

Integrating Dental Screening and Fluoride Varnish Application into a Pediatric Residency Outpatient Program: Clinical and Financial Implications

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Delivery of preventive oral health services (POHS) has been embraced by many pediatric and family medical practices in North Carolina (NC). The outcome of implementing a state-wide Medicaid-supported oral health prevention initiative, "Into the Mouth of Babes Varnish and Screening Program (IMB), in an academic medical residency setting is described.

Retrospective chart audit of encounter forms and collection of administrative records related to POHS provided by pediatric medical residents for Medicaid recipients less than 3 years of age at the University of North Carolina pediatric continuity care clinic over 31 months were examined. A total of 1,081 visits and 655 patients were documented during the study period accounting for 36.6% of all children aged 6-36 months seen in the clinic during the period of this study. Thirty-eight percent of the patients received one or more IMB follow-up visits. Twenty-nine (4.4%) children were reported to have one or more carious teeth and 94 children (14.1%) were referred to a dentist. The IMB program provides an oral screening, parent oral health counseling and application of fluoride varnish to the teeth at the medical appointment by non-dental personnel. Following a cost/revenue analysis it was concluded that a preventive oral health initiative in an academic setting provides an additional access to oral health preventative services for underserved children and contributes to the financial viability of the clinic.

Key words: *infant oral health, medical residency, dental care for children, dental caries*

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INTRODUCTION

The state of North Carolina (NC) has a history of dental workforce issues, ranking 47th in the number of dentists and 44th in dentists' participation in Medicaid.^{1,2} A shortage of dentists and the uneven geographic distribution of the dental workforce contributes to access to care difficulties for children. In NC, 25% of children enter kindergarten with untreated dental disease, causing a tremendous burden to the child, family and health care system.³ In response to these challenges, expanding the role for primary care physicians was proposed as an innovative means to help improve this current public health crisis for children's oral health.⁴ In 2000, a

physician-based and Medicaid funded oral health preventive initiative called "Into the Mouths of Babes Varnish and Screening Program" (IMB) was introduced.⁵ Following a required training session, physicians participating in IMB are reimbursed by Medicaid for providing an oral screening, fluoride varnish application, and parent counseling for public-assistance eligible children less than 3 years of age.

Physicians' overall involvement in the prevention of early childhood caries is a concern as they often lack the dental background needed to promote children's oral health.^{6,7,8} The issue was addressed in the Surgeon's General Report on Children's Oral Health (2000) to revamp medical education that produce pediatricians who understand the benefits of oral health and will integrate these concepts into overall health.⁹

Several factors coalesced in the late 1990's to catalyze the development of an oral health curriculum for pediatric medical residents at the University of NC at Chapel Hill (UNC-CH). These included an acute awareness of the lack of access to dental care by leaders in the pediatric medical community, the realization that parents often do not seek early professional preventive oral health care for their children, the high prevalence of dental caries among pre-school children, and the fact that most medical residents trained in primary care in NC remained in the state. Accordingly, an institutional educational program was included in the implementation of the IMB at the UNC-CH.

The demanding clinical training programs, competitive pressures

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and declining funding of post-graduate medical education continues to prompt an interest in examining the effect of the types of services delivered in academic health centers and their financial implications.^{10,11} Increased physician involvement in preventing early childhood caries is promising and likely to continue, as reflected in the number of additional state Medicaid programs having adopted a physician-based model as an adjunct to deliver oral health preventive services to underserved populations.¹² This trend underscores the need to provide adequate oral health education exposure during resident training to prepare physicians to address primary care issues in clinical practice. Because little was known about the impact of introducing a dental varnish and screening program in an academic residency setting, our goal was to describe the utilization of preventive oral health services (POHS) and reimbursement accompanying implementation of the IMB program in a pediatric medical residency setting over a 31 month period.

METHOD

Approval was obtained from the UNC-CH Committee on the Protection of the Rights of Human Subjects (IRB-July 15, 2003) to gather data from encounter forms completed by pediatric medical residents at the NC Children’s Hospital from Medicaid recipients’ ages 6-36 months who presented to the pediatric continuity care clinic from December 2001 to July 2004. A retrospective chart audit of patient encounter forms was used to collect financial data for all procedures completed during the study time-frame.

Patient demographic, oral conditions, patient caries risk assessment, caregiver role in oral health practices, preventive services provided, and dental referral patterns was recorded. This information was entered without identifiers into a data base and responses were verified by a second reviewer.

Statistical Analysis

The data were converted using SAS-6 for analysis with $p \leq 0.05$. Twenty encounter forms were excluded from the study due to illegibility or incomplete patient information. Univariate and bivariate analyses were completed. Data from the pediatric administration office was compared to this file to confirm accuracy.

RESULTS

Over the study period, 1,818 children ages 6-36 months presented to the pediatric continuity care clinic logging a total of 13,660 visits. These included private and public assisted patients. A total of 665 children from 6-36 months of age (36.6% of children in this age group) received POHS as part of their 1,081 visits to the clinic. The mean age of the children was 15.2 months (SD: 7.0 months). A total of 7.9% of all clinic encounters included oral health intervention during the period of the study. It is important to note that approximately 50% of children seen in this clinic were Medicaid eligible; thus, approximately 73% (N=665) of all eligible children received at least one POHS benefit under the IMB program.

