



From the First Tooth: Eliminating Early Childhood Caries in Maine

A White Paper Prepared By

Center for Research to Evaluate and Eliminate Dental Disparities

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Contents

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| From the First Tooth: Eliminating Early Childhood Caries in Maine | 3 |
| Northeast Center for Research to Evaluate and Eliminate Dental Disparities (CREEDD) Description | 8 |
| Annotated Bibliography | 9 |

From the First Tooth: Eliminating Early Childhood Caries in Maine

In February 2007, the twelve- year- old Maryland child Deamonte Driver suffered from a tooth abscess due to a lack of dental care. The infection spread to his brain, both killing the child and creating tens of thousands of dollars in emergency medical expenses.¹

Early childhood caries (ECC) is the most widespread, chronic, infectious disease among children living in the United States,² and its prevalence is increasing in children 2-5 years old.³ The U.S. Public Health Service identifies ECC as a serious problem in the U.S. and recognizes that there is a disproportionate distribution of ECC with higher levels occurring in racial and ethnic minority groups and in lower socioeconomic communities.⁴

Multiple interrelated social and demographic factors, including income, race, and parent's educational attainment can impact children's access to preventive dental care and contribute to these disparities.⁵ For example, it is well documented that low-income children are only half as likely to access preventive dental services as middle or high-income children, despite the higher occurrence of dental problems in this population. They are also two to three times more likely to suffer from untreated dental disease than their non-poor peers.⁶ Unfortunately, U.S. populations with the greatest burden of dental caries are the least likely to access dental care.

Without access to regular preventive dental services, dental care for many children is postponed until the disease must be treated in the operating room or symptoms, such as toothache and facial abscess, become so acute that care is sought in hospital emergency departments.⁷ This latter consequence of failed prevention is not only wasteful and costly to the health care system, but it rarely addresses the problem, as few emergency departments deliver definitive dental services.⁸

Moreover, the health problems associated with ECC extend beyond the mouth. The Infant Oral Health Subcommittee of the American Association of Pediatric Dentistry notes that ECC can lead to a variety of problems such as decreased growth, malocclusion, and deadly infection of the facial spaces. Since in the current health care delivery system dentists generally play a limited role in infants' health, the Committee suggests that pediatricians should play a more active role in addressing infant oral health problem.⁹ Health services research, which has provided a knowledge base for evidence based solutions to many healthcare access issues, is beginning to address oral health care and to reshape the dental care delivery system for young children.

In fact 35 states, including Maine through MaineCare (the state's Medicaid program), currently reimburse primary care medical providers for fluoride varnish application. Despite the coverage of this service by MaineCare, and because of Maine's shortage of general dentists and pediatric dentists, young children of all economic status are receiving an inadequate amount of dental care.¹⁰ Recent reports published by the University of Southern Maine's Muskie School of Public Service document persistent problems in access to dental services for children under six. In 2008, nearly one-half (48%) of these children enrolled in MaineCare had no preventive dental visits in the past year.¹¹ As coverage of fluoride varnish by MaineCare commenced only in 2008, no data is yet available on the utilization of this service; however, anecdotal reports suggest that the service is underutilized. For these reasons, From the First Tooth (FTFT) is seeking to promote and expand fluoride varnish coverage to all of Maine's children.

From the First Tooth

Dental disease continues to be one of Maine's most pressing health problems among children of all ages due to factors including, but not limited to poverty, limited access to dental providers, and shrinking commitments by national, state, and local governments to proven dental public health interventions. From the First Tooth seeks to eliminate ECC in Maine's youngest children (birth to age 3) which would dramatically improve the health of Maine's children and serve as a model to eliminate ECC in similar communities. FTFT will accomplish this by using evidence-based approaches to integrate primary medical and dental care, specifically by integrating oral health assessments and fluoride varnish applications into pediatric well child visits. The program will also educate pregnant women and parents on the behavioral risk factors and preventive measures that can impact the prevalence of ECC. This approach ensures that Maine's children will have access to a comprehensive, family centered, primary care medical home.

