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Disparities in Parental Human Papillomavirus (HPV) Vaccine Awareness and Uptake among Adolescents in Los Angeles County, 2007 and 2011

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Abstract

Trends in HPV vaccine awareness among parents of adolescent girls and boys (ages 13-17) and HPV vaccine uptake (1 dose) among girls (ages 13-17) were evaluated in Los Angeles County, California. Between 2007 and 2011, parental HPV vaccine awareness increased from 72% to 77% overall, with significant increases among mothers, Latinos, and respondents with daughters and Medi-Cal insured children. In 2011, parents who were male, older, less educated, Asian/Pacific Islander, and had sons remained significantly less likely to be aware. HPV vaccine initiation among daughters nearly doubled from 25% in 2007 to 48% in 2011, and girls who were older, uninsured, and had access-related barriers showed the largest improvements. In 2011, daughters who were younger and who had older and African American parents were at risk for low uptake. Thus, initiatives targeting male and younger adolescents, culturally-relevant information, and access to vaccination may help to reduce identified disparities.

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Conflicts of Interest

The authors have no potential conflicts of interest to disclose.

Keywords

Human papillomavirus; HPV vaccine; awareness; disparities; adolescents

INTRODUCTION

The quadrivalent human papillomavirus (HPV) vaccine was licensed in the U.S. in 2006, and the bivalent and 9-valent formulations were approved in 2009 and 2014, respectively. These vaccines protect against 66-81% of cervical cancers and the majority of other HPV-associated cancers [1]. Mitigating disparities in incidence of HPV-associated cancers remains critical [2, 3], particularly by ensuring equitable coverage among adolescents prior to HPV exposure. The Advisory Committee for Immunization Practices (ACIP) has recommended routine HPV vaccination at ages 11-12 for girls since 2006 and for boys since 2011, with catch-up vaccinations through age 26 for females and age 21 for males. In 2015, however, coverage rates for teenage girls and boys only reached 63% and 50%, respectively, in the U.S. and 67% and 59%, respectively, in California [4].

Prior studies have identified facilitators to adolescent HPV vaccination, including parent and adolescent race/ethnicity, parental awareness and knowledge, child age, health insurance status, health care utilization, and physician recommendation [5–7]. Many, however, included limited ethnic subpopulations or non-random samples, and few assessed correlates over time. To address this gap, we analyzed two cycles of a large, ethnically-diverse population survey in Los Angeles (LA) County, California, the most populous county in the U.S., with high rates of cervical cancer incidence and mortality [8]. In this article, we compared (1) HPV vaccine awareness among parents of adolescent girls and boys (ages 13-17) between 2007 and 2011 and (2) HPV vaccine uptake (1 dose) among girls (ages 13-17) over this same period.

MATERIALS AND METHODS**Data Source and Study Population**

This study is nested in the Los Angeles County Health Survey (LACHS), a periodic, population-based telephone survey and focuses on the 2007 and 2011 child surveys. Methodology details are described elsewhere [9]. Briefly, a sample of LA County households was random digit dialed, and surveys were completed with the parent or primary caregiver (parent for brevity) of a selected child ages 0-17 in that household. Computer-assisted telephone interviews were conducted in six languages between April and December 2007 for the 2007 survey and between June 2010 and June 2011 for the 2011 survey. Overall sample sizes for 2007 and 2011 child surveys were 5,728 and 6,013, and response rates were 15% and 20%, respectively. We restricted analyses to parents with children ages 13-17, comparable to the National Immunization Survey – Teen, resulting in 1,783 and 1,864 respondents from 2007 and 2011, respectively.

Data Measures

Primary outcomes included parental HPV vaccine awareness and adolescent HPV vaccine uptake. A statement about HPV and the cervical cancer vaccine or HPV shot (or Gardasil in the 2007 survey) for girls (and boys in the 2011 survey) introduced HPV survey questions. Awareness was measured with a question asking parents whether they had ever heard of a vaccine to prevent HPV and cervical cancer; awareness was defined as having heard of the vaccine. Aware parents with children ages 9-17 were then asked whether their children had received any HPV shots and how many. For unaware parents, we assumed their children received no shots. HPV vaccine uptake was defined as having received at least one shot. Other measures, informed by literature and prior work [10–12], included parental and child demographics and child's access to health care.

