EARLY CHILDHOOD CARIES: AN OVERVIEW AND A COMBATIVE EFFORT IN EASTERN NORTH CAROLINA

by

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Abstract

Early childhood caries have become an endemic problem in recent years within many varying populations and regions across the globe. Both developed and underdeveloped nations have seen the impacts of dental caries on widespread populations. Very few demographics or geographic areas seem immune from dental caries, especially young children. For the past decade, the effects of early childhood caries on young children in the US has been a condition of widespread concern. With such virulence from a chronic, preventable condition the etiology and circumstances surrounding the condition deserve to be analyzed along with present treatment methods, as well as possible improvements that can be made on existing practices. In this review, these main topics will be explored along with a current effort that is attempting to combat early childhood caries in eastern North Carolina.

Introduction

For the past 30 years, records and statistics for dental caries in general populations have greatly declined for developed nations that practice fluoridated water programs. [1] However, in recent years a new increase in rates for young children has sparked new interest in dental caries. In the United States, data for pre-school children of 2-5 years has shown a 4% increase from 1988-1994 to 1999-2004, up to 28% and up 15% from previous years. [2, 3] Other developed nations, such as New Zealand, have experienced up to 49% of children age 5-11 years showing visible caries, while European nations (England, Sweden, and Finland) fall between 1% and 32%.[1] The highest prevalence of caries in children have found to be in undeveloped regions, such as Africa between 38% and 45%. [3] Other undeveloped nations in the Middle East have shown prevalence to fall between 22% and 61% for 3-year-olds.[3] These trends point to approximately one-third of children across the globe presenting caries in primary teeth. In the United States, early childhood caries shows to be the most common chronic condition among children. [4]

The emphasis on childhood caries cannot be urgent enough for several key reasons. For one, the impacts of dentition during adolescence ultimately affects greater physical and health issues that occur later in life. Physical appearance and face shape are affected by the early development and placement of primary teeth. Likewise, oral health during early years may affect diet and food choice encompassing the body's overall health.[3] As problems worsen and treatment is delayed, the complexity of the condition increases, the cost of treatments increase, and the number of clinicians who can perform the procedures necessary decreases.

Children are also not expected to have the control or circumstances to protect themselves as adults with such complicated health issues. Adults are able to make informed and concerned decisions, while children are often at the mercy of their guardians or environment. Children do not often complain of discomfort, or directly present signs or symptoms that may need attention.[1] Understanding this should provide a basis for why attention and effort must be taken to children to ensure a healthy, active lifestyle for their future. These factors argue that dental care during the first 10 years of life are more important than at any other point in life.

Description and Diagnosis

The American Dental Association has defined Early Childhood Caries (ECC) as "the presence of one or more decayed (non-cavitated or cavitated lesions), missing (due to caries) or filled tooth surfaces in any primary tooth in a preschool-age child between birth and 71 months of age."[5] Other organizations, such as the CDC, have defined ECC as "tooth decay among children younger than 6 years." [6] The latter definition does not address the fact of primary or secondary teeth, and so is used as a broader more general definition of ECC. In either case, the progression of ECC begins from a newly erupted tooth that has yet to be colonized by bacteria. From this unmarked tooth, biofilm begins to establish itself, possibly noticed by visible plaque.[6] The resulting identification of ECC is recognized as a dull, white demineralized enamel, or "white spot" on any one, or multiple, teeth. Caries are frequently seen on one, or both, of the labial and lingual sides of teeth. At this early stage of non-cavitated lesions (or caries), remineralization can occur with the use of intervention treatments, such as sealants and fluorides. Without such treatments or behavior changes, these areas progress to show rapid and obvious

decay along gingival margins and in turn produce cavitated lesions (or cavities).[2,7] Further progressed cavities are observed to be decayed hard tissue that is characteristically yellow or brown in color.[3]

Etiology

It is well documented that the causes of ECC are extensive and widespread. Behavioral, environmental, and sociological factors all contribute to the presence of ECC in children of many regions and demographic backgrounds. Some factors contribute to the presence of ECC more than others, but each has its own danger. Chemically speaking however, ECC has but one origin. Micro-organisms. Bacteria, such as *S. mutans* and *Streptococcus sobrinus,* are the main culprits of caries and cavities of teeth. Although many bacteria preside in the oral cavity at any given time, these organisms in particular produce acid as a waste product of metabolism upon ingesting fermentable carbohydrates.[3] Of course, it is here that behavioral, environmental, and sociological factors begin to contribute to the eventual progression of caries. The ability to contain and limit these micro-organisms becomes the ultimate decider of carie progression.

