



Pediatric Dentists' Participation in the California Medicaid Program

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Abstract

Purpose: The purpose of this study was to determine pediatric dentists' participation in the California Medicaid program and investigate barriers to participation.

Methods: A 24-question mail-in survey with a follow-up was sent to all pediatric dentists in California with questions including demographics, Medicaid participation, and barriers to participation. Data were analyzed using descriptive statistics, chi-square tests, bivariate analysis, and multivariate logistic regression.

Results: Pediatric dentists returned 364 useable mail-in surveys for a response rate of 70%. Forty-five percent participated in the Medicaid program, one third of which would accept all patients and two thirds of which placed some restriction on their participation. Twenty-five percent of respondents had at least 10% Medicaid patients in their practice, and 25% accepted 6 or more new Medicaid patients per month. Dentists in rural areas were significantly more likely than those in urban or suburban areas to accept a new Medicaid patient ($P < .05$). Eighty-nine percent of all respondents reported low fees and 82% reported broken appointments as important reasons for not participating or limiting participation.

Conclusions: Participation of California pediatric dentists in Medicaid is low compared to other states that have participation studies. Pediatric dentists in rural areas are most likely to participate. Among the reasons that contribute to California dentists not participating in the Medicaid program, the major ones appear to be low fees, broken appointments, and denial of payment. (*Pediatr Dent.* 2004;26:79-86)

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Medicaid (Title XIX of the Social Security Act) was established in 1965 to provide health care to eligible low-income individuals. The goal was to eliminate financial barriers to care for the poor and increase their ability to be cared for within the mainstream of the health care system, rather than being restricted to public health clinics. Mainstreaming was supposed to increase access to services by creating a wider geographic distribution of service providers.¹ Access to dental care for children covered by Medicaid, however, has not been entirely successful and is perceived as the greatest pediatric health care problem in many states.² Only 1 in 5 Medicaid-eligible children received preventive dental services in 1993.³ Similar findings were published in a 1996 report by the U.S. Department of Health and Human Ser-

vices office of the Inspector General in which more than 80% of eligible children for whom disease levels are known to be high did not receive a single preventive dental service.⁴ Since about one third of all babies born in the United States are covered by Medicaid,⁵ a large number of American children do not receive adequate dental care.

Provider participation is a significant factor affecting access to care for Medicaid recipients.⁶ There are, however, few studies of participation in Medicaid by pediatric dentists. Available studies report 64% of Connecticut pediatric dentists accept new Medicaid children, 80% of North Carolina pediatric dentists accept new Medicaid patients, and 70% of pediatric dentists sampled from the nation accept Medicaid as a method of payment either occasionally or

frequently.⁷⁻⁹ There are no published data that specifically address participation of pediatric dentists in the California Medicaid program.

In 1990, it was reported that only 16% of primary care providers in California (general dentists and pediatric dentists) accepted new Medicaid children, and that access to dental services was inadequate to meet the needs of Medicaid patients.¹⁰ This study, however, did not report separately on participation by pediatric dentists. Considering this lack of information and important role that pediatric dentists play in the care of California Medicaid children, the authors undertook this study to document pediatric dentists' participation in the state's Medicaid program.

Methods

The subjects for the study were pediatric dentists in California currently treating patients. The subject list was obtained from 4 sources:

1. American Academy of Pediatric Dentistry;
2. California Society of Pediatric Dentistry;
3. American Dental Association;
4. AMI (American Medical Information, Inc), a service that provides information gathered primarily from listings in the yellow pages and business white pages.

All sources were combined to form a single master list. Names from AMI that were not on the other 3 lists were telephoned by the authors' research staff to verify accuracy. The front office staff were asked whether their dentist was a pediatric dentist or general practitioner, and only pediatric dentists were retained. The method of identifying pediatric dentists generated a sample of 565 subjects.

