Published in final edited form as:
J Calif Dent Assoc. 2010 October ; 38(10): 746–761.

Pediatric Dental Care: Prevention and Management Protocols Based on Caries Risk Assessment

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Abstract

Recent increases in caries prevalence in young children, especially among minorities and the economically disadvantaged, highlight the need for early establishment of dental homes and simple, effective infant oral care preventive programs for all children as part of a medical disease prevention management model.[1–3] This article presents an updated approach and practical tools for pediatric dental caries management by risk assessment, CAMBRA, in an effort to stimulate greater adoption of infant oral care programs among clinicians and early establishment of dental homes for young children.

A 2007 publication by the Centers for Disease Control and Prevention reported that although dental caries prevalence had declined significantly among school-aged children since the early 1970s, caries rates in children aged 2–5 years had increased.[2] This confirmed early childhood caries (ECC) as the most prevalent chronic childhood disease in the United States; five times more common than asthma and seven times more common than hayfever.[3–5] ECC is more prevalent among young children in low socioeconomic populations and among racial/ethnic minorities who are also more likely to face barriers in accessing care.[6] Caries is a preventable infectious disease and it is well-documented that one of the best predictors for future tooth decay is the presence of current caries or evidence of prior caries experience.[7,8]

Despite awareness of an increase in ECC prevalence, infant oral health care, as well as the establishment of a dental home by age 1, or when the first tooth erupts, has not yet become the standard of care in clinical practice. The Dental Health Foundation's report, *Mommy It Hurts to Chew* indicated that 28 percent of California third-graders had untreated tooth decay.[6,9] It also showed that only 35 percent of reporting families had private dental

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insurance, 42 percent had some type of government-funded coverage, and nearly a quarter (23 percent) had no dental coverage at all.[6]

In 2007, a half-million school-aged children missed at least one day of school in California due to dental problems.[10] This resulted in $29.7 million of lost revenue to school districts.[10] In the National Survey of Children's Health, California ranked near the bottom in children's oral health (only Arizona and Texas ranked lower).[11]

Several reports have shown that preventing the onset of ECC is more cost effective compared to treating advanced caries. Typical costs of comprehensive oral care visits for preschoolers are considerably less than the cost of emergency room treatment or extensive restorations requiring sedation or treatment under general anesthesia.[12,13] Early identification of risk indicators and implementation of oral health preventive practices at a young age can reduce or avoid caries progression.[14] The American Dental Association, the American Academy of Pediatric Dentistry (AAPD), the American Academy of Pediatrics (AAP),the American Association of Public Health Dentistry (AAPHD), and the Academy of General Dentistry (AGD), all recommend that a child see a dentist to establish a dental home by age 1 or within six months from eruption of the first primary tooth.[15–19] A dental home is defined as the ongoing relationship between the dentist and the patient, inclusive of all aspects of oral health care delivered in a comprehensive, continuously accessible, coordinated, and family centered way.[20] Establishment of a dental home should include referrals to dental specialists when appropriate.[21]

Despite widespread support for establishing a dental home by age 1, infant oral health visits have not yet been embraced universally by practicing clinicians. This situation persists even as dental and other health professionals recognize the growing prevalence of early childhood caries.

This article presents an updated pediatric dental caries management by risk assessment (CAMBRA) approach, along with practical tools to use in caring for young children, to stimulate greater adoption of infant oral health care programs by clinicians.[14] Age- and risk-specific "care paths" are included as a part of a "disease-prevention management model."

Perinatal Oral Health

Caries is a transmissible, infectious disease. When the disease is allowed to progress, surface cavitation and destruction of dental tissue occur over time. Due to their ability to stick to smooth tooth surfaces and produce copious amounts of acid, the mutans streptococci (MS) group of bacteria is considered one of the most important groups of pathogens in the cariogenic process.[20]

Primary caregivers can transmit these organisms to their children, which results in MS colonization of the child's oral cavity.[21] There is a direct relationship between adult caregiver MS levels and MS levels and dental caries prevalence in their children.[21] Factors influencing colonization include frequent sugar exposure in infants and habits that allow salivary transfer from mothers to infants. Maternal factors, such as high levels of MS, poor oral hygiene, low socioeconomic status, and frequent snacking increase the risk of bacterial transmission to their infants.[22] Infants have tested with high levels of MS even before the eruption of their first tooth.[22]

Therefore, it is critical to consider an infant oral care program in the context of a mother-child pair or dyad, which includes comprehensive maternal perinatal oral health care and treatment.

Dental professionals have begun to recognize the critical role a mother plays in ensuring her child's oral health. Improving expectant mothers' oral health by reducing pathogenic bacteria levels in their own mouths can delay the acquisition of oral bacteria in their children and may delay the development of early childhood caries.[23] Restoring carious lesions, by itself, is insufficient to reduce a mother's risk of transmitting cariogenic bacteria to her offspring. An effective perinatal program should institute a long-range, pre- and postpartum maternal strategy to reduce maternal MS and lactobacilli levels through therapeutic interventions and counseling on lifestyle modifications.[23]

Unfortunately, pregnant women often do not receive oral health care and education in a timely manner. Many women do not know they should seek dental care during their pregnancy and for the many others who do, they often encounter dentists unwilling to provide dental care during pregnancy. New mothers are more likely to be receptive to ideas that would improve their offspring's oral health and both dental and obstetric providers have a prime opportunity to educate mothers on changes that could improve their children's oral health.[24] In 2010, the CDA Foundation published evidence-based guidelines for health profession on oral health for pregnant women and infants, which indicate that perinatal oral health care is not only safe but necessary to the oral and overall health of the pregnant mother but also that of her infant.[23]

In light of the importance of perinatal oral health in preventing early childhood caries, and the need to intervene early for mother and child in a "dual parallel track" of treatment and disease prevention management, collaborations and partnerships among all health professionals are encouraged to foster early and timely oral health care and referrals for expectant mothers.

