

## **I. Introduction**

### Nature of the research problem

Over the past half century, the majority of Americans (including children) have benefited from improved oral health.<sup>1</sup> However, children from poor families, racial/ethnic minorities and those with special health care needs still experience needless pain, suffering, social stigma, loss of school time, and self-esteem,<sup>1-4</sup> due to a common dental disease. This disease, commonly referred to as tooth decay, dental caries or cavities (which result from the disease) is a chronic, infectious, and transmissible disease.<sup>5</sup> Dental caries is preventable with early preventive measures (such as fluoride varnish application), sustainable home care, and appropriate periodic dental visits. Despite this information, dental caries remain the single most common disease of childhood,<sup>6</sup> and the most prevalent unmet treatment need.<sup>7</sup> The Medicaid program is the largest source of public funding for medical and dental services in the United States covering approximately 25 million children (more than one in four) in 2001.<sup>8,9</sup> One in three children in rural America relies on Medicaid for coverage.<sup>10</sup> Medicaid provides comprehensive dental care as part of the Early and Periodic Screening, Diagnostic and Treatment (EPSDT) program for children as a mandatory requirement for all states by the federal government. Despite the goal of early prevention, only one child of every five enrolled in Medicaid receives dental services.<sup>11</sup> The lack of adequate access and appropriate dental care for children enrolled in Medicaid has led to an alarming increase in oral health disparities for this population. Under these circumstances, there is a definite need to pursue alternative ways to deliver preventive dental care services to public program patients and to prove the services' short and long-term sustainability and effectiveness.

Recent data from the National Health and Nutrition Examination Survey (NHANES) indicates that:

- ◆ In children aged 2-11 years, the prevalence of dental caries in primary teeth increased by approximately 2% (40% to 42%) between 1988-1994 and 1999-2004;
- ◆ In children aged 2-4 years, the prevalence of dental caries in primary teeth has increased from approximately 18% to 24% between 1988-1994 and 1999-2004 (**Healthy People objective 21-1a**);
- ◆ Approximately 20% to 25% of US children—mostly the poor, racial/ethnic minority, and children with special health care needs (about 22 million children)—experience 80% of decayed teeth; and
- ◆ Children from low-income families and racial and ethnic minorities have higher levels of untreated Early Childhood Caries (ECC).

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Early Childhood Caries (ECC), a virulent form of caries is defined as “the presence of one or more decayed (noncavitated or cavitated lesions), missing (due to caries), or filled tooth surfaces”<sup>12</sup> in any primary tooth in a child 71 months of age or younger.<sup>13,14</sup> ECC begins soon after the eruption of the primary teeth starting at six months of age.<sup>2</sup> The prevalence of ECC varies from 5% to 72%, depending on diagnostic criteria, age, and race/ethnicity.<sup>14</sup> It has also been reported that 19% of children aged two to five have at least one primary tooth with untreated caries.<sup>2</sup> The signs and symptoms of ECC include teeth discoloration, severe pain, infection, abscesses, chewing difficulties, malnutrition, and gastrointestinal disorders.<sup>15</sup> ECC is associated with future caries in the permanent dentition.<sup>1</sup> ECC is a major public health problem and has a lasting detrimental impact on children’s dentition. Americans infected with dental caries missed more than 164 million hours of work and 51 million hours of school from the disease.<sup>1</sup> The majority of those hours were lost by low-income households and others who could least afford it.<sup>1</sup>

Data from the *Make Your Smile Count Survey*, conducted by the Wisconsin Department of Health and Family Services (DHFS) in 2001-02, indicated that 30.8% of third-grade children screened were found to have untreated decay in at least one primary or permanent tooth.<sup>16</sup> Of these children, 4% were determined to have urgent treatment needs.<sup>17</sup> It was also found that 44.5% of the children from low income schools, schools having a free and reduced lunch rate of greater than 40%, had untreated tooth decay compared to only 16.6% at high income schools.<sup>16</sup> The need for urgent dental care was 8.4% in low income schools versus 1.5% in high income schools.<sup>16</sup> Within the regions of Wisconsin, 36% of children in the southeastern region (the most urban area) had untreated decay compared to only 19.1% in the southern region and 15.2% in the western region (more rural regions).<sup>16</sup> Additionally, among the children screened for caries, 64% of American Indians, 50% of African-Americans, 47% of Hispanic/Latinos, 45% of Asians, and 26% of white children had untreated caries.<sup>16</sup>