Table 1 illustrates demographic characteristics of the patient population. Sixty-one percent of children had one visit and 38% reported to have a follow-up IMB visit. The percentages of children reported to have risk factors associated with the development of early childhood caries is shown in the Figure. The most frequently reported risk factors were children going to bed with a bottle (22.3%) and frequent snacking > 3 times/day (18.5%). Pediatric medical residents reported 4.4% of children (N=29) receiving

Figure 1: Risk factors for Dental Caries.

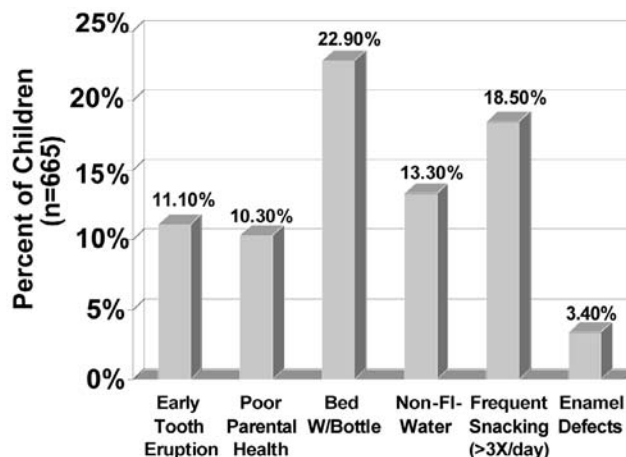


Table 1: Demographics of children receiving preventative services in a pediatric medical residency program at initial visit

Gender (%)	
Male	53
Female	47
Mean Age	
Months at initial visit (SD:7.0)	15.2
Race Distribution (%)	
African American	52.3
Caucasian	22.4
Hispanic	15.5
Asian-American	1.2
Other	1.7

POHS under the Medicaid IMB program had dental caries. A low number of patients were referred to dentists for dental caries (12.9%) and other oral pathology (1.9%); conversely, a high rate of oral health education and fluoride varnish application (88%) to program eligible children was reported.

Our bivariate analysis revealed a statistically significant finding for frequency of snacking (> 3 times per day) ($p=0.03$) and child age ($p=0.01$) to caries. Specifically, children experiencing higher levels of disease were older and reported more frequent snacking.

Financial Implication

During the period of this study, Medicaid reimbursed physicians \$31.46 for an initial comprehensive oral examination, \$15.44 for applying topical fluoride varnish to the teeth and \$15.00 for providing oral hygiene instructions to the child’s parent/caregiver. Medicaid fees for return periodic oral health evaluations was \$23.07, \$15.44 for applying topical fluoride to the teeth and \$15.00 for reviewing oral hygiene instructions. Each child was limited to a maximum of six applications of topical fluoride varnish prior to age 36 months. Each application of fluoride was at 4-6 months interval.

The IMB program produced \$51,992 in revenue for this clinic over the study period at a cost for labor and materials of \$4,951. Materials included fluoride varnish, application brushes, disposable

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Table 2: Indirect cost analysis of pediatric medical workforce

Resident's total working time	<ul style="list-style-type: none"> Average working hours = 60 hrs/wk x 50 weeks/yr = 3,000 hours/year 3,000 hrs/yr X 60min/hr = 80,000 min/yr work time
Time to administer IMB	<ul style="list-style-type: none"> 5 minutes to administer an IMB visit (Haupt, 2000)⁴
Percent time for resident time to deliver IMB preventive services	<ul style="list-style-type: none"> 5 minutes = 0.000028% IMB resident time/yr
Cost in dollars for resident's time to deliver IMB preventive services	<ul style="list-style-type: none"> Average medical post graduate resident salary (2004) = \$36,250/yr* 0.000028% resident time/yr X \$36,250 average resident salary/yr = \$1.02 resident salary cost to deliver IMB to a child

*Average salary of pediatric medical resident in 2004 (UNC-CH)

mouth mirrors, toothbrushes and gauze and averaged \$3.56/IMB encounter. Labor cost of \$1.02/per IMB encounter was determined using the 2004 resident salary base (Table 2).

DISCUSSION

This study describes the experience of implementing a state-wide physician based preventive oral health initiative for underserved children receiving public assistance in an academic setting. The findings confirm the program provides an additional access source for preventive oral health services to children at high-risk for early childhood caries and also provides a modest source of clinic income. An examination of the oral health information documented on the encounter forms revealed age to be a significant variable in the bivariate analysis with more teeth emerging over time, thus creating the opportunity for greater disease experience.