Barriers to Assessing Oral Health Care

The American Academy of Pediatrics recommends that all children see a dentist by age one¹² In Maine, the dental workforce shortage makes attainment of this goal impossible in many communities. This access barrier for very young children is compounded by the fact that few general dentists treat children this young, there is a paucity of MaineCare providers who are taking new patients and that there are only sixteen pediatric dentists in Maine.

As a result, many children without insurance and increasing numbers of young children with dental insurance do not receive preventive oral healthcare. Instead, those children visit emergency departments for more serious complications, such as toothaches or abscessed teeth. These children suffer from severe ECC because they lack access to simple, effective preventive dental treatments such as fluoride varnish applications. Their lack of access has another, indirect impact on the children's oral health. Without oral health counseling and education, parents lack an understanding of the importance of maintaining proper care of baby teeth through proper dietary and oral hygiene practices.

Fluoride Varnish Effectiveness

As research continues to expand the knowledge base for the effectiveness of dental interventions in preschool children, fluoride varnishes, along with patient and parent education, are rapidly becoming integral components of prevention-based programs and the standard of care for pediatric medical care. Several studies testify to the efficacy of fluoride varnishes as caries preventive agents and most recently a randomized clinical trial demonstrated the effectiveness of fluoride varnish in children 0-3 years of age.¹³ When used appropriately, varnishes offer a 40-50% reduction in caries incidence.¹⁴ Additional studies confirm that fluoride varnish application is effective in reversing and arresting incipient dental decay by remineralizing the tooth enamel, and thus, in reducing the need for restorative interventions within a dental office.¹⁵

Cost Effectiveness of Fluoride

It has been shown that fluoride varnish treatments can be a cost effective approach to preventing ECC in low income populations. Fluoride varnish costs \$7.18 for each cavity-free month gained per child and \$203 per dental treatment averted. Fluoride treatment increased in cost effectiveness with age and would be considered cost effective at the age of 48 months. Thus, the estimated costs saved in avoided dental treatment will be equal to or greater than the cost of fluoride treatment as age increases in children past four years.¹⁶

However, the cost effectiveness of fluoride varnish application is more complex than the calculations used to determine the aforementioned cost of dental treatment averted as one must also consider the significant financial costs avoided from operating room, inpatient and emergency department dental visits. Dr. Barbara Covey, an emergency-department physician at MaineGeneral Medical Center, is quick to acknowledge that she often treats up to ten dental emergencies a day, including caring for children with emergent needs such as abscessed teeth. This experience is common and increasing, with California reporting a 12% increase in emergency department visits for preventable dental conditions from 2005-2007.¹⁷

During dental emergency visits which cost on average \$459¹⁸, the children receive little more than an injection of antibiotics and symptom management because most emergency departments do not provide comprehensive dental care. This means that in order to receive definitive dental treatment, after the \$459 expenditure on emergency services, the children will still have to be seen in a dental office. If the dental emergency visits result in hospitalization, as they often do for treatment of cellulitis, in 2005 the average cost for treatment was \$6500¹⁹ and still the underlying dental problem is often not treated. In comparison, although the \$2,000 hospital charge for an outpatient operating room visit does not include the cost of the dental services, at least the dental problems are treated during these costly visits.²⁰

