

INTEGRATING PEDIATRIC ORAL HEALTH INTO
A RURAL, PUBLIC-HEALTH SETTING

By

Janelle Marie Bowden

A scholarly project submitted in partial fulfillment
of the requirements for the degree

of

Doctor of Nursing Practice

in

Family and Individual Health

MONTANA STATE UNIVERSITY
Bozeman, Montana

April 2020

©COPYRIGHT

by

Janelle Marie Bowden

2020

All Rights Reserved

ACKNOWLEDGEMENTS

I would like to formally express my sincere thanks and appreciation to my project chair, Dr. Laura Larsson, PhD, MPH, RN. Your guidance and support through this process have been invaluable. Heartfelt thanks also to my committee members, Heather Jurvakainen, RN, and Julie Ruff, Ed. D., MSN, RN, for the helpful suggestions, support, and guidance through not only my project, but my nursing career. A special thanks to Dr. Jane Gilette, DDS, for helping me navigate the oral-health world and the policies and procedures I needed to master in order to make my project successful.

I would also like to acknowledge my husband, Landon, and daughter, Draya. You went through this program and project with me, sacrificing time so that I could accomplish my goals. For this I will be forever grateful to you both!

TABLE OF CONTENTS

1. INTRODUCTION1

 Statement of the Problem.....2

 Purpose Statement.....2

 Background.....3

 Statement of Significance5

2. LITERATURE REVIEW7

3. THEORETICAL UNDERPINNING.....10

 Setting.....10

 Sample.....11

4. METHODS12

5. RESULTS AND DISCUSSION.....14

REFERENCES CITED.....17

APPENDIX: Oral Health Risk-assessment Tool.....22

LIST OF TABLES

Table	Page
1. Results of Oral Health Assessment.....	14
2. Referral Results.....	15

ABSTRACT

Rural, low-income families in Montana experience individual and environmental barriers to oral healthcare access. In addition to knowledge deficits regarding pediatric milestones in oral health care, families in rural areas also have few, if any, pediatric dentists who accept Medicaid clients. The Centers for Disease Control and Prevention reported 2- to 5-year-olds are the only age group where the incidence of tooth decay is on the rise. This evidence-based demonstration research documents the baseline oral-health status of Park County Women, Infants, and Children (WIC) participants as well as the longitudinal efficacy of a bundled intervention to improve oral-health status in this high-priority population. Anticipatory guidance, caries risk assessment, repeated fluoride varnish application, and referrals for establishing a dental home and completing referrals for untreated decay are the bundled interventions under investigation in this project. Each level of intervention was documented in terms of state and national goals for the prevention of early childhood caries. The rate of signed forms consenting to treatment was used as a proxy measure that educating pregnant moms, parents, and caregivers about caring for baby teeth was effective. The long-term goal is to improve oral-health status in the Park County WIC population. The results of this research illustrated that performing oral-health assessments in a public-health setting provides an opportunity for nurses to promote sound oral-health practices, educate families on oral hygiene, and provide interventions aimed at preventing early childhood caries. Integrating oral health into public health as well as primary-care settings is a feasible and imperative practice in order to decrease the rates of ECC. A collaborative and integrative effort will ensure more children are screened for and educated on ECC. Introducing the intervention bundle at the WIC office in Park County proved to be a successful way of performing oral-health screenings, applying preventative FV, educating families on oral hygiene practices, and referring children to a dental home.

INTRODUCTION

Oral health is often overlooked or left out of children's primary-care visits and comprehensive assessments. Yet, the Centers for Disease Control and Prevention reported that 37% of children aged 2–8 have early childhood caries (ECC), commonly known as tooth decay (Dye, Thornton-Evans, Li, & Lafolla, 2015a, 2015b). Early childhood caries is an infectious disease that can be transmitted to others and is caused by bacterial byproducts that dissolve the hard surfaces (enamel) of the teeth (Adair et al., 2001). This cariogenic bacterium resides in dental plaque and, if left untreated, can reach the soft pulp tissue and even cause systemic infection (Adair et al., 2001). ECC can be prevented by proper oral hygiene, healthy dietary practices, and the use of fluoride (Adair et al., 2001).

There is also evidence that connects oral health to overall health (Institute of Medicine, 2011a, 2011b). Early Childhood Caries is a very costly, painful, and sometimes even deadly disease that is nearly 100% preventable (Hummel et al., 2016). This illustrates the need to utilize the integration of oral-health screening and ECC-prevention strategies into multidisciplinary healthcare and public-health settings (American Academy of Family Physicians, 2018; American Academy of Pediatrics, 2014; American Academy of Pediatric Dentistry, 2016; American Dental Association, 2018). Practicing oral-health habits based in evidence in settings outside a dental office can help reduce the number of children who suffer from ECC (U.S. Department of Health and Human Services, 2012).

Statement of the Problem

According to the Montana DPHHS Montana Oral Health Survey (2014), third-graders living in Montana have a higher proportion (65%) of decay on primary and permanent teeth compared to the national average (52%). Much of the data collected on oral health is for school-aged children. Interventions aimed at preventing ECC in preschool-aged children may reduce disease burden (American Academy of Pediatrics, 2014; Indian Health Service, 2010; Nowak, Casamassimo, Scott, & Moulton, 2014). Oral health has an impact on the physical and social development of a child (Oral Health Program, 2016). Children who suffer from oral-health issues experience mouth pain, miss school, and may perform poorly at school (Jackson et al., 2010). It is estimated that, every year, 51 million hours of school are missed due to oral-health issues (Oral Health Program, 2016).

