



The Clinician's Companion

TO DENTAL CARIES MANAGEMENT

DentaQuest
INSTITUTE





Welcome

Welcome to a new paradigm of oral healthcare, where dental caries is managed as a chronic disease process. You have chosen to take your practice to a new level of patient engagement, and the road ahead will be challenging. However, you are joining a group of clinicians across the United States who have already embraced a disease management approach to caring for patients. You will see your patients' oral health improve, watch your clinical team become excited about the care they deliver, and find renewed passion and joy in your practice.... But it will not be easy.

This guide provides the rationale behind the Disease Management Framework we have developed and will give you the skillset to sustain the work into the future. You will learn the language of "Quality Improvement" and use your electronic dental record to evaluate the health of your patient population. As noted in *Quality Improvement Efforts in Pediatric Oral Health*, "Quality improvement strategies are intended to support care delivery redesign and are opportunities to accelerate the pace of change into clinical practice" (Ng, 2016, p. 227). By tracking and understanding your data about your patients, you can optimize the systems in your practice to further improve the health of your patients by decreasing their incidence of disease, while contributing to the success of the dental profession in the future.

The skills you are about to learn may be applied to patients of any age, but starting with younger patients is likely to be the easiest and most impactful. Through the implementation a chronic disease management approach, your practice has the opportunity to see a decrease in rates of new cavitation and pain experienced by your patients (Ng MW, Ramos-Gomez F, Lieberman M, 2014). You will discover that the disease management approach and the associated Framework should be adopted in a systematic fashion to enable the greatest buy-in and ease of implementation. I hope you will take full advantage of our available resources. I am confident that you will find the paradigm shift to a disease management approach in patient care to be a pivotal moment for you, your staff, your practice, and your patients.

Welcome to the new era of oral healthcare!

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Executive Summary

Introduction

The mission of the DentaQuest Institute is to promote optimal oral health through effective and efficient care, and prevention. We believe that the oral health care delivery system is undergoing an important transition from one that focuses mainly on surgical and restorative treatment to one that uses the latest innovations in science to help patients prevent and manage their underlying disease. It is now within our grasp to help people live caries-free lives and to prevent the negative consequences oral disease can have on children and adults.

The Clinician's Companion to Dental Caries Management (*hereinafter referred to as the Clinician's Companion*) provides the rationale for disease prevention and management of caries and describes the components of this approach. It introduces a tested risk-based disease prevention and management protocol for health care professionals, along with tools to start and sustain such a protocol. The Clinician's Companion was developed by DentaQuest Institute faculty and staff in an effort to combine the work and best practices learned from our previous initiatives,

the Early Childhood Caries (ECC) and the Dental Caries Management (DCM) Collaboratives. The Clinician's Companion is built upon the Disease Management Protocol. The components of the Protocol are structured into the Disease Management Framework (*hereinafter referred to as the Framework*) "LEARN, ACT, TRACK, BRING BACK" to help dental practices implement disease management.¹

The first section of the Clinician's Companion provides an overview of the Disease Management Framework, establishes the case for transforming how dental care is delivered, addresses the need to redefine quality in the context of clinical and the business of dental practice, and discusses the rationale for adopting a disease management approach into clinical practice.

The subsequent sections focus on how to apply the different components of the Disease Management Framework "LEARN, ACT, TRACK, BRING BACK". Each of the four components of the Framework includes tools and resources that can be used to help implement disease management in your practice.

Disease Management Framework



¹ For more information on the resources and information covered in this guide, a references section is located at the end of the document with links to additional resources.

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Establishing a Common Language



Young children, typically between 0 - <6 years of age depend on adult caregivers for their needs. In a disease management approach for this age group, recommendations focus on the adult caregivers.



In 6-20 year olds, the focus is on the patients themselves. Please keep a lookout for these call-out symbols to recognize the important differences between the age groups.

We recognize that providers see every combination of families with children, and that the caregiver attending patient appointments may include moms, dads, grandparents, adoptive parents, guardians and many others. For the purposes of the Clinician’s Companion to Dental Caries Management we rely on the word parent, knowing that it will be substituted for the appropriate term by providers.

NAMING CONVENTIONS FOR CARIES

Demineralization (*white spot lesions*) and other early caries lesions may be remineralized while advanced lesions/cavitation may require surgical intervention (*with a restoration*). Arrested lesions can be maintained in an inactive state without surgical repair.

Throughout this document the following terms will be used to describe the various stages of demineralization (*the dental caries process*).

Caries lesions are signs or manifestations of the disease process in their various forms, which may be:

- Non-cavitated (*initial and moderate lesions, incipient lesions, white spot lesions*)
- Cavitated (*advanced lesions*)
- Demineralization (*white spots, initial lesions*)
- Remineralized (*arrested*)
- Inactive – disease does not show signs of progression
- Active – caries disease is progressing (*new lesions forming and/or progressing*)

Tooth decay is synonymous with “caries lesions”, however “tooth decay” is more acceptable to use when speaking with patients and families

Cavity is a “hole” in the tooth. The use of the term “cavity” should be reserved for situations where the tooth surface has cavitated and irreversible damage to the tooth has occurred.

COMMONLY USED ACRONYMS

AAPD	American Academy of Pediatric Dentistry	ECC	Early Childhood Caries
ADA	American Dental Association	ICDAS	International Caries Detection and Assessment System
CAMBRA	Caries Management by Risk Assessment	ITR	Interim Therapeutic Restoration
CPP-ACP	Casein Phosphopeptide Amorphorous Calcium Phosphate	PDSA	Plan-Do-Study-Act
CRA	Caries Risk Assessment	QI	Quality Improvement
DA	Dental Assistant	RDH	Registered Dental Hygienist
DCM	Dental Caries Management	SMG	Self-Management Goals

Previous DentaQuest Institute Collaboratives

The DentaQuest Institute’s approach to preventing, managing, and treating childhood and early childhood caries is based on a comprehensive Disease Management Protocol developed at Boston Children’s Hospital and originally tested by Boston Children’s Hospital, and St. Joseph Health Services and Hospitals of Rhode Island in Providence, RI.

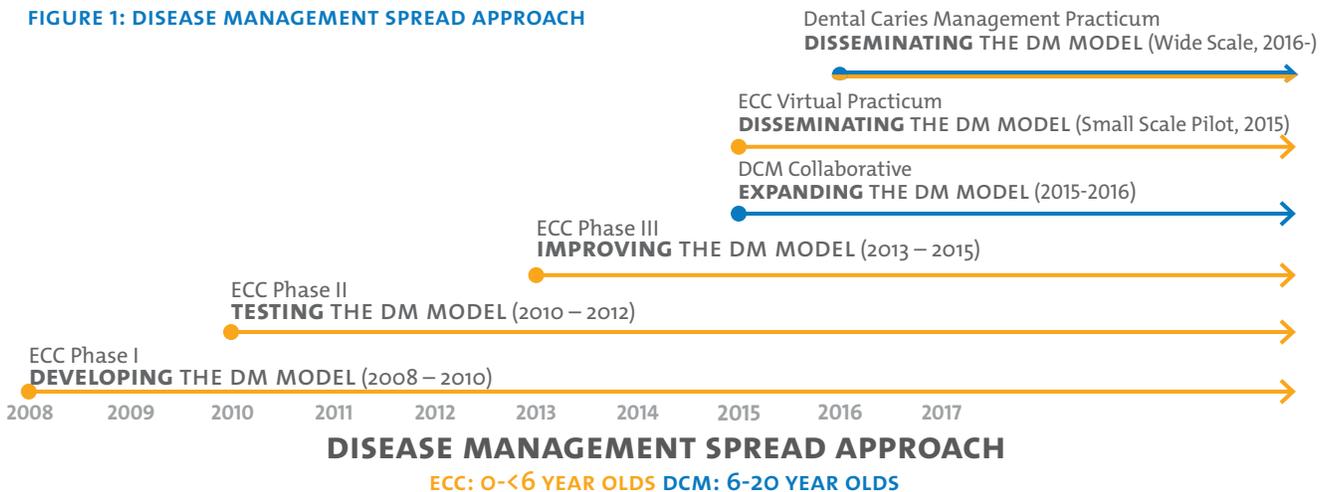
Since 2008, over 50 dental practices across the United States have participated in a series of Breakthrough Series Collaboratives (Figure 1)². The Collaborative teams engaged in the testing, implementation, and refining of the Disease Management Protocol. They also learned about and used quality improvement (QI) methodology, and participated in collecting and analyzing monthly process and outcome measures. The teams had access to a variety of tools (including those found in the Appendices of *The Clinician’s Companion*), and they received training and technical assistance from QI experts and a national group of faculty who are knowledgeable about disease management.

All the Collaborative teams worked towards the same aim—to improve the outcomes of their patients through a change in how oral health care is delivered for children and adolescents. They re-designed their practice care delivery systems, such that every child and adolescent patient would routinely receive an assessment of their caries risk and the opportunity to collaborate with the provider on patient-centered strategies to improve their caries risk. Children and adolescents who were high or moderate risk were invited to return more frequently to receive caries risk assessment and timely risk-based preventive and restorative care.

Teams connected their improvement efforts with process and outcomes data. Collaborative faculty and staff helped teams understand how their data reflected the changes that were implemented, and the impact on patient health outcomes.