The American Academy of Pediatrics has focused in improving children's oral health through its Oral Health Initiative and Section on Pediatric Dentistry and Oral Health (aap.org/oralhealth). Through these efforts, pediatricians are becoming more educated on oral health and their role in preventing disease and referring to a dental home. However, many continue to be unaware of the AAP's current oral health recommendations and more work needs to be done to disseminate this policy and raise awareness. Efforts to increase awareness of incorporating oral health evaluations into well-child visits are crucial since pediatricians often see children on an average of up to six times before age 2.

In addition to pediatricians, family practitioners, and other medical providers who see children frequently during infancy and early childhood are also ideally suited to assess young children for caries risk assessment and refer for dental care.[25] A partnership between medical and dental professionals is important to increase patient awareness of the importance of establishing a dental home by the child's first birthday, assessing caries risk, and coordinating care. As an important step in that direction, the AAP's "Bright Futures Guidelines for Health Supervision of Infants, Children, and Adolescents," which focuses on health promotion and prevention for children and their families, not only advocates for a dental home but also provides extensive information, education and training opportunities, and materials on pediatric oral health for a broad range of practitioners. The AAP is currently conducting a Bright Futures Implementation Project, Brightening Oral Health, to pilot test an oral health risk assessment tool for the primary care practitioner. See TABLE 1.[25]

Initial Infant Oral Care Visit

Infants and parents can benefit from early infant oral health visits and early establishment of a dental home. Infant oral health visits should include caries risk assessment, individualized preventive strategies and anticipatory guidance.[27] Periodic supervision of care intervals

(periodicity) should be determined based on each patient's risk of disease and include age- and risk-appropriate "care paths" for management of the disease process.[14]

Infants and toddlers should not be expected to be cooperative during an oral examination. Crying and movement are developmentally age-appropriate behaviors for young children. Explaining expected behaviors to parents prior to, during and after infant care visits can help allay any fears and concerns they may have.

There is a simple six-step protocol for an infant oral care visit:

1. Caries risk assessment;
2. Proper positioning of the child (knee-to-knee exam);
3. Age-appropriate toothbrushing prophylaxis;
4. Clinical examination of the child's oral cavity and dentition;
5. Fluoride varnish treatment; and,
6. Assignment of risk, anticipatory guidance, self-management goals and counseling.

1. Caries Risk Assessment

An individualized risk assessment of an infant or toddler for developing caries serves as the foundation for health care providers and parents/caregivers to identify and understand the child's ECC risk factors. The specific information gained from a systematic assessment of caries risk guides the dentist in the decision-making process for treatment and preventive protocols for children already with disease and those deemed at risk. For optimal outcomes, caries risk assessment should be done as early as possible, and preferably, prior to the onset of the disease process. Since caries in the primary dentition is a strong predictor of caries in the permanent dentition, caries risk assessment and therapeutic management of the disease is crucial, as is the subsequent follow-up.[28,29]

Risk factors are determined from an interview with the parent and from a clinical assessment of the child. Further details, where evidence-based disease indicators, biological risk factors and preventive factors are described, have been previously published by Ramos-Gomez et al. and are accessible via the web at cdafoundation.org/journal.[14] The example provided in TABLE 2 is a one-page, practical form for use in the dental office and has been modified from the original form published by Ramos-Gomez et al. based on the collective experience of pediatric dentists using the form and recommendations developed by the NIDCR-PRIME research at the SF NAHC and the CAMBRA coalition committee of West Coast Dental Schools. TABLE 3 in the present article offers further modifications of the original published form that is an alternative currently suggested by the AAPD.

In practice, the caries risk assessment would begin in the dental office with an initial interview with the parent or caregiver. The assessment interview should explore biological or lifestyle predisposing risk factors that contribute to the development or progression of caries. Examples of these risk factors include recently placed dental restorations or active caries in the mother, low health literacy of caregiver, frequent intake of fermentable carbohydrates by the infant, sleeping with a bottle that contains liquids other than water, prolonged use of a sippy cup containing milk, juice, or a sweetened beverage. The practitioner can simply circle "Yes" beside the risk or protective factors that apply in order to make a judgment as to whether the risk factors outweigh the protective factors or vice versa, thereby determining a risk status of low, moderate, or high. The risk level will then dictate which care path to be used, as described below.

Protective factors are indicators of preventive activities that may reduce a child's risk for the onset extension of ECC and should be assessed during the parental interview. These factors include optimal exposure to fluoride, access to regular dental care (e.g., the presence of a dental home), and consistent daily brushing with fluoride toothpaste.

Disease indicators are indications of current and active caries and are obtained from the clinical examination of the child and include cavitated carious lesions, white spot lesions/ decalcifications, and recent restorations. Biological risk factors are also observed at the clinical examination and include the presence of plaque, gingival bleeding (an indicator of inadequate oral hygiene), and dry mouth. In older children, the presence of dental or orthodontic appliances increases plaque retention and the risk for caries.

The caries balance concept (FIGURE 1) states that the progression or reversal of dental caries is determined by the balance between pathological factors and caries protective factors.[30–33] A risk assessment categorization of low, moderate, or high is based on a preponderance of the factors circled as "Yes" on the caries risk assessment form. When risk factors outweigh the protective factors, it indicates an increased likelihood for the development of caries, which would place the child in a high-risk category. When protective factors prevail and risk factors are controlled, the child can be considered low risk. The clinician's experience, expertise, and personal historical experience with his patient and the child's caregivers, is of vital importance in determining a child's risk, which serves as the basis for an individualized treatment plan for each infant/caregiver. These specific patient conditions and risks will help the practitioner and the parents understand the factors that contribute to or protect the patient from caries.

