Determinants of Dental Service Utilization Among 2 to 11-Year-Old California Children

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Abstract

Objective: *The 2001 California Health Interview Survey (CHIS) was designed to elicit population-based estimates about health care access and insurance coverage. This study aimed to determine factors associated with dental service utilization among children ages 2 to 11 years in California.* ***Methods:*** *CHIS was a random digit dialing telephone survey. Interviews were conducted with the adult in the household that was most knowledgeable about the child's care, and information was collected on the child's last dental visit.* ***Results:*** *Data on dental visits were collected on 10,569 children ages 2-11 years. In 2001, 73.5 (±0.6)% of children had a dental visit, 58.2 (±0.6)% a preventive dental visit, while 18.3 (±0.5)% had never visited the dentist. Nearly 1 million children had never visited the dentist, primarily children ages 2-5 years. Overall, 76.3 (±0.6)% of children had dental insurance. Children with a past-year dental visit were likely to be school age, insured and from high-income households. Other predictors of utilization were the responding adult's age and educational attainment.* ***Conclusion:*** *Dental service utilization is determined by a mix of parental, child and household factors.*

Key Words: California, child, child (preschool), dental health services/utilization, ethnic groups/statistics & numerical data, insurance benefits/statistics & numerical data, insurance (dental/statistics & numerical data), poverty/statistics & numerical data, support (U.S. Gov't, P.H.S.), health services accessibility/statistics & numerical data.

Introduction

Professional dental care complements self-care and community-based measures to improve and maintain oral health. Indeed, the receipt of professional dental services is a surrogate measure of a population's capacity to maintain or improve its oral health (1). Certain segments of the child population in the United States (U.S.) experience poor access to dental care; these children are at high risk for poor oral health (1-9). Minority, uninsured and low-income children are at greatest risk for inadequate dental access (10). These children are less likely to have regular dental visits and use fewer preventive dental services than their peers (2-6).

Preventive dental visits are an even better indicator of a population's oral health than dental visits made for any reason. The preventive visit is intended to prevent dental disease before it occurs, reverse or control the early stages of disease and monitor oral health (4). Healthy People (HP) 2010 dental objectives recommend monitoring both health indicators (11). For oral health to improve through the regular and timely use of professional dental services, the pattern of dental visits amongst various age, insurance, income, racial and ethnic population subgroups must be understood (1). Several studies have employed national data in an attempt to describe these patterns; however, state data are sorely lacking (1-5). Available regional and state data suggest that significant variation may occur within and among states in their patterns of dental service utilization (1). Thus, researchers may gain valuable insight into children's oral health disparities by using state or regional data to describe this variation.

California is one of the most populous, racially and ethnically diverse states in the U.S. It has the highest medical uninsurance rates in the country (12). One in three children in immigrant families nationally resides in California; these children are three times as likely to be uninsured as children in U.S. born families (13). Even those immigrant children who do qualify for Medicaid or the State Children's Health Insurance Program (S-CHIP) may not enroll in these programs for fear this may adversely affect their immigration status (12,13). These factors make California an ideal setting for a study of children's oral health disparities. The purpose of this study is to describe the use of dental services among 2 to 11 year old children in California. The study also aims to identify the determinants of dental service utilization in this population. The 2001 California Health Interview Survey was used as the source of data for this study (14).

Methods

Data source. The 2001 California Health Interview Survey (CHIS) was the largest state health survey ever undertaken in the United States (14). Its purpose was to provide reliable population-based estimates for various health-related indicators in the state, with an emphasis on access to care and health insurance coverage. The CHIS sample was representative of California's non-institutionalized population living in households with telephones; data were adjusted statistically to compensate for households without telephones (14). CHIS 2001 was undertaken as three separate surveys – an adult (ages 18 years and

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older), adolescent (ages 12 to 17 years) and children's (under age 12 years) surveys. Data in this study are derived from the children's survey.

The CHIS sample was selected using a two-stage geographically stratified random-digit-dial design. Households were randomly selected within each county, and then an adult was randomly selected from each sampled household. Children were selected for the children's sample using a linked sampling approach. In households with children under age 12, a child was selected at random from amongst all children under age 12 that were associated with the sampled adult. The "associated" adult was in most cases either the parent or guardian of the child. Additional details of the selection process are provided elsewhere (14). A total of 12,592 children ages 0 to 12 years were selected for the children's sample. Sample weights were applied to account for the linked sampling approach so population estimates would be unbiased. In addition, major racial/ethnic subgroups were over-sampled so that differences between these groups may be described (14).

