

SHORT REPORT



## Provider recommendation for HPV vaccination across Hispanic/Latinx subgroups in the United States

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### ABSTRACT

Healthcare provider recommendation is a key predictor of HPV vaccination among adolescents, yet little is known about how parents' receipt of a provider recommendation differs across Hispanic/Latinx subgroups in the United States. We analyzed data from the 2012–2016 National Immunization Survey – Teen on Hispanic/Latinx adolescent ages 13–17 ( $n = 16,335$ ). Analyses used weighted logistic regression models. Overall, 62.6% of parents of Hispanic/Latinx females and 46.4% of parents of Hispanic/Latinx males reported that they had received a provider recommendation for HPV vaccination. Among parents of females, receipt of a provider recommendation ranged from 55.0% among Central Americans to 73.3% among parents of Puerto Ricans. Among parents of males, the range was from 44.5% among Mexicans and multi-subgroup males to 53.4% among Cubans. There were no differences across Hispanic/Latinx subgroups in adjusted models among either males or females (all  $p > .05$ ). Among parents of females, provider recommendation was less common among those whose preferred language was Spanish for Central Americans and South Americans (both  $p < .05$ ). Efforts are needed to improve provider communication about and recommendations for HPV vaccination among the Hispanic/Latinx population and to ensure the availability of language assistance services for individuals with limited English proficiency.

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Almost half of adolescents in the United States (US) are not up-to-date with the human papillomavirus (HPV) vaccine series, and over 30% have not even initiated the series.<sup>1</sup> Past research has consistently shown that one of the strongest predictors of HPV vaccination among adolescents is whether their parents have received a recommendation from a healthcare provider to vaccinate.<sup>2,3</sup> In fact, recent national data show that nearly 75% of adolescents whose parents had received a provider recommendation had initiated the HPV vaccine series, compared to only 47% of adolescents whose parents had not received a recommendation.<sup>1</sup>

Hispanic/Latinx individuals experience several HPV-related disparities,<sup>4–7</sup> and can therefore benefit greatly from HPV vaccination, yet many Hispanic/Latinx parents are not receiving a provider recommendation to vaccinate their child.<sup>8,9</sup> This could be attributable to several reasons including a lack of effective communication about HPV vaccine from providers, which may be especially true for parents with limited English proficiency.<sup>10</sup> A limitation of past research in this area is that Hispanic/Latinx individuals have been examined as a single, homogeneous group. The Hispanic/Latinx population in the US is quite heterogeneous and includes persons of Mexican, Cuban, Puerto Rican, Central American, South American, and other Spanish descent.<sup>11</sup> There are important differences between these subgroups, including characteristics that may affect provider recommendation for HPV vaccination (i.e., English proficiency).<sup>11–14</sup> However, little is currently known about how receipt of a provider recommendation for HPV

vaccination differs across Hispanic/Latinx subgroups. We conducted a secondary data analysis to assess HPV vaccination outcomes across Hispanic/Latinx subgroups in the US. A secondary aim of this project was to examine receipt of a provider recommendation for HPV vaccination across these subgroups.

We describe the methods for this project in detail elsewhere<sup>15</sup> and briefly here. We analyzed data from the National Immunization Survey – Teen (NIS-Teen), an annual survey that monitors adolescent vaccination among 13–17 year-olds in the US.<sup>16</sup> The NIS-Teen collects data via a random-digit-dialed telephone survey with parents of adolescent ages 13–17 and a mailed survey to adolescents' healthcare providers. Our analyses included NIS-Teen data from 2012 to 2016 (i.e., the five most recent data years available at the start of our study) on 16,335 Hispanic/Latinx adolescents. All of these adolescents had information available on Hispanic/Latinx subgroup from the parent survey and had healthcare providers who completed the mailed survey. The NIS-Teen obtained informed consent from all participants.

The Institutional Review Board at the Ohio State University determined our secondary data analysis was exempt from review. The NIS-Teen is sponsored and conducted by the National Center for Immunization and Respiratory Diseases (NCIRD) of the Centers for Disease Control and Prevention (CDC) and authorized by the Public Health Service Act [Sections 306]. Data collection for NIS-Teen survey was approved by the National Center for Health Statistics

(NCHS) Research Ethics Review Board (ERB). Analysis of de-identified data from the survey is exempt from the federal regulations for the protection of human research participants. Analysis of restricted data (as described below) through the NCHS Research Data Center is also approved by the NCHS ERB.

