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Differences in Parental Reasons for "No-Intent" for Teens to Receive HPV Vaccine by Receipt of Other Adolescent Vaccines, National Immunization Survey-Teen 2014

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Abstract

Differences in Parental Reasons for "No-Intent" for Teens to Receive HPV Vaccine by Receipt of Other Adolescent Vaccines, National Immunization Survey-Teen 2014

By Samantha Retzloff

Background: Few studies make comparisons between refusal of HPV vaccine and other recommended adolescent vaccines. The purpose of this study is to identify differences in parental reasons for lack of intention for children to receive HPV vaccine by the receipt of other adolescent vaccines, meningococcal and Tdap vaccines.
Methods: Data from the household survey participants in the 2014 National Immunization Survey-Teen was used for analyses. Parents cited their main reason for no intention for their teens to receive HPV vaccine. Responses were collapsed into five domains: i) Safety and Effectiveness Concerns, ii) Systemic Barriers, iii) Misperceptions About HPV Vaccine, iv) Lack of Knowledge, v) Socio-Cultural Barriers, and vi) Other. Multivariate analyses of covariance (MANCOVA) was used to test for the differences in means between the six different dependent variables (i.e. domain-level reason for non-vaccination) across the main independent variables of interest: receipt of any meningococcal vaccine and receipt of any tetanus booster vaccine.
Results: Parents of teens who received Tdap vaccine were more likely cite "misperceptions about HPV vaccine." Parents of female teens that received meningococcal vaccine were more likely to cite "safety and effectiveness concerns" about HPV vaccine. Parents of male teens that did not receive Tdap vaccine were more likely to cite "lack of knowledge" as their reason for HPV non-vaccination. Parents of female teens that did not receive Tdap vaccine were more likely to cite "systemic barriers" to receiving HPV vaccine.
Discussion: Misperceptions about HPV vaccine can lead parents to make decisions about receipt of HPV vaccine differently than other adolescent vaccines. Parents of female teens have more concerns about the safety and effectiveness of HPV vaccine than other adolescent vaccines. Parents of male teens cite their lack knowledge as the reason for non-receipt of adolescent vaccines. Systemic barriers are more likely to affect parents of female teens, depressing coverage of multiple adolescent vaccines. Future research is needed to determine how to appropriately tailor information for parents of adolescents to address these disparate reasons for HPV vaccine hesitance.

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BACKGROUND

The most prevalent sexually-transmitted infection (STI) in the United States is human papillomavirus (HPV), affecting approximately 1 in 4 teens (1). HPV causes an estimated 30,700 cancers in the U.S. each year; of which 28,000 are preventable by vaccination against HPV (2,3). This includes 70% of diagnosed cervical cancers that are caused by HPV types 16 and 18 (2). Additionally, HPV types 6 and 11 cause 90% of genital wart cases (2). The quadrivalent HPV vaccine (Gardasil) was first recommended by the Advisory Committee on Immunization Practices (ACIP) in 2006 for routine use in adolescent females (4). Since 2006, the FDA has approved two more highly efficacious HPV vaccinations: a bivalent vaccine (Ceravix) and more recently, the 9-valent vaccine (Gardasil 9), which has the potential to prevent 90% of cervical cancers (5, 6). The ACIP extended its recommendation to include males in 2011, and further updated its recommendations in 2016 to include a 2-dose schedule when the first dose is received before age 15 (7, 8).

Despite the Healthy People 2020 goal of 80% coverage for HPV vaccination among female adolescents aged 13-15 years, HPV vaccine coverage rates for both males and females remain lower than other recommended adolescent vaccinations (9,10). Recent data from the 2016 National Immunization Survey – Teen (NIS-Teen) estimated that only 65.1% of females and 56.0% of males aged 13 to 17 had initiated the HPV vaccine series, and only 43.4% overall were considered “up-to-date” with the vaccination schedule (10). Compared to the 88.0% coverage rate for Tdap booster vaccine, and 82.2% for at least one meningococcal vaccine, HPV vaccine remains underutilized and coverage is well below the Healthy People 2020 goal (10).