Even still, the mere presence of *S. mutans* and *Streptococcus sobrinus* has been a source of interest in children. Children are not born with these bacteria, or many others for that matter, leaving doctors to seek out the reservoirs of the bacteria. For young infants these reservoirs are none other than mothers and caregivers. A well defined range has been designated as the "window of infectivity" for infants, leaving them vulnerable to contamination of bacteria.[3] During this time period, shortly after birth, infants do not have the immunity to fend off bacteria, allowing such microorganism to begin their way of life in the body. *Vertical transmission* as it is called, from mother to child, has become

established as a key source of carie causing microorganisms.[3] In comparing the percentage of these micro-organisms in patients and non-patients of caries, an understanding has developed that these micro-organisms are simply opportunistic in nature, competing for various niches in the mouth with other bacteria.[3]

Behavioral factors include, but are not limited to, diet and oral hygiene practices.[4] The overarching theme among them all is the presence of fermentable sugars that preside on teeth for a prolonged period of time. One such behavior that has been of high concern is the feeding practices of small infants. Poor baby bottle use has shown a significant correlation with ECC.[3] Sleeping with a baby bottle and highly sweetened baby formulas only increase the chance of ECC. Breastfeeding has shown to be at much lower risk for ECC, however, prolonged contact has still been shown to result in acidic conditions and softening enamel.[3] Any prolonged sugar intake by practices, such as "grazing" throughout the day, significantly increases chance of caries in any individual.[1] After only 20-40 minutes of sugar exposure bacteria are able to produce acidic conditions.

Beyond direct behavioral factors, environmental and socioeconomic factors that cause ECC have increasingly become of concern. Among groups with high rates of ECC, studies show that ethnic and racial minorities, those born to single mothers, parents with low educational levels, and those with illiterate mothers are all at high risk.[3] In recent decades, as fluoridated water practices have increased the overall oral health of all U.S. citizens, there are still regions where caries seem more prevalent than others. This correlation may be a consequence of different dietary habits and sugar intake, as well as, inefficient exposure to fluoride.[3]

Carie Care and Treatment Methods

The traditional approach for caring for primary dentition has continued to evolve over the past several decades as research on success and longevity of treatment methods have been more closely studied. The common theme through all research and study is that a proper diagnosis and identification of carie progression must first be recognized to ensure proper treatment.[1]

The succession of caries from simple demineralization to extreme decay calls for more advanced treatment as caries show more prevalence or development in the patient. As a carie control method, and more recently as a prevention method, fluoride as a remineralizing agent in toothpaste, mouth rinses, or varnish allows for simple carie demineralization of enamel to be restored.[2] These products alone have shown to reduce caries between 30% and 70% compared to no fluoride therapy.[3]

As caries progress to form deep pits or grooves in tooth surfaces, a more involved treatment method may be needed. Such treatment includes sealants, typically for permanent molars, but possibly for primary molars as well if tooth structure has been compromised.[4] If tooth structure is minimally damaged, a sealant may provide enough reinforcement to arrest future decay.[4] However, if caries continue to damage tooth structure or underlying dentin has been mildly compromised interim therapeutic restoration may be needed. This treatment measure involves removal of caries using slow-speed rotary instruments to reveal healthy tooth structure. After this preparation step has been completed the resulting space is filled with a fluoride-releasing glass ionomer. Amalgam is also viewed as a sealant alternative with notable success. Again, such atraumatic restorative treatment is only a carie control method and does not provide protection against future carie advancements.[4]

