinic	21 (41.2)	36 (70.6)	11 (40.7)
Private practice	30 (58.8)	15 (29.4)	16 (59.3)
Insurance			
Public	23 (46.9)	31 (60.8)	10 (38.5)
Private	26 (53.1)	20 (39.2)	16 (59.3)

*Race/ethnicity was determined by participant self-identification.

located vaccination for their daughter mentioned improved access and convenience of the service as primary factors in their decision ($n = 8$). These factors hinted at reasons why some daughters had not completed the series: "[School-located vaccination is] more convenient. She's right there. They are right there. I don't have to set up an appointment. I don't have to take her out of school in order to do that it's right there...It's a lot easier to complete." Some also pointed out that by vaccinating at school they would minimize missed opportunities ($n = 2$) and take advantage of positive peer pressure ($n = 3$).

Parents did voice concerns, however. The most common reason, cited by 15 parents who preferred not vaccinate their

Table 2. Parental support for school-based provision and school entry mandates for HPV vaccination.

Question	Not-initiated (n = 51) n (%)	Incomplete/Unsure (n = 51) n (%)	Complete (n = 27) n (%)	P value Chi-square
Support offering vaccines in schools*§	29 (56.9)	32 (68.1)	16 (59.3)	0.50
Would get daughter vaccinated in school if available*§	21 (42.0)	33 (70.2)	12 (44.5)	0.012
Supports school mandates*§	23 (46.0)	30 (63.8)	8 (32.0)	0.028

*Not all parents responded to all questions, and responses with "Ambivalent" are not included in the percentages leading some cells to have fewer than the total possible number of responses

§The questions were worded as follows: 1) Flu shots are often offered in schools for students. Some people have suggested offering the HPV vaccine in schools in addition to at the doctor's office. This would mean that you (the parent or guardian) would sign a written permission slip, and the shot would then be given to your daughter by the school nurse during school hours. What do you think of this idea? 2) If the HPV vaccine were available at your daughter's school, would you like her to get it there? Why or why not? 3) Several vaccines are required for school, but the HPV vaccine is not required at this time. How would you feel about requiring children to get the HPV vaccine in order to go to middle school or high school? Why do you feel this way?

teenagers at school, was feeling uncomfortable with school nurses administering vaccinations and/or their capability of handling adverse reactions: "I still think it should be done at the doctor's office just because you never know if someone might have side effects." Some parents who were willing to vaccinate their daughters in schools stated wanted assurance on the consent process for both the parent and the daughter, or wanted to be present at the time of vaccination (n = 4).

Parents views on other alternative sites

Parents were also asked whether they would feel comfortable with vaccination in other sites including pharmacies, community centers, and churches. Support for these sites was lower, with only 37% of parents feeling comfortable with the idea of their child receiving vaccination there. The most common concerns cited were lack of privacy, lack of medical expertise, and lack of cleanliness. Four parents expressed comfort with pharmacies but not churches or community centers, while two specifically opposed pharmacies. One parent felt comfortable only with vaccination received in church, but others felt that vaccination against a sexually transmitted infection was not appropriate for church.

Table 3. Parents' views supporting and opposing school-based provision of HPV vaccines.

