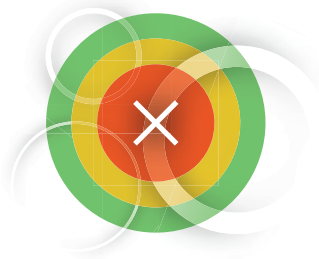
CDA JOURNAL, VOL 35, Nº10



Caries Risk Assessment Appropriate for the Age 1 Visit (Infants and Toddlers)

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ABSTRACT This article discusses caries management by risk assessment for children age 0-5. Risk assessment is the first step in a comprehensive protocol for infant oral care. The program includes opportunities to establish a "dental home" and provide guidance for improved health outcomes. Risk assessment forms, instructions for use, and guidance-related education points have been included. Collaboration among all health professionals regarding early and timely intervention to promote children's oral health and disease prevention is emphasized.

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ACKNOWLEDGMENT

The authors thank Ms. Barbara Heckman for her editorial assistance and the HRSA Oral Health Disparities Collaborative for the implementation of the CAMBRA instrument and the development of the self-management goal instrument through High Plains Health Center.

While the oral health of many children in the United States has improved dramatically in recent years, caries remains the most prevalent chronic childhood disease in the United States — five times more common than asthma.[1-3]

Early childhood caries is prevalent among young children, particularly in underserved populations. For example, 8 percent of children age 2 to 5 have 75 percent of the caries experience.[4] Moreover, the 2005 California Oral Health Needs Assessment of Children reported caries in kindergarten and third-grade children as disproportionately affecting children of migrants, in lower socioeconomic strata, and certain racial/ethnic groups such as Hispanics.[5]

INITIAL INFANT ORAL CARE VISIT

Evidence increasingly suggests that to be successful in preventing oral disease, dentists and other health care professionals must begin preventive interventions in infancy.[6] The American Dental Association, American Academy of Pediatric Dentistry, and the American Association of Public Health Dentistry currently recommend all children have their first preventive dental visit by 12 months of age.[7-9]

ESTABLISHMENT OF A DENTAL HOME

Parents and other care providers are encouraged to help every child establish a dental home for early dental care to provide caries risk assessment, education for parents/care givers and anticipatory guidance on the prevention of dental disease.[10] In addition, periodic supervision of care interval (periodicity) should be determined by level of risk.[11] The "dental home" concept is derived from the American Academy of Pediatrics' recommendation that every child should have a "medical home."[12] The intention of the recommendation is to promote health

care for infants, children, and adolescents that ideally is accessible, continuous, comprehensive, family-centered, coordinated, compassionate, and culturally appropriate.

From the medical point of view, referring a child for an oral examination and risk assessment to a dentist who provides care for infants and young children, starting six months after the first tooth erupts or by 12 months of age, will establish the child's dental home, and provide an opportunity to monitor and implement preventive oral health habits that will meet each child's individual and unique needs. The intent of this effort is to maintain the child's cavity-free status and prevent other oral diseases. For this to become a reality, practicing clinicians must be committed to welcoming these young patients into their practices. If physicians are to refer children at age 1, the practicing dental community must take on the responsibility of being willing and well-prepared to accept them.

BENEFITS OF RISK ASSESSMENT

Risk assessment is an estimation of the likelihood that an event will occur in the future. An individualized caries risk assessment is the first step and an important part of a comprehensive protocol for the infant oral care visit by identifying characteristics that can help the health care providers and parents/caregivers to have a true understanding of the level of caries risk and oral health needs of infants and toddlers. Caries risk assessment guides the clinical decision-making process.[13-15] Featherstone described a balance between pathological and protective factors that can be swung in the direction of early caries intervention and prevention utilizing the active role of the dentist and allied dental staff.[16] To achieve the best management and outcomes for good dental health, an appropriate caries risk assessment screening must be executed as early as possible and preferably prior to the onset of the disease process. Caries risk assessment and subsequent management of the disease in children is crucial due to the known fact that caries in the primary dentition is a strong predictor of caries in the permanent dentition.[17,18]

CARIES MANAGEMENT BY RISK ASSESSMENT

In April 2002, a consensus conference was held in Sacramento, Calif., on caries management by risk assessment. A group of experts designed a caries risk assessment, CRA, form and proposed its use based upon the known literature at that time. One form was designed for patients 6-years-old through adulthood, and a second was for patients 0-5. All supporting review articles and summaries from this CAMBRA consensus, as well as the CRA forms and intervention procedures, were published in the *Journal of the California Dental Association* in February and March 2003. They are accessible in their entirety at www.cdafoundation.org/journal.[19,20] Since then, our group has used and modified the form for infants and toddlers targeting 0-5, and has added a treatment protocol.[21] Modifications include 0-5 age-specific threshold values for salivary, cariogenic bacterial assays, and both child and maternal caries risk and protective factors. This article will present the considerably modified form and discuss our experiences with its use, as well as recommendations for managing different risk groups based on their individualized risk assessments. The 6-year-old through adult form is described in detail in a separate article by Featherstone et al. this issue.

> **IF PHYSICIANS ARE** to refer children at age 1, the practicing dental community must take on the responsibility of being willing and well-prepared to accept them.

Modified Caries Risk Assessment Form (CAMBRA 0-5) Targeted at Infants and Toddlers 0-5 Years-old

Featherstone and colleagues, at the California consensus conference in 2002, proposed that the progression or reversal of dental caries is determined by the balance between caries pathological factors and caries protective factors. The original age 0-5 form was designed to reflect the full range of pathological and protective factors.[20] The modified form presented here has been revised to improve ease of use while retaining essential components related to the caries balance.

The CAMBRA 0-5 form is a one-page questionnaire that is designed for use with children age 0-5 in a busy dental practice, and is laid out in a sequence that follows the normal flow from the patient/parent interview through the clinical examination of the child. The modified CAMBRA 0-5 form followed by a one-page revised summary of instructions is provided in **TABLE 1**. The form has interview questions comprising five subgroups:

- *Caries disease indicators — parent interview.* Disease indicators are observations that indicate the presence of disease symptoms or the presence of an environment that indicates the child is likely to have the disease called dental caries. For example, past dental restorations indicate disease in the past, which most likely is still progressing. The socioeconomic status of the fam-