Topical fluoride varnish is a highly concentrated (2600ppm [2.26%] as sodium fluoride) fluoride product applied to children’s teeth for caries prevention.<sup>17</sup> This product has been shown to be an effective way to minimize development of dental caries and to remineralize carious lesions. It has been widely used for this purpose in Europe, Canada and other parts of the world for over 40 years. In a meta-analysis study fluoride varnish application led to 38% overall reduction in permanent dentition caries compared to patients in the control group.<sup>18</sup> Another study indicated that fluoride varnish application is also effective in conjunction with caregiver counseling in reducing early childhood caries incidence.<sup>19</sup> In addition to its impact on caries prevention, fluoride varnish is an attractive product because of its ease of application, the speed with which the product dries (immediately upon contact with saliva), low cost, application time of less than 5 minutes, and the ability to be applied without special dental equipment. The current dental care system faces significant challenges in dealing with ECC, particularly in the most vulnerable children, due to relatively small numbers of pediatric dentists, reluctance of many general dentists to treat very young children (especially those covered by Medicaid), declining dentist-to-population ratios, and a relatively meager public health or ‘safety net’ infrastructure.

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To address these barriers to preventive dental services for children and subsequent oral health disparities, changes in the dental workforce and the involvement of non-dental providers have been widely advocated by oral health stakeholders. Some of the reasons given for the involvement of non-dental providers include:

- ◆ A physician's office is considered an opportune site to reach a large number of children that make a medical visit, but do not see a dentist;<sup>20-25</sup>
- ◆ "Physicians have a relatively high participation rate in Medicaid (>65% for pediatricians, *AAP News 2000*), which could offer a substantial advantage"<sup>26</sup> with the MCH population; There is a reduction or elimination of many of the costs associated with providing this service at a dental office;
- ◆ Non-dental provider clinics are open for longer hours than regular dental offices;
- ◆ With non-dental providers applying fluoride varnish, the burden on dentists is reduced, especially with reports indicating that there is a decline in dentist to patient ratios and a maldistribution of dentists to the populations that need their services the most;
- ◆ Most infants and children see their pediatricians and family physicians for early preventive procedures such as immunization and for other health care checks;
- ◆ Physicians and their auxiliaries can assess risks for dental problems and counsel parents and their children about the prevention of these problems;<sup>27</sup>
- ◆ Seventy-four percent of pediatricians who responded to a national survey indicated that they would accept reimbursement to have fluoride varnish applied to children's teeth in their practices.<sup>27</sup>

In addition, other attempts to address the lack of access to oral health care for Maternal Child Health populations and children enrolled in the Medicaid program in private dental practice settings have been for the most part, unsuccessful. The reasons for these failures include: low reimbursement,<sup>28</sup> high no-show rate among publicly insured patients, administrative burden, and insufficient numbers of dentists willing to accept Medicaid patients.<sup>29, 30</sup> With this information, efforts were made to allow pediatricians and other primary health care providers to become sources of preventive oral health education and care for these very young children and others who are unable to gain access to a regular source of dental care.<sup>17</sup> This opportunity is a major source for children to get preventive health services like fluoride varnish application. To effectively do this, eight state Medicaid programs (including Wisconsin) made a service provision change to start reimbursing non-dental health providers who bill for and apply fluoride varnish, a caries preventive agent, to eligible children's teeth.

In 2004, the State of Wisconsin introduced a change to its Medicaid Policy allowing medical care providers to be reimbursed for fluoride varnish treatment. This allowed pediatricians and other primary health care providers to become sources of fluoride varnish treatment, risk assessment, preventive oral health education and care for young children and others who are unable to readily gain access to dental care. The Medicaid Policy change states as follows: *Wisconsin Medicaid and BadgerCare "Effective for dates of services on and after February 26, 2004, Wisconsin Medicaid will reimburse providers for topical applications of fluoride. These applications can be provided by*

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*nurses and dental hygienists employed at certified HealthCheck nursing agencies, physicians, physician assistants, and nurse practitioners.”*

