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HPV vaccination prevalence, parental barriers and motivators to vaccinating children in Hawai'i

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Abstract

Objective—To determine the prevalence and barriers to human papillomavirus (HPV) vaccine uptake among 11–18 year olds in the Hawai'i's four major ethnic groups–Native Hawaiians, Filipinos, Japanese, and Caucasians.

Study design—A telephone survey assessed parents' knowledge of HPV and the HPV vaccine, status of their child's HPV vaccine uptake, variables operationalizing the Health Belief Model, and barriers and motivators to uptake.

Results—Across the groups, 799 parents completed the survey. About 35% of daughters and 19% of sons had received all three shots. Although ethnic differences in vaccine uptake were seen in bivariate analysis (with significantly lower uptake in Filipino youth), in multivariable logistic regression analysis, only Caucasian parents were significantly less likely to start their sons on the HPV vaccine series compared with Japanese parents (reference group). Having heard about the vaccine, believing in its effectiveness, and older age of the child were also associated with vaccine uptake. Motivators for HPV vaccination were physician's recommendation and wanting to protect one's child. The primary barrier to uptake was lack of knowledge about the vaccine.

Conclusions—Findings reinforce the fact that a physician's recommendation and receipt of information about the vaccine are strong motivators for parents to vaccinate their children, regardless of ethnicity.

Keywords

Human papillomavirus; HPV; HPV vaccine; Hawaii; parent survey; prevalence; motivators; barriers

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Introduction

In 2011, the three-dose human papillomavirus (HPV) vaccination was added to the Adolescent Immunization Schedule by the Centers for Disease Control and Prevention's (CDC) for children 11–12 years old, along with tetanus, diphtheria, and pertussis (Tdap) and meningococcal conjugate (MCV4) vaccines (Markowitz et al. 2012). CDC's National Immunization Survey for Teens (NIS-Teen), age-appropriate uptake of Tdap and MCV4 were 88% and 79%, respectively, in 2014. But, completion of all three doses of the HPV vaccine for 13–17 year olds was only 40% for girls and 22% for boys, nationally, and 38% for girls and 31% for boys in Hawai'i (Centers for Disease Control and Prevention 2013; Darden et al. 2013; Elam-Evans et al. 2014; Reagan-Steiner et al. 2015; Stokley et al. 2014).

Hawai'i has a diverse, multi-ethnic population of 1.4 million people, with 23% Native Hawaiian, 23% Japanese, 19% Caucasian, 15% Filipino, and 20% other ethnicities, including other Asian and Pacific Islander ethnicities (Hawai'i Health Survey 2012). NIS-Teen data are provided by state and for Whites, Blacks, Hispanics, American Indian/Alaska Natives, and Asians. Data on Hawai'i's predominant ethnic groups are not provided. Other U.S. studies have examined HPV uptake in minority populations (Kepka et al. 2015; Kepka, Ulrich, and Coronado 2012; Lechuga, Vera-Cala, and Martinez-Donate 2016; Perkins et al. 2010; Roberts et al. 2015; Taylor et al. 2014; Thomas et al. 2012; Tsui et al. 2013), but not in Hawai'i-relevant ethnic groups, including Native Hawaiians and Filipinos, who are at highest risk for cervical cancer (Giddings et al. 2012; Gomez et al. 2014; Hawai'i Cancer Facts & Figures 2010; Jeudin et al. 2014; Lee et al. 2011; Sentell et al. 2013).

Parental acceptability of the HPV vaccine is a critical step in increasing vaccine uptake. Parental barriers include lack of knowledge about it, lack of physician's recommendation, belief that the HPV vaccine might encourage sexual activity, financial constraints, and concerns about safety (Chan et al. 2007; Davis et al. 2004; Grandahl et al. 2014; Hawai'i Cancer Facts & Figures 2010; Healy and Pickering 2011; Lechuga, Swain, and Weinhardt 2012). The Health Belief Model (HBM) has been applied to HPV vaccine research, and these analyses have linked uptake to perceptions of risk and seriousness of HPV-preventable diseases, vaccine effectiveness, and barriers to vaccination (Donadiki et al. 2014; Gargano et al. 2013; Jeudin et al. 2014; Reiter et al. 2009).