TABLE 1

CAMBRA for Dental Providers (0-5) Assessment Tool

Caries Risk Assessment Form for Age 0 to 5

Patient name:_____ I.D.#_____ Age _____ Date_____

Initial/base line exam date_____ Caries recall date_____

Respond to each question in sections 1, 2, 3, and 4 with a check mark in the "Yes" or "No" column	Yes	No	Notes
1. Caries Risk Indicators — Parent Interview**			
(a) Mother or primary caregiver has had active dental decay in the past 12 months			
(b) Child has recent dental restorations (see 5b below)			
(c) Parent and/or caregiver has low SES (socioeconomic status) and/or low health literacy			
(d) Child has developmental problems			
(e) No dental home/episodic dental care			
2. Caries Risk Factors (Biological) — Parent Interview**			
(a) Child has frequent (greater than three times daily) between-meal snacks of sugars/cooked starch/sugared beverages			
(b) Child has saliva-reducing factors present, including: 1. Medications (e.g., some for asthma or hyperactivity) 2. Medical (cancer treatment) or genetic factors			
(c) Child continually uses bottle - contains fluids other than water			
(d) Child sleeps with a bottle or nurses on demand			
3. Protective Factors (Nonbiological) — Parent Interview			
(a) Mother/caregiver decay-free last three years			
(b) Child has a dental home and regular dental care			
4. Protective Factors (Biological) — Parent Interview			
(a) Child lives in a fluoridated community or takes fluoride supplements by slowly dissolving or as chewable tablets			
(b) Child's teeth are cleaned with fluoridated toothpaste (pea-size) daily			
(c) Mother/caregiver chews/sucks xylitol chewing gum/lozenges 2-4x daily			
5. Caries Risk Indicators/Factors — Clinical Examination of Child**			
(a) Obvious white spots, decalcifications, or obvious decay present on the child's teeth			
(b) Restorations placed in the last two years in/on child's teeth			
(c) Plaque is obvious on the child's teeth and/or gums bleed easily			
(d) Child has dental or orthodontic appliances present, fixed or removable: e.g., braces, space maintainers, obturators			
(e) Risk Factor: Visually inadequate saliva flow - dry mouth			
****If yes to any one of 1(a), 1(b), 5(a), or 5(b) or any two in categories 1, 2, 5, consider performing bacterial culture on mother or caregiver and child. Use this as a base line to follow results of antibacterial intervention.**	Parent/Caregiver Date:		Child Date:
(a) Mutans streptococci (Indicate bacterial level: high, medium, low)			
(b) Lactobacillus species (Indicate bacterial level: high, medium, low)			
Child's overall caries risk status: (CIRCLE) Extreme	Low	Moderate	High
Recommendations given: Yes _____ No _____ Date given _____		Date follow up: _____	

SELF-MANAGEMENT GOALS 1) _____ **2)**_____

Practitioner signature_____ Date_____

Instructions for Caries Risk Assessment Form — Children Age 0-5

1. Answer the questions: Respond to questions 1 to 5 with "yes" or "no" answers. You can make special notations such as the number of cavities present, the severity of the lack of oral hygiene, the brand of fluorides used, the type of bottle contents used, the type of snacks eaten, or the names of medications/drugs that may be causing dry mouth.

2. Determine the overall caries risk of the child: Add up the "yes" answers to the disease indicators/risk factors from caries risk categories 1, 2, and 5. Then add up the number of "yes" answers for the protective indicators/factors identified in categories 3 and 4. Make a judgment as to low, moderate or high overall caries risk based on the balance between the pathological factors (caries disease indicators and risk factors) and the protective factors. **Note:** Determining the caries risk for an individual child requires evaluating both the number as well as the severity of the disease indicators and risk factors. Certainly a child with caries presently or in the recent past is at high risk for future caries. A patient with low bacterial levels would need to have several other risk factors present to be considered at moderate risk. Some judgment is needed while also considering the protective factors to determine the risk.

3. Bacteria testing: If the answer is "yes" to any one of 1(a), 1(b), 5(a), or 5(b) questions regarding parent/caregiver's recent active decay, or child's recent restorations, or any obvious white spots, decalcifications or obvious decay; or any two of the questions in 1, 2, 5, consider performing bacterial cultures on parent/caregiver and child (see **notes on the form). See separate "Bacterial Testing" instructions for technique steps. Use the bacterial colony density level (low, medium, or high) to determine who would benefit from antibacterial therapy and to establish a base line to assess the impact of any prescribed antibacterial intervention(s) and whether to carry out antibacterial therapy for the parent/caregiver or child.

4. Plan for caries intervention and prevention: Develop a caries control and management plan for the child and parent/caregiver based on completed assessments incorporating antibacterial therapy and fluoride delivery forms as indicated. (See "CAMBRA Clinical Guidelines for Patients 0-5 Years," TABLE 2.) High caries risk status is generally an indication for the use of both antibacterial therapy and fluoride therapy. If the answer is "yes" to any one of questions regarding the presence of white spots, decalcification or obvious decay on the child's teeth or parent/child restorations (1(a), 1(b), 5(a), or 5(b)), strongly consider using antibacterial therapy for the parent/caregiver as well as the child. Once strategies have been planned to aggressively deal with caries as a bacterially-based transmissible infection, determine which teeth have cavitation and treatment plan for minimally invasive restorative procedures designed to conserve tooth structure.

5. Home care recommendations: Review with the parent/caregiver the individualized home care recommendations you have selected for them on the "Parent/Caregiver Recommendations for Control of Dental Decay in Children 0-5" form (TABLE 4). Use this interaction as an opportunity for a brief patient-centered approach to engage the parent/caregiver in two-way communication on strategies for caries control and management. During this motivational interviewing intervention, ask the parent/caregiver to commit to two goals and note them on the "Self-management goals 1) and 2)" area in the last section of the CAMBRA 0-5 form (TABLE 1). Inform the parent/caregiver that you will follow up with them on these goals at the next appointment. Give one copy of the signed recommendations form to the parent/caregiver and keep one in the child's chart. Point out to the parent/caregiver that the back of the recommendations form includes additional information on "How Tooth Decay Happens" and "Methods of Controlling Tooth Decay" to help them further understand the caries disease process and ways to control it (TABLE 4).

6. Bacteria test results: After the inoculated media sticks or culture tubes have incubated for 72 hours (see TABLE 3 for instructions), determine the colony density level, and inform the parent/caregiver of the results of the bacteria tests. Since showing the parent/caregiver the bacteria grown from their own mouth can be a good motivator, show them the culture tube at the next visit (the culture keeps satisfactorily for some weeks) or provide them with a photograph or digital image of their bacterial colonies. If the parent/caregiver has high cariogenic bacterial counts then work with them to lower their caries risk and get their caries infection under control. The goal is to eliminate this source of infection and reinfection for the child.

7. Follow up: After the parent/caregiver/child has been following your recommendations for three to six months, have them back to reassess how well they are doing. Some practicing clinicians report good motivational success in doing a bacterial culture immediately after the patient's very first month of antibacterial treatment. Patients need encouragement early on when behavior change is required. Ask them if they are following your instructions and how often. If the bacterial levels were moderate or high initially, repeat the bacterial culture to see if bacterial levels have been reduced by antibacterial therapy. Make changes in your recommendations or reinforce protocol if results are not as good as desired or the parent/caregiver is not cooperating as much as expected. It is very important to inform patients that changing a pathogenic biofilm is not going to happen overnight. In fact, it may take several months to even years in some cases.

ily does not cause dental caries but has been associated strongly with its presence. Low health literacy of the primary caregiver is a good indicator that the environment is conducive to dental caries. Similarly, developmental defects and the absence of a dental home are indicators of a higher likelihood of the presence of dental caries.

■ *Caries risk factors (biological) — parent interview.* These are biological factors that explain why dental caries is in progress and helps us to determine how to arrest or reverse the process. These risk factors include frequency of ingestion of fermentable carbohydrates, sleep habits that provide a continual food source for the bacteria, medications that would reduce salivary flow, and continual bottle use.