A package containing a cover letter, survey, and return-addressed, stamped envelope was mailed in April 2002 to all 565 subjects. Follow-up packages were mailed to nonrespondents 6 weeks after the initial mailing. A further check to determine if respondents were active pediatric dentists was carried out using responses to relevant questions on the survey instrument that was sent to each subject. The survey procedure was approved by the Institutional Review Board at the University of California at Los Angeles (UCLA).

The survey instrument consisted of 24 questions and was 3 pages long. Subjects were asked to provide information regarding demographics, Medicaid participation, barriers to participation, and additional comments if desired. A copy of the survey is available by request. Prior to mailing the survey, a test survey was distributed to 10 pediatric dentists affiliated with UCLA pediatric dentistry for feedback on clarity, ease of participation, and intended results. Based on their comments, minor changes were made to the skip patterns of the survey to improve the logical flow of questions.

As the surveys were returned, responses were entered into an Excel spreadsheet. Analysis was carried out using STATA for personal computers.¹¹ Descriptive statistics

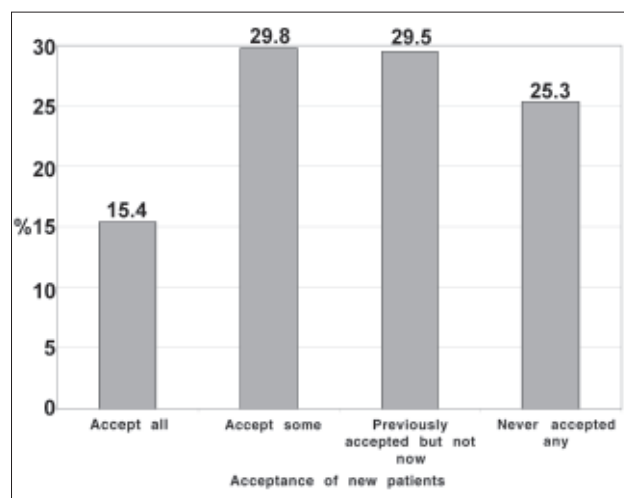


Figure 1. Acceptance of new Medicaid patients.

were compiled for demographics and other attributes of the sample. Comparisons were made between dentists who accepted all or some of the Medicaid patients (participants) and the dentists who were not currently accepting or never accepted Medicaid patients (nonparticipants). Comparisons were also made for participants who accepted all Medicaid patients and those who accepted less than all Medicaid patients. Bivariate analysis was used to assess differences between these groups. Multivariate analysis was then used to see which factors were the most important determinants in the dentist accepting all or all/some of the Medicaid patients contacting them. Chi-square analysis was used to examine participants and nonparticipants regarding barriers to participation that they considered "very important" vs less than very important. Significance was set at $\leq .05$.

Results

Response rate

The first mailing yielded 321 completed surveys. The second mailing sent 6 weeks later to nonrespondents yielded an additional 85 responses for a total of 406 surveys. Of these, 42 surveys were discarded because respondents indicated that they were not pediatric dentists or did not currently treat patients in private practice for reasons such as recently retired or full-time faculty. Thus, the final respondent count was 364 pediatric dentists from a modified sample pool of 523 dentists, and a response rate of 70%.

An analysis of nonrespondents was done with respect to sex and location based on approximating first names with gender and using office addresses to approximate geography as described in a California dentist geographic distribution study.¹² The findings were that nonrespondents were similar to responders, as 30% nonrespondents were female (31% for responders) and 5% practiced in rural areas (4% for responders).

Characteristics of the overall sample

Demographic characteristics of the dentists and their practices are shown in Table 1. The largest group of respondents by age was 46 to 55 years old (29%). Fifty-seven percent of the practitioners were over age 45, with 12% over 65 years of age. The large majority was male (69%). Thirty-one percent of the sample had been practicing for more than 25 years. Only 16 of the respondents (4%) characterized their practice as being in rural areas, with the majority (58%) located in suburban areas. Sixty-two percent practiced in a group setting, and 76% practiced more than 30 hours a week. There was a 4 to 6 week waiting time for a new patient examination in 19% of the practices, and the waiting time was 7 weeks or longer in 8% of the practices.