SUPPORTING SCHOOL-LOCATED VACCINATION	<p>Improves access (n = 9) "Some family doesn't have insurance or they are not convenient to hospitals or if they live far in the country—I don't know. Yes. I think it's a very good idea. We always come here because we live in the city and, you know, it's not a problem. It's not everywhere like that" – <i>White mother of 11 year-old, public practice, Not Initiated Group</i></p> <p>Captive audience (n = 3) "I think you have got a controlled group. They are all there. March 'em in, march 'em out. Done!" – <i>White father of 17 year-old, private practice, Complete Group</i></p> <p>Positive peer pressure (n = 3) "I think a lot of kids would be willing to do it in school. Because they can spread it to their friends and then their friends would be down for it when it came time." – <i>Hispanic mother of 16 year-old, public practice, Incomplete Group</i></p> <p>More convenient than physician's office/school nurse is competent to vaccinate (n = 21) "It's more convenient. She's right there. They are right there. I don't have to set up an appointment. I don't have to take her out of school in order to do that it's right there...It's a lot easier to complete" – <i>Black mother of 16 year-old, public practice, Incomplete Group</i></p>
OPPOSING SCHOOL-LOCATED VACCINATION	<p>Safety concerns (n = 7) "I still think it should be done at the doctor's office just because you never know if someone might have side effects. I don't think vaccines should be given at the school at all. I think the doctor should give it where they can be watched." – <i>White mother of 16 year-old, private practice, Complete Group</i></p> <p>School is for education, not healthcare (n = 8) "Doctor's office is appropriate. School is for learning other things besides our genital examination...there is a different purpose for those organizations. Doctors have purpose, leave it with doctor" – <i>Other race father of 12 year-old, private practice, Not Initiated Group</i></p> <p>HPV vaccination is a private issue that is better discussed with the healthcare provider (n = 4) "I don't think the school has a place in this. I think it's between the parent and the child and their own belief." – <i>White grandmother of 16 year-old, private practice, Complete Group</i></p> <p>HPV vaccination might stigmatize girls/promotes sexual activity (n = 10) "Don't give them at school cause it sends a bad image of some of these kids..." – <i>Black mother of 15 year-old, public practice, Not Initiated Group</i> "It may lead kids to have sex and it may lead them to believe that they are protected and it may influence umm... what sex is at that time." – <i>Black mother of 15 year-old, public practice, Complete Group</i></p> <p>Parent wants to be present/daughter wants parent present (n = 4) "I'm a type of parent that like to be there, see what goes on, be part of her health situation, the problems she may have." – <i>Hispanic mother of 17-year-old, public practice, Complete Group</i></p> <p>Documentation concerns (n = 3) "Why get it at the school if she can get it at the clinic? And even better for me, it stays on file and record and everything, her shots and stuff...that's what doctors are there for." – <i>Hispanic mother of 17 year-old, public practice, Complete Group</i></p>

*Total numbers of quotes do not equal total numbers of respondents as some respondents gave more than one reason, while others answered yes or no to questions but did not explain their reasoning.

Parents' views on school-entry requirements

Parents' views on school-entry requirements also differed by group, with 63.8% of parents in the Incomplete/Unsure group supporting requirements compared with 46% of parents in the Not Initiated group and 32% of parents in the Complete group ($p = 0.028$; Table 2). Interestingly, support for school entry requirements did not correlate with personal decisions to vaccinate, as 68% of parents whose daughters were fully vaccinated opposed such requirements. All but two parents felt that school-entry requirements should apply to both boys and girls. Parents' most common reason to support school-entry requirements was an improvement in public health overall or their child's health specifically ($n = 27$ parents; Table 4). Other parents supported requiring all medically recommended vaccines, and felt such requirements would protect girls whose parents might otherwise choose not to vaccinate ($n = 7$): "If it has to be mandatory for people to do the right thing then it has to be that way." Parents also felt that the benefits of requirements outweighed their risks ($n = 12$) and that requirements would protect teens from sexually transmitted infections ($n = 11$): "I would be in favor of it. Because it sounds like from what I understand the vaccine is safe, efficacious and I'd be a fool and also have amnesia to believe that high schoolers do not engage in unwise sexual practices at times." Three parents believed that requirements would normalize the HPV vaccine and reduce stigma associated with vaccinating.

Among parents who opposed school-entry requirements, the most common reason was the limitation on parental autonomy (43 parents; Table 4): "Even though I believe you should get it... I don't think it should be forced on people if they do not agree." Many of these parents felt that HPV vaccines were different than other required vaccines because HPV cannot be transmitted by casual contact (19 parents). Opponents to school-entry requirements also mentioned the newness of the vaccine (10 parents). Seven parents felt that HPV vaccine should not be required because some teens are not sexually active, and seven parents said the HPV requirement and the vaccine itself might stigmatize girls or result in a false sense of security related to sexual experimentation. Three parents felt that children should not be kept out of school for lack of HPV vaccination, and another three felt that HPV was not a severe enough disease to justify a school requirement.

Provider demographics

Thirty-four providers participated in qualitative interviews: 24 physicians, 5 nurse practitioners, and 5 registered nurses. Seventeen physicians, 5 nurse practitioners, and 4 nurses worked in private practices, the remainder worked in the public clinic. Seventeen physicians and all nurse practitioners and nurses were female; eight physicians were male. Providers had been practicing for an average of 15 years, with a range from a few months to more than 30 y.

