Impact of Wisconsin Medicaid Policy Change on Dental Sealant Utilization

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Background. In September 2006, Wisconsin Medicaid changed its policy to allow nondentists to become certified Medicaid providers and to bill for sealants in public health settings.

Objective. This study examined changes in patterns of dental sealant utilization in first molars of Wisconsin Medicaid enrollees associated with a policy change.

Data Source. The Electronic Data Systems of Medicaid Evaluation and Decision Support for Wisconsin from 2001 to 2009.

Study Design. Retrospective claims data analysis of Wisconsin Dental Medicaid for children aged 6-16 years.

Principal Findings. A total of 479,847 children followed up for 1,441,300 person-years with 64,546 visits were analyzed. The rate of visits for sealants by dentists increased significantly from 3 percent per year prepolicy to 11 percent per year postpolicy, and that of nondentists increased from 18 percent per year to 20 percent after the policy change, but this was not significant. Non-Hispanic blacks had the lowest visit rates for sealant application by dentists and nondentists pre- and postpolicy periods.

Conclusions. The Wisconsin Medicaid policy change was associated with increased rates of visits for dental sealant placement by dentists. The rate of visits with sealant placements by nondentists increased at the same rate pre- and postpolicy change.

Key Words. Medicaid-enrolled children, access to care, dental sealant, policy change

In the last several decades, many Americans have benefited from improved oral health. However, children from racial/ethnic minority groups, poor families, and those with special health care needs still experience a higher burden of dental caries and undergo needless pain, suffering, social stigma, and loss of school time and self-esteem (Edelstein 1998; Vargas, Crall, and Schneider 1998; Newacheck, McManus, and Fox 2000a; Newacheck et al. 2000b; United States Department of Health and Human Services 2000). A common challenge facing these population groups is inadequate access to and utilization of

preventive dental care (United States Department of Health and Human Services 2000). Nationally, it is estimated that about 90 percent of all dental caries in schoolchildren occurs in pits and fissures (Kaste et al. 1996). A systematic review conducted by the independent, nongovernmental Task Force on Community Preventive Services documented strong evidence for the effectiveness of dental sealants—a thin plastic coating bonded into deep grooves, as well as pit and fissure surfaces of premolar and molar teeth to prevent dental caries (tooth decay) and to reduce its incidence (Truman et al. 2002; Centers for Disease Control and Prevention [CDC] 2001). Dental sealants are efficacious and cost-effective in preventing dental caries, but they remain under-utilized in dental offices for enrolled children in Medicaid (Robison, Rozier, and Koch 1997).

The under-utilization of dental sealants as well as the need to minimize barriers to dental care access has led to the continued investigation of innovative programs and policies that could improve sealant utilization for high-risk children. In 2009, an expert work group sponsored by the Centers for Disease Control and Prevention (CDC) released updated recommendations and reviews of evidence on preventing dental caries through school-based sealant programs (Gooch et al. 2009). The workgroup concluded that dental sealants are effective and can be placed on sound tooth surfaces and noncavitated lesions even in cases where follow-up cannot be ensured (Gooch et al. 2009). A Pew Charitable Trusts report released in early 2015 indicated that about 37 states allow nondentists to place sealants in public health settings without prior examination by a dentist. However, in 25 of the 37 states, there is a requirement that the nondentist be certified as a public health hygienist or have a collaborative practice agreement in place with a dentist (The Pew Charitable Trusts 2015). The literature evidence supports the need to continue to explore how policies and programs improve utilization of dental sealants for children at high risk for dental caries.

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Effective September 1, 2006, Wisconsin's Medicaid changed its policy to allow nondentists with at least 2 years or 3,200 hours of active practice to become Medicaid certified providers for dental sealant placement in public health settings (e.g., school-based dental programs) (Wisconsin Medicaid and Badgercare Update 2006). However, it was unclear whether this particular policy change resulted in an appreciable increase in access and utilization of dental sealants for Medicaid-enrolled children in Wisconsin. The main goal of this study was to assess changes in patterns of dental sealant utilization in first molars of enrollees associated with the Wisconsin Medicaid policy change.

