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Providers' practice, recommendations and beliefs about HPV vaccination and their adherence to guidelines about the use of HPV testing, 2007 to 2010

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Abstract

Human papillomavirus (HPV) vaccines prevent cervical pre-cancer lesion and can potentially reduce abnormal Papanicolaou (Pap) results among vaccinated females. However, current U.S. cervical screening guidelines recommend no change in screening initiation and frequency based on vaccination status. We examined providers' practices and beliefs about HPV vaccination to evaluate their adherence to guidelines. We used 4-year data (2007–2010) from two nationally representative samples totaling 2119 primary-care providers from the Cervical Cancer Screening Supplement to the National Ambulatory Medical Care Survey (NAMCS) and National Hospital Ambulatory Medical Care Survey (NHAMCS). Providers in each survey were stratified to obstetrician/gynecologist (OB/GYNs) and non-OB/GYNs. Descriptive statistics and chi-square tests were performed to assess differences between providers' types in each survey. Approximately 60% of providers believed that HPV vaccination will result in fewer abnormal Pap tests and fewer referrals to colposcopy and over 92% would not change their cervical cancer screening practices for fully vaccinated females. NAMCS OB/GYNs were more likely ($p < 0.05$) than non-OB/GYNs to rarely/never use the number of sexual partners to determine who gets the HPV vaccine (68.4% vs. 59.1%), more likely to recommend the vaccine to females with history of abnormal Pap (79.6% vs. 68.4%) and to females with a history of HPV positive test result (75.3% vs. 62.8%). Consistent with guidelines, most providers would not change cervical cancer screening practices based on patients' vaccination history. However, some providers used inappropriate tests for making vaccination decisions. Improving HPV vaccine knowledge and recommendations for its use is warranted to implement a successful vaccine program.

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1. Introduction

Current research shows that HPV vaccines are effective in preventing high-grade cervical pre-cancers and can potentially reduce the burden of abnormal cytology and histology among vaccinated females (Rodriguez et al., 2013); (Gertig et al., 2013); (Baldur-Felskov et al., 2014); (Brotherton et al., 2015). However, current U.S. organizations state that screening (when to start and how often to screen) should not currently change based on vaccination history, given the low vaccination rate in the U.S. (Saslow et al., 2012); (US Preventive Services Task Force, 2012) and possibly because the vaccines do not cover all HPV types. Our goal was to examine 4-year data of providers' practices, recommendations and beliefs that would allow us to evaluate adherence to guidelines about the use of HPV testing.

2. Methods

We analyzed a nationally representative sample of 2119 primary care providers from the 2007–2010 Cervical Cancer Screening Supplement (CCSS) to the National Ambulatory Medical Care Survey (NAMCS) and National Hospital Ambulatory Medical Care Survey (NHAMCS) (Centers for Disease Control and Prevention, 2009) representing approximately 100,000 providers. Responses were obtained from 1418 NAMCS providers and 701 NHAMCS clinic providers. Response rates for the NAMCS and NHAMCS surveys were 33.6% and 73.0% in 2007, 61.8 and 73.3% in 2008, 60.5% and 50.4% in 2009, and 58.3% and 83.6% in 2010, respectively.

We combined data from all survey years separately for each survey to assess providers' responses to questions about their frequency of HPV test use and their criteria to determine who should get the vaccine, whether their practice will change screening and management procedures for fully vaccinated females, and whether there would be fewer numbers of abnormal Pap tests or referrals for colposcopy among vaccinated females.

To facilitate the same analysis for the 2 surveys, we collapsed providers' specialties in NAMCS into 2 groups including obstetricians/gynecologists (OB/GYN) and primary care providers (internal medicine, family/general medicine and midlevel providers). NHAMCS providers had already been grouped into OB/GYN and general medicine by the survey administrators. NHAMCS data, which is based on hospital outpatient clinics data, had sparse demographic information on providers. Differences between provider groups in each survey were assessed with chi-square statistics. Data were weighted to obtain national estimates and were analyzed with SUDAAN 10.1 (RTI International) to account for the sampling design and nonresponse.

