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## Views on Human Papillomavirus Vaccination: A Mixed-Methods Study of Urban Youth

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### Abstract

While the human papillomavirus (HPV) vaccine has potential to protect against the majority of HPV-associated cancers, vaccination rates in the United States remain low. Racial/ethnic and economic disparities exist for HPV vaccination completion rates. We conducted a mixed-methods study using the theory of planned behavior framework to explore attitudes and beliefs about HPV vaccination among urban, economically disadvantaged adolescents. Fifty adolescents aged 14-18 years were recruited from community-based organizations to complete a written survey and participate in a focus group. The mean age was  $15.5 \pm 1.3$  years; 98% were African American or mixed race; 64% were female; 52% reported previous sexual intercourse; 40% reported receipt of

1 HPV vaccine dose. The knowledge deficit about the HPV vaccine was profound and seemed slightly greater among males. Mothers, fathers and grandmothers were mentioned as important referents for HPV vaccination, but peers and romantic partners were not. Common barriers to vaccination were lack of awareness, anticipated side effects (i.e., pain), and concerns about vaccine safety. Characteristics associated with 1 vaccine dose were: having heard of the HPV vaccine vs. not (65% vs. 20%,  $p=0.002$ ) and agreeing with the statement "Most people I know would think HPV vaccine is good for your health" vs. not (67% vs. 27%,  $p=0.007$ ). Our work indicates a profound lack of awareness about HPV vaccination as well as the important influence of parents among urban, economically-disadvantaged youth. Awareness of these attitudes and beliefs can assist providers and health officials by informing specific interventions to increase vaccine uptake.

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## Keywords

Adolescent; Health promotion; Papillomavirus vaccine; Healthcare disparity

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## Introduction

The human papillomavirus (HPV) vaccine has potential to protect against the majority of HPV-associated cancers as well as genital warts.<sup>1,2</sup> However, coverage with HPV vaccination in the United States remains low and has not kept pace with other vaccines recommended for adolescents, despite significant public health efforts. In 2012, among adolescents aged 13-17, only 33.4% of females and 6.8% of males had received all three recommended doses of HPV vaccine.<sup>3</sup>

Racial/ethnic and economic disparities exist both for rates of HPV vaccination completion (i.e., 3 doses within 6 months of initiation recommended to establish adequate protection) as well as incidence of cervical cancer and related deaths.<sup>4-8</sup> Studies indicate that rates of vaccine series *completion* are lower among black and Hispanic females, as well as those who lack insurance coverage or a medical home.<sup>9-10</sup> Notably, rates of HPV vaccination *initiation* (reported at age 13-17 years) are not lower for black or Hispanic youth than for whites, and this is true for adolescents of both sexes.<sup>11</sup> Despite their higher risk for poor health outcomes, HPV vaccine research among these populations is lacking.

Designing interventions to increase HPV vaccination coverage to levels consistent with Healthy People 2020 goals is a complex process that requires understanding the perspectives of adolescents.<sup>12</sup> The theory of planned behavior (TPB) is a conceptual framework that can be used to model adolescent behavior. The theory states that attitudes, social norms and perceived behavioral control influence behavioral intention, which in turn influences actual behavior.<sup>13</sup> The TPB has been used for understanding a variety of adolescents behaviors, including exercise, healthy eating, and sexual risk behaviors.<sup>14-20</sup>

We conducted a mixed-methods study using the TPB framework to explore attitudes and beliefs about HPV vaccination and to identify perceived barriers to HPV vaccination among urban, minority, economically disadvantaged adolescents.

## Methods

We conducted a mixed-methods study consisting of a written survey followed by focus group sessions. The study protocol (including waiver of written consent) was approved by the hospital Institutional Review Board.

## Participants

Participants were recruited by purposeful sampling from Community Based Organizations (CBOs) within a large, Midwestern city. Targeted CBOs provided a wide variety of services and programming (e.g., sports, life skills development, mentoring) to primarily African American adolescents from urban, economically disadvantaged areas. One CBO was a local chapter of a national organization and all others were local organizations. Two CBOs

provided gender-specific services (e.g., female members only). Adolescents aged 14 to 18 years receiving services at participating CBOs were eligible. Adolescents who did not speak English or had significant developmental delay (as determined by CBO staff) were excluded from the study. A liaison from each CBO assisted with the identification of volunteer participants using verbal and written announcements. Participants were provided a \$25 incentive and light refreshments. No one refused participation and all youth gave verbal consent.

