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RESEARCH ARTICLE



Los Angeles County dentists' opinions on discussing human papilloma virus-related oral health issues and recommending vaccine to patients

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ABSTRACT

Dentists are well-positioned to discuss oral health issues related to Human Papillomavirus (HPV) and recommend the HPV vaccine to their patients, mainly because the HPV virus causes oropharyngeal cancers. We assessed Los Angeles (LA) County dentists' opinions on discussing HPV-related oral health issues and recommending the HPV vaccine to their patients. We tested if opinions differed between dentists whose primary patient population was only adults versus children and adults. We mailed a 19-item survey to 2000 randomly sampled LA County dentists for this cross-sectional study. The primary outcome variable was a summary opinion score of 7 opinion statements. We ran descriptive, bivariate comparisons and adjusted linear regression models. Overall, 261 dentists completed the survey. A majority (58.5%) worried they would lose patients if they recommended the vaccine; 49% thought dentists were not appropriate to educate, counsel, or advise on HPV-related issues; 42% were concerned about the safety of the vaccine; and 40% did not feel comfortable recommending the vaccine. The mean summary opinion score was 21.4 ± 5.4 for the total sample. Regression analysis showed no differences in opinions between dentists whose primary patient population was only adults versus children and adults (Coefficient = 0.146, $p = 0.83$). Overall, the responding dentists were not very favorable about discussing oral health-related HPV issues and recommending the HPV vaccine to their patients. Additionally, the overall opinions were similar between dentists whose primary patient population was only adults versus children and adults.

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Introduction



The most common sexually transmitted infection in the United States is caused by the Human papillomavirus (HPV).^{1–3} HPV leads to a myriad of health conditions and diseases in both men and women, like anogenital warts, recurrent respiratory papillomatosis, cervical intraepithelial neoplasia, oropharyngeal cancers (OPCs), and many anogenital cancers, including penile, anal, vaginal, vulvar, and cervical cancers.⁴ The prevalence of any HPV infection among 15 to 24-year-olds was approximately 33% in 2018, with a higher prevalence among females (40.1%) compared to males (25.6%).⁵

Almost two decades ago, cervical cancer was the most common HPV-associated cancer in the United States; however, the incidence rates have decreased while the age-adjusted incidence of HPV-associated OPCs substantially increased between 1999 and 2015.⁶ During 1995–2015, the incidence rates of HPV-associated OPCs increased by 2.7% and 0.8% per year among men and women, respectively.⁶ In 2015, the age-adjusted incidence rates of HPV-associated cancers were highest in females for cervical carcinoma (7.2%), followed by anal SCC (2.2%), vulval SCC (2.0%), oropharyngeal SCCs (1.7%), and vaginal SCC (0.4%). In males, the incidence rates

were highest for the oral pharyngeal SCC (8.5%), followed by anal SCC (1.3%), and penile SCC (0.8%). Between 2015 and 2019, 47199 new cases of HPV-associated cancers were estimated in the United States.⁷

Vaccinations can prevent both HPV-related anogenital warts and cancers.^{8,9} In June 2006, a quadrivalent HPV vaccine was approved by the U.S. Food and Drug Administration (FDA) for use in females aged 9 to 26 years,⁸ followed by a bivalent vaccine in 2009 for females aged 10 to 25.⁹ A quadrivalent vaccine was approved for males aged 9 to 26 by the FDA in 2009.⁹ The Centers for Disease Control and Prevention (CDC) Advisory Committee on Immunization Practice (ACIP) recommends two vaccine doses be administered at 11 or 12 years of age, with 6 to 12-month intervals.⁹ These vaccines were approved mainly to prevent warts and cervical cancers. Catch-up vaccination is recommended for specific individuals aged 27 through 45 who are not adequately vaccinated after making a shared clinical decision with their healthcare professional.¹⁰

Almost 3,300 HPV-attributable cancer cases are diagnosed each year in California, translating to 10% of all nationwide HPV-attributable cancers.¹¹ The California HPV vaccination roundtable set the 2026 goal of fully vaccinating at least 80% of

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13-year-old adolescents against HPV.¹¹ However, in 2022, only 60.6% of adolescents aged 13 to 17 were fully immunized in California for HPV, below the national average of 62.6%.¹² California ranked 33rd in HPV vaccination rates, much behind other states. Improving vaccination rates will require all healthcare professionals, including dental professionals in California, to increase awareness of HPV and promote HPV vaccinations among their patient populations. Because of their training, knowledge, and managing risks for dental diseases, dentists are well-positioned to prevent HPV-related oral health issues by increasing their patients' knowledge and awareness by discussing the relationship between HPV and OPCs and the benefits of HPV vaccination.