Purpose Statement

The main goal of this project was to test a bundled intervention for improving oral-health outcomes in Park County Women, Infant, and Children Supplemental Nutrition Program (WIC) Clinic participants aged 0–5 years. Four interventions comprised the bundle including anticipatory guidance and education, risk assessment, application of fluoride varnish based on risk assessment score, and referral to a local dentist.

Background

Oral health is an essential component of overall health (U.S. Department of Health and Human Services, 2000). The traditional physical assessment performed by primary-care providers includes the head, ears, eyes, nose, and throat (HEENT). This omits the oral cavity completely and discounts oral health as a component and contributing factor to overall health. Adding an assessment of the oral cavity (HEENOT) will train providers and other members of the health community to examine the oral cavity, increasing oral-health screenings, referrals to dental professionals to treat oral disease, and detection of oral-health comorbidities (Haber et al., 2015). Integration of the oral-health assessment into visits other than dental exams is becoming more widely accepted. In 2010, 504,403 children under age 6 that were covered by Medicaid received oral-health services by a non-dental provider (CMS, 2010). That number increased to 1,198,867 in 2018 (CMS, 2018). This concept is in line with the public-health goal of the WIC program as being a “gateway to health care” and providing comprehensive health promotion and disease prevention. (National WIC Association, 2013).

The incidence of ECC in children ages 2 to 4 has increased while incidence in children older than 4 has either stayed the same or decreased in the same time period (AAP, 2014). Prevention efforts for this age group should be implemented to detect early signs of the disease in order to stop it before it progresses. Prevention efforts should not just focus on one strategy. A multifactorial approach to prevent ECC needs to be applied (AAP, 2014). As mentioned before, part of the multifactorial approach should include oral-health assessments during early childhood. Risk factors that should be assessed

include sugar consumption, active dental decay in the primary caregiver, previous dental decay in the child, medications, and chronic disease processes (AAP, 2014). Anticipatory guidance can then be offered to the caregiver and the child that addresses the risk factors found. Anticipatory guidance may include dietary counseling, oral hygiene, and the use of fluoride (AAP, 2014).

Most water has naturally occurring fluoride; however, the levels are not high enough to prevent caries (CDC, 2019a). Water systems in the United States have contained added fluoride for over 70 years (CDC, 2019a). Fluoridated water systems have reduced the rate of dental caries in populations since 1945 (CDC, 2019b). Starting in Grand Rapids, Michigan, a small amount of fluoride was added to public water systems (CDC, 2019b). By the 1950s, children in Grand Rapids had fewer dental caries compared to school children in nearby areas that did not fluoridate their water (CDC, 2019b). Fluoridated water keeps small amounts of fluoride on the teeth and in the saliva helping to reduce dental caries (CDC, 2019b). Public water systems with added fluoride help prevent ECC regardless of race, gender, or socioeconomic status (CDC, 2019a). It is an efficient and cost-effective way to deliver fluoride to members of an entire community. The recommended concentration of fluoride in water in order to prevent dental caries is 0.7 mg/L (U.S. Department of Health and Human Services Federal Panel on Community Water Fluoridation, 2015). The fluoride concentration levels in Park County range from 0.1 to 1.5 mg/L (Montana Department of Environmental Quality, 2019)

Fluoride prevents dental caries by inhibiting the demineralization of intact enamel and promotes remineralization of demineralized enamel (Adair et al., 2001). When bacteria metabolizes carbohydrates and produces acid, fluoride is released because of the lower pH where the tooth and plaque meet (Adair et al., 2001). Calcium and phosphate are then taken up with the released fluoride and fluoride in the saliva to improve the enamel crystal structure, which becomes more acid resistant and contains more fluoride (Adair et al., 2001). This cycle of demineralization and remineralization continues throughout the lifetime of a tooth and fluoride is taken up more readily by demineralized enamel (Adair et al., 2001). Saliva carries fluoride in the oral cavity. The concentration of fluoride in saliva is too low to affect cariogenic activity (Adair et al., 2001). Drinking fluoridated water, using fluoride toothpaste, or using other fluoride products can raise fluoride concentrations in saliva by 100- to 1,000-fold (Adair et al., 2001). Saliva serves as an important source of fluoride during the one to two hours of elevated fluoride levels after ingesting or using fluoride products (Adair et al., 2001). Similarly, applying fluoride gel or varnish to teeth leaves a temporary layer on the enamel surface of teeth (Adair et al., 2001). The fluoride is then released when pH drops in an acidic environment and is available for remineralization (Adair et al., 2001).

Statement of Significance

The current configuration of the oral-healthcare system fails to deliver care to the highest-risk populations. This includes rural, low-income, and minority individuals (Hummel et al., 2016). There is also a misnomer that oral health is a “silo” of care

reserved only for dental professionals (Hummel et al., 2016). Many children do not see a dentist before they go to school, which contributes to children attending school with untreated decay. In fact, in 2010, only 20% of Medicaid-enrolled children under age 3 received dental care, and only 9% received preventive dental care (Hummel et al., 2016).

Being in a rural setting poses access barriers for comprehensive health care (Winters & Lee, 2018). Families living in rural areas often have to travel many miles to reach the nearest town in order to receive health care (Winter & Lee, 2018). In addition, as mentioned previously, screenings are not usually performed until the children reach school age (Hummel et al., 2016). Therefore, services should be integrated in order to give the family the most value for their time and travel. By testing the efficacy of implementing preventative oral health care at WIC appointments, the burden on rural families may be reduced.

