

RESEARCH PAPER



## Vaccination perspectives among adolescents and their desired role in the decision-making process

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### ABSTRACT

**Background:** To assess the knowledge and attitudes of middle school students toward vaccination, we measured their understanding of vaccine safety and effectiveness, expectations for communication with health care providers, and their desired role in the vaccination decision-making process.

**Methods:** A cross-sectional, self-administered survey was conducted among seventh and eighth grade students in a middle school in Upstate New York. Bivariate analyses were conducted to identify differences in perspective by gender, grade, and attitudes toward vaccination.

**Results:** Of 346 students attending class, 336 (97.1%) participated. The majority of respondents were White (71.3%) and 11 to 13 years of age (78.2%). Boys were significantly more likely than girls to perceive vaccines to be very safe (48.4% vs 30.2%,  $p < 0.01$ ) and very effective (49.7% vs 29.0%,  $p < 0.01$ ). Approximately one-third of adolescents reported having a say in the decision to be vaccinated and a quarter of students expressed a desire for specific information about vaccines.

**Conclusions:** This study found that young adolescents in a nonurban area of Upstate New York were generally marginalized in the vaccine decision-making process yet third of them indicated an interest in how vaccines work and a desire to participate in healthcare decisions. Interventions to improve vaccine uptake among adolescents should capitalize on this desire to understand vaccine safety, effectiveness and mechanism of action.

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### Introduction

In the last decade, the adolescent immunization schedule has been modified to confer protection against multiple infections and HPV-related cancers.<sup>1</sup> The current platform now includes four vaccines: tetanus, diphtheria, and acellular pertussis (Tdap), meningococcal (MCV), human papillomavirus (HPV), and influenza.<sup>2,3</sup> Although vaccination coverage rates are high for vaccines mandated for school entry (i.e., Tdap, MCV) they remain below the national goals of 70% and 80% for influenza and HPV, respectively.<sup>4</sup> Research has illuminated parental attitudes and the utility of provider-oriented interventions, and multiple factors contributing to relatively stagnant coverage rates have been identified, including concerns about safety, efficacy and timing of vaccines.<sup>5–10</sup> Relatively little is known about the adolescent's perspective on vaccines, but it appears that some adolescents have an impact on the decision-making process and vaccine acceptance, highlighting the importance of understanding teen perspective.<sup>11–14</sup>

The HPV vaccine is one of the most effective measures to protect adolescents against a variety of HPV-related cancers<sup>15–18</sup>, but uptake remains low. In 2017, only 44.3% of males and 53.1% of females completed the 3-dose series.<sup>19</sup> Vaccine hesitancy research initially focused on identifying specific concerns among parents and providers.<sup>20–22</sup> The parents who refuse

vaccines noted that their stance was, in part, due to a paucity of information being delivered by the clinician<sup>23</sup>, coupled with underlying concerns about vaccine safety<sup>24</sup>, efficacy<sup>25</sup>, impact on adolescent sexual behavior, and little personal knowledge about the vaccine.<sup>26,27</sup> Recent research evaluating the communication style between provider and parent is beginning to elucidate some dynamics which may promote vaccine acceptance, such as assertively engaging hesitant parents to address their concerns, adopting a more presumptive approach, and ensuring that the adolescent has a voice in the conversation triad which is often dominated by the adults in the exam room<sup>28–30</sup>.

With respect to the adolescent perspective, the majority of studies have focused on females and their mothers, finding that these young women are somewhat passive, and while they tend to mirror their mother's position<sup>25,27,31</sup> they desire more information on the topic.<sup>23,25</sup> The perspective of the adolescent male is less understood, and given the lower vaccination rates among boys, it is an important line of inquiry.<sup>32</sup> One consideration is the relative impact of physician recommendation among parents of boys versus girls. The provider's recommendation appears to be more influential in the vaccine decision among parents of adolescent males compared to females, but providers recommend the vaccine less frequently for adolescent males,<sup>33</sup> perhaps a residual effect of

the relatively more recent recommendation to include boys in the universal 11–12 year vaccination schedule.<sup>34</sup> In other words, parents of females may have had several more years of exposure to physician recommendation and media coverage of the HPV vaccine, and thus may have already established a firm opinion less amenable to physician counsel, whereas parents of young adolescent males may be hearing the recommendation for the first time.

