Utilization of dental sealants by Alabama Medicaid children: barriers in meeting the year 2010 objectives

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Abstract

***Purpose**: As a national objective, 50% of US children are expected to have dental sealants on at least one permanent molar by the age of 14 years. The present study was conducted to estimate the prevalence of dental sealants among Alabama Medicaid children and to evaluate the characteristics of the sealant users and non-users so the potential barriers in meeting the year 2000/2010 sealant objectives can be identified.*

***Methods**: Alabama Medicaid 1990-1997 claims for children (N=3,683,842) were analyzed using basic descriptive statistics, likelihood ratio, Chi-Square and t-tests, and ANOVA. Logistic regression analysis was used in identifying the predictors of dental sealant utilization.*

***Results**: Nearly 22 percent of children had at least one sealant claim by 12 to 14 years of age (white =28.3%; Black=19.8%; OR=1.6, 95% CI=1.4-1.8; female=23.6%; male=19.7%; OR=1.3, 95% CI=1.1-1.4). 5- to 9-year-olds were more likely to have sealants compared to 11- to 14-year-olds (OR=4.1, 95% CI=2.7-6.1). The availability of a Medicaid accepting dentist within the county of residence was a significant predictor (OR=1.5, 95% CI=1.1-2.2). Less than 2% of the annual amount claimed for total dental services in Alabama was related to sealants and the providers were reimbursed only for 50% to 70% of the amount claimed for sealant procedures.*

***Conclusions**: Racial and gender disparities in obtaining care, non-availability of a Medicaid-participating dentist within the county, and lower payment/claim ratio may make the national sealant objective difficult to achieve in Alabama. (Pediatr Dent 23: 401-406)*

In 1976, the Council on Dental Materials of the American Dental Association approved sealants as a safe and effective way to prevent pit and fissure caries.[1] The use of pit and fissure sealants is an additive preventive measure that is synergistic with the use of fluorides and other preventive methods. Pit and fissure sealants also have a cariostatic effect on dental caries.[2] Therefore, even if a carious tooth is inadvertently sealed, the disease process will stop as long as sealant margins remain intact. The levels of viable cariogenic organisms under such sealants remain very low for considerable periods of time.[3,4,5,6]

In terms of the cost effectiveness of sealants, Weintraub *et al*, have shown that identifying children with prior restorations and sealing the remaining molars is a cost-saving measure.[7] According to Kuthy, the mean charge for a one-surface restoration is more than double the mean sealant charge.[8]

As a National Health Objective for the year 2000, 50% of US children were expected to receive dental sealants on at least one permanent molar by the age of 14 years.[9] This objective is now extended up to the year 2010. However, a significant gap has been identified between the prevalence of sealants in many areas of the country and the national objective. In 1986, the National Institute of Dental Research survey indicated that only 7.6% of U.S. schoolchildren had at least one sealant.[10] A subsequent study using NHANES III data between 1988-1991 revealed that 18.5% of children aged 5 to 17 had at least one sealant.[11] A lower prevalence of sealant use has also been reported from areas such as North Carolina (12% 6- to 17-year-olds),[12] Ohio (43% of the dentists using sealants on less than 15% of the school children),[13] and Tennessee (10% of 6- to 17-year-olds).[14]

In 1999, the CDC-sponsored Special Interest Projects (SIPs) among its Prevention Research Center (PRC) participants to examine the existing data on sealants. University of Alabama at Birmingham PRC obtained funding for one such project. Under this project, sealant use among Alabama Medicaid children was evaluated using data from 1990 to 1997.

The Alabama Medicaid program was approved by the Department of Health, Education and Welfare in 1970. It was implemented to provide federal health care assistance and increase health care access to low-income families. In 1989, Medicaid adopted sealants as part of its children's dental coverage.[15]

The objective of this study was to estimate the proportion of Medicaid eligible Alabama children who have received at least one dental sealant by the age of 12 to 14 years. Since the recent Surgeon General's Report on Oral Health identified racial disparities in oral health as a significant public health problem,[16] we also wanted to evaluate the extent of the racial disparity in sealant use. The identification of how far the Alabama Medicaid children have come in relation to the national objectives for sealant use and the barriers they face in achieving the objectives would help policy makers develop potential strategies to overcome such barriers.