### **B. Purpose, Scope and methods of the investigation**

The overall goal of this project was to examine the impact of Wisconsin's Medicaid policy change related to the authorization of non-dentists to apply and bill for fluoride varnish application to children's teeth. Prior to the implementation of the policy change, employees of the Wisconsin Department of Health and Family Services, Division of Public Health conducted a series of training sessions for physicians, physician assistants, pediatricians and nurse practitioners regarding the need and proper application techniques for fluoride varnish treatment to young children's teeth. However, to date, there has not been any assessment of whether this policy change and additional training has led to an improvement in access to fluoride varnish treatment for Medicaid enrolled children. Despite the lack of evidence indicating whether the involvement of medical care providers has been effective in improving access to fluoride varnish treatment, presently about twenty-seven other states in America have adopted similar policies. The primary purpose of the present study was to evaluate whether the inclusion of medical care providers has led to an increase in the rate of fluoride varnish treatment claims for Medicaid enrolled children in Wisconsin.

This secondary data analysis is critical to the long-term continuation and promotion of this policy change in Wisconsin, as well as to other states that have yet to adopt or implement similar legislation to improve access to fluoride varnish treatment for the Maternal and Child Health (MCH) population.

Our findings will provide crucial policy-driven data that will inform the decision as to whether or not to expand the settings for which fluoride varnish treatment is applied to children's teeth by non-dental providers.

### **A. Nature of the findings**

A state-level Medicaid policy change was followed by both a significant involvement of medical care providers and an overall increase in fluoride varnish treatment. Children between the ages of 1 and 2 years appear to benefit the most from the involvement of MCP. There was an increase in the level of fluoride varnish treatment among all children examined, with Native American children experiencing the highest level of increase, while African American children had the lowest level of increase.

## **II. Review of the Literature**

Research has shown that untreated dental caries cause many children to experience needless pain, and to suffer from social stigma, lower self-esteem and loss of school time.<sup>5,6</sup> In addition, the burden of dental caries is disproportionately shouldered by poor and racial/ethnic minority children, as well as those with special health care needs.<sup>6</sup> Most of these children rely on public programs, such as Medicaid, to pay for medical and dental care services. Under Medicaid, the Early, Periodic Screening, Diagnosis and Treatment program requires that basic dental services be covered for children,<sup>7</sup> including

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services aimed at caries prevention. However, inadequate access to these services has led to oral health disparities for Medicaid enrolled children.<sup>1</sup>

Currently, a number of explanations for inadequate access to dental care for the Medicaid enrolled population have been put forth in the literature. One reason is the geographic mal-distribution of dentists,<sup>8</sup> leading to severe shortages in communities where oral health care services are needed the most. Another reason is the severe shortage of minority dentists to serve this population, as one study has reported that minority dentists are more likely to accept new Medicaid patients.<sup>9</sup> In addition, Valdes *et al.*<sup>10</sup> pointed out that while parents of enrolled children are aware of the need for preventive dental procedures covered by Medicaid, their lack of usage may be driven by inappropriate pain management and a lack of cultural sensitivity amongst dentists.

From a public health perspective, it is important to provide adequate access to measures aimed at primary prevention of caries because of their self-compounding effects. As discussed by Vargas *et al.*<sup>2</sup> and Vargas and Ronzio,<sup>31</sup> dental caries produce a self-sustaining spiral of unmet needs whereby untreated caries become more severe and difficult to treat, thereby increasing treatment costs and reducing the availability of clinicians able to perform more complicated treatments. Therefore, a reduction in the prevalence of caries for high risk populations requires the early availability of services designed to stop the initiation of this cycle. One such measure, fluoride varnish treatment, has been advocated by the American Dental Association for high-risk children as young as 6 months old, where the definition of high-risk includes children from low-socioeconomic backgrounds.<sup>32</sup>

However, many of these high-risk children are unable to receive care from a dentist, due in part to low number of dentists who are Medicaid providers in most states. The need for alternative delivery mechanisms for preventive dental services to public program patients in a sustainable and effective manner led to the involvement of medical care providers such as physicians and nurses in fluoride varnish application for Medicaid-enrolled children. This study is the first in the country to evaluate any aspect of the impact of this Medicaid policy change and to assess whether this policy change and additional training have led to improved access to fluoride varnish treatment for Medicaid enrolled children.