The American Academy of Pediatric Dentistry (AAPD) encourages dental professionals to educate their patients and parents on the health consequences of HPV-associated OPCs and the relationship between OPCs and HPV infections.¹³ In addition, as part of anticipatory guidance for adolescent patients, dental professionals should counsel both youth and their parents about the need for the HPV vaccination.¹³

Recent studies show that adult patients and parents of children are supportive of dentists discussing HPV-related oral health issues with them in a dental setting.^{14–16} Researchers have conducted studies in other States that assessed dentists' willingness to discuss or communicate HPV-related issues and recommend the HPV vaccine.^{17–19} However, no studies have assessed California dentists' opinions about discussing HPV-related oral health issues and recommending HPV vaccinations to patients in their dental practice. Therefore, in this study, we assessed dentists' opinions in Los Angeles (LA) County about discussing HPV-related oral health issues and recommending HPV vaccinations. Additionally, we tested if the opinions differed between dentists who provided services to children and/or adults and those who provided services to only adults (18 years and above) and hypothesized more favorable opinions among those treating children than those treating only adults.

Methods

The UCLA Office of the Human Research Protection Program determined that this study meets the criteria for an exemption from the Institution Review Board (IRB) review (IRB#23–000751).

The survey instrument

We used a 19-item survey adapted and modified from Fellows et al. for this cross-sectional study.²⁰ The following data collected for this study was used: gender (Male/Female), race/ethnicity (White, Hispanic/Latino, Black/African American, Asian, American Indian/Alaskan Native, Middle Eastern or North African, Native Hawaiian or Pacific Islander), year graduated from predoctoral dental training (DMD/DDS) program, location of the primary practice (Urban/Sub-urban/Rural), the current status of accepting new Medicaid patients every month (Yes/No), number of work hours per week (Less than 20 hours/20 to 30 hours/More than 30 hours per week), and age of the patient population (All ages/Only adults 18 and

above/Only children and adolescents up to 17) they served. Dentists were asked if they or their team had discussed the association between HPV and OPCs with their clinic patients in the past 12 months (Yes/No) and if they had ever recommended HPV vaccination (Yes/No). Dentists in California are not authorized to administer HPV vaccines, only COVID or Flu vaccines. We asked respondents if dentists were authorized to administer vaccines in California (No/Yes/Don't know).

Dentists' opinions on discussing HPV-related oral health issues and recommending HPV vaccinations to their patients were measured using seven statements, with response options ranging from Strongly Agree, Agree, Neither Agree nor Disagree, Disagree, and Strongly Disagree on a 5-point Likert Scale. All seven statements were framed in the negative; therefore, if a dentist responded with an agree or strongly agree, it indicated that the dentist had an unfavorable opinion about the statement.

Data collection

The survey was mailed to a random sample of dentists ($N = 2000$) living in LA County and with current dental licenses. The contact information of the LA County dentists is available publicly from the Dental Board of California. In July 2023, approximately 8,621 dentists held dental licenses in LA County. The survey was sent to the sample of LA County dentists in mid-August 2023. The survey package comprised a cover letter, the survey, a self-addressed paid envelope, and a \$2.00 incentive to encourage the dentists to complete the survey. The cover letter also had a Quick Response (QR) code for dentists to scan and complete the survey online if they preferred an online response. The first reminder was sent in mid-September, and the second in mid-October. We waited until mid-November 2023 to complete the data collection by paper and online. A total of 261 dentists responded, with a total response rate of 13.1%. Almost 25% of the respondents completed the survey online.

