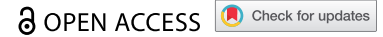


RESEARCH ARTICLE



# An opportunity to increase human papillomavirus vaccination rates: Change the guidelines

Abraham Aragones<sup>a,b</sup>, Francesca Gany<sup>a</sup>, Andrea Kaplan<sup>c</sup>, and Denise Bruno<sup>b</sup>

<sup>a</sup>Immigrant Health & Cancer Disparities Service, Department of Psychiatry and Behavioral Sciences, Memorial Sloan-Kettering Cancer Center, New York, NY, USA; <sup>b</sup>School of Public Health, Downstate Health Sciences University, State University of New York, Brooklyn, NY, USA; <sup>c</sup>Pediatric consultant

## ABSTRACT

Given the low rates of Human Papillomavirus (HPV) vaccination initiation and timely series completion in 11- and 12-year old children, we sought to assess potential opportunities for initiating routine vaccination at a younger age. A cross-sectional study of Latino parents of HPV vaccine-eligible 9- or 10-year-old children in New York City assessed whether there were opportunities to discuss the HPV vaccine during their most recent primary care provider (PCP) visit. Parents were approached between November, 2016 and January, 2018. Of 86 parents who participated, 97% reported having visited the child's PCP in the previous year for an annual checkup and 85% reported that they had neither discussed the HPV vaccine nor received a recommendation for the vaccine during that visit. In a population of Latino parents, predominantly Mexican immigrants with less than a high school education and limited English proficiency, most 9- to 10-year-old children followed the recommendation for an annual PCP visit. Lowering the recommended age for routine vaccination with the HPV vaccine to 9 – 10 years of age should be considered as an important strategy to increase HPV vaccination rates in this and other populations.

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## Introduction

The HPV vaccine is a safe and effective cancer prevention strategy that continues to lag in acceptance despite efforts to remove barriers to vaccination. In 2020, HPV vaccination completion rates were far below the Healthy People 2030 objective of having 80% of 13–15 year old adolescents receive the recommended doses.<sup>1</sup> From 2012–2016, in the United States, an average of 34,800 cancers were attributable to the Human Papillomavirus, and it is estimated that more than 32,000 of those would be preventable with the 9-valent HPV vaccine.<sup>2</sup>

The HPV vaccine is currently administered in a series of 2 or 3 doses: two doses are recommended for most persons starting the series before their 15<sup>th</sup> birthday; three doses are recommended for teens and young adults who start the series at ages 15 through 26 years and for immunocompromised persons.<sup>3</sup> The HPV vaccine is currently recommended for routine vaccination at 11 or 12 years of age even though it can be initiated at age 9.<sup>3</sup> Despite FDA approval and evidence supporting its use starting at age 9, the Advisory Committee on Immunization Practices (ACIP) recommends routine HPV vaccination for 11- or 12-year-old girls and boys during their routine vaccine appointment, the established young adolescent health care visit recommended by several professional organizations, when receipt of other vaccines is also recommended.<sup>4</sup> The rationale for this strategy includes vaccine safety, higher antibody titers than in older age groups, HPV epidemiology, potential age of sexual debut, cost-effectiveness, and the administration age of other vaccines.<sup>4</sup> And yet, almost a decade since this recommendation was put in place,

according to the 2020 National Immunization Survey -Teen, only 46% of U.S. adolescents completed the HPV vaccination series by age 13.<sup>5</sup>

Although HPV vaccination rates are generally low in the U.S., they are slightly higher among Latino adolescents than those of other ethnicities, for reasons including greater parental acceptance of vaccines in general, higher adherence to provider recommendations, more reliance on public school and other state and federal programs requiring immunizations, among others.<sup>6–8</sup> However, consistent with other populations, initiation of the vaccine series and completion rates by 13 years of age remain very low, below 50% in most geographical areas in the United States for all populations, including Latino children.<sup>5,6</sup> Furthermore, Latino children have overall lower access to care than the general population, including lower rates of health insurance and regular sources of health care, underlining the importance of maximizing every opportunity to administer the vaccine.<sup>9–11</sup> Despite this, most Latino children 9 or 10 years of age have a routine medical checkup.<sup>12</sup> Therefore, we sought to assess and describe potential missed opportunities to vaccinate Latino children of those ages during routine visits and understand the consequences of the current HPV vaccine guidelines.