### **III. Study Design and Methods**

#### **A. Data Sources**

The study used data from the Electronic Data Systems of Medicaid Evaluation and Decision Support database for Wisconsin from 2002-2006. This database, managed by the Division of Health Care Financing in the Wisconsin Department of Health and Family Services, contains all Medicaid claims for the state of Wisconsin. The data extracted for this study consisted of two primary components: claim level data for fluoride varnish applications and enrollment data that defined the Medicaid enrolled population in Wisconsin. The Medicaid enrolled population consisted of children between the ages of 6 months to 6 years with at least one month eligibility between January 1, 2002 and December 31, 2006. The claims data consisted of fee for service claims and managed care encounter information for those children receiving fluoride

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varnish treatment (as indicated by procedure code D1203). The claim level data was merged with the eligibility data by patient identification number. Unknown race/ethnicity was treated as a separate category (2,189 records, 6.7%). The provider type was unknown for 112 records (0.3%); these were excluded in any calculations involving provider type. Because an individual's enrollment status can change within the course of a year, enrollment data was used to normalize the rate of claims for fluoride varnish applications relative to the number of person-years of enrollment. For example, a child enrolled for an entire year contributes one person-year of enrollment.

### **B. Sample Size calculation**

The project is a retrospective analysis of all Wisconsin Medicaid dental claims for fluoride varnish application submitted for 2002-2006. Based on caseloads reported by Medicaid, a total of 400,000-500,000 (depending on year) Wisconsin residents were enrolled in programs for which children aged 1-5 are eligible (mostly AFDC, Badger Care or Healthy Start). Approximately 6% of the general Wisconsin population falls into the 1-5 age group, however since these programs are for women/families with dependent children, we expect that a much larger proportion of Medicaid recipients will be young children. Thus we expected at least 40,000 children aged one to five to be eligible for this study every year. With this sample size, estimates of proportions will have a standard error not exceeding 0.25%. We can estimate proportions with standard errors not exceeding 1% for subgroups as small as 2,500. Depending on the specific comparisons, we have adequate power to detect changes as small as 1 percentage point (which is too small for practical significance), thus we expect that the study has adequate sample size and contains enough statistical power to detect the differences proposed in the research study.

**C. Population studied:** Wisconsin Medicaid children enrollees between the ages of 6 months to 6 years

**D. Sample Selection:** See section IIIA, above

**E. Instruments used:** Not Applicable

**F. Statistical Techniques Employed**

### **Demographic Variables**

Demographic variables obtained from the MEDS database included: the race/ethnicity and age of each Medicaid enrolled child. Race/ethnicity was self-designated under the following categories: White, African-American, Hispanic, Asian/Pacific Islander, Native American, Multiracial, and Unknown. In all analyses, unknown race/ethnicity was treated as a separate category (2,189 records, 6.7%), rather than as missing. Age groups were defined as: 1-<2 years, 2-<3 years, 3-<4 years, 4-<5 years, and 5-<6 years.

### **County-Level Information**

County of residence at the time of the claim was used to define two county-level variables: DHPSA designation, and Urban Influence Code (UIC). DHPSA designation

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was developed by the federal government to address communities with high unmet dental needs and services.<sup>33,34</sup> In this study, we used the classification followed in a recent oral health report by the Wisconsin Department of Health Services (formerly the Wisconsin Department of Health and Family Services).<sup>35</sup> Under this classification scheme, a county is considered an entire DHPSA when it meets the criteria established by the Bureau of Health Professionals, which are “that the area should be a rational area for the delivery of dental services; the population to full-time dentist ratio should be less than 5,000:1 but greater than 4,000:1 and has unusually high needs for dental services or insufficient capacity of existing dental providers; or dental professionals in the contiguous area are over utilized, or excessively distant, or inaccessible to the population of the area under consideration.”<sup>33,34</sup> For the 72 counties in Wisconsin, 29 were classified as none DHPSA, 9 as partial DHPSA, and 34 were designated as entire DHPSA.