### Survey Questions and Moderator Guide

The survey and moderator's guide were developed by a multidisciplinary team with expertise in adolescent health and psychology, health services research, and qualitative methods. Questions were based, in part, on national surveys and relevant literature.<sup>21-24</sup> The questions in the focus group moderator guide were designed to explore the TPB constructs: attitudes/knowledge, subjective norms, and perceived behavioral control. Relevant discussion guide questions included: *"What do you know about the HPV vaccine?"*, *"What do your friends think about the HPV vaccine?"*, and *"What information do you wish was available about the vaccine?"* Probes were used to garner more detail and examples from subjects' experience. In addition to discussion of HPV disease and vaccine, focus group topics included healthcare access and sexual health concerns that are reported elsewhere.<sup>25</sup> Before each focus group, participants completed a written survey that assessed demographics, health behaviors, and healthcare utilization, in addition to HPV vaccine-related TPB constructs.

### Focus Group Logistics

A female, Caucasian, PhD-level psychologist trained in focus group moderation (SJ) conducted the sessions. Six sessions were held at 4 CBOs (three sessions for each gender). Sessions were held at CBOs during times when adolescents and staff were already scheduled to be present for services. Sessions lasted about 60 minutes and were audio-taped and transcribed. A second member of the research team was present to take written notes.

### Data Analysis: Qualitative

The transcribed data were entered into NVivo 9 (QSR International, Cambridge, MA). Each analysis team member (MM, SJ, JW) read all transcripts, generated first-level codes, and summarized key findings into analytic memos. At the initial analysis meeting, memos were shared and key findings were grouped into themes through a consensus process. Each team member then reread the transcripts to assure thematic fit for all focus group content. An additional team member (JL) reviewed the transcripts and final summative memo to uncover possible areas of interpretive disagreement. Triangulation and consensus were used throughout the analysis phase to maximize the reliability of the findings.

### Data Analysis: Quantitative

Demographic characteristics were summarized with descriptive statistics. Likert scale responses to statements (e.g., "Most people I know would think that HPV vaccines are good for your health") were dichotomized to strongly agree/agree or disagree/strongly disagree.

Participants were dichotomized by doses of HPV vaccine received: none or  $\geq 1$ . Bivariate comparisons of responses between subgroups (e.g., gender, vaccine receipt) were analyzed using Chi-square test. Comparisons of responses between subgroups were analyzed using Chi-square test. Data entry and analysis were done with SPSS for Windows version 18 (SPSS Inc, Chicago, IL, USA).

## Results

### Demographics

Subjects were enrolled between July and November, 2012. Among 50 eligible adolescents approached, all agreed to participate. Group size ranged from 3 to 12 participants. Subject characteristics are described in Table 1. The mean age was 15.5 years ( $\pm 1.3$  years) and 98% were African-American or mixed race. Two females self-identified as bisexual and the remainder self-identified as heterosexual.

### HPV Experience

Less than half (40%) of participants reported receipt of  $\geq 1$  HPV vaccine dose. Among those who had received  $\geq 1$  doses (20 participants), 7 completed the series, 3 received 1 or 2 doses, and 10 could not recall the number of doses received. Characteristics associated with  $\geq 1$  vaccine dose were: having heard of the HPV vaccine vs. not (65% vs. 20%,  $X^2=10.1$ ,  $p=0.002$ ), knowing HPV can cause cervical cancer vs. not (69% vs. 32%,  $X^2=5.2$ ,  $p=0.022$ ), agreeing with the statement “Most people I know would think HPV vaccine is good for your health” vs. not (67% vs. 27%,  $X^2=7.4$ ,  $p=0.007$ ). Gender was not significantly related to receipt of the HPV vaccine (females 43% vs. males 39%,  $X^2=0.1$ ,  $p=0.76$ ). Surprisingly, there was no significant difference in having received an HPV vaccine when comparing those with and without a personal healthcare provider (39% vs. 45%,  $X^2=0.2$ ,  $p=0.69$ ). There also was no significant difference in having received a vaccine between those who had and had not had a health check up in the past 12 months (46% vs. 27%,  $X^2=0.7$ ,  $p=0.27$ ).

