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Adolescent health brief

## Characteristics of Adolescents Lacking Provider-Recommended Human Papillomavirus Vaccination



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### A B S T R A C T

**Purpose:** To characterize subgroups of teens in the United States for whom provider recommendation is less likely to impact human papillomavirus (HPV) vaccine initiation.

**Methods:** We analyzed provider-verified vaccination data from the Centers for Disease Control and Prevention's 2014 National Immunization Survey—Teen. Poisson regression models identified characteristics associated with the lack of HPV vaccine initiation among teens who received a provider recommendation (n = 12,742). Top qualitative reasons for nonvaccination among teens who received a provider recommendation were summarized (n = 1,688).

**Results:** Among teens with provider recommendations, males, younger teens, and white teens were less likely to initiate vaccination, compared to peers. Believing the vaccine was unnecessary, concerns about safety and lack of vaccine knowledge were common reasons parents did not initiate the vaccine, despite receiving provider recommendations.

**Conclusions:** These key subgroups and barriers to HPV vaccination should be targeted with interventions that complement provider recommendation to achieve broad vaccine uptake in the United States

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### IMPLICATIONS AND CONTRIBUTION

This study identified U.S. teens less likely to initiate human papillomavirus vaccine, despite provider recommendation, including males and younger teens. Concerns about vaccine necessity, safety, and knowledge were common parent-reported reasons for lack of vaccination. Study results inform future intervention targets to complement and improve provider recommendation to increase vaccine uptake.

Human papillomavirus (HPV) vaccines are effective yet underutilized cancer prevention tools for adolescents in the United States. The Advisory Committee on Immunization Practices recommends vaccination at ages 11–12 years. Despite this recommendation, HPV vaccination rates among teens remain far below the Healthy People 2020 target of 80% coverage [1]. Thus,

it is imperative to identify key points for intervention to improve national vaccination rates.

Provider recommendation is a well-established and important facilitator of HPV vaccination [2–7]. However, it is not a sure path to vaccination for all. A crucial yet unanswered question asks which teens are less likely to be impacted by provider recommendation? Thus, the present study examines key characteristics associated with lack of HPV vaccine initiation among teens who receive provider recommendations and reasons why they may fail to vaccinate. Results can inform future intervention targets to complement provider recommendation for groups less likely to vaccinate.

**Conflicts of Interest:** The authors have no conflicts of interest to disclose.

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**Table 1**  
Proportions and prevalence ratios for human papillomavirus (HPV) vaccine initiation among teens with a provider recommendation, 2014 NIS—Teen