If significant tooth structure has been destroyed or if control methods have proven to be unsuccessful, the doctor and patient have fewer options as to how to treat. One treatment option that has shown very successful outcomes in primary molar dentition is the stainless steel crown.[1] These pre-fabricated crowns are cemented in place and essentially shield the tooth from direct contact from carie-causing agents. Such crowns have shown to last as long as 9 years and are considered cost effective. Still, this treatment methods must be carefully explored, evaluating factors such as tooth overhangs and pulp involvement.[1]

Finally, if the tooth is causing pain or creating caries in other teeth, extraction may be required. This step should be taken as a last result as premature loss of primary dentition is likely to result in future orthodontic problems. This alone will continue the child's problematic oral health into the future if left untreated .[3]

In recent years, a shift toward increased prevention and education methods have been of upmost concern, involving dentists to reach the child even before they arrive in the dental chair. These methods vary from traditional methods of instructing patients what to do, and instead follows a more recent medical model of chronic conditions such as diabetes and asthma. In this model, doctors assume patients are responsible for their own health and play a central role in determining their own chronic conditions.[4] By requiring parent/family engagement in oral health behaviors, the model looks to promote healthy behavior rather than solely concentrate on restorative treatment. [8] These methods also requires an active and informed patient, as well as appropriate collaboration in areas such as language and culture.[4]

One such approach that acts as disease system management system is the Caries Management by Risk Assessment, also known as CAMBRA. This approach allows providers to systematically 1) assess child and caregiver's caries risk, 2) tailor specific management plans, 3) customize a restorative plan, along with preventative care, and 4) plan a timely and specific periodic schedule based on risks.[8] CAMBRA is carried out in six steps and creates a path for future health development and growth.

Step one involves a caries risk assessment helping the provider consider risk and health status of the patient. The risk assessment specifically identifies 3 areas of consideration. These are risk and/or biological factors, protective factors, and clinical findings. The assessment is completed through a short interview with the caregiver. The formation of a caries risk profile helps establish a prevention and treatment plan, as well as a scheduled plan for the patient.[8]

Step two progresses to in-chair assessment of the patient. Proper positioning, with the child lying supine, with his/her head resting in the provider's lap. This position gives the child the opportunity to see parent and the parent opportunity to see what the provider sees.[8]

Step three uses the "tell-show-do technique" involving toothbrush prophylaxis. The provider is able to show parent and child the proper technique for brushing teeth. Step four is a clinical examination. Step five is an application of fluoride varnish.[8]

Finally, step six involves the provider working with the parent to determine a mutually agreed upon set of self-management goals appropriate for the family.[8] From this meeting, it is encouraged that the family set goals involving diet and oral hygiene to be reevaluated during the next visit.

This type of risk assessment approach has been endorsed by the American Dental Association, the American Academy of Pediatric Dentistry, and the American Association of Public Health. Providers who participate within community organizations have found this approach to be essential, and non-dental professionals are finding its use more widespread.[8] Nevertheless, implementing such a systematic management program has its concerns as no universal reimbursements system produces hesitancy for providers.[8]

Results

DentaQuest: Early Childhood Caries (ECC) Collaborative

In 2008, the DentaQuest Institute partnered with Children's Hospital Boston and St. Joseph's Health Services of Rhode Island to developed a protocol to implement an evidence-based method of managing and preventing ECC within a clinical setting. Over the course of three years, the program known as the ECC Collaborative proved to significantly reduce cavity recurrence, operating room visits, and pain complaints by patients. The protocol used a modified CAMBRA approach to engage and educate patients and guardians, as well as, connect them to physicians at every point of intervention. With the groundwork laid, Phase II of DentaQuest's effort to combat ECC began with 7 new locations. In Phase II, Federally Qualified Health Centers were the focus of attention. These community health clinics continued the same basic protocol with, again, very similar results. Phase II also put an emphasis on individual system changes like hanging posters in the exam room, educating front office staff, and identifying self-management goals for patients. These developments allowed the

Collaborative to successfully demonstrate that a disease management and prevention program in oral health can improve outcomes, reduce disease, and control cost.[9]

Beginning in late 2013, DentaQuest began Phase III of the ECC Collaborative. This phase would include 40 locations across the country, again with a focus on Federally Qualified Health Centers, to address ECC. The James D. Bernstein Community Health Center – Dental Clinic of Pitt County was selected to participate in the Phase III portion of the program. Phase III of the Collaborative will last from August 2013 to February 2015.