Providers' views on school-located provision of HPV vaccination

Thirty-one providers responded to questions on school-located provision of vaccination, (MD, NP, RN). Twenty-five (81%)

supported provision of HPV vaccination in schools. Several believed that vaccination rates would improve if vaccination were provided in schools ($n = 12$) while others stated that school-located vaccination would decrease the barriers associated with clinic-based vaccination ($n = 4$; Table 5): "I think any way you can make it easier, you don't have to require an adolescent to make an appointment, show up, navigate the transportation system... I think school-based immunization makes a lot of sense." Three providers echoed parents' feelings that adolescents are a "captive audience," thus school-located vaccination would ensure high vaccine coverage. Two providers cited positive peer influence if many teens receive the vaccine in school, and two others welcomed the possibility of decreasing the burden of vaccinations on clinics.

Providers did express concerns about school-located vaccine provision, however (Table 5). One common concern was inadequate documentation ($n = 5$). The logistics of communication become especially challenging with the Family Educational Rights and Privacy Act (FERPA),²⁰ which prohibits schools from sharing information with physician offices under most circumstances. Five providers were concerned about waiting periods and backup in the case of a serious vaccine reaction: "It's a great idea as long as they can be monitored for the potential of the fainting." Two providers felt providing vaccination would overburden already stressed school health systems, while two others felt that vaccinating in school might erode primary care. Two others felt that providing only HPV vaccine in schools could be detrimental by treating HPV vaccine differently than other recommended adolescent vaccines.

Providers' views on school-entry requirements for HPV vaccination

A minority of providers ($n = 11$, 32%) favored school entry requirements for HPV vaccination. An additional 21% ($n = 7$) said that they personally would favor a requirement, but thought that implementation would be difficult due to public resistance. Nearly 40% ($n = 13$) opposed a requirement, and two providers were unsure. Reasons given for supporting school requirements included improving vaccination rates ($n = 6$; Table 6): "It's very clear that if you have a school mandate it will get done better than if you didn't," and improving public health ($n = 4$): "I think I mean the more vaccines [that are required] I think the better really if it helps the common good that's the goal of a lot of vaccines anyways."

However, twelve providers felt that society was not ready for HPV vaccine requirements, and seven shied away from the idea of school entry requirements due to the potential for provoking a public backlash (Table 6): "I wouldn't mind living in a country where that happened, but I can't see that happening in this country." Nine providers felt that HPV did not warrant a requirement because it cannot be transmitted by casual contact: "There is a conscious choice to engage in sexual activity." A physician who works closely with the public schools brought up an important point about educational funding being spent on vaccine compliance rather than other aspects of education: "So the issue for me is that we're paying educational dollars, two \$50,000 salaries, so \$100,000 of educational money to enter this data and it doesn't come easy."

Table 4. Parents' views supporting and opposing school-entry requirements for HPV vaccines.