A number of studies have characterized factors associated with initiation and completion of the HPV vaccine series. For example, studies have found that sociodemographic characteristics of parents, having an 11 to 12 year old preventative visit, and provider recommendation are associated with HPV vaccine series initiation and completion (11-15). Though factors associated with receipt of HPV vaccination are well characterized, there is limited research that describes reasons for foregoing HPV vaccination and parental lack of intention to vaccinate adolescents. Further, there are few studies that make comparisons between refusal of HPV vaccine and other recommended adolescent vaccinations like the meningococcal and Tdap vaccines, and parental reasons for lack of intention to vaccinate their children. The purpose of this study is to identify differences in parental reasons for lack of intention for children to receive HPV vaccine by the receipt of other adolescent vaccines, meningococcal and Tdap vaccines.

METHODS

Data from the National Immunization Survey-Teen (NIS-Teen) was used for the analyses. The NIS-Teen survey is a nationally implemented survey that is collected annually by the National Center for Immunization and Respiratory Diseases and the National Center for Health Statistics of the Centers for Disease Control and Prevention. The survey uses a stratified national probability sample of teens and teens' parents from the United States that includes all 50 states, the District of Columbia, and the U.S. Virgin Islands. The methodology and weighting procedures that are used to provide a nationally-representative sample have been previously published (16). The surveys are administered as random-digit-dialing (RDD) telephone surveys and examine households with adolescents aged 13 to 17 years old. There are two steps in the collection of the survey: the household survey is collected via computer-assisted telephone interview techniques, followed by surveying of immunization providers who are identified in the first step (17).

At the time this analysis commenced, the 2014 NIS-Teen Survey was the most recent NIS-Teen iteration that contained all relevant data for this analysis, including data on parental reasons for no intention for teen to receive HPV vaccine. All estimates in this analysis are based on the household survey, which was parent-reported. Household survey data were used because our main outcome of interest are parental reasons for lack of intention for their teens to receive HPV vaccine, negating the need for provider-verified data. All respondents were asked questions about recall of vaccine receipt, health of the teen and teen's family, and demographic information about the teen and the teen's mother. The household survey in 2014 yielded a sample size of 38,703. The weighting used for the analysis was from the first phase, the RDD telephone survey, since our

outcomes of interest, reasons for lack of intention to vaccinate against HPV, is obtained from the household survey, as specified in the NIS-Teen Data User's Guide (17). The weight variable used for these analyses was specific to inclusion of only respondents living in the 50 states and District of Columbia.

Receipt of HPV, Meningococcal, and Tetanus Booster Vaccines

Parents were asked during the household survey to report if their teens had received vaccinations including for HPV, meningitis, and tetanus among several others. We focused on these three vaccines for these analyses because they are the three vaccinations recommended by healthcare providers and the ACIP for the 11-12 year old adolescent age group (10). Further, we assessed distribution of receipt of meningococcal and Tdap vaccines between teens with and without a history of receiving any dose of HPV vaccine (Figure 1 and 2).

No-intent to Receive the HPV Vaccine Series

In the household survey, parents or guardians of adolescents with no history of receiving any HPV vaccination dose at the time of the survey were asked the question "how likely is it the teen will receive HPV vaccinations in the next 12 months?". Those who responded "not too likely", "not likely at all", or "not sure/do not know" were considered to lack intention for their teen to receive the HPV vaccine. These parents were then asked what the main reason was for not intending to vaccinate their teen in the next 12 months. There were a total of 24 reasons documented (Table 1). For this analysis, we collapsed these 24 reasons into five domains, which were adapted from previous research (18): i) **Safety and Effectiveness Concerns**, ii) **Systemic Barriers**, iii)

Misperceptions About HPV Vaccine, iv) **Lack of Knowledge**, v) **Socio-Cultural Barriers**, and vi) **Other** (18) (Table 1). Each of these domains were treated as a dichotomous outcome for the purposes of our analyses, coded as 1 if a parent reported one of the reasons within each domain, and 0 if they did not.

Statistical Analysis

We assessed vaccine coverage for HPV, Tdap, and meningococcal vaccine, and compared vaccine uptake by demographic characteristics. The primary analysis utilized multivariate analyses of covariance (MANCOVA) to test for the differences in means between the six different dependent variables (i.e. domain-level reason for non-vaccination) across the main independent variables of interest: receipt of any meningococcal vaccine and receipt of any tetanus booster vaccine. MANCOVA was used because there are multiple dependent variables and multiple covariates for which we controlled. Covariates included: age of teen, sex of teen, race/ethnicity of teen, poverty status of teen's family, education level of teen's mother, mother's age, and whether the teen had received an 11-12 year old check-up or wellness visit. Additionally, results were stratified on sex.

