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How Parents Hear about HPV Vaccine: Implications for Uptake

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Introduction

Parental awareness of the benefits of human papillomavirus (HPV) vaccine may be especially important in maximizing uptake among adolescent females.[1] Although industry-sponsored television advertisements have been the most common source of information about HPV vaccine reported by parents in the United States,[1–3] recommendations from children's healthcare providers are especially influential in parental decisions about HPV vaccination for their daughters.[4–6] Other information sources commonly reported by parents include family and friends,[1, 3] Internet,[1, 3] news stories[1] and brochures.[1, 3] Reported HPV vaccine information sources can differ by socioeconomic group, including gender, race, age, education and income.[1] We hypothesize these differences could lead to disparities in vaccine uptake.[1]

While parents may ultimately learn about the vaccine from their daughters' providers, one early source of information may be their daughters' schools. At least 7 states (Indiana, Louisiana, Michigan, New Jersey, North Carolina, Texas, and Washington, as of October, 2009) have passed legislation requiring information about HPV vaccine be distributed to parents of adolescents through their schools.[7] Whether school-based outreach to parents has been effective in raising awareness or encouraging vaccine uptake, to our knowledge, is largely unknown.

We examined characteristics of parents, their adolescent daughters, and households as potential correlates of HPV vaccine awareness and information sources, and associations of information sources with HPV vaccine initiation.

Methods

Participants were a population-based sample of 696 parents of 10–17 year old females in North Carolina. They completed the 2008 Child Health Assessment and Monitoring Program Survey (CHAMP) of caregivers for children under 18 years old, a follow-up survey to the Behavioral Risk Factor Surveillance System (BRFSS) survey of adults.[8]

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The survey assessed parents' HPV vaccine awareness with the question, "Have you ever heard of the HPV vaccine?" For parents who had heard of HPV vaccine, questions assessed whether they had heard about it from any of four possible sources: daughter's school, daughter's healthcare provider, drug company advertisement, and news stories or Web sites other than drug company advertisements. The survey assessed HPV vaccine initiation with the question, "Has (daughter's name) had any shots of the HPV vaccine?"

We used bivariate logistic regression models to identify correlates of HPV vaccine awareness and information sources and entered statistically significant ($p<0.05$) predictors into multivariate logistic regression models. We evaluated the four sources of information about HPV vaccine as bivariate predictors of HPV vaccine initiation. Multivariate models for HPV vaccine uptake controlled for variables we previously identified as multivariate correlates of initiation.[9] Analyses were weighted to reflect population characteristics of North Carolina[8] and estimated odds ratios (ORs) and associated 95% confidence intervals (CIs).

Results

Most parents (91%) reported having heard of HPV vaccine. In multivariate analyses, parents were less likely to be aware of HPV vaccine if they were male, or had daughters who were non-Hispanic African American or other races/ethnicities than non-Hispanic white (Table 1). Vaccine awareness was higher among parents from households with incomes of $50,000 or higher versus under $50,000, or who reported having daughters already vaccinated against meningitis.

Of parents who had heard of HPV vaccine, 64% had heard from drug company advertisements, 50% from their daughters' healthcare providers, 50% from news stories or Web sites, and 9% from their daughters' schools. In multivariate analyses, parents were more likely to have heard about HPV vaccine from their daughters' healthcare providers if they had daughters 16–17 years old (OR=2.09, 95% CI:1.23–3.54, versus daughters aged 10–12), their daughters had received preventive check-ups in the last 12 months (OR=3.50, 95% CI: 1.97–6.24), or their daughters had received meningococcal vaccine (OR=1.64, 95% CI:1.07–2.52). Daughters' schools were more likely to be information sources for parents of daughters who attended public schools (OR=4.88, 95% CI: 1.04–22.93). We found no correlates of having heard about the vaccine through drug company advertisements or through news stories and Web sites.

Similar to 2008 National Immunization Survey-Teen estimates for North Carolina (34%),[10] 31% of parents reported they had initiated HPV vaccination for their daughters. Of parents who had heard about the vaccine from their daughters' healthcare providers, 46% had daughters who had started HPV vaccination (Table 2). In contrast, only 16% of parents who had not heard about HPV vaccine from their daughters' healthcare providers had started vaccination for their daughters. The other three information sources were not associated with HPV vaccine initiation.

Discussion

How parents of adolescent girls heard about HPV vaccine varied substantially in this population-based survey. While awareness was nearly universal among parents of white and higher income daughters, many parents of non-white or lower income daughters had not heard of HPV vaccine. Differential consumption of news about HPV vaccine is one potential explanation for differences in vaccine awareness.[1] Most parents heard through drug company advertising, healthcare providers, and news stories, consistent with Hughes

(2009) and other studies.[1–3] However, information sources may differently affect parents' awareness of HPV vaccine and, ultimately, their decisions to vaccinate their daughters. Researchers should identify media channels and vaccine messages that meet different needs of various audiences.