Statistical Analysis

All statistical analyses employed weighted data to account for design effects. For unadjusted analyses, we examined 95% confidence intervals [CI] between years, and non-overlapping CIs were considered statistically significant ($p < 0.05$). For adjusted analyses, we employed logistic regression, calculated adjusted odds ratios [aOR] and 95% CIs, and stratified analyses by parent gender. Because the vaccine was not approved for boys in 2007, vaccine uptake was modeled only among girls ($n=888$ in 2007 and $n=891$ in 2011). We evaluated statistical significance using the Wald test, and p -values were two-sided. All analyses were performed in SAS 9.3 (SAS institute, Cary, NC).

RESULTS

Study sample

Respondent characteristics in 2007 and 2011 were comparable (Table 1). The majority were ethnic minorities, foreign-born, and lower-income. Due to changes in respondent selection, proportionally more men were included in 2011. In both years, about half of respondents' children were female, half privately insured, and ages were equally distributed.

Parental HPV vaccine awareness

Overall, parental HPV vaccine awareness moderately increased from 72% in 2007 to 77% in 2011 (Table 2). Significant increases were observed among mothers, Latinos, and respondents with daughters or Medi-Cal insured children. Among mothers only, additional subgroups revealed increases, including those who were younger, less-educated, foreign-born, lower-income, mostly spoke Spanish, and whose children had greater health care access (data not shown).

In adjusted analyses, many subgroup differences were attenuated, including for lower household income, Latino and African American race/ethnicity, and other primary language (Table 2). Lower awareness, however, remained associated with Asian/Pacific Islander and less-educated parents. Fathers also remained significantly less likely than mothers to report awareness, albeit to a lesser magnitude, while the disparity between parents with sons compared with daughters widened. Additionally, in 2011, younger versus older parents were more likely aware.

HPV vaccine uptake among girls

Overall, HPV vaccine uptake doubled between 2007 (25%) and 2011 (48%) (Table 3). Daughters who were older, uninsured, and had difficulty accessing medical care or no regular source of care exhibited the largest improvements (ranging from 22 to 42 percentage-point increases). In 2011, poor uptake was associated with younger child age, and parent African American race, moderate-income level, and older age (Table 3).

DISCUSSION

In 2007 and 2011, approximately 3 in 4 parents were aware of the HPV vaccine in LA County. Awareness rates among our sample of parents with specifically daughters paralleled national estimates (85%) [13], but were higher than those reported in California and high-risk communities in LA County (ranging from 53% to 60%) [11, 12, 14, 15]. Although rates of HPV vaccine uptake among girls nearly doubled, coverage only reached 48% in 2011, lower than U.S. (53%) and California (65%) estimates [16].

These findings highlighted subpopulations for outreach. The persistent gender disparities underscore the need for targeting both fathers and mothers and promoting the vaccine's direct benefits for both boys and girls. Child gender differences may reflect slow dissemination of HPV vaccine approval for boys and physicians' reluctance to recommend it for boys [17]. Furthermore, stagnantly low awareness among Asian/Pacific Islanders, who historically have had the poorest rates of cervical cancer screening, raises concerns [18]. Asian parents, however, were as likely as white parents to vaccinate their daughter. In contrast, despite awareness rates comparable to white parents in 2011, African American respondents were significantly less likely to have vaccinated daughters. These results suggest promoting awareness may be an effective strategy for Asians, but alone may be an insufficient approach for some African American parents. Modifiable facilitators that narrow the gap between awareness and action merit continued exploration.

Older teens also made greater coverage gains than younger teens, consistent with prior research [19]. In addition to parental refusal, providers may feel less urgency to recommend the vaccine to younger adolescents. Given well-documented impacts of providers' recommendation [5] and superior immune response in younger children, interventions encouraging providers' strong endorsement of HPV vaccination and its cancer prevention benefit among younger adolescents may help to reduce this disparity [20]. Moreover, recent changes to ACIP recommendations from a three-dose to a two-dose schedule for adolescents before age 15 strengthen the rationale for initiating HPV vaccination in younger adolescents.