Statistical data management and analysis

We created an additional variable to represent years since graduation by subtracting the year the dentist graduated from the year (2023) the survey was conducted. Only three dentists responded that their primary practice location was in a rural region. Therefore, we combined dentists who worked in rural and sub-urban regions into one category, with those in an urban region as the second category. Dentists who worked below 20 hours per week were included in one group versus those who worked 20 hours and above. Dentists who knew that they were not authorized to administer the HPV vaccine were categorized in one group compared to dentists who either thought they could or did not know if they could.

A new summary score variable was created by totaling all seven statements' responses to reflect the dentists' overall opinions about discussing HPV-related oral health issues and recommending the HPV vaccine. The 5-point Likert Scale responses were coded 5 through 1, with 5 being 'Strongly Disagree' and 1 being 'Strongly Agree.' Total scores could range from 7 to 35, with a higher score indicating that dentists

had a more favorable opinion about discussing HPV-related oral health issues and recommending the HPV vaccine. This summary score variable was the primary outcome of interest.

Frequencies, percentages, means, and standard deviations were calculated to characterize the study sample. Chi-square tests and student t-tests were conducted to understand whether there were differences between dentists who provided dental care to only adults (18 and above) compared to those delivering services to mainly children or patients of all ages.

We used a multivariable-adjusted linear regression analysis to predict the level of favorable opinions of dentists in discussing HPV-related oral health issues and recommending the HPV vaccine. The following variables were included in the analysis: year since graduation, gender (Male versus Female), race/ethnicity (White vs. Asian vs. Latino vs. Other, location (Urban vs. Suburban), recommended HPV vaccination to patients in dental office in past 12 months (Yes vs. No), accepting new Medicaid patients every month (Yes vs. No), number of hours worked per week (Less than 20 hours per week vs. 20 hours or more), and awareness about their eligibility to administer HPV vaccine in California (Yes vs. No).

Results

The mean years since graduation of responding dentists was 27.2 ± 14.2 years. Most responding dentists were male (60%) (Table 1). Most dentists were White (37.5%) or Asian (37.2%). Almost 63% of them practiced primarily in urban regions, followed by sub-urban or rural (35.5%) regions. Approximately 32% reported accepting new Medicaid

Table 1. Characteristics of the responding LA County dentists.

| Characteristics | N (%) ^a |
|--|--------------------|
| Gender | |
| Female | 104 (40.2) |
| Male | 155 (59.8) |
| Race/Ethnicity | |
| Whites | 98 (37.5) |
| Hispanic/Latino | 28 (10.7) |
| Asian | 97 (37.2) |
| All other race | 38 (14.6) |
| Current Primary Practice Location | |
| Urban | 159 (63.3) |
| Suburban | 89 (35.5) |
| Rural | 3 (1.2) |
| Currently accepting new Medicaid patients every month | |
| Yes | 80 (32.4) |
| No | 167 (67.6) |
| Number of work hours per week | |
| Less than 20 hours | 40 (15.6) |
| 20 to 30 hours | 80 (31.3) |
| Greater than 30 hours | 137 (53.3) |
| Age of patient population | |
| Primarily adults (ages 18 and over) | 131 (50.2) |
| Primarily children and adolescents (up-to age 17) | 25 (9.6) |
| All ages | 106 (40.6) |
| Dentists in California are authorized to provide HPV vaccinations | |
| Yes | 11 (4.3) |
| No | 54 (20.9) |
| Don't know | 193 (74.8) |
| In past 12 months dentist or the team discussed relationship between HPV and oropharyngeal cancer | |
| Yes | 50 (20.4) |
| No | 203 (79.6) |

^aNot all subcategories add to overall sample size due to missing values

Table 2. Dentists' opinions on discussing HPV-related oral health issues and recommending HPV vaccinations to their patients.