SUPPORTING SCHOOL-ENTRY REQUIREMENTS	<p>Improves public health/girls health (n = 27) "If I'm correct in my understanding of the vaccine that HPV can cause some rather significant cancers, that's worth being protected against and I would say that I would not have a problem with it being mandatory. I don't have a problem with mandatory vaccines" –<i>White father of 12 year-old, private practice, Not Initiated Group</i> "I think anything we can do to keep our kids healthy, give them a better chance at the future, I think we should go for it." –<i>Black mother of 17 year-old, private practice, Incomplete Group</i></p> <p>Trust medical recommendations/Protect girls against their parents' or their own bad decisions (n = 7) "You know I don't have a problem with requiring any vaccinations. You know in some cases there are some children that need to be protected by the government because their parents have very archaic religious views. And when you talk about the health of a child, you can't let religious views get in the middle so I don't have a problem with that." –<i>White father of 17 year-old, private practice, Complete Group</i> "Sometimes things need to be...for health reasons...should be enforced. Something that is harmless and will protect someone's life. And, and the child really doesn't have a choice in the matter. And, maybe they—it's a decision that should be made for them since it's a harmless vaccine and could have life-saving qualities" –<i>White father of 15 year-old, public practice, Complete Group</i></p> <p>Protect teens from sexually transmitted infections (n = 11) "It's like any other communicable disease, so you should be vaccinated against it. And to pretend that it doesn't exist or that teenagers are not sexually active is to be putting one's head in the sand. So yes of course it should be part of the mandate, just as much as the MMR, children should be vaccinated against it." –<i>White mother of 12 year-old, private practice, Not Initiated Group</i></p> <p>Benefits outweigh risks (n = 12) "If there are no side effects to it, if there are no disadvantages to having the shot, I think should be required to have it" –<i>Black mother of 17 year-old, private practice, Incomplete Group</i> "Why not protect them as much as we can." –<i>White mother of 16 year-old, private practice, Not Initiated Group</i></p> <p>Presence of a mandate would normalize vaccination (n = 3) "I don't see anything wrong if they made it mandatory for them to have. That'd be one of their shots (8)" –<i>Black mother of 15 y old, public practice, Incomplete group</i></p>
OPPOSING SCHOOL-ENTRY REQUIREMENTS	<p>Parental autonomy (43 Parents) "Unlike getting chicken pox or you know, I think it's something that the parents have to really talk over and discuss and decide on." –<i>Black mother of 15 year-old, public practice, Complete Group</i> "I think it's a parent and child's decision and their right. I don't think it should be something that's enforced—that should be forced...give the parent the decision to decide whether or not." –<i>White mother of 14 year-old, public practice, Incomplete Group</i></p> <p>HPV cannot be transmitted by casual contact (19 Parents) "I don't know. I think that because it is a sexually transmitted disease and not spread by casual contact I think it's much less likely that someone would just stumble upon it and there are so many other sexually transmitted diseases that aren't as easily prevented. I'm not sure it's as vital as avoiding measles where you can just get coughed on." –<i>White mother of 15 year-old, private practice, Complete Group</i></p> <p>HPV vaccine is new/need more information (10 Parents) "I know vaccines can be lifesaving, but the HPV at this point, there's not enough information to find out if everyone has to do it." –<i>Hispanic mother of 17-year-old, public practice, Not Initiated Group</i></p> <p>Not all teenagers are sexually active (7 Parents) "I don't think that that would be reasonable because it is for a sexually transmitted disease and not all pre-teens and teens are going to be sexually active. It also would interfere with some family's religious beliefs even more so than regular...then other types of vaccines would so. And because it is a sexually transmitted disease it's not something that somebody is going to catch from another student walking down the hall. So I don't think it would be necessary to require it for school." –<i>White mother of 17 year-old, public practice, Complete Group</i></p> <p>HPV vaccination can promote sexual activity or may stigmatize girls (7 Parents) "When parents hear 'I'm giving my 11-year-old daughter vaccines for sexually transmitted disease' it's just like, you know, with the mentality before you know, giving contraceptives to children, does it give them permission to go." –<i>Other race mother of 17 year-old, private practice, Incomplete Group</i></p> <p>Children should not be prevented from attending school if they have not had HPV vaccine (3 Parents) "They should go to school no matter what. I mean what if some kids they don't have the money or the chance to get the HPV. Just because of that they can't go to school. No I think that's ridiculous." –<i>Hispanic mother of 14 year-old, public practice, Complete Group</i></p> <p>HPV is not a serious disease (n = 3) "[HPV] doesn't seem deadly. Like the measles, I had a cousin die of the measles. I don't think HPV is deadly, well I suppose it could be, maybe. I don't know, as far as I know it isn't." –<i>White mother of 16 y old, private practice, Complete Group</i></p>

*Total numbers of quotes do not equal total numbers of respondents as some respondents gave more than one reason, while others answered yes or no to questions but did not explain their reasoning.

Discussion

HPV vaccination rates in the US lag far below national goals, especially for the recommended ages of 11–12.²¹ Improvements in both vaccine initiation and completion of all three doses among those who start are current goals of the Centers for Disease Control and Prevention, American Academy of Pediatrics, and President's Cancer Panel.^{22–26} Fewer than two thirds of adolescents who begin the HPV vaccine series complete all three doses, which may put adolescents at risk for HPV-related disease as three doses are associated with maximum effectiveness.²⁷ Because completing a three dose series has proven difficult for adolescents, policymakers are considering additional steps to raising vaccination rates, including vaccine provision at alternative

sites and school-entry requirements. Our study with parents and providers found high levels of support for HPV vaccine provision in schools, especially among those who had difficulty completing the series. However support for school-entry requirements was limited.

Nearly two-thirds of parents and 81% of providers supported school-located HPV vaccination. Many parents felt that vaccination in school would be more convenient than vaccination in their providers' offices, and that school-located vaccination could improve vaccination rates for those with limited healthcare access. Providers felt that school-located vaccination would improve vaccination coverage and decrease logistical barriers to obtaining recommended vaccines. School-located vaccinations have a strong track record of success in other industrialized nations, as

Table 5. Providers' views supporting and opposing school-based provision of HPV vaccines.