Describing the results of implementing a dental screening and varnish program in an academic clinical residency setting is meaningful from an educational, service and expanded health care perspective. For example, incorporating preventive dental services to children during medical residency training can help increase the awareness and value placed on oral health as part of general health by physicians during a time when practice behaviors are being established. Exposure to certain skill sets during residency training emerges has been shown to be an important factor in determining eventual practice choices in other areas of medicine.¹³ Schaff *et al.*¹⁴ examined changes in pediatric medical residents' knowledge, opinion, confidence and practices relating to providing POHS for children less than 36 months of age following an oral health intervention that included the current IMB varnish program in NC. The investigators reported an increase in knowledge by the pediatric residents following a one-year post-test evaluation. The extent to which these changes translate into future preventive oral health practice patterns following completion of residency training remains to be seen. However, it was apparent to the pediatric faculty that the residents easily integrated the oral health component into the routine well-child visit.

The IMB program as implemented in this academic clinic clearly improved access to preventive oral health services for children that would otherwise have been unlikely to receive them. Early intervention can help decrease future dental treatment needs and cost in this population at a time when demand for dental services for low-income infant and toddlers outpaces traditional access.¹⁵ Such a program in an academic setting provides an excellent strategy for the

integration of medicine and dentistry, highlighting one of the main objectives in the 2000 Surgeon General's Report.¹⁶

It is important that our findings be considered in the context of the study limitations. All data were retrospective and based on provider encounter forms, a few of which were excluded because of incompleteness and illegibility. Recorded data probably represents an underestimate of dental caries in this population because the pediatric residents screened the children but did not do a definitive dental examination. This study was unique in that it attempted to account for some level of indirect costs but our financial calculations were averages. More refined measures to account for costs could improve the accuracy of these calculations including opportunity costs such as caregiver time away from work, child's time away from school, etc. This will become increasingly important as competitive pressures and diminishing resources for post-graduate medical education continue to encourage academic health centers to evaluate training programs from a financial perspective.¹⁰

In summary, more research is needed to fully analyze expanded roles of primary care physicians in providing POHS to children. Implementing similar programs during medical specialty training offers promise as a means to maximize the benefits of integrating medical and dental health care for young children.

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REFERENCES

1. North Carolina Institute of Medicine (NC IOM). Task Force on Dental Care: Final Report. 2005. Available at: <http://www.nciom.org/projects/dental/dental.html>.
2. National Conference of State Legislatures (NCSL). Dentist's Participation in Medicaid. Fact Sheet. Source of data: 1998 Survey of State Medicaid Departments by the Forum for State Health Policy Leadership. NCHS. Healthy People 2000 Review. 1998-99. Hyattsville, Md: Public Health Service, 1998.
3. North Carolina Institute of Medicine (NC IOM). Task Force on Dental Care. Report to the General Assembly and the Secretary of the NC Department of Health and Human Services. 1999. Available at: <http://www.nciom.org>.
4. Lewis CW, Grossman DC, Domoto PK, Deyo RA. The role of the

- pediatrician in the oral health of children: A National Survey. *Pediatrics* 106(6):E84, 2000. Available at:
<http://www.pediatrics.org/cgi/content/full/106/6/e84>.
5. Haupt K. Into the Mouths of Babes Fluoride Varnish Program. North Carolina, 2004. Available at:
<http://www.ncafp.com/imb/reimbursement.html>.
 6. Rozier RG, Sutton BK, Bawden JW, Haupt K, Slade GD, King RS. Prevention of early childhood caries in North Carolina Medical Practices: implications for research and practices. *J Dent Edu* 67: 867-885, 2003.
 7. Mouridian WE, Wehr E, Crall JJ. Disparities in children's oral health and access to dental care. *J Am Dent Assoc* 284:2625-31, 2000.
 8. Meskin, L.H. Look Who's Practicing Dentistry. *J Am Dent Assoc* 132(10):1352-9, 2001.
 9. Proceedings of Surgeon General's workshop and conference on children and oral health: The Face of a Child. Available at:
<http://www.nider.nih.gov/children/children.htm>.
 10. Shine D, Beg S, Jaeger J, Pencak D, Panush R. Association of resident coverage with cost, length of stay, and profitability at a community hospital. *J Gen Intern Med* 16:1-8, 2001.
 11. Newhouse JP. Accounting for teaching hospitals' higher costs and what to do about them. *Health Aff* 22:126-9, 2003.
 12. Vargas CM, Crall JJ, Schneider DA. Sociodemographic distribution of pediatric dental caries: NHANES III, 1988-1994. *J Am Dent Assoc* 129:1229-38, 1998.
 13. Lief S, Andrew M, Tiberius R. Community psychiatrists who see geriatric patients: what's training got to do with it? *Acad Psychiatry* 28:27-33, 2004.
 14. Schaff-Blass E, Rozier G, Chattopadhyay A, Quinonez RB, Vann WF, Mohr JJ. Effectiveness of an educational intervention in oral health for pediatric residents: A controlled trial. *Ambul Pediatr* 6:157-64, 2006.
 15. Savage M, Lee JY, Kotch JB, Vann WF Jr. Early preventive dental visits: effects on subsequent utilization and costs. *Pediatr* 114:e418-23, 2004.
 16. US Department of Health and Human Services. Oral Health in America. A Report of the Surgeon General. Rockville, MD: US Department of Health and Human Services, National Institute of Dental and Craniofacial Research, National Institutes of Health; 2000.