2. Proper Positioning

Proper positioning of the child is critical to conducting an effective and efficient clinical exam in a young child. In general, the knee-to-knee position should be used with children ages 6 months to 3 years, or up to age 5 with children who have special health care needs. Children older than 3 may be able to sit forward on their caregiver's lap or sit alone in a chair. Examiners and caregivers need to work together to transition the child smoothly from the interview to the exam. The clinician should explain what will happen ("Tell-Show-Do") prior to starting and anticipate that young children may cry since crying is developmentally appropriate for children at this age. If the child can perceive a friendly and comfortable interaction between the clinician and caretaker, a positive tone is frequently set for the visit. Knee-to-knee positioning allows the child to see the parent throughout the exam. It also allows the caregiver to observe clinical findings and hygiene demonstrations directly, while gently helping to stabilize the child safely for the clinical examination.

3. Toothbrush Prophylaxis

A toothbrush prophylaxis is efficient in removing plaque in most young children. It is also nonthreatening to young children and serves to demonstrate the proper technique of brushing to the caregiver. The examiner retracts the child's lips and cheeks and demonstrates brushing along the gingival margins (FIGURE 2). The spongy handle of an age-appropriate toothbrush can be used to prop open the child's mouth. The handle of a second toothbrush can be used as a mouth prop. During this "Tell-Show-Do" encounter, the caregiver should be encouraged to brush their child's teeth at least twice a day, especially before bedtime. The use of fluoride toothpaste should be emphasized since fluoride has been shown to be effective both systemically and topically to prevent caries. Parents and caregivers should be instructed to use a "pea-sized" amount of fluoride toothpaste for children age 2–6 and a "smear" for children under age 2.[34] (FIGURE 3) Children should be taught to spit out excess toothpaste during and after brushing.

4. Clinical Examination

Clinical examination can be accomplished while counting the child's teeth aloud, using the toothbrush handle as a mouth prop, if necessary. Many providers make a game of this task, singing songs, engaging the child's attention, and, if all else fails, distracting the child with a brightly colored toothbrush or toy. Praise the child at each step for their cooperation and good behavior. While counting the teeth, the examiner also inspects the soft tissues, hard tissues, and occlusion, if the child is able to cooperate. Data from the clinical exam results should be combined with data from the caregiver interview to determine the child's overall caries risk, establish an oral diagnosis, and formulate an individualized treatment plan.

The following information should be documented:

- Visible plaque and location;
- White spot lesions;
- Demineralized or remineralized enamel;
- Brown spots on the occlusal surfaces that may indicate caries;
- Tooth defects, deep pits/fissures, tooth anomalies;
- Missing and decayed teeth;
- Existing restorations;
- Defective restorations;
- Gingivitis or other soft tissue abnormalities;
- Occlusion; and
- Indications of trauma.

5. Fluoride Treatment

Fluoride is an important and cost-effective prevention method to strengthen tooth enamel and prevent decay. The ADA recommends that high caries risk children receive a full-mouth topical fluoride varnish application with reapplication consistently at three months intervals.[35] A minimum of every six months is recommended for children at moderate caries risk, even if the child lives in a community that already receives the benefits of water fluoridation[34] (FIGURE 3). Practitioners should also be aware that fluoridation of public water supplies can vary greatly by community and by the water source. Only 27.1 percent of Californians have access to optimally fluoridated community (tap) water.[9] Providers should reiterate the cumulative benefit of the fluoride varnish, even if it has been mentioned earlier in the visit.[40] Following the fluoride application, the caregiver should be reminded not to allow brushing of the child's teeth or eating crunchy/sticky foods for the rest of the day to maximize the effect of the fluoride varnish.

6. Risk-Classification, Anticipatory Guidance, Self-Management Goals and Counseling

An individualized treatment plan (TABLES 4 and 5) for each infant/caregiver is determined by the risk determined from the parent interview and the clinical examination of the child. A dual treatment plan approach is essential for moderate and high caries risk children and their parent/caregivers. Strategies need to be employed to modify the maternal transmission of cariogenic bacteria to infants through the potential use of chlorhexidine rinse and xylitol products for caregivers, and fluoride varnish for both the caregiver and the child.[36] Additionally, the necessary changes in the child's diet, toothbrushing, and fluoride

application can be identified from the risk analysis. Expected parental compliance to recommended treatment protocols is essential for moderate and high caries risk children.

Parents should be given additional information and anticipatory guidance on the prevention of dental disease that is specific to the their child's needs and caries risk factors, e.g., information on oral hygiene, growth and development, teething, digit or pacifier habits, oral habits, diet and nutrition, and injury prevention (FIGURE 4). The anticipatory guidance approach is designed to take advantage of time-critical opportunities to implement preventive health practices and reduce the child's risk of preventable oral disease.[37]

An important component of the visit is to counsel parents to change specific risk factors, which may contribute to caries activity or the child's caries risk. Traditionally, general recommendations to parents such as "brush your teeth twice a day and don't eat candy," have had very limited success. Research shows that family-centered approaches and individualized recommendations are more promising in engaging parents to change specific practices.

Motivational interviewing is a counseling technique that relies on two-way communication between the clinician and the patient or parent and establishes a therapeutic alliance (rapport and trust).[38] In this process the clinician asks questions to help parents identify problems; listens to their concerns; encourages self-motivational statements; prepares them for change (discussing the hurdles that interfere with action); sets attainable specific self-management goals; responds to resistance; schedules follow-up appointments; and prepares the parent for their family's specific and unique difficulties, which inevitably arise when instituting a consistent, lifetime dental care program for their child.[39]

Following the brief motivational interviewing (counseling), the parent/caregiver is asked to select two self-management goals or recommendations as their assignments before the next re-evaluation dental visit and to commit to the two goals selected, and is informed that the oral health care providers will follow-up on those goals with them at the next appointment (FIGURE 4).