Integrating oral-health assessment into the WIC visits for rural, pre-school children helped prevent decay earlier and promote good oral-health practices. By sharing interventions with Park County WIC families, preschool children were given strategies in order to prevent ECC before entering school.

LITERATURE REVIEW

There are many documented risk factors that contribute to early childhood caries. *Streptococcus mutans* (*S. mutans*) can be found in children as early as 10 months of age (Karn et al., 1998) and contributes to the development of tooth decay (Harris et al., 2004). However, with the use of preventative treatment and counseling, *S. mutans* can be reduced (Günay et al., 1998). Sweetened beverage consumption also increases the risk for developing early childhood caries (Warren, et al., 2009), as does bottle feeding rather than breastfeeding (Chou et al., 2013). Living in poverty has also been found to be a risk factor for developing ECC, although it is unclear what specific conditions contribute to higher dental caries rates (Warren, et al., 2016). Some factors that may contribute include poor diet, poor oral hygiene, poor maternal oral health, and crowded housing (Warren, et al., 2016).

Fluoride has been well documented as being an effective way to fight ECC and prevent tooth decay in children (American Dental Association, 2005). The CDC (2016) reported that drinking fluorinated water was shown to reduce cavities (also called tooth decay) by about 25% in children and adults. Weintraub et al. (2006), Divaris et al. (2009), and Gugwad et al. (2011) reported a decrease of caries after using fluoride varnish compared to the control of no fluoride varnish use. However, intensive fluoride use of stronger fluoride varnish or more than four applications of fluoride a year was not shown to significantly reduce caries compared to standard fluoride varnish application (Weinstein et al., 2009). In a 2013 meta-analysis, standard fluoride varnish application reduced the risk of decayed, missing, or filled primary teeth by 37% and the risk of

decayed, missing, or filled permanent teeth by 43% (Marinho et al., 2013). Using fluoride as a preventative measure is much less expensive, invasive, and time consuming than restorations (i.e., drilling and filling).

A review of the literature shows the need for regular oral-health screenings starting at the first primary tooth eruption; this is well before a child starts school (Chou, Cantor, Zakher, Mitchell, & Pappas, 2013). Oral-health screening assessments can be done at the child's well-child check (Haber, et al., 2015). The well-child check also provides an opportunity for education about the importance of oral health to be given to the caregivers (Haber, et al., 2015). Education should include avoidance of sweetened beverages, the advantages of breastfeeding and oral health, and the effectiveness of fluoride varnish application (Günay, Dmoch-Bockhorn, Günay, & Geurtsen, 1998). Treatment with fluoride varnish will reduce the risk of development of early childhood caries (Gugwad, et al., 2011). These treatments can be applied at well-child checks by primary caregivers or in public-health settings.

The U.S. Preventative Services Task Force (USPSTF) (2014) developed guidelines for primary providers concerning oral health care of children. It is recommended that providers apply fluoride varnish to children's teeth at the age of first primary tooth eruption (USPSTF, 2014). According to USPSTF, primary-care providers should apply varnish to all children's teeth under the age of 5 regardless of estimated risk (2014). The recommendation is regardless of risk due to the current lack of validated risk-assessment tools for use by primary providers. Caries incidence was higher in a group of children who only received counseling about oral health versus receiving

counseling and fluoride varnish (Weintraub et al., 2006). The current configuration of a well-child check includes counseling on preventative oral health practices only.

Implementation of fluoride application at primary-care-provider visits is feasible (Chou et al., 2013).

THEORETICAL UNDERPINNING

Pender's Health Promotion Model (HPM) is the conceptual framework used in the design of this project. Pender placed an emphasis on preventative approaches tailored to the characteristics of the individual or family, emphasizing the importance of building clients' skills and confidence (self-efficacy) for promoting behavioral change (Masters, 2015). In keeping with Pender's HPM, the information was delivered in a way that recognized each family's circumstances and encouraged them to adopt the best oral-health practices. This included demonstrating tooth-brushing techniques, providing educational materials, and making referrals to local dentists who accept Healthy Montana Kids insurance.

Setting

The study was conducted at the Park County WIC office in the Community Health Partners building in Livingston, Montana. Community Health Partners is a Federally Qualified Health Center that offers medical, as well as dental, services. Having the WIC services in this building was advantageous due to the WIC office being located in the same hallway as the dental clinic, making referrals to a dentist convenient. Referrals were also sent to Livingston Dental, another children's dental provider located in Livingston. These two dental offices were chosen to receive referrals because they are the only two in the city who accept children's Medicaid.

Sample

Participants were recruited from Park County WIC clients. Children participating in WIC must be between the ages of 0 and 5, making this an ideal sample for testing interventions aimed at reducing ECC in preschool children. An additional qualification for WIC participation is an income below 185% of the U.S. poverty guidelines (USDA, 2019). Any child with teeth participating in WIC, with caregiver permission, could participate in the intervention bundle. The participants were from across Park and Sweetgrass counties which include the following communities: Clyde Park, Wilsall, Gardiner, Livingston, Emigrant, Big Timber, and Springdale, Montana.