An Investment in the Health of Maine's Children Reimbursement

Currently in Maine, oral health assessment and fluoride varnish are covered procedures for children enrolled in MaineCare. The current MaineCare reimbursement of \$12 per fluoride application can be billed by physicians up to three applications per year for children with a high caries risk and twice a year for all other children.²¹ In 2009, there were approximately 42,000 children between the ages of 6 and 42 months living in Maine. Of this number, 24,375 were enrolled in MaineCare, and thus eligible for fluoride varnish application. Currently, Harvard Pilgrim is the only commercial payer in Maine that offers coverage of this procedure as a benefit on a dental rider; however, access to the benefit is dependent on whether an employer chooses the rider as part of the employee health plan. The fact that MaineCare and Harvard Pilgrim have adopted fluoride varnish as a covered service is a positive development; however, this still leaves almost half of Maine's children without insurance coverage for this cost effective preventive service. If one assumes that the remainder of Maine's children were covered by private medical insurance for this service, and that each child aged 6-42 months received 2 applications of fluoride varnish in a year at a cost of \$12 per application, it would cost \$423,000 to extend the service to the remainder of Maine's children. This is, however, an overestimation of the cost since not all children have private insurance and not all children would receive 2 applications in a one year period.

If we conservatively assume the average cost of inpatient dental visit has remained constant since 2005, then by averting dental visits to the emergency department which required in

patient care, in a little over one third of one percent of this population (65 inpatient stays), the cost savings would cover the cost of the fluoride applications for the remainder of Maine's children. Similarly, by preventing 922 emergency department visits the costs for the fluoride varnish would be covered. Investing healthcare dollars on fluoride varnish applications could ultimately realize a cost-offset because it is possible that the prevention costs may be less than averted treatment costs, especially in terms of emergency department and operating room costs. Therefore, fluoride varnish application is a covered service that should be considered by private payers, including self-insured employers. MaineHealth, the nonprofit health system that is the administrative home for the From the First Tooth initiative, and a self-insured employer with approximately 9,000 covered lives, recently added fluoride varnish to the system's health benefit plan. It is estimated that there are approximately 800 children who would benefit from the procedure.

Conclusion

Maine's youngest children are experiencing significant levels of dental disease. Financial decision makers need to understand the impact of dental disease on oral and systemic well-being. Failure to prevent dental problems has long-term adverse effects that are consequential and costly. In particular, unchecked dental disease compromises children's growth and function (including their ability to attend to learning, to develop positive self-esteem, to eat and to speak), thereby making the cost of preventive dental care low compared to alternatives of suffering, dysfunction, and expensive repair.^{2,22}

Fluoride varnish is a cost-effective means to prevent ECC. Its ease of application and relative safety makes it a perfect candidate for prevention in non-dental settings. Like so many other programs across the United States, From the First Tooth recognizes that pediatric visits are an essential venue to ensure that all children have access to this important preventive service and may be the first step to reducing barriers to care and eliminating oral health disparities.

However, successful implementation of the From the First Tooth program on a large scale and its sustained impact over time will require the engagement of all stakeholders. It will be necessary to integrate these procedures into current professionally-accepted guidelines for well-child care as published by the American Academy for Pediatrics and other professional medical and dental organizations; to increase awareness and acceptance of the procedure by children, parents, family members, and health care providers. In addition, private payers will have to adopt this as a covered service. Even in the absence of the anticipated cost offsets of avoided operating room costs and emergency department dental expenditures that covering fluoride varnish would provide, it is important to recognize that for a maximum of \$36 per year/per child, private insurers can make an investment that will have a positive, lifelong impact on the overall health of Maine's children.