Recall Visits and Recall Periodicity

The clinician must consider each child's individual needs to determine the appropriate interval and frequency for oral examination; some infants and toddlers with high caries risk should be re-evaluated on a monthly basis.[37] Most children at high risk need to be seen on a three-month interval for re-evaluation, additional counseling and clinical preventive services (e.g., fluoride varnish). Children in the moderate-risk category usually are placed on a six-month interval, while low-risk children can be re-evaluated at six- to 12-month intervals.

Parents who have demonstrated compliance with recommendations for three to six months should be scheduled back for a follow-up visit with their child for reassessment of risk. Parents need encouragement early on when new behavioral change is required and should be questioned regarding any difficulties with following recommendations. Reassessment of risk factors and monitoring the progress of improvements in established self-management goals are essential elements of infant oral care visits. Modifications of recommendations or positive reinforcement for successful changes are necessary to achieve and sustain successful risk modification. Parents should be reminded that changing risk factors and lifestyles do not happen overnight and require persistence.

Summary

Pediatric dentists and general dentists have a critical role in preventing and reducing the severity of early childhood caries. Embracing the concepts of caries risk assessment, early establishment of a dental home, medical home with their recommendations integrated within the family home practices are essential. Perinatal and infant oral health and implementation of the techniques, protocols, and care paths highlighted in this paper in a clinical practice can help break the cycle of dental disease in high-risk families and reduce burden of disease. Caries risk assessment, individualized counseling, clinical preventive services such as fluoride varnish applications, xylitol use, and referral of high-risk infants and children to dental homes are increasingly being recognized as important elements of efforts to engage other pediatric health care providers in reducing the prevalence and severity of early childhood caries.

Many providers adapt caries risk assessment tools to meet their individual practice needs. For example, the Western CAMBRA group uses and recommends the forms presented in TABLE 2. AAPD has endorsed and adapted as their 2010 Risk Assessment the guideline presented in TABLE 3. Also, some pediatricians have been using an AAP-recommended sticker version of caries risk assessment tools on their charts (TABLE 1). Whatever form is chosen, what remains critical is the process of assessing caries risk on a routine basis in an individualized and age-specific manner that can empower practitioners and parents/caregivers in identifying each child's risk and protective behaviors for a targeted "age- and risk-specific" approach to lower their risk for ECC.

Acknowledgments

The authors wish to acknowledge NIDCR — R21DE018650-01 for providing support for research and the PRIME team and staff at the San Francisco Native American Health Center for development of the CAMBRA 0-5 instrument. They also thank Dr. Norman Tinanoff for contributing his support and knowledge to this project; CSPD and Dr. Paul Reggiardo for their invitation to contribute for this publication; Ms. Debra Tom for her editorial assistance; and in addition, to HRSA — Oral Health Disparities Collaborative for implementation of the CAMBRA instrument and development of the self-management goal instrument through High Plains Health Center. The authors also wish to acknowledge the Western CAMBRA coalition and the American Academy of Pediatric Dentistry for its support and leadership on development of the caries risk assessment tool, and the committee and staff of the American Academy of Pediatrics and their project, "Brightening Oral Health: Implementing Oral Health Risk Assessments in Pediatric Care."

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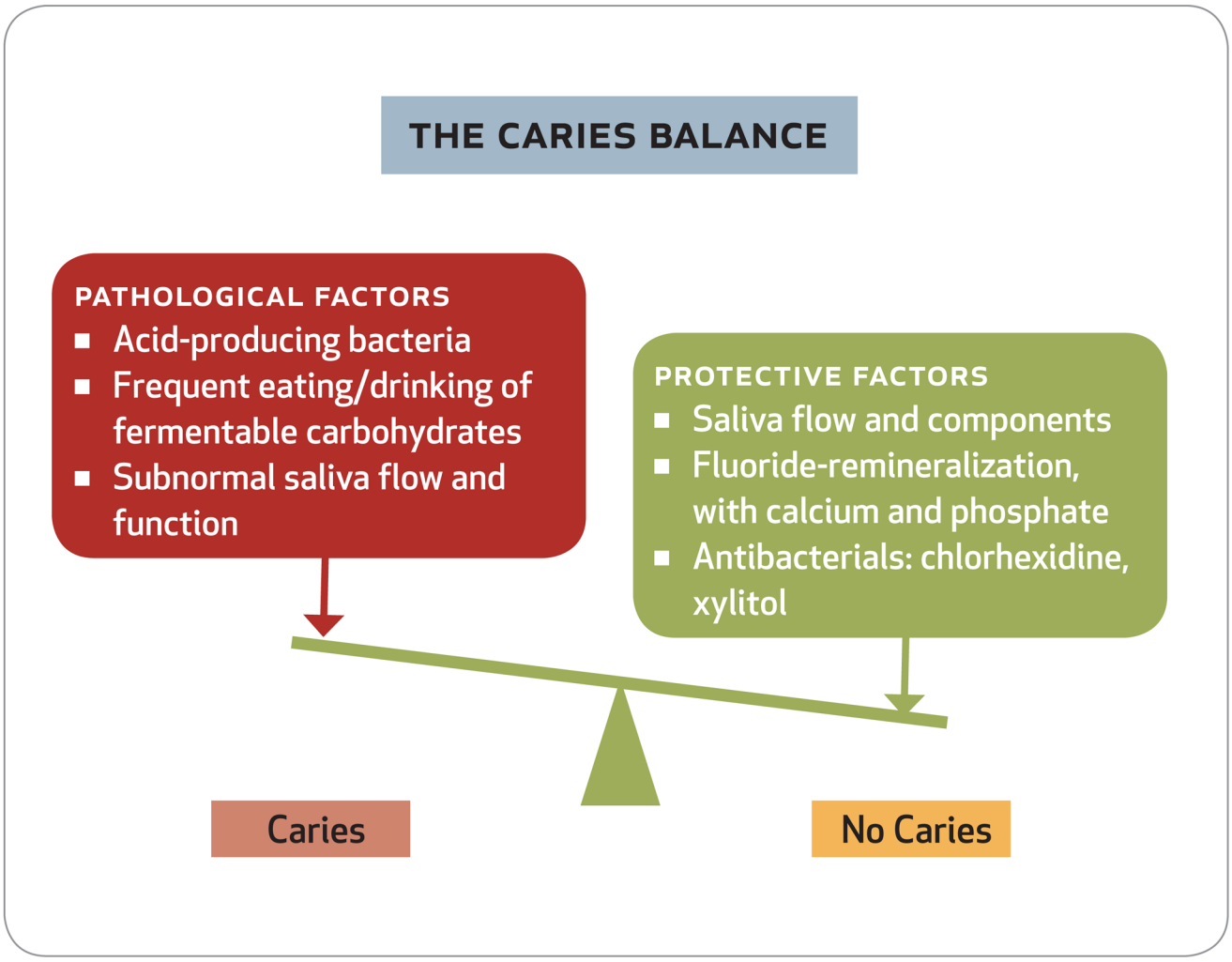

