



Published in final edited form as:

Vaccine. 2015 January 3; 33(2): 289–293. doi:10.1016/j.vaccine.2014.11.032.

Factors associated with HPV awareness among mothers of low-income ethnic minority adolescent girls in Los Angeles

Beth A. Glenn^{a,b,*}, Jennifer Tsui^{a,b,1}, Rita Singhal^c, Leah Sanchez^b, Narissa J. Nonzee^{a,b}, L. Cindy Chang^b, Victoria M. Taylor^d, and Roshan Bastani^{a,b}

Beth A. Glenn: bglenn@ucla.edu; Jennifer Tsui: jk1341@cinj.rutgers.edu; Rita Singhal: risinghal@ph.lacounty.gov; Leah Sanchez: leahsanchez@ucla.edu; Narissa J. Nonzee: nnonzee@ucla.edu; L. Cindy Chang: clichang@ucla.edu; Victoria M. Taylor: vtaylor@fhcrc.org; Roshan Bastani: bastani@ucla.edu

^aDepartment of Health Policy and Management, Fielding School of Public Health, University of California, Los Angeles, 650 Charles Young Drive South, A2-125 CHS, Los Angeles, CA 90095-6900, USA

^bCancer Prevention and Control Research Center, Fielding School of Public Health and Jonsson Comprehensive Cancer Center, University of California, Los Angeles, 650 Charles Young Drive South, A2-125 CHS, Los Angeles, CA 90095-6900, USA

^cOffice of Women's Health, Los Angeles County Department of Public Health, 3400 Aerojet, 3rd Floor, El Monte, CA 91731-2803, USA

^dDivision of Public Health Sciences, Fred Hutchinson Cancer Research Center, 1100 Fairview Avenue North, (M3-B232), Seattle, WA 98109-4433, USA

Abstract

Among caregivers of adolescent girls, awareness of human papillomavirus (HPV) is strongly associated with vaccine uptake. Little is known, however, about the predictors of HPV awareness among low-income ethnic minority groups in the U.S. The purpose of this study is to understand demographic factors associated with HPV awareness among low-income, ethnic minority mothers in Los Angeles County. We conducted a cross-sectional study of caregivers of adolescent girls through the Los Angeles County Department of Public Health Office of Women's Health's hotline. The majority of the participants were foreign-born (88%), one quarter lacked a usual source of care, and one quarter lacked public or private health insurance for their daughter. We found that one in three participants had never heard of HPV or the vaccine. Mothers that were unaware of HPV were significantly more likely to conduct the interview in a language other than English and to lack health insurance for their daughters. HPV vaccine awareness was much lower in our caregiver sample (61%) than in a simultaneous national survey of caregivers (85%). The associations between lack of awareness and use of a language other than English, as well as lack

*Corresponding author at: UCLA Cancer Prevention & Control Research Center Fielding School of Public Health and Jonsson Comprehensive Cancer Center, 650 Charles Young Drive South, A2-125 CHS, Box 956900, Los Angeles, CA 90095-6900, USA. Tel.: +01 310 206 9715; fax: +01 310 206 3566.

¹Present address: Rutgers Cancer Institute of New Jersey, Robert Wood Johnson Medical School, 195 Little Albany St., New Brunswick, NJ 08903, USA.

Conflict of interest statement

The authors have no potential conflicts of interest to disclose.

of health insurance for their daughter indicate the need for HPV vaccine outreach efforts tailored to ethnic minority communities in the U.S.

Keywords

Human papillomavirus; Vaccination; Health disparities; Cervical cancer prevention; Low-income

1. Introduction

The benefits of the prophylactic human papillomavirus (HPV) vaccines will not be fully realized without high levels of coverage across all eligible populations. Despite the availability of the HPV vaccine since 2006, rates for initiation of the three dose series among adolescent girls in the U.S. hover at around 57% [1]. Ethnic minority women bear a disproportionate burden of cervical cancer in the U.S. [2]. Although data from the National Immunization Survey suggest ethnic minority adolescents may initiate the HPV vaccine at a higher rate than non-Latino whites [3], a number of other studies suggest HPV vaccine initiation rates among ethnic minorities may be lower than national estimates, at least in some settings [4–8].

