Published in final edited form as:

Sex Transm Dis. 2014 January ; 41(1): 24–28. doi:10.1097/OLQ.0000000000000064.

Human Papillomavirus Vaccine Administration Among Medicaid Providers Who Consistently Recommended Vaccination

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Abstract

We examined factors potentially related to providers' self-reported human papillomavirus vaccine administration to female Medicaid enrollees among providers who consistently recommended vaccination. Some pronounced variability was observed in characteristics among providers who consistently administered vaccination, including provider age, race, and Vaccines for Children enrollment; patient/parent vaccine refusal; patient race/ethnicity; and patient volume.

Human papillomavirus (HPV) is the most common sexually transmitted infection and is causally linked to cervical cancer.¹ The Advisory Committee on Immunization Practices recommends HPV vaccination of females as early as age 9 years, routine vaccination for ages 11 to 12 years, and catch-up vaccination for ages 13 to 26 years.² Although a vaccine has been available since 2006, the 2010 National Health Interview Survey data show that only approximately 15% of girls aged 11 to 12 years received 1 or more doses of HPV vaccine.³ Florida has the seventh highest age-adjusted invasive cervical cancer incidence rate in the United States,⁴ yet the 2012 National Immunization Survey-Teen demonstrate that HPV vaccine initiation for girls aged 13 to 17 years in Florida (39%) falls below other states and areas in the south census region (range, 39%–67%) and the United States overall (54%).⁵ Vaccine initiation rates are even lower among the Florida Medicaid population⁶ despite disproportionately high cervical cancer rates among women of low socioeconomic status,^{7,8} perhaps because of provider failure to discuss vaccination with patients.⁹

Provider recommendation is among the strongest predictors of HPV vaccine uptake.^{10–12} Although studies have examined patient, provider, and financial factors associated with providers' HPV vaccine recommendation,^{13–17} to our knowledge, none have examined the

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Regarding potential conflicts of interest, Dr Giuliano has received funding from Merck for consultancy and lectures. In addition, she receives grant funding from Merck and Glaxo Smith Kline. For the remaining authors, no conflicts were declared.

relationship between these factors and administration (ie, in-office vaccine delivery to patients) among providers who recommend the vaccine. Using data from a provider study of HPV vaccine delivery to females receiving care in the Florida-based Medicaid program,¹⁸ we examined factors that may be related to HPV vaccine administration to female Medicaid enrollees among providers who consistently recommended vaccination.

Data were derived from a larger observational study described elsewhere.¹⁸ Briefly, a sample of 800 providers was randomly selected from the Florida Medicaid Master Provider File. Study inclusion criteria were as follows: (1) physical address in Florida, (2) billed claims or an assigned panel of 25 or more girls aged 9 to 17 years in the past year, and (3) primary care specialty (ie, pediatrics, obstetrics and gynecology, family medicine, internal medicine, general practice, and preventive medicine). After applying the inclusion criteria, the sampling frame included 1710 providers. After removing duplicates, the final sample pool was 1625 providers, from which 800 were randomly selected using the SURVEYSELECT procedure in SAS. Upon institutional review board approval, the 27-item survey was mailed in October 2009, and data were collected until April 2010.

After accounting for undeliverable surveys (n = 65) and ineligible providers (n = 25), the overall response rate was 68.3% (n = 485). The response rate based on usable surveys (n = 433) was 61%. The sample was limited to providers who consistently recommended HPV vaccination, which was assessed by asking: "In the past 12 months, how often did you recommend the HPV vaccine to your female Medicaid patients, in the following age groups?" A 12-month period was used to capture a better aggregate of recommendation practices and to account for seasonal fluctuations in patient health care visits. Recommendations were assessed separately for age groups 9 to 10, 11 to 12, 13 to 14, and 15 to 17 years with 6 response options: never (0%), rarely (1%–25%), sometimes (26%–50%), often (51%–75%), always (>75%), or "do not see patients in this age group." Providers who reported "always" (ie, consistently) recommending HPV vaccine were included in subsequent patient age group-specific evaluations for ages 9 to 10 years (n = 63), 11 to 12 years (n = 196), 13 to 14 years (n = 265), and 15 to 17 years (n = 310; Fig. 1).

Human papillomavirus vaccine administration was assessed by asking: "In the past 12 months, how often did you administer at least one dose of the HPV vaccine to your female Medicaid patients, in the following age groups?" Administration was assessed for each of the 4 patient age groups with the same response options as recommendations. Given their relatively small sample sizes and our primary interest in examining more frequent vaccination, the never, rarely, and sometimes groups were combined.