Thus, the aims of this study were to: (1) determine the prevalence of HPV vaccine uptake among youth ages 11–18; and (2) identify HBM-rated barriers and motivators to HPV vaccination.

Methods

A population-based, cross-sectional telephone survey was conducted in Hawai'i in early 2014 using random-digital dialing (RDD) and following a customized program to reach listed, unlisted, and unpublished home and mobile phone numbers. Computer-assisted data entry software was used for data collection.

The study design called for 800 parents, with 200 parents in each of Hawai'i's four largest ethnic groups. To be eligible, a participant had to report being: a parent or guardian of an

11–18-year-old child; the primary parent that takes the child(ren) to get vaccinated; of Native Hawaiian, Filipino, Japanese, or Caucasian ancestry; and a Hawai'i resident. Parents were informed of the purpose of the survey, and they provided verbal consent. Participants were reminded that they could refuse to answer questions and/or terminate the call at any time. This study was approved by the Western Institutional Review Board.

The target number of surveys was determined by budget and feasibility. Statistically, with 200 subjects in each ethnic group, we had a margin of error of less than 0.07 for the two-sided 95% confidence interval of the proportion (e.g. % of children with at least one shot). For comparison between two ethnic groups, the 200 subjects per group provides over 80% statistical power to detect a difference of 15% in the two proportions (e.g. the proportions of Japanese versus Filipino children with at least one shot), based on a Fisher's exact test with a 0.05 two-sided alpha.

Using RDD, a total of 38,359 phone calls were attempted. Of these attempted phone calls, 28,284 were eliminated because of inadequate phone numbers (e.g. business/government agency, fax/modem/pager, disconnected, etc.). Another 5659 calls reached individuals who were ineligible (e.g. did not speak English, no children in the age group, not Hawai'i residents, etc.). Of the 4416 eligible individuals, 3099 (70%) declined to participate (e.g. lack of interest or time). Of the 1317 (30% of eligible) that consented, 70 were of an ethnic group for whom the quota of 200 already had been reached, 309 asked to be called back, and 139 terminated mid-interview. Thus, a total of 799 surveys were complete, 189 (23%) with Native Hawaiian parents, 199 (24%) with Filipino parents, 211 (26%) with Caucasian parents, and 200 (25%) with Japanese parents. The parents reported on 492 daughters and 466 sons (159 parents had both a daughter and son in the age range). Of reporting parents, 73% were female, 81% were married, and 50% were college graduates.

Survey items were guided by literature (Donadiki et al. 2014; Gargano et al. 2013; Jeudin et al. 2014; Reiter et al. 2009). Demographic items included parent's ethnicity, age, residence zip code, gender, and ages of children ages 11–18 years old. Questions asked about parental knowledge of HPV, if the parent had heard of the HPV vaccine, and their child(ren)'s HPV vaccination status. Applying the HBM, questions were asked about perceived risk (e.g. 'HPV is a common infection' and 'Most people are infected with HPV at some point in their lives'), perceived seriousness (e.g. 'Cervical cancer and other cancers of the reproductive system are not dangerous' reverse scored), and perceived effectiveness (i.e. 'The HPV vaccine can reduce the risk of cervical cancer and other cancers of the reproductive system'). Parents of unvaccinated children were asked to agree or not with a list of potential barriers, including not knowing about the vaccine, not having it recommended by the physician, feeling that it was too new or unsafe, feeling the child was too young or not at risk, feeling that the vaccine might encourage the child to starting having sex, and not knowing if insurance would cover associated costs. They also were asked about potential cues to action, including a doctor's recommendation, wanting to protect the child, general acceptance of vaccines, and having friends whose children were vaccinated. The survey questions and their measures are shown in Table 1.