Medicaid participation

Pediatric dentists' participation was measured in 3 ways:

1. whether pediatric dentists accepted all or some Medicaid patients (Figure 1);
2. percentage of Medicaid patients in the practice (practice concentration) (Figure 2);
3. number of new Medicaid patients that pediatric dentists personally saw per month (Figure 3).

The results showed that 45% accept at least some new Medicaid patients. Fifteen percent of dentists accept all new Medicaid patients, and 30% accept some. Twenty-five percent had never participated in the program, and 30% did not currently accept new patients, although they had done so in the past (Figure 1).

Criteria developed for previous studies of physician Medicaid participation defined 10% or more as "active" Medicaid participation.⁸ Using this definition, the authors found that 25% of surveyed pediatric dentists in California were "active" participants (Figure 2).

Respondents were asked specifically how many new patients they saw compared to an associate in the practice. With respect to the number of new Medicaid patients seen per month, most pediatric dentists (59%) reported that they saw no new Medicaid patients. However, 25% of respondents personally saw 6 or more new Medicaid patients per month, and 4% of the respondents saw more than 50 (Figure 3).

Both bivariate and multivariate analysis were used to determine the likelihood of a pediatric dentist participating in the Medicaid program based on demographic and practice characteristics. The results for the bivariate analysis are shown in Table 1 and the multivariate analysis in Table 2. In these analyses, the authors chose as the dependent variable categories, dentists seeing all or some new Medicaid patients and those seeing none.

The only variable with a significant difference in the bivariate analysis was location. Eighty-one percent of rural practitioners participated in the Medicaid program, whereas 47% of urban and 41% of suburban pediatric dentists reported accepting all or some new Medicaid patients ($P=.006$).

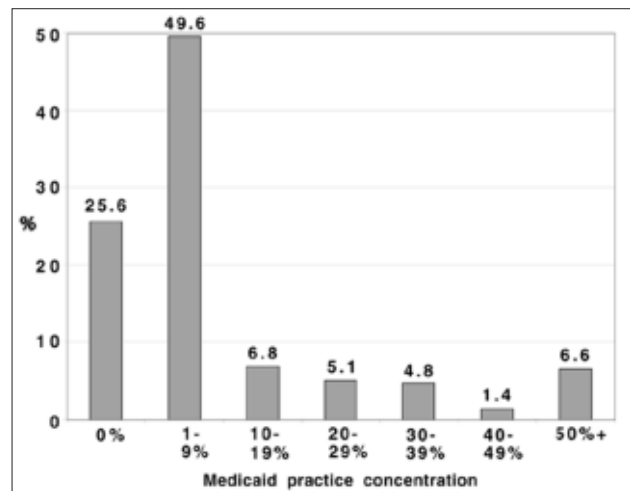


Figure 2. Percentage of Medicaid patients in practice.

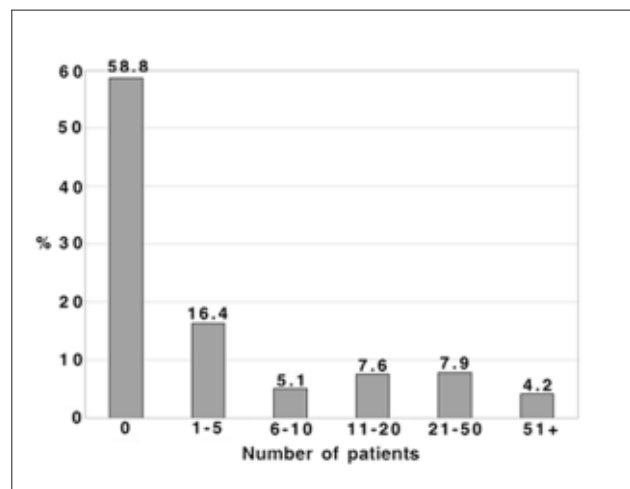


Figure 3. Number of new Medicaid patients seen/month.