Qualitative studies have provided valuable insight into the decision-making process.<sup>11,14</sup> Providers have stated that older adolescents sometimes have a role in decision-making, noting the occasional parental capitulation to an adolescent's vaccine refusal.<sup>11</sup> Given that older teens appear to exert some influence in the decision-making process<sup>11,14</sup>, it is curious that little is known about the desired role and perspectives of younger adolescents, the ages during which vaccine administration is most efficacious.<sup>13</sup> The present study evaluates the perceptions of middle school students regarding vaccines as well as their perceived experience of the medical encounter.

## Results

A total of 346 students were in attendance in the science classes participating in the study. Of these, one student was excluded from taking the survey (parent opted out), and eight students wrote “do not use” on their questionnaires or stated they did not want to participate; an additional one student provided insufficient information to be included. Thus, 336 students who completed the survey (response proportion of 97.1%) were included in the analyses.

The vast majority of adolescents were 12 (35.2%) and 13 (42.7%) years of age; 180 (53.6%) were female and 156 (46.4%) were males. The majority of students were White (71.3%). (Table 1)

Overall, most adolescents (88.7%) believe they received all vaccines recommended by their health care provider, though this was more common among boys than girls (93.0% versus 85.5%,  $p = 0.03$ ). While decision-makers varied, about one third of adolescents (33.0% of girls and 37.4% of boys)

reported having a say in the decision to be vaccinated. Girls were more likely than boys to report that their mothers had the greatest influence in vaccine decision making (48.5% vs 31.7%,  $p = 0.01$ ). Physicians appeared to be slightly, but not statistically significantly, more influential with boys in the vaccine decision compared to girls (41.3% versus 35.5%,  $p = 0.29$ ). About a third of all adolescents reported discussing vaccines with their parents outside the medical encounter and another third reported not discussing vaccines at all. (Table 2) About one-third of adolescents (30.2% of girls and 34.2% of boys) reported making decisions about vaccines with their parents. (Table 2) Among 105 adolescents who wanted to make vaccine decisions, 43 (41.4%) reported being part of the decision; of the 222 adolescents that didn't care or didn't want to make a decision, 62 (28%) reported being part of the decision ( $p = 0.02$ ).

Boys were significantly more likely than girls to perceive vaccines to work very well (49.7% vs 29.0%,  $p < 0.01$ ) and be very safe (48.4% vs 30.2%,  $p < 0.01$ ). Consistent with this finding, girls were slightly, but not significantly, more concerned about vaccines than boys (16.5% vs 10.9%,  $p = 0.14$ ) and girls wanted more information about vaccines from doctors compared to boys (31.6% vs 23.1%,  $p = 0.08$ ). (Table 2) In terms of adolescent's experience with their provider, nearly half (46.9%) of adolescents felt the doctor shared control of the encounter and a majority (87.7%) had an equal exchange of information with them. (Table 2) However, about a quarter of adolescents felt their parent was in charge of the medical encounter. (Table 2) One respondent's comment highlighted this dynamic by noting “*I want to know what the vaccine is. I am never told; the doctor only spoke to my mom then gives it [the vaccine] to me.*” Only 8<sup>th</sup> graders were asked specifically about HPV vaccination. The results were consistent with the findings in the general vaccine survey of all students. (Table 3)

Among all 336 students, 257 (76.5%) responded to open-ended questions and provided insight into adolescents' knowledge and perceptions of vaccines. (Table 4) The adolescents expressed the need to learn basic information about vaccines, including their contents and how they work. While some adolescents showed concern regarding vaccine-related experiences (e.g., “*they hurt*”), adolescents also expressed concerns that vaccines could seriously harm and potentially kill them (e.g. “*What if they affect someone differently and kill them?*”). Some adolescents were also unsure about whether vaccines are effective (e.g. “*Some people have different bodies so the vaccine might not work for them.*”).