The dependent variable was parents' receipt of a recommendation from a healthcare provider to vaccinate their child against HPV. The NIS-Teen assessed receipt of a provider recommendation (yes or no) by asking parents, "Has a doctor or other healthcare professional ever recommended that [TEEN] receive HPV shots?" The main independent variable was Hispanic/Latinx subgroup. The parent survey collected information on Hispanic/Latinx subgroup among parents who indicated their adolescent was Hispanic/Latinx. Based on this information, adolescents were categorized as Mexican, Cuban, Puerto Rican, Central American, South American, other Spanish descent, or multi-subgroup (i.e., parents indicated at least two of the other subgroups). Data on Hispanic/Latinx subgroups were not available in the public use NIS-Teen datasets, so we accessed these restricted data through the NCHS Research Data Center. We also examined preferred language in a potential interaction with Hispanic/Latinx subgroup, as described further below. Preferred language was based on whether parents completed the NIS-Teen telephone survey in English or Spanish. Additional covariates included demographic and health-related characteristics collected by the NIS-Teen. Sample characteristics are shown in Table 1.

We stratified analyses by sex since routine HPV vaccination was first recommended for adolescent females in 2006, and this type of recommendation was not issued for adolescent males until 2011.<sup>17,18</sup> For each sex, we used logistic regression to compare Hispanic/Latinx subgroups on parents' receipt of a provider recommendation for HPV vaccination. We constructed an unadjusted model that included only Hispanic/Latinx subgroup and then an adjusted model that controlled for year of data collection and the demographic and health-related characteristics in Table 1. These models produced odds ratios (ORs) and 95% confidence intervals (CIs).

To determine the effect of preferred language across Hispanic/Latinx subgroups, we examined if an interaction existed between these two variables. In examining this interaction, we constructed an adjusted logistic regression model that controlled for year of data collection and demographic and health-related characteristics. We used Holm's stepdown approach to adjust *p*-values from interaction models to account for multiple comparisons.<sup>19</sup> All analyses applied sampling weights and accounted for the complex design of the NIS-Teen,<sup>20</sup> though frequencies are not weighted. Statistical tests were two-tailed with a critical alpha of 0.05. We performed analyses using SAS Version 9.4 (SAS Inc., Cary, NC).

Overall, 62.6% of parents of Hispanic/Latinx females reported that they had received a provider recommendation for HPV vaccination. Across subgroups, receipt of a provider recommendation ranged from 55.0% among parents of Central American females up to 73.3% among parents of Puerto Rican females (Table 2). In the unadjusted model, receipt of a provider recommendation was more common among parents of Puerto Rican females compared to parents of Mexican

females (OR = 1.73, 95% CI: 1.26–2.38). However, there were no differences across subgroups in the adjusted model for females (all *p* > .05).

There was an interaction between Hispanic/Latinx subgroup and preferred language among females (interaction *p* < .001). In this model, receipt of a provider recommendation was less common among parents who completed the NIS-Teen telephone survey in Spanish compared to those who completed the survey in English for the following subgroups (Figure 1, panel A): Central American (39.7% vs. 73.1%; OR = 0.31, 95% CI: 0.14–0.69; *p* = .03) and South American (42.4% vs. 79.7%; OR = 0.16, 95% CI: 0.07–0.38; *p* < .001). A qualitatively similar pattern was found for the other subgroups among females, though these differences did not reach statistical significance (all *p* > .05).

Just under half (46.4%) of parents of Hispanic/Latinx males reported that they had received a provider recommendation for HPV vaccination. Receipt of a provider recommendation ranged from 44.5% among parents of Mexican and multi-subgroup males up to 53.4% among parents of Cuban males (Table 2). In the unadjusted model, receipt of a provider recommendation was more common among parents of Puerto Rican males compared to parents of Mexican males (OR = 1.38, 95% CI: 1.03–1.87). Similar to females, there were no differences across subgroups in the adjusted model for males (all *p* > .05). There was also no interaction between Hispanic/Latinx subgroup and preferred language among males (interaction *p* = .99). Although the percentage of parents who had received a provider recommendation was lower among those who completed the NIS-Teen telephone survey in Spanish compared to those who completed the survey in English for all but one subgroup (Figure 1, panel B), these differences did not reach statistical significance (all *p* > .05).