A growing number of studies have assessed correlates of HPV vaccine uptake among adolescent girls [4,9–11]. In prior studies, HPV and HPV vaccine awareness among caregivers have been found to be two of the strongest predictors of vaccine uptake among adolescent girls [5,11–15]. These findings are consistent with numerous health behavior theories, which posit that knowledge, of which awareness is the most basic form, is a necessary condition for health behavior change [16–18]. Many of these prior studies, however, focus on national samples and provide little information about underserved populations or racial/ethnic minorities.

This study reports on data from a survey of mothers of vaccine-eligible girls in Los Angeles to assess rates and correlates of HPV vaccine initiation [5]. The purpose of this study was to identify correlates of HPV awareness, including demographics, health care access, general vaccine attitudes, and childhood vaccine history among mothers of adolescent girls eligible for the vaccine, for future intervention development.

2. Materials and methods

2.1. Setting

The study was a collaboration between the University of California, Los Angeles (UCLA) and the Los Angeles County Department of Public Health, Office of Women's Health (OWH). The OWH operates a multi-language health education hotline targeting low-income, uninsured, and ethnic minority women in the county. OWH operates the telephone hotline in six languages (English, Spanish, Korean, Cantonese, Mandarin, Armenian), receiving approximately 10,000 calls per year from low-income women (<200% of the federal poverty level). Services provided include telephone education about preventive health issues and referrals to preventive health care appointments. UCLA project staff provided hotline operators with training in research interviewing techniques, the study

protocol, and human subjects research protections. OWH hotline operators were responsible for conducting recruitment and data collection activities with continued guidance from UCLA.

2.2. Identification of participants and study procedures

All women who called into the hotline between January 2009 and January 2010 were screened for eligibility. Eligible women were between the ages of 18 and 65, spoke one of the hotline's six most common languages at the time of the study (English, Spanish, Mandarin, Cantonese, Korean, Armenian), and were the primary medical decision-maker for a girl 9 to 18 years of age. Callers with more than one age-eligible girl were asked to provide information about the one with the earliest birth month. After addressing the caller's primary need, the operators introduced the study, screened interested women for eligibility, obtained verbal informed consent, and proceeded to complete the telephone interview with willing, eligible callers. All participants ($n = 490$) received HPV vaccine print materials in their preferred language and a \$10 grocery store gift certificate. The study was approved by the Institutional Review Boards of the Los Angeles County Department of Public Health and UCLA.

2.3. Survey instrument and conceptual framework

Development of the survey instrument was guided by the Health Behavior Framework, utilizing items drawn from population-based surveys and our own prior work, as has been previously described [5]. As necessary, items were modified to ensure appropriateness for administration by telephone to a low-literacy, low-education, and multilingual population. The survey instrument was translated from English into all hotline languages using established methods that utilized at least two bilingual translators for each language and an iterative review process [5,19–21]. The 75-item survey for the parent study assessed a broad range of topics related to HPV vaccination. However, given the purpose of this study was to assess factors associated with HPV awareness, analyses for the present study utilized data on a limited number of relevant topics: demographic characteristics, access to care, general vaccine attitudes, and HPV knowledge and awareness.

2.4. Measures

The main study outcome was HPV awareness among mothers/caregivers, which was measured through the dichotomous (yes/no) question "Have you ever heard of human papillomavirus, or HPV?" Women were also asked whether they were aware of the HPV vaccine (yes/no), and if applicable, the source of HPV vaccine awareness. Among mothers who were aware of HPV, follow-up questions assessed whether they knew that HPV causes cervical cancer, is sexually transmitted, and resolves without treatment.