## Discussion

In this survey of predominantly 12- and 13-year-old adolescents in an Upstate New York school, we found that about third of adolescents wanted to be a part of the vaccine-decision making process and desired more vaccine information. We also noted that vaccine hesitancy emerges early, complementing research that has found similar sentiments among young adults.<sup>35</sup> With the expansion of the adolescent vaccination platform to include Tdap, meningococcal, HPV and influenza vaccines, our findings have implications regarding the importance of engaging adolescents in the vaccine decision-making process. Early adolescence is an important

**Table 1.** Demographic characteristics of 336 participating 7<sup>th</sup> and 8<sup>th</sup> grade students.

Factors	N	Percent
<b>Gender</b>		
Female	180	53.6
Male	156	46.4
<b>Grade</b>		
7 <sup>th</sup>	228	67.9
8 <sup>th</sup>	108	32.1
<b>Age</b>		
11	1	0.3
12	118	35.2
13	143	42.7
14	68	20.3
15	5	1.5
Missing	1	–
<b>Race/Ethnicity</b>		
White, non-Latin	238	71.3
Black, Non-Latin	24	7.2
Latin	22	6.6
Asian	13	3.9
American Indian	3	0.8
Mixed race (including White)	28	8.4
Mixed race (not White)	6	1.8
Missing	2	–

**Table 2.** Participants' perspective on vaccines and experience with medical encounter, stratified by gender.

Survey questions	Female (N = 180)		Male (N = 156)		Total N	P*
	N	%	N	%		
Do you always get the vaccines your doctor recommends?						0.03
Yes	73	40.8	82	52.6	155	
I think so	80	44.7	63	40.4	143	
No	24	13.4	8	5.1	32	
Other	2	1.1	3	1.9	5	
Missing	1	–	0	–	1	
Who makes decisions about you being vaccinated?*						0.60
Doctor	17	9.5	19	12.3	36	
Parents & Doctor	103	57.5	78	50.3	181	
Parents & me	54	30.2	53	34.2	107	
Parents, doctor & me	5	2.8	5	3.2	10	
Missing	1	–	1	–	2	
Who do you think has the biggest influence on if and when you are vaccinated?						0.01
Doctor	60	35.5	60	41.4	120	
Father	4	2.4	10	6.9	14	
Me	16	9.5	24	16.6	40	
Mother	82	48.5	46	31.7	128	
Someone else	7	4.1	5	3.4	12	
Missing	11	–	11	–	22	
Have <b>you</b> ever discussed vaccines with your doctor?						0.86
Yes	70	39.3	62	40.3	132	
No	108	60.7	92	59.7	200	
Missing	2	–	2	–	4	
Have you ever discussed vaccines with your parents?						0.26
Only in presence of doctor	61	34.1	40	25.8	101	
Yes, outside of doctors' office	63	35.2	61	39.4	124	
No	55	30.7	54	34.8	109	
Missing	1	–	1	–	2	
Do you want to decide when you get vaccines?						0.36
Yes. By myself	53	29.9	52	34.7	105	
No, want doctor to decide	53	29.9	35	23.3	88	
No, want parents to decide	53	29.9	52	34.7	105	
Other	18	10.2	11	7.3	29	
Missing	3	–	6	–	9	
To the best of your knowledge, do you think you received all recommended vaccines?						0.22
Yes	104	57.8	98	62.8	202	
No	14	7.8	17	10.9	31	
Not sure	62	34.4	41	26.3	103	
Missing	0	–	0	–	0	
The last time you got a vaccine (shot), where did you get it?						0.33
Doctor's	119	66.5	109	70.8	228	
Children's clinic	38	21.2	31	20.1	69	
School	21	11.7	11	7.1	32	
Don't know	1	0.6	3	2.0	4	
Missing	1	–	2	–	3	
How safe do you think vaccines are?						<0.01
Very	54	30.2	75	48.4	129	
Somewhat	93	52.0	58	37.4	152	
Not	7	3.9	5	3.2	12	
Don't know	25	14.0	17	11.0	42	
Missing	1	–	1	–	2	
How well do you think vaccines work?						<0.01
Very well	52	29.0	77	49.7	129	
Works well for some, not Others	100	55.9	54	34.8	154	
Not well	7	3.9	5	3.2	12	
Don't know	20	11.2	19	12.3	39	
Missing	1	–	1	–	2	
Do you have any concerns about vaccines?						0.14
Yes	29	16.5	17	10.9	46	
No	147	83.5	139	89.1	286	
Missing	4	–	0	–	4	
Would you like more information about vaccines when you see your doctor?						0.08
Yes	56	31.6	36	23.1	92	
No	121	68.4	120	76.9	241	
Missing	3	–	0	–	3	
There was equal exchange of information between you and the doctor.						0.85
Strongly agree	53	30.3	49	32.7	102	
Agree	101	57.7	82	54.7	183	
Disagree	21	12.0	19	12.6	40	
Missing	5	–	6	–	11	
Who was in control of the visit?						0.81
You and doctor were equal	81	46.8	77	52.4	158	
Doctor	34	19.7	24	16.3	58	
You	3	1.7	2	1.4	5	
Parent	39	22.5	34	23.1	73	
Other	16	9.3	10	6.8	26	
Missing	7	–	9	–	16	