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- ¹Miller M. *Dental Insurance Crisis*. 2008. Available from URL: http://www.cbsnews.com/video/watch/?id=4217889n%253Fsource=search_video. [accessed 6/23/09]
- ²Yost J, Li Y. Promoting oral health from birth through childhood: prevention of early childhood caries. *MCN Am J Matern Child Nurs*. Jan-Feb 2008; 33(1):17-23; quiz 24-5.
- ³Dye, B.A., et al., Trends in oral health status: United States, 1988-1994 & 1999-2004. *Vital Health Stat* 11, 2007(248):1- 92.
- ⁴ *Oral Health in America: A Report of the Surgeon General*. 2000. Available from URL: <http://www.surgeongeneral.gov/library/oralhealth/>. [accessed 7/23/09]
- ⁵Edelstein, Burton. Disparities in Oral health and Access to Care: Findings of National Surveys. *Ambul Pediatr* Mar.-Apr. 2002; 2(2); Supplement.
- ⁶Kenney Genevieve, Ko Grace, Ormond Barbara. Gaps n Prevention and Treatment: Dental Care for Low-Income Children. *The Urban Institute*. Accepted for publication; American Journal of Public Health.
- ⁷Pettinato Erika, Webb Michael, Seale N. Sue. A comparison of Medicaid reimbursement for non-definitive pediatric dental treatment in the emergency room versus periodic preventive care. *Pediatrc Dent* 2000; 22 (6): 463- 8.
- ⁸CDHP Policy Brief: Cost Effectiveness of Preventive Dental Services.
- ⁹Clinical Affairs Committee – Infant Oral Health Subcommittee. *Clinical Guidelinse on Infant Oral Health Care*. 2001. AAPD.
- ¹⁰Anderson, N., Thayer, D. Children served by MaineCare, 2008 Survey Findings, p. 24. March 2009
- ¹¹Anderson, N., Thayer, D. Children served by MaineCare, 2008 Survey Findings, p. 8. March 2009.
- ¹²Hale KJ. American Academy of Pediatrics Section on Pediatric Dentistry. *Pediatrics* May 2003; 111(5 Pt 1):1113-6.
- ¹³Weintraub, J.A., et al., Fluoride varnish efficacy in preventing early childhood caries. *J Dent Res* 2006; 85(2): 172-6.
- ¹⁴Bravo M, Baca P, Llodra JC, Osorio E. A 24-month study comparing sealants and fluoride varnish in caries reduction on different permanent first molar surfaces. *L Pub Health Dent* 1997; 57:184- 6.
- ¹⁵Autio J, Courts F. Effect of fluoride varnish on caries progression. *J Dents Res* 2000; 79:210, #532.
- ¹⁶Quiñonez RB, et al. Simulating cost-effectiveness of fluoride varnish during well-child visits for Medicaid-enrolled children *Arch Pediatr Adolesc Med*. 2006;160:164-170.
- ¹⁷California Healthcare Foundation. Emergency department visits for preventable dental conditions in California. Oakland, CA: California Healthcare Foundation; 2009.
- ¹⁸Davis, Elizabeth E. Doctor, my tooth hurts: the costs of incomplete dental care in the emergency room. Pre-publication Epub, 2010. *J Public Health Dent* . p. 3.
- ¹⁹Edelstein, Burton. Disparities in oral Health and access to care: Findings of National Surveys. *Ambul Pediatr* Mar-Apr 2002; 2(2); Supplement.
- ²⁰Kanellis, MJ, et al. Medicaid costs associated with the hospitalization of young children for restorative dental treatment under general anesthesia. *J Public Health Dent*. 2000 Winter; 60 (1): 28-32.
- ²¹MaineCare Benefits Manual Chapter III <http://www.maine.gov/sos/cec/rules/10/144/ch101/c3s025.doc> [accessed 7/12/10]
- ²²Edelstein, Burton. Disparities in oral Health and access to care: Findings of National Surveys. *Ambul Pediatr* Mar-Apr 2002; 2(2); Supplement.

NORTHEAST CENTER FOR RESEARCH TO EVALUATE AND ELIMINATE DENTAL DISPARITIES

www.creedd.org

Center Mission and Objectives

The primary mission of the Northeast Center for Research to Evaluate and Eliminate Dental Disparities (CREEDD) is to eliminate oral health disparities through research, training, and action. We believe this can be achieved by a multidisciplinary, multi-institutional approach to provide early and continuous community engagement, community-based research interventions, integrated oral health training and career development of underrepresented groups, broad dissemination of research findings, and targeted health policy initiatives.

