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Brief report

Correlates of HPV vaccination among adolescent females from Appalachia and reasons why their parents do not intend to vaccinate

Paul L. Reiter[a,b,c,*], Mira L. Katz[a,b,c], Electra D. Paskett[a,b,c]

[a] Division of Cancer Prevention and Control, College of Medicine, The Ohio State University, United States
[b] Comprehensive Cancer Center, The Ohio State University, United States
[c] College of Public Health, The Ohio State University, United States

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ABSTRACT

Limited research has examined HPV vaccination in Appalachia, a region with cervical cancer disparities. We analyzed 2008–2010 National Immunization Survey-Teen data for adolescent females ages 13–17 from Appalachia ($n = 1951$) to identify correlates of HPV vaccination and reasons why their parents do not intend to vaccinate. HPV vaccine initiation was 40.8%, completion was 27.7%, and follow-through was 67.8%. Vaccination outcomes tended to be higher among females who were older, had visited their healthcare provider in the last year, or whose parents reported receiving a provider recommendation to vaccinate. Only 41.0% of parents with unvaccinated daughters intended to vaccinate in the next year. The most common reasons for not intending to vaccinate were believing vaccination is not needed or not necessary (21.5%) and lack of knowledge (18.5%). Efforts to reduce missed opportunities for vaccination at healthcare visits and address reasons why parents are not vaccinating may help increase HPV vaccination in Appalachia

1. Introduction

Several populations in the U.S. continue to suffer from cervical cancer disparities, including females from Appalachia. Appalachia is a 13-state region (from New York to Mississippi) containing about 8% of the U.S. population [1]. Parts of Appalachia have among the highest cervical cancer incidence and mortality rates in the country [2,3]. Human papillomavirus (HPV) vaccination offers a strategy for reducing these disparities. Guidelines currently recommend that all females ages 11–12 receive three doses of HPV vaccine, with catch-up vaccination for ages 13–26 [4].

Most healthcare facilities in Appalachia have HPV vaccine available [5], and vaccine acceptability is fairly high among Appalachian adults [6,7]. We previously found that HPV vaccine uptake among adolescent females from Appalachia was generally comparable to the rest of the U.S. [8]. Although several studies have identified correlates of HPV vaccination [9], none have done so among adolescent females from Appalachia or identified reasons why Appalachian parents do not intend to vaccinate. Such information will be useful to future efforts to increase HPV vaccination in Appalachia.

2. Materials and methods

2.1. Study design

We analyzed data from the National Immunization Survey-Teen (NIS-Teen), an annual survey conducted by the Centers for Disease Control and Prevention (CDC) that monitors adolescent vaccination among 13–17 year-olds in the U.S. [10]. The NIS-Teen collects data using a random-digit-dialed telephone survey with parents/guardians (referred to as "parents") of adolescents ages 13–17 and a mailed survey to adolescents' healthcare providers. We report NIS-Teen data from 2008 to 2010 (all publicly available years at the time of analysis) on 1951 adolescent females from Appalachia with provider-verified vaccination records. Appalachian residence was established using county of residence and the Appalachian Regional Commission's county classification scheme [11].

Data collection for the NIS-Teen was approved by the National Center for Health Statistics (NCHS) Research Ethics Review Board (ERB). Analysis of deidentified data from the survey is exempt from the federal regulations for the protection of human research participants. We accessed restricted data through the NCHS Research Data Center (RDC), including data on county of residence and parents' intent to vaccinate. Analysis of restricted data through the RDC is approved by the NCHS ERB. The Institutional Review Board at The Ohio State University determined this study was exempt from review.

* Corresponding author at: Division of Cancer Prevention and Control, College of Medicine, The Ohio State University, Suite 525, 1590 North High Street, Columbus, Ohio 43201, United States. Tel.: +1 614 366 4265; fax: +1 614 293 5611.
E-mail address: Paul.Reiter@osumc.edu (P.L. Reiter).

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2.2. Measures

We examined three dichotomous (yes or no) HPV vaccination outcomes: (1) initiation: receipt of at least one dose; (2) completion: receipt of three doses; and (3) follow-through: completion among initiators. Among parents with unvaccinated daughters, we examined intent to vaccinate their daughters in the next year. Surveys asked these parents, "How likely is it that [TEEN] will receive HPV shots in the next 12 months?" Response options included "very likely," "somewhat likely," "not sure/don't know," "not too likely," and "not likely at all." Parents who indicated one of the latter three responses were asked, "What is the main reason [TEEN] will not receive HPV shots in the next 12 months?" This open-ended survey item allowed parents to indicate multiple reasons, with the CDC coding responses into categories.

Parent surveys collected data on several characteristics (Table 1). We used county of residence to determine which Appalachian subregion adolescent females resided in. Appalachia can be divided into five subregions (Northern, North Central, Central, South Central, and Southern) [11], which are contiguous areas within Appalachia with similar characteristics (e.g., demographics, etc.).