Many parents of Hispanic/Latinx adolescents in our study had not received a healthcare provider recommendation to vaccinate their child against HPV. Receipt of a provider recommendation was more common among parents of female adolescents than parents of male adolescents. This is not surprising since routine HPV vaccination was first recommended for females in 2006 but not for males until 2011.<sup>17,18</sup> Receipt of a provider recommendation did not differ greatly across Hispanic/Latinx subgroups among females or males. The lack of differences across subgroups is actually encouraging and may be one of the reasons why HPV vaccine coverage is similar across Hispanic/Latinx subgroups in the US.<sup>15</sup>

Our findings do highlight that, within some of the Hispanic/Latinx subgroups, receipt of a provider recommendation for HPV vaccination was less common among parents whose preferred language was Spanish compared to those whose preferred language was English. This is consistent with past research on provider communication about and recommendation for HPV vaccination,<sup>21,22</sup> but it is interesting that statistically significant differences were found only among parents of females who were Central American or South American. In terms of why differences were found only among parents of females, it may be due in part to HPV vaccine protecting against a sexually transmitted infection (STI). Healthcare providers are less likely to provide high-quality HPV vaccine recommendations if they believe that having to talk about an

**Table 1.** Characteristics of Hispanic/Latinx adolescents and their parents ( $n = 16,335$ ).

	<i>n</i> (weighted %)
Year	
2012	2546 (19.4)
2013	2735 (19.7)
2014	3251 (20.0)
2015	4599 (20.3)
2016	3204 (20.6)
<i>Adolescent characteristics</i>	
Sex	
Male	8492 (51.0)
Female	7843 (49.0)
Age	
13 y	3627 (20.4)
14 y	3500 (21.5)
15 y	3231 (20.8)
16 y	3207 (19.8)
17 y	2770 (17.5)
Race	
White	13688 (82.8)
Black	946 (6.5)
Other	1701 (10.7)
Hispanic/Latinx subgroup	
Mexican	10337 (63.8)
Cuban	219 (1.8)
Puerto Rican	1326 (7.7)
Central American	1066 (6.3)
South American	823 (5.5)
Other Spanish descent	1989 (11.1)
Multi-subgroup	575 (3.7)
Visited healthcare provider in last year	
No	3055 (21.8)
Yes	13051 (78.2)
Healthcare coverage	
Through parent employer or union	6509 (36.4)
Other health insurance	7670 (51.0)
No health insurance	1997 (12.6)
<i>Parent characteristics</i>	
Mother's age	
<35 y	2219 (13.4)
35–44 y	8151 (52.8)
45+ y	5965 (33.8)
Mother's education	
Less than high school	5599 (36.6)
High school	3472 (26.2)
Some college	3577 (19.3)
College graduate	3687 (17.8)
Mother's marital status	
Not married	6045 (40.0)
Married	10290 (60.0)
Language of NIS-Teen telephone survey	
English	9573 (53.7)
Spanish	6762 (46.3)
<i>Household characteristics</i>	
Poverty status	
Below or unknown poverty	7241 (48.6)
Above poverty	9094 (51.4)
Region of residence	
Northeast	2201 (12.6)
Midwest	2021 (9.9)
South	7431 (35.6)
West	4682 (41.9)

Totals may not sum to stated sample size due to missing data. Percents may not sum to 100% due to rounding. Frequencies were not weighted. NIS-Teen = National Immunization Survey – Teen.

STI makes conversations about HPV vaccine uncomfortable,<sup>23</sup> and it is possible that this effect is accentuated in situations with parents who have adolescent daughters and limited English proficiency.

In terms of the Hispanic/Latinx subgroups where differences by preferred language were found, Central Americans

**Table 2.** Parents' receipt of provider recommendation to vaccinate their child against HPV across Hispanic/Latinx subgroups.