METHODS

The four interventions tested in the study include anticipatory guidance and education, risk assessment, application of fluoride varnish based on risk assessment score, and referral to a local dentist. After completing CITI Human Subjects training and applying for MSU Institutional Review Board oversight, anticipatory guidance and education was provided to the client during their WIC visit. A WIC visit consists of nutritional education, referral to resources in the community, and disbursement of the client food package. After the conclusion of the WIC visit, the client was informed that their WIC appointment had concluded. This was an important step in the study process as it is not within the scope of the WIC nurse to perform oral-health assessments or apply fluoride varnish. The anticipatory guidance and education given included a one-page handout on the importance of oral health and the safety of fluoride. Documentation was kept of whether providing the parental-education intervention (both verbal and with a one-page summary) led to a 75% or greater consent rate for oral-health services. Anticipatory guidance in this style has been shown as effective in the literature with immunizations (Chin, Alexander-Young, & Burnet, 2009). Following the anticipatory guidance and education, the use of The American Academy of Pediatrics risk-assessment tool was pilot-tested (see appendix). Any child aged 0–5 with erupted teeth and caregiver consent received a risk assessment, which follows the recommendation of the American Academy of Pediatrics (AAP) of infants receiving an oral-health screening before 6 months of age (Nowak & Warren, 2016). The AAP further recommends repeat oral-health assessments at 12, 18, 24, and 30 months if they have not established a dental

home (2016). Children who had not established a dental home at subsequent WIC appointments three, six, and nine months later were offered an additional oral-health screening. Children categorized as high-risk for caries, or by the request of the caregiver, received a treatment of 2.26% fluoride varnish with additional applications at least every three to six months if a dental home had not been established (Nowak & Warren, 2016). This coincides with clients' WIC appointments as WIC participants come to the clinic every three months. Following the risk assessment and FV application, an after-care handout was given and, if no dental home was established, a referral to a dental home was made to one of two dental providers that accept children's Medicaid in Livingston. The billing procedures were also tested for this service using the appropriate Medicaid CDT code as a measure of feasibility of this intervention. Children categorized as low risk did not require FV as evidence has shown they receive sufficient fluoride through fluorinated water and toothpaste (2016). Therefore, these children received a referral, if a dental home was not established, FV application only if requested by the caregiver, and anticipatory guidance, including tooth-brushing habits, limited sweet-beverage consumption, and the importance of regular dental visits. Referrals were sent using the Connect Electronic Referral System. This system tracked appointments made and kept with the dental providers.

RESULTS AND DISCUSSION

There were 111 Park County WIC participants eligible to receive the intervention bundle. To be eligible, participants were aged 6 months to 5 years at the time the intervention bundle was being piloted, October, 2018 through August, 2019. Of the 111 eligible participants, 57 agreed to receive oral-health assessments, an opt-in rate of 53.15%. Reasons caregivers chose not to receive the interventions included confidence in their child's oral health, uncertainty about the safety of fluoride, and lack of time for the assessment and fluoride application. The results of the oral-health assessment of each participant are displayed in Table 1.

Table 1: Results of Oral Health Assessment

Results of Oral Health Assessment

Number of Children with oral health assessment	Number of children that were high risk	Number of children who receive FV treatment
57	14	17

Children who were categorized as high-risk had multiple risk factors contributing to the high-risk status. These factors included Medicaid eligible, continual bottle/sippy cup use with fluid other than water, white spots or visible decalcifications in the past 12 months, obvious decay, and visible plaque accumulation. Dental home establishment was also an important part of the intervention. Children who had not established a dental home were referred to Community Health Partners' dental office by informing caregivers they could walk down the hall to schedule an appointment or Livingston Dental through the Connect Referral system. See Table 2 for dental home-referral results.

Table 2: Referral Results

Referral Results

Number of children with dental home	Number of children referred to dental home	Number of referrals that resulted in a dental appointment
31	26	9

Thirty-four percent of children who were referred to a dental home had an appointment with a dentist. Factors that contributed to children failing to make a dental appointment included change in phone number of the patient, patients not answering dental-office calls, and lack of follow-up on the referrals.

FV application by a nurse is a billable service through Medicaid. Fifteen of the 17 children who received FV treatments were insured through Montana Medicaid. These 15 applications were submitted to Medicaid for reimbursement using codes Z41.8, CPT code D1206. No payment was received by Medicaid for these FV applications. The reason no reimbursement was received is because of the setting of the oral-health assessment and FV application. FV treatments by nurses are not reimbursed by Medicaid unless they are completed in a primary-care setting (American Academy of Pediatrics, 2019).

Performing oral-health assessments in a public-health setting provides an opportunity for nurses to promote sound oral-health practices, educate families on oral hygiene, and provide interventions aimed at preventing early childhood caries. Integrating oral health into public health as well as primary-care settings is a feasible and imperative practice in order to decrease the rates of ECC. Instead of having silos of healthcare providers such as dentists, nurses, hygienists, and primary-care providers, a

collaborative and integrative effort will ensure more children are screened for and educated on ECC. Introducing the intervention bundle at the WIC office in Park County proved to be a successful way of performing oral-health screenings, applying preventative FV, educating families on oral-hygiene practices, and referring children to a dental home. Referral to a dental home was an important part of the intervention bundle. Though the integration of oral-health assessments and FV treatment in children under age 5 is a worthwhile endeavor, regular dental care by a dentist is an important aspect of a child's health care that should begin at the first tooth eruption.

To further explore this concept, introducing oral-health intervention bundles in other public-health settings, such as health departments, food pantries, OPA offices, or other settings where families living in poverty use services, may ensure more children have the opportunity to prevent ECC. It would be worth exploring the billing codes and regulations regarding oral-health screening and FV application reimbursement. The current configuration of entities outside primary-care settings prevents nurses from being able to bill and be reimbursed. Nurses are performing the same procedures and screenings in primary-care settings and the facility is able to bill and be reimbursed for the service.