To accomplish this, the Center has determined that its overall objectives are to:

- Conduct research that will lead to an understanding of the factors associated with oral health disparities, with a special focus on children and their caregivers;
- Develop, test, and evaluate community based interventions designed to reduce oral health disparities in children and their caregivers;
- Identify effective means by which to engage non-dental health care providers in oral health promotion;
- Further extend the venues for oral health promotion to non-clinical care and residential settings in underserved communities;
- Serve as a training and mentoring resource for developing and strengthening biomedical, clinical, and behavioral oral health research capacity by expanding research opportunities for scientists from underrepresented groups;
- Disseminate information on oral health status of underserved populations and on effective means to reduce oral health disparities; and
- Create a regional network of collaborating institutions committed to partnering together to provide community based oral health research, education, outreach, and service activities in health disparities communities.

Key Research Projects

- **Project #1 – Partnering with Community Health Centers to Prevent Early Childhood Caries**
Physician-delivered interventions, targeted at children aged 1 to 3 years old, will include fluoride varnish applications, patient-centered counseling, and systems-level changes to clinical information systems and clinical prompts used in order to include age-appropriate, oral health-specific anticipatory guidance items.
- **Project #2 – Oral Health Advocates in Public Housing**
Resident Health Advocates (RHA), trained peer advocates, will incorporate motivational interviewing and community oral health promotion activities into their ongoing health promotion efforts targeting caregivers with children from birth to 5 years old, aimed at caries risk reduction and lowering incidence of Early Childhood Caries.

The knowledge garnered from these projects will have major public health implications nationwide due to the emphasis on identifying and addressing the factors that can both inhibit and facilitate future widespread implementation of oral health preventive services to underserved children and their families.

Annotated Bibliography of Works Cited

Anderson, N., Thayer, D. Children served by MaineCare, 2008 Survey Findings.

This report presents findings from a telephone survey of children currently enrolled in or recently disenrolled from MaineCare, the State's Medicaid and State Children's Health Insurance Program. Among the minority of respondents who did express dissatisfaction with MaineCare, the most common specific complaint was the lack of dental providers who accept MaineCare coverage or who have a practice in the area.

Autio J, Courts F. Effect of fluoride varnish on caries progression. *J Dents Res* 2000; 79:210, #532.

This study evaluated the efficacy of varnish application for enamel caries prevention. Subjects included 142 children, ages 3-5 from Head Start schools, who were randomized into one group that received fluoride varnish twice, and another that received no professional fluoride treatment. After 9 months, results indicated that FV application may be an "effective measure in reversing active enamel lesions in the primary dentition."

Bravo M, Baca P, Llodra JC, Osorio E. A 24-month study comparing sealants and fluoride varnish in caries reduction on different permanent first molar surfaces. *L Pub Health Dent* 1997; 57:184- 6.

This study examines the separate effects of dental sealants and fluoride varnish on dental caries in fissured and nonfissured surfaces of permanent first molars. "Compared to the controls, sealants resulted in a 68 percent and 87 percent reduction on fissured and nonfissured surfaces, respectively. The corresponding figures for varnish were 38 percent and 66 percent."

CDHP Policy Brief: Cost Effectiveness of Preventive Dental Services. Available at URL: http://www.cdc.gov/Oralhealth/publications/library/burdenbook/pdfs/CDHP_policy_brief.pdf. [accessed 6/16/10]

This policy brief details how "early and routine preventive care, sealants, and fluoridation are cost-effective preventive intervention in reducing childhood dental disease. The other sections of the brief address the lack of dental care leading to costly emergency department visits; and the connection between access and preventive care."

Clinical Affairs Committee – Infant Oral Health Subcommittee. *Clinical Guidelines on Infant Oral Health Care*. 2001. AAPD.

"AAPD proposes recommendations for caries-risk assessment, anticipatory guidance, preventive strategies, and appropriate therapeutic interventions to be followed by the stakeholders in pediatric oral health."

Davis, Elizabeth E., et al. Doctor, my tooth hurts: the costs of incomplete dental care in the emergency room. Pre-publication Epub, *J Public Health Dent*. 2010.