The Bernstein Dental Clinic, as it is often referred, is a Federally Qualified Health Center receiving a monetary grant from the federal government to support a portion of its budget. Directed by head dentist Rob Doherty, the clinic operates under Greene County Health Care, Inc. The center seeks to serve minority and low-income individuals who may not have substantial access to oral health care. This goal makes the Bernstein Clinic a preferred location for the ECC Collaborative, which follows a similar goal. The center currently serves approximately 12,000 patients to some degree, with the help of 4 full-time dentists and a fully functional staff.

The Collaborative Aim that Greene County Health Care, Inc. seeks to attain through this newly established program is to improve oral health of ECC patients by reducing new cavitation by 45%, pain by 28%, and keeping operating room (OR) referrals at or below 2%. New cavitation is defined as the presence of one or more teeth with clinical or radiographic caries 90 days after the initial visit. Excluded new cavitation are: 1) caries identified at initial visit, 2) caries that is new demineralization, 3) caries identified from the first initial visit radiographs. Pain is defined as pain reported by the

patient and attributed to untreated caries. Excluded are patients who reported pain at their initial visit. Referral to OR is defined as referral to OR after the initial visit. Excluded are patients who are referred to the OR at the time of their initial visit.

ECC Collaborative: Plan of Action

The first step in the action plan for the Bernstein Dental Clinic began in September 2013 with the Randomized Baseline Chart Review. This baseline review would act as a guiding tool for determining what effectiveness the Collaborative may have on the population. Fifty charts who met the following criteria were randomly selected for the review: 1) routine diagnostic test in last 90 days, 2) between the ages of 0 and 5 years, 3) had at least one recall diagnostic visit in last 90 days after initial visit, 4) had a history of caries at time of initial visit. This criteria helped form the chart review in Figure 1 after selection of 50 patients:

ECC Phase III Baseline Data Review		
	Num. of Pts.	Pct. of Sample
Total number of patients sampled	50	100%
Number with new cavitation	18	36%
Number with complaints of pain	7	14%
Number referred for oral sedation	9	18%
Number referred for IV sedation	0	0%
Number referred to OR	1	2%

Figure 1. ECC Phase III Baseline Data.[10]

From this Baseline Data Review an Action Plan was developed to emulate the CAMBRA approach to treatment.

1) First a patient is determined to be eligible for the Collaborative based on age (0-5 years).

2) At the initial visit, the patient is taken through a Risk Assessment Form (Index A-1). This form determines a child's risk to ECC based on "Biological Predisposing Factors", "Protective Factors", and "Disease Indicators". This form is completed through a face-to-face interview with the guardian and child, as well as through a clinical examination, which is very similar to the CAMBRA approach. Behavioral risks, environmental risks, and observed disease are all measured to determine overall risk.
3) Along with the Risk Assessment Form, Self-Management Goals for the Guardian (Index A-2) are explained and determined for the child. These could be as simple as no/less soda or brush with fluoride toothpaste at least two times a day. The parent is aided in determining one prominent goal, along with a secondary goal, to be evaluated at the time of the next visit.
4) Upon completion of the Risk Assessment and Self-Management Goals, the patient is categorized as High, Moderate, or Low risk. These decisions are communicated to front office staff for scheduling. High Risk patients are schedule for a monthly visit to the clinic for monitored screening and evaluation. Moderate risk patients are scheduled for visits every three months. And Low risk patients are scheduled for a visit every six months.
5) Subsequent appointments are used to monitor, screen, and treat ECC and other disease.

This protocol is done with all patients who participate in the ECC initiative. ECC patients are all scheduled on one day of the week, which allow team members to more efficiently follow protocol.

Patients are never sought after outside the clinic, but are deemed eligible once they arrive for a regular routine exam. Staff members simply use step (1) in the protocol to determine eligibility.