Survey instrument. The survey instrument covered a wide range of topics, including access to care, use of health services and health insurance (15). Several questions were adapted from the National Health Interview Survey and other national and state surveys. Questions were also created to address topics that were unique priorities for the state (15). Survey instruments were administered via telephone interviews conducted with an adult proxy respondent. This respondent was the adult within the household who was most knowledgeable about the sampled child's health care. Telephone interviews were conducted between November 2000 and October 2001 using computer-assisted telephone interviewing (CATI) technology (15). Interviews were conducted in six languages to capture the rich diversity of the California population - English, Spanish, Chinese, Vietnamese, Korean, and Khmer (Cambodian). CATI range and logic edits were used to ensure the integrity and quality of data collected (16).

Description of variables. The main outcome variable for this study was having a dental visit during the 12-month period preceding the interview (past-year dental visit). Respondents were asked, "About how long has it been since (child's name) last visited a dentist, dental hygienist or orthodontist?" Responses to this question were used to identify children that had a dental visit during the preceding twelve months. Preventive visits occurring within the last 12 months were identified by combining responses to the question "Did (child's name) go for a routine check-up or cleaning or was it for a specific problem?" with information on the interval since their last dental visit. A past-year preventive dental visit was defined as a past-year dental visit that was for a routine check-up or cleaning only.

Dental insurance status was determined from responses to the question "Do you have any kind of dental insurance for (child's name)?" Health insurance coverage and the number of months with this coverage during the past year were also determined. For this analysis, the child's health insurance status was classified as uninsured, publicly insured (Medicaid or S-CHIP) or privately insured (employer, union or other health plan). The child's race/ethnicity was determined by the questions "Is (child's name) of Latino or Hispanic origin?" and "Also, please tell me which one of the following you would use to describe (child's name): Native Hawaiian, Other Pacific Islander, American Indian, Alaska Native, Asian, Black, African-American, or White?" The classification of race/ethnicity described by the UCLA Center for Health Policy Research was used.

Additional variables were identified from the survey data, including poverty level, immigration status and measures of acculturation. Poverty level was calculated using the ratio of the total family income (adjusted for household size) to the applicable federal poverty threshold established annually by the U.S. Census Bureau (17). Children were classified as either poor (0-99% Federal Poverty Level (FPL), near-poor (100-199% FPL), middle-income (200-299% FPL) or high-income (300+% FPL). The child's immigration status was determined by their place of birth and residency status. Measures of acculturation identified included the language spoken at home and the adult's ability to speak English. Predictor variables were organized into categories using Aday and Andersen's model on access to care as a conceptual framework (18). Predisposing variables included socio-demographic characteristics such as age and race/ethnicity. Enabling variables included insurance and poverty level, while need variables included the perceived general health status of the child.

Data analyses. Children with missing data on the time since their last dental visit were excluded from the analysis. Children less than two years of age were excluded because dental visit data were not collected on these children (N=1955). An additional 68 children were excluded for not providing information on the interval since their last dental visit, resulting in a final sample of 10,569 children for this study. Data analyses were performed using SAS 8.2 © statistical software; SUDAAN 7.5 © software was used to account for the complex sampling techniques employed in the survey (19,20). The distribution of key variables was examined using univariate analysis and descriptive statistics were reported. Bivariate associations were tested using chi-squared analyses, and crude odds ratios and 95% Confidence Intervals (95%CIs) were obtained (21). Variables that were significantly associated with the outcome variable on bivariate analyses ($p<0.05$) became candidates for the multivariate model. Separate logistic regression models were fit for past-year dental visits and past-year preventive dental visits. Non-automated backward elimination was used to select variables for the final model, with the criterion for removal being 0.05 significance on the

Wald chi-square test. Multivariate analysis was used to account for the effects of variables in the model, and adjusted odds ratios and 95%CIs were calculated.