3. Results

About 47% of NAMCS providers were general/family practitioners, 24.3% were internal medicine practitioners, 4.6% were midlevel providers (e.g. physician assistants, nurse practitioners, and nurse midwives) and 24.5% were OB/GYNs. Of these providers, 60% were males, 67% were 45 years or older, 65.4% worked in practices with fewer than 6 practitioners and 83% practiced in metropolitan areas. NHAMCS providers included 24.4% OB/GYNs and 73.5% were not affiliated with a teaching hospital.

NAMCS OB/GYNs were more likely than NAMCS non-OB/GYNs to rarely or never use the number of sexual partners to determine who gets the HPV vaccine (68.4% vs 59.1%; $p < 0.05$), more likely to recommend the vaccine to females with a history of abnormal Pap results (79.6% vs 68.4%; $p < 0.001$) and to females with a history of HPV positive test results (75.3% vs 62.8%; $p < 0.001$) (Table 1). NHAMCS OB/GYNs were more likely than NHAMCS non-OB/GYNs to rarely or never recommend the vaccine to females with a history of abnormal Pap results (22% vs 8.9%; $p < 0.05$).

Approximately 60% of providers believed that there will be fewer abnormal Pap tests and fewer referrals to colposcopy among vaccinated females (Table 2). However, we also found, that albeit small percentages, NHAMCS OB/GYNs were more likely ($p < 0.05$) to disagree with these statements than NHAMCS non-OB/GYNs. Over 92% would not change their cervical cancer screening practices and management for fully vaccinated females with the HPV vaccine. These beliefs were also consistent over the 4-year period (data not shown).

4. Discussion

Our findings indicate that the majority of providers believed that HPV vaccination will result in fewer abnormal Pap tests and colposcopies, but they did not intend to change cervical cancer screening practices based on vaccination history. This findings most likely reflect guidance from a variety of organizations including the American Cancer Society (ACS), the American Society for Colposcopy and Cervical Pathology (ASCCP), the American Society for Clinical Pathology (ASCP) (Saslow et al., 2012), and the US Preventive Services Task Force (US Preventive Services Task Force, 2012). These organizations support keeping cervical cancer screening guidelines without change due to the low vaccination coverage, inability to accurately assess past receipt, number of doses, and timing of the HPV vaccine when a woman presents for cervical cancer screening in the United States. Only high coverage rates of pre-adolescents before the onset of sexual activity will increase herd immunity and reduce HPV transmission rates, as has been shown in Australia (Gertig et al., 2013), where a publicly funded school-based HPV vaccination program was established in 2007, and in Denmark, where a vaccination program was implemented in 2006 (Baldur-Felskov et al., 2014). Australia has recently changed its guidelines to start screening at age 25 with an HPV test every 5 years for all women, starting in 2017, regardless of HPV vaccination status (Australian Government Department of Health, n.d). In the U.S. and other countries, there has been much concern that girls who were vaccinated would be less likely to get screened. However, the results from 2 population studies in Sweden and Australia were mixed. While the Swedish study found that attendance in cervical cancer screening

among vaccinated young women was equal or higher than among unvaccinated women of the same birth cohort (Herweijer et al., 2015), the Australian study found that less vaccinated young women reported being screened than unvaccinated women (Budd et al., 2014). An evaluation of physicians' intentions about the impact of HPV vaccination on future cervical cancer screening in the U.S., which was conducted in 2006–2007, revealed that approximately 40% agreed that the vaccine will affect screening initiation and frequency. However, a significant group believed that nothing would change or were unsure, reflecting then a lack of acceptance (Wong et al., 2010). A recent editorial describing how, despite advances in prevention of pre-cancer lesion with sensitive HPV tests, cervical cancer screening in the US is still in a confusing state and suggested an approach to simplify and improve it. This approach will result in less but more targeted screening (Schiffman and Wentzensen, 2016).