The multivariate analysis, which takes all variables into account simultaneously, also found location to be a significant predictor. Pediatric dentists in rural areas were 5.7 times more likely to participate in the Medicaid program than those in urban areas, which was used as the reference group. There was no significant difference between dentists in urban and suburban locations. Waiting time was also significant. Pediatric dentists with a new patient waiting time of 4 to 6 weeks were almost 2 times more likely to participate than the reference group, which was those with a waiting time of less than 1 week. The practices with a 4 to 6 week wait were also significantly more likely to accept Medicaid patients than practices with a 2 to 3 week wait. The type of practice approached significance ($P=.061$), with group practices 1.6 times more likely to accept a new patient.

The authors also conducted multivariate analyses using as the dependent variables dentists who would see all Medicaid patients who sought care and dentists who had a practice concentration of 10% or greater. In both of these analyses, location was significant. Also, for the variable of dentists who see all Medicaid patients, the authors found

Table 1. Characteristics of Pediatric Dentists Accepting All or Some New Medicaid Patients and Those Accepting None

Variable	Number (%) (total=364)	Accept all or some (%)	Accept none (%)
Age			
25-35	85 (23)	39	61
36-45	73 (20)	45	55
46-55	104 (29)	49	51
56-65	59 (16)	49	51
66+	43 (12)	44	56
Gender			
Female	112 (31)	41	59
Male	252 (69)	47	53
Years practicing			
0-5	65 (18)	43	57
6-10	44 (12)	34	66
11-15	45 (12)	43	57
16-20	39 (11)	41	59
21-25	58 (16)	49	51
26+	112 (31)	47	53
Location*			
Urban	134 (37)	47	53
Suburban	208 (58)	41	59
Rural	16 (4)	81	19
Practice Type			
Solo	137 (38)	40	60
Group	223 (62)	48	52
Time spent practicing			
<30 hours/week	86 (24)	42	58
>30 hours/week	278 (76)	46	54
Waiting time for new patient exam			
<1 week	115 (32)	41	59
2-3 weeks	146 (41)	41	59
4-6 weeks	69 (19)	57	43
7+ weeks	29 (8)	52	48

* $P<.05$.

older practitioners significantly more likely to do so than younger ones.

Barriers to participation

All respondents were asked to rate the degree of importance of participation barriers. Table 3 shows the findings where dentists rated a problem as “very important.” A very high percentage of both participating and nonparticipating dentists found low fees and broken appointments to be very important. Nonparticipating dentists ranked low fees and broken appointments as equally problematic (90%). Non-

Table 2. Multivariate Logistic Regression of Characteristics of California Pediatric Dentists on Participation in Medicaid Program

Variable	Accept all or some		
	Odds ratio	SE	P value
Age			
25-35 (reference group)			
36-45	1.58	.9	.411
46-55	2.89	2.2	.167
56-65	3.31	2.9	.168
66+	2.93	2.7	.236
Gender			
Female (reference group)			
Male	1.10	.3	.745
Years practicing			
0-5 (reference group)			
6-10	.76	.4	.572
11-15	.89	.6	.860
16-20	.46	.4	.326
21-25	.57	.5	.509
26+	.51	.5	.543
Location			
Urban (reference group)			
Suburban	.71	.2	.157
Rural	5.65	3.9	.012*
Practice type			
Solo (reference group)			
Group	1.58	.4	.061
Time spent practicing			
<30 hours/week (reference group)			
>30 hours/week	1.21	.4	.505
Waiting time for new patient exam			
<1 week (reference group)			
2-3 weeks	.94	.3	.829
4-6 weeks	1.98	.7	.041*
7+ weeks	1.30	.6	.565

*Statistically Significant

participating dentists were significantly more likely than participating dentists to rate 8 factors as a “very important” problem ($P<.05$). These were:

1. broken appointments;
2. denial of payment;
3. need for prior authorization;
4. complicated paperwork;
5. slow payment;
6. not enough services covered;
7. too busy as it is;
8. difficult to verify eligibility.