Since participants are expected to pay for all subsequent visits, financial limitations are expected for the served population. For this reason, costs are kept down to the best of the clinic's ability. Usually return visits are schedule on the days of operative treatment or joined to hygiene appointments. By combining visits, cost can be minimized.

Another effort that has been made to lower cost and increase oral health outcomes is to provide fluoride varnish to all ECC Collaborative patients free of charge. While the clinic does lose money by not charging for this service, the benefits of doing this are considered to outweigh the costs of not providing fluoride varnish.

There are currently no reimbursements to the Bernstein Clinic for its services; however, the DentaQuest Institute does provide some financial support in participating in the ECC Collaborative.

Bernstein Dental Clinic – Monthly Progress

Beginning in December 2013, the ECC Collaborative officially began. As a part of the administrative duties a monthly report is made by the team members to track progress, identify needs, and make changes. Each monthly report lists current team members, action plans, new data, changes that occurred during the month, barriers, as

well as breakthroughs. Lastly, the monthly report determines a number value to measure degree of progress on a scale of 0.5 - 5. This scale (Index A-3) begins at 0.5- "intend to participate", to 5- "all goals accomplished, world-class performance."

Also, listed in all monthly reports is the ECC Driver Diagram (Index A-4), which acts as a flow chart to guide team members in the direction and focus the collaborative seeks to achieve.

December 2013-Montly Report[10]

Action Plan Aims:

- Identify patients that fit the criteria for the ECC Collaborative.
- Implement processes and procedures to collect data for the Collaborative.
- Stabilize team members due to commitment questions and job changes.
- Implement the ECC initiative to 3 patients per week until committed team members identify and are comfortable with new implementation and documentations.

December 2013		
	Patients	**Pct. of Total Patients**
Total	10	100%
New	10	100%
High Risk	9	90%
Moderate Risk	1	10%
Low Risk	0	0%
Pain Complaints	1	10%
OR Referrals	0	0%
CRA and SMG Completed	10	100%

Barriers and Breakthroughs:

- Dentrix computer system connections would not connect to scheduling system.
- Time constraints and practice demands on team members.
- Added new data manager to team.
- Starting to average 2-3 new patients per week

Self-Assessment Degree of Progress Value: 2.0

January 2014-Monthly Report[10]

Action Plan Aims:

- Identify patients that fit the criteria for the ECC Collaborative.

- Implement processes and procedures to collect data for the Collaborative.
- Stabilize team members due to commitment questions and job changes.
- Implement the ECC initiative to 3 patients per week until committed team members identify and are comfortable with new implementation and documentations.

January 2014		
	Patients	**Pct. of Total Patients**
Total	18	100%
New	8	44%
High Risk	14	78%
Moderate Risk	1	6%
Low Risk	3	17%
Pain Complaints	2	11%
OR Referrals	0	0%
CRA and SMG Completed	18	100%

Barriers and Breakthroughs:

- Adjusting to loss of old team members and addition of new team members.
- Continued computer system problems.
- Added new bilingual team member.
- Began implementing one morning a week for exams, fluoride rinses, and self-management goal reviews as a part of ECC Collaborative

Self-Assessment Degree of Progress Value: 2.0

February 2014-Monthly Report[10]

Action Plan Aims:

- Identify patients that fit the criteria for the ECC Collaborative.
- Implement processes and procedures to collect data for the Collaborative.
- Stabilize team members due to commitment questions and job changes.
- Implement the ECC initiative to 3 patients per week until committed team members identify and are comfortable with new implementation and documentations.

February 2014		
	Patients	**Pct. of Total Patients**
Total	30	100%
New	12	40%
High Risk	21	70%
Moderate Risk	3	10%
Low Risk	7	23%
Pain Complaints	2	7%

OR Referrals	0	0%
CRA and SMG Completed	30	100%

Barriers and Breakthroughs:

- Difficulty scheduling several (12) new patients
- No new cavitation more a function of insufficient recall rather than effective self-management goals
- Computer system problems fixed

Self-Assessment Degree of Progress Value: 2.5

Discussion

ECC Collaborative Analysis and Evaluation

Evaluating the program is essential in determining its level of achievement and purpose on many levels. Being at such an early stage in the program's development, evaluation now could ultimately help propel the program to new levels of achievement and purpose in the future. To organize the evaluation procedure, the program will be assessed according to a *process evaluation* that looks at how well the program was implemented, then according to a *summative evaluation* that looks at the effectiveness of the program. The summative evaluation will be made up of a short-term and long-term effectiveness evaluation to gauge success over time. Using both of these perspectives a strong measure of achievement will be able to be given to the program up to this point.