■ *Protective factors (nonbiological) — parent interview.* These indicators, obtained during the parent interview, shed light on the possibilities of increasing or enhancing protective practices. Protective factors include such things as whether the mother/caregiver is free of decay (may not have cariogenic bacteria to transmit to the child), and the child's access to regular dental care (dental home).

■ *Protective factors (biological) — parent interview.* These are biological protective factors that can help arrest or reverse dental caries. They include the child's exposure to fluoride, or exposure to calcium phosphate paste or xylitol-based products by the mother/caregiver as well as the child.

■ *Caries disease indicators and risk factors — clinical examination of child.* Disease indicators include clinical observations such as obvious white spot lesions/decalcifications, obvious decay, and recent restorations. Biological risk factors include quantity of plaque and gingival bleeding (an indicator of heavy plaque), dry mouth, and the presence of dental/orthodontic appliances. The presence of several disease indicators and risk factors indicates that the health care provider perform a bacterial culture for mutans streptococci and lactobacillus species on both the mother/caregiver and child to assess the need for antibacterial therapy.

A simple visual diagram of the interaction of the disease indicators and risk factors is presented by Featherstone et al. later in this issue of the Journal.

IDENTIFICATION OF risk factors is essential to understand why the disease is where it is, or whether it is likely to manifest symptoms in the future.

Desired Outcomes for the Caries Risk Assessment Form CAMBRA 0-5

The caries risk assessment form has been designed to ensure clear identification of disease indicators and caries risk factors. Identification of risk factors is essential to understand why the disease is where it is, or whether it is likely to manifest symptoms in the future. Risk assessment permits the dental health care provider to determine the balance of protective factors appropriate for the high, moderate, or low caries risk level in an individual. Findings from the child and parent/caregiver assessment regarding caries risk level and reasons for risk can be used to design and implement an intervention strategy that incorporates the appropriate protective factors. This permits the clinician to use a more targeted approach in the management of the disease process.

IMPLEMENTATION OF CARIES RISK ASSESSMENT FOR CHILDREN 0-5 YEARS-OLD AS PART OF THE INFANT ORAL CARE VISIT

Protocol for a comprehensive CAMBRA 0-5/infant oral care visit includes the following components:

■ Parent interview
■ Examination of the child
■ Assignment of caries risk level
■ Individualized treatment based on risk level
■ If indicated, bacterial culture on parent or care giver and child
■ Show bacterial results to parent/care giver — effective motivator
■ Individualized home care recommendations
■ Motivational interview/strategies for caries control
■ Setting of self-management goals with parent/child
■ Anticipatory guidance according to a specific age category
■ Determine the interval for periodic re-evaluation (periodicity of examination)
■ Collaboration with other health care professionals

The CAMBRA 0-5 assessment components are further described below:

PARENT INTERVIEW

The parent interview before the child is examined will establish the presence of several important risk factors and disease indicators. It will also establish whether protective measures are already in place. If the mother and/or caregiver has active decay, this automatically places the child at high risk due to the high possibility of bacterial transmission and inoculation of the child's mouth at an early stage by the parent/caregiver.

TABLE 2

CAMBRA Treatment Guidelines (0-5 years)

Caries Management by Risk Assessment (CAMBRA) Clinical Guidelines for Patients 0-5 years

Risk Level	Saliva Test	Antibacterials	Fluoride	Frequency of Radiographs	Frequency of Periodic Oral Exams (POE)	**** Xylitol and/or Baking Soda	Sealants ***	Existing Lesions
Low risk	Optional (Base line)	Not required or if saliva test was performed; treat main caregiver accordingly	Not required	After age 2: Bitewing radiographs every 18-24 months	Every 6-12 months to re-evaluate caries risk AND ANTICIPATORY GUIDANCE**		Optional	
Moderate risk	Recommended	Not required or if saliva test was performed; treat main caregiver accordingly	OTC fluoride-containing toothpaste twice daily (a pea-sized amount) Sodium fluoride treatment gels/ rinses	After age 2: Bitewing radiographs every 12-18 months	Every 6 months to re-evaluate caries risk AND ANTICIPATORY GUIDANCE	Xylitol gum or lozenges Two sticks of gum or two mints four times daily for the caregiver Xylitol food, spray or drinks for the child	Sealants for deep pits and fissures after two years of age. High fluoride conventional glass ionomer is recommended	Lesions that do not penetrate the DEJ and are not cavitated should be treated with fluoride toothpaste and fluoride varnish
High risk*	Required	Chlorhexidine 0.12% 10 ml rinse for main caregiver of the infant or child for one week each month. Bacterial test every caries recall. Health provider might brush infant's teeth with CHX	Fluoride varnish at initial visit and caries recall exams OTC fluoride-containing toothpaste and calcium phosphate paste combination twice daily Sodium fluoride treatment gel/ rinses	After age 2; Two size #2 occlusal films and 2 bitewing radiographs every 6-12 months or until no cavitated lesions are evident	Every 3 months to re-evaluate caries risk and apply fluoride varnish AND ANTICIPATORY GUIDANCE	Xylitol gum or lozenges. Two sticks of gum or two mints four times daily for the caregiver Xylitol food, spray, or drinks for the child	Sealants for deep pits and fissures after two years of age. High fluoride conventional glass ionomer is recommended	Lesions that do not penetrate the DEJ and are not cavitated should be treated with fluoride toothpaste and fluoride varnish ART might be recommended
Extreme risk*	Required	Chlorhexidine 0.12% 10 ml rinse for one minute daily at bedtime for two weeks each month. Bacterial test at every caries recall Health provider might brush infant's teeth with CHX	Fluoride varnish at initial visit, each caries recall and after prophylaxis or recall exams OTC fluoride-containing toothpaste and phosphate paste combination twice daily Sodium fluoride treatment gel/ rinses	After age 2; Two size #2 occlusal films and 2 bitewing radiographs every 6 months or until no cavitated lesions are evident	Every 1-3 months to re-evaluate caries risk and apply fluoride varnish and anticipatory guidance	Xylitol gum or lozenges. Two sticks of gum or two mints four times daily for the caregiver Xylitol food, spray, or drinks	Sealants for deep pits and fissures after two years of age. High fluoride conventional glass ionomer is recommended	Holding care with glass ionomer materials until caries progression is controlled (ART) Fluoride varnish and anticipatory guidance/self-management goals

* Pediatric patients with one (or more) cavitated lesion(s) are high-risk patients.
* Pediatric patients with one (or more) cavitated lesion(s) and hyposalivary or special needs are extreme-risk patients.
* Pediatric patients with daily medication such as inhalers or behavioral issues will have diminished salivary function.
** Anticipatory guidance – "Appropriate discussion and counseling should be an integral part of each visit for care." AAPD
*** ICDAS protocol presented by Jenson et al. this issue may be helpful on sealant decisions.
**** Xylitol is not good for pets (especially dogs).
For all risk levels: Pediatric patients, through their caregiver, must maintain good oral hygiene and a diet low in frequency of fermentable carbohydrates.
Patients with appliances (RPDs, orthodontics) require excellent oral hygiene together with intensive fluoride therapy. Fluoride gel to be placed in removable appliances.