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Table 1: Gender and Race-Specific Prevelance of Sealants: 12- to 14-Year-Olds[a]

Variable	Total	Number with sealants (%)	OR	95%CI
Gender				
Female	4555	1073(24)	1.3	1.1-1.4
Male	4994	986 (20)		
Race				
White	2002	566 (28)	1.6	1.4-1.8
Non-White	7547	1493 (20)		
Total	9549	2059 (22)		

[a]Based on a subgroup of children who were continuously Medicaid eligible from 1990-1997

Table 2: Gender-Specific Annual Sealant Utilization: 5- to 9-Year-Old Alabama Medicaid Children:1990-1997

	Male		Female	
Year	**Eligible**	**Sealants (%)**	**Eligible**	**Sealants (%)**
1990	33598	726 (2.2)	32241	832 (2.6)*
1991	42292	1095 (2.6)	40711	1173 (2.9)*
1992	51079	1160 (2.3)	48788	1323 (2.7)*
1993	57057	1336 (2.3)	53822	1551 (2.9)*
1994	48360	1768 (3.7)	45145	1861 (4.1)*
1995	49895	1926 (3.9)	46429	2090 (4.5)*
1996	51891	1962 (3.8)	48245	2137 (4.4)*
1997	47962	1995 (4.2)	44023	2096 (4.8)*

* Gender differences are statistically significant at p<0.01 level

Table 3: Gender-Specific Annual Sealant Utilization: 11- to 14-Year-Old Alabama Medicaid Children:1990-1997

	Male		Female	
Year	**Eligible**	**Sealants (%)**	**Eligible**	**Sealants (%)**
1990	13,888	217 (1.6)	13,593	282 (2.1)*
1991	17,599	232 (1.3)	17,673	299 (1.7)*
1992	18,173	185 (1.0)	17,683	240 (1.4)*
1993	18,438	177 (1.0)	17,342	199 (1.2)[a]
1994	17,775	186 (1.1)	15,833	218 (1.4)*
1995	19,332	246 (1.3)	17,216	298 (1.7)*
1996	21,903	286 (1.3)	19,938	359 (1.8)*
1997	23,990	353 (1.5)	21,853	445 (2.0)*

* Gender differences are statistically significant at p<0.01 level
[a] Gender differences are reaching statistical significance (p=0.08)

Methods

The analysis was based on 3,683,842 Alabama Medicaid claims related to dental services that were submitted between October 1990 and September 1997 for all children 14 years and younger. Two primary databases were used in the analysis. The first database (eligibility database) contained a listing of all Medicaid eligible subjects. This database included the Medicaid identification number of the individual as well as demographic data and county of residence.

The second database (claims database) contained data for each procedure performed at each visit on each individual who used Medicaid to obtain dental care. Among the variables in this database were the identification numbers for the individual (linking variable), the visit designation, a procedure code, the county of service provider, charges for that procedure, and the amount reimbursed by Medicaid. For the current analyses, the data was restricted to visits related to sealants (ADA code 1351). This database was merged with the eligibility database to create a database of Medicaid-eligible people who received dental sealants and Medicaid-eligible people who did not receive dental sealants. This database was used in subsequent analyses where "users" were compared to "non-users."

For the final analysis, children who were between 5 to 14 years of age during the study period of 1990-97 were identified. There were 741,538 children in the 5-9 year-old group (51% male; 58.4% black; 39.5% white) and 128,820 in the 11-14 year group (51% male; 64.8% black; 33.5% white). The above age range was used because Medicaid only reimbursed for sealant procedures performed on first permanent molars in 5-9 year-olds and second molars in 11-14 year-olds during the period used in this study.

Since one objective of this study was to obtain an estimate of the proportion of Alabama children with at least one sealant by the age of 14 (Year 2000/2010 objective), a subgroup of children who were between 5-7 years of age by September 1990 who also remained Medicaid-eligible for all subsequent years until October 1997 was selected. There were 9,549 children in this group. The proportion of children for whom there was at least one claim for sealants during the study period (N=2,059) was then calculated as an estimate of prevalence of sealants in children by the age of 12-14 years.