(Continued)

Table 2. (Continued).

Survey questions	Female (N = 180)		Male (N = 156)		Total	P*
	N	%	N	%		
Who was the doctor you saw for your last routine checkup (physical exam)?						0.09
Regular doctor	119	68.4	93	60.3	212	
Doctor I know but not regular doctor	22	12.6	29	18.8	51	
Doctor I never saw before	15	8.6	22	14.3	37	
[School-Based Health Clinic] is my only health care provider	18	10.3	10	6.5	28	
Missing	6	-	2	-	8	

\*p-values are for exact tests of general association between gender and the categories listed for each survey question.

\*\*Having "No say in the decision about being vaccinated" was created by combining two response categories: (1) "Doctor" or (2) "Parent and doctor" made the decision(s).

Table 3. 8<sup>th</sup> graders' attitudes and knowledge about HPV vaccine, stratified by gender.

	Female (n = 64)		Male (n = 44)		Total	P*
	N	%	N	%		
	How safe do you think the Gardasil vaccine is?					
Very	14	23.3	16	38.1	30	
Somewhat	22	36.7	14	33.3	36	
Not safe	3	5.0	0	0.0	3	
Don't know	21	34.0	12	28.6	33	
Missing	4	-	2	-	6	
How well do you think Gardasil works?						0.42
Very well	16	26.7	16	38.1	32	
Works well for some not Others	19	31.6	12	28.6	31	
Not well	1	1.7	2	4.8	3	
Don't know	24	40.0	12	28.6	36	
Missing	4	-	0	-	4	
Did your doctor talk to you about the Gardasil (HPV) vaccine?						0.99
Yes	25	40.0	17	40.5	42	
No	37	60.0	25	59.5	62	
Missing	2	-	2	-	4	
Did your doctor recommend you wait to get Gardasil until you are older?						0.05
Yes	16	29.1	5	12.5	21	
No	39	70.9	35	87.5	74	
Missing	9	-	4	-	13	
To the best of your knowledge, how many Gardasil (HPV) shots have you received?						0.62
None	15	28.3	13	31.0	28	
Some	14	26.4	14	33.3	28	
All	24	45.3	15	35.7	39	
Missing	11	-	2	-	13	
If you received a Gardasil (HPV) shot, what is the single most important reason for you to receive all 3 doses?***						0.70
Want best protection against Infection	10	43.5	9	60.0	19	
Doctor recommended	8	34.8	3	20.0	11	
Parents wanted	4	17.4	2	13.3	6	
Friends also did it/other	1	4.3	1	6.7	2	
Missing	1	-	0	-	1	
If you received a Gardasil shot what is the single most important reason for you not to get all recommended doses?****						0.72
Will get all doses	7	53.8	5	35.7	12	
Shot was painful	3	23.1	2	14.3	5	
No time	1	7.7	2	14.3	3	
Parents didn't want	1	7.7	4	28.6	5	
Friends didn't do it	1	7.7	1	7.1	2	
Missing	1	-	0	-	1	
Where did you get the Gardasil shots?****						0.93
Doctor's	25	69.4	18	64.3	43	
Children's Clinic	7	19.4	6	21.4	13	
School	4	11.2	4	14.3	8	
Missing	2	-	1	-	3	