METHODS

Data for the study were extracted from the Wisconsin Medicaid Evaluation and Decision Support (MEDS) database for 2001 to 2009 managed by the Division of Public Health, Department of Health Services. All claims data related to sealant placement, provider type, and data defining periods of enrollment (either in a fee-for-service program or through a managed care organization) for the entire Wisconsin Medicaid population were obtained. Medicaid enrollment periods were available, along with exact commencement and cessation dates for each enrollee, so person-level lengths of enrollment were calculated with a precision of 1 day.

The study population consisted of child enrollees aged 6 to 16 years. Additional demographic information linked to each enrollee included sex, race/ethnicity (reported as non-Hispanic white, non-Hispanic black, Hispanic, American Indian/Alaskan Native, Asian, Other Race/Ethnicity, or not reported). Providers were classified as "dentist" or "nondentist" based on the reported provider type in the dental claim. Sealant application was identified using the D1351 code and was counted as a first molar sealant when reported with tooth number 3, 14, 19, or 30. A dental visit was considered to be a "first molar sealant visit" if at least one first molar sealant claim was reported.

Statistical Analysis

Enrollee characteristics were examined using descriptive statistics. The study period was separated into 1-month intervals, and for each interval, we computed the number of first molar dental sealant visits overall and by provider type, as well as the number of person-years of enrollment overall and by age, sex, and racial/ethnic group. Over-dispersed Poisson regression with the

number of visits as the outcome and log-transformed person-years of eligibility as an offset term was the primary analysis tool. This approach allows modeling of event rates with a more appropriate variance structure with the number of visits as the outcome and log-transformed person-years of enrollment as an offset term.

First, we identified break points in the overall rates of visits using segmented regression (Muggeo 2003). Using these break points, a full model relating the rate of visits to provider type, patient age, sex, and race-ethnicity with piecewise linear calendar type effect was fitted to monthly visit counts. Interactions of provider type with all other covariates were included to examine the variability of the impact of nondentists among various patient subgroups. The number of first molar sealants per visit was defined among visits with at least one first molar sealant applied. Overdispersed Poisson regression was used to model this outcome using a piecewise linear calendar time effect with the same break points as above, and the log-transformed number of first molar sealant visits as offset.

RESULTS

Table 1 displays the demographic characteristics of the study population receiving dental sealants during the study period. A total of 479,847 unique children enrolled for 1,441,300 person-years with 64,546 visits were included in the analysis. Age distribution was approximately uniform from ages 6 to 15, with slightly younger female children representing 51 percent of all person-years, and non-Hispanic whites 47 percent. There were some differences in the population composition before and after the policy change by age, gender, and race/ethnicity. After the policy change, there were more non-Hispanic white (45 percent person-year vs. 50 percent person-year) and Hispanic (9.4 percent person-year vs. 13 percent person-year) enrollees, but fewer non-Hispanic black (28 percent person-year vs. 23 percent person-year) enrollees.

The relationship between visits with dental sealants on first molars per 100 person-years for dentists and nondentists by year is displayed in Figure 1. The visit rates for dental sealant placements by nondentists and dentists increased over time. The increase in rate of visits with dental sealants for first molars for dentists was most pronounced after the policy change and lowest from 2004 to 2007 when an essentially flat slope was observed. For nondentists, there was a steady increase throughout the study period.

Table 1: Characteristics of Wisconsin Medicaid Enrollees before and after Policy Change Based on Person-Years of Enrollment from 2001 to 2009