TABLE 3

Bacterial Testing Procedures

Bacterial tests for cariogenic bacteria, mutans streptococci and for lactobacilli species, can readily be done in a dental office or community clinic setting. There are two test kits currently available in the United States for chairside testing that tests for both MS and LB. One is the "Caries Risk Test" (CRT) marketed by Vivadent/Ivoclar (Amherst, N.Y.). The other is the "Dentocult SM" and "Dentocult LB" test, marketed by Edge Dental. Both are sufficiently sensitive to provide a level of low, medium, or high cariogenic bacterial challenge separately for MS and for LB. Each has selective media culture "sticks" that test MS and LB levels in saliva sampled from the patient.

The CRT kit has a single "media stick" with selective media for MS on one side and LB on the other. The Dentocult slides come as two separate sticks. The results obtained from the test sticks from either supplier can also be used as a motivational tool for patient compliance with an antibacterial regimen. Another system CariScreen/Caricult (Oral Biotech, Albany Ore.) uses a quick screening and culturing techniques targeting MS. Other bacterial test kits will likely be available in the near future.

The following is the procedure for administering the currently available caries risk test. The kit comes with two-sided selective media sticks that assess mutans streptococci on the blue side and lactobacilli on the green side. A starter kit that includes six "media sticks" in culture tubes, and an incubator is available (Ivoclar catalog #NA 6556001). Although the accompanying manufacturer's instructions recommend 48 hours of incubation, 72-hour incubation seems to give better results.

Procedure steps:

a. For parent/caregiver and for children old enough to spit (probably 4 or 5 years-old), a bacterial culture should be taken as follows: The subject chews on the chewing gum (wax) provided in the kit for three minutes (accurately timed), and spits all mixed saliva into a measuring beaker. Measure the volume (in ml) and divide by 3 to give ml/minute stimulated saliva flow rate. Normal flow is greater than 1 ml/minute and low is less than 0.7 ml/minute. If the patient is unable to spit, collect a plaque sample using a sterile swab, agitate/vibrate in 2 cc of sterile saline and use the liquid to inoculate the culture tube as below.

b. Remove the selective media stick from the culture tube. Peel off the plastic sheet covering each side of the stick. Pour the collected saliva over the media on each side until it is entirely wet.

c. Place one of the sodium bicarbonate tablets (included with the kit) in the bottom of the tube.

d. Replace the media stick in the culture tube, screw the lid on and label the tube with the patient's name, number, and date.

e. Place the tube in the incubator at 37 degrees Celsius for 72 hours. (Incubators suitable for a dental office are sold by the company.)

f. Remove the culture tube from the incubator after 72 hours and compare the densities of bacterial colonies with the pictures provided in the kit indicating relative mutans streptococci and lactobacilli bacterial levels, ranging from low to high. Colony densities in the middle of the range are medium. (The dark blue agar is selective for MS and the light green agar is selective for LB.) Record the level of bacterial challenge in the patient's chart as low, medium, or high.

Bacteria Testing for Young Children: Children age 0-3 are difficult to culture reliably in the fashion described previously. However, a good approximate indication for the child can be obtained by using a cotton swab to sample the surfaces of all teeth and gums in the mouth, thoroughly dispersing the sample in about 1 to 2 ml of sterile saline in a test tube (Fisher Scientific), and dispersing it for 1 minute on a laboratory vortex (Fisher Scientific, catalog 12-813-52). The suspension is then coated on the CRT stick as described previously for saliva samples and incubated for 72 hours. This will give a good estimate of the MS and LB challenge in the young child.[25] If this is not possible for whatever reason, the bacterial levels of the parent/caregiver could be used as a rough estimate of the child's likely bacterial challenge.

EXAMINATION OF THE CHILD

The examination of the child will complete the risk factor/disease indicator list. If the child has obvious decalcification (white spots) or cavities, this places the child at high risk for future cavities because caries can progress rapidly at this age.

ASSIGNMENT OF CARIES RISK LEVEL

Once the risk factors list has been checked (TABLE 1), the provider summarizes them and assigns a caries risk level (low, moderate, or high). As stated previously, active decay in the parent/caregiver or in the child automatically places the child at high risk, signaling the need for antibacterial intervention and fluoride treatment for both parent/caregiver and child.

INDIVIDUALIZED TREATMENT BASED ON RISK LEVEL

An individualized treatment plan for each infant/caregiver is determined by items checked during the interview process and the clinical examination of the child. A dual approach is essential for moderate and high caries risk children and their parent/caregivers. Strategies need to be employed to modify the maternal/caregiver transmission of cariogenic bacteria to infants through the potential use of chlorhexidine rinse, fluoride varnish, and xylitol-based products.

BACTERIAL CULTURE

If assessments reveal the presence of high-risk factors/indicators, providers

should consider performing a bacterial culture on the parent or caregiver and child. The salivary assay results should be shown to the parent/caregivers because seeing the bacterial growth may motivate behavioral change for them and their children. If the parents/caregivers have high cariogenic bacterial counts they should be advised to seek appropriate dental care to reduce their caries risk and control their caries by eliminating the infection source and reducing the early infant inoculation.

Relatively low bacterial levels have been demonstrated in several studies to be significantly associated with early demineralization and dental caries in infants and toddlers.[23,24] As presented recently, children with significant levels of mutans streptococci and any level of lactobacilli were at greatest risk for developing early childhood caries.[24]

INDIVIDUALIZED HOME CARE RECOMMENDATIONS

Home care recommendations are provided at the end of the infant oral care visit based on all information gathered through the assessment process. **TABLE 4**, first page for a "Parent/Caregiver Recommendations for Control of Dental Decay in Children 0-5 Years" form that includes a checklist for suggested home caries interventions and **TABLE 4**, second page, presents the suggested information designed to provide the parent or caregiver and patient with a simplified description of the dental decay process — "How Tooth Decay Happens," as well as "Methods of Controlling Tooth Decay" (designed for the back page of the home care recommendations form).

MOTIVATIONAL INTERVIEWING AND STRATEGIES FOR CARIES CONTROL

Dental professionals can enhance the effectiveness of their preventive communication by focusing on a patient-centered brief counseling approach called motivational interviewing.[26] Motivational interviewing relies on two-way communication that includes the following steps: establishing a therapeutic alliance (rapport and trust); asking questions to help parents identify the problem and listening to what they say; encouraging self-motivational statements; preparing for change (discussing the hurdles that interfere with action); responding to resistance; and scheduling follow-up, as well as preparing the parent for the inevitable bumps in the road. A patient/parent-centered approach to health promotion and caries prevention is showing promise in getting parents to engage in preventive parenting practices.[27] The more parents talk about their intent to act or change and their optimism, the better. When parents hear themselves acknowledging a problem and voicing their commitment to solve the problem, action is facilitated.[27] Peltier, Weinstein, and Fredekind discuss behavioral issues in greater detail later in the next issue of the *Journal*.[28]

> **WHEN PARENTS** hear themselves acknowledging a problem and voicing their commitment to solve the problem, action is facilitated.

SETTING SELF-MANAGEMENT GOALS WITH PARENT AND CHILD

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. The parent/caregiver is asked 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. (See **TABLE 5** for "Self-management Goals for Parent/Caregiver" with patient confidence scale and patient commitment signature section.)