If a parent had multiple sons and daughters between ages 11–18 years old, we included only the oldest son and oldest daughter in our analysis. The proportion of children who received the HPV vaccine was calculated separately for boys and girls. Because recent findings suggest that one shot may be as effective as three we used ‘at least one shot’ as the dependent variable in logistic regression models to estimate odds ratios (ORs) and 95% confidence intervals (95% CIs) for boys and girls separately (Kreimer et al. 2015). Crude odds ratios (ORs) and their 95% confidence intervals (95% CIs) were first calculated for the association between the dependent variable and other variables, such as ethnicity and other demographic variables, for boys and girls separately. Multivariable logistic regression analyses were then conducted to further assess the association between ethnicity and HPV vaccination outcome controlling for other factors, separately for boys and girls. Adjusted odds ratios (aORs) were summarized together with their 95% CIs. Chi-square analyses were used to assess bivariate relationships between ethnicities and variables related to barriers and motivators to vaccination. Data were analyzed using IBM SPSS Statistics 21.0 for Mac©.

Results

Vaccination prevalence by ethnicity

Overall prevalence for three-shot completion for 11–18 year olds was 35.2% for girls and 18.8% for boys (Table 2). To compare Hawai’i’s overall prevalence with NIS-Teen findings, prevalence also was estimated for 13–17 year olds. In our sample, 38.7% of girls and 18.0% of boys had received all three shots, compared to 38% of girls and 31% of boys estimated for Hawai’i by NIS-Teen.

The number of shots reported for children ages 11–18 years old by parents varied by ethnicity and gender (Table 2). Filipino parents were least likely to report that their oldest daughters and sons had at least one shot (45.1% and 35.9%, respectively) or all three shots (21.3% and 12.6%, respectively). Japanese parents were most likely to report that their oldest daughters and sons had at least one shot (60.8% and 50.5%, respectively) or all three shots (40.8% and 22.5% respectively).

To assess the difference of HPV vaccination (at least one dose) across the four ethnic groups, bivariate OR and 95% CI were estimated separately for girls and boys, as well as adjusted ORs and 95% CI. In multivariable analysis, we controlled for parent gender, education, marital status, age of parent, age of child, correct knowledge about HPV, having heard of HPV vaccine, perceived risk and seriousness of HPV, and perceived effectiveness of the HPV vaccine (Table 3). In bivariate analysis, Filipino parents were significantly less likely to vaccinate their daughters and sons. However, in multivariable analysis, ethnicity was significant only in that Caucasian parents were less likely to vaccinate their sons than the reference group (Japanese parents). In bivariate analysis, male parents were less likely to vaccinate their children, but this difference was attenuated in multivariable analysis. Older children were more likely to be vaccinated in both bivariate and multivariable analyses. All HBM variables were significantly associated with a child receiving at least one shot in bivariate analysis, but having heard of the vaccine and believing that the vaccine was effective in reducing cancer risk were also significantly associated with uptake in

multivariable analysis for both girls and boys. Perceiving that many people are at risk of HPV also was associated with uptake in boys.

Parents who had heard of the vaccine were asked about the primary source of their information. About 70% of each group said they heard about it from their physician, and about 20% of each group said the media (not shown in table).

Barriers to and motivators for vaccination

As shown in Table 4, parents of more than 90% of 160 daughters and 115 sons who had a least one shot said they started the vaccine series because the doctor recommended it and they wanted to protect their child. Top reasons for not vaccinating 222 daughters and 275 sons said were not knowing enough about the vaccine, feeling unsure of its safety, and being concerned about its newness. Interestingly, parents were less likely to remember a physician's recommendation to vaccinate their son (versus their daughter).

Parents that had not vaccinated their sons and daughters were asked to pick one statement to identify their current thoughts on vaccinating their unvaccinated children (not shown in table). Parents of about one-fifth of unvaccinated girls and boys were not sure because they had not heard of the HPV vaccine prior to this study. Parents of about 10% of unvaccinated girls and boys said they planned to vaccinate their children. Parents of about 40% of unvaccinated girls and boys said they were either thinking about vaccinating their child or talking to the doctor about it. However, parents of about 25% of unvaccinated girls and 23% of unvaccinated boys said they were not planning to vaccinate their child.