Data analysis

Basic descriptive statistics were calculated for all variables. Group means were compared using t-test and ANOVA. Frequency distribution of discrete variables was tested using the Chi-Square test. Logistic regression analysis was used in identifying the predictors of dental sealant utilization. In addition to the main effects, two-way and three-way interaction terms were included in the models. The fit of the models was tested using the Goodness of Fit test. For all statistical tests, two-sided Type I Error probability less than or equal to 5% was chosen as the level of significance. Institutional Review Board approval was obtained for the project.

Results

Since the analyses were based on two cohorts (all Medicaid eligible children and a subset who were continuously eligible), results pertaining to each cohort are presented separately.

Sealant use among continuously eligible children

Overall, 21.6% of Alabama children who remained Medicaid eligible continuously from 1990-1997 received at least one sealant by the age of 14 years (23.6% females, 19.7% males; 28.3% white and 19.8% black). Table 1 indicates the overall

Table 4: Race-Specific Annual Sealant Utilization: 5- to 9-Year-Old Alabama Medicaid Children:1990-1997

	White		Black		Other	
Year	Eligible	Sealants (%)	Eligible	Sealants (%)	Eligible	Sealants (%)
1990	15,906	514 (3.2)*	49,403	1,035 (2.1)	530	9 (1.7)
1991	23,866	895 (3.8)*	58,405	1,351 (2.3)	732	22 (3.0)
1992	32,119	1,158 (3.6)*	66,749	1,307 (2.0)	999	23 (2.3)
1993	37,084	1,261 (3.4)*	72,534	1,601 (2.2)	1,261	25 (2.0)
1994	36,767	1,559 (4.2)*	55,103	2,018 (3.7)	1,635	52 (3.2)
1995	37,466	1,806 (4.8)*	56,816	2,150 (3.8)	2,042	60 (2.9)
1996	38,978	1,863 (4.8)*	58,494	2,146 (3.7)	2,664	90 (3.4)
1997	35,345	1,745 (4.9)*	53,801	2,262 (4.2)	2,839	84 (3.0)

* Racial differences are statistically significant at p<0.01 level

Table 5: Race-Specific Annual Sealant Utilization: 11- to 14-Year Old Alabama Medicaid Children:1990-1997

	White		Black		Other	
Year	Eligible	Sealants (%)	Eligible	Sealants (%)	Eligible	Sealants (%)
1990	6,821	137 (2.0)[a]	2,0367	355 (1.7)	293	7 (2.4)
1991	9,468	143 (1.5)[a]	2,5372	386 (1.5)	432	2 (0.5)
1992	9,892	134 (1.4)[a]	2,5464	289 (1.1)	500	2 (0.4)
1993	9,400	130 (1.4)*	25,889	243 (0.9)	491	3 (0.6)
1994	10,349	153 (1.5)*	22,701	248 (1.1)	558	3 (0.5)
1995	12,106	218 (1.8)*	23,817	318 (1.3)	625	8 (1.3)
1996	14,883	299 (2.0)*	26,152	337 (1.3)	806	9 (1.1)
1997	16,720	351 (2.1)*	28,232	429 (1.5)	891	18 (2.0)

* Racial differences are statistically significant at p<0.01 level
[a] Racial differences are not statistically significant

prevalence of sealants by 12-14 years of age and the association between gender, race and the use of sealants. The odds of females receiving at least one sealant by 12-14 years were higher compared to males (OR=1.3; 95% CI=1.1-1.4). Whites had 1.6 times higher odds (95% CI=1.4-1.8) of receiving at least one sealant by 14 years compared to non-whites.

The multiple logistic regression analysis based on the above cohort also identified higher odds of receiving sealants by females (OR=1.3; 95% CI=1.2-1.4) and whites (OR=1.7, 95% CI=1.5-1.9).

Sealants use among all eligible children

Table 2 indicates the gender specific annual utilization of sealants by fiscal year for 5-9 year old children. Annually, less than 5% of Medicaid-eligible children received at least one sealant. The proportion of females who received at least one sealant during the year was statistically significantly higher compared to males for every year (p<0.01).