| Statements | Strongly Agree/ Agree | Neither Agree or Disagree | Strongly Disagree/ Disagree |
|---|-----------------------|---------------------------|-----------------------------|
| I don't feel comfortable recommending the HPV vaccine to patients (or their parents). | 40.0% | 29.0% | 31.0% |
| I worry that I may lose patients if I recommend HPV vaccinations | 58.5% | 28.5% | 13.0% |
| There is inadequate time to discuss HPV vaccines with patients (or their parents) during dental appointments. | 36.7% | 25.3% | 38.0% |
| I do not have sufficient information about the HPV vaccine. | 16.9% | 14.9% | 68.2% |
| I am concerned about the safety of the HPV vaccine | 42.1% | 31.9% | 26.0% |
| There are no established professional policies/guidelines that would help me counsel patients/parents about HPV vaccine | 14.4% | 37.0% | 48.6% |
| Dentists are not the appropriate health care professional to educate, counsel or advise on HPV related issues | 48.6% | 31.0% | 20.4% |

patients monthly, with 53% reporting working more than 20 hours weekly. Only 21% knew that dentists in California were not authorized to administer the HPV vaccine, and 80% reported that their team had not discussed the relationship between HPV and OPC with patients in the past 12 months (Table 1).

Table 2 describes the dentists' opinions on discussing HPV-related oral health issues and recommending HPV vaccinations to their patients. Substantial respondents endorsed responses that reflected unfavorable opinions toward discussing/recommending HPV. Over half indicated that they worry they would lose patients if they recommended the HPV vaccine (58.5%). Almost 49% thought dentists were not appropriate to educate, counsel, or advise on HPV-related issues; 42% were concerned about the safety of the HPV vaccine; 40% did not feel comfortable recommending the HPV vaccine; and 37% thought they did not have sufficient time to discuss HPV vaccines during dental appointments. Most respondents (68%) reported that they have enough information about the HPV vaccine, and about half (49%) agreed with the statement that there are no established guidelines that would help them counsel about HPV vaccines. The mean summary opinion score was 21.4 ± 5.4 .

Table 3 shows the differences between dentists whose primary patient population was of all ages (children, adolescents, and adults) compared to only adults (18 and above). No significant differences between these groups were observed except for gender and acceptance of new Medicaid patients. The overall summary opinion score did not vary between these two groups.

Table 4 shows adjusted linear regression analysis testing whether opinions differed between dentists who provided services to children and adults and those who provided services to only adults (18 years and above), while holding other variables in the model constant. Results show no significant differences in opinions between the two groups ($p = .83$). Latino (coefficient = -2.727 , $p = 0.02$) and Asian (coefficient = -2.752 , $p =$

Table 3. Differences between dentists providing care to patients of all ages versus primarily adult patients.

| Characteristics | Both children and adult patients | Primarily adult patients | p-value |
|--|----------------------------------|--------------------------|---------|
| Gender | | | |
| Female | 51.9% | 67.7% | 0.009* |
| Male | 48.1% | 32.3% | |
| Race/Ethnicity | | | |
| White | 36.1% | 38.9% | 0.72 |
| Hispanic/Latino | 38.5% | 35.9% | |
| Asian | 10.0% | 11.5% | |
| All other race/ethnicities | 15.4% | 13.7% | |
| Current Primary Practice Location | | | |
| Urban | 62.7% | 64.0% | 0.83 |
| Suburban/Rural | 37.3% | 36.0% | |
| Currently accepting new Medicaid patients every month | | | |
| Yes | 38.9% | 25.6% | 0.03* |
| No | 61.1% | 74.4% | |
| Number of work hours per week | | | |
| Less than 20 hours | 13.1% | 18.1% | 0.3 |
| Greater than 20 hours | 86.9% | 81.9% | |
| Dentists in California are authorized to provide HPV vaccinations | | | |
| No | 18.5% | 23.4% | 0.33 |
| Yes or Don't know | 81.5% | 76.6% | |
| In past 12 months dentist or the team discussed relationship between HPV and oropharyngeal cancer to patients | | | |
| Yes | 80.6% | 78.6% | 0.68 |
| No | 19.4% | 21.4% | |

*statistically significant.