Discussion

In this study, parents reported completion of the HPV vaccine series at 35.2% of girls and 18.8% of boys ages 11–18 years old, and at 38.7% of girls and 18.0% of boys ages 13–17 years. The findings for the two age groups are similar to each other, and the findings from our survey compare favorably with the NIS estimate for Hawai'i girls (at 38% in 2014). However, our estimates were much lower for boys ages 13–17 years old, at 18% compared to the NIS estimate of 31% of Hawai'i boys. It is not clear why this large difference was found. Both surveys used RDD methods, although the Hawai'i-based study purposefully attempted to collect data from equal numbers of Japanese, Filipino, Native Hawaiian, and Caucasian parents, whereas this level of racial/ethnic detail about the NIS sample was not available. Also, unlike the NIS-Teen Survey, no attempt was made to verify parental reports of their child's vaccination status with providers. It could be that the NIS sample included greater proportions of Japanese parents, who are more likely to report vaccinating their children, or it could be that some parents in Hawai'i were unaware that their sons had been vaccinated.

Of interest to Hawai'i and other states with large numbers of Asians and Pacific Islanders, this study provides current prevalence data for Japanese, Filipino, and Native Hawaiian youth. Ethnic vaccination patterns for HPV uptake are not dissimilar to other preventive health patterns seen in Hawai'i, with Japanese demonstrating higher levels of compliance than Caucasians, and with Filipinos and Native Hawaiians demonstrating lower compliance.

This pattern also is seen for compliance with cancer screening in Hawai'i (Hawai'i Cancer Facts & Figures 2010). Even among Japanese, however, three-shot completion still falls far below the Healthy People 2020 completion goal of 80% for adolescents and also below the Tdap and MCV4 vaccines completion rates (U.S. Department of Health Services 2014).

The HBM was used as a framework for exploring barriers and motivators to HPV vaccination. Interestingly, ethnic differences in uptake were attenuated once awareness of the vaccine (for parents of girls and boys), perceived effectiveness of the vaccine (by parents of girls and boys), and perceived risk for HPV (for parents of boys) were entered into the models. This suggests large ethnic differences in vaccine awareness, with Japanese parents receiving more (and more persuasive) information and Filipino parents receiving less (and less persuasive) information about it than Caucasian parents. The fact that most parents who said they had heard of the vaccine learned about it from their physicians suggests that the ethnic groups may have different health care access or clinical experiences. This may be especially true for the Filipino parents who may not speak English or may have limited English proficiency (Loui 2011). Physicians should be encouraged to discuss HPV vaccination with parents with low English proficiency and provide health materials that can be brought home, where assistance with translation may be available. Access to translators and HPV brochures in Tagalog and/or Ilokano (Filipino languages spoken by most Filipinos in the U.S.) also would help insure that health information was culturally sensitive and more easily understood by parents.

Physician-related barriers also need to be overcome. In a survey of pediatricians and family physicians in Hawai'i, researchers found that some physicians did not stock the HPV vaccine because of financial concerns related to its purchase and storage (Soon et al. 2015) Providers that serve large volumes of teens and/or work in large clinics with generous storage capacity may be more likely to stock it. Also, pediatricians are more likely to provide the HPV vaccine than family medicine physicians (Bynum et al. 2014).

Similarly to the NIS-Teen data, parents in Hawai'i are more likely to vaccinate their daughters than their sons. This may be in part due to the fact that the HPV vaccine was not recommended for males until 2009, whereas it was recommended and available for girls in 2006 (Markowitz et al. 2012). Physicians and media may not be communicating the importance of the HPV vaccine for boys (Cates et al. 2014). Also, Hawai'i physicians who felt it necessary to discuss sexuality with patients prior to recommending the HPV vaccine were five times less likely to strongly recommend the vaccine for boys 11–12 years old (Soon et al. 2015).

Regardless of gender, multivariable analysis suggests that older children were more likely to start the vaccine series than younger children. This finding concurs with other studies that found that parents delay vaccination beyond the recommended 11–12-year-old window, possibility due to parental tendency to associate the HPV vaccine with sexual activity and the hesitance of physicians to insist that vaccination commence at age 11 or 12 years old (Cates et al. 2014; Grandahl et al. 2014; Hansen et al. 2016).

Because a physician's recommendation is critical to HPV vaccine uptake, physicians should receive more education on communicating about the vaccine with parents and youth. (Chung et al. 2007; Jeudin et al. 2014). There also is a critical need for better public education. In another Hawai'i-based study, parents who were interviewed on HPV brochure preferences stated that the brochure should be tailored to the local population, reflecting local faces in the photos and voices in the testimonials (Dela Cruz et al. 2017). A local brochure should address concerns hesitant parents may have on vaccine safety, insurance coverage, recommended age for uptake, and why both girls and boys should receive it (Dela Cruz et al. 2017). An educational brochure on the HPV vaccine could help supplement discussions with the physician for those parents who have not vaccinated their children.