The 2003 UIC, published by the US Department of Agriculture, were used as a measure of the rurality of the county of residence for each enrollee.<sup>36</sup> The UICs use population and commuting data from the 2000 Census to classify the 3,141 US counties and county equivalents into 12 groups. For the purposes of this study, we only used the three major classification levels: metropolitan, micropolitan, and non-core/rural. Based on this classification, 25 counties were designated as metropolitan, 13 as micropolitan, and 34 as non-core/rural.

Descriptive statistics (means, medians, sample proportions) were computed to examine the distribution of study variables within the Wisconsin Medicaid population. The primary statistical analysis consisted of comparing the overall rate of fluoride varnish claims before and after the policy change in 2004. The rate was computed as the number of claims relative to the number of person-months (person-years) of Medicaid eligibility within each study period. We have taken a statistical modeling approach where comparisons were made via a Poisson Generalized Linear Model (GLM) using Generalized Estimating Equations (GEE) where appropriate. This approach has been used in other studies<sup>37</sup> to assess the impact of a policy change on utilization within a Medicaid population. The use of GEE allows the statistical model to incorporate the inherent correlation between claims made by the same individual for multiple fluoride varnish applications. The GLM framework also allows an assessment of the effect of the policy change adjusted for relevant characteristics. These could include person-level covariates (race/ethnicity, sex, etc.), county-level (UIC and DHPSA designation), and provider-level for non-dental providers (provider type, clinic type, etc.). In addition, the GLM approach also facilitates an assessment of interactions amongst the various covariates. Model selection was guided by the Bayesian Information Criterion.<sup>37</sup>

## **IV. Detailed Findings**

Overall, we found a significant increase in the rate of FVT claims for Medicaid enrolled children. This result was particularly positive on two fronts. First, there was a significant involvement of medical care providers, as they accounted for slightly over 40% of the FVT claims submitted after 2004. This would appear to indicate the willingness of medical care providers to support the prevention of dental caries in children. Possible reasons for this participation of medical care providers in the provision of FVT include its ease of application, patient acceptance, and a reduced risk for toxicity. Secondly, we also

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observed a corresponding increase in the rate of FVT claims submitted by dentists. This was in spite of the fact that the size of Medicaid enrolled population in Wisconsin continued to grow over the study period. This result is particularly promising given reports indicating that there is a decline in the dentist-to-patient ratio and a mal-distribution of dentists, especially in communities where their services are needed the most.

The rate of fluoride varnish treatment provided by dentists to children aged 3 to 6 years substantially increased following the policy change. Children ages 6 months to 3 years appeared to benefit the most from the involvement of medical care providers in the application of fluoride varnish treatment. We found that medical care providers were responsible for over three-quarters of the increase in fluoride varnish treatment for children in this age range. This finding is not surprising given that children within the ages of 6 months to 3 years usually see their pediatrician and family physicians for early preventive procedures such as immunizations and other health care checks. This finding also supports a recent study that reports that 74% of pediatricians who responded to a national survey would be willing to accept reimbursement for applying fluoride varnish treatment to children's teeth in their practices.<sup>20</sup>

In the multivariable and stratified analyses, African-Americans generally had the lowest rate of FVT claims, especially for younger children under the age of 3. While the rate of FVT claims for African-Americans were somewhat higher (relative to the other racial/ethnic groups) for those living in micropolitan counties, it is important to note that the vast majority of African-Americans enrolled in Medicaid reside in metropolitan counties (98.7% of person year of enrollment). Decreased utilization of fluoride varnish treatment for African-Americans could be related to findings that African-Americans are less likely to have a usual source of care, thus making them more likely to make emergency room visits for dental conditions. Future policy changes should thus be tailored to specifically address the short coming of this particular policy by targeting African-American children, along with other Medicaid enrollees residing in urban areas.

Prior to the policy change, Asians [Rate Ratio (RR):0.46; 95% CI 0.32, 0.65] and the unknown group [Rate Ratio (RR):0.63; 95% CI 0.51, 0.70] were the racial/ethnic group with a rate of FVT claims significantly lower from that of whites. However, after the policy change, Asians, Hispanics, and Native Americans all displayed rates that were approximately 2 fold higher than whites. Compared to metropolitan counties, residents of micropolitan counties had higher rates of FVT, while those in rural counties had lower rates of FVT in the pre-policy period. After the policy change, the rate of FVT claims was approximately 10-fold higher for residents of micropolitan and rural counties. While the adjusted rate of FVT claims for enrollees living in entire DHPSA counties was the lowest pre-policy, residents of these counties actually displayed the highest adjusted rate following the policy change [RR: 10.65; 95% CI 5.49, 20.60] compared to none DHPSA.