FIGURE 1.
Caries balance.

FIGURE 2.
Knee-to-knee positioning.

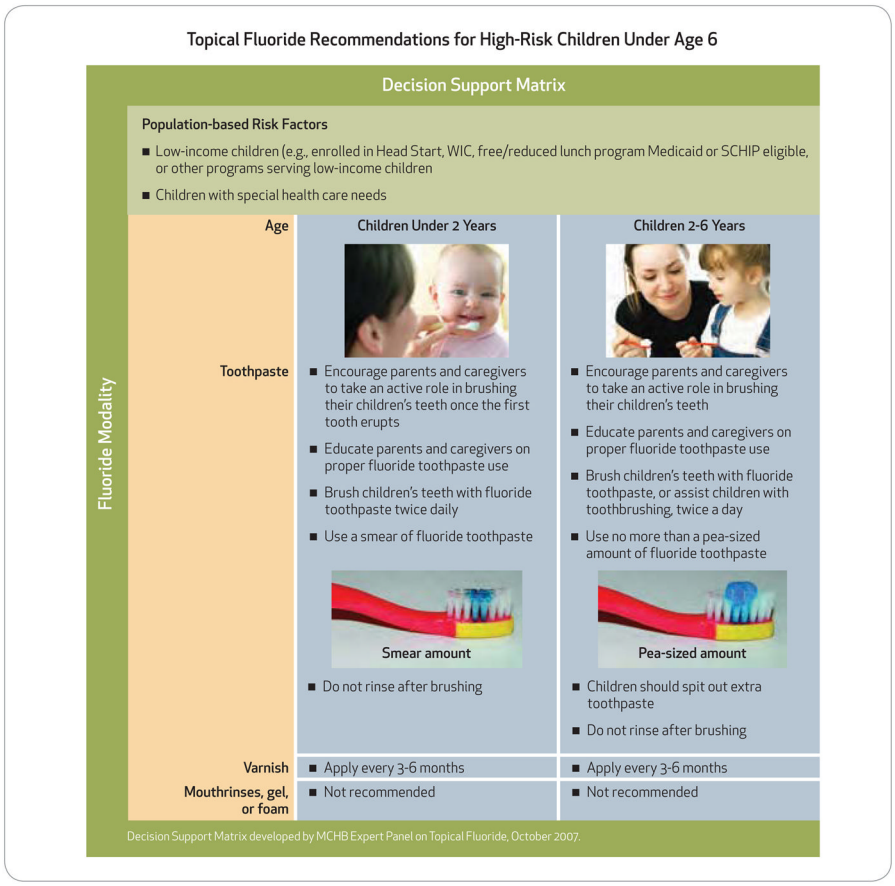

FIGURE 3.
Topical fluoride recommendations for high-risk children younger than age 6.

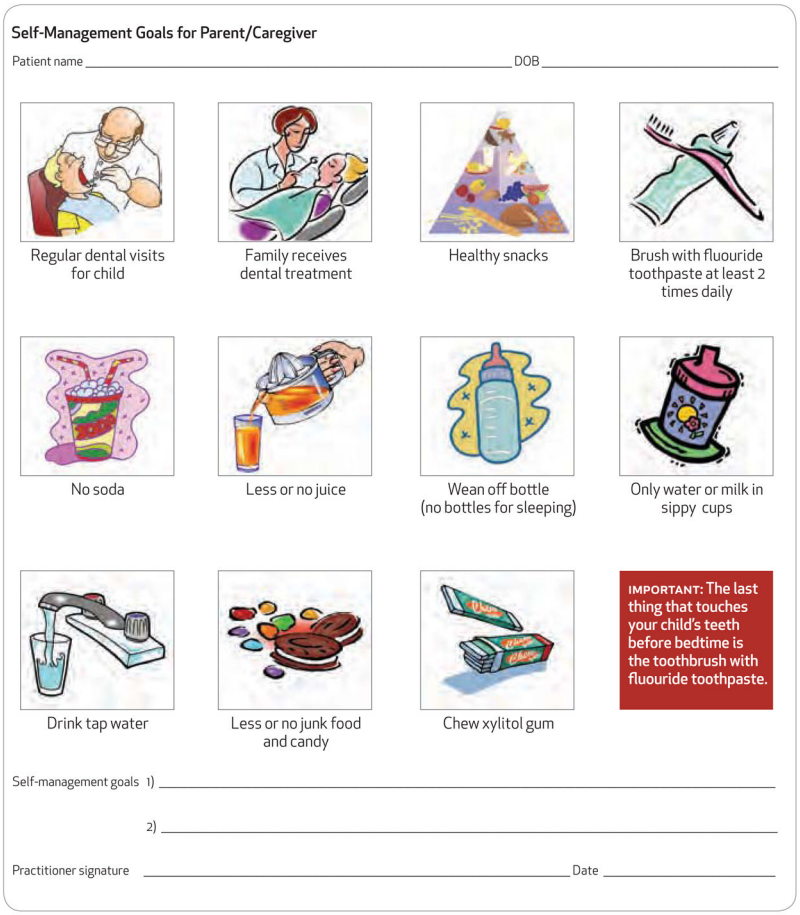

FIGURE 4.
Self-management goals.