Sampling weights provided in the 2014 NIS-Teen public use data were used to obtain population-based estimates (17). All analyses were performed using SAS version 9.4 (Cary, NC, USA), using survey procedures (PROC SURVEYFREQ and PROC SURVEYMEANS) as well as MANCOVA methods to test for differences in parental reason domains for "no-intent" to vaccinate with HPV vaccine. Further, MANCOVA

analyses were repeated to distinguish between male and female teens, to account for any differences in reasons for “no-intent” to vaccinate between male and female teens.

RESULTS

Sample Characteristics

The full sample of 38,703 parents were included in the analysis of characteristics for Table 2, which reports weighted prevalence estimates with 95% confidence intervals (CIs). Parents of teens that had not received any HPV vaccination were asked about intent to receive the HPV vaccine in the next 12 months. If they were classified as having no intention vaccinate in the next 12 months, they were prompted to give the main reason. 14,418 parents reported their main reason for their decision. However, this analysis used 13,974 of the overall sample size after excluding parents that responded "Already Up to Date" for their reason for lack of intention to vaccinate because this would indicate teens' HPV vaccine receipt.

Table 2 presents the socio-demographic characteristics of all 13-17 year old teens that were included in the household survey portion of the NIS-Teen Survey, and describes adolescent vaccine uptake across these characteristics. It also presents whether or not teens included in the analyses had received any doses of each of the three recommended adolescent vaccines: HPV, meningococcal, and tetanus booster.

The lowest reported coverage was for receipt of any HPV vaccine, with 42.34% (95% CI: 41.40%-43.28%) of teens that reportedly received any HPV vaccine. There were higher weighted percentages of teens that received any meningococcal or any tetanus booster vaccine, with 52.49% (95% CI: 51.54%-53.44%) that reportedly received any meningococcal vaccine, and 86.38% (95% CI: 85.72%-87.04%) that reportedly received any tetanus booster vaccine.

Figure 1 Receipt of meningococcal vaccine among 13-17 year olds that received and did not receive any dose of HPV vaccine, NIS-Teen 2014 (For bottom boxes: (% of all adolescents) (% of adolescents who did/did not receive HPV vaccine))

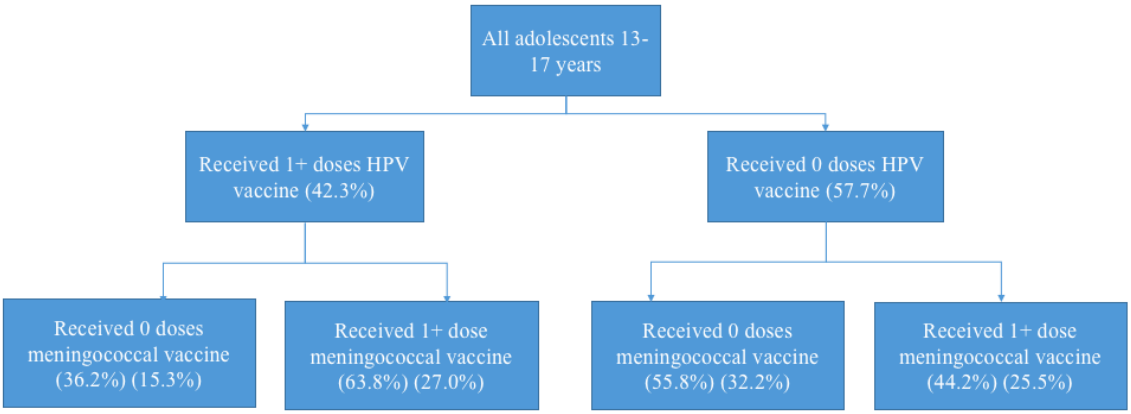
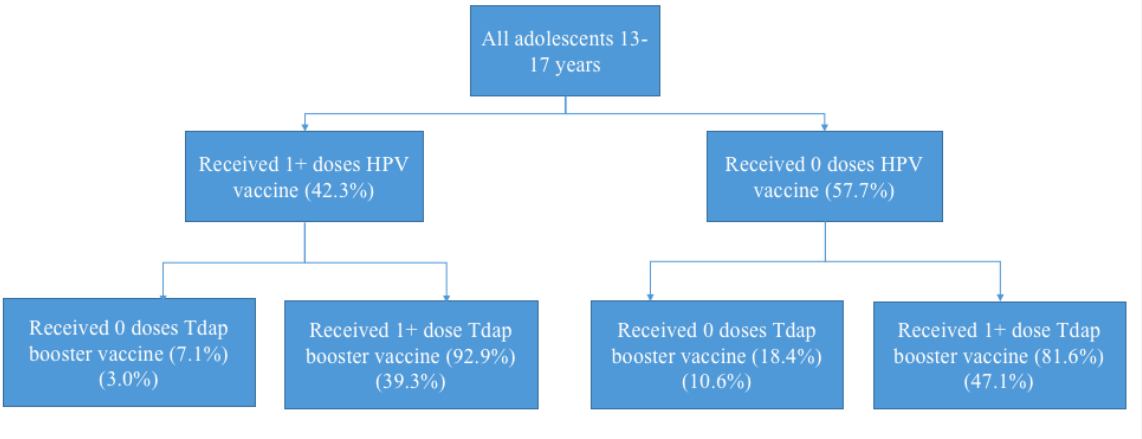