REFERENCES CITED

- Adair, S. M., Bowen, W. H., Burt, B. A., Kumar, J. V., Levy, S. M., Pendrys, D. G., . . . Whitford, G. M. (2001). Recommendations for using fluoride to prevent and control dental caries in the United States. Retrieved from <https://www.cdc.gov/mmwr/preview/mmwrhtml/rr5014a1.htm>
- American Academy of Family Physicians. (2016). Oral health. Retrieved from <https://www.aafp.org/about/policies/all/oral-health.html>
- American Academy of Pediatrics. (2014). Maintaining and improving the oral health of young children. Retrieved from <https://pediatrics.aappublications.org/content/134/6/1224>
- American Academy of Pediatrics. (2019). Oral Health Coding Fact Sheet for Primary Care Physicians. Retrieved from https://www.aap.org/en-us/Documents/coding_factsheet_oral_health.pdf
- American Academy of Pediatric Dentistry. (2016). Policy on oral health care programs for infants, children and adolescents. Retrieved from <https://www.aapd.org/research/oral-health-policies--recommendations/Oral-Health-Care-Programs-for-Infants-Children-and-Adolescents/>
- American Dental Association. (2018). MyView: Building practice through interprofessional collaboration. Retrieved from <https://www.ada.org/en/publications/ada-news/viewpoint/my-view/2018/september/myview-building-practice-through-interprofessional-collaboration>
- CDC. (2019a). Community water fluoridation. Retrieved from <https://www.cdc.gov/fluoridation/index.html>
- CDC. (2019b). Over 70 years of community water fluoridation. Retrieved from <https://www.cdc.gov/fluoridation/basics/70-years.htm>
- Chin, M.H., Alexander-Young, M., & Burnet, D.L. (2009). Health care quality-improvement approaches to reducing child health disparities. doi:10.1542/peds.2009-1100K.
- Chou, R., Cantor, A., Zakher, B., Mitchell, J. P., & Pappas, M. (2013). Preventing dental caries in children 5 years: Systematic review updating USPSTF recommendation. *Pediatrics*, *132*(2), 332–350.
- CMS. (2010). Annual reporting data files: FY 2010 data. Retrieved from <https://www.medicaid.gov/medicaid/benefits/epsdt/index.html>

- CMS. (2018). Annual reporting data files: FY 2018 data. Retrieved from <https://www.medicaid.gov/medicaid/benefits/epsdt/index.html>
- Divaris, K., Preisser, J. S., & Slade, G. D. (2011). Surface-specific efficacy of fluoride varnish in caries prevention in the primary dentition: Results of a community randomized clinical trial. *Caries Research*, *47*(1), 78–87.
- Dye, B. A., Thornton-Evans, G., Li, X., & Iafolla, T. J. (2015a). Dental caries and sealant prevalence in children and adolescents in the United States, 2011–2012. NCHS data brief, no 191. Hyattsville, MD: National Center for Health Statistics. Retrieved from <http://www.cdc.gov/nchs/data/databriefs/db191.pdf>
- Dye, B. A., Thornton-Evans, G., Li, X., & Iafolla, T. J. (2015b). Dental caries and tooth loss in adults in the United States, 2011–2012. NCHS data brief, no 197. Hyattsville, MD: National Center for Health Statistics. Retrieved from <http://www.cdc.gov/nchs/data/databriefs/db197.pdf>
- Gugwad, S. C., Shah, P., Lodaya, R., Bhat, C., Tandon, P., Choudhari, S., & Patil, S. (2011). Caries prevention effect of intensive application of sodium fluoride varnish in molars in children between age 6 and 7 years. *The Journal of Contemporary Dental Practice*, *12*(6), 408–413.
- Günay, H., Dmoch-Bockhorn, K., Günay, Y., & Geurtsen, W. (1998). Effect on caries experience of a long-term preventive program for mothers and children starting during pregnancy. *Clinical Oral Investigations*, *1998*(2), 137–142.
- Haber, J., Hartnett, E., Allen, K., Hallas, D., Dorsen, C., Lange-Kessler, J., . . . Wholihan, D. (2015). Putting the mouth back in the head: HEENT to HEENOT. Retrieved from https://www.smilesforlifeoralhealth.org/pdf/smilesforlife/Putting_the_Mouth_Back_in_the_Head_HEENT_to_HEENOT_-_AJPH.2014.302495.pdf
- Harris, R., Nicoll, A. D., Adair, P. M., & Pine, C. M. (2004). Risk factors for dental caries in young children: A systematic review of the literature. *Community Dental Health*, *2004*(21), (Supplement), 71–85.
- Hummel, J., Phillips, K. E., Holt, B., Hayes, C. (2016). Oral health: An essential component of primary care. Seattle, WA: Qualis Health.
- Indian Health Service. (2010). Early childhood caries initiative. Retrieved from https://www.ihs.gov/medicalprograms/doh/documents/ecc/DentalDocs/Promoting_AwarenessOfECC.pdf
- Institute of Medicine. (2011a). Improving access to health care for vulnerable and underserved populations. Washington, DC: The National Academies Press.