### Themes—Qualitative Findings

**Attitudes**—The HPV vaccine knowledge deficit was profound and pervasive. Most participants indicated they had no knowledge about the vaccine. Those who were familiar with the vaccine typically disagreed on vaccination basics, including the number of shots in the series, what the vaccine protects against, and who should receive it. Most felt that vaccination required a series of shots, though most did not know the correct number and some insisted that one was adequate. A few participants thought the vaccine would protect against cancer, but only rarely was the risk appropriately identified as cervical cancer. Some felt the vaccine had something to do with sexual intercourse. One participant indicated a belief that it is a “vaccine for sexual activity” while several thought it protected against “sexual disease.” Some reported the vaccine should be obtained as a teenager or “before you go to college” while others thought you could receive it at any age. Several were confused about whether the vaccine was required to attend school. Even some participants who reported vaccine receipt or having HPV discussions with their doctor could not recall specifics about the vaccine. Compared to females, the knowledge deficit seemed slightly greater among males overall, particularly in regards to which gender should be vaccinated.

Participants expressed a curiosity about HPV vaccination. Many expressed interest in learning more about the mechanism of action and safety of the vaccine. Participants wanted to know what the vaccine “helps” and “what it will do for you.” Several participants had ideas for sharing information such as advertisements, flyers, and “forums in the community to let people know.”

**Subjective Norms**—Mothers, fathers and grandmothers were most often mentioned as important referents and their opinions (positive or negative) about HPV vaccination were influential to many participants. Both genders mentioned they had family members who were supportive of the vaccine, such as one male whose mother “makes me get it.” A few females reported familial concern about vaccines in general and specifically about getting sick from influenza vaccination. Notably, peers were not identified as someone who influenced attitudes and decisions about vaccination and when asked specifically, participants did not respond about whether peers had received the vaccine.

**Perceived Behavioral Control**—The most common barrier to having received the HPV vaccine was lack of awareness. In addition to specific knowledge deficits, several participants reported they had never heard of HPV. Several males and females worried about pain, with some who had received it reporting that the shot “burned.” A few mentioned that familial attitudes and fears about vaccination in general were barriers, while one male specifically questioned if the HPV vaccine could be “trusted.”

## Discussion

This study describes the perspectives of urban, minority, economically-disadvantaged youth who expressed specific attitudes, norms, and barriers related to HPV vaccination. Despite a profound knowledge deficit, the majority of these youth expressed interest in learning more about HPV. Among adolescents, lack of vaccine knowledge and awareness has been reported for both genders, though most commonly studied among females.<sup>9,26</sup> It is concerning that vaccination rates remain low, despite significant public health efforts to increase awareness and acceptance of HPV vaccine. Importantly, several teens who reported vaccine receipt or vaccine discussions with providers still had profound knowledge deficits, which is similar to findings from Rand et al.<sup>21</sup> Also similar to other studies, participants reported modifiable vaccine beliefs including perceived harms (e.g., pain, lack of safety) and perceived effectiveness, which offer potential targets for future interventions to increase vaccine acceptability and uptake.<sup>26-28</sup> More research is needed to understand the most effective methods for educating and persuading youth about HPV, especially with youth most at-risk for infection.

Previous studies have demonstrated that acceptability for HPV vaccination is higher when youth believe that important referents (e.g., peers, parents, romantic partners) hold favorable beliefs toward vaccination.<sup>26-28</sup> For our participants, parental—but not peer—influence was notable. In discussion, adolescents reported parents having both negative and positive attitudes toward HPV vaccination. Further, only 38% of subjects agreed that referents would think HPV vaccine is good for health. Wisk et al. found that while most US parents (62.6%) have heard of HPV vaccine, significant disparities in awareness exist and parents of children

who are older, female, and privately insured are more likely to have heard of HPV vaccine.<sup>29</sup> Thus, increased efforts to educate and persuade parents whose children are younger, male, or lack private insurance seem warranted.

HPV vaccination interventions directly targeting parents are uncommon. Two studies that provided parents with detailed HPV information had mixed results. Dempsey et al. demonstrated that increased knowledge did not affect HPV vaccine acceptability, but found attitudes and life experiences to be more important factors influencing acceptability.<sup>30</sup> Davis et al. demonstrated increased knowledge did result in increased vaccine acceptability, especially among parents previously undecided about vaccination.<sup>31</sup> Brawner et al. described the development of a novel intervention for urban adolescent females and their parents.<sup>28</sup> The group based curricula was designed to increase perceived vulnerability to HPV and build self-efficacy and intention to obtain vaccination. While data on intervention efficacy has not been published, this work seems especially promising because it adheres to strategies demonstrated to increase efficacy of sexual health promotion programs (e.g., skill development, theory-based).<sup>32-33</sup>

While gender was not associated with reporting vaccine receipt among our study participants, males demonstrated less vaccine awareness and knowledge during group discussions. Similarly, in a recent study of low-income male adolescents, most (75%) had never heard of HPV vaccine.<sup>27</sup> Among our participants, very few males agreed that referents would think HPV vaccine is good for health. This is in contrast to several recent studies in which male adolescents reported moderate levels of peer acceptance of HPV vaccine and 75% of parents would accept HPV vaccine for their sons.<sup>21, 27, 34</sup> These contrasting findings suggest that adolescent males may not be aware of parental vaccine support and that more research is needed on interventions to augment actual vaccine uptake among males.