2.3. Data analysis

For each HPV vaccination outcome, we used logistic regression to first identify variables with $p < 0.15$ in univariable analyses. We then entered these variables into a multivariable logistic regression model to produce adjusted odds ratios (ORs) and 95% confidence intervals (CIs). Analyses applied sampling weights, accounted for the complex design of the NIS-Teen, and combined data from multiple survey years using recommended methods [12]. Frequencies are not weighted. Statistical tests using SAS Version 9.2 (Cary, NC) were two-tailed with a critical alpha of 0.05.

3. Results

3.1. Initiation

About 40.8% (743/1951) of adolescent females had initiated the HPV vaccine regimen (Table 2). Initiation increased from 32.4% in 2008 to 45.4% in 2010. In multivariable analyses, initiation was more common among adolescent females who had visited their healthcare provider in the last year (OR = 2.17, 95% CI: 1.42–3.34), whose parents had heard of HPV vaccine (OR = 2.53, 95% CI: 1.14–5.63), or whose parents reported receiving a provider recommendation for vaccination (OR = 4.07, 95% CI: 3.06–5.43). Initiation was lower among adolescent females from the Central (OR = 0.47, 95% CI: 0.28–0.78) or Southern (OR = 0.67, 95% CI: 0.47–0.95) subregions.

3.2. Completion

Overall, 27.7% (482/1951) of adolescent females had completed the HPV vaccine regimen (increasing from 19.2% in 2008 to 34.5% in 2010; Table 2). Adolescent females who were 17 years old (OR = 2.04, 95% CI: 1.26–3.31), had visited their healthcare provider in the last year (OR = 1.65, 95% CI: 1.00–2.72), had healthcare coverage other than through their parents' employer or union (OR = 3.67, 95% CI: 1.32–10.20), or whose parents reported receiving a provider recommendation for vaccination (OR = 2.71, 95% CI: 1.99–3.70) were more likely to have completed the vaccine regimen, in multivariable analyses. Completion was less common among adolescent females from the North Central (OR = 0.54, 95% CI: 0.32–0.91), Central (OR = 0.33, 95% CI: 0.19–0.57), or Southern (OR = 0.48, 95% CI: 0.34–0.69) subregions.

Table 1
Characteristics of parents and adolescent daughters from Appalachia ($n = 1951$).

	n (weighted %)
Year	
2008	667 (32.9)
2009	630 (34.9)
2010	654 (32.2)
Daughter characteristics	
Age	
13 years	424 (20.7)
14 years	382 (18.7)
15 years	401 (20.7)
16 years	393 (19.8)
17 years	351 (20.1)
Race/ethnicity	
White, non-Hispanic	1664 (80.6)
Black, non-Hispanic	163 (12.1)
Other	124 (7.3)
Visited healthcare provider in last year	
No	244 (14.6)
Yes	1699 (85.4)
Healthcare coverage	
Through parent employer or union	1296 (63.3)
Other insurance	559 (31.3)
No insurance	93 (5.4)
Parent characteristics	
Mother's age	
<35 years	179 (9.9)
35–44 years	957 (50.7)
45+ years	815 (39.4)
Mother's education	
High school or less	684 (44.3)
Some college	597 (27.0)
College graduate	670 (28.7)
Mother's marital status	
Married	1457 (74.3)
Other	494 (25.7)
Heard of HPV	
No	304 (16.4)
Yes	1623 (83.6)
Heard of HPV vaccine	
No	101 (5.0)
Yes	1835 (95.0)
Received provider recommendation to get daughter HPV vaccine	
No	856 (43.8)
Yes	1045 (56.2)
Household characteristics	
Poverty status	
Below poverty	309 (18.9)
Above poverty, ≤$75,000	908 (50.7)
Above poverty, >$75,000	658 (30.4)
Urbanicity	
Non-MSA	775 (36.9)
MSA, non-central city	723 (38.8)
MSA, central city	453 (24.3)
Appalachian subregion	
Northern	343 (32.3)
North Central	402 (10.1)
Central	200 (8.0)
South Central	309 (19.0)
Southern	696 (30.7)

Note. Totals may not sum to stated sample size due to missing data. Percents may not sum to 100% due to rounding. HPV = human papillomavirus; MSA = metropolitan statistical area.

3.3. Follow-through

Most Appalachian females who initiated the HPV vaccine regimen received all three doses (67.8% [482/743]; Table 2). Follow-through increased from 59.4% in 2008 to 76.1% in 2010. In multivariable analyses, follow-through was more common among adolescent females who were 17 years old (OR = 3.01, 95% CI: 1.48–6.11), had healthcare coverage other than through their parents' employer or union (OR = 3.83, 95% CI: 1.04–14.09), or whose parents had heard of HPV (OR = 2.33, 95% CI: 1.28–4.24).