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Middle- and High-School Health Education Regarding Adolescent Vaccines and Human Papillomavirus

Amanda F. Dempsey¹ and Sarah Schaffer¹

¹ Child Health Evaluation and Research Unit, Department of Pediatrics, University of Michigan, Ann Arbor, MI

Abstract

We performed a mail-based survey of health education teachers in 6 states with diverse health education environments to better understand health education curricula in secondary schools related to adolescent vaccination and human papillomavirus (HPV) infection. Of the 198 respondents (response rate 68%), 66% and 71% reported teaching adolescents about recommended vaccines and HPV, respectively. Middle schools were significantly less likely to include these topics in their health curriculum than high schools even though middle schools are generally the school type attended by 11–12 year olds, the preferred target age for adolescent vaccination and HPV prevention activities.

Keywords

adolescent; vaccines; human papillomavirus; education

1.0 Introduction

Since 2005, a number of vaccine recommendations targeted to adolescents have been introduced. [1–3] However, vaccination coverage data demonstrate that, thus far, uptake of these vaccines has been below national vaccination targets. [4] Research has therefore begun to focus on finding ways to increase uptake of recommended vaccines among the adolescent population. Several recent studies have documented that both parents and adolescents want adolescents to play an active role in the decision to be vaccinated.[5–9] Educating adolescents about recommended vaccines is therefore likely to be an important component of future efforts to improve vaccine uptake among this population.

Past research demonstrates that adolescents have traditionally learned about vaccines from their parents, peers, physicians and the media.[10–13] However, schools are also an important potential venue to consider for educating adolescents about vaccines since school attendance is compulsory through age 16 years. Currently, no national curriculum for health education exists. Instead, states and/or local school districts typically decide on health education content, potentially resulting in wide variability in what is taught. Furthermore, vaccination does not neatly fit into any one classroom setting; students could conceivably

Correspondence: Amanda F. Dempsey, MD, PhD, MPH, Child Health Evaluation and Research Unit, Department of Pediatrics, University of Michigan, 300 North Ingalls, Rm. 6E08, Ann Arbor, MI 48109-5456, Ph: 734-615-0398, FAX: 734-764-2599, adempsey@umich.edu.

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learn about vaccinations in science, health education, or physical education classes, or from school nurses or school-based clinics.

Given their potential for reaching adolescents, and the potential variability in educational practices, it is important to understand whether schools are teaching adolescents about vaccines and if so, what information is being provided. Furthermore, the recent licensure of HPV vaccines has brought the topic of HPV infection to the forefront of adolescent health care issues. Numerous studies have demonstrated poor knowledge among adolescents about the epidemiology and potential clinical sequelae of HPV infection.[10–12,14] Including information about HPV infection would therefore be a natural extension of health education discussions in schools about adolescent vaccines. To our knowledge, there have been no previous studies examining these issues. Thus, the aim of this study was to characterize the proportion of middle and high schools that teach adolescents about recommended vaccines, the content of this information, and how content varies by school demographic characteristics. We also sought to understand whether information about HPV infection was provided to adolescents in health education classes. To do this we surveyed health education teachers from 6 states, purposefully selected to represent a wide variability in health education practices.[15]

2.0 Methods

2.1 Sample Selection - States

To encompass a wide variety of school types and settings, we used an informed selection process to target specific states from which we then derived a random sample of 300 schools. From the Centers for Disease Control and Prevention *School Health Profiles 2008* report[15] that compiles state-level data about health education, we examined six criteria: 1) the percentage of secondary schools in that state requiring health education in any grade 6–12, (2) the percentage of secondary schools in that state requiring two or more health education courses from 6th–12th grade, (3) the percentage of secondary schools in that state providing a written health education curriculum to the teacher, (4) the percentage of secondary schools in that state in which teachers aimed to increase student knowledge on sexually transmitted disease (STD) prevention, (5) the percentage of schools in that state where teachers taught prevention of HIV, STDs and pregnancy in any grade 6–8 and also in any grade 9–12; and (6) the percentage of schools in that state where teachers taught students how to access information, products, and services related to HIV, STDs, and pregnancy in any grade 6–8 and also in any grade 9–12.

We identified the 5 states with the highest and the lowest percentage of schools fulfilling each of these six criteria. This analysis demonstrated that two states consistently ranked highest (WV and NJ) or lowest (AZ, OK). We selected these four states, as well as two additional states (MI and OR) who were not at either extreme.

2.2 Sample Selection – Schools

For each of these 6 states, a list of public middle- and high-schools was compiled using the “search for public schools” function on the National Center For Education Statistics (NCES) website.[16] We focused on public schools (which included traditional, charter and magnet schools) since they are more likely to be influenced by state educational policies than private schools.