\*p-values are for exact tests of general association between gender and the categories listed for each survey question.

\*\*includes students who completed the HPV vaccine series.

\*\*\*includes students who initiated HPV vaccination but have not completed.

\*\*\*\* includes students who received at least one HPV vaccination.

stage during which health behavior patterns develop.<sup>36</sup> As such, this formative period represents a key opportunity to engage young adults in a dialogue about immunology while their attitudes and beliefs are amenable to clinician's recommendation, and before those who become parents themselves must consider the decision on behalf of their own children.

Similar to our findings, a qualitative study of 20 adolescents, 11–18 years of age residing in an urban area, indicated that pain and vaccine safety were their primary concerns, and many teens played a passive role in vaccine decision-making.<sup>13</sup> Our findings are also consistent with a prior study of 32 adolescents from Michigan, where adolescents had

**Table 4.** Summary of 7<sup>th</sup> and 8<sup>th</sup> grade students' qualitative responses categorized by themes elicited.

Themes	Descriptions	Examples
Perceived vaccine harm	Students were concerned that vaccines could have harmful immediate or long-term side effects. Some of these perspectives were grounded in experiences they had themselves while others expressed a lack of knowledge about the potential harm and wanted to learn more. Predominant concerns included: Vaccines cause unspecified illness	<i>"They make me sick!"</i> <i>"Last time I got a vaccine they injected the shot in the wrong place and I got really sick."</i> <i>"The vaccine might not work and the person could get hurt."</i> <i>"The side effects to them are they cancerous?"</i> <i>"What if they affect someone differently and kill them? Like the Gardasil shot."</i>
	Association between vaccines and future illness	<i>"... they hurt."</i> <i>"They should give tips so shots will not hurt as much."</i> <i>"I hate the pain of shots! Work on it."</i> <i>"Needles. Some kids are TERRIFIED."</i> <i>"Some people have "needle phobia", like I do, and have anxiety, breakdowns."</i>
	Illustration of a lack of knowledge about vaccines	<i>"I'm not sure if the needles are clean."</i> <i>"Some people have different bodies so vaccine might not work for them."</i> <i>"What are the vaccines for, how do they help me? Etc."</i>
Fear of needles	Students expressed concerns and experiences related to pain with some belief that vaccines do not need to hurt.	<i>"What are they putting in my body?"</i> <i>"How much of the virus is in the shot?"</i> <i>"What chemicals are in it?"</i> <i>"What illness does the vaccine protect from? What does the illness do?"</i> <i>"What exactly it may be doing"</i> <i>"How well the vaccine works on a scale of 1 to 10."</i> <i>"What are the vaccines for, how do they help me? Etc"</i>
	Fear of needles causing emotional distress.	<i>"More about what they are for, the dangers if you don't get one, and the dangers if you do"</i> <i>"I want to know if it's safe"</i> <i>"The side effects."</i>
Need for more education about vaccines	Fear needles may be a potential source of infection Unclear if vaccines work and how they work	
	What is in the vaccine?	
	What do vaccine do?	
	What kind of harm do vaccines cause?	