## Patients and methods

Self-described Mexican-origin parents were approached to participate in this cross-sectional study at the Mexican Consulate's Ventanilla De Salud (VDS), (Health Window)

program in New York City. The VDS program operates in 50 Mexican consulates across the U.S. and is a collaboration between the Mexican government, nonprofits, and private agencies aimed at facilitating access to health care, and also provide health education and health screenings to low-income and migrant Latinos in the U.S. in a trusted environment.

A convenience sample of parents attending the VDS were approached consecutively between November 2017 and January 2019 to assess their eligibility. Participants had to (1) be born in Mexico or the U.S. and self-identify as Mexican-American or Latino/Hispanic, (2) speak primarily Spanish, (3) have at least 1 child between the ages of 9 and 10 years who had not received the HPV vaccine (confirmed via the child's immunization card), (4) parent self-identify as the child's main caregiver in health-care matters, (5) have been present during the child's most recent visit to their primary care provider (PCP), and (6) consent to participate.

Participants completed a Spanish-language self-assessment and received a \$10 participation incentive for their time spent in the study. After completion of the survey, parents participated in a one-on-one tailored education session about HPV in general and HPV vaccine specifically conducted by the research team (see [Appendix A](#)), and their interest and willingness to vaccinate their child was assessed. Questionnaires were administered using Research Electronic Data Capture (REDCap), a data management software system hosted and managed by Memorial Sloan Kettering (MSK) and analyzed using SPSS v27. Descriptive statistics were used to evaluate demographic variables such as education, insurance status, regular source of care, country of origin, among others, for parents and children. Associations between parental and children variables and access to care measurements were explored using rate comparisons (chi-square). The Institutional Review Board at MSK approved this study.

## Results

Of 122 eligible parents approached for study participation, 86 consented and took part, representing 86 unique families. [Table 1](#) shows socio-demographic characteristics of parents and children.

Ninety-eight percent (84) of parents reported having health insurance and a regular source of healthcare for their child, and 88% (76) reported a private pediatrician as being the source of care. Provider information was verified by study team via phone call. No private practice provider identified by parents cared for more than one child in the study. Other sources of care besides private practice pediatricians included pediatric clinics within 3 federally qualified health centers ( $n = 4$ ) and 3 public hospitals ( $n = 6$ ).

Eighty-four parents (97%) reported that either their 9 or 10-year-old had a wellness visit to their PCP in the past 12 months. Only 15% of parents reported having a conversation with the child's PCP about the HPV vaccine and none reported receiving a recommendation for the vaccine during their visit. No significant associations were found between parents and children socio-demographic information and visit to PCP or having had a conversation about HPV vaccine.

**Table 1.** Parents & Children Socio-Demographic Characteristics (N = 86).

Age (Parents) mean(range)	36yo (27–52)
Mother	87%
Father	13%
Parent Country of Origin	
Mexico	97%
U.S.	3%
Parent years of education	
Less than 5 <sup>th</sup> grade	14%
6 <sup>th</sup> to 8 <sup>th</sup> Grade	45%
8 <sup>th</sup> to 12 <sup>th</sup>	36%
More than High School	5%
Parents Primary Language	
Spanish	100%
Parent English Proficiency	
Less than Very Well	58%
Very Well	42%
If Parent Born Abroad, how many years in the US	
Less than 1 year	5%
1 to 5 years	5%
6 to 10 years	1%
More than 10 years	89%
Age (Children)	
9yo	50%
10yo	50%
Sex of Child	
Female	58%
Male	42%
Child Country of Birth	
U.S.	96%
Mexico	4%

Eighty-two percent of parents had previously heard of HPV in general but only 21% were aware of the HPV vaccine. After participation in the educational session about HPV and HPV vaccine, 95% of parents reported their desire to request the HPV vaccine during the next regular visit with their child's PCP. 84% of all parents in the study reported interest in contacting their child's PCP, before their next visit, for further information about the vaccine and of those 63% conveyed their desire to vaccinate their child as soon as possible, before the child's next wellness or immunization visit with their PCP. Finally, 91% of all parents reported dissatisfaction with their child's PCP for not discussing the availability of the HPV vaccine for their child during their last visit.