While the homogeneity of our sample allowed us to describe specific factors affecting behavior, these results may not be generalizable to other racial/ethnic groups or youth outside of the Midwest. It is possible that use of a Caucasian moderator may have influenced communication among focus group participants. While potential bias among the investigators during qualitative analysis cannot be fully neutralized, we utilized a multidisciplinary team, experienced in maintaining objectivity in conducting research to minimize this possibility. Researcher triangulation with five study members enhanced credibility of analysis.

Racial/ethnic and poverty disparities for rates of HPV vaccination completion as well as the unique lack of national progress for this important vaccine warrant immediate action by immunization stakeholders. Our work indicates a profound lack of awareness about HPV vaccination as well as the important influence of parents among urban, economically-disadvantaged youth. Awareness of these attitudes and beliefs can assist public health officials as well as providers by informing specific interventions to increase vaccine uptake.



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**Table 1**  
**Participant characteristics and quantitative knowledge, norms, and barriers**

	<b>Total n (%)</b>	<b>Female n (%)</b>	<b>Male n (%)</b>	<b>p</b>
All participants	50 (100)	32 (64)	18 (36)	--
Had previous sexual activity	26 (52)	18 (56)	8 (44)	0.34
Used condom at last intercourse	18 (69)	13 (72)	5 (63)	0.62
Had health check-up in past 12 months	39 (78)	25 (78)	14 (78)	0.98
Heard of the HPV vaccine	24 (48)	16 (50)	8 (44)	0.71
Missed needed care in past 12 months	11 (22)	8 (25)	3 (17)	0.50
Has a personal doctor or nurse	29 (58)	20 (62)	9 (50)	0.39
Knowledge—Answered correctly (“true”)				
HPV can cause cervical cancer	13 (26)	11 (35)	2 (11)	0.62
HPV can cause genital warts	14 (28)	10 (32)	4 (22)	0.45
HPV is very common	20 (40)	12 (39)	8 (44)	0.69
HPV is passed by sexual contact	26 (52)	15 (48)	11 (61)	0.39
A person may be infected with HPV and not know it	24 (68)	21 (68)	13 (72)	0.74
Social Norms—Answered “agree” or “strongly agree”				
“Most people I know would think HPV vaccine is good for your health”	19 (38)	14 (44)	5 (28)	0.26
Perceived Behavioral Control—Answered “disagree” or “strongly disagree”				
“It would be hard for me to get transportation for 3 appointments to get vaccinated for HPV”	34 (68)	21 (66)	13 (72)	0.63

**Table 2**  
**Interview themes within the theory of planned behavior constructs with participant quotes**

Theme	Quote	Participant
Attitudes/knowledge		
Knowledge deficit	"I said I never heard of it. I might have had it, but I don't remember."	Female
	"Because it sound(s) dangerous like HIV. But at the same time, ... it's not like on commercials or at least I never pay attention to that commercial. It's like, if it's really dangerous, it's not out there how all the other ones is out there."	Female
Curiosity about HPV and vaccine	"But after I heard what was – what happens if you don't take it (HPV vaccine), then I wanted to take it."	Male
	"I want to know as much information about all the diseases I possibly can know to prevent – so I won't get them."	Female
	"I just want to know a little bit more about it."	Male
Subjective Norms		
Referent opinions are important and influential	"She [my mother] said she don't want me to have it – getting a shot because it might cause a problem to my body or something."	Female
	"My mama... she say if you don't get the shot, something will happen...I forgot what she says. I think she said I'm going to die."	Female
	"And like on my 14th birthday, my dad took me and then made me get it. And I didn't know what it was at first ...and he was like, it prevents you from getting cancer."	Female
Perceived Barrier Control		
Pain	"The needle goes inside and it burns!"	Female
	"I don't like needles, but I'm going stay – try to keep my body healthy."	Female
Safety concerns	"What chemicals are they putting inside the HPV shot...How can we trust it?"	Male
Lack of awareness	"Nobody ever talks about it [HPV], so this is my first time hearing it."	Female