Interestingly, traditional access-related barriers did not predict poor vaccine receipt among girls, potentially owing to several safety net programs in LA County and the federal Vaccines for Children program. The large increase in uptake among uninsured daughters may also reflect early impacts of community health center expansions and delivery system reforms to California's safety net. Other unmeasured potential confounders beyond access, such as behavioral and psychosocial determinants and provider recommendation, warrant further study. Furthermore, our results may underestimate uptake because we categorized children with unaware parents as unvaccinated. Parents may have not recalled the HPV

vaccine if co-administered with other adolescent vaccinations. Also, in California, legislation permits adolescent HPV vaccination without parental consent, and vaccines are accessible at school-based clinics.

Study limitations are acknowledged. First, cross-sectional data limit causal inferences. Second, the 2007 sampling frame did not include residents who solely used cellular telephones. To mitigate potential bias, we adjusted survey weights to account for noncoverage of cellular-only households. Third, similar to other population-based surveys, measures were self-reported, and surveys had low response rates. Finally, findings may not be generalizable to all populations, but may inform other diverse communities.

In conclusion, improvements in HPV vaccine awareness and uptake are needed. Emphasis on routine provider recommendation for all age-eligible boys and girls, integration of culturally-relevant information, and greater awareness about how to access the vaccine regardless of insurance remains critical. The inclusion of HPV vaccination as a HEDIS® performance measure for boys and girls and reduction in recommended number of doses for younger adolescents may further facilitate improvements. Thus, continued monitoring of HPV vaccine awareness and uptake, for boys and girls, is important to understanding impacts of incremental efforts to increase and promote equitable coverage.

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References

1. Saraiya M, Unger ER, Thompson TD, Lynch CF, Hernandez BY, Lyu CW, et al. US assessment of HPV types in cancers: implications for current and 9-valent HPV vaccines. *Journal of the National Cancer Institute*. 2015; 107:djv086. [PubMed: 25925419]
2. McDougall JA, Madeleine MM, Daling JR, Li CI. Racial and ethnic disparities in cervical cancer incidence rates in the United States, 1992–2003. *Cancer Causes & Control*. 2007; 18:1175–86. [PubMed: 17805982]
3. Benard VB, Johnson CJ, Thompson TD, Roland KB, Lai SM, Cokkinides V, et al. Examining the association between socioeconomic status and potential human papillomavirus- associated cancers. *Cancer*. 2008; 113:2910–8. [PubMed: 18980274]
4. Reagan-Steiner S. National, regional, state, and selected local area vaccination coverage among adolescents aged 13–17 years—United States, 2015. *MMWR Morbidity and mortality weekly report*. 2016; 65
5. Holman DM, Benard V, Roland KB, Watson M, Liddon N, Stokley S. Barriers to human papillomavirus vaccination among US adolescents: a systematic review of the literature. *JAMA Pediatrics*. 2014; 168:76–82. [PubMed: 24276343]
6. Kessels SJM, 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]
7. Brewer NT, Fazekas KI. Predictors of HPV vaccine acceptability: a theory-informed, systematic review. *Preventive Medicine*. 2007; 45:107–14. [PubMed: 17628649]
8. Los Angeles County Department of Public Health Office of Women's Health and Office of Health Assessment & Epidemiology. *Health Indicators for Women in Los Angeles County*. Los Angeles,

CA: www.publichealth.lacounty.gov/owh/docs/DataReport/2017-HealthIndicatorsforWomeninLACounty.pdf; 2017 [accessed 17.07.31]