Predictor	Person-Years (PY)	Person-Year	Before Policy Change		After Policy Change		p-Value
			Enrollees in PY	Enrollees in % PY	Enrollees in PY	Enrollees in % PY	
N = 479,847 enrollees with 1,441,300 person-years of enrollment and 64,546 visits							
Age (years)							
6	165,426	11%	92,869	11%	72,558	12%	<.0001
7	156,718	11%	87,602	11%	69,117	11%	
8	151,497	11%	85,382	10%	66,115	11%	
9	146,771	10%	83,954	10%	62,817	10%	
10	142,745	9.9%	83,220	10%	59,525	9.8%	
11	139,463	9.7%	82,744	9.9%	56,719	9.3%	
12	136,371	9.5%	81,520	9.8%	54,851	9.0%	
13	133,586	9.3%	79,313	9.5%	54,273	8.9%	
14	130,688	9.1%	76,620	9.2%	54,068	8.9%	
15	127,528	8.8%	73,421	8.8%	54,107	8.9%	
16	10,506	0.7%	5,992	0.7%	4,514	0.7%	
Gender							
Female	709,221	49%	407,646	49%	301,575	50%	
Male	732,079	51%	424,991	51%	307,088	50%	
Race/Ethnicity							
Non-Hispanic white	682,615	47%	377,767	45%	304,849	50%	
Non-Hispanic black	370,640	26%	230,769	28%	139,872	23%	
Hispanic	155,244	11%	78,160	9.4%	77,084	13%	
American Indian/Alaskan	121,573	8.4%	70,862	8.5%	50,711	8.3%	
Native, Asian (other)							
Unknown	111,228	7.7%	75,080	9.0%	36,148	5.9%	

Figure 1: Wisconsin Medicaid Enrollees: Visits with Dental Sealant Placed on First Molars (M1) by Dentists and Nondentists per 100 Person-Year [Color figure can be viewed at wileyonlinelibrary.com]

The overall rate of visits for dental sealants for both dentists and nondentists was 4.5 per 100 person-year of enrollment, and this increased at an average rate of 13 percent per year from 1.9 per 100 person-years (PY) of enrollment in 2001 to 6.8 per 100 person-years in 2009 (results not shown). For nondentists, it increased at an average rate of 20 percent per year, rising from <0.1 per 100 PY in 2001 to 0.6 per 100 PY in 2009. For dentists, the rate of visits for sealant placement increased at an average rate of 14 percent per year, rising from 1.9 per 100 PY in 2001 to 6.3 per 100 PY in 2009 (results not shown).

The rates of visits with enrollees receiving dental sealants on first molars are presented in Table 2. Overall, the rates of visits with dental sealant placement in first molars per 100 person-years increased after the policy change for all age groups, gender, and racial/ethnic groups. Nondentists' rates of visits with dental sealants increased from 0.14 before the policy change to 0.44 after policy change and dentists increased from 3.36 prepolicy to 5.38 after the policy change. For 6-, 7-, and 8-year-olds, the rates of visits with dental sealant placement by dentists in first molars per 100 person-years increased by 60, 51, and 41 percent, respectively, after the policy change. For nondentists, the rates of visits with dental sealant placement on first molars per 100 person-years

Table 2: Wisconsin Medicaid Enrollees: Rates of Visits with Dental Sealant Placed on First Molars Based on 100 Person-Years of Enrollment before and after Policy Change: 2001–2009

<i>Predictor</i>	<i>Before Policy Change</i>			<i>After Policy Change</i>		
	<i>Rate Per 100 PY</i>	<i>Dentists Rate Per 100 PY</i>	<i>Nondentists Rate Per 100 PY</i>	<i>Rate Per 100 PY</i>	<i>Dentists Rate Per 100 PY</i>	<i>Nondentists Rate Per 100 PY</i>
Total	3.50	3.36	0.14	5.82	5.38	0.44
Age (years)						
6	5.08	5.06	0.02	8.11	8.08	0.03
7	7.99	7.66	0.33	12.84	11.57	1.27
8	6.30	5.81	0.49	9.62	8.19	1.44
9	4.01	3.79	0.22	5.98	5.54	0.44
10	2.94	2.80	0.13	4.63	4.19	0.45
11	2.30	2.21	0.09	4.01	3.71	0.30
12	2.05	2.01	0.04	3.42	3.28	0.14
13	1.44	1.42	0.02	2.64	2.61	0.03
14	1.07	1.07	0.00	2.16	2.15	0.01
15	0.91	0.91	0.00	1.74	1.74	0.00
16	0.62	0.62	0.00	1.62	1.62	0.00
Gender						
Female	3.58	3.43	0.14	5.84	5.40	0.43
Male	3.43	3.30	0.13	5.80	5.36	0.44
Race/ethnicity						
Hispanic	2.72	2.58	0.14	5.26	4.76	0.50
Non-Hispanic black	1.37	1.26	0.10	2.14	1.91	0.24
Non-Hispanic white	5.02	4.86	0.15	7.37	6.88	0.49
Other	4.17	3.94	0.23	7.53	6.88	0.65
Unknown	2.61	2.54	0.08	5.74	5.39	0.35