Table 4. Multivariable linear regression model for dentists' favorable opinions on discussing HPV-related oral health issues and recommending HPV vaccine.

| Characteristics | Parameter estimate (Coefficient) | Standard error | p-value |
|--|----------------------------------|----------------|---------|
| Year since graduation (Higher number) | -0.0161 | 0.0253 | 0.53 |
| Age of patient population | | | |
| All ages (children, adolescents and adults) | 0.146 | 0.692 | 0.83 |
| Only adults | REF | | |
| Race/ethnicity | | | |
| All other race/ethnicities | -1.389 | 1.095 | 0.21 |
| Hispanic | -2.727 | 1.118 | 0.02* |
| Asian | -2.752 | 0.801 | 0.0007* |
| Non-Hispanic White | REF | | |
| Gender | | | |
| Female | -0.610 | 0.752 | 0.42 |
| Male | REF | | |
| Accept New Medicaid patients every month | | | |
| Yes | -0.349 | 0.743 | 0.64 |
| No | REF | | |
| Primary location of dental practice | | | |
| Rural/suburban | -0.382 | 0.719 | 0.60 |
| Urban | REF | | |
| Work hour per week | | | |
| Less than 20 hours per week | 0.874 | 0.914 | 0.34 |
| More than 20 hours per week | REF | | |
| Dentists in California are authorized to provide HPV vaccinations | | | |
| Yes or Don't know | -1.924 | 0.854 | 0.02* |
| No | REF | | |
| In past 12 months dentist or the team discussed relationship between HPV and oropharyngeal cancer to patients | | | |
| Yes | 6.941 | 0.896 | <.0001* |
| No | REF | | |

*statistically significant

0.0007) dentists had significantly unfavorable opinions in discussing HPV-related oral health issues and recommending HPV vaccines compared to White dentists. Dentists who either did not know if they were authorized to provide HPV vaccine or those who thought they were permitted to administer the vaccine had significantly unfavorable opinions in discussing HPV-related oral health issues and recommending HPV vaccines than those who knew they were not authorized to administer HPV vaccine in California (coefficient = -1.924, $p = .02$). Those who had already discussed HPV-related oral health issues with patients in their clinic within the past 12 months had significantly higher favorable opinions than those who did not (coefficient = 6.941, $p < .0001$). No significant differences in opinions were observed based on years since graduation, gender, accepting new Medicaid patients, primary location of dental practice, and number of hours worked per week.

Discussion

The reduction of cervical cancer in the US can be attributed to adopting a combined comprehensive approach of both cervical screening and HPV vaccination programs.²¹ HPV vaccination may protect against many types of cancers, including OPCs. Therefore, to improve HPV vaccination rates, all healthcare professionals, including dental professionals, should be engaged in discussing the benefits of HPV vaccination and issues related to HPV with their patients. Therefore, keeping in mind the HPV vaccination rate (60.6%) in 13-year-old adolescents in California in 2022 and the California HPV round table's goal to achieve at least 80% of adolescents vaccinated against HPV by 2026,¹¹ we assessed Los Angeles County dentists' opinions about discussing HPV-related oral health issues and recommending the HPV vaccine to patients. The responses varied considerably for the 7-statements that assessed these opinions, with only a little over a third of the dentists responding to these statements favorably. Interestingly, we also found that almost one-fourth to one-third of the respondents neither agreed nor disagreed with these statements, suggesting that a significant proportion of the responding dentists were unsure of their role in preventing HPV-related oral health issues and recommending HPV vaccination. This could also mean that the responding dentists did not have an opinion about the statements we listed.

Previous studies about dentists' interaction with their patients and parents regarding HPV show results different from our study of LA dentists. In a study of Utah dentists, almost 90% of the responding dentists felt that discussing the link between HPV and OPCs was within the scope of their practice.¹⁷ A similar finding was reported in a study in Arizona, where the mean favorable score for dentists agreeing to discuss the relationship between HPV and OPCs fell within their scope of practice and was much higher than that of dental hygienists.¹⁸ However, in our study, only 20% thought dentists were appropriate healthcare professionals to educate, counsel, or advise on HPV-related oral health issues. On the other hand, like in our study, only 21% of New York State Dental Association member dentists agreed that promoting the HPV vaccine to their patients was within their scope of practice.¹⁹