Figure 2 Receipt of tetanus booster (Tdap) vaccine among 13-17 year olds that received and did not receive any dose of HPV vaccine, NIS-Teen 2014 (For bottom boxes: (% of all adolescents) (% of adolescents who did/did not receive HPV vaccine))



Among teens that did not receive any doses of HPV vaccine, the majority reported receipt of Tdap vaccine (82%) (Figure 2), while receipt of meningococcal vaccine was lower (44%) (Figure 1). Receipt of Tdap and meningococcal vaccines was higher among teens who received at least one dose of HPV vaccine (93% and 64%, respectively) (Figure 1 and 2).

Results of the multivariate analyses of covariance (MANCOVA) are summarized in Tables 3, 4, and 5. When comparing reasons for HPV non-vaccination by receipt of

meningococcal vaccines, we observed no significant differences in reasons cited for lack of intention to receive HPV vaccine. However, we did find that parents of teens who received Tdap vaccine were more likely cite “misperceptions about HPV vaccine” than parents of teens who did not receive Tdap vaccine (13.8% vs. 11.8%, respectively), while parents of teens who did not receive Tdap vaccine were more likely to cite “lack of knowledge” about HPV vaccine than parents of teens who received Tdap vaccine (16.1% vs. 13.8%, respectively).

Sex-stratified results are presented in Table 5 (compared by meningococcal vaccine receipt) and Table 6 (compared by tetanus booster vaccine receipt). The only statistically significant result for differences in reasons for no intention to receive HPV vaccine by receipt of meningococcal vaccine was for parents of females that received any meningococcal vaccine, who were more likely to cite “Safety and Effectiveness Concerns” about HPV vaccine than parents of females who did not receive meningococcal vaccine (19.8% vs. 17.3%, respectively).

There were more differences in parental reasons for lack of intention to receive HPV vaccine between the subgroups of teens that received any tetanus booster vaccine and teens that did not. Parents of male teens that did not receive tetanus booster vaccine were significantly more likely to cite “Lack of Knowledge” as the reason for no intention to receive HPV vaccine than parents of male teens that received tetanus booster vaccine (18.3% vs. 14.6%, respectively). Parents of female teens that did not receive any tetanus booster vaccine were more likely to cite “Systemic Barriers” as the reason for no intention to receive HPV vaccine than parents of female teens that received a dose of tetanus booster (23.2% vs. 18.4%, respectively).

DISCUSSION

This study is the first, to our knowledge, to compare subgroups of parents giving reasons for no intention to vaccinate their teens with HPV vaccine within the next 12 months by receipt of other recommended adolescent vaccines. This is an important research question because parents' reasoning for non-vaccination of their children differs by type of adolescent vaccine. This information is vital for healthcare providers because strategies in educating parents about adolescent vaccines may then need to differ depending on which vaccine is under consideration.