Variables potentially related to HPV vaccine administration were selected using the Competing Demands Model framework, which posits that the provider, patient, and practice environment impact provider delivery of preventive health services.¹⁹

Provider factors considered were clinical specialty, demographic characteristics, and HPV-related knowledge. We measured providers' knowledge about HPV infection and vaccination with 6 items (described elsewhere²⁰).

Practice patient population factors included patient racial/ethnic distribution and the frequency of experiencing patient/parent HPV vaccine refusal for each patient group. Refusal was measured by asking: "In the past 12 months, how often did your female Medicaid patients or parents of your female Medicaid patients in the following age groups refuse HPV vaccination when it was offered (ie., did not agree to vaccination currently or at a later date)?" Response options mirrored those used to assess vaccine recommendation and administration and were collapsed into never/rarely, sometimes, and often/always.

Practice environmental factors included practice type, number of clinical specialties, number of providers, daily patient volume, enrollment in the Vaccines for Children (VFC) program, strategies in place to ensure HPV vaccine series completion, and providers' perceptions of financial barriers to HPV vaccination.

Among these providers who consistently recommended HPV vaccination, 33.3% (21/63) reported consistent vaccine administration to patient ages 9 to 10 years, 40.3% (79/196) to ages 11 to 12 years, 38.5% (102/265) to ages 13 to 14 years, and 40.3% (125/310) to ages 15 to 17 years. Some pronounced variability was observed in provider and practice characteristics among providers who reported consistent ("always") vaccine administration (Table 1; data not shown for patient ages 15–17 years given similar findings to ages 13–14 years). Regarding provider factors, a higher percentage of family physicians (compared with other specialties) and Hispanic/Latino (vs. non-Hispanic/Latino) providers reported consistent HPV vaccination across all patient age groups. A similarly higher percentage of providers aged 40 to 49 years and those 50 years or older (vs. 31–39 years) reported consistent administration to patient ages other than 9 to 10 years. Providers who reported white or "other" race had higher percentages of consistent administration for patients aged 9 to 10 years, but these differences seemed to diminish for older patient age groups.

A noticeably higher percentage of providers who reported never/rarely (vs. sometimes or often/always) experiencing patient/parent vaccine refusal reported consistent vaccine administration. In addition, a higher percentage who saw primarily Hispanic (vs. other race/ethnicity groups) patients reported consistent vaccination for patient age groups other than 9 to 10 years.

Providers enrolled in the VFC program (vs. no/don't know) and those with a daily patient volume of 20 or more (vs. <20) reported higher percentages of consistent vaccination. Higher percentages were also found among providers in a multispecialty (vs. single or other) practice for patients aged 9 to 10 and 11 to 12 years, but differences between single specialty and multispecialty practices seemed to lessen for older ages. Percentages of consistent vaccine administration were similar for practices with 1 or 2 to 15 providers and were higher than practices with 16 or more providers.

Financial barriers were present across vaccine administration and patient age groups and seemed to be experienced by more providers reporting less consistent vaccine administration. Also, the strategies to ensure HPV vaccine completion that were most commonly used across vaccine administration and patient age groups included recording when the next dose is due on a card kept by the patient and scheduling the next recommended dose during the patient's office visit. Using a computerized immunization database or registry seemed to be used more by consistent vaccine administrators.

Although provider recommendation is an important first step, vaccine delivery is necessary to prevent cervical cancer and reduce subsequent disparities in medically underserved populations. Patients whose provider recommends, but does not administer, the vaccine may be vaccinated either later (at a health department or another facility) or not at all.²¹ Despite provider recommendation and patient eligibility for free vaccination through the VFC program, only approximately 40% of providers reported consistently administering HPV vaccine to the target (11–12 years) and catch-up (13–17 years) ages; fewer (33%) vaccinated those aged 9 to 10 years. This study suggests that several factors may be related to the disconnect between providers' consistent HPV vaccine recommendation and administration practices, including provider age, race, and VFC enrollment; patient/parent vaccine refusal; patient race/ethnicity; and patient volume.

It is imperative to further explore the relationship between these variables and vaccine administration in a larger sample of providers, particularly for the younger age groups where fewer providers reported consistent vaccine administration; doing so may help disentangle potential mediating effects. As an example, provider age may be a proxy for experience or amount of time in practice. Providers who are relatively new in their practice may be inexperienced with establishing office-based systems to support better vaccination coverage.²² Additional research is needed to examine potential interactions between provider age and strategies for ensuring vaccine completion.