TABLE 1

AAP-Recommended Sticker Version of Caries Risk Assessment Tools

AAP-Recommended Sticker Version of Caries Risk Assessment Tools

Brightening Oral Health Project

Oral Health Risk Assessment Tool

This is a: 9-month visit ❑
12-month visit ❑

Risk Factors	Protective Factors	Disease Indicators (clinical examination)
Has mother or primary caregiver had active decay in the past 12 months? Yes ❑ No ❑	Yes No	❑ White spots or visible decalcifications
Does mother have a dentist? Yes ❑ No ❑	❑ ❑ Existing dental home	❑ Obvious decay
Other risk factors:	❑ ❑ Drinks fluoridated water or takes F supplements	❑ Restorations present
Yes No	❑ ❑ F varnish in the last 6 months	❑ Visible plaque accumulation
❑ ❑ Continual bottle/sippy cup use with fluid other than water	❑ ❑ Child has teeth brushed daily with fluoridated toothpaste*	❑ Gingivitis (swollen/bleeding gums)
❑ ❑ Frequent snacking		❑ None
❑ ❑ Special health care needs		❑ No Teeth Present
❑ ❑ Low SES/health literacy/ Medicaid eligible		

Caries Risk: ❑ Low ❑ High

Completed: ❑ Anticipatory guidance ❑ Fluoride varnish Referral to: _____

Goals:

*Current AAPD recommendation, not currently the recommendation of Bright Futures or the CDC.

Adapted from: Preventive Oral health Intervention for Pediatricians (2008), Oral Health Risk Assessment, Timing and Establishment of the Dental Home (2003), and Ramos-Gomez, FJ, Crall, et al, Featherstone J, Caries risk assessment appropriate for the age 1 visit (infants and toddlers). *J Calif Dent Assoc* 35(10) 697–702, October 2007. Distributed with funding from Crest and Oral-B Health Smiles, P&G Live, Learn and Thrive Initiative.

TABLE 2

CAMBRA — Caries Risk Assessment Form for Age 0 to 5 Years

CAMBRA — Caries Risk Assessment Form for Age 0 to 5 Years

Patient Name:_____ ID#_____ Age:_____ Date:_____

Assessment Date:_____ Please circle: BASELINE, three-month follow-up or six-month follow-up

	1	2	3	
NOTE: Any one Yes in Column 1 signifies likely "High Risk" and an indication for bacteria tests	Yes =CIRCLE	Yes =CIRCLE	Yes =CIRCLE	Comments:
1. Risk Factors (Biological Predisposing Factors)				
(a) Mother or primary caregiver has had active dental decay in the past 12 months*	Yes			
(b) Bottle with fluid other than water, plain milk and/or plain formula		Yes		Type of fluid:
(c) Continual bottle use		Yes		
(d) Child sleeps with a bottle, or nurses on demand		Yes		
(e) Frequent (>3 times/day) between-meal snacks of sugars/cooked starch/sugared beverages		Yes		#times/day:
(F) Saliva-reducing factors are present, including: 1. medications (e.g., some for asthma [albuterol] or hyperactivity) 2. medical (cancer treatment) or genetic factors		Yes		
(g) Child has developmental problems/CSHCN (child with special health care needs)		Yes		
(h) Caregiver has low health literacy, is a WIC participant and/or child participates in Free Lunch Program and/or Early HeadStart		Yes		
2. Protective Factors				
(a) Child lives in a fluoridated community or takes fluoride supplements by slowly dissolving or as chewable tablets (note resident ZIP code)			Yes	
(b) Child drinks fluoridated water (e.g., use of tap water)			Yes	
(c) Teeth brushed with fluoridated toothpaste (pea size) at least once daily			Yes	
(d) Teeth brushed with fluoride toothpaste (pea size) at least 2x daily			Yes	
(e) Fluoride varnish in last six months			Yes	
(f) Mother/caregiver chews/dissolves xylitol chewing gum/lozenges 2–4x daily			Yes	
3. Disease Indicators/Risk Factors – Clinical Examination of Child				
(a) Obvious white spots, decalcifications enamel defects or obvious decay present on the child's teeth*	Yes			
(b) Restorations present (past caries experience for the child)*	Yes			
(c) Plaque is obvious on the teeth and/or gums bleed easily		Yes		
(d) Visually inadequate saliva flow		Yes		

Child's Overall Caries Risk* (circle): High Moderate Low

Child: Bacteria/Saliva Test Results: MS: LB: Flow Rate: Ml/min: Date:

Caregiver: Bacteria/Saliva Test Results: MS: LB: Flow Rate: ml/min: Date:

Self-management goals:

1)_____

2)_____

VISUALIZE
CARIES BALANCE

*Assessment based on provider's judgment of balance between risk factors/disease indicators and protective factors.

TABLE 3

Example of a Caries Risk Assessment Form for 0–5 Year Olds** as adopted in 2010 by the American Academy of Pediatric Dentistry (AAPD)

Example of a Caries Risk Assessment Form for 0–5 Year Olds as adopted in 2010 by the American Academy of Pediatric Dentistry (AAPD)**

Biological Factors	High-Risk Factors	Moderate-Risk Factors	Protective Factors
Mother/primary caregiver has active caries	Yes		
Parent/caregiver has low socioeconomic status	Yes		
Child has >3 between-meal sugar containing snacks or beverages per day	Yes		
Child is put to bed with a bottle containing natural or added sugar	Yes		
Child has special health care needs		Yes	
Child is a recent immigrant		Yes	
Protective Factors			
Child receives optimally fluoridated drinking water or fluoride supplements			Yes
Child has teeth brushed daily with fluoridated toothpaste			Yes
Child receives topical fluoride from health professional			Yes
Child has dental home/regular dental care			Yes
Clinical findings			
Child has more than one dmfs	Yes		
Child has active white spot lesions or enamel defects	Yes		
Child has elevated mutans streptococci	Yes		
Child has plaque on teeth		Yes	

** Modified from Ramos-Gomez et al., *J Calif Dent Assoc* 35(10):687-702, October 2007, and ADA Caries Risk Assessment forms.