Results

The response rate for the CHIS 2001 survey was 43.3% (22). In 2001, 73.5 (±0.6)% of 2-11 year old children in CA had a dental visit within the prior year - 50.2% within the past six months, 23.3% within the past 7-12 months. A preventive dental visit occurred in 58.2 (±0.6)% of children. Approximately 18.3 (±0.5)% of CA children had never visited the dentist, representing a total of over 954,500 children. The vast majority of children with no dental visits were ages 2 to 5 years (87.3%). Table 1 summarizes the use of dental services in selected demographic groups within the population by predisposing, enabling and need categories. Specific subgroups of children underutilized dental services, e.g. uninsured, poor and very young children (Table 1). California children were more likely to lack public or private insurance for dental care (23.7% uninsured) than health care (9.3% uninsured). Among children lacking dental insurance, 57.7% had a past-year dental visit and only 44.2% had a preventive dental visit. Near-poor children had higher utilization rates than poor children. Among children living in poverty (<99%FPL), 65.4% had a past-year dental visit while 48.1% had a preventive dental visit during the previous year. Among children living in near poverty (100-199%FPL) the corresponding utilization rates were 69.5% and 53.0%, respectively. The use of dental services varied significantly by age, as illustrated in Figure 1. The proportion of young children using dental services was only 20.7% among children two years of age; this rate increased dramatically to 81.1% among children 5 years of age. Approximately 85% of children ages 6 to 11 years had a past-year dental visit.

The results of bivariate analyses are shown in Table 2. Several factors were associated with dental utilization, including the child's race/

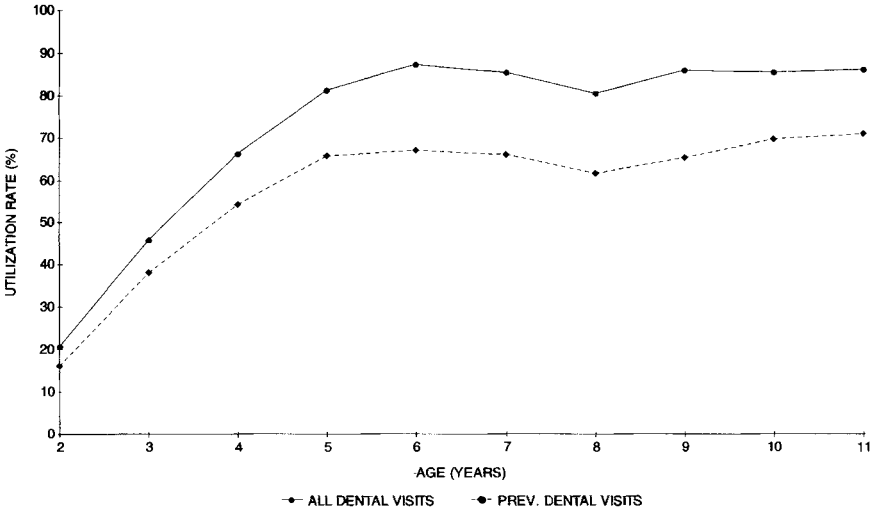
TABLE 1
Weighted percentage of 2 to 11-year-old CA children who used dental services during the previous 12 months, 2001 (N=10,569)