### **A. Initial findings**

A substantial increase in the rate of fluoride varnish treatment claims was observed following state policy change. Children under 2 years benefitted the most from

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involvement of medical care providers, while children over 3 years benefitted from an increased provision by dental providers. Native American children had the largest increase in FVT claims, and African-American children had the least increase in fluoride varnish treatment claims.

### **B. Subsequent findings**

The study supports the adoption of similar policies in states that are yet to allow medical care providers to be reimbursed for fluoride varnish treatment.

## **V. Discussion and Interpretation of Findings**

### **A. Conclusions to be drawn from findings (with reference to data supporting each).**

Although Native-American children constitute the lowest of percentage of the Medicaid enrolled children in Wisconsin, this population experienced the largest increase in its rate of FVT claims. This finding for Native-American children is particularly important given what we know about the dental disease burden in this minority population. Therefore, the involvement of medical care providers could be one way to address the observed oral health disparities amongst Native American populations. In contrast, African-American children displayed the lowest absolute rate of fluoride varnish treatment claims as well as the smallest change in rates following the policy change. One possible explanation for this phenomenon is that African-American children are also particularly susceptible to inadequate access to medical care. This would imply that promoting preventive oral health services amongst African-American children is invariably tied with the large task of improving their access to the health care system in general.

Despite the observed increase in the rate of fluoride varnish treatment, the absolute rates following the policy change still indicate a need to improve access to preventative oral health care for Medicaid enrolled children. Given that the American Dental Association advocates fluoride varnish treatment twice a year for high-risk children, which includes children from low socioeconomic backgrounds, the rates shown in Table 2 clearly show a deficit in the receipt of fluoride varnish treatment. As an example, even if we conservatively say that only 50% of Medicaid enrolled children in Wisconsin should be receiving FVT twice a year this implies that the rate per 100 person-years should be on the order of 100. However, the highest rate observed for any population subgroup was only 19.6 for Native-Americans. This suggests that 1) further monitoring should be done to examine whether the rates of fluoride varnish treatment continue to rise towards optimal levels and 2) the involvement of medical care providers will likely not be sufficient to meet the preventive oral health care needs of underserved populations. Continued effort should also be focused on alternative programs such as the education of social care workers and other medical care providers about the need for preventive oral health care and implementing a statewide school-based dental delivery program.

### **B. Explanation of Study limitations**

Certain potential study limitations should be noted. First, we examined only Wisconsin Medicaid enrollees; therefore it is possible that our findings do not generalize to other states. However, given that Wisconsin's Medicaid population consists of a

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racially/ethnically diverse population with both urban and rural poor, we believe our results should extend to other states. The second limitation is that Medicaid claims data can be subject to coding errors and inconsistently recorded provider information, leading to a potential study bias. Finally our inability to account for concurrent changes is an inherent weakness of the pre-post design used in our study.

### **C. Comparison with findings of other studies**

This study is the first to examine the impact of a change in Medicaid policy that allows for reimbursing medical care providers for fluoride varnish treatment to help prevent dental caries.

Following a similar policy change implemented in the state of Washington, a focus-group type study with providers and staff was conducted in 12 community-based medical practices to determine factors that encourage or impede diffusion of fluoride varnish into primary care physicians' (PCP) offices. This qualitative study concluded that fluoride varnish application can be adopted successfully into PCP offices given provider and staff commitment and openness, appropriate system and resources for professional dental referral.

Despite this study, no quantitative study has been done to examine whether there is an increase in the application of fluoride varnish to the teeth of children who are enrolled in Medicaid following the change in policy. Little is known about whether this policy change has met its intended goal on Medicaid enrollees, specifically whether it has improved the rate of fluoride varnish applications by relying on non-dental providers.