Note: Other: American Indian, Alaska Native, Asian.

increased by 50,285, and 194 percent, respectively. In terms of race/ethnicity, non-Hispanic whites and Hispanics had the highest rates of visits with dental sealant placement on first molars by nondentists and dentists. Pre- and post-policy, non-Hispanic blacks had the lowest visit rates increase for sealant placements by both dentists and nondentists.

The segmented regression analysis of the overall visit rates identified two break points at 2004.0 (SE 0.08) and 2007.0 (SE 0.17). Since the policy change was introduced on September 1, 2006, the second break point was moved to that date to increase interpretability. The results of the multivariable Poisson regression on the relative risks of enrollees visit with first molars

dental sealant segmented into three periods are presented in Table 3. The analysis results are substantively the same if the originally identified break point is used (results not shown).

Compared to 6-year-olds, the relative rate of dental sealant placements on first molars by dentists was more pronounced among 7- and 8-year-olds, while older ages had somewhat lower rates. In contrast, visits to nondentists were much more concentrated in the 7- to 12-year-olds. There was no significant difference between dentists and nondentists in

Table 3: Wisconsin Medicaid Enrollees: Multivariable Poisson Regression of Rate of Visits with First Molar Sealants Divided into Three Study Time Periods: Before 1/1/2004 (P1), Between 1/1/2004 and 9/1/2006 (P2), and After 9/1/2006 (P3)

<i>At Policy Change Comparison</i>	<i>Among Dentists</i>		<i>Nondentists versus Dentists</i>	
	<i>RR (95% CI)</i>	<i>p-Value</i>	<i>RR (95% CI)</i>	<i>p-Value</i>
Rate per 100 PY	8.51 (8.28, 8.74)		0.0031 (0.0022, 0.0043)	<.0001
Age (years)				
7 versus 6	1.47 (1.44, 1.51)	<.0001	23.89 (17.05, 33.47)	<.0001
8 versus 6	1.08 (1.05, 1.11)	<.0001	40.15 (28.67, 56.21)	<.0001
9 versus 6	0.72 (0.70, 0.74)	<.0001	21.08 (14.93, 29.76)	<.0001
10 versus 6	0.54 (0.52, 0.56)	<.0001	24.03 (16.96, 34.03)	<.0001
11 versus 6	0.45 (0.44, 0.47)	<.0001	18.99 (13.29, 27.12)	<.0001
12 versus 6	0.41 (0.39, 0.42)	<.0001	10.04 (6.85, 14.71)	<.0001
13 versus 6	0.31 (0.29, 0.32)	<.0001	3.40 (2.07, 5.61)	<.0001
14 versus 6	0.24 (0.23, 0.25)	<.0001	1.09 (0.48, 2.45)	0.8388
15 versus 6	0.20 (0.19, 0.21)	<.0001	0.19 (0.03, 1.39)	0.1013
16 versus 6	0.17 (0.14, 0.20)	<.0001	0.00 (0.00)	0.9968
Gender				
Female versus male	1.04 (1.02, 1.06)	<.0001	0.98 (0.92, 1.04)	0.5158
Race/ethnicity				
Hispanic versus non-Hispanic white	0.56 (0.55, 0.58)	<.0001	1.57 (1.41, 1.73)	<.0001
Non-Hispanic black versus non-Hispanic white	0.28 (0.27, 0.29)	<.0001	2.09 (1.90, 2.31)	<.0001
Other versus non-Hispanic white	0.93 (0.91, 0.96)	<.0001	1.55 (1.40, 1.72)	<.0001
Unknown versus non-Hispanic white	0.71 (0.69, 0.73)	<.0001	1.06 (0.91, 1.24)	0.4289
Yearly trends during different periods				
Period 1 (1 year)	1.32 (1.29, 1.36)	<.0001	12.67 (7.80, 20.58)	<.0001
Period 2 (1 year)	1.03 (1.02, 1.04)	<.0001	1.15 (1.08, 1.21)	<.0001
Period 3 (1 year)	1.11 (1.10, 1.12)	<.0001	1.08 (1.05, 1.12)	<.0001