For mothers, demographics including age, race/ethnicity, household income, education, nativity, years in U.S. (among foreign-born), insurance status, and having a usual source of care, were measured. General attitudes toward vaccines were captured through two perception questions related to the vaccine benefits and side effects. For adolescent girls, measures of age, insurance status, usual source of care, and receipt of childhood vaccines were based on mother report. Caregiver covariates included age, income (<\$12,000,

\$12,000), insurance status (any, none), usual source of care (yes, no), ethnicity (Latina, Chinese, Korean, African American, other), and language of interview (English, non-English). Adolescent girl covariates included age, insurance status (any, none), usual source of care (yes, no), and receipt of all childhood vaccines (yes, no).

2.5. Statistical analysis

Descriptive statistics were conducted to characterize the sample with regard to demographics, access to health care, and the main study outcome: awareness of HPV. *t*-Tests and chi-square analyses were used to assess bivariate relationships between HPV awareness and demographic factors of the mothers and daughters, access to care of the mothers and daughters, general vaccine attitudes of mothers. Multivariate logistic regression analyses were then conducted to identify independent correlates of HPV awareness controlling for other factors. Statistical significance of variables in the bivariate analyses ($p < 0.05$), tests of multicollinearity, and conceptual importance of predictors informed the selection of variables included in our final multivariate model. Adjusted odds ratios (OR) with 95% confidence intervals (95% CI) are reported, and statistical significance was assessed at the 0.05 level. Data were analyzed using SAS version 9.2 (SAS Institute, 2008).

3. Results

Demographic information is displayed in Table 1. The study participants ($n = 490$) were almost exclusively foreign-born (88%) and about half were Latina (52%), 20% Chinese and 13% Korean. Women in the “other” race/ethnicity category (7%) reported being non-Hispanic white, multiracial, or from other Asian subgroups. Among foreign-born women, the mean number of years in the U.S. was 18. Nearly half of women had less than a high school diploma (47%), and the majority made less than \$24,000 per year (74%). Respondents were 44 years of age on average, consistent with the typical age of parent of adolescent children.

Close to two-thirds of mothers reported that they had heard of HPV (63%) with a similar proportion reporting they had heard specifically of the HPV vaccine (61%) (Table 2). The proportion of caregivers who had heard of HPV was lowest among Koreans (45%), followed by Latinas (64%) and Chinese (66%), and highest among African Americans (68%) or those reporting “other” race/ethnicity (69%) (data not shown). Among mothers who were aware of HPV ($n = 306$), two-thirds of respondents were knowledgeable that HPV causes cervical cancer, 71% knew that HPV is a sexually transmitted disease, and only 4% knew that HPV usually resolves without treatment. Mothers reported having heard of the HPV vaccine from a variety of sources, the most common being from a doctor or nurse (66%) and the least common from the web (3%).

Table 3 presents results of the bivariate analyses. Because the proportion of mothers who were aware of HPV was approximately 20 percentage points lower among Koreans compared to all other racial/ethnic groups in descriptive analyses, we subsequently collapsed this variable into Korean vs. non-Korean for further analyses. Factors significantly associated with a higher likelihood of HPV awareness among mothers included non-Korean ethnicity, completing the interview in English (vs. another language), greater years in the

U.S. (among foreign born), and having a usual source of care. Mothers who reported that their daughters were insured and had gotten their childhood vaccines were significantly more likely to have heard of HPV than mothers whose daughters lacked insurance or had not received childhood vaccines in unadjusted analyses. In multivariate logistic regression analyses (Table 4), only two factors independently predicted a higher likelihood of HPV awareness: completing the interview in English (aOR 2.27, 95% CI 1.24, 4.16) and the daughter being insured (aOR 2.40, 95% CI 1.34, 4.29).

Given the substantially lower level of awareness among Korean mothers, we conducted additional analyses to assess other potential differences in demographics between Korean mothers and mothers from other racial/ethnic groups (data not shown). Compared to mothers from other racial/ethnic groups, Korean mothers reported higher levels of income and education and were more likely to be foreign born and complete the interview in a language other than English. Korean mothers were also less likely to report having a usual source of care, health insurance for their daughter, or to report that their daughter had received her childhood vaccinations. Further, they were more likely to agree that “vaccines have more side effects than benefits” compared to mothers from other racial/ethnic groups ($p < 0.05$).