Table 3 indicates the gender-specific annual utilization of sealants by fiscal year for 11- to 14-year-old children. The annual proportion of Medicaid-eligible children who received at least one sealant in this age group was around 2%. In general, the proportion of females in this age group who received at least one sealant during the year was also statistically significantly higher compared to males.

Table 4 indicates the race-specific annual utilization of sealants by fiscal year for 5-9 year old children. The racial difference in annual utilization of sealants was statistically significant for all years (p<0.001) in favor of whites.

Table 5 indicates the race-specific annual utilization of sealants by fiscal year for 11- to 14-year-old children. Except for the 11-14 year-old group during the first three years, the racial difference in annual utilization of sealants in this age group was also statistically significant for all years (p<0.001) in favor of whites.

In essence, the proportion of Medicaid-eligible children who received sealants annually ranged from 1% to 6%. Throughout the study period, a consistently higher proportion of young (5- to 9-year-old) white males and females received sealants compared to 11- to 14-year-old nonwhite males.

Table 6. Determinants of Dental Sealants Use Among Medicaid Children: Logistic Regression Analysis

Variable	Adjusted OR	95% CI
Age (5-9 vs. 11-14)	4.1	2.7-6.1
Sex (F vs. M)	1.3	1.3-1.4
Race (W vs. NW)	1.4	1.2-1.6
Provider[a] (Yes vs. No)	1.5	1.1-2.2
Year (Trend)	1.09	1.08-1.1

[a]Having a Medicaid-accepting dentist within the county of residence

Table 6 gives the results of the logistic regression model for all eligible children. This model included the use of sealants as a binary dependant variable and age group, gender, race, fiscal year and the availability of a dentist within the county of residence who participates in Medicaid as independent variables. The odds of dental sealant utilization in 5-9 year olds were higher compared to 11-14 year-olds (OR=4.1, 95% CI=2.7-6.1). Whites had higher odds of receiving sealants than blacks and other groups (OR=1.4, 95% CI=1.2-1.6), while females had higher odds than males (OR=1.3, 95% CI=1.3-1.4). These adjusted odds ratios are only slightly different from the crude odds ratios reported in Table 1, indicating minimal confounding by the other factors that were in the model. There was a small improvement (unit OR=1.09; 95% 1.08-1.1) in dental sealant utilization over time, subsequent to a drop observed from 1990 to 1993, which may or may not be of any clinical significance. Among the other factors that were significantly positively associated with sealant use was the availability of a dentist within the county of residence who participates in the Medicaid program (OR=1.5, 95% CI=1.1-2.2).

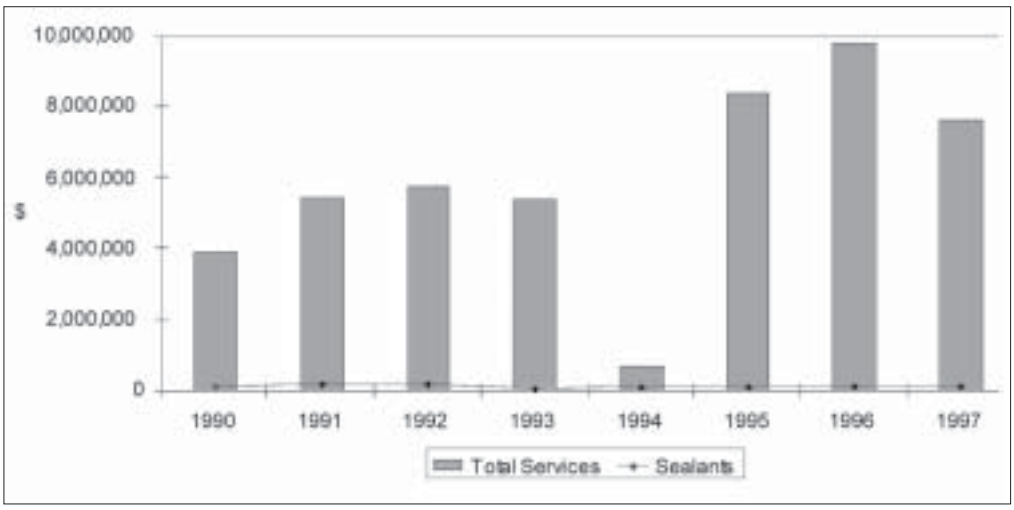

Fig 1. Medicaid claims for total dental services and sealants in 5- to14-year-old Alabama children

Figure 1 indicates the annual dollar amounts claimed for total dental services in relation to the amounts claimed for sealant procedures. Nearly $10 million was claimed for total dental services in 1996, compared to less than $1 million in 1994. Since 1993, less than 2% of the annual total dental service claim amount was related to sealants.