How Tooth Decay Happens

Tooth decay is caused by certain types of bacteria (bugs) that live in your mouth. When they stick to the film on your teeth called dental plaque, they can do damage. The bacteria feed on what you eat, especially sugars (including fruit sugars) and cooked starch (bread, potatoes, rice, pasta, etc.). Within about five minutes after you eat or drink, the bacteria begin making acids as they digest your food. These acids can break into the outer surface of the tooth and melt away some of the minerals. Your spit can balance the acid attacks, as long as the acid attacks don't happen very often. However if: 1) your mouth is dry; 2) you have a lot of these bacteria; or 3) you snack frequently, then the acid causes loss of tooth minerals. This is the start of tooth decay and leads to cavities.

Methods of Controlling Tooth Decay

Diet: Reducing the number of sugary and starchy foods, snacks, or drinks can help reduce tooth decay. That does not mean you can never eat these types of foods. You should limit the number of times you eat these foods between main meals. A

TABLE 4

Parent/Caregiver Recommendations Form

Parent/Caregiver Recommendations for Control of Dental Decay in Children 0-5 Years

Daily Oral Hygiene/Fluoride Toothpaste Treatment

(These procedures reduce the bacteria in the mouth and provide a small amount of fluoride to guard against further tooth decay as well as to repair early decayed areas.)

_____ Brush child's teeth with a fluoride-containing toothpaste (small smear or pea-sized amount on a soft small infant-sized toothbrush) twice daily (gently brushed by parent or caregiver)

_____ Selective daily flossing of areas with early caries (white spots)

_____ Other: _____

Diet

(The aim is to reduce the number of between-meal sweet snacks that contain carbohydrates, especially sugars. Substitution by snacks rich in protein, such as cheese will also help.)

_____ OK as is

_____ Limit bottle/nursing (to avoid prolonged contact of milk with teeth)

_____ Replace juice or sweet liquids in the bottle with water

_____ Limit snacking (particularly sweets)

_____ Replace high carbohydrate snacks with cheese and protein snacks

_____ Other _____

Xylitol (Parent/caregivers)

Xylitol is a sweetener that the bacteria cannot feed on. Using xylitol-containing chewing gum or mints/lozenges is a way that parents/caregivers of high-risk children can reduce the transfer of decay-causing bacteria to their baby/toddler. This is most effective when used by the parent/caregiver starting shortly after the child's birth. Parents/caregivers with dental decay place their children at high risk for early childhood caries. Xylitol is not good for pets (especially dogs).

_____ Parents/caregivers of children age 3 and under with high bacterial levels should use xylitol mints/lozenges or xylitol gum two to four times daily.

Antibacterial Rinse (Parents/caregivers)

(In addition, parents/caregivers of high-risk children may require antibacterial treatment to decrease the transmission of cariogenic bacteria and lessen the infant/child's risk of early childhood caries.)

_____ Parents/caregivers of children age 3 and under with high bacterial levels should rinse with 10 ml of chlorhexidine gluconate 0.12 percent (Periogard, Peridex, Oral Rx by prescription only). Rinse at bedtime for 1 minute 1x/day for one week. Repeat each month for one week until infection is controlled. Separate by one hour from fluoride use. Continue for six months or until bacterial levels remain controlled.

Practitioner signature_____ Date_____

Parent/caregiver signature_____Date_____

TABLE 5

Self-management Goals for Parent/Caregiver

Patient Name_____ DOB_____

Regular dental visits for child

Family receives dental treatment

Healthy snacks

Brush with fluoride toothpaste at least twice daily

No soda

Less or no juice

Wean off bottle (At least no bottle for sleeping)

Only water or milk in sippy cup

Chew gum with xylitol

Drink tap water

Less or no candy and junk food

IMPORTANT:
The last thing that touches your child's teeth before bedtime is the toothbrush with fluoride toothpaste.

Circle the goals you will focus on between today and your next visit.

On a scale of 1-10, how confident are you that you can accomplish the goals? 1 2 3 4 5 6 7 8 9 10

Not likely Definitely

My promise: I agree to the goals circled and understand that staff may ask me how I am doing with my goals.

Date:_____ Signed by:_____

Review Date:_____ Comments: _____ Staff Initials:_____

Review Date:_____ Comments: _____ Staff Initials:_____

good rule is three meals per day and no more than three snacks per day.

Fluorides: Fluorides help to make teeth stronger and to protect against tooth decay, and to heal tooth decay if it has not gone too far. Fluorides are available from a variety of sources such as drinking water, toothpaste, and rinses you can buy in the supermarket or drug store. They may also be prescribed by your dentist or applied in the dental office. Daily use of fluoride is very important to help protect against the acid attacks.

Plaque Removal: Plaque is a yellowish film that sticks to the surface of teeth. Toothbrushing removes plaque and should be done twice every day. Bacteria live in plaque, so removing the plaque from your teeth on a daily basis helps to control tooth decay. Plaque is very sticky and may be hard to remove from between the teeth and in grooves on the biting surfaces of back teeth. If your child has an orthodontic retainer be sure to remove it before brushing your child's teeth. Brush all surfaces of the retainer also.

Spit: Spit (saliva) is important for healthy teeth. It balances acids and provides other ingredients that protect the teeth. If one cannot brush after a meal or snack, one can chew sugar-free gum. This will stimulate the flow of saliva to help reduce the effect of acids. Sugar-free candy or mints can also be used, but some of these contain acids themselves. Acids in sugar-free candy will not cause tooth decay, but can slowly dissolve the tooth surface over time (a process called erosion). Some sugar-free gums are made to help fight tooth decay. Some gums contain baking soda that neutralize the acids produced by the bacteria in plaque.

Gum that contains xylitol as its first listed ingredient is the gum of choice. This type of gum has been shown to protect against tooth decay and to reduce the decay causing bacteria.

Antibacterial mouthrinses: Rinses that your dentist can prescribe are able to reduce the number of bacteria that cause tooth decay and can be useful in patients at high risk for tooth decay. These rinses are only recommended for children who can rinse and spit.

Sealants: Sealants are plastic or glass ionomer coatings bonded onto the biting surfaces of back teeth to protect the deep grooves from decay. In some people the grooves on the surfaces of the teeth are too narrow and deep to clean with a toothbrush. They may decay even if you brush them regularly. Sealants are an excellent preventive measure used for children and young adults at risk for this type of decay. They do not last forever and should be inspected once a year and prepared if needed.

ACIDS IN SUGAR-FREE candy will not cause tooth decay, but can slowly dissolve the tooth surface over time (a process called erosion).

ANTICIPATORY GUIDANCE (EARLY PARENTAL EDUCATION AND TIMELY INTERVENTION AND/OR REFERRAL)

In addition to caries risk assessment and parent/caregiver commitment to specific caries prevention self-management goals, the infant oral care appointment should include anticipatory guidance about age-specific, oral hygiene, growth and development issues (i.e., teething, digit, or pacifier habits), oral habits, diet, and nutrition and injury prevention. See **TABLE 6** for "Age-specific Anticipatory Guidance Table" for the age categories of prenatal, birth to first year, 2- to 3-years-old, and for the child age 3 to 5. 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.[29]

DETERMINE THE INTERVAL FOR PERIODIC RE-EVALUATION (PERIODICITY OF EXAMINATION)

The clinician must consider each infant and child's individual needs and caries risk assessment to determine the appropriate interval and frequency for oral examination.[29] Some infants and toddlers with white spot lesions and caregivers with high-risk behaviors should be re-evaluated on a monthly basis. Most children at high risk should be seen on a three-month interval for re-evaluation; those in the moderate risk category should be placed on a six-month interval and the low-risk child at a six- to 12-month range interval. At each of these infant oral care visits, it is essential to reassess the risk status and monitor improvement on the previously set self-management goals.