Please note: Results from these Collaboratives can be found on the Virtual Practicum at <https://www.dentaquestinstitute.org/learn/dental-caries-management-practicum/faculty-publications>

FIGURE 1: DISEASE MANAGEMENT SPREAD APPROACH



6 ² The Breakthrough Series: IHI’s Collaborative Model for Achieving Breakthrough Improvement. IHI Innovation Series white paper. Boston: Institute for Healthcare Improvement; 2003. (Available on www.IHI.org)

Transforming Care Delivery

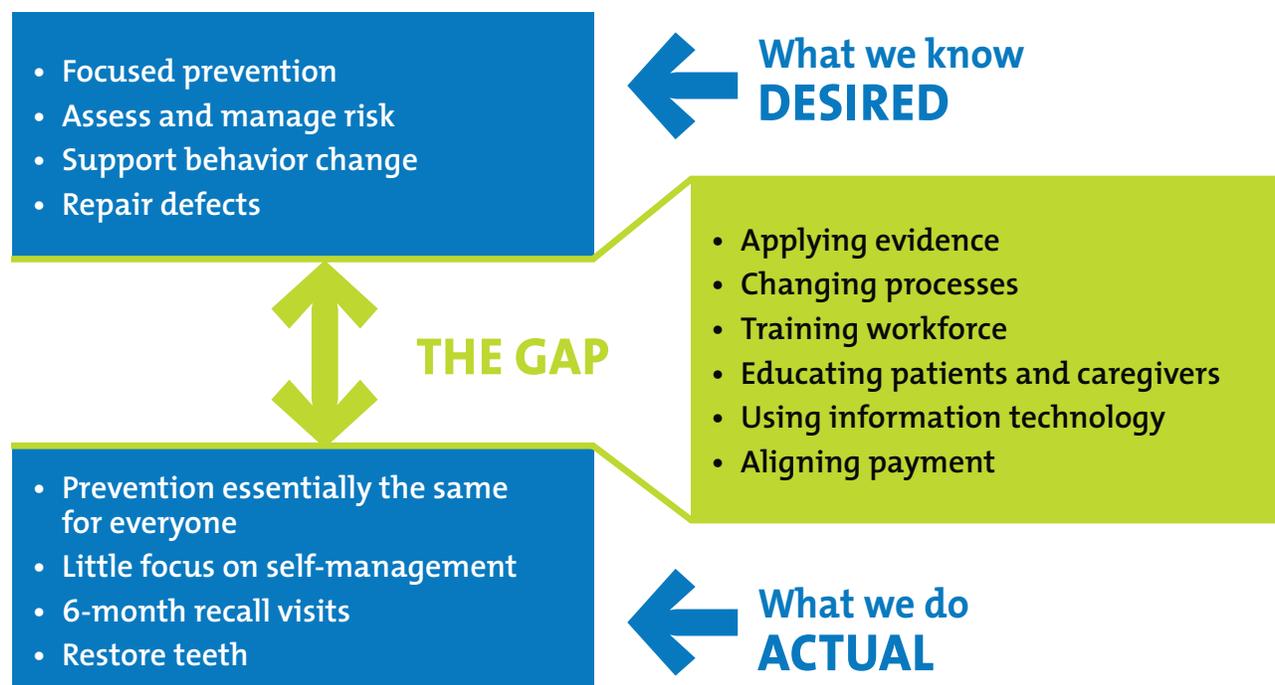
Dental caries is a largely preventable disease. Yet, it continues to be prevalent among children and adolescents. In fact, caries is the most common chronic disease in children 5-17 years of age. The impact on the overall health and development of the pediatric population is well documented. Traditional approaches to the treatment of dental caries do not address the contributing societal or individual risk factors which lead to disease progression.³

At the DentaQuest Institute, we focus on understanding the barriers that lead to the gap between knowledge and practice and work with clinical partners to close this gap (Figure 2). We do this by teaching providers to understand their system and the processes involved when delivering patient-centered, risk-based care.

All improvement requires change⁴, but there is no “one size fits all” approach to delivering this type of care to our patients. We help practices determine and test change ideas that are customized and realistic for their individual practice and also give them tools to collect and analyze data to see if the changes they make are truly making an impact on the health of the patients they see.

Disease management is a set of activities aimed at improving the health and clinical outcomes of patients⁵. Providers who implement a disease management approach in their practice believe that patients have the most important role in the care of their chronic health condition. Disease management is not a series of yes/no questions on a checklist, or cutting the tooth and using a better restorative material, or applying silver diamine fluoride (SDF), or telling your patient what changes to make.

FIGURE 2: THE GAP BETWEEN CURRENT AND DESIRED APPROACHES TO CARE



³ Ng MW, Ramos-Gomez F.

⁴ Institute for Healthcare Improvement (2017).

⁵ American Academy of Family Physicians (2017).



The disease management approach is based on a comprehensive Disease Management (DM) Protocol (Figure 3) developed and tested at Boston Children's Hospital. The DM Protocol is based on the premise that a patient's caries risk status is not static, but rather can change over time. The DM Protocol addresses the social and environmental factors, as well as the biological causes of the dental caries disease process.

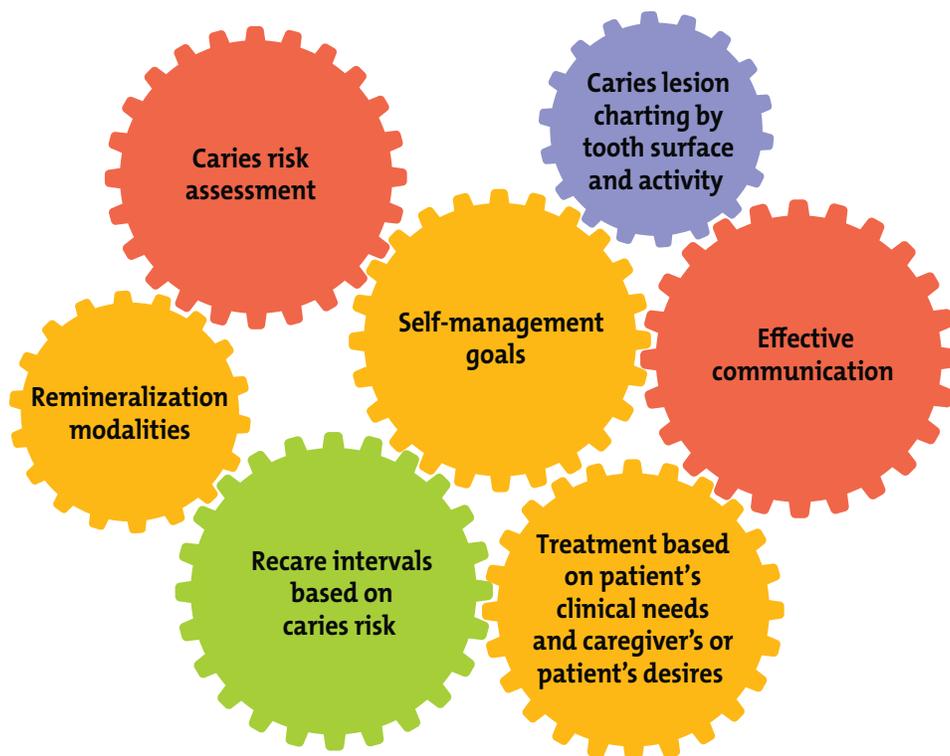
The Disease Management Protocol (Figure 3) is comprised of seven components. Each component is represented by a gear. The gears are aligned with the elements of the Disease Management Framework (Figure 7), and color coded to align with where in the Framework they are addressed.

The Disease Management Protocol is not a checklist. It is not a series of steps. Rather, it is a set of components that, when used together in clinical practice, leads to effective disease management of caries in patients.

Successful implementation of a risk-based disease management protocol in dental practices can be challenging, but also satisfying and inspiring. In time, care providers, practice team members, patients and their families can be expected to value disease management over traditional treatment options. Practices need to create a culture of transformation, continuous quality and disease management.

FIGURE 3: DISEASE MANAGEMENT PROTOCOL

Disease Management Protocol



Redesigning Dental Practice

A paradigm shift is needed in the practice of dentistry to include risk-based disease prevention and management of caries. However, large-scale adoption of disease management approaches will require policy and payment reform to include reimbursing for providers for disease management components. These include:

- Caries risk assessment
- Diagnosis of caries
- Non-surgical management of caries
- More frequent risk-based disease management visits for some appropriate patients

- Education and counseling

Presently, these activities are typically not reimbursed by fee-for service insurance plans. Substantial changes are also needed in how practices manage their patient visits, organize their daily work, and measure the quality of their services. Care providers, patients and families, who are accustomed to the conventional surgical approach, have to be introduced to and accept a contemporary approach to treating disease that emphasizes risk assessment, individualized disease prevention and management, and maintenance of health.

Case Example of Remineralization

One patient, a high caries risk 6-year-old male presented with initial active caries lesions on #8 and 9. Using effective communication and motivational interviewing while also engaging the parent, the patient implemented changes to his home care routine. The patient and his mother began to regularly report back to the practice on their success at home using over the counter (OTC) fluoride toothpaste and MI Paste nightly. Once positive changes were verified clinically, the patient began orthodontic treatment with an orthodontist who was receptive to the practice's new philosophy. The pediatric dentist and orthodontist remained engaged with the patient and parent, supporting continued goal setting, and taking clinical photos at each visit. Visual remineralization was used to verify the same risk reduction documented via caries risk assessment. The successful remineralization of the initial lesions all began with one self-management goal to improve oral hygiene. Over time, other goals were agreed upon, such as introducing xylitol and CPP-ACP in the form of MI Paste which was applied nightly. (Figures 4, 5a, 5b)



FIGURE 4: Radiographs showing the lack of caries progress (e.g. Remineralization) on the mesial of #8 and distal of #9



FIGURE 5a: Initial presentation of high caries risk 6-year-old patient. Note the initial caries lesions present on the mesial of #8 and distal of #9.



FIGURE 5b: 21 months later at recare the initial caries lesions appear inactive and remineralized.



Disease Management

There is more to health than just healthcare

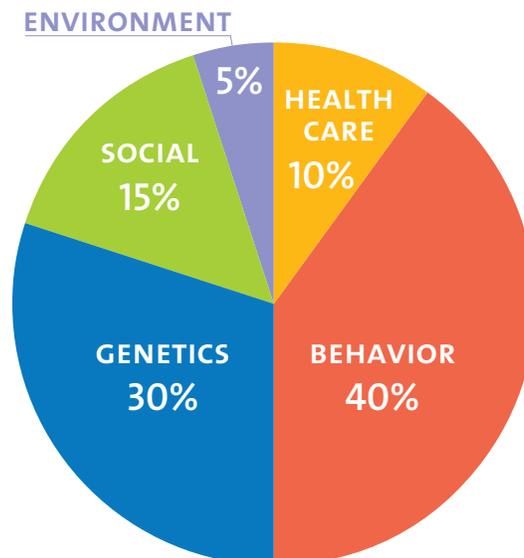
Why is caries difficult to diagnose and treat, even though it is almost 100% preventable? It seems there is much more to attaining health than just receiving healthcare. The foundation of understanding what determines health was laid out by McGinnis, et al⁶. They explain that, while health care is certainly important to overall health, other factors are also important (*especially for the long-term management of chronic diseases*) such as behavior patterns, dietary habits, oral hygiene practices, fluoride exposure, genetic predisposition, social circumstances and environmental exposure. In fact, they have determined that healthcare accounts for only 10% of your health (**Figure 6**).