Among teens that had not received HPV vaccine and whose parents lack intention for their teen to receive HPV vaccine, the most common reason domain given is "Misperceptions about HPV Vaccine," followed by "Systemic Barriers." Parents of females were more likely to cite "Safety and Effectiveness Concerns" as their reason for HPV non-vaccination than parents of males. Further, parents of female teens receiving meningococcal vaccine but not HPV vaccine cite "safety and effectiveness" concerns about HPV vaccine, which suggests these concerns exist towards HPV vaccine specifically. Parents of females that did not receive other adolescent vaccines were more likely to cite "Systemic Barriers" as the reason for HPV non-vaccination than among parents of females that did receive a dose of meningococcal or Tdap vaccine. However, this finding was not found to be true among parents of male teens. This suggests that "Systemic Barriers" are affecting a sizable proportion of adolescents, depressing coverage of multiple adolescent vaccines. While there have been improvements in addressing financial barriers (e.g. insurance coverage expansion through the Affordable

Care Act), other logistical barriers to accessing care appear to be present, and need further exploration.

Prior studies have identified factors associated with parental reasons for no intention for their teens to receive the HPV vaccine series within the next 12 months (17, 18). In a study by Cheruvu et al. in 2017, the authors used NIS-Teen data from 2008 to 2012 to attempt to identify socio-demographic factors associated with parents having no intention for female adolescents to receive HPV vaccine, longitudinal patterns by socio-demographic factors over the years studied, and factors associated with the reasons parents cited for having no intention to vaccinate female adolescents. (18). They found that number of people in the household, household income, mothers' education, mothers' age, insurance status, and non-recommendation from a healthcare provider were associated with parental lack of intention to vaccinate. Further, over the study period some of these factors such as mothers with college education, mothers older than 45 years old, and higher household income became more strongly associated with parental lack of intention to vaccinate. They also found that lack of a recommendation by a provider was strongly associated with parents citing "Systemic Barriers" as their reason for lack of intention to vaccinate. However, this analysis stopped with data in 2012, and does not include more recent information on reasons for HPV non-vaccination. A study done by Darden et al. in 2013 performed an analysis on NIS-Teen data from 2008 to 2010, and sought to compare reasons given by parents for not vaccinating their teens against HPV compared to other adolescent vaccines, MCV4 and Tdap/Td (19). Reasons cited by parents for not vaccinating teens against MCV4 and Tdap/Td were consistent over time, with main reasons including "Not recommended" and "Not needed or not

necessary." However, for reasons cited by parents for not vaccinating teens against HPV, the top concerns cited included the same as for other vaccines but also including "Not sexually active," which is a misperception about the HPV vaccine. In both studies, the importance of provider recommendation is highlighted by parents citing "Not Recommended" or "Systemic Barriers" as the reason for non-vaccination of their teens. The analyses we have performed further the idea that "Systemic Barriers" are cited by parents as reasons for HPV non-vaccination among teens that have also not received other adolescent vaccinations. In addition, Darden et al. demonstrated that the concern about the safety of the HPV vaccine was significantly higher over time (19). Our analyses show that concerns about the safety and effectiveness of HPV vaccine still exist in the 2014 NIS-Teen data, and parents of teens that received other vaccines but not HPV vaccine are more likely to have safety and effectiveness concerns. These findings suggest that to address growing concerns about HPV vaccine, providers and health education programs must pay attention to overall vaccination patterns, as well as patterns around HPV vaccine receipt versus other adolescent vaccines, to ensure a focus on the most appropriate topics for discussion around HPV vaccine.

This study has some limitations. Our analysis did not include provider recommendation as a covariate, because the parental reason "Not recommended" was included in the domain "Systemic Barriers" as one of our dichotomous outcome variables. The study done by Cheruvu et al., 2017 included provider recommendation as a predictor variable and covariate (18). Future studies should include additional stratification by receipt of provider recommendation to understand the impact of these recommendations on other potential barriers to vaccination. Additionally, our study is

limited in that our estimates of vaccine receipt are based on household survey data. To address this, a sensitivity analysis needs to be conducted to compare the household survey data to the provider-verified data collected in the second step of the NIS-Teen 2014.