Note: RR, relative risk.

the relative rates of dental sealant for first molars for enrollees by gender. Nondentists had a significantly higher relative rate of dental sealants for first molars for Hispanics and blacks compared to whites. Nondentists had a much higher rate of increase of dental sealants for first molars in period 1 (RR: 12.67 95 percent CI: 7.80, 20.58), but in periods 2 and 3, their rate of increase was slightly higher than for dentists.

The increase among nondentists in Period 1 was 16-fold per year and in Period 3 was 1.20-fold per year (Appendix S2a). The increases among dentists and nondentists were statistically significant in Period 2 versus Period 1. Dentists had the highest increase in relative rate of dental sealants placement on first molars in P2 versus P1 and in P3 versus P2 among nondentists and dentists (Appendix S2a). In addition, the rate of visits for sealants placed by dentists increased significantly from (RR: 1.03 period 2) 3 percent per year prepolicy to (RR: 1.11 period 3) 11 percent per year postpolicy, and that of nondentists increased from 18 percent per year to 20 percent after the policy change, but this was not significant (Table 3 and Appendix S2a). Furthermore, we examined the number of first molar sealants applied at each visit. Appendix S2b displays the results of a multivariable Poisson model of the rate of sealants per visit. Dentists placed an average of 2.8 dental sealants per visit, and this value was stable over the periods. Nondentists provided more dental sealants per visit for first molars, and while this was not statistically significant in periods 2 and 3, it was in period 1.

DISCUSSION

This study presents changes in patterns of dental sealant utilization in first molars of enrolled children associated with a Wisconsin Medicaid policy change. The policy change allowed nondentists to place dental sealants in public health settings and to directly bill for them. Notwithstanding, it is important to note that most of the sealants placed and billed for in dental offices prior to the policy change were placed by nondentists. Therefore, our findings on changes in the rates of visits for sealants in relation to the policy change relates more broadly to the location of service and the understanding that nondentists can now bill directly for the services after the policy change.

In this study, the rate of visits by children with first molars who received sealants from dentists and nondentists increased after the policy change. This finding demonstrates how a system-level factor influenced professional

behavior and improved access and utilization of dental sealants for children enrolled in Medicaid. Although the policy change was directed at nondentists, the results clearly show some indirect influence on dentists who were not the target of the policy change, as the number of sealant placements by dentists also increased. Our finding clearly aligns with the recommendation of the Community Preventive Services Task Force to increase the number of school-aged children (5–16 years of age) who receive dental sealants at schools (Guide to Community Preventive Services 2016).

More broadly, the policy change provided an opportunity to ascertain and determine the magnitude and direction of dental sealant utilization for children enrolled in the Medicaid program during the study period. Interestingly, we found that there were increased rates of sealant placement on first molars and in the number of sealants provided per visit by dentists following the policy change. Therefore, the change did not solely impact nondentists but had a far reaching impact on dentists, indicating a potential need to implement it throughout the 50 states and the District of Columbia. In addition, the increase in sealant placements is a laudable outcome of a policy of this nature and could stimulate some discussion and possible action regarding the suboptimal use of sealants nationally.

Another important finding is that the largest increases in rates of visit with first molar sealants provided by dentists were among 7-year-old enrollees and by nondentists, among 8-year-olds. The fact that these age groups were observed to have the largest increases for sealant placement by dentists and nondentists is interesting and worth exploring further, given the existence of school-based programs in various states. Most school-based sealant programs are targeted at third-grade children, and the observed increase among 8-year-olds seen by nondentists is consistent with this. Although the overall increase in sealant placement pre- and postpolicy was not statistically significant, the age that is most likely to be targeted by nondentists in public health settings appears to have benefitted from the policy change. The smallest increase was observed among 12-year-old enrollees within the examined age group of 6- to 16-year-olds. This finding is not surprising given that they are mostly not a target group for sealant placement by dentists and nondentists. However, the policy change improved access to a known preventive dental treatment for children from low-income families who are known to be at high risk for caries. According to Galeucia and Hirsch, prevention efforts are maximized by the effective development of structural approaches which facilitate access to health care and promote engagement of evidence-based care (Galeucia and Hirsch 2016).