So how can we use this understanding of health to help patients and the public to optimize their oral health? Featherstone's caries balance concept⁷ states that the balance of pathologic factors can be altered in favor of protective factors to slow down

or completely halt the caries process. In individuals with active caries disease (*lesions forming and/or progressing*), without changes to alter the balance in favor of protective factors over pathologic factors, the caries process continues, with new and recurrent caries resulting. However, if caries risk factors can be countered with protective factors, and if the disease is identified early, then protective factors can be enhanced to stop the progression of the disease. For the purposes of this Clinician's Companion, we will consider that there are five protective factors that can interrupt the caries process⁸.

1. Inhibit biofilm acid production with fluoride and other agents
2. Avoid in-between meal snacking
3. Stimulate saliva flow after meals
4. Block the substrate with sealants
5. Maintain oral pH at or above neutrality

FIGURE 6: DETERMINANTS OF HEALTH



10 ⁶ McGinnis, et al
⁷ Featherstone JD

⁸ Described by Twetman at the IAPD Keynote address in 2013

Caries is a disease we need to treat differently

Dental caries is a very widespread disease among children and adolescents. Early childhood caries (ECC) is a prevalent form of caries that affects the primary teeth of infants, toddlers and preschool children. ECC can progress rapidly. If left untreated, caries may result in pain and infection.

Restoration of teeth without addressing the etiology of the disease will likely lead to future decay.

Until recently, standards of care called for restorative and surgical treatment, along with general recommendations to change dietary and oral hygiene practices. Young children who are not cooperative or have special health care needs and require restorative treatment are commonly sedated or treated under general anesthesia. However, the scientific literature has documented the high costs of general anesthesia and relapse rates of 37-79% (*restorative treatment failures*)⁹. It is now known that restorative treatment of caries alone does not address the disease process¹⁰.

When protective factors are effective, early lesions will remineralize, and new lesions are prevented. This remineralization process can only be successful when the patient and/or parent commits to daily interventions, and therein lies the most significant challenge. How do we teach our youngest patients to take ownership of their oral health?

It is important that healthy habits are established early and routinely. In young children (0-6 years), parents help to define the oral health practices early in their children's life. They also help to establish regular dental care for their children. Their own beliefs and self-efficacy help determine the extent to which their children will engage in oral health promoting behaviors.

As children become older, the responsibility of maintaining healthy habits shifts from the parent to the child. Most children who are older than 6 years of age are able to take ownership of their oral health with the support of their parents and healthcare professionals.

Establishing a dental home early in life offers the best opportunity for children to receive an assessment of their caries risk, primary prevention along with early intervention, and recommendations on sound oral health practices which can mitigate their risk of disease over a lifetime.¹¹ Infants should ideally have an oral health visit and children should have an established dental home by one year of age. The mixed dentition stage begins during this time, and represents a critical time in the etiology of caries disease¹². In children who already manifest early childhood caries or caries lesions, a risk-based disease prevention and management approach is critical to address the disease etiology.

⁹ Ng MW, Ramos-Gomez F, Lieberman M, et al

¹⁰ Ng MW, Ramos-Gomez F

¹¹ Ng MW, Ramos-Gomez F

¹² Recommended by the American Academy of Pediatric Dentistry, the American Dental Association, the American Academy of Pediatrics and the American Association of Public Health Dentistry



As children grow into preadolescents and adolescents, the focus needs to shift to engaging the patient to embrace their own health. Depending upon the family dynamic and individual patient, this transition will be different for each child. Disease management requires clinicians to meet the unique needs of the patient at each individual visit while resisting the temptation to simply provide oral hygiene instruction and nutritional counseling that is not tailored to the patient's needs.

Risk based disease management requires teamwork

Contemporary approaches to caries prevention and management, modeled after the medical management of chronic conditions, such as diabetes and asthma, have been published in the scientific literature¹³. Chronic disease management differs from a traditional approach of the provider telling patients and/or parents what to do. Instead,

it assumes that patients and/or parents have a central role in determining the care of their chronic condition, and that the dental practice has a supporting role in tracking and managing patients' care. This requires close collaboration between the healthcare provider, patients and/or parents, ideally in a culturally and linguistically appropriate manner. Providers educate patients and/or parents about the factors that lead to dental disease and assists in selecting self-management goals to improve their caries risk. Treatment decisions (**Figure 3**) are based on the latest evidence-based guidelines, including minimally invasive techniques. Risk-based disease prevention and management of caries requires family engagement and empowerment from the provider and care team in effective day-to-day behavior modifications (*e.g. tooth-brushing, topical fluorides and dietary control*) that address disease etiology.

The Disease Management Framework: LEARN, ACT, TRACK, BRING BACK

The Disease Management Framework (*LEARN, ACT, TRACK, BRING BACK*) provides a structure to the components of the Disease Management Protocol. The DM Framework (**Figure 7**) is a series of steps, that when incorporated **together** in clinical practice, can lead to a caries reduction in child and adolescent patients.

Dental disease affects individuals of all ages, cultures, ethnicities, and socioeconomic backgrounds. Through the implementation of

LEARN, ACT, TRACK, BRING BACK, care providers are prepared and empowered to address the caries risk of the whole patient. This DM Framework creates a partnership between dental providers and their patients. Practices and care providers who adopt disease prevention and management in their offices can help their patients and caregivers establish optimal oral health by promoting healthy oral behaviors and habits.

FIGURE 7: THE DISEASE MANAGEMENT FRAMEWORK

Disease Management Framework





Recognize the Patient and Caregiver's Oral Health and Habits

Objectives:

- Learn about the role of effective communication between the care team and the patient/parent.
- Describe the pivotal role of caries risk assessment in disease management.
- Implement Caries Risk Assessment using principles of effective communication.



EFFECTIVE COMMUNICATION

As with other chronic diseases, caries is influenced by various social and behavioral factors, such as diet, oral hygiene practices and fluoride exposure. When patients have active caries, the disease process will continue when protective and restorative factors are not brought into balance. On the other hand, if the disease identified early and the risk factors responsible for the disease are addressed, new caries lesions can be prevented, and progression of early caries lesions can be slowed, halted or even reversed.

When most oral health care professionals enter school, there is an awareness of the need to learn technical skills to perform the daily tasks of clinical care. However, these technical skills often do not include communication, despite the fact that most students do not enter school with any formal training in health care communication. Frequently, the ingrained communication style and various techniques employed by oral health professionals are ineffective, and rely on the incorrect assumption that knowledge and education equal behavior change. While knowledge is an important ingredient in behavior,

another significant ingredient is forgotten: motivation. Thus, it is imperative to discuss the importance of understanding and learning effective communication styles and techniques to help patients increase their motivation for oral health behavior changes, as the disease management approach focuses largely on behavioral change—in the provider/care team and the patient and/or parent.

Motivational Interviewing (*MI*) is a widely used communication style designed to effect change by increasing motivation and commitment to goals. Motivation can be and often is influenced by the provider; what providers do or say can make patients more or less likely to change their behaviors—in the case of dental caries management, changes in oral hygiene and diet.

Elements promoted by the dental caries management approach (*knowledge, skill, confidence, and motivation*) support behavior change. By contrast, change is likely to be resisted when providers and the care team create roadblocks of fear, insecurity, shame, imposition,

and persuasion. A key element of helping patients make positive oral health behavior changes is a strong partnership with a patient and/or parent, while at the same time honoring their ultimate autonomy. To this end, engagement and trust can be created by focusing on desires, goals, hopes, and positive expectations for their oral health and for the relationship. To help patients start increasing their motivation, it is important to focus closely on listening to “*why*” change is important. Once the patient has established the “*why*,” the provider/care team can help the patient explore the “*how*.” Ultimately, the decision to change or not change is up to the patient. When a provider/care team tries to control and coerce this decision, it often evokes defensiveness. However, when we let go of the idea that we can MAKE people change, patients are more likely to choose change for themselves.

The most important predictor of change is the balance of “*change talk*” vs. “*sustain talk*.” Change talk refers to any patient or parent speech in favor of making a change. Sustain talk favors keeping the status quo. When patients/parents voice more change talk than sustain talk, change becomes more likely. The job of the provider/care team is to help patients and parents voice change talk whenever we can. It is important to dig deeply into comments to look for or “mine” change talk. For example, imagine a parent says, “*I can probably switch from juice to water in the baby’s bottle—just not right now.*” How might you respond? Using motivational interviewing techniques, you can recognize and respond to the change talk selectively, perhaps responding by saying, “*That’s great! You think it may be possible to switch to water.*” Evoking even more change talk could include a follow up open-ended question like “*What might have to happen before you’d be ready to switch to water?*”

Techniques for you to acknowledge and recognize change talk include reflecting and asking follow-up questions. Specific examples or open-ended questions, such as “*What else?*” are useful. The more patients and parents hear themselves say something about positive changes in oral hygiene and/or diet (*through your reflections and asking evocative questions focused on change talk*), the more they will internalize and believe them.

Strategies for eliciting change talk include asking evocative open ended questions focusing on desires, abilities, reasons, and/or needs in favor of change, gauging a patient or parent’s perceptions of how important a change may be, exploring the decisional balance between changing and not changing, querying extremes, and exploring goals and values. For detailed strategies to elicit change talk, see [Appendix A-1](#).