a greater role in vaccine decision making than previously identified.<sup>11</sup> Our findings refine the appreciation of gender-specific disparities in the vaccine decision, and how these are modified by the parent-child dyad. Specifically, female adolescents in our study had more concerns about vaccine safety and efficacy than their male peers, and they were more likely to report that their mothers had the greatest influence in the vaccine decision. Our findings are consistent with McRee, et al., who reported that half of the parents stated their daughters played a role in the decision to receive HPV vaccine<sup>12</sup>, however, the authors noted the study was not designed to describe the role the adolescents played nor the nature of their participation. Our results begin to span this gap by highlighting concerns adolescents have about HPV vaccine and the gender-specific perceived role in decision-making, and we open a line of inquiry which should be expanded to include adolescents of various ages, ethnic and socio-demographic backgrounds. In addition, interventions to inform adolescents about the value of vaccines should continue to be developed and evaluated.

As the HPV vaccine recommendation is more recent for males than females, there may be greater awareness of this vaccine among both the female adolescent and her parents than among male adolescents.<sup>34</sup> It is possible that gender-based differences in communications about HPV vaccination may have influenced parents of female adolescents more than

parents of male adolescents, particularly outside the medical encounter. It will be important to better understand parental willingness to engage adolescents in vaccine decision-making.

Responses to the open-ended questions indicated a pattern of answers that mirror common misconceptions about vaccines, including perceptions that a single vaccine formulation may not work properly in all individuals, and that vaccines, specifically the HPV vaccine, can potentially cause severe adverse reactions or death. Our study took place in a community where media and local news channels propagated misinformation that Gardasil is unsafe and caused death in a young teen who died of unknown cause shortly after Gardasil vaccination in 2007.<sup>27</sup> These sorts of media stories are not uncommon. Given the importance of social media in shaping opinion on a wide variety of contemporary topics, it is important that future research efforts identify the sources of information most trusted by adolescents. It may be that the same avenues which influence adult vaccine hesitancy are also influential among adolescents.

The misconceptions and concerns of the students about vaccines suggest that such information should be incorporated into the school curriculum from a young age. In the short term, one way to address many of these identified issues is through better education regarding vaccines and the immune system, including pertinent specifics such as the association between younger age (< 15 years of age) and

better immunogenicity of the HPV vaccine.<sup>31</sup> However, in the recent National Science Education Standards monograph of the National Committee on Science Education Standards and Assessment of the National Research Council, there was no mention of vaccines, vaccination, or immunization, and the only reference to the immune system was in a discussion of complex body systems.<sup>37</sup> Efforts need to be made to incorporate education on vaccines in the curricula of younger children, through both health education and science classes.

This article is, to the best of our knowledge, one of the largest attempts thus far to gather quantitative data on preteen and young teen perceptions and attitudes towards vaccination outside urban centers. As with any survey, our study is subject to several limitations. First, internal validity could not be assessed but should be high given the excellent response proportion. Our findings are based on self-reported data and reliability was not assessed as prior research has shown high adolescent reliability in self-reported surveys for low-frequency/high-risk behaviors, especially when students understood the importance of the survey.<sup>23</sup> While not generalizable to the state or country, the students live in a small town, middle-America school which is rarely included in HPV vaccine research usually conducted in major urban centers. Future studies should explore vaccine attitudes among adolescents and their desire to be involved in the vaccine decision-making process with national sampling to allow for improved external validity.

## Methods

### *Study participants and procedures*

The study was conducted in the single middle school of a small city in Upstate New York (population approximately 22,000) in March 2016. The city is predominately White (>80%) and economically struggling. The median income of this population was about \$41,000, substantially below the national median of about \$57,617.<sup>39</sup> Over 20% of residents lived in poverty, and less than a quarter of the population over 25 years had a bachelor's degree.<sup>40</sup> Over half the students received free or reduced cost meals.