We excluded private schools and non-traditional schools, (e.g., schools in jails). From each of the six states school lists, we then randomly selected 25 schools middle schools and 25 high schools, for a final sample of 300 schools.

2.3 Survey Development

The survey content was based on key informant interviews conducted with state-level departments of education and health, and with middle- and high-school health education teachers. From these interviews, we developed a 10-item survey that focused on four domains: respondent demographics (educational background, courses and grades taught); how the schools' health education curriculum was determined (was a curriculum used; if so who provided it; if not, who determined what was taught; was health taught in a co-ed setting); the content of the school's health education with regard to adolescent vaccines (are they discussed as a topic; if so, which ones and what information is provided); and the content of the school's health education with regard to HPV (was information on STDs taught; is HPV taught as a specific topic and if so, what information is provided). All questions used fixed responses, with a write-in option available for several questions. The survey instrument is available upon request.

For each school, additional information was available from publically available sources.[16] This included the size of the school (<500 students ["small"], 500–1000 students ["medium"], and >1000 students ["large"]), the NCES defined locale (rural, town, suburb or city),[16] the percentage of students who received free or reduced lunch, and the race of the majority of students attending the school (white, black, Hispanic, Asian, Native American).

2.4 Survey Administration

A survey packet was mailed to the principal of each school with instructions to give it to "the person who teaches the majority of health education classes in your school." The packet included the 2-page survey and a postage paid return envelope. No incentives were provided. Mailing addresses for each school were derived using the National Center For Education Statistics website.[16] For those who had not responded within 2 weeks of the survey mailing, two phone calls were made to attempt to administer the survey over the phone. If requested, the survey was sent via FAX or email. The study was approved by the Institutional Review Board at the University of Michigan.

2.5 Data analysis

Descriptive statistics were generated for each survey item. Associations between items were assessed using Chi-square or Fisher's exact tests. A p-value of ≤ 0.05 was considered statistically significant. STATA 10.0 (College Station, TX) was used for all analyses.

3.0 Results

3.1 Response Rate

Of the 300 surveys mailed, 5 were returned with inaccurate addresses, and 3 were returned noting that the school had closed. Of the remaining 292 schools with deliverable addresses, 198 responded to the survey for an overall response rate of 68%. Characteristics of these 198 schools are shown in Table 1, separated by middle and high schools. The greatest proportion of schools were small, located in rural areas, and with a majority white student population. Approximately 1/3 of students received free or reduced lunch – a proxy indicator for poverty status. Other than the proportion of students receiving free/reduced lunch, there were no statistically significant differences in school characteristics between respondents and non-respondents.

A total of 43 schools (27 middle schools and 16 high schools) were not analyzed further as they did not offer any health education classes (24 middle schools, 14 high schools), offered health education but not information on vaccines (2 each in middle and high school), or refused the survey (1 middle school). Therefore, subsequent analyses focused on the 155

schools (78% of respondents) that offered health education courses including information about vaccines.

3.2 Characteristics of Survey Respondents and School Setting

Table 2 describes the characteristics of the survey respondents and the general setting in which health education occurred. Most respondents had an educational background in >1 area and taught more than one type of class. As would be expected, there were significant differences between respondents recruited from middle versus high schools in the grades that were taught. There were also some differences between school types with regard to the educational background of the respondent. In middle and high schools respectively, health education was most commonly provided in the 7th and 10th grades.

There were no differences by school type in whether a set curriculum was used or whether health was taught in a co-ed setting. Of those using a set curriculum, 61.3% derived curricula content from the state, 13.7% from the county, 44% from the school district and 22.6% from other resources (many respondents used >1 source). Of those *not* using a curriculum, 81.0% indicated that they and/or other health teachers decided on the class content, 19.5% used curriculum content from the school's principal, and 38.1% cited other sources used (e.g. "privately developed" and "district resources"). Respondents could choose >1 source.

3.4 Inclusion of Information About Adolescent Vaccines

Approximately 2 out of 3 schools taught students about adolescent vaccines in their health education classes (Table 3). This was significantly more common in high schools than middle schools, but was not associated with following a set curriculum, whether health class was taught in a co-ed setting, the educational background of the health teacher or school demographic characteristics. The flu vaccine and the meningococcal vaccine were the most and least commonly discussed vaccines, respectively (Table 3). However, 17.7% of schools indicated they did not teach vaccine-specific information, but rather provided general information about adolescent vaccines.

Of schools that *did* include adolescent vaccination in their health education classes, there were no statistically significant differences between middle and high schools with respect to the type of vaccines discussed or the information provided.

3.5 Inclusion of information about HPV

Most schools (71.6%) included information about HPV in their health education curriculum. This was more common among high schools than middle schools (Table 4) and among schools where health class was taught in a co-ed setting versus those who did not teach in a co-ed setting (74.7% vs. 36.4%, $p=0.012$).