Table 3. Problems Reported as “Very Important” by Participants and Nonparticipants in California Medicaid Program

Reported problems	Participants (accept all or some)	Nonparticipants (accept none)	Combined participants and non- participants	
	(%)	(%)	Number	(%)
Low fees	88	90	310	89
Broken appointments*	71	90	282	82
Denial of payment*	64	82	252	74
Need for prior authorization*	39	66	182	54
Complicated paperwork*	43	62	181	54
Slow payment*	37	62	171	51
Not enough services covered*	32	61	161	48
Too busy as it is*	22	43	111	34
Difficult to verify eligibility*	9	24	55	17
Medicaid patients in office discourages other patients	9	15	41	12
Patient behavior	11	11	36	11
Language barriers	5	10	26	8
Few eligibles in area	5	10	24	8
Health status of patients	8	6	23	7
Concern of Medicaid audit	5	6	18	5

* $P < .05$.

Low fees were the single most commonly reported problem with Medicaid for all practitioners (89%). As an indication of the extent of the low fees, 67% felt that Medicaid fees were not high enough to cover overhead. When participating dentists were asked to estimate their future participation if Medicaid fees remained the same in the future, 56% said that they will not change and 29% will see fewer patients. For nonparticipants, 69% indicated that they would participate if fees were raised to 91 to 100% of usual, customary, and reasonable (UCR) fees. The remaining 31% would not participate regardless of fees. Seventy-eight percent of respondents who limit participation would increase participation if fees were increased to 81% or higher of UCR fees.

Discussion

The relatively high response rate (70%) increases the likelihood that respondents to the survey are representative of practicing pediatric dentists in California. As a control for nonrespondents, the authors found that the sex and location of nonrespondents was similar to the responders. Further, Hovland has suggested that nonrespondent bias is less in a well-educated, homogenous population such as dentists.¹² Considerable care was taken in identifying active pediatric practitioners, given that retirement, change of locations, dual trained specialists who do not currently practice pediatric dentistry, full-time faculty, and lack of participation in organized dentistry all are factors that must be accounted for. The authors found 5% (N=25) of their initial master list was

self-reported as not pediatric dentists. Mertz et al reported 492 active pediatric dentists in 1998, which provides support to the authors' finding, in that an increase of 31 practitioners (6%) to 523 4 years later seems reasonable.¹³

Nevertheless, this study faces similar limitations to most other such surveys including the reliance on self-reported data and inability to determine characteristics of nonrespondents. The 30% nonrespondents could be disproportionately within a single group. Given that there were only 16 pediatric dentists who reported practicing in rural areas, the findings could be altered if relatively few nonrespondents were substantially different. Practical considerations required reliance on self-reported information. The respondents were anonymous, which should reduce the

likelihood of purposefully misrepresenting data. Terms such as rural, suburban, and urban were self defined.

This study found that 45% of pediatric dentists participate in the California Medicaid program. A similar study done in North Carolina found that 80% of pediatric dentists accept new Medicaid patients.⁸ A Connecticut study found that 64% accept new Medicaid children.⁷ Using the definition of at least 20% of the practice consisting of Medicaid patients, “nearly half” participated in North Carolina,⁸ whereas 18% participated in California. For those practitioners who accept all Medicaid patients, 28% of North Carolina pediatric dentists participated compared to 15% in California.⁸ Of those few states that have pediatric dentist participation studies, therefore, California dentists report the lowest level of participation.