Instructions:

1. Circle the "Yes" wherever there is a yes answer to the question or observation for the patient or caregiver.

2. Use the "Yes" answers in the risk factor columns (red and yellow) versus the "Yes" answers in the protective factor column (green) to caries risk level of low, moderate, or high. If there are clinical observations that indicate current and ongoing disease (frank cavities) then these will outweigh the protective factors. When the restorative work is done and preventive (protective) measures are in place, the green "yes" answers can outweigh the risk factors.

Overall assessment of the child's dental caries risk High Moderate Low

TABLE 4

Example of a Caries Management Protocol for 0–2 Year Olds

The science of caries prevention continues to evolve. This table is an illustration on how to develop care paths for a practice's patients. There are many alternative approaches to the prevention and treatment of dental caries, with more emerging continuously. Care paths should remain dynamic and change over time as the effectiveness of new as well as current protocols is validated by scientific evidence.

Risk Category Ages 0 to 2	Diagnostic			Preventive Intervention							Restoration**
	Periodic Oral Exams	Radiographs*	Saliva Test	Fluoride	Xylitol Products	Sealants	Antibacterials	Anticipatory Guidance/Counseling	Self-Management Goals	White Spot / Precavitated Lesions	Existing Lesions
Low	Annual	Posterior bitewings at 12–24 month intervals if proximal surfaces cannot be examined visually or with a probe	Optional baseline	**In office:** No **Home:** Brush 2× day w/ smear of F toothpaste	Not Required	No	No	Yes	No	n/a	n/a
Moderate	Every 6 months	Posterior bitewings at 6–12 month intervals if proximal surfaces cannot be examined visually or with a probe	Recommended	**In office:** F Varnish initial visit & recalls **Home:** Brush 2× day w/smear of F toothpaste **Caregiver:** OTC sodium fluoride treatment rinses	**Child:** Xylitol wipes **Caregiver:** 2 sticks of gum or 2 mints 4× day	Fluoride-releasing sealants recommended on deep pits and fissures	No	Yes	No	Treat w/ fluoride products as indicated to promote remineralization	n/a
Moderate; Noncompliant	Every 3–6 months	Posterior bitewings at 6–12 month intervals if proximal surfaces cannot be examined visually or with a probe	Required	**In office:** F varnish initial visit & recalls **Home:** Brush 2× day w/smear of F toothpaste combined w/smear of 900 ppm calcium-phosphate paste, leave on at bedtime **Caregiver:** OTC sodium fluoride treatment rinses	**Child:** Xylitol wipes **Caregiver:** 2 sticks of gum or 2 mints 4× day	Fluoride-releasing sealants recommended on deep pits and fissures	Recommend for caregiver	Yes	Yes	Treat w/ fluoride products as indicated to promote remineralization	n/a
High	Every 3 months	Anterior (#2 occlusal film) and posterior bitewings at 6–12 month intervals if proximal surfaces cannot be examined visually or with a probe	Required	**In office:** F varnish initial visit & recalls **Home:** Brush 2× day w/smear of F toothpaste combined w/smear of 900 ppm calcium-phosphate paste, leave on at bedtime	**Child:** Xylitol wipes **Caregiver:** 2 sticks of gum or 2 mints 4× day	Fluoride-releasing sealants recommended on deep pits and fissures	Recommend for caregiver	Yes	Yes	Treat w/ fluoride products as indicated to promote remineralization	ITR (interim therapeutic restorations) or conventional restorative treatment as patient cooperation and family circumstances allow

Risk Category Ages 0 to 2	Diagnostic			Preventive Intervention							Restoration**
	Periodic Oral Exams	Radiographs*	Saliva Test	Fluoride	Xylitol Products	Sealants	Antibacterials	Anticipatory Guidance/Counseling	Self-Management Goals	White Spot / Precavitated Lesions	Existing Lesions
				Caregiver: OTC sodium fluoride treatment rinses							
High; Noncompliant	Every 1–3 months	Anterior (#2 occlussal film) and posterior bitewings at 6–12 month intervals if proximal surfaces cannot be examined visually or with a probe	Required	**In office:** F varnish initial visit & recalls **Home:** Brush 2× day w/smear of F toothpaste combined w/smear of 900 ppm calcium-phosphate paste, leave on at bedtime **Caregiver:** OTC sodium fluoride treatment rinses	**Child:** Xylitol wipes **Caregiver:** 2 sticks of gum or 2 mints 4× day	Fluoride-releasing sealants recommended on deep pits and fissures	Recommend for caregiver	Yes	Yes	Treat w/ fluoride products as indicated to promote remineralization	ITR or conventional restorative treatment as patient cooperation and family circumstances allow
Extreme	Every 1–3 months	Anterior (#2 occlusal film) and posterior bitewings at 6–12 month intervals if proximal surfaces cannot be examined visually or with a probe	Required	**In office:** F varnish initial visit & recalls **Home:** Brush 2× day w/smear of F toothpaste combined w/smear of 900 ppm calcium-phosphate paste, leave on at bedtime **Caregiver:** OTC sodium fluoride treatment rinses	**Child:** Xylitol wipes **Caregiver:** 2 sticks of gum or 2 mints 4× day	Fluoride-releasing sealants recommended on deep pits and fissures	Recommend for caregiver	Yes	Yes	Treat w/ fluoride products as indicated to promote remineralization	ITR or conventional restorative treatment as patient cooperation and family circumstances allow

*American Dental Association Council on Scientific Affairs. The use of dental radiographs: update and recommendations. *J Am Dent Assoc*137:1304–12, 2006

**American Academy of Pediatric Dentistry. Guideline on pediatric restorative dentistry. *Pediatr Dent*30(suppl):163–9, 2008

TABLE 5

Example of a Caries Management Protocol for 3–6-Year-Olds

The science of caries prevention continues to evolve. This table is an illustration on how to develop care paths for a practice's patients. There are many alternative approaches to the prevention and treatment of dental caries, with more emerging continuously. Care paths should remain dynamic and change over time as the effectiveness of new as well as current protocols is validated by scientific evidence.