- **Process Evaluation:**

  Process evaluation looks at if the program was carried out as initially intended. Understanding that this portion of the ECC Collaborative (Phase III) has been 6 years in the making gives the program a strong vision in how to organize and carry out its objectives. Online seminars, objective materials, and regional conferences to each and every member location of Phase III have all made the

vision of the ECC Collaborative clear and concise to all its participants, including the Bernstein Dental Clinic. Many of the logistical components of the program such as how to provide risk assessments and self-management goals have already been worked out as key pieces to the ECC Collaborative. Likewise, how often to schedule patients and how to define new or existing disease have already been outlined in past phases of the Collaborative. Using this comparative nature to how well the Bernstein Clinic follows the already established implementation of program protocols will determine how well the Bernstein clinic measure in its process evaluation.

Individually, the Bernstein Clinic has served the population that the ECC Collaborative seeks to serve. Being a Federally Qualified Health Center that acts as a safety net provider to underserved, limited access individuals makes the population that the Bernstein Center serves as ideal to the ECC Collaborative. Also, as the monthly reports show, the number of individuals receiving service from the Collaborative shows that this population is actually being served accordingly. As of March 1, 2014 exactly thirty children were participating the ECC Collaborative. The services rendered to this population is in line with all current treatment options and places an upmost importance on health prevention and management. This quality of care is precisely what the ECC Collaborative seeks to maintain. Each and every member of the Bernstein staff is fully equipped and trained to deliver any and all services that need to be rendered to its patients in a reasonable manner. With 4 full-time dentists, along with 4 dental hygienists

and 16 office staff members, most any situation can be managed and handled appropriately.

As of March 23, 2014, no patient/guardian opinion survey of the program had been used to measure patient satisfaction. Being early, there is still time to suggest and follow up with patients about success of the program. This type of survey could aid in the overall flow of patients through the program from the first initial visit to the subsequent follow-up visits thereafter, as well as help in the summative evaluation.

- **Summative Evaluation:**

The summative evaluation seeks to measure the success of the program. Since the Bernstein Clinic has only been implementing the program for three full months as of March 23, 2014, only a limited summative evaluation can be delivered for the program. The overall collaborative goals to improve oral health of ECC patients by reducing new cavitation by 45%, pain by 28%, and keeping operating room (OR) referrals at or below 2% is still too early to accurately measure any progress.

This only allows for a limited short-term evaluation and relatively no long-term evaluation. Also, given that new cavitation is defined as occurring in the last 90 days, this limits the number of new cavitation patients to just the few very early patients of the program. Even still, short-term self-management goals can be monitored in high-risk patients who return for a follow-up visit every month. Asking guardians how well they are managing their self-management goals is crucial in keeping family and patient accountable for their oral health.

This information in not yet being recorded in monthly reports and should be listed or graded as “Self-Management Goal Accountability.” This would quantify the short-term and long-term goal of effectively changing participant’s attitudes and beliefs about oral health behavior or risk.

In the coming months as more information is gathered and more participants enroll in the program a clearer vision of how well the program is developing will be able to be seen. Through patient/guardian opinion surveys, as well as raw data, a distinct trend of oral health progression will be seen.

Conclusion

Early Childhood Caries will continue to be a substantial health problem in future generations if the primary problems of behavioral risk factors are not dealt with appropriately. Poor dental hygiene and diet prove to be of upmost importance as each of these lead to a significant majority of ECC cases. New knowledge and techniques on how to properly maintain oral health will never be achieved by solely operative treatments and procedures. Such efforts only temporarily correct the problem but can never act as a long-term solution. Prevention and management programs can be a first step in teaching and educating any population, especially low income and limited access individuals, how to responsibly care for their own dental needs. This approach serves to correct problems in the short-term, while also keeping costs down in the long-term as fewer treatment will be needed.