4. Discussion

Results revealed that about one third of mothers in our sample were not aware of HPV, with a similar proportion not aware of the HPV vaccine. These levels of awareness are somewhat lower than other studies conducted around the same time. Dorell and colleagues [3] showed that among a national sample of caregivers for teens, 92% had heard of HPV and 85% had heard of the HPV vaccine. This finding suggests the need for efforts to enhance awareness as an important step in increasing use of the vaccine in low-income ethnic minority communities.

Another purpose of this study was to identify correlates of awareness that might provide guidance for future intervention efforts. In unadjusted analyses, we found a number of factors associated with HPV awareness. Lack of awareness was most common among Korean women in our sample; however, race/ethnicity did not emerge as a significant predictor in multivariate analyses, which suggests that race/ethnicity may be associated with other correlates we examined. For example, Korean mothers in our sample were less likely to have a usual source of care or to report their daughter had health insurance or had completed her childhood vaccinations compared to women from other racial/ethnic groups. Understanding that Korean mothers may be at greater risk for poor awareness could prove valuable for program planning and outreach efforts targeted toward this particular community, even if that lack of awareness is associated with other factors. Exploration of multidimensional constructs underlying cultural values and preferences contributing to differences in HPV awareness would be a valuable contribution by future studies.

Daughters' receipt of childhood vaccines was also a strong correlate of HPV awareness in unadjusted analyses, although general attitude toward vaccines was not associated with awareness. Conceivably, mothers who reported that their daughters received all their childhood vaccines have a history of engagement with the health care system, which may

have resulted in greater awareness of HPV. It is possible that a favorable attitude toward vaccines was not a significant predictor because attitude does not reflect greater access to the health care system, an important source of HPV information. In our study, two-thirds of women heard about the vaccine from a doctor or nurse, suggesting that leveraging providers may be a promising strategy to increase HPV recommendations and the need of further investigation of potential gaps in information dissemination in the clinical setting.

While daughter's insurance status was associated with HPV awareness, having a usual source of care was not associated with HPV awareness in the adjusted analyses. Enrolling a daughter in a health insurance plan (typically public insurance in our sample) may reflect greater engagement with the health care system and higher health literacy than simply having a usual source of care. Similarly, completing the survey in English, a marker for English language proficiency, was related to higher likelihood of HPV awareness. All girls in our sample, regardless of insurance status, were eligible to receive the vaccine for free or at low cost through the Vaccines for Children program if visiting a county-affiliated immunization clinic. Our results point to the need for linguistically targeted outreach to ensure that all women regardless of insurance status or language preferences receive accurate and culturally-appropriate information about the HPV vaccine and how the vaccine can be accessed for free or at low cost.

Awareness is a necessary but not sufficient condition for performing a health behavior. As women become aware of the HPV, they may have additional questions or concerns that may function as barriers to getting their daughters vaccinated. Future research will be necessary to identify these concerns as they arise, which will help shape ongoing vaccine promotion efforts.

A few study limitations should be noted. Given the cross-sectional nature of the study, our findings demonstrate associations between predictors and HPV awareness but do not establish causality. In addition, our ability to compare across ethnic groups is limited given the unequal sample sizes across groups. Furthermore, mother report of childhood vaccine receipt was not verified through medical record review. Thus, over- or underreporting may have occurred, and this measure may have been subject to recall bias or differences in interpretation. Finally, findings from our low-income, ethnically diverse sample may not be generalizable to other populations.

In summary, these study results point to a need for interventions to ensure that all mothers of adolescent girls, regardless of insurance status or language, have the information they need to make an educated decision about getting the HPV vaccine for their daughters. Though there is a paucity of published educational interventions among low-literate or minority populations [22], interventions involving culturally- and community-informed messaging have shown efficacy in increasing HPV and HPV vaccine knowledge and intent to vaccinate girls [23–25]. Targeting outreach efforts to ethnically diverse populations to ensure widespread dissemination of information about HPV and the vaccine thus holds the promise of ultimately enhancing uptake across the population and reducing the burden of cervical cancer on society's most vulnerable groups.