This study has important strengths, including a large, population-based sample of parents and examination of the association of sources of information with awareness and initiation of HPV vaccine. Study limitations include the self-reported vaccine initiation measure and the cross-sectional study design, which prevents us from inferring causal relationships. Generalizability of findings to parents living in other states will need to be established.

Our main finding was that healthcare providers were the only information source associated with parents' vaccination of their adolescent daughters. Future campaigns promoting HPV vaccine should target healthcare providers, since results show they can be influential sources of information for parents. An additional important public policy finding was that less than one tenth of parents recalled vaccine information provided by their daughters' schools, despite a statewide requirement that schools disseminate this information. Having heard of HPV vaccine through schools was not associated with vaccine initiation, but this may be due to the low number of parents who had heard through schools. Policymakers in North Carolina should explore effective ways to disseminate the required HPV information through schools.

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References

1. Hughes J, Cates J, Liddon N, Smith J, Gottlieb S, Brewer N. Disparities in How Parents Are Learning About the HPV Vaccine. Cancer Epidemiology, Biomarkers & Prevention February 2009;18(2):363–372.
2. Gerend MA, Weibley E, Bland H. Parental Response to Human Papillomavirus Vaccine Availability: Uptake and Intentions. Journal of Adolescent Health 2009;45(5):528–531. [PubMed: 19837361]
3. Katz ML, Reiter PL, Heaner S, Ruffin MT, Post DM, Paskett ED. Acceptance of the HPV vaccine among women, parents, community leaders, and healthcare providers in Ohio Appalachia. Vaccine 2009;27(30):3945–3952. [PubMed: 19389447]
4. Dempsey AF, Abraham LM, Dalton V, Ruffin M. Understanding the Reasons Why Mothers Do or Do Not Have Their Adolescent Daughters Vaccinated Against Human Papillomavirus. Annals of Epidemiology 2009;19(8):531–538. [PubMed: 19394865]
5. Kahn JA, Ding L, Huang B, Zimet GD, Rosenthal SL, Frazier AL. Mothers' Intention for Their Daughters and Themselves to Receive the Human Papillomavirus Vaccine: A National Study of Nurses. Pediatrics June 2009;123(6):1439–1445.
6. Gottlieb SL, Brewer NT, Sternberg MR, et al. Human Papillomavirus Vaccine Initiation in an Area with Elevated Rates of Cervical Cancer. Journal of Adolescent Health 2009;45(5):430–437. [PubMed: 19837348]
7. National Conference of State Legislatures. HPV Vaccine: State Legislation. NCSL Issues and Research. 2009 [Accessed January 13, 2010]. http://www.ncsl.org/default.aspx?tabid=14381#2009leg
8. North Carolina State Center for Health Statistics. 2008 North Carolina CHAMP, Child Health Assessment and Monitoring Program Survey. 2009 [Accessed January 6, 2010]. http://www.schs.state.nc.us/SCHS/champ/designanddatacollection.html

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9. Reiter PL, Cates JR, McRee A-L, et al. Statewide HPV vaccine initiation among adolescent females in North Carolina. Sexually Transmitted Diseases. (in press).

10. Centers for Disease Control and Prevention. National, State, and Local Area Vaccination Coverage Among Adolescents Aged 13--17 Years --- United States, 2008. Morbidity and Mortality Weekly Report September 18;2009 58(36):997–1001. [PubMed: 19763075]

Table 1

Awareness of HPV vaccine (n = 696)

	n	Weighted %	*n* aware	Weighted %	Bivariate OR (95% CI)	Multivariate OR (95% CI)
Total	696	100.0	632	91.0		
Parent Characteristics						
Gender[a,b]						
Female	561	81.5	521	91.9	ref.	ref.
Male	135	18.5	111	85.0	0.48 (0.24–0.97)*	0.20 (0.09–0.43)*
Relationship to child[a,b]						
Biological parents	607	88.3	560	91.5	ref.	ref.
Step/adoptive parents	39	5.3	35	93.7	1.31 (0.38–4.52)	2.56 (0.65–10.03)
Other	50	6.5	37	75.7	0.30 (0.13–0.67)*	0.47 (0.18–1.24)
Female parent received HPV vaccine[a]						
No/don't know (DK=2)	311	90.4	287	90.4	ref.	--
Yes	38	9.6	37	96.1	2.49 (0.32–19.69)	--
Flu vaccine in past year[a]						
No/don't know (DK=2)	458	66.2	410	88.9	ref.	ref.
Yes	238	33.8	222	94.0	2.25 (1.03–4.89)*	2.33 (0.98–5.56)
Female parent most recent Pap test[a]						
Not within last 3 years	63	13.9	58	88.3	ref.	--
Within last 3 years	384	86.1	357	91.6	1.20 (0.37–3.91)	--
Beliefs about how frequently child should see doctor[b]						
Less frequently than once per year/don't know (DK=7)	56	6.5	50	86.5	ref.	--
At least once per year	640	93.5	582	90.9	1.65 (0.60–4.55)	--
Daughter Characteristics						
Age (years)[b]						
10–12	225	36.6	200	89.9	ref.	--
13–15	271	35.7	242	87.8	0.87 (0.43–1.77)	--
16–17	200	27.7	190	95.1	2.49 (0.96–6.46)	--
Race/Ethnicity[b]						