Compared to non-Hispanic whites, Hispanics and blacks had higher relative rates of receiving dental sealants from nondentists in this study. This is an indication that racial/ethnic minority enrollees benefitted highly from the policy change. It therefore suggests that policy changes of this nature have the potential to promote the delivery of sealants to low-income children and could be instrumental in reducing oral health disparities. In addition, a policy of this nature could help many states improve upon the failing grade received by them on the Pew Charitable Trusts report of 2015 and enhance their chances of meeting national goals for sealant utilization in children. Despite the lack of change in Medicaid reimbursement and in the number of certified dental providers pre- and postpolicy, the increased rates of sealant placement seen among dentists and nondentists demonstrate some public health impact of the policy. In addition, it is important to note that the number of certified nondentists who could have taken advantage of this policy is relatively small compared to the overall number of certified dental providers in the state.

Limitations

Certain study limitations should be noted. First, our analysis was restricted to a system-level factor with no measure on the availability of providers, which could affect the success or failure of the policy change. However, the number of dental providers in the state that accept Medicaid patients did not change much pre- and postpolicy change. In addition, there was no change in the State Medicaid reimbursement for sealant placements for all types of providers (pre- and postpolicy change) that could have influenced increased placements of sealants by dentists.

It is important to mention that our group observed a similar response pattern from dentists in the area of fluoride varnish application following a policy change in Wisconsin that allowed nondentists the opportunity to apply and bill for fluoride varnish treatments (Okunseri, Szabo, and Jackson 2009).

Secondly, the relationship between policy change and rates of visits with first molar sealants could have also been influenced by certain political processes and some advocacy to raise awareness among dentists on the need to increase sealant placement in their offices before the actual policy change was implemented. This could have accounted for some of the increases in the number of sealant placements by dentists. Additionally, the utilization of sealants represents a surrogate outcome for the incidence of dental caries. Thirdly, our study design accounts for differences within the state and lacks control from some other state Medicaid with consistent

policies on dental sealant placements over the same study time period. In addition, despite the nondentist providers having a larger effect on racial/ethnic minority children, we cannot tell if the populations at highest risk were impacted by this policy change given that they were least likely to have access to a dentist. Finally, we cannot rule out the potential of another un-measured confounder contributing to changes in the utilization of dental sealants by dentists and nondentists.

A major strength of this study is the generalizability of our findings from Wisconsin to other states with similar enrollee populations and a Medicaid system. This study provides some insights as to how to address the question of the extent of the impact of a policy. In addition, it expands the literature on the influence of policy and how it can mitigate the adverse effects of structural inequalities without requiring a wholesale transformation of systems. A key finding from these analyses is that the policy's intent—to have more nondentists provide sealants—does not appear to have had much of an effect. However, the overall use of dental sealants increased postpolicy, so it could be argued that the policy worked after all—at least in an indirect and perhaps unintended, way, by getting more dentists to provide more sealants as well. We acknowledge that there are more issues regarding this policy change that are outside the scope of this manuscript which could be of interest for future research. However, policy makers could continue to explore options aimed directly at nondentists to improve sealant utilization. This could include creating incentives to recruit new providers and improving upon methods of disseminating information and implementing new policies.

CONCLUSION

The Wisconsin Medicaid policy change was associated with increased rates of dental sealant placement by dentists. The rate of visits with sealant placements by nondentists increased at the same rate pre- and postpolicy change.

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SUPPORTING INFORMATION

Additional supporting information may be found in the online version of this article:

Appendix S1: Author Matrix.

Appendix S2: Wisconsin Medicaid Enrollees. (a) Comparisons Based on the Model Showing the Relative Rates per Year for Sealant Placement by Dentists and Nondentists. (b) Results of a Multivariable Poisson Regression of Rate of Sealants Applied at Each Visit on First Molars.