Figure 2 indicates the total annual dollar amounts claimed for sealants compared to the reimbursement amounts. Provider reimbursement was between 50% to 60% of the amount claimed per sealant procedure prior to 1993 and was between 60% to 70% since then.

The average sealant claim was for $19.96 ±5.17 and the average reimbursement per sealant was $12.57 ±1.92. There was a modest increase in the amount paid by Medicaid per sealant over the years from $ 9.99 in 1990 to $13.94 in 1997.

Discussion

The Centers for Disease Control and Prevention and Association of State and Territorial Dental Directors (CDC/ASTDD) oral health synopsis for Alabama for the year 2000 indicates that 18% (732,042) of the 4.15 million Alabamians are K-12 school children. A considerable proportion of these children (38%) qualify for a free or reduced-pay school lunch program, an economic indicator that may also qualify their families for Medicaid. Oral health and utilization of oral health services among Medicaid children are subjects with considerable public health importance.

Alabama Medicaid provides health care coverage to a considerable portion of the state's population who otherwise would not be able to obtain health care. In recent years, it has been reported that a large proportion of the eligible subjects (530,128 or 83% of the eligible subjects in 1998) and about one-third of eligible adolescents (i.e., 29.2% in 1988) actually received general health care that was paid by Medicaid.[15]

One objective of the study was to assess the Medicaid population's progress toward achieving the Healthy People 2000/2010 objective in relation to sealants. Although, the ideal method (gold standard) of assessing sealant prevalence may be to clinically examine a random sample of children, this large data set provided a surrogate, yet robust, estimate of the sealant prevalence using minimal financial resources. As the study findings are based on a large sample, possible random error is minimal. Since all available and valid data were used, the potential selection bias is also minimal.

Twenty two percent of children who were continuously eligible for Medicaid from 1990-1997 received at least one sealant by the age of 14 years. For this to be a valid estimate of prevalence of sealants in this group, an assumption should be made that these children did not obtain dental sealants from providers who did not participate in Medicaid. Based on our experience, this is a reasonable assumption. It is not surprising that the use of sealants by this lower socioeconomic group is lower than the national objective. However, estimates of this nature would help the health care providers and policy makers assess the progress made by this population in achieving the national objectives and identify the problems associated with it.

Factors such as educational level of the subject and parents or caregivers, availability of transportation, and availability of service providers within a reasonable distance may be among the significant determinants of utilization of sealants. Surveys of parents and focus groups can identify a wide variety of such factors. However, by comparing the children who received sealants to those who did not receive sealants using limited variables available in the Medicaid data, the key demographic factors that are related to sealant utilization can still be identified. In return, such information can be used in modifying and improving oral health services provided under Medicaid.

The finding that females are more likely to receive sealants is in contrast with the literature[12] but is consistent with the findings of a recent survey in the region (personal communication, Dr. Steve Silberman, Mississippi Sealant Survey; 16% in 9 year old females vs. 13% in males). The baseline data for year 2010 objectives also indicated slightly higher sealant prevalence among females compared to males. Even though there are important differences between males and females in relation to eruption times, distribution of certain oral diseases, and awareness of personal appearance, such differences may or may not explain why females have a higher prevalence of sealants. At least in certain Far Eastern cultures, parents are more careful about the teeth of their daughters than their sons due to the perception of daughters as a commodity being prepared for the "marital market." Since this may not be applicable to the Southern USA, it is of academic and anthropological interest to further explore why these differences exist.