This study adds to the existing body of knowledge on reasons for HPV non-vaccination. By comparing these reasons across receipt of other vaccines, we were able to identify differences in reasons that parents give for lack of intention to vaccinate their teens against HPV. These findings may help in future outreach efforts to healthcare providers regarding vaccine communication. Providers may be able to use prior knowledge about non-receipt of HPV vaccine to understand reasons for HPV non-vaccination and deliver appropriate messages to address parental concerns. Based on the findings of previous studies as well as our analyses, providers should address parents' safety concerns about HPV vaccine, especially for parents of female adolescents. The large proportion of parents who have misperceptions about HPV vaccine also suggest that providers, as well as educational materials about HPV vaccine, need to focus on providing accurate information about HPV vaccine while debunking misinformation that parents may have.

PUBLIC HEALTH IMPLICATIONS

Numerous studies have addressed factors related to receipt of HPV vaccination. This study adds to the existing body of knowledge on reasons for HPV non-vaccination by comparing these reasons across receipt of other recommended adolescent vaccines. We identified differences in reasons that parents cite for lack of intention for their teens to receive HPV vaccine depending on receipt of meningococcal or Tdap vaccine. These findings may provide useful information to health care providers and adolescent health programs in future outreach efforts regarding communication about vaccines. Providers may use knowledge about non-receipt of HPV vaccine and reasons for HPV non-vaccination to effectively deliver messages to address parents' concerns and misinformation. Previous studies, as well as our analyses, present findings that suggest providers should address parents' safety concerns about HPV vaccine, especially for parents of female adolescents. Due to the large proportion of parents who have misperceptions about HPV vaccine, we also suggest that providers, as well as educational materials about HPV vaccine, need to focus on providing accurate information about HPV vaccine while debunking misinformation that parents may have.

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Table 1 Reasons for no-intent to receive human papillomavirus vaccine (HPV) series among unvaccinated adolescents aged 13-17 years, National Immunization Survey-Teen 2014

Domain	Reason # [a, b]	Main reason teen will not receive HPV vaccine dose in the next 12 months
Safety and Effectiveness Concerns	HPVI_REAS_11	Safety Concern/Side Effects
	HPVI_REAS_12	Effectiveness Concern
	HPVI_REAS_21	More Info/New Vaccine
Systemic Barriers	HPVI_REAS_1	Not Recommended
	HPVI_REAS_10	Costs
	HPVI_REAS_20	Time
	HPVI_REAS_23	Not Available
	HPVI_REAS_24	Not a School Requirement
	HPVI_REAS_28	No Doctor or Doctor's Visit Not Scheduled
	HPVI_REAS_26	No OB/GYN
Misperceptions about HPV Vaccine	HPVI_REAS_2	Not Needed or Not Necessary
	HPVI_REAS_6	Not Appropriate Age
	HPVI_REAS_15	College Shot
	HPVI_REAS_5	Not Sexually Active
	HPVI_REAS_25	Increased Sexual Activity Concern
	HPVI_REAS_27	Already Sexually Active
	HPVI_REAS_29	Child is Male
Lack of Knowledge	HPVI_REAS_3	Lack of Knowledge
Socio-Cultural Barriers	HPVI_REAS_14	Child Should Make Decision
	HPVI_REAS_16	Don't Believe in Immunizations
	HPVI_REAS_17	Family/Parental Decision
	HPVI_REAS_19	Religion/Orthodox
Other	HPVI_REAS_9	Other Reason
	HPVI_REAS_13	Child Fearful
	HPVI_REAS_18	Handicap/Special Needs

[a] HPV Reason variables from original NIS-Teen 2014 dataset

[b] HPVI_REAS_22 "already up to date" excluded from analysis

Table 2 Sample characteristics of teens aged 13-17 years included in the household survey, National Immunization Survey-Teen 2014 (Unweighted sample N = 38,047)