DentaQuest’s ECC Collaborative exemplifies such an effort. This program has cleaved the prevention and management strategies model away hospitals and primary care providers, where it was used primarily for chronic health problems, and carried it

into dental offices across the country. Over the course of six years, the ECC Collaborative has shown that it can successfully improve outcomes, reduce disease, and control cost.[9]

The Bernstein Clinic is just one of forty locations enacting the ECC Collaborative and time will tell just how well this approach works at the much smaller scale of individually run offices. Up to this point, results are positive and efforts are strengthening to see positive change in the behaviors and minds of ECC Collaborative participants.

Index

A-1

J.D. Bernstein CHC – ECC Collaborative

CARIES RISK ASSESSMENT FORM FOR AGES 0 TO 5 YRS OLD

Patient Name:_____ I.D.#_____ Age:_____

Date:_____ Assessment Date: _____

NOTE: Any one YES in Column 1 signifies likely "High Risk" and an indication for bacteria tests	YES = CIRCLE 1	2	3	Comments:
1. Risk Factors (Biological Predisposing Factors)				
(a) Mother/caregiver has had known active dental decay in past year				
(b) Bottle with fluid other than water, plain milk and/or formula		YES		Type(s):
(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: Type(s):
(f) Saliva-Reducing factors are present, including: 1. medications (e.g., 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) Parent and/or caregiver has low SES (Socio-economic status) and/or low health literacy, WIC/Early Head Start		YES		
2. Protective Factors				
(a) Child lives in a fluoridated community (note zip code)			YES	Zip Code:
(b) Takes fluoride supplements			YES	
(c) Child drinks fluoridated water (e.g., tap water)			YES	
(d) Teeth brushed with fluoride toothpaste (pea size) at least 2x daily			YES	# times/day:
(e) Fluoride varnish in last 6 months			YES	
(f) Mother/caregiver understands use of xylitol gum/lozenges			YES	
(g) Child is given xylitol (recommended wipes, spray, gel)			YES	
3. Disease Indicators - Clinical Examination of Child				
(a) Obvious white spots, decalcifications, or decay present on the child's teeth				
(b) Existing restorations				
(c) Plaque is obvious on the teeth and/or gums bleed easily		YES		
(d) Visually inadequate saliva flow		YES		
(e) New remineralization since last visit (List teeth):			YES	Teeth:
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. _____

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

Clinician's Signature: _____ Date:_____ (Updated: 8/16/12)

A-2

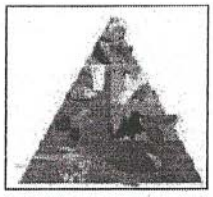
J.D. Bernstein CHC - ECC Collaborative

Self Management Goals for Parent/Caregiver

Patient Name _____ DOB _____

Regular dental visits for child

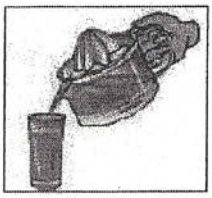
Family receives dental treatment



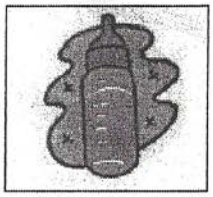
Healthy snacks

Brush with fluoride toothpaste at least 2 times daily

No soda

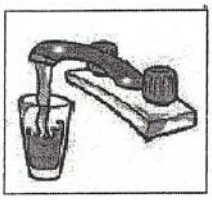


Less or no juice

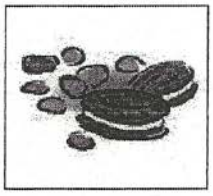


Wean off bottle (no bottles for sleeping)