9. Los Angeles County Department of Public Health. Los Angeles County Health Survey. <http://www.publichealth.lacounty.gov/ha/hasurveyintro.htm> [accessed 17.04.25]
10. Cui Y, Baldwin SB, Wiley DJ, Fielding JE. Human papillomavirus vaccine among adult women: disparities in awareness and acceptance. *Am J Prev Med*. 2010; 39:559–63. [PubMed: 21084077]
11. 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 Epidemiology, Biomarkers & Prevention*. 2011; 20:1463–72.
12. Glenn BA, Tsui J, Singhal R, Sanchez L, Nonzee NJ, Chang LC, et al. Factors associated with HPV awareness among mothers of low-income ethnic minority adolescent girls in Los Angeles. *Vaccine*. 2015; 33:289–93. [PubMed: 25434792]
13. Dorell CG, Yankey D, Santibanez TA, Markowitz LE. Human papillomavirus vaccination series initiation and completion, 2008–2009. *Pediatrics*. 2011; 128:830–9. [PubMed: 22007006]
14. 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. *Journal of women's health*. 2012; 21:656–65.
15. 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]
16. Centers for Disease Control and Prevention. National and state vaccination coverage among adolescents aged 13–17 years—United States, 2011. *MMWR Morbidity and mortality weekly report*. 2012; 61:671. [PubMed: 22932301]
17. Liddon N, Hood J, Wynn BA, Markowitz LE. Acceptability of human papillomavirus vaccine for males: a review of the literature. *Journal of Adolescent Health*. 2010; 46:113–23. [PubMed: 20113917]
18. Centers for Disease Control and Prevention. National Center for Health Statistics. Use of Pap smears among women aged 18 and over, by selected characteristics: United States, selected years 1987–2013. 2015. <https://www.cdc.gov/nchs/data/hus/15.pdf#071> [accessed 17.04.25]
19. Reiter PL, Gupta K, Brewer NT, Gilkey MB, Katz ML, Paskett ED, et al. Provider-verified HPV vaccine coverage among a national sample of Hispanic adolescent females. *Cancer Epidemiology and Prevention Biomarkers*. 2014 cebp-0979.
20. Gilkey MB, Calo WA, Moss JL, Shah PD, Marciniak MW, Brewer NT. Provider communication and HPV vaccination: The impact of recommendation quality. *Vaccine*. 2016; 34:1187–92. [PubMed: 26812078]

Highlights

- We assessed parental HPV vaccine awareness and uptake among girls in 2007 and 2011.
- About 3 in 4 parents remained aware of the HPV vaccine, and vaccine uptake doubled.
- In 2011, being male, Asian, less educated, and having a son predicted unawareness.
- Uptake among daughters with poor access to care and insurance markedly increased.
- Interventions to increase uptake among younger adolescents merit implementation.

Table 1

Sample characteristics (n=3,647)

	2007	2011
	n ¹ (Weighted % ²)	n ¹ (Weighted % ²)
Overall	1,783 (100)	1,864 (100)
<i>Parent Characteristics</i>		
Gender		
Female	1,711 (96.3)	1,363 (74.4)
Male	72 (3.7)	501 (25.6)
Age Group		
18–39	442 (26.0)	347 (29.7)
40–49	877 (50.1)	899 (47.4)
50 or over	452 (23.9)	609 (22.9)
Race/Ethnicity³		
White	503 (24.6)	598 (23.9)
Latino	924 (54.9)	896 (55.7)
African American	130 (11.0)	159 (10.4)
Asian/Pacific Islander	206 (9.6)	181 (10.1)
Education		
Less than high school	542 (32.2)	486 (29.8)
High school	299 (18.3)	308 (20.3)
Some college or trade school	410 (23.3)	388 (20.5)
College or post graduate	512 (26.2)	662 (29.3)
Household Income (% FPL)⁴		
0–99% FPL	619 (36.6)	435 (31.0)
100%–199% FPL	394 (23.7)	424 (25.5)
200%–299% FPL	205 (10.6)	218 (12.1)
300% or above FPL	565 (29.1)	787 (31.4)
Primary Language		
English	1,007 (56.6)	1,130 (56.3)
Spanish	613 (37.7)	583 (37.4)
Other	118 (5.7)	124 (6.4)
Country of Birth		
Foreign born	989 (56.9)	947 (55.7)
US born	784 (43.1)	906 (44.3)
<i>Child Characteristics</i>		
Gender		
Female	888 (49.6)	891 (48.2)
Male	895 (50.4)	973 (51.8)
Age (years)		
13	315 (20.6)	295 (18.3)