There are some limitations that should be noted in this study. This survey was conducted only in English. Although the vast majority of Native Hawaiians, Japanese, Filipinos, and Caucasians in Hawai'i report English as their primary language, about 32% of Filipinos and 7% of Japanese in Hawai'i are recent immigrants (Asian American Advancing Justice 2015). We were unable to control for this variable. Also, vaccination status was reported by the parents and not verified with health care providers. Another limitation included restricting questions regarding barriers to vaccination to parents of unvaccinated children.With hindsight, it might have been useful to identify barriers initially experienced by parents of vaccinated children and the ways parents overcame them. These findings could then be applied to approaches to increase uptake. This study utilized the Health Belief Model, which is an individual model; other cultural, relationship, community, and societal factors may also contribute to decisions surrounding HPV vaccination uptake. Also, this study specifically surveyed Native Hawaiian, Filipino, Japanese, and Caucasian parents, leaving out parents of other ethnicities that comprise Hawai'i's multi-cultural population. Finally, the response rate was low, with 70% of eligible individuals refusing to participate in the survey, perhaps due to the topic, lack of time, poor timing, etc.

Conclusions

This study provides new information of HPV vaccine uptake prevalence in the multi-ethnic population of Hawai'i. About 35% of daughters and 19% of sons had received all three shots. In multivariable analysis, having heard about the vaccine, believing in its effectiveness, and older age of the child were associated with the child having had a least one of three shots. Motivators for HPV vaccination were physician's recommendation and wanting to protect one's child. The primary barrier to uptake was lack of knowledge about the vaccine. Findings reinforce that a physician's recommendation and receipt of information about the vaccine are strong motivators for parents to vaccinate their children, regardless of ethnicity.

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Table 1

Interview questions and measures.

Eligibility	
Residency	• On what island do you reside?
Parent of child between 11 and 18 y.o.	• Are you the parent of a child between the ages of 11–18 living
Ethnicity	• in this household?
Main parent for vaccinations	• What is your ethnicity? • Are you the parent that usually takes your child for vaccinations? If you are not, who usually takes your child and his/her relation?
Demographics	
Age Gender	• What was your age on your last birthday?
Language spoken	• What is your gender?
Marital status	• What language do you speak at home most of the time?
Education	• What is your relationship status? What is the highest grade of school that you finished?
Child's Vaccination History	
Vaccination Schedule	• How did you know when to vaccinate your child? • How do you know that your child received all his/her vaccines?
HPV Vaccine Awareness & Status	
HPV Awareness	• Have you heard of the HPV vaccine? • If yes, where/from who?
Child HPV vaccine status	• Of your 11–18 year old daughter/son, has he/she been vaccinated with the HPV vaccine? • How many shots did he/she receive? • How old was he/she when he/she received the first shot?
Physician Recommendation	
Discussion with the physician about the HPV vaccine	Did her/his doctor recommend the HPV vaccine to her/him?
Motivators & Barriers to Vaccinating Child with HPV Vaccine	
Vaccinating child(ren) with HPV vaccine	Of the statements that I will mention, tell me if any are reasons that he/she received the HPV vaccine: (Yes/No, choose all that apply) • My doctor recommended it • Once I learned about the vaccine, I wanted to protect my child • I get my children vaccinated for everything else, so I thought I should for this too • I have friends whose children are HPV vaccinated • Other