If the bacterial levels were moderate or high initially, repeat the bacterial culture to see if bacterial levels have been reduced by the antibacterial therapy recommended to the parent/caregiver and the multiple fluoride varnish applications on the infant. Make changes in recommendations or keep reinforcing the protocol if results are not as good as desired, or the

TABLE 6

Age-Specific Anticipatory Guidance (from Ramos-Gomez, reference 21)

	PRENATAL	BIRTH TO ONE YEAR	TWO TO THREE YEARS	THREE TO FIVE YEARS
Take home message for caregivers	• Baby teeth are important. • Parents'/caregivers' oral health affects baby's oral health. • Parents/caregivers should obtain regular dental check-up and get treatment if necessary. • Schedule child's first dental appointment by age 1. • Use of fluorides, including toothbrushing with fluoride toothpaste, is the most effective way to prevent tooth decay.	• Baby teeth are important. • Parents'/caregivers' oral health affects baby's oral health. • Parents/caregivers should obtain regular dental check-up and get treatment if necessary. • Parents/caregivers should avoid sharing with their child things that have been in their mouths. • Schedule child's first dental appointment by age 1. • Prevention is less costly than treatment. • Use of fluorides, including toothbrushing with fluoride toothpaste, is the most effective way to prevent tooth decay.	• Baby teeth are important. • Parents'/caregivers' oral health affects baby's oral health. • Parents/caregivers should obtain regular dental check-up and get treatment if necessary. • Parents/caregivers should avoid sharing with their child things that have been in their mouths. • Schedule child's first dental appointment by age 1. • Prevention is less costly than treatment. • Use of fluorides, including toothbrushing with fluoride toothpaste, is the most effective way to prevent tooth decay.	• Baby teeth are important. • Parents'/caregivers' oral health affects child's overall health. • Parents/caregivers should obtain regular dental check-up and get treatment if necessary. • Parents/caregivers should avoid sharing with their child things that have been in their mouths. • Prevention is less costly than treatment. • Use of fluorides, including toothbrushing with fluoride toothpaste, is the most effective way to prevent tooth decay.
Oral health and hygiene	• Encourage parents/caregivers to obtain dental check-up and, if necessary, treatment before birth of baby to reduce cavity-causing bacteria that can be passed to the baby. • Encourage parents/caregivers to brush teeth with fluoride toothpaste.	• Encourage parents/caregivers to maintain good oral health and get treatment, if necessary, to reduce spread of bacteria that can cause tooth decay. • Encourage parents/caregivers to avoid sharing with their child things that have been in their mouths. • Encourage parents/caregivers to become familiar with the normal appearance of child's gums. • Emphasize using a washcloth or toothbrush to clean teeth and gums with eruption of the first tooth. • Encourage parents/caregivers to check front and back teeth for white, brown, or black (signs of cavities).	• Encourage parents/caregivers to maintain good oral health and get treatment, if necessary, to reduce spread of bacteria that can cause tooth decay. • Encourage parents/caregivers to avoid sharing with their child things that have been in their mouths. • Review parent's/caregiver's role in brushing toddler's teeth. • Discuss brush and toothpaste selection. • Problem solve on oral hygiene issues. • Schedule child's first dental visit by age 1.	• Encourage parents/caregivers to maintain good oral health and get treatment, if necessary, to reduce spread of bacteria that can cause tooth decay. • Encourage parents/caregivers to avoid sharing with their child things that have been in their mouths. • Discuss parents/caregivers continued responsibility to help children under age 8 to brush their teeth. • Encourage parents/caregivers to consider dental sealants for primary and first permanent molars.
Oral development	• Describe primary tooth eruption patterns (first tooth usually erupts between 6-10 months old). • Emphasize importance of baby teeth for chewing, speaking, jaw development and self-esteem.	• Discuss primary tooth eruption patterns. • Emphasize importance of baby teeth for chewing, speaking, jaw development and self-esteem. • Discuss teething and ways to sooth sore gums, such as chewing on teething rings and washcloths.	• Emphasize importance of baby teeth for chewing, speaking, jaw development, and self-esteem. • Discuss teething and ways to soothe sore gums, such as teething rings and washcloths.	• Emphasize importance of baby teeth for chewing, speaking ,and jaw development.

TABLE 6

Age-Specific Anticipatory Guidance (from Ramos-Gomez, reference 21) *continued*

	PRENATAL	BIRTH TO ONE YEAR	TWO TO THREE YEARS	THREE TO FIVE YEARS
Fluoride adequacy	• Evaluate fluoride status in residential water supply. • Review topical and systemic sources of fluoride. • Encourage mother to drink fluoridated tap water.	• Evaluate fluoride status of residential water supply. • Review topical and systemic sources of fluoride. • Encourage drinking fluoridated tap water. • Consider topical needs (e.g., toothpaste, fluoride varnish).	• Re-evaluate fluoride status of residential water supply. • Review topical and systemic sources of fluoride. • Encourage drinking fluoridated tap water. • Review need for topical fluorides.	• Re-evaluate fluoride status in residential water supply. • Review sources of fluoride. • Review need for topical or other fluorides..
Oral habits	• Encourage mother to stop smoking.	• Encourage breastfeeding. • Advise mother that removing child from breast after feeding and wiping baby's gums/teeth with damp washcloth reduces the risk of ECC. • Review pacifier safety.	• Remind mother that removing child from breast after feeding and wiping baby's gums/teeth with damp washcloth reduces the risk of ECC. • Begin weaning of non-nutritive sucking habits at 2.	• Discuss consequences of digit sucking and prolonged non-nutritive sucking (e.g. pacifier) and begin professional intervention if necessary.
Diet and nutrition	• Emphasize eating a healthy diet and limiting number of exposures to sugar snacks and drinks. • Emphasize that it is the frequency of exposures, not the amount of sugar that affects susceptibility to caries. • Encourage breastfeeding. • Remind parents/caregivers never to put baby to bed with a bottle with anything other than water in it or to allow feeding 'at will.'	• Remind parents/caregivers never to put baby to bed with a bottle with anything other than water in it or allow feeding 'at will.' • Emphasize that it is the frequency of exposures, not the amount of sugar that affects susceptibility to caries. • Encourage weaning from bottle to cup by 1 year of age.	• Remind parents/caregivers never to put baby to bed with a bottle or allow feeding 'at will.' • Discuss healthy diet and oral health. • Emphasize that it is the frequency of exposures, not the amount of sugar that affects susceptibility to caries. • Review snack choices and encourage healthy snacks.	• Review and encourage healthy diet. • Remind parents/caregivers about limiting the frequency of exposures to sugar. • Review snacking choices. • Emphasize that child should be completely weaned from bottle and drinking exclusively from a cup.
Injury prevention	• Review child-proofing of home including electrical cord safety and poison control. • Emphasize use of properly secured car seat. • Encourage caregivers to keep emergency numbers handy.	• Review child-proofing of home including electrical cord safety and poison control. • Emphasize use of properly secured car seat. • Encourage caregivers to keep emergency numbers handy.	• Review child-proofing of home including electrical cord safety and poison control. • Emphasize use of car seat. • Emphasize use of helmet when child is riding tri/bicycle or in seat of adult bike. • Remind caregivers to keep emergency numbers handy.	• Emphasize use of properly secured car seat. • Have emergency numbers handy. • Encourage safety in play activities including helmets on bikes and mouthguards in sports. • Remind caregivers to keep emergency numbers handy.