FIGURE 8: NEW PATIENT CONVERSATION FLOW

Compassion and Empathy	STYLE/SKILLS	CONVERSATION FLOW	EXAMPLES
	<ul style="list-style-type: none"> Engaging Partnership 	Open Conversation <ul style="list-style-type: none"> Name Role Time 	“My name is _____, and I’m a dental assistant here. I’ll be taking care of you today if that’s all right with you. We’re happy you’re here! We have about 10 minutes together today. I’d love to start by having a conversation about your teeth, just so we can see where you’re currently at with your oral health and where you’d like to go. How does that sound to you?”
	<ul style="list-style-type: none"> Focusing Autonomy Partnership 	Negotiate Agenda	“I wonder what is most important for you to address today?”
	<ul style="list-style-type: none"> Evoking Open ended questions focused on change talk 	Goals for Oral Health	“What are your goals for your teeth?”
	<ul style="list-style-type: none"> Evoking Reflective Open ended questions focused on change talk Sharing information 	Caries Risk Conversation	<ul style="list-style-type: none"> “What are you currently doing to help you achieve your goals?” “Tell me about what you eat and drink at home?” “In an ideal world, what would your nighttime routine look like as far as your teeth and gums are concerned?” See Appendix A-1 for more ideas
	<ul style="list-style-type: none"> Scaling questions Planning Autonomy Partnership 	Self-management Goal Identification	<ul style="list-style-type: none"> “It sounds like you really want to work on _____.” “On a scale from 0-10, where 0 is not important/confident at all and 10 is super important/how important is _____ (or how confident are you in _____?)” “Why a 7 and not a 4?” (<i>remember to pick a lower number than they gave you!</i>)
	<ul style="list-style-type: none"> Autonomy Partnership 	Permission to Follow Up if Goal is Set	“I wonder if it would be okay with you if we put your goals into our chart and followed up with you during future visits on how you’re doing?”
		Close Conversation <ul style="list-style-type: none"> Thank you! 	“Thanks a ton for chatting with me today about this. We really appreciate hearing from you, and we are here to help support you in achieving your goals.”



LEARN

CARIES RISK ASSESSMENT (CRA)

Caries Risk Assessment (CRA) is the cornerstone of approaching disease prevention and management in a patient centered manner. To properly determine and understand a patient's risk of developing new and recurrent caries, an individualized CRA is performed. The progression or reversal of dental caries is determined by the balance between pathologic and caries protective factors. The information gained from both the interview with the patient and/or parent and the clinical examination determines the patient's caries risk level and allows for development of a customized comprehensive treatment plan (including preventive and restorative plans).

Multiple caries risk assessment tools are available.

It is important to use a reliable caries risk assessment on tool. Examples are found in [Appendix B-1](#) (Ages 0 - >6) and [B-2](#) (Ages 6 - 20).

In assessing caries risk, three domains are explored and documented:

1. Risk and/or biologic factors
2. Protective factors
3. Clinical findings

Risk factors such as food and drink preferences, frequency and types of snacks and drinks, and chronic medications should be gathered through a patient interview and documented. Protective factors are also explored, such as the use of fluoridated water, fluoridated toothpaste, or xylitol use. A clinical examination reveals the presence of other protective factors such as sealants. It is during the clinical exam that disease indicators

are identified based on clinical findings such as the presence of early demineralized enamel surfaces, cavitated lesions, acidic plaque and lack of buffering saliva.

Although there are no specific recommendations regarding the order of activities during a patient care visits, you may find these tips useful for the different age groups for implementing the CRA into your workflow. An example workflow is provided on page 18.



In a preschool child, it is often less traumatic for the child and parent and less disruptive to the visit to review the CRA before performing a knee to knee examination.



In an older cooperative child, the examination and radiographs could be completed first, followed the CRA which can take place through a conversation with a parent while the child is having their prophylaxis or radiographs.

Explaining the caries process can be as simple and/or detailed as desired by the patient and/or parent. Typically, the patient and/or parent will need more than one visit to process all of the information discussed to be able to successfully implement dietary and oral hygiene changes. For additional guidance, sample scripts, and resources on explaining the caries process, see [Appendix A-2](#) and [Appendix A-3](#).



Caries Risk Assessment¹⁴

Getting Started

- Choose a recognized CRA Form/Tool (*i.e.* ADA, AAPD, AAP, CDA) that works best for your office setting.
- Determine how you will document and gather important information from the CRA. Start with one of the following:
 - Paper form
 - Use or build a CRA tool into electronic practice management software.
 - Document information gathered from CRA into clinical notes or elsewhere in practice management software
- Train staff on Disease Management Protocol, CRA and data tracking. Include those who are knowledgeable about Information Technology, if available.
- Start with a small group of your patient pool (*i.e.* patients ages 0-5, 6-9, etc.).
- Start testing with a limited number of providers—one provider tries CRA on one patient and build on their learning, experience, confidence—to gain buy-in.
- Draft (*and revisit*) your office's workflow for completing CRA from start to finish. Determine the *whom, when, where* for each step in the process.
- Measure your progress and set goals for your measures. Suggested measures include:
 - % of patients receiving CRA
 - % of patients with reduced caries risk status
- After pilot testing, train additional providers and staff and calibrate and train how low, moderate and high risk patients are defined and addressed.

Dental Provider Workflow

Patient seated in exam room

RDH/DA begins clinical assessment/exam

RDH/DA uses CRA to guide conversation; draws out patient information on risk and protective factors

Key information from CRA (*i.e.* risk factors, protective factors, clinical indicators) is confirmed by the dentist and documented in practice management software (*i.e.* Dentrix)

Risk level is determined, explained and recorded:

D0603 – HIGH RISK

D0602 – MODERATE RISK

D0601 – LOW RISK

Engage patient/parent to set 1 or 2 Self-Management Goals

Develop with patient/parent a risk-based preventive and restorative treatment plan

Schedule follow-up re-care appointment based on risk-based interval, in conjunction with restorative treatment if possible

Guide to defining caries risk

When protective factors outweigh risk factors (*i.e. risk factors are controlled*), and the patient does not have active caries lesions, the patient's caries risk status can be classified as low risk. Research has indicated three findings that are always associated with elevated caries risk:

1. New caries lesions within the past 12 months
(*or in the primary caregiver in the past 12 months if the patient is under the age of 6*)

2. Prior caries and/or restorations in the last 12 months
3. Demineralization, enamel defects or other obvious caries in the last 12 months¹⁵

Although the evidence validating caries risk assessment tool is not yet available, caries risk profiling is an essential first step in determining a preventive and restorative treatment plan as well as the patient's recare interval.

Based on information gathered from CRA and findings from a clinical examination, the **caries risk** is **individually** determined for the patient during each particular visit. The following are guidelines for use in determining a patient's caries risk that **we recommend**:

TERM / CODE	DEFINITION
High Risk Do603	A patient who has as active caries lesions, active interproximal caries lesions, or has a history of caries within the past 6 months. The patient has other risk factors without appropriate balancing protective factors .
Moderate Risk Do602	A patient with no new demineralization and no cavitation. This is a patient who was previously "high risk" who has had disease indicators addressed and has demonstrated a reduction in the risk factors such as improved diet, or an increase in protective factors (<i>fluoride use, brushing and flossing</i>). Although the disease indicators have been addressed and the risk factors better controlled or the protective factors increased, there is sufficient risk to increase the likelihood that caries lesions or demineralization may still develop in the next 12 months. OR A patient who was previously "low risk" with new unbalanced risk factors , such as cariogenic diet or the presence of plaque/gingivitis without sufficient balancing protective factors such as adequate oral hygiene habits or daily use of fluoride. While the patient does not have signs of active disease the risk factors increase the chance that lesions may appear within 12 months. Moderate risk patients do not have uncompleted treatment plans.
Low Risk Do601	A patient who currently does not have disease indicators such as clinical or radiographic caries lesions and has balanced all risk factors with protective factors . OR A previously "Moderate risk" patient, who has had disease indicators addressed, has demonstrated a reduction in risk factors and/or an increase in protective factors and/or presence of remineralization for the past 12 months. It does not seem likely that new caries lesions will manifest within the next 12 months Low risk patients do not have uncompleted treatment plans.

TABLE 1: RISK CODES DEFINED

¹⁵ Sacheti A, Ng MW, Ramos-Gomez, F.



Based on the guidelines in **Table 1**, a patient’s caries risk status can be determined during their initial visit and all subsequent recare visits. A patient’s caries risk can be expected to change from one visit to the next. **Figure 9** is a decision tree which can be used to help in determining the caries risk status of a patient at their first appointment in your clinic. Caries risk status for each patient should be assessed at all subsequent

recare visits. Providers should use the information gathered from conversations with the patient and/or caregiver and the clinical examination to determine if the patient’s caries risk has increased, decreased or remains the same.

Figure 10 illustrates how patients can move from one risk category to another based on either increased or decreased risk.