SUPPORTING SCHOOL-LOCATED VACCINATION	<p>Improve vaccination coverage (n=12) "It would definitely lead to higher immunization rates and I think when you have these adolescents, it's just hard to deliver a preventative service to adolescents in general, and for the school to participate in that process, I think would be helpful" –<i>Physician, public practice</i></p> <p>Decrease barriers/increase access (n=4) "I think anything you can do to make it easier. I would offer it at the YMCA, I would offer it any of a number of places" –<i>Physician, public practice</i></p> <p>Captive audience (n=3) "I think all vaccines should be given in schools, I think it would be wonderful, a captive population." –<i>Physician, private practice</i></p> <p>Positive Peer Influence (n=2) "I think that actually might help, knowing that your peers are getting it." –<i>Physician, private practice</i></p>
OPPOSING SCHOOL-LOCATED VACCINATION	<p>Concern of inadequate documentation (n=5) "The record-keeping so that it comes back to the doctor is a nightmare. How would I know then know who's getting it in the schools, who isn't, what the dates are, did they get all 3, they did the kids move?" –<i>Physician, private practice</i> "It's hard to do if you don't have good information exchange, because for a nurse with confidence to know that you haven't received the vaccine is important, because they don't want to over immunize, and so registries and things like that are really important." –<i>Physician, public practice</i></p> <p>Waiting period/Lack of backup in case of serious reaction (n=5) "I think the thing is you don't have the back up if you ever have a reaction to anything" –<i>Nurse, public practice</i> "Logistically if you have to do this, you know, it's unlike a flu where you give it and you can just walk out the door. You're supposed to wait 15 minutes and that's you know, you have this line up of 40 you know, 12 y olds, 14 y olds whatever it is waiting there with a nurse and then a secretary, I mean you have, it's logistically very difficult I would think to give a large volume in a school where you have all these kids who are sitting in the nurse's office for 15 minutes and checking them before they leave" – <i>Physician, private practice</i></p> <p>Increase burden on schools (n=2) "It would create work for schools. The nurses would have to do more work to document completely." – <i>Physician, public practice</i></p> <p>Erode primary care (n=2) "I'm sure it would be more cost effective if all vaccines were given in schools but at the same time there's so much that pediatricians do for families in terms of anticipatory guidance and support and not just medical, I mean we also examine the child, it's very important to rule out all kinds of things that can happen in childhood." –<i>Physician, private practice</i></p> <p>HPV shouldn't be treated differently than other vaccines (n= 2) "I'd have to know why, what would be the reason for doing this particular one in the school, as opposed to the DTaP or the Menactra or anything else?—<i>Physician, private practice</i></p>

*Total numbers of quotes do not equal total numbers of respondents as some respondents gave more than one reason, while others answered yes or no to questions but did not explain their reasoning.

well as in the US. Australia, Canada, and the United Kingdom, have implemented school-located HPV vaccination programs and have documented complete vaccination rates exceeding 70% at the recommended ages.^{2,28,29} These programs have demonstrated success in terms of decreasing genital warts and cervical dysplasia,^{5,6,30} though have also noted that school-located vaccine provision can provoke anxiety among adolescents.³¹ Though school-located immunization programs are relatively uncommon in the US at the present time, school-located immunization was commonly used to administer polio vaccination in the 1950s and Hepatitis B vaccination in the 1980s. Recent surveys addressing the acceptability of school-located immunization programs for HPV vaccination found that rates ranged 27%³² among primarily Hispanic, urban parents of middle-schoolers in Texas to 71% of a survey of primarily African-American parents in Georgia.³³ A national internet-based survey found that 67% of mothers were willing to vaccinate their children in school.³⁴ In this survey, parents who had not yet initiated vaccination demonstrated the highest intent to utilize school-located immunization programs. Similarly, we found that the majority of parents and providers supported school-located provision of HPV vaccination, and that intended program utilization was highest among parents whose daughters had not completed the vaccine series. Together these results indicate that expanding school-located immunization programs might be especially helpful to improve vaccine initiation and completion rates among adolescents most vulnerable to under-vaccination.