This study examined the charges and frequency of return visits for treating dental health problems in hospital emergency rooms. Records from five major hospitals in Missouri demonstrated that 10,000 visits to the ER for dental problems cost \$5 million, 50 percent of which was covered by the state. The frequency of repeat visits suggested that the underlying dental condition was often unresolved. The report concludes with public health policy recommendations.

Dye, B.A., et al., Trends in oral health status: United States, 1988-1994 & 1999-2004. *Vital Health Stat* 11, 2007(248):1- 92.

This report describes “national estimates and trends for a variety of oral health status measures for persons aged 2 years and older by sociodemographic and smoking status since the late 1980s in the United States.” Data were derived from NHANES III 1988-1984 and 1999-2004. Analysis found that for youth ages 2-5, dental caries increased during these time periods.

Edelstein, Burton. Disparities in Oral health and Access to Care: Findings of National Surveys. *Ambul Pediatr* Mar.-Apr. 2002; 2(2); Supplement.

This paper summarizes the findings of national surveys to characterize oral health status and access of children in the United States based on sociodemographic factors. The author finds that the fastest growing populations of children are the ones that have the highest rates of disease and the lowest amount of dental care.

Hale KJ. American Academy of Pediatrics Section on Pediatric Dentistry. *Pediatrics* May 2003; 111(5 Pt 1):1113-6.

This article discusses a preventive approach to early childhood caries that focuses on decreasing the level of cariogenic organisms in the mother's dental flora. This method seeks to address the problem of infant inoculation to cariogenic organisms via shared utensils or other shared practices between intimate caregivers and infants. The author discusses behavioral modifications and anticipatory guidance for high-risk mothers.

Kanellis, MJ, et al. Medicaid costs associated with the hospitalization of young children for restorative dental treatment under general anesthesia. *J Public Health Dent.* 2000 Winter; 60 (1): 28-32.

This paper examines the cost to the Iowa Medicaid program of hospitalizing young children for restorative dental care under general anesthesia. The results demonstrated that the total cost to the Medicaid program of treating a child under general anesthesia was \$2,009 per case.

Kenney Genevieve, Ko Grace, Ormond Barbara. Gaps in Prevention and Treatment: Dental Care for Low-Income Children. *The Urban Institute*. Accepted for publication; *American Journal of Public Health*.

This brief uses data from the 1997 National Survey of America's Families to assess dental care quality and access for children. Survey analysis reveals that 10% of low-income children had unmet need for dental care, nearly twice the level experienced by higher-income children. Nationally, 30% of low-income children received no dental care in the previous year, and nearly 60% failed to receive recommended minimum levels of care. The report concludes that there is “considerable scope for increasing the provision of dental care to low income children.”

Miller M. *Dental Insurance Crisis*. 2008. Available from URL: http://www.cbsnews.com/video/watch/?id=4217889n%253Fsource=search_video. [accessed 6/23/09]

This 2008 CBS News Report describes how 100 million Americans lack dental health insurance, leading to problems such as school absence, unemployment and death. The report shows a program of mobile dental care for underserved children and adults, and addresses the importance of dental health to overall health.

Oral Health in America: A Report of the Surgeon General. 2000. Available from URL: <http://www.surgeongeneral.gov/library/oralhealth/>. [accessed 7/23/09]

The Surgeon General's 2000 Report details Americans' lack of awareness of the importance of oral health, and the disparities in oral and overall health among racial and socioeconomic populations.

Pettinato Erika, Webb Michael, Seale N. Sue. A comparison of Medicaid reimbursement for non-definitive pediatric dental treatment in the emergency room versus periodic preventive care. *Pediatric Dent* 2000; 22 (6): 463- 8.

This study compares Medicaid reimbursement costs for patients who went to the ER for caries-related treatment and were treated as inpatients or outpatients, with anticipated costs for preventive care. The reimbursement amounts for patients admitted to the hospital were 10 times greater than the anticipated amount for preventive care. The reimbursement amounts for preventive services were approximately 3 times more costly than outpatient treatment in the ER.