FIGURE 9: CARIES RISK DETERMINATION FLOW – INITIAL VISIT

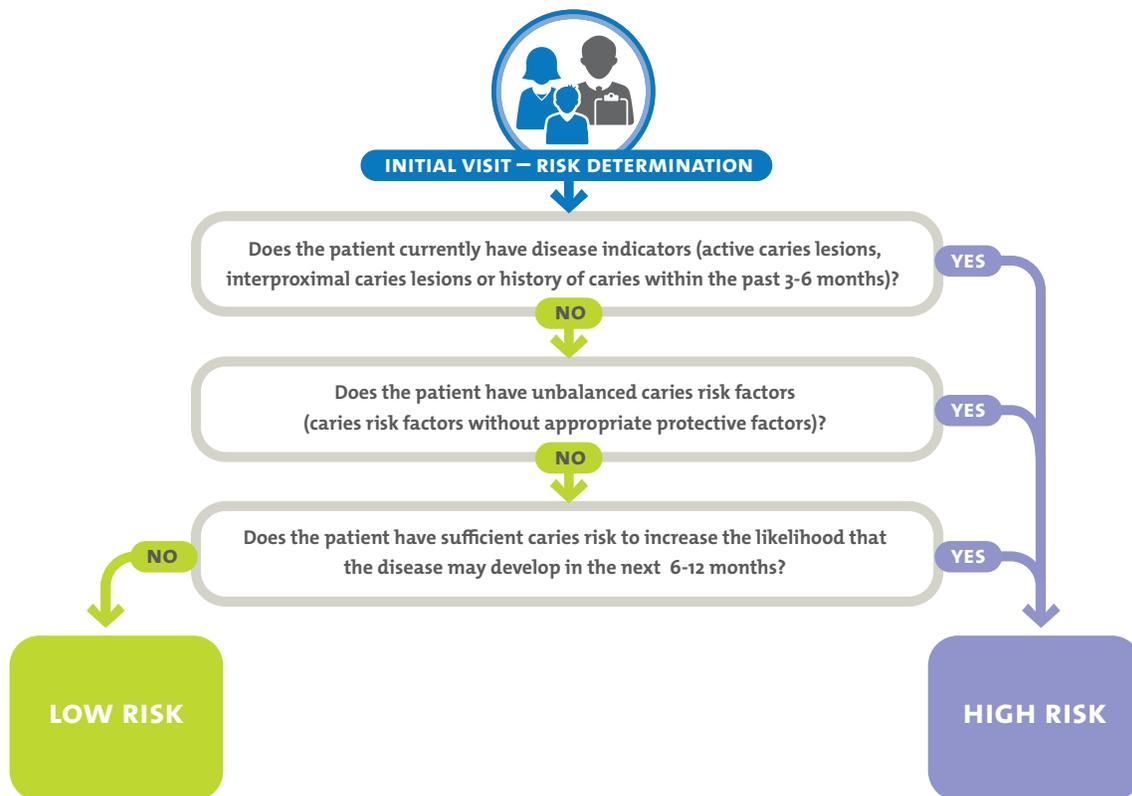
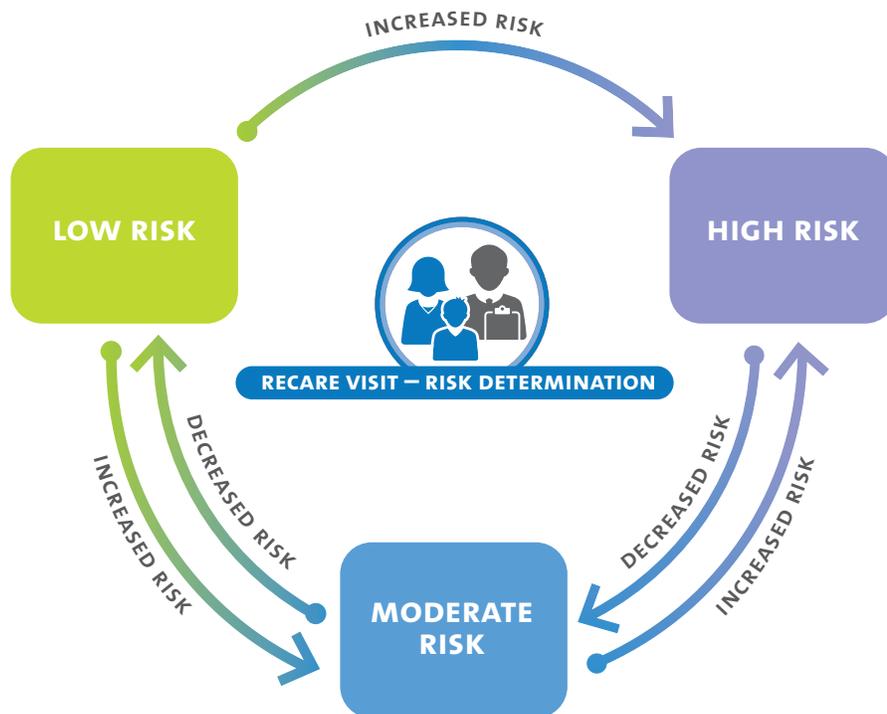


FIGURE 10: CARIES RISK DETERMINATION FLOW – DURING THE RE CARE VISIT



It is important that the patient and/or parent understands the caries process—it is the “why” children get caries that patients and/or parents need to understand to be motivated to change.

To solicit cooperation from the patient or caregiver providers and staff should offer an explanation as to why a CRA is important.

Appendix A-2 is an example of a Caries Risk Conversation.

Appendix A-3 can be used to help explain the caries process patients of all ages as well as families.

Practices should feel free to adapt these tools to their own conversation styles and comfort level.





LEARN

TAKING IT CHAIRSIDE

The following table contains example practice changes tested and implemented during the DentaQuest Institute disease management initiatives that you may adapt to your practice.

EXPLAINING THE CARIES PROCESS/ COMMUNICATING WITH PATIENTS AND PARENTS

TRY FIRST

Use a flipchart or other visual to educate parents on caries process
(see Appendix A-3)

Train providers and other key staff (e.g. front desk) on how to use
Motivational Interviewing/effective communication and caries risk conversations

Use a camera to document caries progression and engage with patient
and caregiver

CRA FORMS AND TRACKING

TRY FIRST

Select and/or modify a Caries Risk Assessment Form/Tool (i.e. ADA, AAPD, AAP,
CDA) that will work best for your setting (See Appendix B-1 and B-2)

Add caries risk assessment form into the electronic dental record (EDR)

STANDARDIZATION AMONG PROVIDERS

TRY FIRST

Add caries risk classifications, documentation workflow, and when to decrease risk
level to agendas for staff meetings and training new employees

Develop workflow for risk assessment within patient visit (see pages 18-19)

Calibrate provider knowledge on caries risk definitions



Intervene to Provide Risk-Based, Preventive Care

Objectives:

- Address risk factors using self-management goals.
- Recommend appropriate evidence-based remineralization strategies.
- Harmonize restorative interventions with disease management strategies.



ACT

SELF-MANAGEMENT GOALS

There has been a paradigm shift in the way chronic disease is being managed in that individuals with chronic conditions have a greater voice and assume the principal role in making care decisions. At the same time, healthcare professionals take on more of a supportive and consulting role¹⁶. This shift requires the patient/parent to self-manage their chronic condition (*caries*) with the support and collaboration of the healthcare team¹⁷. Helping the patient/parent understand and set achievable goals (*we may call them Self-Management Goals (SMGs), but the patient/parent will often just call them goals*) is an important part of making healthy change and ultimately reducing caries risk. Clinical goals are the care team's health goal for the patient, e.g. *"Our patient's caries risk level will decrease at their next visit."* A self-management goal differs from this in that it is an achievable personal goal in which the patient finds value. SMGs are often helpful in the achievement of the clinical goal. Example: *"I will brush my teeth every night for two minutes using fluoride toothpaste and not rinse"*¹⁸. Two important things to remember about helping a patient/parent set self-management goals:

1. A patient can choose to set no goal at all. Respecting their autonomy in this way can further engagement (*which can help in setting SMGs at future appointments*).
2. Encourage patients to make the goal SMART (*Specific, Measurable, Achievable, Realistic, Time Bound*) by asking open ended questions that seek patient-driven solutions, e.g. *"That's great you want to brush your teeth more. Tell me a little more about the specifics of what that might look like for you."*¹⁹

The patient and/or parent may select one or two SMGs to work on at home before the next visit. Care teams are encouraged to utilize effective communication skills outlined in LEARN to create a partnership with patients and/or parents so that the process of identifying SMGs is effective. Chronic disease management relies on patients and/or parents taking a proactive approach to modifying risky behaviors, which is a stark departure from traditional care planning where the provider dictates which changes should be made.

¹⁶ Bodenheimer, T., Lorig, K., Holman, H., & Grumbach, K

¹⁷ Coleman, M. T., & Newton, K. S.

¹⁸ Jordan, L. M.

¹⁹ Jordan, L. M.



Appendix C provides several examples of several SMG forms for patients and/or parents adapted from CAMBRA (*Caries Management by Risk Assessment*).

Diet and nutrition

Dietary factors and food choices are determinants of dental caries and other chronic conditions. Increased risk of caries is significantly associated with frequent as well as total consumption of simple sugars. Patients and/or parents should be counseled on the importance of reducing the frequency of exposure to sugars and refined carbohydrates in foods and drinks.²⁰

Oral hygiene

Learning how to properly care for teeth is paramount to preventing caries and remineralizing early lesions. Every patient will need to learn oral hygiene in a different way, but resources like *2min2xday* (*2min2x.org*) provide an excellent foundation and are appropriate for patients of all ages²¹.



Since the quality of tooth cleaning is important, younger children (*typically <4 years*) require direct assistance with tooth brushing from an adult caregiver beginning with the first erupted tooth. With correct positioning (*such as employing a knee to knee position with two adults or by having an adult approach from behind the child's head*), and retraction of the lips and cheeks, it should take no more than one minute to brush a young child's teeth. Flossing is indicated if there are any contacts between teeth (*typically after 3-4 years of age for posterior teeth*).²²



Older patients should be encouraged to perform their own oral hygiene and parents should reward good behavior when appropriate.²³ Parents should supervise toothbrushing and flossing in their school age children until about 7-8 years of age (*when they can tie their own shoelaces*).

Harmful Habits

Frequent snacking on carbohydrate-rich foods like chips and crackers (*remember carbs cause caries*)

Bottle or sippy cups in bed with anything other than water (*this causes caries*)

Sugary foods and drinks, including fruit juices, other than mealtimes (*reduce the frequency of sugars*)

Helpful Habits

Snacks such as "milk and cheese, nuts and seeds, and green things like spinach" (*these are caries preventing foods and snacks!*)

Only drinking water at bedtime after teeth have been brushed (*these will reduce caries*)

Leaving toothpaste foam in mouth at bedtime (*rinsing removes all the helpful fluoride*)

²⁰ Ng MW, Chase I.

²¹ Ng MW, Chase I.

²² Ng MW, Chase I.

²³ Ng MW, Chase I.



ACT

REMINERALIZATION MODALITIES

Fluoride Toothpaste

Fluoride toothpaste is an effective, safe and cost-effective prevention tool for children. Current recommendations by the American Dental Association²⁴ are:



Parents should begin brushing teeth with fluoride toothpaste twice a day as soon as they erupt into the mouth. The amount of toothpaste should be no larger than a grain of rice (*i.e. smear*), for children under the age of 3. In children 3-6 years of age, no more than a pea-size amount of toothpaste is recommended. Children should be supervised to minimize swallowing of the toothpaste.



Older children should brush their teeth thoroughly twice a day using a pea sized amount of fluoride toothpaste. Parent involvement assists in thorough brushing with the proper amount of toothpaste.

To maximize the protective effects of fluoride, it is recommended to **wait 30 minutes after brushing with fluoride toothpaste before eating, drinking or rinsing**. There is no need to rinse out the toothpaste after brushing.

There continues to be a great deal of confusion and mistrust among the public and even healthcare providers about the use of fluoride toothpaste in young children. Parents, families and the public need to know that **brushing with fluoridated toothpaste two or more times per day (especially before bedtime) is one of the most effective preventive measures that can reduce the risk of caries²⁵**.

²⁴ American Dental Association Council on Scientific Affairs.

²⁵ Ng MW, Ramos-Gomez F.

²⁶ Ng MW, Chase I.

Fluoridated Water

Drinking fluoridated water is the most convenient and cost-effective way to provide optimal fluoride benefits. In sub-optimally fluoridated communities, a fluoride supplement may be prescribed to children with high caries risk as recommended by the ADA²⁶.