- Institute of Medicine. (2011b). *Advancing oral health in America*. Washington, DC: The National Academies Press.
- Jackson, S. L., et al. (2010). Impact of poor oral health on children's school attendance and performance. *American Journal of Public Health, 101*(10), 1900–1906. doi:10.2105/AJPH.2010.200915.
- Karn, T. A., O'Sullivan, D. M., & Tinanoff, N. (1998). Colonization of Mutans Streptococci in 8- to 15-month-old Children. *Journal of Public Health Dentistry, 58*(3), Summer, 1998.
- Marinho, V. C. C., Worthington, H. V., Walsh, T., & Clarkson, J. E. (2013). Fluoride varnishes for preventing dental caries in children and adolescents (review).
- Masters, K. (2015). *Nursing theories: a framework for professional practice* (2nd ed.). Burlington, MA: Jones & Bartlett Learning.
- Montana Department of Environmental Quality. (2019). MT Fluoride Sample Results and Related Information. Retrieved from <https://dphhs.mt.gov/publichealth/oralhealth/OHFluoride>
- Montana Department of Public Health and Human Services, Family & Community Health Bureau. (2015). Montana oral health program data brief. Retrieved February 28, 2017, from: <http://dphhs.mt.gov/Portals/85/publichealth/documents/OralHealth/2015BSSDataBriefMontana.pdf>
- Montana Oral Health Program. (2016). Summary of Oral Health Screenings for Park County. Retrieved from file:///C:/Users/Landon/Downloads/Park%20ECC%20data.pdf
- National WIC Association. (2013). The role of WIC in public health. Retrieved from https://s3.amazonaws.com/aws.upl/nwica.org/role_of_wic_public_health.pdf
- Nowak, A. J., Casamassimo, P. S., Scott, J., & Moulton, R. (2014). Do early dental visits reduce treatment and treatment costs for children? *Pediatric Dentistry, 36*(7), 489–93.
- Nowak, A. J., & Warren, J. J. (2016). Preventive dental care and counseling for infants and young children. Retrieved February 28, 2017, from https://www-uptodate-com.proxybz.lib.montana.edu:3443/contents/preventive-dentalcare-and-counseling-for-infants-and-youngldren?source=search_result&search=Preventive%20dental%20care%20and%20counselin

- g%20for%20infants%20and%20young%20children&selectedTitle=1~150
United States Department of Agriculture. (2019). WIC eligibility requirements. Retrieved from <https://www.fns.usda.gov/wic/wic-eligibility-requirements>
- U.S. Department of Health and Human Services. (2000). Oral Health in America: A Report of the Surgeon General. Rockville, MD: U.S. Department of Health and Human Services, National Institute of Dental and Craniofacial Research, National Institutes of Health, 2000.
- U.S. Department of Health and Human Services. (2012). Considerations for oral health integration in primary care practice for children. Retrieved from <https://www.hrsa.gov/sites/default/files/oralhealth/oralhealthprimarychildren.pdf>
- U.S. Department of Health and Human Services Federal Panel on Community Water Fluoridation. (2015). U.S. Public Health Service Recommendation for Fluoride Concentration in Drinking Water for the Prevention of Dental Caries. *Public Health Reports*, 130(4), 318–331.
- U.S. Preventative Services Task Force. (2014). Prevention of dental caries in children from birth through age 5 years: U.S. Preventive Services Task Force recommendation statement. Retrieved from <https://www.guideline.gov/summaries/summary/48054/prevention-of-dental-caries-in-children-from-birth-through-age-5-years-us-preventive-services-task-force-recommendation-statement?q=early+childhood+caries+prevention>
- Warren, J. J., Blanchette, D., Dawson, D. V., Marshall, T. A., Phipps, K. R., Starr, D., & Drake, D. R. (2016). Factors associated with dental caries in a group of American Indian children at age 36 months. *Community Dentistry and Oral Epidemiology*, 2006(44), 154–161.
- Warren, J. J., Weber-Gasparoni, K., Marshall, T. A., Drake, D. R., Dehkordi-Vakil, F., Dawson, D. V., & Tharp, K. M. (2009). A longitudinal study of dental caries risk among very young low SES children. *Community Dentistry and Oral Epidemiology*, 37(2), 116–122.
- Weinstein, P., Spiekerman, C., & Milgrom, P. (2009). Randomized equivalence trial of intensive and semiannual applications of fluoride varnish in the primary dentition. *Caries Res*, 2009(43), 484–490.
- Weintraub, J. A., Ramos-Gomez, F., Jue, B., Shain, S., Hoover, C. I., Featherstone, J. D. B., & Gansky, S. A. (2006). Fluoride varnish efficacy in preventing early childhood caries. *J Dent Res*, 85(2), 172–176, 2006.
- Winters, C. A., & Lee, H. J. (2018). Rural nursing: Concepts, theory, and practice (5th

ed.). New York, NY: Springer Publishing Company.

APPENDIX



ORAL HEALTH RISK ASSESSMENT TOOL

Oral Health Risk Assessment Tool

















The American Academy of Pediatrics (AAP) has developed this tool to aid in the implementation of oral health risk assessment during health supervision visits. This tool has been subsequently reviewed and endorsed by the National Interprofessional Initiative on Oral Health.

Instructions for Use

This tool is intended for documenting caries risk of the child, however, two risk factors are based on the mother or primary caregiver's oral health. All other factors and findings should be documented based on the child.

The child is at an absolute high risk for caries if any risk factors or clinical findings, marked with a  sign, are documented yes. In the absence of  risk factors or clinical findings, the clinician may determine the child is at high risk of caries based on one or more positive responses to other risk factors or clinical findings. Answering yes to protective factors should be taken into account with risk factors/clinical findings in determining low versus high risk.