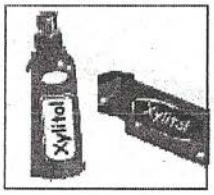
Only water or milk in sippy cups



Drink tap water



Less or no junk food and candy



Use xylitol spray, gel or dissolving tablets

Self-management goals 1) _____

2) _____

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

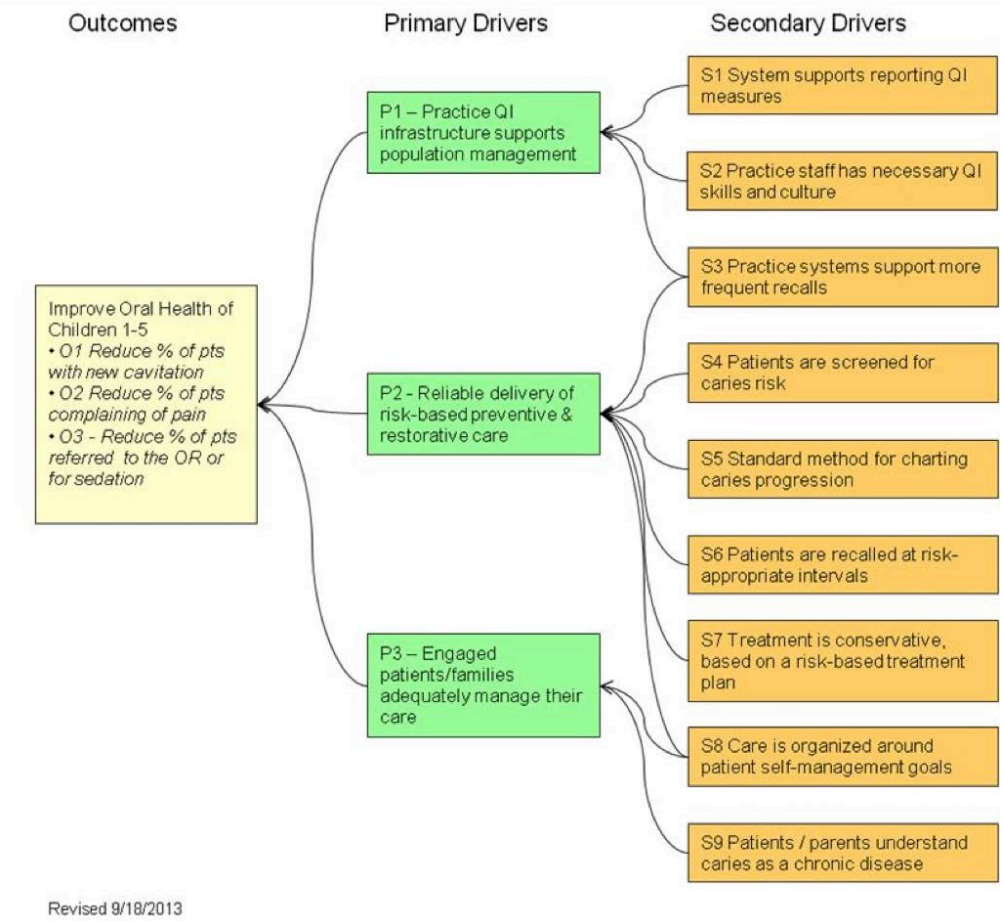
Signature _____ Date _____

Practitioner signature _____ Date _____

A-3

0.5 - Intent	Intend to participate
1.0 - Forming	Forming team, collaborative aim discussed, info gathering
1.5 - Planning	Team meets; collaborative aim submitted; segmentation plan complete
2.0 - Activity	Action period plan posted with goals; preliminary tasks underway; baseline data complete; initial changes planned
2.5 - Testing	PDSA testing in progress, no improvement yet
3.0 - Modest Improvement	Moderate improvement 1 process measure;
3.5 - Improvement	Moderate improvement 1 outcome measure, >1 process measure; testing in all 2° drivers indicated in aim; implementation underway in 1 driver
4.0 - Significant Improvement	Testing underway in all 2° drivers indicated in aim; improvement in all outcomes indicated in aim; gap to process goals closed by 75%; Implementation underway in all drivers, planning for spread
4.5 - Sustained Improvement	Implementation in all drivers in aim; outcome and process goals achieved; improvement sustained by run or SPC rules; Spread underway as indicated in aim
5.0 – Outstanding	All goals accomplished; world-class performance

A-4



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