Variable	Prevalence % (SE)	Dental visit % (SE)	Preventive visit % (SE)
PREDISPOSING FACTORS			
Responding adult's age			
Less than 30 years	18.0 (0.5)	61.8 (1.6)	46.0 (1.7)
30 to 39 years	49.7 (0.8)	72.1 (0.9)	57.8 (1.0)
40+ years	32.4 (0.7)	82.0 (0.9)	65.6 (0.9)
Responding adult's education			
Less than high school	22.7 (0.6)	63.1 (1.6)	45.2 (1.7)
High school graduate	25.9 (0.6)	72.5 (1.2)	57.2 (1.2)
College	51.5 (0.5)	78.5 (0.8)	64.5 (0.9)
Adult's ability to speak English			
Not at all	8.9 (0.5)	57.4 (2.3)	40.9 (2.9)
Not well	13.3 (0.6)	67.0 (2.1)	46.9 (2.2)
Well	12.0 (0.6)	73.5 (1.7)	55.7 (2.0)
Very well	65.8 (0.6)	76.9 (0.6)	63.3 (0.7)
Language spoken at home			
English only	50.7 (0.6)	78.2 (0.7)	64.3 (0.8)
English and other language	37.0 (0.6)	71.0 (1.1)	55.1 (1.2)
Other language	12.3 (0.4)	61.4 (2.3)	42.8 (2.2)
Geographic location			
Urban	90.6 (0.3)	73.7 (0.7)	58.7 (0.7)
Rural	9.4 (0.3)	70.9 (1.6)	53.7 (1.6)
Occupational status			
Not working	31.3 (0.7)	71.1 (1.2)	55.0 (1.2)
Working	68.8 (0.7)	74.5 (0.8)	59.7 (0.8)
Mother's citizenship			
U.S citizen	72.4 (0.7)	77.0 (0.6)	62.5 (0.6)
Non US citizen	27.6 (0.7)	64.2 (1.4)	47.1 (1.4)
Child's age			
2 to 5 years	38.2 (0.3)	54.6 (1.0)	44.4 (1.1)
6 to 11 years	61.8 (0.3)	85.1 (0.7)	66.8 (0.8)
Child's race / ethnicity			
American Indian Alaska Native	0.4 (0.1)	74.8 (4.6)	58.7 (5.4)
Asian	9.4 (0.3)	73.3 (2.3)	58.3 (2.1)
African-American	6.7 (0.3)	78.5 (2.3)	66.0 (2.8)
Latino	37.6 (0.4)	67.1 (1.2)	50.5 (1.2)
White	43.4 (0.4)	78.7 (0.7)	64.3 (0.7)
Other race	2.5 (0.2)	64.1 (4.7)	47.4 (4.1)
Child's gender			
Female	49.0 (0.2)	73.3 (0.8)	58.0 (0.9)
Male	51.0 (0.2)	73.6 (0.8)	58.5 (0.9)
Child's citizenship			
U.S. citizen	95.2 (0.3)	74.1 (0.6)	59.2 (0.6)
Non U.S. citizen	4.8 (0.3)	60.1 (3.8)	39.2 (2.9)
ENABLING FACTORS			
Child's dental insurance			
Uninsured	23.7 (0.6)	57.7 (1.4)	44.2 (1.4)
Insured (public or private)	76.3 (0.6)	78.4 (0.7)	62.6 (0.7)
Child's health insurance			
Uninsured	9.3 (0.4)	53.7 (2.5)	39.3 (2.2)
Public insurance	29.6 (0.5)	70.5 (1.3)	51.7 (1.3)
Private insurance	61.1 (0.5)	77.9 (0.7)	64.3 (0.7)
Health insurance last year			
Less than 12 months	13.5 (0.5)	56.6 (2.0)	42.2 (1.9)
12 months	86.5 (0.5)	76.1 (0.6)	60.7 (0.6)
Usual source of health care			
No	3.3 (0.3)	51.1 (4.1)	32.7 (3.8)
Yes	96.7 (0.3)	74.2 (0.6)	59.1 (0.6)

Table 1 - Continued
Weighted percentage of 2 to 11-year-old CA children who used dental services during the previous 12 months, 2001 (N=10,569)

Variable	Prevalence % (SE)	Dental visit % (SE)	Preventive visit % (SE)
Federal Poverty Level (%FPL)			
0-99%	23.0 (0.6)	65.4 (1.7)	48.1 (1.7)
100-199%	22.5 (0.7)	69.5 (1.4)	53.0 (1.5)
200-299%	15.1 (0.5)	74.3 (1.3)	61.0 (1.4)
300+%	39.4 (0.5)	80.1 (0.7)	66.1 (0.9)
NEED FACTORS			
Child's general health status			
Excellent	47.3 (0.7)	76.6 (0.8)	63.2 (0.9)
Very Good	25.2 (0.6)	74.4 (1.1)	60.1 (1.3)
Good	20.2 (0.6)	68.4 (1.6)	49.0 (1.8)
Fair / Poor	7.3 (0.4)	64.1 (2.9)	45.6 (2.9)
Fluoride prescription			
No	81.8 (0.5)	72.5 (0.8)	57.2 (0.7)
Yes	18.2 (0.5)	77.6 (1.3)	63.0 (1.6)
TOTAL	**10,569**	**73.5 (0.6)**	**58.2 (0.6)**

FIGURE 1
Utilization of dental services among 2 to 11-year-old CA children within the past 12 months, 2001



ethnicity, age and dental insurance status. Asian and Latino children were significantly less likely to have a past-year dental visit than White children; very young children were less likely to have a dental visit than school-age children. Dentally insured children were more than twice as likely to have a past-year dental visit compared to uninsured children. Acculturation was also a significant predictor of dental service utilization. Children from non-English speaking households were less likely to visit the dentist than children from English speaking households. The utilization pattern was similar for preventive dental visits, although the utilization rates were lower. Minority, young and uninsured children were less likely to have used preventive dental services than their peers.