Patient Name: _____ Date of Birth: _____ Date: _____
 Visit: 6 month 9 month 12 month 15 month 18 month 24 month 30 month 3 year
 4 year 5 year 6 year Other _____

RISK FACTORS	PROTECTIVE FACTORS	CLINICAL FINDINGS
<ul style="list-style-type: none">  Mother or primary caregiver had active decay in the past 12 months <input type="checkbox"/> Yes <input type="checkbox"/> No  Mother or primary caregiver does not have a dentist <input type="checkbox"/> Yes <input type="checkbox"/> No  Continual bottle/sippy cup use with fluid other than water <input type="checkbox"/> Yes <input type="checkbox"/> No  Frequent snacking <input type="checkbox"/> Yes <input type="checkbox"/> No  Special health care needs <input type="checkbox"/> Yes <input type="checkbox"/> No  Medicaid eligible <input type="checkbox"/> Yes <input type="checkbox"/> No 	<ul style="list-style-type: none">  Existing dental home <input type="checkbox"/> Yes <input type="checkbox"/> No  Drinks fluoridated water or takes fluoride supplements <input type="checkbox"/> Yes <input type="checkbox"/> No  Fluoride varnish in the last 6 months <input type="checkbox"/> Yes <input type="checkbox"/> No  Has teeth brushed twice daily <input type="checkbox"/> Yes <input type="checkbox"/> No 	<ul style="list-style-type: none">  White spots or visible decalcifications in the past 12 months <input type="checkbox"/> Yes <input type="checkbox"/> No  Obvious decay <input type="checkbox"/> Yes <input type="checkbox"/> No  Restorations (fillings) present <input type="checkbox"/> Yes <input type="checkbox"/> No  Visible plaque accumulation <input type="checkbox"/> Yes <input type="checkbox"/> No  Gingivitis (swollen/bleeding gums) <input type="checkbox"/> Yes <input type="checkbox"/> No  Teeth present <input type="checkbox"/> Yes <input type="checkbox"/> No  Healthy teeth <input type="checkbox"/> Yes <input type="checkbox"/> No

ASSESSMENT/PLAN

<p>Caries Risk: <input type="checkbox"/> Low <input type="checkbox"/> High</p> <p>Completed: <input type="checkbox"/> Anticipatory Guidance <input type="checkbox"/> Fluoride Varnish <input type="checkbox"/> Dental Referral</p>	<p>Self Management Goals:</p> <table border="0" style="width: 100%;"> <tr> <td><input type="checkbox"/> Regular dental visits</td> <td><input type="checkbox"/> Wean off bottle</td> <td><input type="checkbox"/> Healthy snacks</td> </tr> <tr> <td><input type="checkbox"/> Dental treatment for parents</td> <td><input type="checkbox"/> Less/No juice</td> <td><input type="checkbox"/> Less/No junk food or candy</td> </tr> <tr> <td><input type="checkbox"/> Brush twice daily</td> <td><input type="checkbox"/> Only water in sippy cup</td> <td><input type="checkbox"/> No soda</td> </tr> <tr> <td><input type="checkbox"/> Use fluoride toothpaste</td> <td><input type="checkbox"/> Drink tap water</td> <td><input type="checkbox"/> Xylitol</td> </tr> </table>	<input type="checkbox"/> Regular dental visits	<input type="checkbox"/> Wean off bottle	<input type="checkbox"/> Healthy snacks	<input type="checkbox"/> Dental treatment for parents	<input type="checkbox"/> Less/No juice	<input type="checkbox"/> Less/No junk food or candy	<input type="checkbox"/> Brush twice daily	<input type="checkbox"/> Only water in sippy cup	<input type="checkbox"/> No soda	<input type="checkbox"/> Use fluoride toothpaste	<input type="checkbox"/> Drink tap water	<input type="checkbox"/> Xylitol
<input type="checkbox"/> Regular dental visits	<input type="checkbox"/> Wean off bottle	<input type="checkbox"/> Healthy snacks											
<input type="checkbox"/> Dental treatment for parents	<input type="checkbox"/> Less/No juice	<input type="checkbox"/> Less/No junk food or candy											
<input type="checkbox"/> Brush twice daily	<input type="checkbox"/> Only water in sippy cup	<input type="checkbox"/> No soda											
<input type="checkbox"/> Use fluoride toothpaste	<input type="checkbox"/> Drink tap water	<input type="checkbox"/> Xylitol											

Treatment of High Risk Children

If appropriate, high-risk children should receive professionally applied fluoride varnish and have their teeth brushed twice daily with an age-appropriate amount of fluoridated toothpaste. Referral to a pediatric dentist or a dentist comfortable caring for children should be made with follow-up to ensure that the child is being cared for in the dental home.

Adapted from Ramos-Gomez FJ, Crystal YO, Ng MW, Crall JJ, Featherstone JD. Pediatric dental care: prevention and management protocols based on caries risk assessment. *J Calif Dent Assoc.* 2010;38(10):746-761; American Academy of Pediatrics Section on Pediatric Dentistry and Oral Health. Preventive oral health intervention for pediatricians. *Pediatrics.* 2003; 122(6):1387-1394; and American Academy of Pediatrics Section on Pediatric Dentistry. Oral health risk assessment timing and establishment of the dental home. *Pediatrics.* 2003;111(5):1113-1116.
 The recommendations in this publication do not indicate an exclusive course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate. Copyright © 2011 American Academy of Pediatrics. All Rights Reserved. The American Academy of Pediatrics does not review or endorse any modifications made to this document and in no event shall the AAP be liable for any such changes.