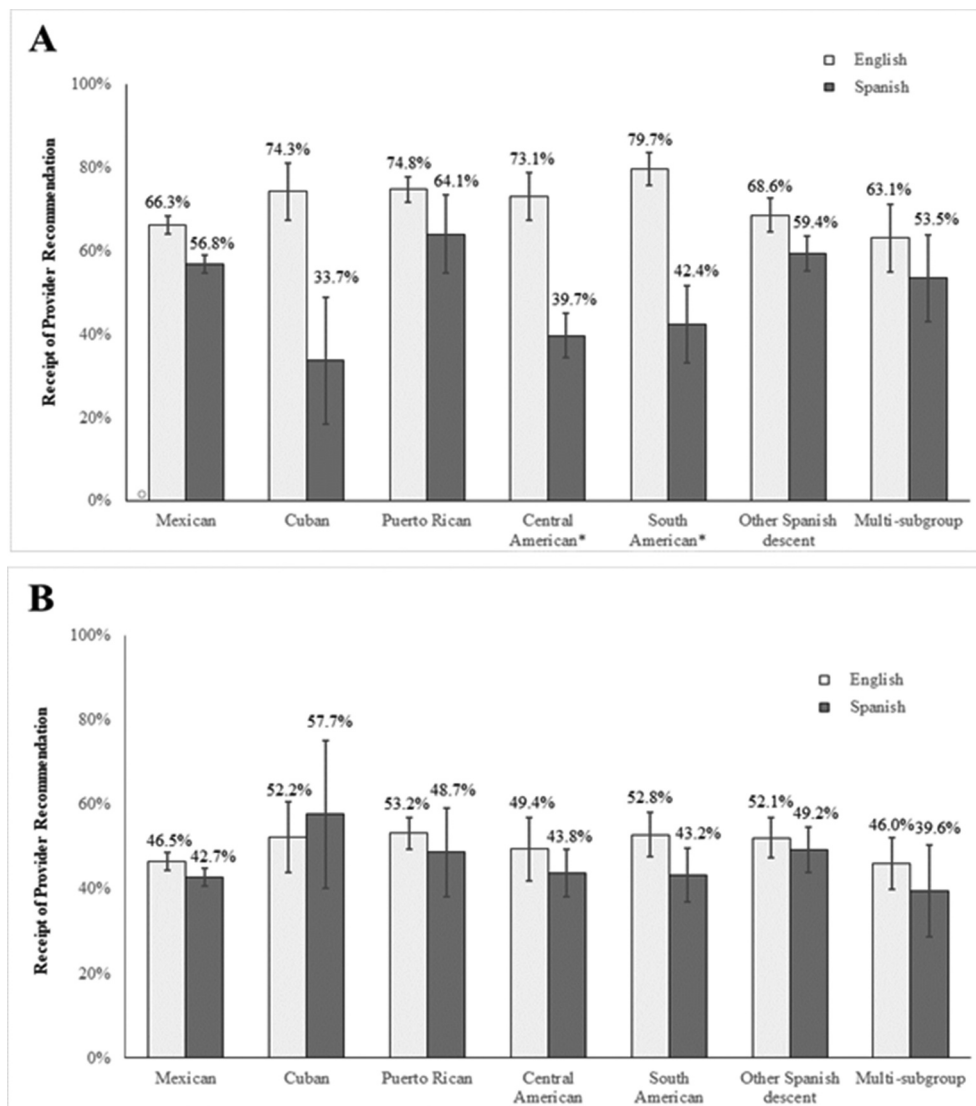
	Weighted %	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
<i>Females</i>			
Mexican	61.3	ref.	ref.
Cuban	63.3	1.09 (0.56–2.12)	0.74 (0.38–1.45)
Puerto Rican	73.3	1.73 (1.26–2.38)**	1.17 (0.80–1.69)
Central American	55.0	0.77 (0.53–1.11)	0.68 (0.45–1.01)
South American	67.7	1.32 (0.87–2.00)	0.83 (0.54–1.29)
Other Spanish descent	64.8	1.16 (0.87–1.54)	0.96 (0.69–1.34)
Multi-subgroup	60.8	0.98 (0.56–1.71)	0.80 (0.47–1.37)
<i>Males</i>			
Mexican	44.5	ref.	ref.
Cuban	53.4	1.43 (0.78–2.64)	1.32 (0.75–2.34)
Puerto Rican	52.6	1.38 (1.03–1.87)*	1.24 (0.88–1.74)
Central American	46.0	1.07 (0.73–1.55)	1.00 (0.68–1.48)
South American	49.6	1.23 (0.87–1.73)	1.06 (0.74–1.51)
Other Spanish descent	50.8	1.29 (0.96–1.74)	1.18 (0.85–1.64)
Multi-subgroup	44.5	1.00 (0.65–1.55)	0.88 (0.56–1.37)

Adjusted models controlled for year of data collection and the demographic and health characteristics included in Table 1. HPV = human papillomavirus; OR = odds ratio; CI = confidence interval; ref. = referent group.