It is likely that the explanation for difference in participation rates is multifactorial. For instance, there was greater participation in North Carolina (80%) than Connecticut (64%), even though the reimbursement in North Carolina was much lower. To estimate the percentage reimbursement of the Medicaid program in California, the authors used the mean UCR for the Pacific Region in 1999¹⁴ for 5 procedures (initial examination, periodic examination, prophylaxis and fluoride, 2-surface amalgam restorations for primary teeth, and stainless steel crowns) and found that Medicaid reimbursement was at 52% of private practice fees. This was somewhat lower than North Carolina, but the California provider participation rate of 45% was substantially below the 80% found in North Carolina.

Perhaps, as described below, rural/urban location may help explain the difference, since pediatric dentists in North Carolina are more likely to be located in rural areas than the 4% found in California.

This study sought to identify those characteristics that would best predict participation in the program. The multivariate analysis, which controls simultaneously for all the variables entered into the analysis, provides the best insight into these factors. The results showed that location was of particular importance with those pediatric dentists in rural areas far more likely to participate in the program. Lang and Weintraub similarly found that general dentists in rural areas are significantly more likely to participate.¹⁵ The reason for this is not known. Possible explanations include there being so few practitioners that it is clear to the dentists that they are the only possible source of care.

This finding, however, does not mean that children in rural areas have adequate access to pediatric dentistry specialty care. Although 81% of rural pediatric dentists participate in the Medicaid program, only 4% of the practitioners reported being located in a rural area. Rural areas in California represent the most seriously underserved population for access to dental services for children, and pose the greatest need. Generally, the lack of access to care in rural communities stems from the fact that there is a workforce shortage in rural communities rather than an unwillingness to participate.^{13,16}

Given the importance of children having access to specialty pediatric dentistry care, the findings of participants and nonparticipants regarding perceived problems are informative. Low fees were rated as very important by 90% of nonparticipants and 88% of participants. The finding that 88% of participating dentists rank low fees as a very important problem but continue to accept new patients underscores the complexity of understanding the relationship between fees and participation.

There is evidence that an increase in fees does increase provider participation. In Connecticut, participation showed a significant increase from one third to one half of the dentists following an increase in reimbursement after 1 year in 1994, and the number of pediatric dentists accepting new Medicaid eligible children nearly doubled.⁷ McKnight-Hanes reported that the regional differences in participation found in their study suggests that individual state Medicaid reimbursement may influence the dentists' willingness to participate.⁹ In this study, dentists were asked what level of reimbursement would be required for them to participate or increase participation. Sixty-nine percent of California pediatric dentists that do not participate reported that they would do so if fees were 91 to 100% of UCR, and 78% who limit participation would increase participation if fees were at least 81% of UCR.

Whether a fee increase would in fact result in greater participation is not clear. The Government Accounting Office reported that, of the 29 states that increased fees and could assess the effect of the fee increase, 14 reported increases in utilization by dentists.¹⁷ Damiano et al reported that simply increasing fees may not be enough to bring many nonpartici-

pants into the program,¹ and, in this study, 31% of respondents who currently do not participate reported that they would not participate regardless of fees. Thus, it is likely that barriers other than fees need to be addressed to increase participation.

Among these other barriers are those that can be classified as administrative, such as denial of payment, slow payment, complicated paperwork, and need for prior authorization, all of which were ranked as "very important" by more than 60% of nonparticipating pediatric dentists. Patient-related factors present a special challenge. Nonparticipating dentists ranked broken appointments equal to low fees as a very important problem (90%). It is understandable that the Medicaid program does not allow penalties such as charges for broken appointments because of the low-income status of families. However, the effect of broken appointments, to the extent that this affects dentist participation, is to reduce access to dental care for the entire Medicaid population. The Medicaid program should encourage research to help understand and reduce the broken appointment rate.

When considering participation in government programs, one might expect that dentists who see Medicaid patients would also participate in Healthy Families, the California State Children's Health Insurance Programs (SCHIP).¹⁸ This program includes dental coverage for children under age 19 whose families' income is above eligibility for Medicaid, between 100 and 250% of the federal income guidelines.¹⁹ In this study, of the pediatric dentists who see Medicaid patients, 40% do not see children on other non-Medicaid government assistance programs which would include Healthy Families. Healthy Families has a significantly higher reimbursement rate for pediatric dentists. This finding could indicate the need to better inform practitioners about the program.