## Discussion

Most HPV-associated cancers can be prevented through the administration of the HPV vaccine, but HPV vaccination rates have only marginally increased in recent years.<sup>2</sup> Growing evidence supports a reconsideration of the rationale for recommending the HPV vaccine at 11 and 12 years of age.<sup>13,14</sup> Our study of Latino children 9–10 years of age provides additional support for this consideration. Eighty percent of U.S. children under the age of 11 years old have had a well-child visit during the previous year;<sup>12</sup> however, the rate of annual visits diminishes as adolescents age, with a sharp drop at 16 years of age.<sup>15</sup> In our study, the majority of 9- and 10-year-old children of Latino parents (97%) visited their PCPs annually, but only 15% received information about the HPV vaccine and none received an HPV vaccine recommendation. The current American Academy of Pediatrics (AAP) clinical report on optimizing adolescent immunization states that HPV vaccination should not be delayed,

since adolescents are less likely than other patients to follow up. The AAP calls on PCPs to address barriers to adolescent immunization and regard every visit as an opportunity to complete immunizations.<sup>16</sup> The current ACIP guidelines' emphasis on 11 and 12 years as the ages for routine recommendation of the HPV vaccine may be discouraging providers from discussing the vaccine with parents at earlier eligible opportunities (9- to 10-year-old well child visits), as found in our study.

Two of the most common obstacles to preteen HPV vaccination recommendation are time constraints and a perceived need to discuss sexuality.<sup>14,17</sup> Studies have shown that the provider recommendation, particularly when strongly made, is key to HPV vaccination uptake; however, providers often give weak HPV vaccine recommendations and, as we found, do not recommend the vaccine before 11 years of age.<sup>17,18</sup> Although studies have demonstrated that providers prefer to recommend HPV vaccination to older rather than younger teens,<sup>17,19</sup> providers have reported positive experiences with parents when they offered the HPV vaccine at earlier ages.<sup>13</sup> Offering the HPV vaccine routinely to younger children may remove the need to discuss sexuality and reduce time constraints.<sup>13,14</sup> Most importantly, there is evidence that initiating the HPV vaccine series at 9 and 10 years of age has been associated with higher rates of on-time series completion compared with initiation at 11 to 12 years of age.<sup>14,20</sup> As rates of health insurance coverage for the Latino population have improved, lack of coverage is less of a barrier to health care access.<sup>9</sup> Our results further emphasize the willingness of a large majority of Latino parents of 9 or 10 year old children to vaccinate their child without waiting until 11 or 12 years of age.

According to the Youth Risk Behavioral Surveillance System, 40% of high school students have had sexual intercourse,<sup>21</sup> and it is estimated that 50% of new HPV infections occur among 15- to 24-year-olds.<sup>4</sup> HPV vaccination at 9 years of age provides more opportunities for follow-up and greater likelihood of early series completion. Also, by increasing early-age vaccination, HPV infection rates and the number of HPV-attributable cancers may decrease.<sup>22</sup> Our results show that PCPs have opportunities to discuss and recommend the HPV vaccine earlier than the current recommended ages. Since the U.S. HPV vaccination completion rate remains well below optimal levels,<sup>2</sup> all opportunities to provide the vaccine should be maximized. Lowering the recommended age for routine HPV vaccine initiation would be an important step toward improving HPV vaccination rates.

Our study has several limitations, including a small and convenient sample size and a sample comprised only of Latino parents from a specific geographic area. As a result, parents may not be representative of a national Latino population. Despite this, we believe that our study provides important information in a population with a history of overall lower access to healthcare,<sup>7-9</sup> and it can inform policy to assure children have the best opportunity for HPV vaccine coverage and protection from HPV-related cancers. In addition, parental responses to post educational session may not reflect changes in their behaviors toward vaccinating their eligible children. Further research should be conducted to better assess the direct effect of parental education on HPV vaccine administration.

## Conclusion

Most HPV-associated cancers can be prevented through the administration of the HPV vaccine, but children are not routinely offered the vaccine at 9 and 10 years of age, even though the vaccine is approved from 9 years of age. To improve low rates of HPV vaccination, we believe the guidelines should be updated to recommend routine vaccination at all well-child visits from the age of 9 years, with catch-up at ages 11 through 12 years.