\* $p < 0.05$ , \*\* $p < 0.001$

and South Americans tend to have lower English proficiency in general compared to other subgroups (e.g., Puerto Ricans and Mexicans).<sup>14</sup> It is therefore possible that parents in these subgroups whose preferred language was Spanish had especially low English proficiency, which in turn may make provider recommendations for HPV vaccination more challenging. Lack of health insurance is also more common among Central Americans and South Americans compared to other subgroups<sup>14</sup> and among Hispanic/Latinx individuals with limited English proficiency in general.<sup>24</sup> This may lead to lower utilization of preventive care services and opportunities to receive a provider recommendation for HPV vaccination among parents in these subgroups with limited English proficiency.

We think there are a few key strategies for increasing provider recommendation for HPV vaccination among the Hispanic/Latinx population, including individuals with limited English proficiency. First, ongoing efforts are needed to improve healthcare providers' communication about and recommendations for HPV vaccination. For example, training providers to use presumptive announcements in their communications with parents (i.e., statements that presume parents are ready to vaccinate) is more effective at improving HPV vaccine uptake than training providers to use participatory conversations.<sup>25</sup> In these communications with parents about HPV vaccine, it is also important that providers emphasize messages about cancer prevention.<sup>26</sup> Second, it is critical to ensure the availability of language assistance services for individuals with limited English proficiency. The Hispanic/Latinx population is the largest racial/ethnic minority population in the US,<sup>27</sup> and nearly 30% of this population reports speaking English less than "very well."<sup>28</sup> The ability to align Hispanic/Latinx individuals with linguistically and culturally concordant medical care improves patient satisfaction and understanding.<sup>29,30</sup> Federal law requires health programs and clinicians receiving federal financial assistance to take reasonable steps to provide meaningful access to free language assistance services for individuals with limited English



**Figure 1.** Receipt of provider recommendation for HPV vaccination by parents' preferred language across Hispanic/Latinx subgroups for adolescent females (panel A) and adolescent males (panel B). Bars indicate the standard errors. \* indicates subgroups with comparisons with  $p < .05$  after adjustment via Holm's stepdown approach.

proficiency,<sup>31,32</sup> yet such services are still not universally available.<sup>33</sup> Lastly, and related, we think it is also important that physicians are enabled to become more fluent in Spanish. About a third of medical schools in the US do not offer a medical Spanish curriculum, and among those that do offer this type curriculum, few use a validated approach to measure language proficiency after curriculum completion.<sup>34</sup>

Study strengths include a large sample of Hispanic adolescents from throughout the US and the ability to examine Hispanic/Latinx subgroup and preferred language. Study limitations include modest household response rates for the NIS-Teen, though the weights generated for NIS-Teen data are adjusted for nonresponse. In assessing provider recommendation for HPV vaccination, data were only available from the parents' perspectives, with no data available from the providers' perspectives. We were not able to examine the other Spanish descent subgroup and multi-subgroup at a more

granular level due to the large number of response categories included in each of these subgroups and the small sample size of each individual category. We also could not include additional factors (e.g., religiosity) in our statistical models due to lack of data on these factors in the NIS-Teen datasets.

In summary, healthcare provider recommendation is strongly associated with HPV vaccination among adolescents, yet many parents of Hispanic/Latinx adolescents in the US have not yet received a recommendation. Receipt of a provider recommendation did not differ greatly across Hispanic/Latinx subgroups, but recommendations were less common among parents whose preferred language was Spanish within multiple subgroups. Efforts are needed to improve provider communication about and recommendations for HPV vaccination among the Hispanic/Latinx population and to ensure the availability of language assistance services for individuals with limited English proficiency. The findings and conclusions in this paper are those

of the authors and do not necessarily represent the views of the Research Data Center, the National Center for Health Statistics, or the Centers for Disease Control and Prevention.

## Disclosure of potential conflicts of interest

None of the authors have disclosures to report.

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