Acknowledgments

We gratefully acknowledge the mothers who participated in the study and the Office of Women's Health hotline operators who conducted the telephone interviews. This work was supported by CDC/NCI UCLA Cancer Prevention and Control Research Network (U48 DP000056/SIP 16-04).

References

1. Elam-Evans LD, Yankey D, Jeyarajah J, Singleton JA, Curtis RC, MacNeil J, et al. National, regional, state, and selected local area vaccination coverage among adolescents aged 13–17 years—United States, 2013. *MMWR Morb Mortal Wkly Rep*. 2014; 63:625–33. [PubMed: 25055186]
2. American Cancer Society. *Cancer facts & figures*. Atlanta, GA: American Cancer Society; 2014.
3. Dorell CG, Yankey D, Santibanez TA, Markowitz LE. Human papillomavirus vaccination series initiation and completion, 2008–2009. *Pediatrics*. 2011; 128:830–9. [PubMed: 22007006]
4. Caskey R, Lindau ST, Alexander GC. Knowledge and early adoption of the HPV vaccine among girls and young women results of a national survey. *J Adolesc Health*. 2009; 45:453–62. (official publication of the Society for Adolescent Medicine). [PubMed: 19837351]
5. Bastani R, Glenn BA, Tsui J, Chang LC, Marchand EJ, Taylor VM, et al. Understanding suboptimal human papillomavirus vaccine uptake among ethnic minority girls. *Cancer Epidemiol Biomarkers Prev*. 2011; 20:1463–72. (a publication of the American Association for Cancer Research, cosponsored by the American Society of Preventive Oncology). [PubMed: 21602307]
6. Guerry SL, De Rosa CJ, Markowitz LE, Walker S, Liddon N, Kerndt PR, et al. Human papillomavirus vaccine initiation among adolescent girls in high-risk communities. *Vaccine*. 2011; 29:2235–41. [PubMed: 21288799]
7. Gelman A, Miller E, Schwarz EB, Akers AY, Jeong K, Borrero S. Racial disparities in human papillomavirus vaccination: does access matter? *J Adolesc Health*. 2013; 53:756–62. (official publication of the Society for Adolescent Medicine). [PubMed: 23992645]
8. Glenn, BA.; Coronado, GD.; Fernandez, ME.; Savas, LSVM.; Bastani, TR. *J Immigr Minor Health*. Vol. 16. Center for Minority Public Health; 2014. Understanding HPV vaccination among Latino adolescent girls in three U.S. regions.
9. Gowda C, Carlos RC, Butchart AT, Singer DC, Davis MM, Clark SJ, et al. CHIAS: a standardized measure of parental HPV immunization attitudes and beliefs and its associations with vaccine uptake. *Sex Transm Dis*. 2012; 39:475–81. [PubMed: 22592835]
10. Tiro JA, Tsui J, Bauer HM, Yamada E, Kobrin S, Breen N. Human papillomavirus vaccine use among adolescent girls and young adult women: an analysis of the 2007 California Health Interview Survey. *J Womens Health (Larchmt)*. 2012; 21:656–65. [PubMed: 22420920]
11. Kessels SJ, Marshall HS, Watson M, Braunack-Mayer AJ, Reuzel R, Tooher RL. Factors associated with HPV vaccine uptake in teenage girls: a systematic review. *Vaccine*. 2012; 30:3546–56. [PubMed: 22480928]
12. Brewer NT, Gottlieb SL, Reiter PL, McRee AL, Liddon N, Markowitz L, et al. Longitudinal predictors of human papillomavirus vaccine initiation among adolescent girls in a high-risk geographic area. *Sex Transm Dis*. 2011; 38:197–204. [PubMed: 20838362]
13. Allen JD, Othus MK, Shelton RC, Li Y, Norman N, Tom L, et al. Parental decision making about the HPV vaccine. *Cancer Epidemiol Biomarkers Prev*. 2010; 19:2187–98. (a publication of the American Association for Cancer Research, cosponsored by the American Society of Preventive Oncology). [PubMed: 20826829]
14. Gerend MA, Weibley E, Bland H. Parental response to human papillomavirus vaccine availability: uptake and intentions. *J Adolesc Health*. 2009; 45:528–31. (official publication of the Society for Adolescent Medicine). [PubMed: 19837361]
15. Dempsey AF, Abraham LM, Dalton V, Ruffin M. Understanding the reasons why mothers do or do not have their adolescent daughters vaccinated against human papillomavirus. *Ann Epidemiol*. 2009; 19:531–8. [PubMed: 19394865]
16. Prochaska JO, Velicer WF. The transtheoretical model of health behavior change. *Am J Health Promot: AJHP*. 1997; 12:38–48.