The findings of multivariate analyses are shown in Table 3. A variety of predisposing, enabling and need factors significantly increased the likelihood of having a dental visit, including older age of the child, having dental insurance and higher-income. Once these factors were accounted for, however, language spoken at home and Latino ethnicity were no longer significant predictors of dental utilization. Certain factors were associated with higher rates of both dental visits and preventive dental visits e.g. older age and higher educational attainment of the responding adult. Other factors were positively associated with either dental visits (e.g. continuous health insurance) or preventive dental visits (e.g. U.S. citizenship of the child). A greater amount of variance was explained for dental visits (R^2=0.17) than for preventive dental visits (R^2=0.11).

Discussion

Healthy People 2010 Objective 21-10 is to increase the proportion of children ages two years and older that use the oral health care system annually to 56% by 2010 (11). These data indicate this objective has been met among 2 to 11-year-old children in California. However, further analysis reveals significant variation amongst various population subgroups such as age, income and insurance groups. Similar disparities have been described nationally. Older children in the United States are more likely to utilize dental services than the very young. Between 1988 and 1994, 77% of 6 to 18-year-old children in the U.S. reported having a dental visit during the previous year, compared to 43% of 2 to 5-year-old children (3). This gap has begun to narrow in recent years, although significant disparities still remain (23). Data from the 1999 National Survey of America's Families (NSAF) indicate that 83.0% of 5 to 10-year-olds vs. 56.9% of 3 to 4 -year -olds had at least one dental visit during 1999 (5). These levels are strikingly similar to those observed in this study. California preschoolers, uninsured children and children lacking a usual source of medical care are yet to achieve the target set for Healthy People Objective 21-10. Health insurance and a usual source of care (USC) are strong predictors of access to dental care (6,

TABLE 2
Predictors of dental utilization within the past twelve months among 2 to11- year- old CA children on bivariate analyses, 2001 (N=10,569)

	Dental visit OR (95%CI)	Preventive dental visit OR (95%CI)
Responding adult's age		
Less than 30 years	1	1
30 to 39 years	1.60 (1.36, 1.89)	1.61 (1.37, 1.90)
40+ years	2.83 (2.39, 3.34)	2.33 (1.99, 2.74)
Responding adult's education		
Less than high school	1	1
High school graduate	1.54 (1.28, 1.85)	1.62 (1.37, 1.91)
College	2.14 (1.81, 2.54)	2.21 (1.88, 2.60)
Adult's ability to speak English		
Not at all	1	1
Not well	1.50 (1.17, 1.93)	1.28 (0.96, 1.70)
Well	2.06 (1.63, 2.60)	1.81 (1.35, 2.44)
Very well	2.47 (2.02, 3.02)	2.49 (1.95, 3.19)
Language spoken at home		
English only	1	1
English and other language	0.68 (0.60, 0.78)	0.68 (0.60, 0.77)
Other language only	0.44 (0.36, 0.55)	0.42 (0.34, 0.51)
Geographic location		
Rural	1	1
Urban	1.15 (0.98, 1.36)	1.23 (1.07, 1.41)
Occupational status		
Not working	1	1
Working	1.19 (1.03, 1.36)	1.21 (1.07, 1.37)
Mother's citizenship		
Non U.S. citizen	1	1
U.S. citizen	1.86 (1.63, 2.12)	1.87 (1.66, 2.10)
Child's age		
2 to 5 years	1	1
6 to 11 years	4.76 (4.13, 5.49)	2.52 (2.24, 2.83)
Child's race / ethnicity		
White	1	1
American Indian Alaska Native	0.89 (0.50, 1.30)	0.79 (0.50, 1.23)
Asian	0.74 (0.58, 0.95)	0.78 (0.65, 0.93)
African-American	0.99 (0.76, 1.29)	1.07 (0.84, 1.37)
Latino	0.55 (0.48, 0.63)	0.57 (0.50, 0.64)
Other race	0.48 (0.32, 0.73)	0.50 (0.36, 0.70)
Child's citizenship		
Non U.S. citizen	1	1
U.S citizen	1.90 (1.39, 2.60)	2.25 (1.76, 2.88)
Child's dental insurance		
Uninsured	1	1
Insured (public or private)	2.66 (2.30, 3.06)	2.11 (1.86, 2.39)
Child's health insurance		
Uninsured	1	1
Public insurance	2.07 (1.65, 2.59)	1.65 (1.34, 2.03)
Private insurance	3.04 (2.44, 3.80)	2.78 (2.28, 3.38)
Health insurance last year		
0 to 11 months	1	1
12 months	2.43 (2.06, 2.88)	2.12 (1.81, 2.48)
Federal Poverty Level (%FPL)		
0-99%	1	1
100-199%	1.20 (0.99, 1.47)	1.22 (1.02, 1.47)
200-299%	1.53 (1.26, 1.85)	1.69 (1.41, 2.03)
300+%	2.13 (1.78, 2.55)	2.11 (1.80, 2.47)
Usual source of health care		
No	1	1
Yes	2.76 (1.98, 3.84)	2.98 (2.10, 4.22)
Child's general health status		
Excellent	1	1
Very Good	0.89 (0.77, 1.03)	0.88 (0.76, 1.01)
Good	0.66 (0.55, 0.80)	0.56 (0.47, 0.66)
Fair / Poor	0.55 (0.42, 0.71)	0.49 (0.38, 0.62)
Fluoride Prescription		
No	1	1
Yes	1.31 (1.10, 1.57)	1.27 (1.09, 1.49)