Only 37% of parents expressed support for vaccination at other community sites, such as pharmacies, compared with nearly 60% who supported school-located vaccination. Although pharmacy-located vaccination has been proposed as a mechanism to improve HPV vaccination rates³⁵ and 61% of states have mechanisms by which pharmacies can provide vaccinations to adolescents ages 12 and older,³⁶ parental support for HPV vaccination in pharmacies is limited, with acceptance ranging from 5% to 21%.^{32,37} Prior to expanding immunization into pharmacies, and other sites, several factors need to be considered including vaccine availability, clarification of vaccine administration to adolescents, retail commitment, vaccine storage and handling, and vaccine financing.³⁸

Only a minority of providers and parents supported school-entry requirements for HPV vaccination. Most parents felt that HPV vaccination should be a choice for parents and adolescents primarily because it could not be easily transmitted via casual contact. Providers felt that school-entry requirements would improve coverage rates, but were concerned about provoking an intense public backlash that could hinder vaccination efforts. These opinions are consistent with other US-based surveys,^{15,17,39,40} and reflect the national debate on the issue of mandatory HPV vaccination. School-entry requirements are generally considered very effective policies for achieving widespread childhood vaccination.^{13,14,41} In 2006, with intense lobbying by the pharmaceutical industry, 24 states and regions initiated legislation to require HPV vaccination for school attendance.⁴² In the setting of modest parental support,^{15,17} the legislation met with substantial public backlash.^{39,43} Existing

Table 6. Providers' views supporting and opposing school-entry requirements for HPV vaccines.

SUPPORTING SCHOOL-ENTRY REQUIREMENTS	<p>Raise vaccination rates/reduce parental hesitancy/decrease stigma (n = 6) "Requiring it would basically make it a no-brainer for a lot of families" –<i>Physician, public practice</i></p> <p>Improve public health (n = 4) "We can send people to Neptune and the Hubble Spacecraft has been out there you know, for 35 y and it's only supposed to be out there for 5 before it exploded. If we can do that, then I think we should be able to prevent a lot of stuff that's really going to cause a lot of problems and heartache. You know, [school-entry requirements are] a simple approach to a potentially devastating—I don't want cervical cancer" –<i>Physician, private practice</i></p>
OPPOSING SCHOOL-ENTRY REQUIREMENTS	<p>Society is not ready for HPV vaccine requirements (n = 12) "I'd be a tough sway on that one to mandate it for schools, for public safety, immediate health reasons. But from a public health standpoint it makes a whole lot of sense. Yeah, I think that would be a tough sell, and I think you'd lose more people potentially if you mandated it for school in some way." –<i>Physician, private practice</i></p> <p>Provoke public backlash/erode parental trust (n = 7) "In order to mandate it you have to get it generally accepted through the legislature etcetera, etcetera and I could see well, when we did discuss this when it first came up 5 or 6 y ago and we decided not to push for that because we thought it was too early and you know, there was too much sort of emotional push back. We do know by experience that the legislators, voters do go to them, they will push back really strongly. Then you get some sort of irrational arguments people pushing back, no, no we couldn't possibly do that. Only on the basis of 1 or 2 or a family or group or whatever in one little tiny pocket and they just totally screw up the entire initiative" –<i>Physician, public practice</i> "I think you would get a ton of opposition from the parents. Another vaccine requirement I think especially in the anti-vaccine sort of age that we're in right now" –<i>Physician, private practice</i></p> <p>Mode of transmission does not justify a requirement (n = 9) "I mean I'm very pro-vaccine myself however, I don't know how I feel about [requirements]. I feel like in some ways it should be [required], but I also understand the parental concern of some kids aren't having sex and some kids aren't experimenting and I don't know that I necessarily feel like they should have to get it, whereas a lot of the other vaccines are needed for things that are very easily acquired or you know, you have really no control over whatsoever." –<i>Nurse, private practice</i> "From the standpoint of public health and the community which is really the reason vaccines in my view are given against infectious diseases, it's the spread, and it's for the most part a conscious choice about exposure and I think that's very different issue than an exposure that is not conscious and just happens by random passing in the hallway and being in the same air with somebody or touching a surface or things like that" –<i>Physician, private practice</i></p>

*Total numbers of quotes do not equal total numbers of respondents as some respondents gave more than one reason, while others answered yes or no to questions but did not explain their reasoning.