Quiñonez RB, et al. Simulating cost-effectiveness of fluoride varnish during well-child visits for Medicaid-enrolled children. *Arch Pediatr Adolesc Med.* 2006;160:164-170.

This study evaluates the cost-effectiveness of applying fluoride varnish during well-child visits. Fluoride varnish was applied at well-child visits for Medicaid-enrolled children at 9, 18, 24, and 36 months, and outcomes were compared with a non-intervention control group. "Fluoride varnish improved clinical outcomes by 1.52 cavity-free months but at a cost of \$7.18 for each cavity-free month gained per child and \$203 for each treatment averted." The study concludes that fluoride varnish use in the medical setting is effective in reducing early childhood caries in low-income populations but is not cost saving until after the first 42 months of life.

Weintraub, J.A., et al., Fluoride varnish efficacy in preventing early childhood caries. *J Dent Res* 2006; 85(2): 172-6.

This study evaluates the efficacy of fluoride varnish in preventing early childhood caries. Subjects were caries-free children (ages 6-44 months), and all received familial oral health counseling. The children were randomly selected into three groups, one receiving no fluoride varnish, another receiving FV once per year, and the third group receiving FV twice per year. Results indicated that there was a statistically significant reduced number of children with caries incidence from the groups that received fluoride varnish. In addition, the "percentage of children with caries decreased linearly with increasing numbers of fluoride varnish applications."

Yost J, Li Y. Promoting oral health from birth through childhood: prevention of early childhood caries. *MCN Am J Matern Child Nur* Jan-Feb 2008; 33(1):17-23; quiz 24-5.

The authors describe the risk factors and prevention for early childhood caries, and the actions nurses can take to improve the oral health of children.

Additional Resources

American Dental Association Council on Scientific Affairs. Professionally applied topical fluoride: Evidence-based clinical recommendations. 2006 *J Am Dent Assoc*, Vol 137, No 8, 1151-1159. Available from URL: <http://jada.ada.org/cgi/content/full/137/8/1151>. [accessed 7/9/10].

This report evaluates the collective body of scientific evidence on the effectiveness of professionally applied topical fluoride for caries prevention. The studies reviewed were from MEDLINE and the Cochrane Library, and focused on systematic reviews and clinical studies of professionally applied topical fluoride—including gel, foam and varnish—through October 2005. The report evaluates and summarizes the evidence and issues clinical and further research recommendations.

Association of State and Territorial Dental Directors Fluorides Committee Research Brief: Fluoride Varnish: an Evidence-Based Approach. Available from URL: <http://www.astdd.org/docs/Sept2007FINALFlvarnishpaper.pdf>. [accessed 6/18/10]

This brief provides an overview of fluoride varnish, its advantages, and its applicability in a variety of settings. The brief addresses the advantages of fluoride varnish over other professionally applied fluorides, whether fluoride varnish prevents dental caries in primary and permanent teeth, how often it should be applied, and the safety of use.

Adams SH, Hyde S, Gansky SA. Caregiver acceptability and preferences for early childhood caries preventive treatments for Hispanic children. *J Public Health Dent.* 2009 Fall; 69(4):217-24.

This study explored caregiver acceptability of early childhood caries preventive approaches for Hispanic children. Subjects were presented with videos, treatment samples and a treatment sample and then were asked to rate each treatment on a scale of 1-5 and rate the most acceptable treatment pairings. All treatments were found to be acceptable, but fluoride varnish and toothbrushing were most highly preferred.

Beltrán-Aguilar, Eugenio D. et al. Fluoride Varnishes: A Review of Their Clinical Use, Cariostatic Mechanism, Efficacy and Safety. *J Am Dent Assoc*, 2000 Vol 131, No 5, 589-596. Available from URL: <http://jada.ada.org/cgi/content/full/131/5/589>. [accessed 7/9/10].

This is a review of the clinical use, cariostatic mechanism, efficacy, safety and toxicity of fluoride varnishes. Semiannual applications are the most proven treatment regimen. Findings from biomedical literature indicate fluoride varnishes are safe and easy to apply and set in contact with intraoral moisture.