There were no statistically significant differences between middle and high schools in the information discussed about HPV. Teaching about HPV was significantly more likely to occur in schools that included information about STDs in their health education curriculum versus those that did not (77.1% vs. 0%, Fisher's exact test = 0.000), in schools that taught about adolescent vaccines versus those that did not (83.3% vs. 50.0%, $p<0.0001$) and in larger versus smaller schools (small 62.1%, medium 70.9%, large 91.2%, Fisher's exact test = 0.006). Teaching about HPV was not associated with using a set curriculum, the educational background of the health teacher, or the schools' other demographic characteristics.

Discussion

To our knowledge, this is the first study to systematically assess the content of secondary school health education classes with regard to adolescent vaccines and HPV. Approximately 2/3 of health education teachers surveyed indicated that they taught students about adolescent vaccines and 71% indicated that they covered HPV as a topic area in these classes. The high proportion of teachers covering these timely adolescent topics suggests that schools can be an important educational resource for informing adolescents about these health issues, and that they may also be useful allies in programs aimed at improving adolescent vaccination rates.

In this study, high schools were significantly more likely than middle schools to teach students about adolescent vaccines and about HPV. However, the “adolescent platform” of vaccines is preferentially recommended for 11–12 year olds. From our results it appears that the targeted population (11–12 year olds) receives disproportionately less education about these topics than other adolescents. This finding suggests that a greater emphasis towards teaching 6th and 7th graders about these topics may be needed to improve adolescents’ preparation for being an active, informed participant in the decision of whether or not to get vaccinated.

Among the schools that did include discussions about adolescent vaccines, HPV and Flu vaccines were the most commonly discussed. The high proportion (>80% for each vaccine) of schools discussing these particular vaccines is encouraging given that HPV vaccine recommendations have only been in place since 2006,[1] and recommendations for routine adolescent seasonal flu vaccination since 2008.[17] More worrisome is the finding that information about the meningococcal vaccine was only included in the curriculum 39.2% of the time. Approximately 2000 cases of invasive meningococcal disease occur annually in the U.S. with a disproportionately higher number of cases among adolescents.[3] National studies have demonstrated coverage among 13–18 year olds with meningococcal vaccine was only 32.4% in 2007, two years after the vaccine was recommended.[18] Though our survey was not able to ascertain why this particular vaccine was less commonly discussed than other vaccines of the adolescent platform, one hypothesis is that because invasive meningococcal disease occurs less frequently among adolescents than either pertussis or HPV, perhaps health education teachers felt less compelled to discuss the meningococcal vaccine. Additional research will be needed to determine why some vaccines are discussed more frequently than others in this setting.

With regard to HPV-related information, it was notable that the association of this virus as a cause of genital warts was the least commonly covered topic in health education classes in both middle and high schools. The HPV vaccine was licensed in 2009 for use in males, specifically for the indication of preventing genital warts.[19] In contrast to female HPV vaccine recommendations, the Advisory Committee on Immunization Practices issued a “permissive” recommendation for the HPV vaccine in males.[20] This enables providers to administer the vaccine to age-eligible males who want it, but does not “require” that physicians to routinely recommend it.

Because of the permissive recommendation, HPV vaccine use among males may be more patient/parent driven than provider-driven. Thus for the vaccine to be widely utilized among males, “community demand” for it would have to be high. Encouraging schools to include information about the link between HPV and genital warts in their health curricula may lead to adolescents having a more comprehensive understanding about the potential clinical sequelae from HPV infection. It might also have the added benefit of motivating some

adolescent males (and females) to request the vaccine from their providers or parents specifically to prevent genital warts.

This study's results should be interpreted with several limitations in mind. First, although we used a purposeful selection process to choose states with a wide range of educational environments, our sample cannot be considered nationally representative. Second, study letters were addressed to school principals with instructions to give the survey to the "person who teaches the majority of health education classes in your school." Principals may have interpreted these instructions differently and/or some schools could have had >1 person who teaches health classes. Because curriculum data was based on self-report, the potential for variability in responses from different individuals within a given school could have impacted our results. Finally, we limited our analysis to public schools. Results from private schools may be different.

CONCLUSION

Schools are a natural venue for educating adolescents about the importance of HPV prevention and adolescent vaccines. In this study we found that more than 2 out of 3 secondary schools included these educational topics in their health education curricula. However, teaching these topics was significantly less likely to occur in middle schools than in high schools. Given that middle schools are where children of the preferred target age for adolescent vaccines, 11–12 years old, typically matriculate, our results suggest that schools should be pushed to include educational content on these issues earlier. This would potentially allow adolescents in the preferred target age range to be better prepared to participate in health care decisions regarding recommended adolescent vaccines.