Rozier *et al*[12] and Cherry-Peppers *et al*[12] have shown that whites had at least 2 times higher prevalence of sealants compared to blacks. The prevalence of sealants among non-Hispanic blacks of 5-17 years of age in NHANES III survey was 7.7% compared to 22.9% among whites.[11] In our study, the odds of whites receiving sealants were 1.6 times higher compared to non-whites. These racial differences may

reflect a variety of other background variables such as the educational level and income of the parents,[12,17] their awareness of oral health and available preventive practices, and transportation. However, due to a limited number of variables that were available in the Medicaid data, we were not able to address some of these issues.

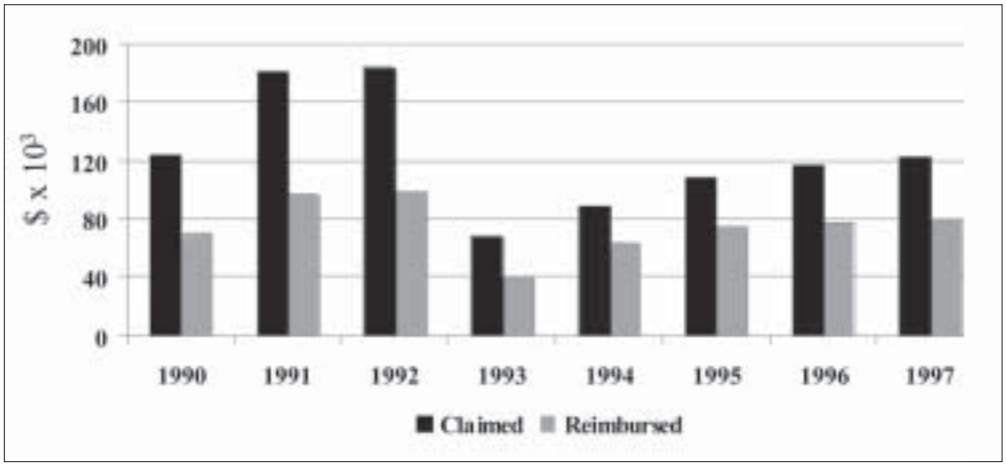

Fig 2. Claim vs. reimbursement for sealant procedures in 5- to 14-year-old Alabama Medicaid children

Rozier *et al*[12] failed to find a significant age disparity in prevalence of sealants (12.1% in 6-11 year olds and 11.9% in 12-17 year olds). The age disparity in our study was much more pronounced and statistically significant. At the time this data was collected, Alabama Medicaid did not pay for sealants between 9-11 years of age and only paid for second permanent molars between 11-14 years. Perhaps this age gap in sealant eligibility partially explains the lower usage of sealants among 11-14 year olds. The fact that adolescents use general dental services at a significantly lower rate than younger children[18] may also explain the observed differences. In addition, older children may also see general dentists rather than pediatric dentists who may or may not use sealants to the extent that pediatric practices do.

Having a provider within the county of residence who accepts Medicaid patients was a significant predictor of dental service utilization. Similar situations have also been reported among other populations.[19] According to the CDC/ASTDD oral health synopsis for year 2000, only about 26% of the licensed Alabama dentists participate in the state's Medicaid program. This figure is even lower compared to other southeastern states such as South Carolina (48%) and Mississippi (31%). Perhaps the number of Alabama dentists who accept new Medicaid patients or annually treat a reasonable number of Medicaid patients (as opposed to just a few) may be even lower than 26%. This challenge requires creative solutions.

A less-than-favorable payment-to-claim ratio was observed in relation to sealants. Apparently, in some states, the Medicaid contract publishes a fee schedule that informs providers of the fees they should submit when filing a claim. However, for Alabama there was no published fee schedule for Medicaid during the period studied. Providers with a long history of Medicaid participation may determine Medicaid's fee schedule from the "Explanation of Payment" (EOP) they receive with payments. Therefore, some providers, in an attempt to minimize the complexity of accounting, submit what they know Medicaid allows for individual claims. This practice may have underestimated the large discrepancy between the reimbursements to claims illustrated in Figure 2, which is an estimate of the discount Medicaid providers must accept in treating this clientele. Alternatively, most providers submit their usual and customary fee (in our data, charges per sealant ranged from $5.20 to $ 80; median = $20).

The mean reimbursement per sealant in this group ($12.57) was only slightly higher than what has been reported by Cohen and Horowitz[20] ($10.96). Since 1990, the payment per sealant by Alabama Medicaid has gone up by about 39.5%, a figure slightly above the value expected after adjusting for inflation.