In light of this study's strengths, limitations include using self-report data, which may introduce social desirability or recall bias effects. Future studies should attempt to minimize these effects by recording patient-provider encounters or surveying parents about provider recommendation immediately after the office visit. Also, survey respondents may differ from non-respondents such that respondents may have stronger opinions about HPV vaccination. Although the high response rate enhances generalizability to Florida Medicaid providers, results may not be generalizable beyond Florida. Finally, most participants were pediatricians; therefore, the vaccination practices of providers from other specialties may have been underrepresented.

Despite these limitations, this study identifies potential variability in provider and practice characteristics among providers who consistently recommend and administer HPV vaccine. Findings suggest that future research should further examine the relationship between vaccine administration and promising variables including provider age, race, and VFC enrollment; patient/parent vaccine refusal; patient race/ethnicity; and patient volume.

Acknowledgments

The work contained within this publication was supported in part by the Survey Methods Core Facility at the Moffitt Cancer Center. The authors thank Deepa Ranka, MS, and the Medicaid programming team at the Institute for Child Health Policy for sample selection and data management.

This research was supported by grants from the University of Florida (UF09035) and the National Institutes of Health (NIH;R01AI076440-01). Drs. Staras and Shenkman were supported in part by NIH/National Center for Research Resources Clinical and Translational Science Awards award to the University of Florida (UL1 RR029890). Dr Staras also was supported in part by the NIH (K01 AA018255).

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Figure 1.
Participant recruitment and study inclusion.

TABLE 1

Provider and Practice Factors Among Providers Consistently Recommending HPV Vaccine, by Patient Age Group and Frequency of Vaccine Administration

	Vaccine Administration to Patient Ages 9–10 y (n = 63)			Vaccine Administration to Patient Ages 11–12 y (n = 196)			Vaccine Administration to Patient Ages 13–14 y (n = 265)		
	Always (n = 21), n (%)	Often (n = 19), n (%)	S/R/N (n = 23), n (%)	Always (n = 79), n (%)	Often (n = 77), n (%)	S/R/N (n = 40), n (%)	Always (n = 102), n (%)	Often (n = 130), n (%)	S/R/N (n = 33), n (%)
Provider factors									
Clinical specialty									
Pediatrician	15 (31.3)	16 (33.3)	17 (35.4)	70 (40.5)	71 (41.0)	32 (18.5)	87 (38.8)	113 (50.5)	24 (10.7)
Family physician	3 (42.9)	2 (28.6)	2 (28.6)	6 (50.0)	3 (25.0)	3 (25.0)	10 (47.6)	6 (28.6)	5 (23.8)
OB/GYN	3 (37.5)	1 (12.5)	4 (50.0)	3 (27.3)	3 (27.3)	5 (45.5)	5 (25.0)	11 (55.0)	4 (20.0)
Age, y									
31–39	3 (27.3)	5 (45.5)	3 (27.3)	5 (17.9)	15 (53.6)	8 (28.6)	7 (18.0)	22 (56.4)	10 (25.6)
40–49	6 (28.6)	3 (14.3)	12 (57.1)	32 (43.2)	32 (43.2)	10 (13.5)	43 (45.7)	43 (45.7)	8 (8.5)
50	12 (40.0)	10 (33.3)	8 (26.7)	41 (46.1)	28 (31.5)	20 (22.5)	51 (41.1)	58 (46.8)	15 (12.1)
Sex									
Male	13 (36.1)	7 (19.4)	16 (44.4)	44 (42.3)	37 (35.6)	23 (22.1)	54 (39.1)	60 (43.5)	24 (17.4)
Female	8 (29.6)	12 (44.4)	7 (25.9)	35 (38.5)	39 (42.9)	17 (18.7)	48 (38.4)	68 (54.4)	9 (7.2)
Race									
White/Caucasian	10 (40.0)	7 (28.0)	8 (32.0)	38 (41.3)	35 (38.0)	19 (20.7)	40 (32.3)	67 (54.0)	17 (13.7)
Black/African American	1 (16.7)	2 (33.3)	3 (50.0)	6 (42.9)	7 (50.0)	1 (7.1)	9 (52.9)	7 (41.2)	1 (5.9)
Asian	1 (12.5)	3 (37.5)	4 (50.0)	10 (33.3)	15 (50.0)	5 (16.7)	16 (38.1)	22 (52.4)	4 (9.5)
Other	8 (38.1)	6 (28.6)	7 (33.3)	20 (41.7)	14 (29.2)	14 (29.2)	31 (44.9)	27 (39.1)	11 (15.9)
Ethnicity									
Hispanic/Latino	10 (35.7)	6 (21.4)	12 (42.9)	34 (46.0)	22 (29.7)	18 (24.3)	43 (46.2)	40 (43.0)	10 (10.8)
Not Hispanic/Latino	11 (32.4)	12 (35.3)	11 (32.4)	45 (37.5)	53 (44.2)	22 (18.3)	59 (34.9)	88 (52.1)	22 (13.0)
HPV knowledge									
Less (0–4 correct)	12 (30.8)	13 (33.3)	14 (35.9)	41 (39.1)	47 (44.8)	17 (16.2)	57 (40.1)	69 (48.6)	16 (11.3)
More (5–6 correct)	9 (37.5)	6 (25.0)	9 (37.5)	38 (41.8)	30 (33.0)	23 (25.3)	45 (36.6)	61 (49.6)	17 (13.8)
Practice patient population factors									
Patient race (majority)									
Non-Hispanic white	3 (37.5)	2 (25.0)	3 (37.5)	12 (37.5)	13 (40.6)	7 (21.9)	15 (32.6)	25 (54.4)	6 (13.0)