24-26). In 1999, 50.1% of 3 to 18-year-old U.S. children without health insurance had a dental visit during the year, compared to 75.4% and 84.8% of children with public and private health insurance, respectively (5).

The patterns of racial/ethnic disparities described in this study are a striking departure from those described in national studies. In the United States, minority children - particularly African-American and Latino children - are less likely to use dental services than their White peers (1-5,27). However in California, while similar underutilization is observed amongst most minorities, African-American children are an important exception. African-American California children under age 12 utilize as much dental services as their White peers. This finding may be explained by the pattern of health insurance coverage amongst African-American children in California. Public health insurance is a major source of safety-net coverage for these children - 42.7% of African-American children in California are enrolled in either Medicaid or S-CHIP, and only 3.2% of African-American children are uninsured (12). In fact, once factors such as insurance, income and parent's education are accounted for, only children from Asian and "other" racial backgrounds use significantly fewer dental services than White children (Table 3). Brown and co-workers describe similar findings when assessing the use of medical services by children in this population (28).

Healthy People Objective 21-12 is to increase the proportion of low-income children and adolescents under age 19 years who receive any preventive service during the past year to 57% by 2010 (11). Low-income children are less likely to use preventive dental services than their high-income peers, although utilization rates are similar for poor and near-poor children (4,5,9). In 1996, only 20.0% of 0 to 18-year-old poor children and 20.1% of near-poor children had a preventive dental visit in the U.S. (4). However, the corresponding figures were 48.1% vs. 53.0% for poor and near poor CA children, respectively.

While Objective 21-12 has not yet been met in California, great strides have been accomplished due in large part to the 1997 enactment of the State Children's Health Insurance Program. These findings highlight the importance of health insurance in improving access to dental care. Age is also a significant predictor of preventive dental visits. U.S. children ages 6 to 11 years are nearly five times as likely as children ages 0 to 5 years to have had a past-year preventive dental visit (4). Moreover, low-income preschoolers in the U.S. are less likely to use preventive dental services than their high-income peers (4). Similar disparities are described in this California population.

Dental and medical insurance are strong predictors of access to dental care (2,3). National data from the 1995 National Health Interview Survey indicate that there are 2.6 children under age 18 with no dental insurance for each child without medical insurance (29). In California, for each 2 to 11-year-old child without medical insurance, there were 2.5 children without dental insurance in 2001. The continuity of this insurance coverage is also a predictor of dental care access (30). California children with full-year insurance coverage are 66% more likely to visit the dentist than children with partial-year or no coverage. Other factors that positively affect dental care access and continuity are a USC and the accessibility of dental providers (6, 30). By ensuring the continuity of care, a USC facilitates the use of clinical preventive services (31). Immigrant children in California are more likely to be uninsured and to have no USC when compared to other children (12, 28). Consequently, these children are less likely to use preventive dental services than their U.S. peers.

