



Original article

Human Papillomavirus Vaccination: What Are the Reasons for Nonvaccination Among U.S. Adolescents?



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A B S T R A C T

Purpose: Human papillomavirus (HPV) vaccination is recommended for 11- to 12-year-old U.S. adolescents. Unfortunately, HPV vaccine rates have been suboptimal. Parents are key decision agents regarding their adolescents' health; thus, it is necessary to understand their reasons for not vaccinating their adolescents. The purpose of this study was to compare parents' primary reasons for non-HPV vaccination by calendar year, sex of the child, and level of vaccine hesitancy.

Methods: The National Immunization Survey-Teen 2012–2015 was subset to parents who did not intend for their adolescent to receive the HPV vaccine in the next 12 months (N = 59,897). Survey-weighted logistic regression models assessed the impact of year, sex, and level of hesitancy on main reasons for nonvaccination.

Results: Not receiving a recommendation and lack of knowledge were significantly more likely to be the reasons for nonvaccination in 2012 and 2013 compared with 2015. The following reasons were significantly less likely to be reported for females compared with males: not recommended (odds ratio [OR] = .63, 95% confidence interval [CI], .58–.69) and lack of knowledge (OR = .86, 95% CI, .79–.94). In contrast, parents of females were more likely to state they were concerned about safety and side effects (OR = 2.19, 95% CI, 1.98–2.41). Differences in reasons for nonvaccination were observed between those who were unlikely and unsure regarding receiving the HPV vaccine.

Conclusions: Findings indicate that U.S. parental attitudes about HPV vaccination have changed over time and reasons for nonvaccination vary based on the sex of the adolescent and the level of hesitancy of the parent. This information can shape how providers respond to parental concerns and HPV vaccine hesitancy.

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IMPLICATIONS AND CONTRIBUTION

Human papillomavirus vaccination rates continue to be suboptimal in the United States. This study found lack of knowledge, and no recommendation were less likely to be reasons in later years. Differences were observed by sex of the child and level of hesitancy, which may have implications for human papillomavirus vaccine messaging to parents.

Conflicts of interest: E.M.D. has served on the U.S. HPV Vaccine Advisory Board for Merck Pharmaceuticals. The other authors have no conflicts of interest to disclose.

Clinical Trial Registry: Not applicable.

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Human papillomavirus (HPV) is the most common sexually transmitted infection in the United States [1]. HPV is responsible for almost all cervical cancers and contributes to cancers of the vagina, vulva, penis, anus, rectum, and oropharynx, resulting in over 30,000 HPV-related cancer cases each year [2]. There are currently three vaccines available and approved for the prevention of HPV, including a quadrivalent (HPV4), bivalent (HPV2),

and nonavalent (HPV9) vaccine. All three vaccines protect against HPV types 16 and 18, which are linked to the majority of HPV-related cancers [2,3]. While vaccination guidelines have changed over the years, the Advisory Committee on Immunization Practices currently recommends routine (HPV4 and HPV9) vaccination for males and females aged 11 or 12 years; females age 13 to 26 years not previously vaccinated; and males age 13 to 21 years and up to age 26 years for special populations, including men who have sex with men and immunocompromised individuals not previously vaccinated [3]. Healthy People 2020 set the overall goal of improving routine vaccination rates for adolescents, and the specific goal of increasing three-dose HPV vaccination rates to 80% for both adolescent males and females between the ages of 13 and 15 years by 2020 [4]. However, despite the recommendations and the availability of safe and effective vaccines, HPV vaccination rates remain far lower than the Healthy People 2020 goal and rates for other routine adolescent vaccines. In 2015, only 49.8% of adolescent males and 62.8% of females had ≥ 1 HPV vaccine dose [5]. In contrast, adolescent vaccination rates for meningococcal conjugate (MCV4) and tetanus, diphtheria, and acellular pertussis (Tdap) were 81.3% and 87.1%, respectively [5].