	Vaccine Administration to Patient Ages 9–10 y (n = 63)			Vaccine Administration to Patient Ages 11–12 y (n = 196)			Vaccine Administration to Patient Ages 13–14 y (n = 265)		
	Always (n = 21), n (%)	Often (n = 19), n (%)	S/R/N (n = 23), n (%)	Always (n = 79), n (%)	Often (n = 77), n (%)	S/R/N (n = 40), n (%)	Always (n = 102), n (%)	Often (n = 130), n (%)	S/R/N (n = 33), n (%)
African American	3 (42.9)	2 (28.6)	2 (28.6)	13 (32.5)	19 (47.5)	8 (20.0)	19 (34.6)	32 (58.2)	4 (7.3)
Hispanic	11 (39.3)	5 (17.9)	12 (42.9)	36 (53.7)	17 (25.4)	14 (20.9)	45 (54.2)	29 (34.9)	9 (10.8)
Other	4 (20.0)	10 (50.0)	6 (30.0)	17 (30.4)	28 (50.0)	11 (19.6)	21 (26.9)	43 (55.1)	14 (18.0)
Patient/parent vaccine refusal									
Never/Rarely	10 (52.6)	6 (31.6)	3 (15.8)	46 (63.9)	19 (26.4)	7 (9.7)	66 (53.2)	49 (39.5)	9 (7.3)
Sometimes	6 (26.1)	8 (34.8)	9 (39.1)	24 (25.0)	49 (51.0)	23 (24.0)	32 (26.9)	67 (56.3)	20 (16.8)
Often/Always	5 (25.0)	4 (20.0)	11 (55.0)	9 (34.6)	8 (30.8)	9 (34.6)	4 (20.0)	13 (65.0)	3 (15.0)
Practice environmental factors									
No. of providers									
1	6 (31.6)	7 (36.8)	6 (31.6)	21 (38.9)	23 (42.5)	10 (18.5)	30 (40.5)	37 (50.0)	7 (9.5)
2–15	15 (35.7)	11 (26.2)	16 (38.1)	55 (43.3)	45 (35.4)	27 (21.3)	68 (39.8)	78 (45.6)	25 (14.6)
16	0 (0.0)	1 (50.0)	1 (50.0)	3 (21.4)	9 (64.3)	2 (14.3)	4 (22.2)	13 (72.2)	1 (5.6)
No. specialties									
Single	13 (28.9)	17 (37.8)	15 (33.3)	62 (39.7)	62 (39.7)	32 (20.5)	83 (39.0)	106 (49.8)	24 (11.3)
Multiple	7 (53.9)	1 (7.7)	5 (38.5)	16 (47.1)	13 (38.2)	5 (14.7)	16 (39.0)	19 (46.3)	6 (14.6)
Other	1 (20.0)	1 (20.0)	3 (60.0)	1 (16.7)	2 (33.3)	3 (50.0)	2 (20.0)	5 (50.0)	3 (30.0)
Type									
Private practice	17 (32.7)	17 (32.7)	18 (34.6)	67 (39.6)	66 (39.1)	36 (21.3)	86 (37.7)	113 (49.6)	29 (12.7)
Other	4 (36.4)	2 (18.2)	5 (45.5)	11 (42.3)	11 (42.3)	4 (15.4)	14 (40.0)	17 (48.6)	4 (11.4)
No. patients/d									
14	4 (33.3)	2 (16.7)	6 (50.0)	14 (33.3)	14 (33.3)	14 (33.3)	17 (29.8)	27 (47.4)	13 (22.8)
15–19	5 (27.8)	6 (33.3)	7 (38.9)	24 (40.0)	25 (41.7)	11 (18.3)	32 (40.5)	41 (51.9)	6 (7.6)
20	12 (37.5)	10 (31.3)	10 (31.3)	41 (46.6)	33 (37.5)	14 (15.9)	52 (43.0)	56 (46.3)	13 (10.7)
VFC provider									
Yes	19 (33.9)	18 (32.1)	19 (33.9)	76 (41.8)	73 (40.1)	33 (18.1)	97 (40.6)	118 (49.4)	24 (10.0)
No	2 (28.6)	1 (14.3)	4 (57.1)	2 (22.2)	3 (33.3)	4 (44.4)	4 (22.2)	9 (50.0)	5 (27.8)
Don't know	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (25.0)	3 (75.0)	0 (0.0)	3 (50.0)	3 (50.0)
Refer patients for vaccine									
No	18 (34.6)	17 (32.7)	17 (32.7)	76 (42.7)	69 (38.8)	33 (18.5)	96 (40.7)	115 (48.7)	25 (10.6)