17. Ajzen, I. From intentions to actions: a theory of planned behavior. In: Kuhl, J.; Beckmann, J., editors. Action control. Berlin Heidelberg: Springer; 1985. p. 11-39.
18. Glanz, K.; Rimer, BK.; Viswanath, K. Health behavior and health education: Theory, research, and practice. 4. San Francisco: Wiley; 2008.
19. Maxwell AE, Bastani R, Chen MS Jr, Nguyen TT, Stewart SL, Taylor VM. Constructing a theoretically based set of measures for liver cancer control research studies. *Prev Med.* 2010; 50:68–73. [PubMed: 19883680]
20. Bastani R, Gallardo NV, Maxwell AE. Barriers to colorectal cancer screening among ethnically diverse high- and average-risk individuals. *J Psychosoc Oncol.* 2001; 19:65–84.
21. Bastani R, Glenn BA, Maxwell AE, Jo AM. Hepatitis B among Korean Americans: finding ways to improve testing, vaccination, and better health outcomes. *Ethn Dis.* 2007; 17:416–7. [PubMed: 17684794]
22. Fu LY, Bonhomme LA, Cooper SC, Joseph JG, Zimet GD. Educational interventions to increase HPV vaccination acceptance: a systematic review. *Vaccine.* 2014; 32:1901–20. [PubMed: 24530401]
23. Kepka D, Coronado GD, Rodriguez HP, Thompson B. Evaluation of a radionovela to promote HPV vaccine awareness and knowledge among Hispanic parents. *J Community Health.* 2011; 36:957–65. [PubMed: 21452030]
24. Spleen AM, Kluhsman BC, Clark AD, Dignan MB, Lengerich EJ. An increase in HPV-related knowledge and vaccination intent among parental and non-parental caregivers of adolescent girls, age 9–17 years, in Appalachian Pennsylvania. *J Cancer Educ.* 2012; 27:312–9. (the official journal of the American Association for Cancer Education). [PubMed: 22131065]
25. Kester LM, Shedd-Steele RB, Dotson-Roberts CA, Smith J, Zimet GD. The effects of a brief educational intervention on human papillomavirus knowledge and intention to initiate HPV vaccination in 18–26 year old young adults. *Gynecol Oncol.* 2014; 132(Suppl 1):S9–12. [PubMed: 24384459]

Table 1Demographic and health care characteristics of mothers/caregivers and adolescent girls ($n = 490$).