	2007	2011
	n ¹ (Weighted % ²)	n ¹ (Weighted % ²)
14	352 (22.3)	338 (20.6)
15	356 (18.1)	366 (18.5)
16	407 (20.4)	429 (21.7)
17	353 (18.7)	436 (21.0)
Insurance⁵		
Healthy Families/Healthy Kids	238 (13.1)	267 (16.2)
Medi-Cal	432 (26.2)	380 (28.1)
Private	932 (50.0)	1,086 (48.4)
No insurance	166 (10.8)	113 (7.3)
Difficulty Accessing Medical Care		
Yes	262 (16.6)	211 (14.1)
No	1,471 (83.4)	1,625 (85.9)
Have Regular Source of Care		
Yes	1,618 (90.5)	1,770 (94.8)
No	161 (9.5)	90 (5.2)

¹ Unweighted frequency; numbers might not add up to 1,783 (2007) or 1,864 (2011) due to missing data

² Percentages were adjusted for sampling weights.

³ Only Whites, Latinos, African Americans, and Asians/Pacific Islanders were included in the analysis.

⁴ Based on U.S. Census Federal Poverty Level (FPL) thresholds at the time of interview

⁵ Healthy Families/Healthy Kids is California's Children's Health Insurance Program. Medi-Cal is the state's Medicaid program.

Table 2

HPV vaccine awareness among parents of boys and girls aged 13-17 (n=3,647)

	2007			2011		
	% (95% CI)		Adj. OR (95% CI) ^I	% (95% CI)		Adj. OR (95% CI) ^I
Overall	72%	(69–74)	–	77%	(74–80)	–
Parent Characteristics						
Gender						
Female	72%	(70–75)	1.0 (ref)	82%	(78–85) [†]	1.0 (ref)
Male	56%	(41–70)	0.19 (0.09, 0.37) [*]	63%	(56–70)	0.39 (0.25, 0.62) [*]
Age Group (years)						
50 or over	73%	(68–78)	1.0 (ref)	69%	(62–76)	1.0 (ref)
40–49	72%	(69–76)	1.09 (0.74, 1.59)	80%	(76–84)	1.70 (1.01, 2.87) [*]
18–39	70%	(65–75)	1.44 (0.94, 2.21)	79%		2.08 (1.09, 3.94) [*]
Race/Ethnicity						
White	90%	(87–94)	1.0 (ref)	87%	(83–91)	1.0 (ref)
Latino	65%	(61–69)	0.50 (0.28, 0.90) [*]	75%	(70–79) [†]	0.91 (0.45, 1.85)
African American	74%	(64–84)	0.39 (0.19, 0.79) [*]	86%	(79–93)	0.81 (0.37, 1.77)
Asian/Pacific Islander	59%	(51–67)	0.33 (0.15, 0.72) [*]	61%	(49–72)	0.42 (0.20, 0.86) [*]
Education						
College or post graduate	84%	(80–88)	1.0 (ref)	84%	(80–89)	1.0 (ref)
Some college or trade school	81%	(77–86)	0.97 (0.55, 1.72)	83%	(77–89)	0.59 (0.32, 1.11)
High school	67%	(60–74)	0.57 (0.31, 1.04)	72%	(64–81)	0.51 (0.26, 0.99) [*]
Less than high school	59%	(54–64)	0.52 (0.28, 0.97) [*]	70%	(63–76)	0.44 (0.21, 0.92) [*]
Household Income (%FPL)²						
300% or above FPL	89%	(86–92)	1.0 (ref)	83%	(79–88)	1.0 (ref)
200–299% FPL	76%	(69–83)	0.51 (0.29, 0.90) [*]	79%	(72–86)	0.94 (0.47, 1.89)
100–199% FPL	66%	(60–72)	0.47 (0.24, 0.90) [*]	76%	(69–82)	1.35 (0.62, 2.96)
0–99% FPL	61%	(56–65)	0.48 (0.25, 0.94) [*]	71%	(64–78)	1.06 (0.39, 2.88)
Primary Language						
English	83%	(80–86)	1.0 (ref)	84%	(80–88)	1.0 (ref)
Spanish	60%	(56–65)	0.68 (0.42, 1.10)	70%	(64–76)	0.71 (0.31, 1.62)
Other	47%	(36–57)	0.29 (0.13, 0.65)	59%	(47–71)	0.74 (0.34, 1.58)
Country of Birth						
US born	84%	(80–87)	1.0 (ref)	86%	(83–90)	1.0 (ref)
Foreign born	63%	(59–66)	0.94 (0.57, 1.57)	69%	(65–74)	0.59 (0.32, 1.09)
Child Characteristics						
Gender						
Female	78%	(75–81)	1.0 (ref)	86%	(82–90) [†]	1.0 (ref)