Professional fluoride treatments

Professional topical fluoride treatments, such as fluoride varnish, should be administered based on a caries risk assessment. The AAPD and the ADA recommends that patients receive a full-mouth topical fluoride treatment (*fluoride varnish*) at the following intervals:

- Every 3 to 6 months for high risk children
- A minimum of every 6 months for moderate risk children

Low risk children may not receive additional benefit from topical fluoride treatment, as their exposure to fluoridated drinking water and toothpaste may be adequate for their needs.



Young patients experiencing ECC will benefit from increased frequency of topical fluoride treatment. See **Table 5** for recommended fluoride treatment based upon risk.

Other fluorides and remineralizing agents

Topical applications of other fluoride compounds such as silver diamine fluoride (*SDF*) and stannous fluoride may be more effective than sodium fluoride for preventing and controlling caries. *SDF* has gained considerable attention recently for its purported ability to arrest caries lesions and prevent recurrent decay. Although its availability in the United States is relatively new, an increasing number of clinicians are using *SDF* with varying degrees of success. It can be applied to cavitated caries lesions during initial and follow-up disease management or restorative visits to control dental caries disease. Topical iodine and emerging products such as casein phosphopeptide amorphous calcium phosphate (*CPP-ACP*), arginine bicarbonate, and others can be used in addition to fluorides to assist in controlling and reversing the caries process.

Combination therapies may be beneficial for some patients and families. These therapies include products that contain calcium and phosphate such as *MI Paste*, along with use of an over the counter fluoride toothpaste or recommending a product that contains calcium, phosphate and fluoride, such as *MI Paste Plus*. *MI Paste Plus* contains fluoride at a level slightly less than OTC fluoridated tooth pastes.

Brushing with or applying 0.4% stannous fluoride to cavitated carious lesions two or more times per day can also be recommended as well as xylitol and *CPP-ACP* products, all of which can help remineralize the caries or help arrest caries lesions.

When using topical fluorides and/or calcium phosphate products, the smallest amount should be applied to at risk tooth surfaces. Eating, drinking and rinsing are to be avoided for 30 minutes.

Xylitol

Xylitol is a natural molecule that is a part of the polyol family which includes sorbitol, mannitol and maltitol that can be used as a non-cariogenic sugar substitute. Xylitol reduces plaque formation, bacterial adherence, inhibits enamel demineralization and inhibits *Streptococcus mutans* (*S. mutans*). Some studies have found that xylitol can reduce *S. mutans* in plaque and saliva and can reduce caries in young children and their mothers. The therapeutic dose required (*6-10 grams/day*) divided into 4-5 exposures per day may be unrealistic in clinical practice. It is important to introduce xylitol products slowly and under the supervision of parents and a healthcare professional. Xylitol may produce some side effects such as gas and diarrhea at higher dosages.

Xylitol is available in multiple forms, including toothpaste, lozenges, chewing gum, syrup, and hard candies which can easily be incorporated into at-home care.



ACT

TREATMENT BASED ON PATIENT'S CLINICAL NEEDS/ CAREGIVER'S DESIRES

Sealants, arresting decay with remineralizing agents, minimally invasive restorative treatment, and conventional restorative treatment

Any tooth surface with deep pits or grooves benefits from treatment with resin or glass ionomer sealant²⁷. Typically, permanent molars are candidates for sealants, but primary molars may also benefit from sealant placement, especially if caries has already developed on other primary molars with similar pit and fissure anatomy.

If a tooth is already compromised by the caries process and the enamel has not yet cavitated, remineralization with materials like glass ionomer is possible. Restorative treatment may be deferred if the disease can be stabilized. If decay has progressed mildly into dentin and/or caries arrest not achieved, minimally invasive restorative treatment, such as interim therapeutic restoration (ITR), may be performed to achieve caries control. The ITR procedure involves removal of caries using hand or slow speed rotary instruments with caution not to expose the pulp. After preparation, the tooth is restored with a fluoride-releasing glass ionomer restorative material. Patients and/or parents should be advised that this approach is caries control rather than permanent restoration²⁸.

When there has been significant tooth structure destroyed by the caries process, restorative treatment is performed to restore function or to improve esthetics²⁹. Long term success of

restorative treatment is contingent upon effective management of the disease, along with the use of appropriate restorative technique and materials.

Re-evaluation of a patient's caries risk status and compliance with self-management goals provides important information to determine the type of restorations best suited for each patient. A patient who demonstrates improved caries risk may receive more conservative restorative treatment. On the other hand, a patient demonstrating no improvement of caries risk and/or worsening clinical caries activity would benefit from receiving more aggressive care, such as the use of stainless steel crowns to reduce new development caries in susceptible tooth surfaces³⁰.

Where there is caries arrest, restorative treatment may be deferred especially in a patient unable to cooperate for restorative care. However, close follow-up and preventive care based on caries risk are essential to safeguard from relapse. Seeing a patient more frequently for disease management visits and preventive care over time usually reduces a patient's fears and builds trust between the care provider and the patient, allowing for restorative treatment to be completed with greater ease in the clinical setting at a later time.³¹

²⁷ Ng MW.

²⁸ Ng MW, Ramos-Gomez F.

²⁹ Ng MW, Ramos-Gomez F.

³⁰ Ng MW, Ramos-Gomez F.

³¹ Ng MW, Ramos-Gomez F.





ACT

TAKING IT CHAIRSIDE

The following table contains example practice changes tested and implemented during the DentaQuest Institute disease management initiatives that you may adapt to your practice.

FORMS AND TRACKING SELF-MANAGEMENT GOAL COMPLETION

TRY FIRST

Test a SMG form which suits your population on several patients, make revisions and try again

Develop method in EDR to:

- code that SMG review was conducted
- document goal selected by patient (*or indicate no goal chosen*)

Call or text patients to check in about SMGs

Use a SMG “menu”—a laminated menu of self-management goals for patients to view and elect their own goal (*see Appendix C-1 and C-2*)

Use motivational interviewing-friendly language on SMG sheets

Consider having front desk staff help reinforce the SMGs before the patient leaves the office

REWARDS AND INCENTIVES

Establish SMG kits with prizes and/or raffle to help motivate patients/parents to accomplish SMGs

FLUORIDE VARNISH APPLICATION, REMINERALIZATION ALTERNATIVES AND TREATMENT BASED ON PATIENT'S CLINICAL NEEDS/CAREGIVER'S DESIRES

TRY FIRST

Review the proper use of fluoride varnish with clinical team to improve efficacy

Explore different opportunities for sealant placement:

- add sealant placement to any visit type, if rooms and support staff are available
- encourage providers to apply sealants at same-day appointments, rather than rescheduling to another appointment
- chart and seal early caries lesions rather than restore them

TRY FIRST

Recommend xylitol containing products, such as chewing gum or toothpaste with patients/caregivers

Suggest the use of calcium phosphate products such as MI Paste

Try glass ionomer sealants for high risk patients, in teeth not fully erupted or in uncooperative patients

Prioritize sealant placement within a restorative treatment plan (*e.g. complete sealants prior to restorative treatment*)

Explore the use of silver diamine fluoride in your clinical setting



See Results by Tracking Caries Lesion Progression, Patient Needs and Care Delivered

Objectives:

- Implement disease management using quality improvement.
- Use data to understand the health outcomes in practice.
- Use clinical measures to evaluate disease management progress and impact.
- Implement the ADA Caries Classification System to chart lesions progression and remineralization.



Quality improvement (QI) is a method of analyzing and improving systems. The goal of QI is improving care and health outcomes for patients and families. Through the use of QI tools, practices are able to determine areas for improvement and organize methods for achieving their goals. The use of quality improvement is an integrated element of the Disease Management Framework and is essential to achieving better health outcomes in your practice.

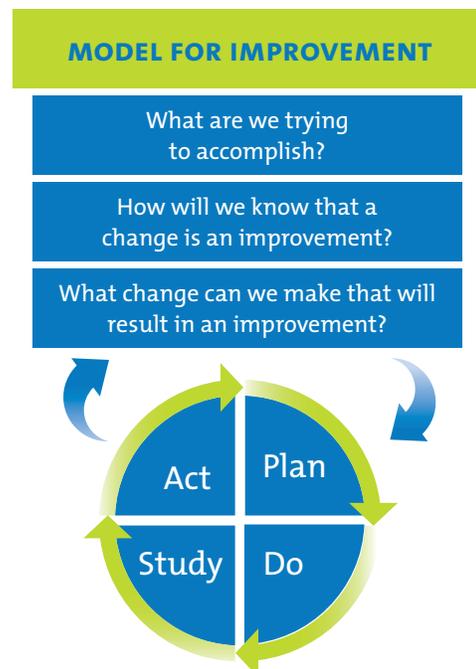
What does a clinician need to know about QI?

QI is not simply an end goal. QI is a continuous process that provides countless opportunities to test new ideas that could lead to positive health outcomes. QI, which uses systematic, data-guided activities, has been helpful in facilitating the use of risk-based disease management approaches.

It is important to understand that QI is a system of changes that must be given the same attention as any other element of operating a dental

practice. Therefore, it is recommended that QI initiatives become part of regular meetings and is incorporated into the culture of your practice.

FIGURE 11: MODEL FOR IMPROVEMENT



Model for Improvement

Commonly used in healthcare to achieve a culture of QI, the Model for Improvement, developed by Associates in Process Improvement, is a simple yet powerful tool for accelerating improvement that has been used successfully by hundreds of healthcare organizations to improve many different healthcare processes and health outcomes. **Figure 11** displays the Model for Improvement in detail.