Characteristics	Overall Weighted %	Has Received Any HPV shots Weighted %	Has Received Any Meningococcal Shots Weighted %	Has Received Any Tetanus Booster Weighted %
Receipt of Vaccine				
Yes	N/A	42.3 (41.4, 43.3)	52.5 (51.5, 53.4)	86.4 (85.7, 87.0)
No, Don't Know, and Refused	N/A	57.7 (56.7, 58.6)	47.5 (46.6, 48.5)	13.6 (13.0, 14.3)
Adolescent Age, years				
13	20.0 (19.3, 20.8)	38.1 (36.0, 40.2)	49.5 (47.3, 51.6)	85.4 (83.8, 87.1)
14	20.3 (19.6, 21.0)	40.8 (38.8, 42.8)	52.9 (50.9, 55.0)	86.6 (85.3, 87.9)
15	20.0 (19.2, 20.7)	43.5 (41.4, 45.6)	49.0 (46.9, 51.1)	88.0 (86.6, 89.4)
16	20.5 (19.7, 21.3)	44.1 (42.0, 46.3)	55.1 (52.9, 57.2)	85.9 (84.4, 87.5)
17	19.2 (18.5, 20.0)	45.4 (43.3, 47.5)	56.1 (54.0, 58.1)	86.0 (84.5, 87.4)
Gender of Child				
Male	51.1 (50.2, 52.1)	34.8 (33.6, 36.1)	51.7 (50.4, 53.0)	86.2 (85.2, 87.1)
Female	48.9 (47.9, 49.8)	50.2 (48.9, 51.6)	53.3 (52.0, 54.7)	86.6 (85.7, 87.5)
Race/Ethnicity				
Hispanic	22.4 (21.5, 23.4)	46.5 (43.9, 49.1)	55.7 (53.1, 58.3)	84.2 (82.4, 86.0)
Non-Hispanic White	54.6 (53.7, 55.5)	40.5 (39.5, 41.6)	51.5 (50.4, 52.6)	88.8 (88.1, 89.5)
Non-Hispanic Black	14.0 (13.4, 14.7)	44.3 (41.8, 46.9)	52.8 (50.3, 55.4)	84.2 (82.3, 86.1)
Other/Multi-Race	9.0 (8.4, 9.5)	39.8 (36.7, 42.9)	50.0 (46.8, 53.2)	80.8 (78.1, 83.5)
Poverty Status				
Above Poverty > $75K	35.3 (34.5, 36.2)	43.8 (42.4, 45.1)	53.9 (52.5, 55.3)	90.4 (89.6, 91.2)
Above Poverty <= $75K	35.4 (34.4, 36.3)	40.0 (38.4, 41.6)	49.2 (47.6, 50.9)	85.8 (84.6, 86.9)
Below Poverty	23.0 (22.1, 23.9)	45.7 (43.4, 48.1)	55.6 (53.3, 58.0)	82.3 (80.6, 84.0)
Unknown	6.4 (5.9, 6.8)	35.1 (31.9, 38.3)	51.4 (47.9, 54.9)	82.4 (79.5, 85.3)
Education Level of Mother				
Less than 12 years	13.7 (12.9, 14.5)	43.0 (39.9, 46.1)	51.8 (48.6, 54.9)	78.6 (76.2, 81.0)
12 years	23.5 (22.6, 24.3)	40.3 (38.2, 42.3)	50.9 (48.8, 53.0)	83.1 (81.5, 84.6)
More than 12 years, Non-college grad	25.8 (25.0, 26.6)	41.8 (40.1, 43.6)	52.7 (50.9, 54.5)	87.4 (81.5, 84.6)
College graduate	37.1 (36.2, 37.9)	43.8 (42.4, 45.2)	53.7 (52.3, 55.1)	90.6 (89.8, 91.4)
Mother's age, years				
Less than or equal to 34	9.2 (8.7, 9.8)	45.8 (42.5, 49.0)	52.3 (49.1, 55.5)	85.0 (82.7, 87.3)
35-44	43.9 (42.9, 44.8)	41.2 (39.8, 42.7)	52.7 (51.2, 54.2)	85.9 (84.9, 87.0)
Greater than or equal to 45	46.9 (46.0, 47.9)	42.7 (41.4, 44.0)	52.3 (51.0, 53.6)	87.1 (86.2, 88.0)
Teen Had 11-12 Year Old Check-Up				
Yes	89.9 (89.3, 90.6)	46.2 (45.1, 47.2)	55.7 (54.6, 56.7)	88.9 (88.3, 89.6)
No	5.8 (5.3, 6.3)	26.8 (23.1, 30.5)	38.1 (34.1, 42.0)	73.6 (69.4, 77.7)
Don't Know	4.3 (3.8, 4.8)	30.7 (25.4, 35.9)	33.4 (28.1, 38.7)	66.3 (60.8, 71.8)
Refused	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	11.3 (0.0, 36.9)	16.5 (0.0, 49.1)