Risk Category —Ages 3 to 6	Diagnostic			Preventive Intervention							Restoration**
	Periodic Oral Exams	Radiographs*	Saliva Test	Fluoride	Xylitol Products	Sealants	Antibacterials	Anticipatory Guidance/ Counseling	Self- Management Goals	White Spot / Precavitated Lesions	Existing Lesions
Low	Annual	Posterior bitewings at 12–24 month intervals if proximal surfaces cannot be examined visually or with a probe	Optional baseline	**In office:** No **Home:** Brush 2× day w/ pea-size of F toothpaste	Not Required	No	No	Yes	No	n/a	n/a
Moderate	Every 6 months	Posterior bitewings at 6–12 month intervals if proximal surfaces cannot be examined visually or with a probe	Recommended	**In office:** F Varnish initial visit & recalls **Home:** Brush 2× day w/pea-size of F toothpaste **Caregiver:** OTC sodium fluoride treatment rinses	**Child:** Xylitol wipes/ products to substitute for sweet treats or when unable to brush. **Caregiver:** 2 sticks of gum or 2 mints 4× day	Fluoride-releasing sealants recommended on deep pits and fissures	No	Yes	No	Treat w/fluoride products as indicated to promote remineralization	n/a
Moderate; Noncompliant	Every 3–6 months	Posterior bitewings at 6–12 month intervals if proximal surfaces cannot be examined visually or with a probe	Required	**In office:** F varnish initial visit & recalls **Home:** Brush 2× day w/pea-size of F toothpaste combined w/pea-size of 900 ppm calcium-phosphate paste, leave on at bedtime **Caregiver:** OTC sodium fluoride treatment rinses	**Child:** Xylitol wipes/ products to substitute for sweet treats or when unable to brush. **Caregiver:** 2 sticks of gum or 2 mints 4× day	Fluoride-releasing sealants recommended on deep pits and fissures	Recommend for caregiver	Yes	Yes	Treat w/fluoride products as indicated to promote remineralization	n/a
High	Every 3 months	Anterior (#2 occlusal film) and posterior bitewings at 6–12 month intervals if proximal surfaces cannot be examined visually or with a probe	Required	**In office:** F varnish initial visit & recalls **Home:** Brush 2× day w/pea-size of F toothpaste combined w/pea-size of 900 ppm calcium-phosphate paste, leave on at bedtime	**Child:** Xylitol wipes/ products to substitute for sweet treats or when unable to brush. **Caregiver:** 2 sticks of gum or 2 mints 4× day	Fluoride-releasing sealants recommended on deep pits and fissures	Recommend for caregiver	Yes	Yes	Treat w/fluoride products as indicated to promote remineralization	ITR (interim therapeutic restorations) or conventional restorative treatment as patient cooperation and family circumstances allow

Risk Category —Ages 3 to 6	Diagnostic			Preventive Intervention							Restoration**
	Periodic Oral Exams	Radiographs*	Saliva Test	Fluoride	Xylitol Products	Sealants	Antibacterials	Anticipatory Guidance/ Counseling	Self- Management Goals	White Spot / Precavitated Lesions	Existing Lesions
				Caregiver: OTC sodium fluoride treatment rinses							
High; Noncompliant	Every 1–3 months	Anterior (#2 occlusal film) and posterior bitewings at 6–12 month intervals if proximal surfaces cannot be examined visually or with a probe	Required	**In office:** F varnish initial visit & recalls **Home:** Brush 2× day w/pea-size of F toothpaste combined w/pea-size of 900 ppm calcium-phosphate paste, leave on at bedtime **Caregiver:** OTC sodium fluoride treatment rinses	**Child:** Xylitol wipes/ products to substitute for sweet treats or when unable to brush. **Caregiver:** 2 sticks of gum or 2 mints 4× day	Fluoride-releasing sealants recommended on deep pits and fissures	Recommend for caregiver	Yes	Yes	Treat w/fluoride products as indicated to promote remineralization	ITR or conventional restorative treatment as patient cooperation and family circumstances allow
Extreme	Every 1–3 months	Anterior (#2 occlusal film) and posterior bitewings at 6–12 month intervals if proximal surfaces cannot be examined visually or with a probe	Required	**In office:** F varnish initial visit & recalls **Home:** Brush 2× day w/pea-size of F toothpaste combined w/pea-size of 900 ppm calcium-phosphate paste, leave on at bedtime **Caregiver:** OTC sodium fluoride treatment rinses	**Child:** Xylitol wipes/ products to substitute for sweet treats or when unable to brush. **Caregiver:** 2 sticks of gum or 2 mints 4× day	Fluoride-releasing sealants recommended on deep pits and fissures	Recommend for caregiver	Yes	Yes	Treat w/fluoride products as indicated to promote remineralization	ITR or conventional restorative treatment as patient cooperation and family circumstances allow

* American Dental Association Council on Scientific Affairs. The use of dental radiographs: update and recommendations. *J Am Dent Assoc*137:1304–12, 2006

** American Academy of Pediatric Dentistry. Guideline on pediatric restorative dentistry. *Pediatr Dent*30(suppl):163–9, 2008