Additional findings show that both NAMCS and NHAMCS providers had similar patterns of recommendations for the selection of patients to whom they would recommend the HPV vaccine with some differences by specialty. More than 60% of providers recommended the vaccine to women with a history of abnormal Pap or HPV test results. This recommendation is consistent with the current ACIP recommendations for age-eligible women. However, women older than 26 years, may benefit less from the vaccine as they most likely have been exposed to HPV. Performing an HPV or Pap test to determine who should receive the vaccine is not a recommended practice and can imply poor understanding of how HPV vaccines work. The majority of all providers in both groups did not employ this practice. Additionally, although over 53% of all providers in NAMCS and NHAMCS rarely or never used the number of sexual partners to determine whether they should get the vaccine, between 20% and 31% recommended vaccination based on the number of sexual partners. This recommendation is contrary to ACIP guidelines, which are based on age and not on other criteria. These practices may lead to overuse of the vaccine with little benefit for females older than 26 years.

Limitations of this study include a low response rate for NAMCS in 2007. However, our weighted estimates, which also accounted for non-response, potentially reduced the bias. Additionally, we were unable to determine whether the non-recommended vaccine practices were occurring among providers for age-eligible females (9–26 years) or for those beyond the eligible age. Therefore, we could not tell how test results influenced their decision to recommend the vaccine. Strengths of this study include the use of the latest nationally representative NAMCS and NHAMCS samples available and consistent methodology which allowed aggregation of data over the four year period.

In conclusion, consistent with current guidelines, the majority of providers did not intend to change cervical cancer screening practices (when to screen and how often) based on vaccination history despite their belief that HPV vaccination will result in fewer abnormal Pap tests and fewer colposcopies. Some providers used inappropriate tests for making vaccination decisions, which potentially could increase unneeded expenses. Future efforts to improve cervical cancer screening and prevention should include expanding the research conducted in the U.S. and in other countries about age initiation and screening intervals for vaccinated women, and improving physician knowledge about the purpose of vaccination

and recommendations for use. As HPV vaccination is an emerging issue in the U.S., monitoring providers' practices and their beliefs is important because of their role in patient care and education.

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Table 1

Provider selection to determine who should get the HPV vaccine, CCSS 2007–2010.

Variable	Percentage NAMCS providers and (95% CI)		Percentage of NHAMCS providers and (95% CI)	
	Ob/Gyn	Not Ob/Gyn	Ob/Gyn	Not Ob/Gyn
How often does this clinic use an HPV test to determine who should get the HPV vaccine?[a]				
Total[b]	292	881	310	287
Rarely or never	70.4 (64.0–76.2)	71.9 (66.9–76.3)	72.2 (63.9–79.2)	81.4 (72.9–87.7)
Sometimes to Always	27.1 (21.8–33.3)	24.3 (20.3–28.7)	24.4 (17.8–32.4)	17.5 (11.3–26.1)
As it relates to the HPV vaccine, how often does your clinic use the number of sexual partners to determine who should get the HPV vaccine?	†			
Total[b]	293	996	315	317
Rarely or never	68.4 (62.1–74.2)	59.1 (54.0–64.0)	67.5 (59.2–74.8)	53.4 (41.8–64.7)
Sometimes to always	19.7 (15.3–25.0)	30.7 (26.0–35.7)	21.4 (15.0–29.5)	26.2 (18.1–36.3)
Do not ask/unknown	11.8 (8.6–16.0)	10.2 (7.8–13.3)	11.2 (7.8–15.7)	20.4 (14.2–28.3)
As it relates to the HPV vaccine, how often does your clinic perform a Pap test to determine who should get the HPV vaccine?				
Total[b]	293	996	314	317
Rarely or never	69.7 (63.5–75.3)	70.9 (66.0–75.3)	69.8 (61.7–76.8)	70.3 (57.0–80.8)
Sometimes to always	19.2 (14.8–24.6)	19.0 (15.1–23.6)	20.0 (13.9–27.9)	15.2 (8.7–25.2)
Do not ask/unknown	11.1 (7.0–17.1)	10.1 (7.7–13.3)	10.2 (7.0–14.6)	14.6 (8.5–23.9)
As it relates to the HPV vaccine, how often does your clinic recommend the HPV vaccine to females with a history of abnormal Pap test result (ASC-US or higher)?	‡		†	
Total[b]	293	995	315	317
Rarely or never	14.7 (10.8–19.8)	18.5 (15.4–22.0)	22.0 (14.8–31.5)	8.9 (4.8–15.7)
Sometimes to always	79.6 (74.4–84.0)	68.4 (63.6–72.9)	67.4 (58.6–75.2)	73.7 (64.1–81.4)
Do not ask/unknown	5.7 (3.3–9.6)	13.1 (9.9–17.1)	10.5 (7.3–15.1)	17.4 (11.6–25.4)
As it relates to the HPV vaccine, how often does your clinic recommend the HPV vaccine to females with a positive HPV test?	‡			
Total[b]	293	995	315	317
Rarely or never	16.7 (12.4–22.0)	21.0 (17.7–24.7)	24.0 (16.4–33.6)	14.9 (9.8–22.0)
Sometimes to always	75.3 (69.7–80.1)	62.8 (58.1–67.3)	63.6 (54.6–71.8)	69.0 (60.3–76.6)