	n	Weighted %	*n* aware	Weighted %	Bivariate OR (95% CI)	Multivariate OR (95% CI)
Non-Hispanic White	480	63.3	459	96.8	ref.	ref.
Non-Hispanic African					0.14 (0.07–0.30)*	0.15 (0.06–0.35)*
American	113	22.9	91	80.9		
Other	103	13.8	82	78.7	0.14 (0.06–0.30)*	0.20 (0.09–0.45)*
School Type[b]						
Private/home schooled	74	12.0	70	91.6	ref.	--
Public	618	88.0	558	90.4	0.87 (0.26–2.97)	--
Healthcare coverage[b]						
No/don't know (DK=1)	49	6.5	36	71.7	ref.	ref.
Yes	647	93.5	596	91.9	4.76 (1.96–11.56)*	1.52 (0.58–3.96)
Regular healthcare provider[b]						
No/don't know (DK=3)	117	15.9	94	82.4	ref.	ref.
Yes	579	84.1	538	92.2	2.53 (1.29–4.96)*	1.62 (0.69–3.80)
Preventive check-up in last 12 months[b]						
No/don't know (DK=7)	148	19.9	124	86.4	ref.	--
Yes	548	80.1	508	91.6	1.80 (0.90–3.59)	--
Meningococcal vaccine[b]						
No/don't know (DK=7)	278	39.6	237	85.5	ref.	ref.
Yes	418	60.4	395	94.0	2.57 (1.32–5.0)*	2.61 (1.29–5.29)*
Household Characteristics						
Number of children in household[a]						
1	328	28.7	299	89.9	ref.	--
≥2	368	71.3	333	90.9	1.09 (0.57–2.11)	--
Annual household income[a]						
<$50,000	280	38.8	237	82.5	ref.	ref.
≥$50,000	364	53.0	351	97.5	7.79 (3.70–16.39)*	4.50 (1.81–11.21)*
Not reported	52	8.2	44	85.1	1.26 (0.45–3.55)	1.83 (0.44–7.66)
Highest education level in household[b]						
High school or less	147	20.8	117	78.4	ref.	ref.

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	n	Weighted %	*n* aware	Weighted %	Bivariate OR (95% CI)	Multivariate OR (95% CI)
Some college or more	549	79.2	515	93.9	3.83 (1.92–7.65)*	1.23 (0.54–2.80)
Geographic region[a]						
Western	125	14.8	114	93.3	ref.	--
Piedmont	343	58.2	321	92.1	0.84 (0.34–2.07)	--
Eastern	228	27.0	197	85.9	0.48 (0.21–1.13)	--
Urbanicity[a]						
Rural	216	28.9	194	90.2	ref.	--
Urban	480	71.1	438	90.8	0.91 (0.46–1.80)	--

Notes. HPV = human papillomavirus, OR = odds ratio, CI = confidence interval, ref. = referent group.

Percents may not sum to 100% due to rounding and weighting. Relationship to child “other” category includes grandmothers (*n* = 33), grandfathers (n=5), aunts (*n* = 5), uncle (*n*=1), sister or brother (*n*=3), and other guardians (*n*=3). Only female parents were asked about HPV vaccine (*n* = 349) and Pap test (*n* = 447). Daughter’s race/ethnicity “other” category includes Hispanic (*n* = 51), Native American or Alaskan Native (*n* = 19), Asian (*n* = 6), mixed race or ethnicity (*n* = 26), or did not indicate (*n* = 1). School type excludes 4 respondents with missing values.

[a] Data collected during BRFSS survey.

[b] Data collected during CHAMP survey.

* $p<0.05$

Table 2

HPV vaccine initiation by source of information (n = 617)

	n initiated/total	Weighted %	Bivariate OR (95% CI)	Multivariate OR (95% CI)
Drug company ad				
No	81/217	37.7	ref.	--
Yes	115/390	28.0	0.65(0.41–1.01)	--
Healthcare provider				
No	56/313	16.4	ref.	ref.
Yes	141/301	45.7	4.28(2.61–6.99)*	2.87(1.69–4.87)*
News/Internet				
No	105/303	34.4	ref.	--
Yes	87/304	27.0	0.71(0.46–1.10)	--
Daughter's school				
No	178/559	30.3	ref.	--
Yes	18/50	41.4	1.60(0.77–3.36)	--

Note. HPV = human papillomavirus, OR = odds ratio, CI = confidence interval, ref. = referent group. Does not include respondents who did not know if they had heard about HPV vaccine from this source (drug company advertisement n=10; healthcare provider n=3; news/Internet n=10; and daughter's school n=8). Multivariate model controlled for variables previously found to be associated with HPV vaccine initiation in this data set (daughter's age, daughter's preventive check-ups within the past 12 months, meningococcal vaccine for daughter, flu vaccine for parent, and urbanicity).[9]

* p<0.05