In this study, a majority (58.5%) of dentists responded that they were worried that they would lose their patient base if they recommended HPV vaccinations to patients, with almost one-third of them being unsure if they may or may not lose patients if they did recommend. Additionally, nearly 40% of dentists agreed that they were uncomfortable recommending the HPV vaccine to patients in the clinic, with one-third being unsure about recommending the HPV vaccine to patients. Some recent studies of parents and adult patients indicate that these patients are comfortable discussing HPV vaccinations with their dental care providers.^{14,15} However, literature also shows that dental care providers were less likely to recommend HPV vaccination if they were not comfortable discussing sex in the context of HPV, perceived parents as hesitant, or believed that patients were not at high risk of contracting HPV.²²

Because regular HPV vaccination is recommended for adolescents ages 11 to 12, we expected dentists who provided dental services to children (21.0 ± 5.4) to have a higher favorable opinion score than those providing services to only adults (21.8 ± 5.4). However, both groups' overall opinion scores were low and did not significantly differ ($p = .02$). The linear regression analysis did not show a significant difference in overall opinion scores, mainly because dentists' opinions were less favorable uniformly across many subgroups.

In the regression analyses, we included primary practice location because in a previous study of Utah dentists, urban dentists were more likely than rural dentists to agree that the HPV vaccine was safe.¹⁷ Our study found no significant differences in the overall opinion scores about discussing HPV oral health issues and recommending HPV vaccine among LA County dentists practicing in urban versus suburban or rural areas. Though not among dental providers, previous studies show some association between Medicaid providers and vaccination rates.^{23,24} Therefore, we included accepting new Medicaid patients (Yes/No) as an independent variable to understand the differences in opinions between those accepting and not accepting Medicaid patients. Our study did not find any significant differences between these groups. Dentists from Latino or Asian backgrounds had less favorable opinions about discussing HPV-related oral health issues and recommending HPV vaccines to their patients compared to White dentists. Though limited literature has examined the differences by race/ethnicity in HPV vaccine administration among healthcare professionals, data shows that race/ethnicity of healthcare professionals is associated with vaccine hesitancy. For example, Latino and Asian healthcare workers were significantly more likely to show COVID-19 vaccine hesitancy compared to White healthcare professionals.²⁵ The three primary reasons behind the healthcare workers' vaccine hesitancy include concerns about side effects (87.1%), the newness of the vaccine (79.2%), and lack of vaccine knowledge (75.2%).²⁵

Understanding facilitators and barriers to discussing HPV-related issues must be further explored among LA county dentists. Major dental organizations, including the California Dental Association and Los Angeles Dental Society, should encourage California dentists to discuss HPV and recommend the HPV vaccine to patients in

their clinics. Continuing education programs to train dental professionals in HPV anticipatory guidance and referrals are highly recommended.

Limitations

This study has its limitations. The response rate was very low, at 13%. It is possible that dentists who had less favorable opinions were more likely to participate in the survey. We could not compare the characteristics of responders versus non-responders because we had no access to that information. The study focused only on LA dentists, so we cannot generalize findings to the larger California or national dentist population. Because a majority of the respondents either did not have an opinion or had a less favorable opinion about discussing HPV-related oral health issues and recommending the HPV vaccine to their patients, it is possible that the respondents were more likely to be hesitant and wanted their voices heard. The survey did not specifically ask questions about factors enabling them to engage in discussions on HPV-related issues and recommend the HPV vaccine. Despite these limitations, this is the first study to determine LA County dentists' opinions and experiences related to HPV-related oral health issues.

Conclusions

In our study, we found that responding LA County dentists had a largely unfavorable opinion about discussing oral health-related issues of HPV and recommending the HPV vaccine to their patients. Dentists who provided services to children and/or adults had unfavorable opinions about discussing oral health-related issues of HPV and recommending the HPV vaccine to their patients, similar to those who provided services to only adults.

Consent for publication

All the authors have seen and approved the final manuscript.

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Disclosure statement

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