All students in the seventh and eighth grades attending a science class were invited to participate in the study. The procedures utilized were modeled on the procedures created for the Centers for Disease Control and Prevention (CDC) Youth Risk Behavior Survey (YRBS), including using a parental consent-based opt-out procedure.<sup>41</sup> A week before the survey was administered, a letter was sent to parents informing them about the survey and providing instructions for how to refuse permission for their child to participate. The study was described to the classes by a researcher, including the content of the survey and that participation was voluntary. Student assent was obtained at the time of the survey administration. The study was approved by the institutional review board (IRB) of the State University of New York, Upstate Medical University and secondary data analysis of the de-identified data exempted from further review by the IRB at the University at Albany.

The 15-minute self-administered survey was designed to protect the student's privacy. Students did not record their name or any other identifiers. Students were told they could skip any question they felt uncomfortable answering. Further, students were instructed to write "Do Not Use" anywhere on the survey if they did not want to participate in the study and did not want to state that refusal. The surveys were collected in unmarked, sealed envelopes. The sealed envelopes were opened by the researchers and reviewed for the notation "Do Not Use;" if this notation was found the survey was excluded from the study. A stress ball with the school logo was given to each student as a thank you, regardless of participation in the survey.

### *Survey content*

Survey items were obtained or adapted from existing surveys including the YRBS,<sup>41</sup> and the Young Adult Health Care Survey (YAHCS).<sup>42</sup> These surveys were augmented with questions regarding vaccine decision-making. The questionnaire included four sections: (1) socio-demographic characteristics, (2) perspectives on vaccines, (3) HPV vaccine-related questions (only for eighth graders), and (4) health care utilization and experiences in medical encounters.

Socio-demographic questions, including age, grade, gender, race and ethnicity were obtained from the YRBS. Questions on vaccine experiences and perspectives oriented on vaccination history: for example, involvement in the decision-making process, and whether the student thought vaccines to be effective and safe. Similar questions were asked of eighth graders specifically about HPV vaccination. The questions related to HPV vaccination were limited to the eighth grade survey at the request of school administration. HPV vaccination was referred to by the trade name Gardasil because in preliminary discussions students did not recognize the term "HPV vaccine" but did know if they had received the "Gardasil vaccine."

Health care utilization queries included identification of their primary health care provider (type of practice, gender). Encounter questions included presence of others in the visit (e.g., seen alone, parent always present), the desire to be seen without parent in the room, and the sense that he/she was listened to and had a voice in discussions.

Data was entered into EpiInfo version 7, and exported to Microsoft Excel and SAS for data analyses. Descriptive statistics were computed for each factor. Bivariate analyses were conducted to identify gender-specific differences in perspective. Chi-square tests were computed and two-tailed p-values are presented, with <0.05 considered statistically significant. Responses to open-ended questions regarding perceived harm and a need for more education about vaccines were reviewed by two independent coders to identify themes. The themes were reviewed and a list of codes was generated to reconcile levels of detail coded. Then, coders reviewed the data again and coded the data using the code list developed. Examples of the themes are presented in the results.

## Conclusion

Our research indicates that nearly third of adolescents want more information to improve their knowledge and awareness about

the safety and benefits of vaccines, including the HPV vaccine, and want to be a part of the vaccine decision-making process.

Future initiatives should develop appropriately tailored interventions to address the adolescent's self-identified desire to be better informed, and to support parents and clinicians in strategies to promote collaborative decision-making.

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## Abbreviations

HPV	Human papillomavirus
CDC	Centers for Disease Control and Prevention
YRBS	Youth Risk Behavior Survey
YAHCS	Young Adult Health Care Survey

## Disclosure of potential conflicts of interest

No potential conflicts of interest were disclosed.

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