You can learn more about using the Model for Improvement here: <http://www.ihl.org/knowledge/Pages/HowtoImprove/ScienceofImprovementHowtoImprove.aspx>

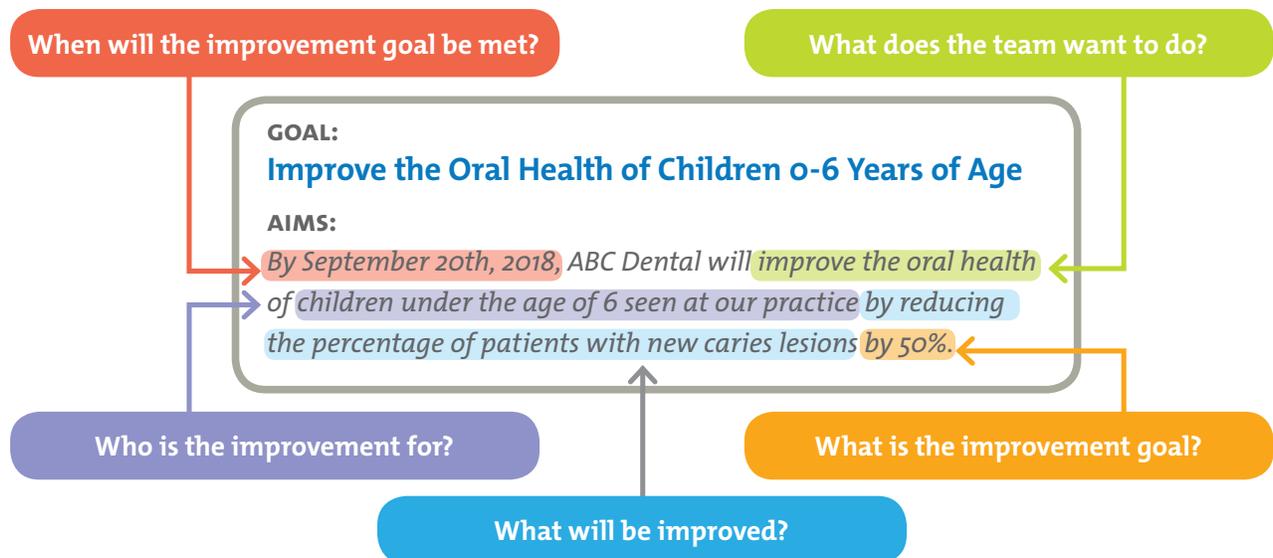
Starting a QI Project

When following the Model for Improvement, the newly formed QI Team first needs to determine what their group is trying to accomplish—also known as the aim statement.

What are we trying to accomplish?

The aim statement should include what your team wants to do, which population will be the focus, a measurable goal and how long the project will last (**Figure 12**).

FIGURE 12: AIM STATEMENT



Selecting and Making Changes

What change can we make that will result in an improvement?

In the Clinician's Companion, several great ideas for improvement are shared for your practice to try as you work towards implementing the Disease Management Protocol. These ideas are found at the end of each section in tables called *Taking It Chairside*. These change ideas are not a checklist list; practices should feel free to select those which might work best for their office. You might even have better ideas.

Testing Change(s)

Practice workflow are evaluated using the Plan-Do-Study-Act (PDSA) Cycle (Figure 13), a workplace-based testing method for rapidly assessing changes on a small scale—by planning a test, trying it, observing the results, and acting on what is learned. Improvement teams may adapt a change and try again, adopt a change because it worked well, or abandon a change entirely. PDSA

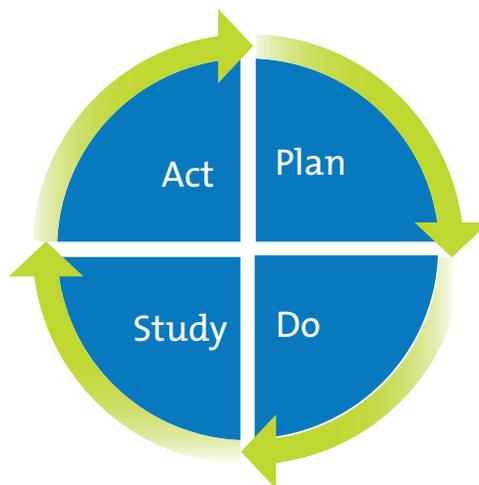
cycles are repeated and built upon until reliably improved performance is demonstrated. There are three phases of testing a change—development, implementation, and spread:

Developing a Change – A first test of change should involve a very small sample size (*typically one provider or one patient*) and should be described ahead of time in a Plan-Do-Study-Act format so that the practice team can easily predict what they think will happen, observe the results, learn from them, and continue to the next test.

Implementing a Change – After testing a change on a small scale, learning from each test, and refining the change through several PDSA cycles, the team can implement the change on a broader scale—for example, for an entire pilot population.

Spreading a Change – After successful implementation of a change for a pilot population, the team can spread the changes to other parts of the practice/organization or to other organizations.

FIGURE 13: PDSA





TRACK

USING DATA TO UNDERSTAND YOUR POPULATION

How will we know that a change is an improvement?

A key component of QI is data collection and analysis. Through collection of both process and outcome measures, teams are able to visualize the impact their changes are having and if those changes are an improvement. Data can also be used to communicate the progress to an entire organization. It is important that teams understand how to interpret the data they are collecting and understand the impact of their changes.

Practices should collect data for **process** and **outcome** measures in order to demonstrate improvement. Outcome measures are tied directly to your aim—what are you trying to accomplish? Outcome measures are usually important to the patients in the practice. Tracking outcome measures

can help answer the question “*Are my patients getting healthier?*” Since clinical outcomes can require a longer time period to manifest, process measures are used to track how key parts or steps of the system are performing. Process measures are useful because they are logically connected to the outcome measures. Process measures typically show improvement first. They are early leading indicators of whether or not our changes are improvements. Therefore, the process measures allow practices to understand how well they are incorporating the Disease Management Framework into clinical and administrative workflow.

Figure 14 shows the clinical measures you could use to evaluate your caries disease management efforts. These measures have been tested in prior Collaboratives.

FIGURE 14: RECOMMENDED CLINICAL MEASURES FOR DISEASE MANAGEMENT PROGRESS EVALUATION



Our Disease Management Collaborative experience has shown that improvement in the process measures generally leads to improved health outcomes, namely: reduced incidence of new caries lesions; reduced caries risk in children and adolescents; reduced pain in young children; and fewer referrals to the operating room or for sedation for young children.

What is a Run Chart

A run chart is simply a line chart with a median. Plotting data over time allows us to see if our measures are heading in the direction of improvement. Run charts help teams understand the impact of their changes and if a change resulted in an improvement. Rather than doing just a before and after assessment, feedback from the measure is consistent and ongoing. When using a run chart to display data, the chart is plotted along two axes (*x axis and y axis*). The **X Axis** is generally used to plot time (*day, week, month, etc.*) while the **Y Axis** is used to display your measure. A **Median** line is drawn and plotted so that half of the data points

are above and half are below.

After you have collected several data points, the run chart can be used to identify patterns, trends, and events that will help practices monitor progress. The run chart will be helpful in deciding if the changes are in fact leading to improvement.

How to Interpret a Run Chart

When using a run chart, there are a few things to look for:

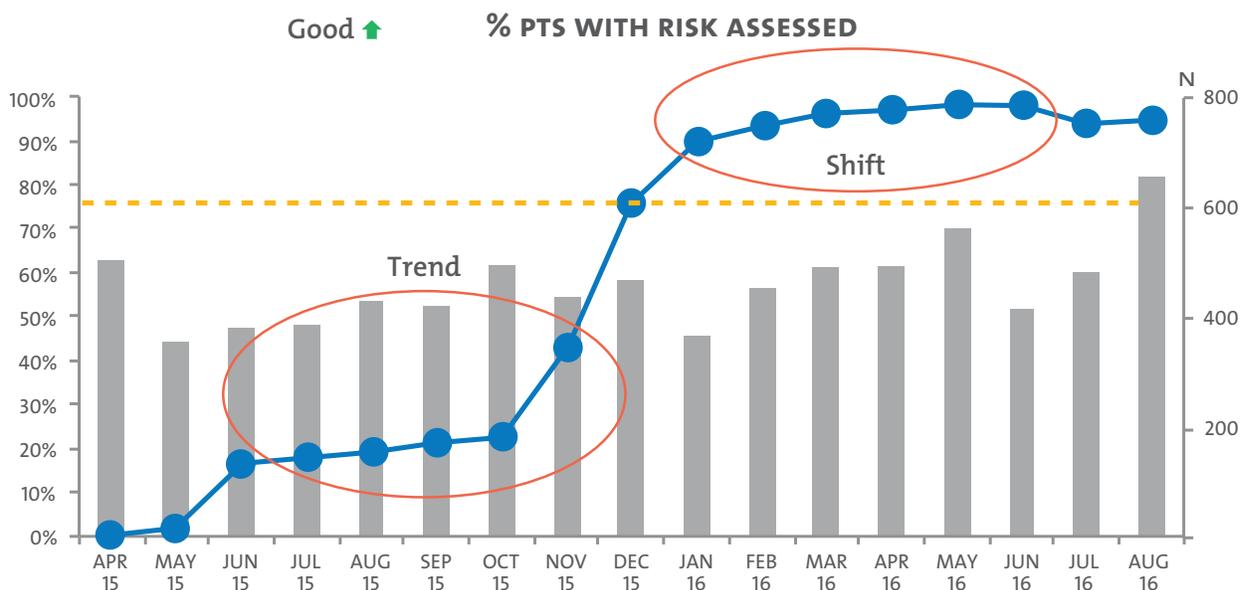
Shift – A shift in the process is indicated by six or more consecutive points above or below the median. Points on the median do not add to or break a shift (*skip values on the median when counting the number of values*).

Trend – A trend is indicated by five or more consecutive points all increasing or decreasing. If two consecutive points are the same, do not count one of them to assess the trend.

Astronomical Data Point – A data point that is clearly different from all others.³²

CARIES LESION CHARTING

FIGURE 15: RUN-CHART EXAMPLE



³² Adapted from Langley GL, Nolan KM, Nolan TW, Norman CL, Provost LP





TRACK

CODING FOR DISEASE MANAGEMENT

Table 2 contains ADA CDT Procedure Codes and SMART Codes that are recommended for use in implementing a disease management protocol in your practice. The SMART Codes were developed to allow tracking of process and outcome measures that reflect the health outcomes of a patient population of a particular practice and the activities associated with a particular patient

visit. These codes can be installed in most EDR systems. They can be logged during patient visits. The SMART Codes listed in Table 2 are examples of what have been used by practices participating in the ECC and DCM Collaboratives. You may use these codes, other codes or invent your own codes to use in your EDR system.