school-entry legislation in Virginia and the District of Columbia contains liberal opt-out provisions that apply only to HPV vaccination, and requirements have not led to higher coverage rates.⁴² Now that the safety of HPV vaccination has been demonstrated over almost 10 y of use, and because vaccination rates remain stubbornly low, interest in school-entry requirements has resurfaced. Rhode Island was the first state to pass a school-entry requirement without exemptions; this regulation took effect in August of 2015. Although HPV vaccination rates in Rhode Island were high prior to the requirement, with 76% of girls and 69% of boys initiating HPV vaccination in 2014,⁴⁴ the legislation provoked some public backlash, even among parents who support vaccination and choose to vaccinate their own children.⁴⁵ The viability of school-entry requirements as a means to improve HPV vaccination coverage is an evolving story requiring careful consideration.

This study has several limitations. The study sample included a small number of participants and was recruited from an urban academic medical center serving primarily low-income and minority patients and three private practices treating more middle- and upper-income largely White parents in the Northeast, which may restrict the applicability of our results to the overall US population, especially those residing in rural areas or other geographic regions in the US. In addition, this study focused only on parents of daughters, and parents of sons could have different views. The results of this study use parental recall of shots administered, rather than the number verified by medical record review, which has limited accuracy.⁴⁶ Another limitation is that providers were not asked specifically about their support for provision of HPV vaccination in sites other than schools, such as pharmacies. A considerable

proportion of parents born outside the US were from low resource countries, in which vaccinations in non-medical settings (e.g. schools) is common, which may have skewed the results obtained.

Conclusions

School-located provision of HPV vaccinations and school-entry requirements have been proposed as ways to raise vaccination rates. Interviews with parents and providers indicate relatively strong support for school-located vaccination, and only weak support for school-entry requirements. The highest intent to use school-located services was noted among parents whose daughters had not completed the vaccine series, indicating that expanding vaccination services into schools might be especially helpful to adolescents at risk for not completing the series.

Methods

Recruitment occurred from September 2012 to July 2013 at one public clinic located within a safety net hospital and three private practices. Parents/guardians presenting with their adolescent daughters between the ages of 11 and 17 were approached before and after their appointments to participate in the study. Trained research assistants reviewed appointment schedules to determine eligible patients and recruited parents in the waiting areas. Interviews were performed in English, Spanish, and Haitian Creole. Interviews were audio-recorded and transcribed verbatim by the research assistants. Bilingual researchers performed and translated interviews in Haitian Creole and Spanish verbatim. These interviews were back-translated to ensure accuracy. Parents received a

\$20 gift card as compensation for their participation. Interviews lasted 30 minutes on average. Physicians, nurse practitioners, and registered nurses who provided primary care including HPV vaccination at the inner-city public clinic and private practices were also recruited. At each clinical site, a physician involved in the study recruited additional providers. Providers did not receive compensation. Thirty-eight percent of eligible parents/guardians participated. More than 80% of providers at private practices participated, and recruitment at the public clinic was terminated when additional interviews provided no new ideas (7 of 20 primary care providers). This study was approved by the Boston University Medical Center's and Harvard Vanguard Medical Associates Institutional Review Boards. This study represents a subset of interviews previously analyzed to examine barriers to and facilitators to initiation of HPV vaccine series initiation.²⁵

The full interview guide used semi-structured, interview questions were designed to probe the constructs of the health belief and Transtheoretical models: background factors, health beliefs, cues to action, readiness to action (stage of change) perceptions of HPV, and logistical barriers related to vaccination. The components of the parent interviews that were analyzed for this study include parental demographic information, daughter's HPV vaccination status as recalled by the parent, and parental views about school entry requirements for HPV vaccination, school-located provision of HPV vaccination, and whether they would vaccinate their daughters in school if the service were available. The components of the provider interviews that were analyzed included provider views on school-entry requirements for and school-located provision of HPV vaccines. All interviews were coded by two to six researchers and discrepant codes were discussed to reach consensus. Codes were generated from the data collected, consistent with qualitative data analysis. Data analysis aimed to understand parents/guardians' and providers' views vis-à-vis HPV school-entry requirements, school-located provision of HPV vaccination and whether parents would vaccinate their daughters in school if the service were available.

Abbreviation

HPV Human Papillomavirus

Disclosure of potential conflicts of interest

Dr. Pierre-Joseph received funding from Merck & Co after this work was completed. No other authors have conflicts of interest to declare.

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