Basic dental services are a crucial component for the overall health and well being of all children. While there have been reductions in the occurrence of dental caries over the past few decades,²⁰⁻²¹ it remains the single most common disease of US children.²² Dental caries in children is more than 5 times more common than and 7 times more common than hay fever, and children of lower socioeconomic status are most affected.²⁰ For these children, most dental problems are not self-limiting, and can lead to pain and infection if left untreated. Pain and infection often lead to a reduced quality of living; including the inability to effectively learn in the classroom, emergency room visits, missed school days, poor interaction with adults and other children, as well as diminished growth in toddlers and compromised nutrition.²³

As problematic as the oral disease situation is in the nation, California is among the worst in addressing oral disease. In California, over half of all school-age children have untreated tooth decay.²⁴ This is double the proportion of children in other states. Almost half of all preschool children have never been to a dentist. For California children, 28% do not have dental insurance. This is nearly 2 times the number of children that do not have medical insurance. Those with dental insurance are twice as likely to have visited a dentist as those without. Four-and-a-half million Medicaid

beneficiaries are eligible for dental services in California, but less than half (44%) utilize these services each year. These are all indicators that amount to an oral disease situation in California that is of a "crisis nature."^{16,19}

Participation by pediatric dentists in government programs such as Medicaid is important to the health of children, and there is a critical need to have the services of specialists available to this population. One approach being considered by the California Children and Families Commission²⁵ is to recruit general dentists to assess their competencies and willingness to see young children after their training. This can improve the level of dental services available to underserved children by increasing the available workforce and complementing specialists in pediatric dentistry. There will remain, however, a need for the skills of pediatric dentistry specialists. Thus, the finding that less than half of California pediatric dentists participate in Medicaid presents a challenge to Californians to work with the practicing community to increase the availability of specialist services.

Conclusions

Participation of California pediatric dentists in Medicaid is low compared to other states that have participation studies. Pediatric dentists in rural areas are more likely to participate. Among the major factors that contribute to California dentists not participating in the Medicaid program, appear to be low fees, broken appointments, and denial of payment.