Crall, JJ. Development and integration of oral health services for preschool-age children. *Pediatr Dent.* 2005 Jul-Aug; 27(4):323-30.

This paper describes “considerations for developing a comprehensive strategy for optimizing the oral health of preschoolers.” Toward this end, the author emphasizes early establishment of a dental home, and integration of medical and dental primary care delivery systems.

Holve, S. An observational study of the association of fluoride varnish applied during well child visits and the prevention of early childhood caries in American Indian children. *Matern Child Health J.* 2008 Jul;12 Suppl 1:64-7. Epub 2007 Oct.

This observational study explored the outcomes of fluoride varnish applications at child well visits for high-risk American Indian children. Results showed that children with 4 or more FV treatments experienced a 35 percent decrease in dental caries.

Lawrence, H.P., et al. A 2-year community-randomized controlled trial of fluoride varnish to prevent early childhood caries in Aboriginal children. *Community Dent Oral Epidemiol.* 2008 Dec;36(6):503-16. Epub 2008.

This article describes a 2-year randomized controlled study of using fluoride varnish (FV) to prevent early childhood caries in Aboriginal children in Canada. Findings include a 25 percent reduction in caries in all children treated twice yearly with fluoride varnish. Further, adjusted odds ratio for caries incidence was 1.96 times higher in the controls than in the FV group. "Findings support the use of FV at least twice a year with caregiver counseling."

Maiuro, Lisa Simonson. Emergency Department Visits for Preventable Dental Conditions in California. California HealthCare Foundation, 2009. Available at URL: <http://www.chcf.org/publications/2009/03/emergency-department-visits-for-preventable-dental-conditions-in-california>. [accessed 7/9/10].

This snapshot uses data from the California Office of Statewide Health Planning and Development (OSHPD) to document the extent to which uninsured and insured Californians use the Emergency Department for preventable dental conditions such as untreated cavities, dental abscesses, and periodontal disease.

Minah G., et al. Evaluation of an early childhood caries prevention program at an urban pediatric clinic. *Pediatr Dent.* 2008 Nov-Dec;30(6):499-504.

This study evaluated an early childhood caries prevention program at an urban pediatric primary care clinic serving low-income residents. Preventative services were conducted with 219 6- to 27-month-year-olds and outcomes compared with a comparison group of patients at the same clinic, 12 months older. Results indicated that these preventative measures reduced dental caries in low socioeconomic status infants and toddlers, supporting the integration of caries prevention with primary pediatric care.

Rozier, RG et al. Parents' satisfaction with preventive dental care for young children provided by nondental primary care providers. *Pediatr Dent.* 2005 Jul-Aug;27(4):313-22.

This study assessed parental satisfaction with dental preventive care for their children received at medical offices. Caregivers filled out pre-visit surveys and then follow-up questionnaires 12 months after the appointment. Results showed that 77 percent rated overall dental care greater than 7 on an 11-point scale with 10 indicating the best care. Caregivers who were less satisfied with the care listed communication and lack of follow-up as primary problem areas. The report concludes with recommendations.

Whatcom County, Washington Oral Health Coalition - Pediatric Oral Health Guide for the Primary Care Physician. May 2002. Available at URL: <http://www.happyteeth.org/media/pdf/primarycare.pdf>. [Accessed 6/21/10]

This brochure is intended for primary care providers for children. It provides a guide to education, assessment and preventive treatment, including fluoride varnish.

Wawrzyniak MN, et al. Incorporating caries prevention into the well-child visit in a family medicine residency. *Fam Med.* 2006 Feb;38(2):90-2.

This article describes a model for training primary medical care residents in early childhood caries prevention services. Within two years of the implementation of ECC prevention curricula, 100 percent of faculty and residents became competent in oral health screening and fluoride varnish application. This model illustrates that integration of this material into medical residency problems may be simple and effective.