	Vaccine Administration to Patient Ages 9–10 y (n = 63)			Vaccine Administration to Patient Ages 11–12 y (n = 196)			Vaccine Administration to Patient Ages 13–14 y (n = 265)		
	Always (n = 21), n (%)	Often (n = 19), n (%)	S/R/N (n = 23), n (%)	Always (n = 79), n (%)	Often (n = 77), n (%)	S/R/N (n = 40), n (%)	Always (n = 102), n (%)	Often (n = 130), n (%)	S/R/N (n = 33), n (%)
Yes, to FQHC/health department/other	3 (27.3)	2 (18.2)	6 (54.6)	3 (16.7)	8 (44.4)	7 (38.9)	6 (20.7)	15 (51.7)	8 (27.6)
Perceived barriers to HPV vaccination (somewhat/strongly agree)									
Cost of stocking HPV vaccine	7 (33.3)	8 (42.1)	9 (39.1)	22 (27.9)	18 (23.4)	15 (37.5)	32 (31.4)	29 (22.3)	16 (48.5)
Lack of adequate reimbursement (nonpayment or partial payment) for HPV vaccination	8 (38.1)	11 (57.9)	10 (43.5)	29 (36.7)	25 (32.5)	20 (50.0)	44 (43.1)	47 (36.2)	20 (60.6)
Lack of timely reimbursement for HPV vaccination	6 (28.6)	10 (52.6)	9 (39.1)	26 (32.9)	20 (26.0)	19 (47.5)	39 (38.2)	41 (31.5)	16 (48.5)
Strategies to ensure HPV vaccine completion (yes responses)									
Recording when next dose is due on paper-based card that patient keeps	18 (85.7)	12 (63.2)	14 (60.9)	55 (69.6)	48 (62.3)	24 (60.0)	72 (70.6)	89 (68.5)	19 (57.6)
Reminder/recall letters or calls	12 (57.1)	11 (57.9)	11 (47.8)	39 (49.4)	44 (57.1)	18 (45.0)	55 (53.9)	64 (49.2)	14 (42.4)
Reminder flag/tag in patient's medical record	11 (52.4)	11 (57.9)	10 (43.5)	28 (35.4)	28 (36.4)	17 (42.5)	37 (36.3)	47 (36.2)	10 (30.3)
Scheduling patients for next recommended dose during their office visit	18 (85.7)	19 (100.0)	20 (87.0)	67 (84.8)	67 (87.0)	33 (82.5)	89 (87.3)	108 (83.1)	29 (87.9)
Using a computerized immunization database or registry to track when next dose is due	9 (42.9)	5 (26.3)	6 (26.1)	31 (39.2)	26 (33.8)	11 (27.5)	36 (35.3)	44 (33.9)	7 (21.2)
None	1 (4.8)	1 (5.3)	2 (8.7)	4 (5.1)	2 (2.6)	2 (5.0)	4 (3.9)	3 (2.3)	1 (3.0)

Totals may not equal the sample size because of missing data. Percentages may not equal 100% because of missing data. Percentages sum across the row by patient age group, except perceived barriers to vaccination and strategies to ensure completion, which represent column percentages (ie, % who somewhat/strongly agree and % yes responses, respectively).

FQHC indicates federally qualified health center; OBGYN, obstetrician/gynecologist.