### **D. Possible application of findings to actual Maternal and Child Health care delivery situations (including recommendations where appropriate)**

This secondary data analysis is important for a variety of reasons:

1. The study will help identify factors important for effective delivery of primary preventive dental services to the poor and to racial/ethnic minority children.
2. Findings have the potential for application in other states that do not currently allow non-dentists to bill Medicaid for fluoride varnish application
3. Findings support the overall goals of the Health Resources and Services Administration to:
  - a. Promote health services and systems of care designed to eliminate disparities and barriers across the MCH population.
  - b. Developing best practice guidelines and a basis for advocating evidence-based dental care, especially on issues for the expansion of the dental workforce.
  - c. The research proposal addresses all four strategies research issues of the Maternal and Child Health Bureau.

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### **E. Policy implications**

The project evaluates the impact of the policy at the workforce level and serves as a prelude for future studies that would evaluate whether the policy change has improved patient outcomes by decreasing the prevalence and incidence of dental caries in the Medicaid population.

At a minimum, our results provide an argument in favor of allowing medical care providers to be reimbursed for fluoride varnish treatment by Medicaid in states yet to implement such a policy. However, the absolute rate of fluoride varnish treatment claims following the policy change also suggest that there is still much to be done to improve the oral health of high risk populations. Educational efforts directed at medical professionals should continue to be pursued, as well as delivery mechanisms through school-based programs. Finally, results from this study could also be stretched to argue in favor of the creation of a mid-level dental provider or expanded duties dental auxiliaries, such as dental therapists, that could improve access to preventive dental services while allowing dentists to focus on higher skill procedures

The study will lead to a better understanding of the benefit or the lack of benefit of the policy change relating to access to preventive oral health care and serve as a guide for future policy changes. Information from the study will be useful in resource allocation for oral health improvement and in understanding the effects of spending discrepancies on the oral health of communities.

### **F. Suggestions for further research**

Further research should examine whether there is an appreciable decrease in the prevalence and incidence of dental caries in children who benefitted the most from this policy change. In addition, future studies should ensure the inclusion of individual-level provider data to allow for tabulation of fluoride varnish treatment claims per provider.

## **VI. List of Products (peer reviewed articles, books, chapters in books, master and doctoral dissertations, conference presentations, etc.)**

Below is a list of products which have been generated from the study:

- A. Okunseri C**, Aniko Szabo, Scott Jackson, Nicholas M. Pajewski, Raul I. Garcia. Increased Children's Access to Fluoride Varnish Treatment by Involving Medical care Providers: Effect of a Medicaid Policy Change. *Health Services Research* 2009;44:11441156.
- B. Okunseri C**, Aniko Szabo, Scott Jackson, Raul I. Garcia Nicholas M. Pajewski,. Fluoride Varnish Treatment and Medical Care Providers Involvement: Variation by Urban Influence Codes and Race/Ethnicity. *Journal of Public Health Dentistry* 2009, **Under Review**.

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- C. **Okunseri C**, Girgis D, Abena A, Self K, Jackson S, Tarima S, McGinley EM. Factors Associated With Reported Need for Dental Care Among Homeless Persons: A National Survey. Submitted to Special Care Dentistry Journal 2009 (**Under review**).
- D. NM Pajewski, RI Garcia, A Szabo, S Jackson, and **C Okunseri**. Improved access to fluoride varnish treatment for Medicaid enrolled children in Wisconsin through the involvement of medical care providers. Poster presented at the University of Alabama Birmingham (UAB) Public Health Research Day, Birmingham Al, April 2009. **It won first prize in the post-doctoral research category.** Poster was also presented at the University of Alabama Birmingham Health Disparities Research Symposium, Birmingham, AL April 2009.
- E. **Okunseri C**, Aniko Szabo, Scott Jackson, Nicholas M. Pajewski, Raul I. Garcia. Wisconsin Medicaid Policy Change Leads to Increased Access to Fluoride varnish Treatment. Abstract presented at the American Association for Public Health Dentistry National Oral Health Conference Portland, Oregon 2009.
- F. **Okunseri C**, Aniko Szabo, Scott Jackson, Nicholas M. Pajewski, Raul I. Garcia. Provision of Fluoride Varnish in Dental Health Professional Shortage Areas. IADR/AADR/CADR 87<sup>th</sup> General Session and Exhibition April 1-4, 2009.

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