	2007			2011		
	% (95% CI)		Adj. OR (95% CI) ^I	% (95% CI)		Adj. OR (95% CI) ^I
Male	66%	(62–70)	0.55 (0.41, 0.74) *	69%	(64–74)	0.32 (0.21, 0.49) *
Age (years)						
13	70%	(64–76)	1.0 (ref)	76%	(68–84)	1.0 (ref)
14	72%	(66–77)	1.03 (0.64, 1.64)	80%	(73–86)	1.15 (0.63, 2.12)
15	74%	(68–79)	1.34 (0.84, 2.12)	74%	(66–82)	0.95 (0.49, 1.86)
16	73%	(68–78)	1.17 (0.72, 1.88)	78%	(71–86)	1.25 (0.65, 2.41)
17	71%	(66–77)	1.02 (0.62, 1.68)	76%	(70–82)	1.20 (0.65, 2.21)
Insurance³						
Private	83%	(80–86)	1.0 (ref)	84%	(80–88)	1.0 (ref)
Healthy Families/Healthy Kids	66%	(59–73)	1.00 (0.61, 1.63)	71%	(61–80)	0.78 (0.36, 1.68)
Medi-Cal	59%	(53–64)	0.67 (0.42, 1.08)	73%	(67–80) [†]	0.75 (0.31, 1.81)
No insurance	60%	(59–73)	0.80 (0.44, 1.45)	61%	(61–80)	0.61 (0.20, 1.91)
Difficulty Accessing Medical Care						
No	74%	(72–77)	1.0 (ref)	79%	(76–82)	1.0 (ref)
Yes	61%	(54–68)	0.94 (0.61, 1.45)	66%	(56–76)	0.82 (0.42, 1.61)
Have Regular Source of Care						
Yes	73%	(71–76)	1.0 (ref)	78%	(75–82)	1.0 (ref)
No	60%	(51–69)	1.00 (0.62, 1.62)	56%	(37–74)	0.53 (0.25, 1.11)

Abbreviations: OR, odds ratio; CI, confidence interval; FPL, federal poverty level

^I Mutually adjusted for variables in table

² Based on U.S. Census Federal Poverty Level thresholds at the time of interview

³ Healthy Families/Healthy Kids is California's Children's Health Insurance Program. Medi-Cal is the state's Medicaid program.

[†] Confidence intervals between years did not overlap

* p<0.05

Table 3

HPV vaccine uptake among girls aged 13–17 years (n = 1779).