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Table 1

Demographic Characteristics of Sample Schools

Characteristic	% Among Sample Overall (n=300)	% Among Respondents (n=198)	% Among Non- respondents (n=102)
Locale*			
Rural	35.7%	37.5%	32.0%
Town	18.3%	19.5%	16.0%
Suburban	26.7%	26.0%	28.0%
Urban	19.3%	17.0%	24.0%
School Size			
Large (≥1000 students)	18.0%	18.5%	17.0%
Medium	32.7%	35.0%	28.0%
Small (≤500 students)	49.3%	46.5%	55.0%
% Students receiving free/reduced lunch**	33.1%	31.2%	37.3%
Majority Race of Students			
White	81.9%	83.5%	78.8%
Black	5.0%	4.0%	7.1%
Hispanic	8.7%	7.0%	12.1%
Asian	0.7%	0.5%	1.0%
Native American	3.7%	5.0%	1.0%

* Locale as defined by the Common Core of Data (CCD)

** Statistically significant difference ($p < 0.0001$) when comparing respondents to non-respondents

Table 2

Characteristics of survey respondents' in sample overall, and divided by school type.

Characteristic	% of total (n=155)	% total, Middle School Sample (n=66)	% total, High School Sample (n=89)
Educational background of respondent*			
Health	72.9%	71.2%	74.2%
Physical Education	60.6%	53.0%	66.3%
Biology/other science	21.3%	22.7%	20.2%
Nursing	5.2%	4.5%	5.6%
Secondary Education	41.9%	51.5%	34.8%
Other	23.2%	19.7%	25.8%
Courses taught by respondent*			
Health	86.5%	83.3%	88.8%
Physical Education	47.7%	37.9%	55.1%
Biology/other science	16.8%	13.6%	19.1%
Other	20.6%	16.7%	23.6%
Grades where health education taught*			
6 th	26.5%	59.1%	2.2%
7 th	38.7%	81.8%	6.7%
8 th	36.1%	72.7%	9.0%
9 th	36.8%	1.5%	62.9%
10 th	41.9%	1.5%	71.9%
11 th	31.0%	1.5%	52.8%
12 th	34.2%	1.5%	58.4%
Health taught in co-ed setting			
Yes	92.8%	89.2%	95.5%
Curriculum used for health education			
Yes	80.5%	78.8%	81.8%
No	13.6%	12.1%	14.8%
Depends on grade being taught	5.9%	9.1%	3.4%

* Participants could choose >1 response.

Bolded percentages indicate statistically significant differences between MS and HS.

Table 3

Adolescent vaccine-related content of health education: overall sample, and divided by school type.

	% of total (n=155)	% total, Middle School Sample (n=66)	% total, High School Sample (n=89)
Health education curriculum includes information on adolescent vaccines?			
Yes	66.2%	52.3%	76.4%
<i>Among those teaching about adolescent vaccination</i>	N=102	N=34	N=68
Which vaccines are discussed?*			
Flu	83.3%	85.3%	82.4%
HPV	80.4%	73.5%	83.8%
Meningococcal	39.2%	32.3%	42.7%
Tdap	58.8%	55.9%	60.3%
Only general vaccine information provided	17.7%	17.7%	17.7%
What information is discussed?*			
That vaccines are recommended for adolescents	73.5%	64.7%	77.9%
The safety of adolescent vaccines	67.7%	61.7%	70.6%
Diseases the vaccines prevent	88.2%	88.2%	88.2%
Where the vaccines can be obtained	67.7%	55.9%	69.1%
To check with parents to see which vaccines are needed	62.8%	64.7%	61.8%

* Participants could choose >1 response.

Bolded percentages indicate statistically significant differences between MS and HS.

Table 4

HPV-related content of health education: overall sample, and divided by school type.

	% of total (n=155)	% total, Middle School Sample (n=66)	% total, High School Sample (n=89)
Health education curriculum includes information on HPV as a specific topic?			
Yes	71.6%	54.5%	84.3%
<i>Among those teaching about HPV</i>	N=111	N=36	N=75
What information is discussed?*			
HPV is sexually transmitted	95.5%	97.2%	94.7%
HPV can cause cervical cancer	90.1%	83.3%	93.3%
HPV can cause genital warts	86.5%	77.8%	90.7%
HPV can cause abnormal Pap smears	69.3%	58.3%	74.7%
Both men and women can get HPV	84.7%	86.1%	84.0%
HPV is usually asymptomatic	74.8%	63.9%	80.0%
There is a vaccine that can protect against some forms of HPV	83.8%	86.1%	82.7%

* Participants could choose >1 response.

Bolded percentages indicate statistically significant differences between MS and HS.