An interesting finding obtained in this study was the association between fluoride supplements and dental visits. Children using fluoride supplements were more likely to have a past-year dental or preventive dental visit than those not using fluoride supplements. Similarly, Wagener *et al.* report that preschool children who had a dental visit in the past year were more likely to use dietary fluoride supplements than those who had no dental visit (32). Most fluoride supplements are prescribed by physicians, and children with a recent preventive medical visit are more likely to visit the dentist (1,5,6). It is therefore likely that the fluoride variable serves as a surrogate measure for a preventive medical visit occurring in children from non-fluoridated communities. This hypothesis would need to be confirmed in other studies. However, this finding and the importance of a usual source of medical care suggest that

TABLE 3
Factors associated with the use of dental services within the past 12 months in 2 to 11-year-olds in CA in multivariate analyses, 2001 (N=10,569)

	Dental visit OR (95%CI)	Preventive dental visit OR (95%CI)
Responding adult's age		
Less than 30 years	1	1
30 to 39 years	1.00 (0.83-1.22)	1.18 (0.99-1.41)
40+ years	1.30 (1.05-1.59)	1.37 (1.15-1.63)
Responding adult's education		
Less than high school	1	1
High school graduate	1.22 (0.98-1.51)	1.26 (1.03-1.55)
Some college	1.53 (1.17-1.99)	1.58 (1.24-2.01)
Child's race / ethnicity		
White	1	1
American Indian Alaska Native	0.88 (0.53-1.49)	0.85 (0.51-1.41)
Asian	0.72 (0.55-0.95)	0.81 (0.66-0.99)
African-American	0.87 (0.63-1.20)	0.93 (0.72-1.21)
Latino	0.94 (0.77-1.15)	0.88 (0.74-1.05)
Other race	0.43 (0.27-0.69)	0.49 (0.35-0.71)
Child's age		
2 to 5 years	1	1
6 to 11 years	5.45 (4.66-6.37)	2.64 (2.30-3.02)
Child's dental insurance		
Uninsured	1	1
Insured	2.30 (1.95-2.72)	1.80 (1.59-2.05)
Fluoride Prescription		
No	1	1
Yes	1.42 (1.16-1.75)	1.30 (1.08-1.55)
Health insurance last year		
Less than 12 months	1	1
12 months	1.66 (1.14-2.41)	ns‡
Federal Poverty Level (%FPL)		
0-99%	1	1
100-199%	1.01 (0.80-1.28)	ns
200-299%	1.09 (0.85-1.38)	ns
300+%	1.33 (1.03-1.71)	ns
Geographic location		
Urban	1	1
Rural	ns	0.75 (0.64-0.88)
Usual source of health care		
No	1	1
Yes	ns	1.79 (1.26-2.54)
Child's citizenship		
U.S. citizen	1	1
Non U.S. citizen	ns	0.67 (0.50-0.90)
Child's general health status		
Other	1	1
Excellent / Very Good	ns	1.37 (1.16-1.62)

*R^2 = 0.17
†R^2 = 0.11
‡Not significant

collaboration between the medical and dental communities could potentially improve the use of dental services by children in this population.

This study is limited by the response rate obtained in the CHIS 2001 survey, which may affect the validity of the findings. Parents and children from immigrant families may be reluctant to participate in this "government" survey, especially if they're undocumented immigrants, thereby potentially biasing these findings. Other populations not represented in the sample may also bias the estimates. One-year-old children and children from households without telephones are less likely to visit the dentist. Thus, the utilization rates obtained may be slightly overestimated. However because the demographic characteristics of CHIS respondents are similar to those of the entire California population, this would suggest that the results obtained are valid (22). Low response rates are a problem facing all research involving telephone surveys (22). For example, the CHIS response rate is nearly identical to the 43.4% response rate obtained in the 2000 California Behavioral Risk Factor Surveillance System Survey (33). Efforts are being made to address this problem (22).

Another limitation of this study is that information on dental visits is based on self-report. Respondents may try to give socially desirable responses, thereby over-reporting dental visits. Unfortunately, there is no way of estimating this bias. This study has several important strengths that outweigh the limitations. The CHIS sample is large and representative of the California population. Racial/ethnic minorities and rural-dwellers were over-sampled so reliable population-based estimates may be obtained for these subgroups. The dental survey is part of a larger health survey; thus information is available on a variety of potential confounders. In addition, future surveys planned will allow researchers to examine trends in dental utilization.

Conclusion

Significant disparities were found in dental service utilization among subgroups of the California population ages 2 to 11 years. Efforts to increase dental utilization should target preschool, low-income, minority and uninsured children. Access to dental care may be improved by ensuring children have a usual source of care and dental insurance coverage for the entire year. Opportunities for collaboration between medical and dental communities should also be explored.

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