	2007		2011	
	% (95% CI)	Adj. OR (95% CI)^a	% (95% CI)	Adj. OR (95% CI)^a
Overall	25 (21–28)	–	48 (42–53) [†]	–
Parent characteristics				
<i>Gender</i>				
Female	25 (21–28)	1.0 (ref)	52 (45–58) [†]	1.0 (ref)
Male	21 (4–38)	0.62 (0.22–1.72)	35 (24–45)	0.58 (0.32–1.05)
<i>Age group (years)</i>				
50 or over	25 (19–31)	1.0 (ref)	37 (28–45)	1.0 (ref)
40–49	23 (18–27)	0.98 (0.62–1.56)	46 (39–54) [†]	1.78 (1.04–3.04) [*]
18–39	27 (20–35)	1.64 (0.92–2.93)	58 (47–70) [†]	3.91 (1.94–7.87) [*]
<i>Race/ethnicity</i>				
White	31 (24–37)	1.0 (ref)	53 (43–62) [†]	1.0 (ref)
Latino	23 (18–27)	1.35 (0.70–2.60)	47 (39–55) [†]	0.54 (0.26–1.13)
African American	17 (8–26)	0.48 (0.21–1.08)	46 (25–67)	0.36 (0.15–0.89) [*]
Asian/Pacific Islander	25 (15–35)	1.51 (0.66–3.48)	46 (30–61)	1.04 (0.42–2.54)
<i>Education</i>				
College or post graduate	36 (29–43)	1.0 (ref)	50 (41–59)	1.0 (ref)
Some college or trade school	22 (15–28)	0.52 (0.31–0.88) [*]	55 (42–68) [†]	1.29 (0.68–2.46)
High school	19 (12–27)	0.48 (0.23–1.00)	52 (39–65) [†]	0.85 (0.41–1.74)
Less than high school	21 (15–27)	0.70 (0.31–1.60)	40 (29–51) [†]	0.48 (0.19–1.20)
<i>Household income (% FPL)^b</i>				
300% or above FPL	31 (25–37)	1.0 (ref)	53 (45–61) [†]	1.0 (ref)
200–299% FPL	21 (12–29)	0.74 (0.39–1.41)	42 (27–56)	0.46 (0.22–0.97) [*]
100–199% FPL	27 (19–35)	1.27 (0.64–2.55)	50 (38–62) [†]	0.91 (0.40–2.09)
0–99% FPL	18 (13–24)	1.03 (0.46–2.32)	43 (32–54) [†]	0.57 (0.21–1.57)
<i>Primary language</i>				
English	29 (24–34)	1.0 (ref)	51 (44–59) [†]	1.0 (ref)
Spanish	19 (13–24)	0.65 (0.29–1.45)	47 (37–57) [†]	1.13 (0.49–2.58)
Other	17 (7–27)	0.67 (0.23–1.95)	35 (19–50)	0.47 (0.18–1.24)
<i>Country of birth</i>				
US born	31 (25–36)	1.0 (ref)	49 (40–58) [†]	1.0 (ref)
Foreign born	20 (16–24)	0.60 (0.32–1.15)	47 (39–54) [†]	1.65 (0.89–3.05)
Child characteristics				
<i>Age (years)</i>				
17	21 (13–30)	1.0 (ref)	62 (51–74) [†]	1.0 (ref)

	2007		2011	
	% (95% CI)	Adj. OR (95% CI)^a	% (95% CI)	Adj. OR (95% CI)^a
16	27 (20–33)	1.36 (0.74–2.48)	50 (37–63) [†]	0.57 (0.30–1.10)
15	27 (19–35)	1.49 (0.78–2.83)	53 (39–66) [†]	0.74 (0.37–1.48)
14	27 (19–35)	1.40 (0.75–2.63)	38 (26–50)	0.25 (0.12–0.54) [*]
13	21 (14–28)	1.14 (0.59–2.21)	35 (24–46)	0.24 (0.12–0.48) [*]
<i>Insurance^c</i>				
Private	30 (25–35)	1.0 (ref)	50 (43–57) [†]	1.0 (ref)
Healthy Families/Healthy Kids	21 (12–30)	1.03 (0.47–2.24)	43 (29–57)	1.12 (0.49–2.58)
Medi-Cal	19 (13–25)	0.75 (0.36–1.54)	48 (37–60) [†]	1.65 (0.67–4.08)
No insurance	12 (3–21)	0.66 (0.22–1.97)	47 (21–72) [†]	1.10 (0.36–3.38)
<i>Difficulty accessing medical care</i>				
No	27 (23–31)	1.0 (ref)	49 (43–55) [†]	1.0 (ref)
Yes	14 (6–22)	0.62 (0.29–1.31)	42 (27–57) [†]	0.65 (0.32–1.33)
<i>Have regular source of care</i>				
Yes	26 (22–30)	1.0 (ref)	48 (42–53) [†]	1.0 (ref)
No	10 (2–17)	0.48 (0.16–1.45)	51 (24–79) [†]	1.14 (0.36–3.55)

Abbreviations: OR, odds ratio; CI, confidence interval; FPL, federal poverty level.

^aMutually adjusted for variables in table.

^bBased on U.S. Census Federal Poverty Level thresholds at the time of interview.

^cHealthy Families/Healthy Kids are state/county children's health insurance programs. Medi-Cal is California's Medicaid program.

[†]Confidence intervals between years did not overlap.

^{*}p < 0.05.