Conclusions

Unless there was great progress during the final three years of the decade, based on 1900-1997 Medicaid data, Alabama was only half way toward achieving the year 2000/2010 national objective in relation to sealants. Policy makers and health care providers should consider racial and gender disparities in obtaining sealants, lower participation of dentists in Medicaid (perhaps due to the low reimbursement rate) and other challenges as modifiable barriers in achieving the national objectives set for the year 2010.

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References

1. ADA Council on Dental Materials and Devices and the Council on Dental Therapeutics. Pit and fissure sealants. *JADA* 93:134, 1976.
2. Heller KE, Reed SG, Bruner FW, et al.: Longitudinal evaluation of sealing molars with and without incipient dental caries in a public health program. *J Pub Health Dent* 56:812-822, 1995.
3. Handelman SL, Washburn F, Wopperer P. Two-year report of sealant effect on bacteria in dental caries. *JADA* 93:967-970, 1976.
4. Going RE, Loesche WA, Grainger DA, Syed SA. The variability of microorganisms in carious lesions five years after covering with a fissure sealant. *JADA* 97:455-462, 1976.
5. Mertz-Fairhurst, EJ, Curtis, JW, Ergle, JW, Rueggeberg FA, Adair MA. Ultraconservative and cariostatic sealed restorations: Results at year 10. *JADA* 129:55-66, 1998.
6. Handelman SL, Buonocore MG, Schoute PC. Progress report on the effect of fissure sealant on bacteria in dental caries. *JADA* 87:1189-1191, 1973.

7. Weintraub JA, Stearns SC, Burt BA, Beltran E, Eklund S. A retrospective analysis of the cost effectiveness of dental sealants in a childrens health center. *Soc Sci Med* 36:1483-1493, 1993.
8. Kuthy RA. Charges for sealants and one-surface posterior permanent restorations: Three years of insurance claims data. *Pediatr Dent* 14:405-406, 1992.
9. USDHHS, Public Health Service, Healthy People 2000. National Health Promotion and Disease Prevention Objectives. DHHS Pub No (PHS) 91-50213. Washington. DC: U.S. Government Printing Office, 1990.
10. Brunelle JA. Prevalence of dental sealants in U.S. schoolchildren (abstract). *J Dent Res* 68:183, 1989.
11. Selwitz RH, Winn DM, Kingman A, Zion GR. The prevalence of dental sealants in the U.S. population: findings from NHANES III, 1988-1991. *J Dent Res* 75(SI):652-660, 1996.
12. Rozier RG, Spratt CJ, Koch GG, Davies GM. The prevalence of dental sealants in North Carolina schoolchildren. *J Pub Health Dent* 54:177-183, 1994.
13. Siegal MD, Garcia AI, Kandray DP, Giljahn LK. The use of dental sealants by Ohio dentists. *J Pub Health Dent* 56:12-21, 1996.
14. Gillcrist JA, Collier DR, Wade GT. Dental caries and sealant prevalences in schoolchildren in Tennessee. *J Pub Health Dent* 52:69-74, 1992.
15. Alabama Medicaid Agency. Annual Report 1998.
16. U.S. Department of Health and Human Services. Oral Health in America: A Report of the Surgeon General - Executive Summary. Rockville, MD: U.S. Department of Health and Human Services, National Institute of Dental and Craniofacial Research, National Institute of Health, 2000.
17. Cherry-Peppers G, Gift HC, Brunelle JA, Snowden CB. Sealant use and dental utilization in U.S. children. *J Dent Child* 62:250-255, 1995.
18. Wadhawan S, Dasanayake AP, Kirk, K, Bronstein J, Li Y, Childers NK. Dental service utilization by adolescent Alabama Medicaid recipients. *J Dent Res* 79:552, 2000.
19. Davis RG. Status and prospects for Mediacid beneficiaries' access to dental services in Kansas. *Health Services Research* 34:5, 1999.
20. Cohen LA, Horowitz AM. Community-based sealant programs in the United States: results of a survey. *J Public Health Dentistry* 53(4):241-245, 1993.