parent/caregiver is not cooperating. Many have reported value in bacterial testing after the first month of antibacterial treatment. By doing so it motivates patients to keep on the regimen when they see positive results. Pathogenic biofilms do not change immediately and patients/caregivers should be informed that it could take months or years to re-establish a healthy normal flora in the family unit.

COLLABORATION

The overall objective of the *Journal of the California Dental Association's* February and March 2003 issues and current documents in this issue on caries management by risk assessment is to reduce or eradicate dental caries in children in every county, community, and culture in California by the year 2010.[19,20] It will take a cross-disciplinary approach among medicine, dentistry, nursing, and other agencies that affect dental health to reach that objective. In order to support collaborative approaches, to more aggressively deal with dental caries as a bacterially based transmissible disease, instruments have been developed specifically for medical/nondental professionals to provide appropriate tools (TABLE 7 — "Medical CAMBRA Risk Assessment Form 0-5

TABLE 7

CAMBRA Form for Medical Providers (0-5 year patients), Assessment Tool

(Adapted from UCSF/San Francisco General Hospital Department of Family and Community Medicine.)

Name

DOB

Community Health Network
San Francisco General Hospital
Medical Center

Family Health Center
Pediatric Oral Health Screening
Progress Notes

MRN
PCP
Patient ID/Addressograph

MEDICAL CAMBRA RISK ASSESSMENT FORM 0 TO 5 INFANTS & TODDLERS

Chief complaint or reason for referral ❏ Initial

❏ Follow-up

Caries risk indicators — based on parent interview	Y	N	Notes
(a) Mother/ primary caregiver has had active dental decay in past 12 months			
(b) Older siblings with history of dental decay			
(c) Continual use of bottle containing beverages other than water/milk. Bottle use > 24 months old.			
(d) Child sleeps with a bottle or nurses on demand			
(e) Frequent (greater 3x/day total) candy, carbohydrate snacks (junk food), soda, sugared beverages (including processed juice)			
(f) Medical Issues 1. Saliva-reducing meds (asthma, seizure, hyperactivity etc.) 2. Developmental problems etc. 3. H/O anemia or Fe+ Rx:			
Protective factors — based on parent interview	Y	N	Notes
(a) Child lives in fluoridated community AND drinks tap water daily			
(b) Teeth cleaned with fluoride toothpaste (pea-size) daily			
(c) Fluoride varnish applied to child's teeth in last 6 months			
Oral examination	Y	N	
Obvious white spots (decalcifications), or obvious decay present on the child's teeth: NOTE ON DIAGRAM			
(b) Plaque is obvious on the teeth and/or gums bleed easily **ECC (Early Childhood Caries) Diagnosis:** ❏ No visible Early Childhood Caries (ECC) ❏ Non-cavitated ECC ❏ Cavitated ECC			
Assessment: Child's caries risk status (cavities in the mother/caregiver, white spots or cavities in the child indicate high caries risk. The balance between the checked shaded areas (risk indicators) and the checked un-shaded areas (protective factors) provides the risk status as high or low): ❏ LOW ❏ HIGH			
Plan: ❏ Health education handouts ❏ Self-management Goals 1._____			
❏ Dispense fluoride toothpaste and toothbrush ❏ Prophylaxis and fluoride varnish ❏ FHC Oral Health Clinic follow-up appointment (high risk) ____ months ❏ Urgent outside dental referral (high risk, needs tracking) ❏ Routine dental referral for dental home (all others)			

Signature of Rendering Provider: _____ Name: _____ CHN # _____

Supervising Attending: _____ CHN # _____ Date of Service: _____

Infants & Toddlers/Self-management Goals") to assess and assist infants/toddlers and their caregivers according to their caries risk status. Please share this form with your medical colleagues.

Traditionally, the first contact an infant has with a health care provider is with the pediatrician or family health care practitioner. It is therefore crucial these practitioners be trained to identify children at high risk for caries. There is some evidence these providers have knowledge in early dental preventive interventions.[30,31] Some effective caries control programs have been addressed by Rozier and colleagues where they demonstrated that nondental professionals were able to successfully integrate preventive dental services into their practices.[32] However, Ismail et al. concluded that a majority of United States physicians do not screen for early signs of early childhood caries nor do they look for white spot lesions which are the precursors of cavitation.[33]

It is our ethical and moral responsibility to ensure the best prevention management model for this vulnerable group of young children. By being proactive on prevention, we can surely decrease the prevalence of early childhood caries and ensure healthy kids with healthy smiles.[34]

Summary

Determining a child's caries risk level (high, moderate, low) is the primary goal of utilizing an appropriate caries risk assessment instrument that is age specific. The caries risk assessment process for the infant/toddler is comprised of parent/caregiver interview, examination of the child, assignment of caries risk level, and bacterial cultures, if indicated. Completing a caries risk assessment (CAMBRA 0-5) is the critical element in the infant oral care visit and vital component of caries management. Once risk level is determined, the provider develops an individualized treatment plan, customizes home care recommendations, engages the parent/caregiver in the process by conducting a motivational interview, involves the parent/caregiver in setting their self-management goals, educates the parent/caregiver about age-specific interventions for prevention (anticipatory guidance), and determines the interval for periodic re-evaluation.

A MAJORITY OF United States physicians do not screen for early signs of early childhood caries nor do they look for white spot lesions which are the precursors of cavitation.

In order to effectively treat early ECC, we need to treat the disease rather than just the results of the disease. Rather than abdicating the responsibility for addressing this growing epidemic to the pediatric dental specialists, the profession must expand the approach to infant/toddler caries risk assessment and prevention to include general dental practices as well as medical care providers. As stated previously, the study by Ismail and colleagues found that although physicians in the United States would refer a child with a high caries risk level for a dental visit, the majority of respondents did not regularly screen for signs of ECC. Expansion of opportunities for addressing ECC also means increasing risk assessment awareness among public health programs and community clinics as well.

Dental providers need to be trained and educated to utilize an age-appropriate risk assessment tool that can assist them to monitor and manage their patients individually and effectively to prevent future dental disease for their pediatric population. In addition, physicians, as well as other nondental providers, need to be trained and educated in appropriate screening, risk assessment of infants and toddlers and referral to a dental home.