Eligibility	
Not vaccinating child(ren) with HPV vaccine	Of the statements that I will mention, tell me if any are reasons that he/she did not receive the HPV vaccine: (Yes/No, choose all that apply) • I never knew about this vaccine • My doctor did not mention the vaccine to me • It's a new vaccine • I'm not sure if it is safe • He/she is too young to receive the vaccine • I don't think that my child is at risk for this HPV virus • I don't want my child to think that it's OK to start having sex if he/she gets the vaccine • I'm not sure if my insurance will cover it • I don't know enough about HPV and the vaccine • Other
The Health Belief Model (True/False or Yes/No)	*Perceived risks* • I don't think my child is at risk for this HPV virus *Perceived severity* • Cervical cancer and other cancers of the reproductive system are not dangerous *Perceived effectiveness* • The HPV vaccine can reduce the risk of cervical cancer and other cancers of the reproductive system *Perceived barriers to action* • I never knew about this vaccine • My doctor did not mention the vaccine to me • I don't want my child to think that it's OK to start having sex if he/she gets the vaccine • I'm not sure if my insurance will cover it • I don't know enough about HPV and the vaccine • I'm not sure if it is safe *Cues to action* • My doctor recommended it • Once I learned about the vaccine, I wanted to protect my child • I have friends whose children are vaccinated

Table 2

Child vaccination status by ethnicity.

	0 shots	1 shot	2 shots	3 shots	*P* value	At least 1 shot	*P* value
All daughters (*n* = 492)	224 (45.5)	45 (9.1)	50 (10.2)	173 (35.2)		268 (54.5)	
Daughters of							
Native Hawaiian parents (*n* = 116)	48 (41.4)	13 (11.2)	11 (9.5)	44 (37.9)	.01	68 (58.6)	.01
Filipino parents (*n* = 122)	67 (54.9)	16 (13.1)	13 (10.7)	26 (21.3)		55 (45.1)	
Caucasian parents (*n* = 134)	62 (46.3)	7 (5.2)	11 (8.2)	54 (40.3)		72 (53.7)	
Japanese parents (*n* = 120)	47 (39.2)	9 (7.5)	15 (12.5)	49 (40.8)		73 (60.8)	
All sons (*n* = 467)	273 (58.5)	64 (13.7)	42 (9.0)	88 (18.8)	.01	194 (41.5)	.02
Sons of							
Native Hawaiian parents (*n* = 122)	72 (59.0)	17 (13.9)	11 (9.0)	22 (18.0)		50 (41.0)	
Filipino parents (*n* = 103)	66 (64.1)	19 (18.4)	5 (4.9)	13 (12.6)		37 (35.9)	
Caucasian parents (*n* = 131)	80 (61.1)	11 (8.4)	12 (9.2)	28 (21.4)		51 (38.9)	
Japanese parents (*n* = 111)	55 (49.5)	17 (15.3)	14 (12.6)	25 (22.5)		56 (50.5)	

Table 3

Unadjusted and adjusted OR and 95% CI for at least one dose of the HPV vaccine.

	Daughters (*n* = 492)		Sons (*n* = 467)	
	Unadjusted OR	**Adjusted OR[a]**	**Unadjusted OR**	**Adjusted OR[a]**
Parent Ethnicity:				
Native Hawaiian	0.91 (0.54, 1.53)	1.38 (0.71, 2.67)	0.67 (0.40, 1.13)	0.89 (0.48, 1.65)
Filipino	**0.53 (0.32, 0.88)**	0.94 (0.48, 1.84)	**0.55 (0.32, 0.95)**	0.64 (0.32, 1.27)
Caucasian	0.75 (0.45, 1.15)	0.56 (0.31, 1.04)	0.63 (0.38, 1.04)	**0.47 (0.26, 0.85)**
Japanese (ref.)				
Parent is male	**0.51 (0.34, 0.78)**	1.03 (0.58, 1.82)	**0.48 (0.31, 0.74)**	0.67 (0.40, 1.14)
Parent has college education	1.41 (0.99, 2.02)	1.01 (0.67, 1.66)	**1.62 (1.12, 2.36)**	1.27 (0.80, 2.03)
Parent's age:				
One year of increase	1.01 (0.99, 1.04)	1.00 (0.97, 1.02)	1.01 (0.99, 1.03)	1.01 (0.98, 1.04)
Child's age:				
One year of increase	**1.33 (1.22, 1.45)**	**1.41 (1.26, 1.57)**	**1.18 (1.09, 1.28)**	**1.26 (1.14, 1.39)**
Parent heard of vaccine	**12.24 (6.30, 23.76)**	**9.73 (4.39, 21.60)**	**9.40 (4.60, 19.24)**	**8.60 (3.63, 20.34)**
Parent knows HPV linked to cancer	**2.27 (1.56, 3.31)**	1.01 (0.60, 1.70)	**2.08 (1.39, 3.11)**	1.01 (0.60, 1.71)
Parent perceives HPV related cancers are serious	**2.41 (1.43, 4.04)**	0.54 (0.24, 1.20)	**1.70 (1.01, 2.86)**	0.51 (0.24, 1.07)
Parents perceives many at risk	**1.74 (1.20, 2.51)**	1.49 (0.93, 2.38)	**2.26 (1.55, 3.30)**	**2.04 (1.29, 3.22)**
Parent perceives effectiveness of vaccine	**7.73 (4.55, 13.12)**	**9.03 (4.49, 18.16)**	**4.02 (2.41, 6.69)**	**2.88 (1.52, 5.46)**
		75.5% correctly classified		67.5% correctly classified