Characteristic	%	<i>N</i>
Mothers/caregivers		
Age (mean, SD)	44 (7.22)	481
Race/ethnicity		
Latina	52%	255
Chinese	20%	98
Korean	13%	66
African American	8%	38
Other race	7%	33
Interview language		
English	19%	92
Non-English	81%	398
Household income		
<\$12,000 or unemployed	36%	162
\$12,000 to <\$24,000	38%	175
\$24,000	26%	118
Education		
<High school diploma	47%	223
High school diploma	28%	132
Any college or more	25%	120
Nativity		
Foreign-born	88%	432
Born in U.S.	12%	58
Years in U.S., among foreign-born (mean, SD)	18 (8.74)	422
Insurance status		
Uninsured	75%	366
Public or private insurance	25%	121
Have usual source of care		
Yes	51%	247
No	49%	241
General vaccine attitudes		
Agrees immunization against disease is a good thing	92%	447
Agrees immunizations have more side effects than benefits	12%	59
Adolescent girls		
Age (mean, SD)	14 (2.84)	487
Insurance status		
Uninsured	26%	127
Private or public insurance	74%	362
Have usual source of care		
Yes	71%	349

Characteristic	%	<i>N</i>
No	29%	141
Received childhood vaccines		
Yes	96%	468
No	4%	20

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

Table 2

Mother/caregiver HPV awareness and knowledge.

	%	<i>N</i>
HPV awareness		
Heard of HPV	63%	306
Heard of HPV vaccine	61%	294
Source of HPV vaccine awareness (among HPV vaccine aware mothers/caregivers)*		
Doctor or nurse	66%	193
Family or friends	21%	61
Newspaper/magazine	16%	46
TV advertisement	31%	90
TV news	30%	87
Web	3%	8
Radio	6%	18
Other	6%	19
HPV knowledge (among HPV aware mothers)		
	% correct	<i>N</i>
HPV causes cervical cancer.	66%	200
HPV is a sexually transmitted disease.	71%	215
HPV usually goes away without treatment.	4%	12

* Not mutually exclusive categories.

Table 3

Sample characteristics by HPV awareness.

Characteristic	% Aware	N
Mothers/caregivers		
Age (mean, SD)		
Aware	43.58 (7.25)	300
Not aware	44.22 (7.19)	180
Race/ethnicity **		
Korean	45%	30/66
Non-Korean	65%	276/423
Interview language ***		
English	78%	71/91
Non-English	59%	235/398
Household income		
<\$12,000 or unemployed	65%	106/162
\$12,000	62%	182/293
Education		
High school diploma	61%	215/355
Any college or more	68%	82/120
Nativity		
Foreign-born	61%	264/431
Born in U.S.	72%	42/58
Years in U.S. (among foreign-born) **		
<15 Years	51%	67/131
15 Years	67%	233/349
Insurance status		
Uninsured	61%	222/365
Public or private insurance	69%	83/121
Have usual source of care *		
Yes	67%	166/246
No	58%	139/241
General vaccine attitudes		
Immunization against disease is a good thing		
Agrees	63%	280/447
Disagrees/neither	64%	25/39
Immunizations have more side effects than benefits		
Agrees	54%	32/59
Disagrees/neither	64%	273/425
Adolescent girls		
Age		
<14 years	59%	125/211

Characteristic	% Aware	<i>N</i>
14 years	65%	180/275
Insurance status**		
Uninsured	52%	66/127
Private or public insurance	66%	240/362
Have usual source of care		
Yes	65%	227/348
No	56%	79/141
Received childhood vaccines*		
Yes	63%	297/468
No	40%	8/20

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

Table 4

Multivariate correlates of HPV awareness.

Covariates	Adjusted OR (95% CI)
Mothers/caregivers	
Age (continuous)	0.97 (0.94, 1.00)
Household income < \$12,000 (Ref: \$12,000)	1.05 (0.68, 1.62)
Any insurance (Ref: no insurance)	0.92 (0.54, 1.57)
Have a usual source of care (Ref: no)	1.40 (0.88, 2.22)
Non-Korean ethnicity (Ref: Korean)	1.68 (0.86, 3.28)
English interview (Ref: Non-English)	*2.27 (1.24, 4.16)
Adolescent girl	
Age (continuous)	1.08 (0.99, 1.16)
Any insurance (Ref: no insurance)	*2.40 (1.34, 4.29)
Have usual source of care (Ref: no)	0.67 (0.37, 1.22)
Received childhood vaccines (Ref: did not)	1.54 (0.54, 4.42)

* $p < 0.05$.