Oral Health Risk Assessment Tool Guidance

Timing of Risk Assessment

The Bright Futures/AAP "Recommendations for Preventive Pediatric Health Care," (ie, Periodicity Schedule) recommends all children receive a risk assessment at the 6- and 9-month visits. For the 12-, 18-, 24-, 30-month, and the 3- and 6-year visits, risk assessment should continue if a dental home has not been established. View the Bright Futures/AAP Periodicity Schedule—http://brightfutures.aap.org/clinical_practice.html.

Risk Factors

⚠ Maternal Oral Health

Studies have shown that children with mothers or primary caregivers who have had active decay in the past 12 months are at greater risk to develop caries. **This child is high risk.**

Maternal Access to Dental Care

Studies have shown that children with mothers or primary caregivers who do not have a regular source of dental care are at a greater risk to develop caries. A follow-up question may be if the child has a dentist.

Continual Bottle/Sippy Cup Use

Children who drink juice, soda, and other liquids that are not water, from a bottle or sippy cup continually throughout the day or at night are at an increased risk of caries. The frequent intake of sugar does not allow for the acid it produces to be neutralized or washed away by saliva. Parents of children with this risk factor need to be counseled on how to reduce the frequency of sugar-containing beverages in the child's diet.

Frequent Snacking

Children who snack frequently are at an increased risk of caries. The frequent intake of sugar/refined carbohydrates does not allow for the acid it produces to be neutralized or washed away by saliva. Parents of children with this risk factor need to be counseled on how to reduce frequent snacking and choose healthy snacks such as cheese, vegetables, and fruit.

Special Health Care Needs

Children with special health care needs are at an increased risk for caries due to their diet, xerostomia (dryness of the mouth, sometimes due to asthma or allergy medication use), difficulty performing oral hygiene, seizures, gastroesophageal reflux disease and vomiting, attention deficit hyperactivity disorder, and gingival hyperplasia or overcrowding of teeth. Premature babies also may experience enamel hypoplasia.

Protective Factors

Dental Home

According to the American Academy of Pediatric Dentistry (AAPD), the dental home is oral health care for the child that is delivered in a comprehensive, continuously accessible, coordinated and family-centered way by a licensed dentist. The AAP and the AAPD recommend that a dental home be established by age 1. Communication between the dental and medical homes should be ongoing to appropriately coordinate care for the child. If a dental home is not available, the primary care clinician should continue to do oral health risk assessment at every well-child visit.

Fluoridated Water/Supplements

Drinking fluoridated water provides a child with systemic and topical fluoride exposure, a proven caries reduction intervention. Fluoride supplements may be prescribed by the primary care clinician or dentist if needed. View fluoride resources on the Oral Health Practice Tools Web Page <http://aap.org/oralhealth/PracticeTools.html>.

Fluoride Varnish in the Last 6 Months

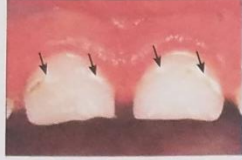
Applying fluoride varnish provides a child with highly concentrated fluoride to protect against caries. Fluoride varnish may be professionally applied and is now recommended by the United States Preventive Services Task Force as a preventive service in the primary care setting for all children through age 5 <http://www.uspreventiveservicestaskforce.org/Page/Topic/recommendation-summary/dental-caries-in-children-from-birth-through-age-5-years-screening>. For online fluoride varnish training, access the Caries Risk Assessment, Fluoride Varnish, and Counseling Module in the Smiles for Life National Oral Health Curriculum, www.smilesforlife.org/oralhealth.org.

Tooth Brushing and Oral Hygiene

Primary care clinicians can reinforce good oral hygiene by teaching parents and children simple practices. Infants should have their mouths cleaned after feedings with a wet soft washcloth. Once teeth erupt it is recommended that children have their teeth brushed twice a day. For children under the age of 3 (until 3rd birthday) it is appropriate to recommend brushing with a smear (grain of rice amount) of fluoridated toothpaste twice per day. Children 3 years of age and older should use a pea-sized amount of fluoridated toothpaste twice a day. View the AAP Clinical Report on the use of fluoride in the primary care setting for more information <http://pediatrics.aappublications.org/content/early/2014/08/19/peds.2014-1699>.



Clinical Findings



⚠ White Spots/Decalcifications

This child is high risk.

White spot decalcifications present—immediately place the child in the high-risk category.



⚠ Obvious Decay

This child is high risk.

Obvious decay present—immediately place the child in the high-risk category.



⚠ Restorations (Fillings) Present

This child is high risk.

Restorations (Fillings) present—immediately place the child in the high-risk category.



Visible Plaque Accumulation

Plaque is the soft and sticky substance that accumulates on the teeth from food debris and bacteria. Primary care clinicians can teach parents how to remove plaque from the child's teeth by brushing and flossing.



Gingivitis

Gingivitis is the inflammation of the gums. Primary care clinicians can teach parents good oral hygiene skills to reduce the inflammation.



Healthy Teeth

Children with healthy teeth have no signs of early childhood caries and no other clinical findings. They are also experiencing normal tooth and mouth development and spacing.

For more information about the AAP's oral health activities email oralhealth@aap.org or visit www.aap.org/oralhealth.

The recommendations in this publication do not indicate an exclusive course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate. Copyright © 2011 American Academy of Pediatrics. All Rights Reserved. The American Academy of Pediatrics does not review or endorse any modifications made to this document and in no event shall the AAP be liable for any such changes.