While provider recommendation is one of the most influential determinants for adolescent HPV vaccination [6], studies have shown parents and primary caregivers to be key decision-making agents [7,8]. Parental factors influencing HPV vaccination include lack of knowledge, concerns for vaccine safety, outcome expectations with vaccination (e.g., belief child will engage in sexual activity), insurance coverage, and parents' social networks [9–11]. To reach optimal adolescent vaccination rates, it is necessary to understand parents' and primary caregivers' reasons for not vaccinating their children for HPV during the recommended period of adolescence. Given the availability of the HPV vaccine over the last decade, it is possible to explore these reasons across years and how these reasons vary by two critical parent-child factors—sex of the child and parent vaccine hesitancy. Specifically, the recommendation for female routine vaccination occurred in 2006 [12], and was followed by the recommendation for male routine vaccination in 2011 [13]. Owing to these delays, there may be differences in parental attitudes toward HPV vaccination by the sex of the child, especially as male HPV vaccination rates rise. Most of the research to date on trends in HPV vaccination over time has focused on females, rather than exploring differences between the two sexes [14–16]. Furthermore, HPV vaccination rates are influenced by the upward trend in vaccine hesitancy in the United States and other industrialized countries [17,18]. The World Health Organization recognized vaccine hesitancy to be a globally relevant issue, defining the behavior as the “delay in acceptance or refusal of vaccination despite availability of vaccination services.” In efforts to address parental vaccine hesitancy, the President's Cancer Panel set a goal to “increase parents', caregivers', and adolescents' acceptance of HPV vaccines” [19]. By assessing trends in reasons for HPV nonvaccination by sex of the child and level of parental hesitancy, health care providers and public health workers can direct vaccination improvement efforts to specifically and efficiently address unique concerns among these subgroups. Thus, the purpose of this study was to compare primary reasons for nonvaccination for HPV by calendar year, sex of the child, and level of vaccine hesitancy.

Methods

Sample

The National Immunization Survey-Teen (NIS-Teen) is the primary U.S. surveillance database for adolescent vaccination. Specifically, it is an add-on survey to the National Immunization Survey, which targets noninstitutionalized households with 19- to 35-month-old children. The National Immunization Survey uses a dual-sampling frame with random digit dialing. Those households contacted by this survey were then screened for the presence of one randomly selected 13- to 17-year-old adolescent for inclusion in NIS-Teen. This two-phased survey includes a telephone interview with an adult in the household, most knowledgeable about the adolescent's health, and a provider survey to verify vaccination status [20]. This analysis combined only the United States interview data from NIS-Teen 2012 to 2015 ($N = 150,250$). These study years were selected since the recommendation for routine male vaccination occurred in October 2011 [13], and 2015 data were the latest available at the time of analysis. This secondary data analysis is considered exempt from the institutional review board.

The interviewed adult was asked to report the adolescent's HPV vaccination status. While the interviewed adult may not have been a parent of the adolescent (e.g., other caregiver), the term parent will be used in this article to refer to the adult respondent. Among adolescents who had not received the HPV vaccine, the interviewed adults were asked “How likely is it that [teen] will receive HPV shots in the next 12 months?” Participant response options were very likely; somewhat likely; not too likely; not at all likely; and not sure/do not know. Persons who responded not too likely; not at all likely; and not sure/do not know were included in this sample since he/she was then asked the main reason for noninterest in HPV vaccination. The final analytic sample was 59,897.

Measures

Participants were asked to describe the main reason the adolescent would not receive the HPV vaccine in the next 12 months. This was then coded into 26 specific categories by the developers of this survey, including not recommended, costs, safety concerns/side effects, effectiveness concern, child fearful, child should make the decision, receive the shot in college, do not believe in immunizations, family/parental decision, special needs or illness, religion, not needed or not necessary, time, need more information on new vaccine, already up-to-date, not available, not a school requirement, increased sexual activity concern, no obstetrician/gynecologist, already sexually active, no doctor or doctor's visit not scheduled, child is male, lack of knowledge, not sexually active, not appropriate age, and other. The frequencies for each of the reasons by sex were assessed for the aggregate 2012–2015 data to identify the top reasons for nonvaccination. The top five items for males and females were included in this analysis due to having adequate sample sizes, specifically, not recommended, not needed or not necessary, lack of knowledge, not sexually active, and safety concern/side effects. Previous studies have used this approach [21,22]. These five main reasons for nonvaccination were operationalized as separate, dichotomous variables; responses no, do not know, and refused were combined as one category and compared with yes responses.

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