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## Author contributions

Dr. Aragonés conceptualized, designed and implemented the study, coordinated and supervised data collection and analyzed and drafted the initial manuscript, reviewed and revised the manuscript, and critically reviewed the manuscript for important intellectual content. Drs. Gany and Bruno, designed and implemented the study and participated in the analyses and interpretation of the results, and reviewed and revised the manuscript. Dr. Kaplan provided support with the design of the study, participated in the analyses and interpretation of the results, and reviewed and revised the manuscript. All authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

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## Clinical trial registry name & registration number

Name: A Randomized Controlled Trial of a Social Marketing Campaign to Increase HPV Vaccination Among Mexican American Children; NCT02697396.

## Data sharing statement

Data for this manuscript stems from a sub-aim on the study described in the Clinical trials registry. All of the participant data collected during the trial, after deidentification is available for sharing. All study documents (protocol, informed consent) are available for review as well with no end date for such review and for anyone who wishes to access the data or documents, upon request.

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## Appendix A: Educational Session Curriculum Guide for the Community Health Outreach Specialist:

### (1) Welcome participant and introduction

*I would like to welcome you! My name is \_\_\_\_\_ and we want to thank you for participating in this study. We realize that you have a busy life and schedule, so we appreciate you taking the time to participate today.*

#### • [Discuss the purpose and process of the educational session]

*We are interested in learning what you already know about HPV, HPV related cancer and the HPV vaccine and your thoughts and opinions about vaccinating your children against HPV. During this discussion, I will make sure to provide you with accurate information on these topics as well as make sure that all of your questions are answered.*

### (2) General questions to be asked to the participant (evaluating baseline knowledge):

- Prior to being invited to participate in this study, had you ever heard about HPV?

(If yes) What had/have you heard about it? Where have you gotten this information?

- Have you heard anything about how someone actually gets HPV?
- [If not already mentioned] Have you ever heard about a connection between HPV and cervical cancer or other cancers?
  - (If yes) What have you heard? Where have you gotten this information?
- [If not already mentioned] Prior to being invited to participate in this study, had you ever heard of a vaccine that protects against HPV?
  - (If yes) What had/have you heard about it? Where have you gotten this information?
    - [If not already mentioned] Are you aware of the vaccine's availability? In other words, who is eligible to receive the vaccine?
    - Based on what you currently know, what's your opinion of the HPV vaccine?
- What would you say are the main reasons that your child has not received the HPV vaccine?
- What are your general thoughts about getting your child vaccinated against HPV? In other words, is this something that you think you'd want to do, and why or why not?
- Do you feel differently about vaccinating a son versus a daughter against HPV?
- What do you think would be the best or most beneficial things about having your child receive the HPV vaccine?  
What concerns you most about it?

•At this point, use the information obtained above to tailor the information provided in the next section of the session.

### (3) Facts about HPV, HPV related Cancer, and the HPV Vaccine

*We understand that there is often a lot of information available concerning health-related topics, including HPV and the HPV vaccine, and it can be difficult to know what information is accurate and what is not. Do not be concerned if some of the things that you previously mentioned are not supported by the information I will provide. We hope this discussion we are about to have will help you have more accurate information going forward.*

- What is HPV?
- How do people get HPV?
- How common is HPV?
- What are the signs, symptoms and health consequences of HPV?
- What type of cancers are related to HPV?
- How can we prevent HPV infection? (Provide detailed information about the vaccine.)
- How safe is the HPV vaccine?
- Who should be vaccinated?
- How can you get the vaccine for your eligible child?

Reinforce the information provided by going through the following points:

- What, if anything, from this presentation was new information for you?
- Was there anything from this presentation that was particularly surprising? If so, what?
- Was there anything in this presentation that influenced your opinion about the HPV vaccine, for better or worse?
- Was there anything that made you either more or less likely to pursue the vaccine for your child? If so, what was it?

### (4) Questions and Answers

Provide further opportunity for the participant to ask any questions. Be sure to answer all questions and provide the educational brochure.

### (5) Linking participant to health care, as needed

*Once the participant has no more questions, assess if he/she needs help with accessing care to obtain the vaccine for their eligible child. Provide assistance with linking their child to health care services, such as obtaining insurance if eligible, finding a local primary care source or program where the vaccine can be obtained for free or at a low cost, among other services.*

#### Potential questions to ask to assess the participant's needs:

- If you wanted to, do you think you could get the HPV vaccine for your child? Do you think it would be easy to do? Why or why not?
- What, if anything, do you think would make it difficult to get your child vaccinated against HPV?
- Are there any specific ways in which you think your child's healthcare services can be improved?  
What would make the experience of getting healthcare services for your child better?