Further information to assist in expansion of related knowledge and skills may be found on the "First Smiles" Web site, www.first5oralhealth.org, part of a statewide oral health initiative funded by First 5 California and managed by the California Dental Association Foundation and the Dental Health Foundation regarding oral health of children 0-5.[34] Web site resources include complementary continuing education courses (2 C.E. units) designed specifically for dental and medical professionals to address the "silent epidemic" of ECC affecting children age 0-5.

The program reflects changes in the modern management of caries and improved diagnosis of noncavitated, incipient lesions and treatment for prevention and arrest of these lesions.[35] Additional skills emphasized for the initial infant oral care visit (within six months of eruption of the first tooth and no later than 12 months of age) include: infant/toddler positioning (knee to knee exam), when to treat/refer, parent/caregiver education and managing behavior of very young children.

The authors have provided caries risk assessment forms (CAMBRA 0-5) for dental and medical (nondental) providers as models for use or modification. The one-page forms are designed for use with infants/toddlers age 0-5. Instructions for

the clinician have been included to guide the health care providers through the risk assessment process. Supplemental forms for use following caries risk assessment (CAMBRA 0-5) are included as well. For example, once the pathological and protective factors are assessed to determine if the patient is at risk of progression or initiation of dental caries, decisions need to be made regarding indications for bacterial cultures, and home care recommendations for the parent/caregiver and child. With this easily identifiable information, both health care providers and guardians can be made aware of the treatment needs, set self-management goals, anticipate age-specific concerns, as well as refer the child to the correct resources and, most importantly, prevent the development of future dental disease. ■■■■

REFERENCES

1. Vargas CM, Crall JJ, Schneider DA, Sociodemographic distribution of pediatric dental caries: NHANES III, 1988-1994. *J Am Dent Assoc* 129:1229-38, 1998.
2. Poland C 3rd, Hale KJ, Providing oral health to the little ones. *J Indiana Dent Assoc* 82:8-14, 2003.
3. Health and Health Care in Schools, Health disparities experienced by racial/ethnic minority populations. *MMRW* 733, 2004.
4. Macek MD, Wagner ML, et al, Survey of oral health status of Maryland school children 2000-2001. *Pediatr Dent* 26 (4):329-36, 2004.
5. Dental Health Foundation, The 2006 oral health needs assessment of children. http://www.dentalhealthfoundation.org/topics/public/. Accessed April 10, 2007.
6. Nowak AJ, Rationale for the timing of the first oral evaluation. *Pediatr Dent* 19:8-11, 1997.
7. American Dental Association, ADA statement on early childhood caries 2004. http://www.ada.org/prof/resources/position/caries/. Accessed Aug. 17, 2007.
8. American Academy of Pediatric Dentistry, infant oral health. *Pediatr Dent* 22:82, 2000.
9. American Association of Public Health Dentistry, First oral health assessment policy. 2004. http://www.aaphd.org/default.asp?page=policy.htm. Accessed Aug. 22, 2007.
10. American Academy of Pediatric Dentistry, Policy on early childhood caries (ECC): classifications, consequences, and preventive strategies, 2003. http://www.aapd.org. Accessed Aug. 17, 2007.
11. American Academy of Pediatric Dentistry, Policy on the dental home, 2004. http://www.aapd.org. Accessed Aug. 17, 2007.
12. American Academy of Pediatrics, Recommendations for preventive pediatric health care. *Pediatrics* 105:645, 2000.
13. Featherstone JDB, The science and practice of caries prevention. *J Am Dent Assoc* 131:887-99, 2000.
14. Featherstone JDB, The caries balance: the basis for caries management by risk assessment. *Oral Health Prev Dent* 2 Suppl 1:259-64, 2004.
15. Hansel Petersson G, Fure S, Bratthall D, Evaluation of a computer-based caries risk assessment program in an elderly group of individuals. *Acta Odontol Scand* 61:164-71, 2003.
16. Featherstone JDB, Caries prevention and reversal based on the caries balance. *Pediatr Dent* 28:128, 32; discussion 192-8, 2006.
17. Peretz B, Ram D, et al, Preschool caries as an indicator of future caries: a longitudinal study. *Pediatr Dent* 25(2):114-8, 2003.
18. Tagliaferro EP, Pereira AC, et al, Assessment of dental caries predictors in a seven-year longitudinal study. *J Public Health Dent* 66(3):169-73, 2006.
19. Featherstone JDB, The caries balance: contributing factors and early detection. *J Calif Dent Assoc* 31 (2):129-33, 2003.
20. Featherstone JDB, Adair SM, et al, Caries management by risk assessment: consensus statement, April 2002. *J Calif Dent Assoc* 31(3):257-69, 2003.
21. Ramos-Gomez FJ, Clinical considerations for an infant oral health care program. *Compendium* 26(5) suppl 1: 17-23, 2005.
22. American Academy of Pediatric Dentistry Council on Clinical Affairs, Policy on use of a caries-risk assessment tool (CAT) for infants, children, and adolescents. *Pediatr Dent* 27:25-7, 2005.
23. Seki M, Yamashita Y, et al, Effect of mixed mutans streptococci colonization on caries development. *Oral Microbiol Immunol* 21(1):47-52, 2006.
24. Ramos-Gomez F, Bacterial salivary markers' role in ECC risk assessment in infants. *J Dent Res Issue* 85B:0516, 2006. www.dentalresearch.org. Accessed Aug. 17, 2007.
25. Fujino T, Zhan L, et al, Comparative enumeration of cariogenic bacteria by two sampling techniques. *J Dent Res Issue* 83A:3455, 2004. www.dentalresearch.org. Accessed Aug. 17, 2007.
26. Weinstein P, Harrison R, Benton T, Motivating parents to prevent caries in their young children. *J Am Dent Assoc* 135:731-8, 2004.
27. Weinstein P, Provider versus patient-centered approaches to health promotion with parents of young children: what works/does not work and why. *Pediatr Dent* 28:172-6, 2006.
28. Peltier B, Weinstein P, Fredekind RE, Risky Business: Influencing People to Change, (in process of being published), *J Cal Dent Assoc*.
29. American Academy of Pediatric Dentistry, Clinical guideline on periodicity of examination, preventive dental services, anticipatory guidance and oral treatment for children 2003. http://www.aapd.org. Accessed Aug. 17, 2007.
30. Bader JD, Rozier RG, et al, Physicians' roles in preventing dental caries in preschool children: a summary of the evidence for the U.S. preventive services task force. *Am J Prev Med* 26:315-25, 2004.
31. de la Cruz GG, Rozier RG, Slade G, Dental screening and referral of young children by pediatric primary care providers. *Pediatrics* 114:642-52, 2004.
32. Rozier RG, Sutton BK, Prevention of early childhood caries in North Carolina medical practices: implications for research and practice. *J Dent Educ* 67(8):876-85, 2003.
33. Ismail AI, Nainar SM, Sohn W, Children's first dental visit: attitudes and practices of U.S. pediatricians and family physicians. *Pediatr Dent* 25:425-30, 2003.
34. California Dental Association Foundation and the Dental Health Foundation, First Smiles. http://www.first5oralhealth.org. Accessed Aug. 17, 2007.
35. National Institutes of Health, Diagnosis and management of dental caries throughout life. Bethesda, Md, National Institutes of Health, 2001.

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