Table 3 Parents' cited reasons for "no-intent" to receive HPV vaccine in next 12 months by receipt of any meningococcal vaccine or any tetanus booster vaccine, NIS - Teen 2014

HPV Reason Domain	Meningococcal Vaccine			Tetanus Booster Vaccine		
	Received %	Did Not Receive %	Difference % difference (95% CI)	Received %	Did Not Receive %	Difference % difference (95% CI)
Safety and Effectiveness Concerns	14.2	12.9	1.3 (-0.1, 2.6)	13.8	11.8	2.0 (-0.0, 4.0)
Systemic Barriers	22.4	22.5	-0.1 (-1.7, 1.5)	22.3	24.2	-2.0 (-4.4, 0.5)
Misperceptions about HPV Vax	37.2	37.3	-0.1 (-2.0, 1.8)	37.7	34.2	3.5 (0.7, 6.4)
Lack of Knowledge	13.6	14.5	-1.0 (-2.3, 0.4)	13.8	16.1	-2.3 (-4.4, -0.2)
Socio-Cultural Barriers	6.2	6.2	0.1 (-0.9, 1.0)	6.2	6.6	-0.5 (-1.9, 1.0)
Other	6.4	6.5	-0.1 (-1.1, 0.8)	6.4	7.2	-0.8 (-2.3, 0.7)

Table 4 Parents' cited reasons for "no-intent" for teen to receive HPV vaccine in next 12 months by receipt of any meningococcal vaccine stratified by sex, NIS - Teen 2014

HPV Reason Domain	Males			Females		
	Received Any Mening. Vaccine %	Did Not Receive Mening. Vaccine %	Difference % difference (95% CI)	Received Any Mening. Vaccine %	Did Not Receive Mening. Vaccine %	Difference % difference (95% CI)
Safety and Effectiveness Concerns	10.3	9.9	0.4 (-1.1, 1.9)	19.8	17.3	2.5 (0.1, 4.9)
Systemic Barriers	25.0	24.8	0.2 (-1.9, 2.4)	18.6	19.4	0.8 (-3.1, 1.6)
Misperceptions about HPV Vaccine	39.0	38.3	0.8 (-1.7, 3.2)	34.7	35.9	-1.2 (-4.1, 1.7)
Lack of Knowledge	14.4	15.6	-1.3 (-3.1, 0.5)	12.3	12.9	-0.6 (-2.6, 1.4)
Socio-Cultural Barriers	5.7	5.3	0.4 (-0.7, 1.6)	7.0	7.5	-0.5 (-2.0, 1.1)
Other	5.6	6.1	-0.6 (-1.8, 0.6)	7.6	7.1	0.6 (-1.0, 2.1)

Table 5 Parents' cited reasons for "no-intent" for teen to receive HPV vaccine in next 12 months by receipt of any tetanus booster vaccine stratified by sex, NIS - Teen 2014

HPV Reason Domain	Males			Females		
	Received Any Tetanus Vaccine %	Did Not Receive Tetanus Vaccine %	Difference % difference (95% CI)	Received Any Tetanus Vaccine %	Did Not Receive Tetanus Vaccine %	Difference % difference (95% CI)
Safety and Effectiveness Concerns	10.2	9.2	1.0 (-1.4, 3.4)	18.9	15.6	3.4 (-0.1, 6.9)
Systemic Barriers	24.9	24.6	0.3 (-3.1, 3.7)	18.4	23.2	-4.9 (-8.4, -1.3)
Misperceptions about HPV Vax	39.0	35.7	3.3 (-0.5, 7.2)	35.8	32.0	3.8 (-0.6, 8.1)
Lack of Knowledge	14.6	18.3	-3.6 (-6.5, -0.8)	12.6	13.2	-0.6 (-3.6, 2.4)
Socio-Cultural Barriers	5.4	6.0	-0.5 (-2.3, 1.3)	7.2	7.6	-0.4 (-2.8, 2.0)
Other	5.8	6.3	-0.5 (-2.4, 1.4)	7.2	8.4	-1.3 (-3.6, 1.1)