Variable	% That had initiated HPV vaccine <sup>a</sup>	All aPR	Females aPR	Males aPR
Sex				
Female	69.2	Ref	—	—
Male	63.4	.91 (.87–.96)	—	—
Age, years				
13	58.4	Ref	Ref	Ref
14	65.5	1.12 (1.03–1.21)	1.12 (1.02–1.24)	1.11 (.98–1.25)
15	69.5	1.21 (1.12–1.30)	1.20 (1.09–1.32)	1.20 (1.06–1.35)
16	69.8	1.21 (1.12–1.31)	1.23 (1.11–1.35)	1.18 (1.05–1.34)
17	70	1.23 (1.14–1.34)	1.28 (1.16–1.41)	1.17 (1.02–1.34)
Race/ethnicity				
White	62.7	Ref	Ref	Ref
Black	67.9	1.07 (.99–1.15)	1.08 (1.00–1.17)	1.03 (.90–1.18)
Hispanic	75.7	1.14 (1.07–1.22)	1.05 (.97–1.15)	1.26 (1.14–1.39)
Other/multi	68.8	1.10 (1.01–1.19)	1.10 (1.01–1.21)	1.12 (.97–1.29)
Household income				
Above \$75,000	63.9	Ref	Ref	Ref
Between poverty level and \$75,000	66.3	.97 (.91–1.03)	.97 (.90–1.04)	.96 (.86–1.06)
Below poverty level	75.1	1.02 (.94–1.11)	1.04 (.94–1.14)	1.02 (.88–1.17)
Unreported	57.6	.86 (.74–1.00)	.91 (.76–1.08)	.79 (.61–1.02)
Insurance <sup>b</sup>				
Private	62.5	Ref	Ref	Ref
Public	71.1	1.06 (.99–1.13)	1.05 (.97–1.15)	1.07 (.95–1.19)
Other	66.5	1.08 (.98–1.20)	1.03 (.92–1.16)	1.15 (.98–1.36)
Multiple	70.3	1.07 (1.00–1.15)	1.14 (1.06–1.23)	.96 (.84–1.11)
None	71.9	1.08 (.94–1.23)	1.05 (.88–1.26)	1.16 (.99–1.34)
Unreported	74	1.10 (.99–1.23)	1.09 (.95–1.24)	1.09 (.92–1.30)
Geographic region <sup>c</sup>				
Northeast	66.7	Ref	Ref	Ref
Midwest	64.6	1.00 (.95–1.06)	1.01 (.94–1.09)	.99 (.90–1.08)
South	65.1	.98 (.93–1.04)	.98 (.91–1.05)	1.00 (.91–1.09)
West	71	1.05 (.98–1.12)	1.05 (.96–1.14)	1.03 (.93–1.15)
Mother's age				
≤34 years	73.8	Ref	Ref	Ref
35–44 years	65.6	.91 (.85–.98)	.88 (.81–.96)	.96 (.85–1.08)
≥45 years	66.4	.94 (.87–1.02)	.89 (.81–.98)	1.03 (.91–1.17)
Mother's education level				
<12 years	77.1	1.10 (1.01–1.19)	1.07 (.97–1.20)	1.13 (1.01–1.28)
High school	69.7	1.05 (.98–1.12)	1.04 (.95–1.12)	1.07 (.96–1.20)
Some college	64.9	1.00 (.94–1.06)	1.02 (.95–1.09)	.98 (.88–1.09)
College grad	63.5	Ref	Ref	Ref
No. of visits to doctor in past year				
None	58.0	Ref	Ref	Ref
1	65.6	1.17 (1.07–1.29)	1.18 (1.04–1.34)	1.14 (1.02–1.28)
2–3	68.7	1.23 (1.13–1.34)	1.29 (1.15–1.45)	1.13 (1.01–1.27)
≥4	72.2	1.28 (1.17–1.42)	1.32 (1.16–1.50)	1.22 (1.07–1.40)
Hepatitis B vaccination				
Yes	67.6	Ref	Ref	Ref
No	45.6	.76 (.65–.89)	.71 (.57–.87)	.86 (.69–1.08)
Tdap vaccination				
Yes	69.1	Ref	Ref	Ref
No	30	.45 (.37–.54)	.43 (.44–.61)	.48 (.35–.64)

<sup>a</sup> Sample size  $n = 12,742$ . Proportions represent the percentage of teens who have initiated the HPV vaccine (i.e., with one or more provider-verified doses of HPV vaccine), among those with a provider recommendation. Variable columns may not add up to total weighted sample size due to rounding. aPR = adjusted prevalence ratio. All variables listed in table were included as covariates in the adjusted model.

<sup>b</sup> Insurance was categorized following guidelines from the U.S. Census Bureau (<https://www.census.gov/hhes/www/hlthins/methodology/definitions/cps.html>), which defines public insurance as Medicaid, S-Chip, military, and American Indian health coverage. Private insurance included individuals who only reported private insurance and no other categories. Multiple insurance included individuals who responded yes to at least two of the three categories: private, public, and other.

<sup>c</sup> Geographic region includes all 50 states and Washington, D.C. Puerto Rico and other U.S. territories are not included in this study sample.

## Methods

This study used the 2014 National Immunization Survey—Teen, an annual cross-sectional household survey conducted by the Centers for Disease Control and Prevention to monitor vaccination coverage in the United States [8]. Teens aged 13–17 years in all 50 states and the District of Columbia with provider-verified data who responded to the provider recommendation question were

included in the study. Analyses were conducted in STATA version 14 using appropriate procedures to weight and analyze complex survey data. We used Poisson regression with robust variance estimation to estimate adjusted prevalence ratios and 95% confidence intervals for characteristics associated with HPV vaccine initiation among teens with a provider recommendation. Parents who recalled a provider recommendation but had not vaccinated their teens were asked how likely they were to initiate vaccination

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