Variable	Percentage NAMCS providers and (95% CI)		Percentage of NHAMCS providers and (95% CI)	
	Ob/Gyn	Not Ob/Gyn	Ob/Gyn	Not Ob/Gyn
Do not ask/unknown	8.0 (5.4–11.9)	16.3 (12.9–20.2)	12.4 (8.8–17.1)	16.1 (9.6–25.6)

Ob/Gyn — obstetrician and gynecologist.

[a] This question was asked of providers who ordered or collected the HPV test. 3.4% of NAMCS providers and 1.7% of NHAMCS providers did not recommend the HPV vaccine and are not included in this table.

[b] Totals are samples sizes. Percentages are weighted to the study population.

[†] Significant difference between Ob/Gyn and not Ob/Gyn at $p < 0.05$.

[‡] Significant difference between Ob/Gyn and not Ob/Gyn at $p < 0.001$.

Table 2

Provider practices and beliefs about abnormal HPV test results among fully vaccinated females, CCSS 2007–2010.

	Percentage of NAMCS providers and (95% CI)		Percentage of NHAMCS providers and (95% CI)	
Variable	**Ob/Gyn**	**Not Ob/Gyn**	**Ob/Gyn**	**Not Ob/Gyn**
Will this clinic's cervical cancer screening and management procedures change forfemales who have been fully vaccinated with the HPV vaccine?				
Total[a]	297	1048	306	328
No	94.7 (91.5–96.8)	92.1 (89.1–94.3)	96.1 (92.4–98.0)	95.4 (91.8–97.5)
There will be fewer numbers of abnormal Pap tests among vaccinated females				*
Total[a]	301	1057	335	344
Agree	66.8 (60.2–72.8)	61.0 (56.8–65.1)	60.1 (51.4–68.2)	59.9 (48.8–70.2)
Disagree	7.5 (4.8–11.5)	6.3 (4.6–8.5)	9.4 (5.6–15.3)	~
Unsure	25.8 (20.0–32.4)	32.7 (28.8–36.9)	30.5 (23.3–38.9)	38.3 (28.1–49.8)
There will be fewer referrals for colposcopy among vaccinated females				*
Total[a]	303	1080	337	345
Agree	63.7 (58.2–69.0)	60.6 (56.3–64.7)	59.3 (50.9–67.2)	58.6 (47.6–68.8)
Disagree	9.1 (6.1–13.3)	6.7 (4.8–9.5)	7.1 (4.4–11.2)	~
Unsure	27.2 (22.3–32.6)	32.7 (28.6–37.0)	33.6 (26.2–42.0)	39.7 (29.6–50.9)

Ob/Gyn — obstetrician and gynecologist.

[a]Totals are sample sizes. Percentages are weighted to the study population.

~The sample is b30 or the relative standard error N30%.

*Significant difference between Ob/Gyn and not Ob/Gyn at $p < 0.05$.