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References

1. Damiano PC, Brown ER, Johnson JD, Scheetz JP. Factors affecting dentist participation in a state Medicaid program. *J Dent Educ.* 1990;54:638-643.
2. Tinanoff N. State surveys of oral health needs and dental care access for children, summary of 15 state reports. *Children's Dental Health Project.* Washington: American Association of Dental Schools; 1998.
3. Palmer C. Medicaid difficulties detailed in report on dental care access. *ADA News.* May 6, 1996;27:1,8,19.
4. US Department of Health and Human Services (USDHHS), Office of Inspector General. Children's dental services under Medicaid. Access and Utilization. San Francisco: Office of Evaluation and Inspection; 1996 Apr. Pub. No. OE1-09-93-00240.
5. Waldman HB. Mid-1990s review of Medicaid and Medicaid dentistry. *J Dent Child.* 1997;64:141-148.
6. Nainar H, Edelstein B, Tinanoff N. Access to dental care for Medicaid children in Connecticut. *Pediatr Dent.* 1996;18:152-153.
7. Nainar SM, Tinanoff N. Effect of Medicaid reimbursement rates on children's access to dental care. *Pediatr Dent.* 1997;19:315-316.
8. Venezie RD, Vann WF Jr. Pediatric dentists' participation in the North Carolina Medicaid Program. *Pediatr Dent.* 1993;15:175-181.
9. McKnight-Hanes C, Myers DR, Dushku JC. Method of payment for children's dental services by practice type and geographic location. *Pediatr Dent.* 1992;14:338-341.
10. Damiano PC, Brown ER, Johnson JD, Scheetz JP. California Policy Seminar. Access to dental care for Medi-Cal recipients. California Policy Seminar Research Report. Berkeley, Calif: University of California; 1990.
11. STATA 6.0. Stata Corporation, 702 University Drive East, College Station, TX, 77840. Available at <http://www.stata.com>. Accessed November 8, 2002.
12. Hovland EJ. Nonresponder bias to mail survey questionnaires within a professional population. *J Dent Educ.* 1980;44:270-274.
13. Mertz E, Grumbach K, MacIntosh L, Coffman J. Geographic distribution of dentists in California. Dental shortage areas, 1998. A report by the Center for California Health Workforce Studies at the University of California, San Francisco; 2000.
14. American Dental Association. *1999 Survey of Dental Fees.* Chicago: July 2000.
15. Lang PA, Weintraub JA. Comparison of Medicaid and non-Medicaid dental providers. *J Public Health Dent.* 1986;46:207-211.
16. Center for California Health Workforce Studies. Distribution of Medicaid dental services in California, Dec. 2000. San Francisco, Calif: The Center for the Health Professions. Available at http://futurehealth.ucsf.edu/press_releases/denta.html. Accessed December 12, 2002.
17. GAO. Oral health: Factors contributing to low use of dental services by low-income populations. GAO/HEHS-00-149. September 2000:13. Available at <http://www.healthyfamilies.ca.gov>. Accessed July 17, 2003.
18. Mertz E, Manuel-Barkin C, Isman B, O'Neil E. *Improving Oral Health Care Systems in California: A Report of the California Dental Access Project.* San Francisco, Calif: Center for the Health Professions, University of California San Francisco; December 2000.
19. US Department of Health and Human Services. *Oral health in America: A report of the Surgeon General.* Rockville, Md: US Department of Health and Human Services. National Institutes of Health publication no. 00-4713; 2000.

20. Venezie RD, Vann WF Jr, Cashion SW. Pediatric and general dentists' participation in the North Carolina Medicaid program: Trends from 1986 to 1992. *Pediatr Dent* 1997;19:114-117.
21. Edelstein BL, Douglass CW. Dispelling the myth that 50 percent of US school children have never had a cavity. *Public Health Rep.* 1995;110:522-530.
22. Edelstein BL. *Crisis in care: The facts behind children's lack of access to Medicaid dental care.* Arlington, Va: National Center for Education in Maternal and Child Health; May 1998.
23. Watahard A, Murphy LO, Isman BE. *The oral health of California's children: A neglected epidemic.* San Rafael, Calif: The Dental Health Foundation; 1997.
24. California Children and Families Commission discussion paper: Oral health agenda item no. 14. Meeting held July 18, 2002.

ABSTRACT OF THE SCIENTIFIC LITERATURE



TOOTH ERUPTION IN PREMATURE CHILDREN

The purpose of this study was to investigate whether clinical eruption of the permanent incisors and first molars is affected by preterm birth. Data for this study originated from 328 prematurely born children and 1,804 control children who were seen in the Collaborative Perinatal Study conducted in the United States during the 1960s and 1970s. Dental casts obtained at varying ages during the previous study were used to determine the eruption time of the permanent incisors and molars. The first permanent molars and permanent incisors erupted significantly earlier in the premature children as compared to the full-term children. Variations within ethnic and gender groups were found. The authors suggest the permanent incisors and molars go through a sensitive period circumnatally under the influence of various neonatal systemic factors and an accelerated postnatal growth period with related unknown factors that may influence their eruption.

Comments: This study utilized previously collected data from premature and full-term children born during the 1960s when neonatal mortality and morbidity rates were higher than current rates. If the study was repeated today, the results might be different due to advances in neonatal intensive care and the resulting change in potential test and control groups. Possible genetic and environmental factors were not investigated in this study. **LDK**

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Harila-Kaera V, Heikkinen T, Alvesalo L. The eruption of permanent incisors and first molars in prematurely born children. *Eur J Orthod.* 2003;25:293-299.

56 references

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