[a]Unadjusted OR was based on simple logistic regression and adjusted OR was based on multivariable logistic regression.

Table 4

Reasons parents did or did not vaccinated their daughters or sons.

	Native Hawaiian		Filipino		Caucasian		Japanese		*P* value	
	Daughters *n* (%)	Sons *n* (%)	Daughters *n* (%)	Sons *n* (%)	Daughters *n* (%)	Sons *n* (%)	Daughters *n* (%)	Sons *n* (%)	Daughters	Sons
Reasons parents vaccinated their daughters (*n* = 160) or sons (*n* = 115)										
The doctor recommended it.	38 (92.7)	24 (96.0)	38 (95.0)	27 (96.4)	31 (96.9)	27 (93.1)	44 (95.7)	32 (97.0)	.88	.89
I wanted to protect my child.	38 (92.7)	24 (96.0)	38 (95.0)	26 (92.9)	31 (96.9)	28 (96.6)	44 (95.7)	33 (100.0)	.88	.51
I vaccinate her/him for everything else.	32 (78.1)	22 (88.0)	33 (82.5)	24 (85.7)	15 (46.9)	22 (75.9)	42 (91.3)	30 (90.9)	<.001	.39
I have friends whose children are HPV vaccinated.	24 (58.5)	15 (60.0)	23 (57.5)	10 (35.7)	19 (59.4)	13 (44.8)	32 (69.6)	21 (63.6)	.72	.12
Reasons parents did not vaccinate their daughters (*n* = 222) or sons (*n* = 275)										
I never knew about the vaccine.	14 (29.2)	38 (51.4)	30 (44.8)	35 (53.0)	9 (14.5)	19 (23.8)	21 (46.7)	24 (43.6)	<.001	.004
The doctor didn't mention the vaccine.	20 (41.7)	34 (45.9)	32 (47.8)	38 (57.6)	13 (21.0)	42 (52.5)	22 (48.9)	33 (60.0)	.011	.19
It's a new vaccine.	27 (56.3)	39 (52.7)	40 (49.7)	30 (45.4)	37 (59.7)	45 (56.3)	27 (60.0)	30 (54.5)	.44	.26
I'm not sure it's safe.	32 (66.7)	42 (56.8)	42 (62.7)	33 (50.0)	41 (66.1)	43 (53.8)	24 (53.3)	27 (49.1)	.52	.53
She/he is too young to get the vaccine.	19 (39.6)	23 (31.1)	33 (49.3)	23 (34.8)	18 (29.0)	16 (20.0)	14 (31.1)	17 (30.9)	.097	.017
She/he is not at risk for HPV.	18 (37.5)	29 (39.2)	26 (38.8)	22 (33.3)	27 (43.5)	39 (48.8)	20 (44.4)	11 (20.0)	.88	.01
I don't want her/him to think it's OK to have sex.	14 (29.2)	29 (39.2)	30 (44.8)	28 (42.4)	21 (33.9)	20 (25.0)	20 (44.4)	18 (32.7)	.54	.051
I'm not sure if insurance covers the vaccine.	14 (29.2)	24 (32.4)	32 (47.8)	30 (45.5)	11 (17.7)	14 (17.5)	11 (24.4)	17 (30.9)	.002	.003
I don't know enough about the vaccine.	36 (75.0)	50 (67.6)	54 (80.6)	44 (66.7)	29 (46.8)	43 (53.8)	33 (73.3)	35 (63.6)	.001	.053