TABLE 2: SUGGESTED DISEASE MANAGEMENT PROCEDURE CODES

Caries Risk	ALL OF THE FOLLOWING: <ul style="list-style-type: none"> • D0601: Low Caries Risk • D0602: Moderate Caries Risk • D0603: High Caries Risk
Self-Management Goals	Self-Management Goals Reviewed (<i>ANY OF THE FOLLOWING AS NEEDED TO REPORT</i>): <ul style="list-style-type: none"> • D1310: Nutritional Counseling • D1330: Oral Hygiene Instruction • D9993: Dental Case Management – Motivational Interviewing • D9994: Dental Case Management – Patient Education to Improve Oral Health Literacy • SM001: SMART code for Self-Management Goals Reviewed • RSMG: SMART Code for Refusal of Self-Management Goal • XTP: SMART code for Xylitol Toothpaste Self-Management Goal
Treatment Plan Complete	<ul style="list-style-type: none"> • TPC01: SMART Code for Treatment Plan Complete 
Caries Lesions	<ul style="list-style-type: none"> • NC001: SMART code for New Caries Lesions • NC002: SMART code for No New Caries Lesions SMART codes for early and moderate lesions: <ul style="list-style-type: none"> • CHA01: Early Active Lesion • CHA02: Early Inactive Lesion • CHA03: Moderate Active Lesion • CHA04: Moderate Inactive Lesion • CHA05: Advanced Inactive Lesion
Pain	<ul style="list-style-type: none"> • PN001: SMART Code for Pain 



TRACK

Since caries may progress and arrest at the

same time in different locations of the dentition, a clinical exam and charting using the ADA Caries Classification System or the International Caries Detection and Assessment System (ICDAS) allows for tracking of caries presence and activity by tooth and surface³³.

Table 3 provides characteristics of active and inactive lesions. **Table 4** provides the definitions of the codes used in the ICDAS charting system, and describes the characteristics of these lesions. **Figure 16** crosswalks both the ADA Caries Classification System and the ICDAS system for easy comparison.

Such charting systems provide important information used in determining the preventive and restorative treatment plan appropriate for the

patient. Caries lesion detection is based on visual and radiographic examination, and gentle tactile exploration of surface characteristics; this is in contrast to “*poking explorers into pits and fissures.*”

During initial visits (*and each recare or subsequent disease management visit*), along with a CRA and review of SMGs, a clinical examination with charting is performed assessing and documenting the presence of new early lesions, progression of early and moderate lesions, along with documentation of remineralization. The information obtained from the CRA and SMGs are important in order to assign the proper risk category and adjust the SMGs. The information is also important for determining whether restorative treatment is needed, the type of appropriate restorative care, and the timing for the treatment, including whether it may be deferred, especially in a child with special health care needs unable to cooperate for restorative care.

TABLE 3: CHARACTERISTICS OF ACTIVE AND INACTIVE LESIONS

CHARACTERISTICS OF ACTIVE AND INACTIVE LESIONS *		
ACTIVITY ASSESSMENT FACTOR	CARIES LESION ACTIVITY ASSESSMENT DESCRIPTORS	
	Likely to be Active	Likely to be Inactive/Arrested
Location of the Lesion	Lesion is in a plaque stagnation area (<i>pit/fissure, approximal gingival</i>)	Lesion is not in a plaque stagnation area
Plaque over the Lesion	Thick and/or sticky	Not thick or sticky
Surface Appearance	Matte/opaque/loss of luster; color: white-yellow	Shiny; color: brown-black
Tactile Feeling	Rough enamel/soft dentin	Smooth, hard enamel/ hard dentin
Gingival Status (If the Lesion is Located Near the Gingiva)	Inflammation, bleeding on probing	No inflammation, no bleeding on probing

* Source: Ekstrand, K R, Zero, D T, Martignon, S, & Pitts, N B. (2009).

³³ Ng MW, Ramos-Gomez F.



TABLE 4: DEFINITIONS OF THE CODES USED IN THE ICDAS AND THE CHARACTERISTICS DESCRIBING THOSE LESIONS

ICDAS CODE	CHARACTERISTICS OF LESIONS	
	Active Lesion	Inactive Lesion
1, 2 or 3	<ul style="list-style-type: none"> • Surface of enamel is whitish/yellowish opaque with loss of luster • Feels rough when tip of probe is moved gently across the surface • Lesion is in a plaque stagnation area, i.e. pits and fissures, near gingival and approximal surface below contact point 	<ul style="list-style-type: none"> • Surface of enamel is whitish, brownish, or black • Enamel may be shiny and feels hard and smooth when tip of probe is moved gently across surface • For smooth surfaces, caries lesion is typically located at some distance from gingival margin
4	<ul style="list-style-type: none"> • Probably active 	
5 or 6	<ul style="list-style-type: none"> • Lesion feels soft or leathery on gently probing the dentin 	<ul style="list-style-type: none"> • Lesion may be shiny and feels hard on gently probing the dentin

FIGURE 16: CROSSWALK OF THE ICDAS AND THE ADA CARIES CLASSIFICATION SYSTEMS





TRACK

TAKING IT CHAIRSIDE

The following table contains example practice changes tested and implemented during the DentaQuest Institute disease management initiatives that you may adapt to your practice.

CARIES LESION CHARTING

TRY FIRST

Test and use a standard charting system such as ADA Caries Lesion Classification System, International Caries Detection and Assessment System (ICDAS) for classifying caries lesions

Rather than “watching” initial lesions, chart and attempt remineralization

To get started, use one tooth as the barometer and only chart and monitor the progress of that lesion on the patient

Calibrate providers on caries charting system

Take photographs of caries lesions; use photos to:

- track lesion progression over time (*remineralization and demineralization*)
- compare lesion classification amongst providers

USING DATA TO UNDERSTAND YOUR POPULATION

TRY FIRST

Integrate Disease Management Codes (*CDT Procedure Codes and SMART Codes*) into EDR to improve the tracking of procedures

TRY FIRST

Have a staff member be responsible for data collection:

- prepare data reports for team and leadership
- conduct regular chart reviews to track success with documentation and coding

Implement and use clinic-level and provider-level dashboards and review monthly with team

Train staff about when to use the disease management codes in the EDR

QUALITY IMPROVEMENT SKILLS

TRY FIRST

Work on initiatives improvements as a team, determine how to:

- hold regular team meetings
- hold regular meetings between data collection lead and IT department to ensure quality of data
- hold morning huddles to coordinate and review tests
- empower and use ideas from staff

Learn to use and report on PDSA cycles to test improvements





Continue to Care Through Timely Follow Up

Objectives:

- Manage disease with appropriate risk-based recare intervals.
- Employ strategies that encourage patients to return for more frequent recare.



BRING BACK RECALE INTERVALS BASED ON CARIES RISK

Patients with active caries and increased caries risk would benefit from more frequent follow up. **Table 5** shows the recare intervals proposed for caries disease management. Return visit intervals are based on the most recent caries risk status, in conjunction with restorative care as needed and as desired by the patient and/or parent, and provider³⁴. It is recommended that patients deemed to be high risk return in 1-3 months, moderate risk patients in 3-6 months and low risk patients in 6-12 months for re-evaluation (*with a new assessment of caries risk, clinical examination and charting, fluoride varnish application and restorative treatment, ITR treatment and sealants as needed*).

During an initial examination, accurate clinical assessment may be hampered by the presence of heavy plaque and/or patient cooperation. A one month follow-up visit for a child assessed to be high or moderate caries risk allows for a more accurate assessment of demineralized enamel, remineralized enamel and pit and fissure caries or fissure caries lesions. It is important to note that caries disease is not static. Caries is a disease that requires management at every visit, which is why it is so important to have the recare interval based upon the individual caries risk of the patient as well as tracking the disease with SMART Codes.

TABLE 5: EXAMPLE OF DISEASE MANAGEMENT RECALL INTERVALS

	LOW RISK	MODERATE RISK	HIGH RISK
Clinical Findings	<ul style="list-style-type: none"> • No caries lesions • All lesions are remineralized (<i>arrested lesions</i>) 	<ul style="list-style-type: none"> • No active caries lesions • Caries lesions exhibit signs of remineralization • Risk factors present and/or inadequate protective factors 	<ul style="list-style-type: none"> • Active caries lesions (<i>demineralization and/or cavitated lesions</i>) • No signs of remineralization • Areas of plaque stagnation
Fluoride Varnish	<ul style="list-style-type: none"> • 6-12 months 	<ul style="list-style-type: none"> • 3-6 months 	<ul style="list-style-type: none"> • 1-3 months
Restorative Treatment	<ul style="list-style-type: none"> • Maintain sealants as needed 	<ul style="list-style-type: none"> • Place/Repair/Replace sealants on at-risk surfaces • ITR maintained 	<ul style="list-style-type: none"> • Place/Repair/Replace sealants on at-risk surfaces or initial lesions • ITR placed and maintained • Restorations to restore form and function, while eliminating infection
Recare Interval	<ul style="list-style-type: none"> • 6-12 months 	<ul style="list-style-type: none"> • 3-6 months 	<ul style="list-style-type: none"> • 1-3 months
Self-Management Goals <i>(TBD by clinician and patient as appropriate based on CRA)</i>	<ul style="list-style-type: none"> • 2x daily brushing with fluoride toothpaste • Interproximal hygiene • Appropriate goals to balance risk factors as needed 	<ul style="list-style-type: none"> • 2x daily brushing with fluoride toothpaste • Interproximal hygiene • Additional sources of fluoride (<i>SnF, NaF, CPP-ACFP</i>) • Xylitol (<i>toothpaste, gum, wipes, etc.</i>) • Adjuncts: Arginine, Glylic, nHAP 	<ul style="list-style-type: none"> • 2x daily brushing with fluoride toothpaste • Interproximal hygiene • Additional sources of fluoride (<i>SnF, NaF, CPP-ACFP</i>) • SDF application to arrest lesions • Xylitol (<i>toothpaste, gum, wipes, etc.</i>)

³⁴ Ng MW, Ramos-Gomez F, Lieberman M, et al.



BRING BACK TAKING IT CHAIRSIDE

The following table contains example practice changes tested and implemented during the DentaQuest Institute disease management initiatives that you may adapt to your practice.

CREATING REPORTS/AUDITS

TRY FIRST

Use EDR reports to generate list of patients due for recare visits based on caries risk level

TRY FIRST

Generate reports from EDR of patients who failed/missed appointment (*no shows*)

USE REMINDERS TO GET PATIENTS BACK/MINIMIZE RISK OF NO SHOWS

Personal reminders (*rather than automated*) the day before recare visit to minimize no shows

Checkout slips at end of clinic visit to remind patients to schedule their future appointment

Verify contact information during visits

If there are access to case managers, engage them to follow up with patients to remind them about their upcoming visits and maintain lists for when patients are due back

Parents self-address post cards to send out 2 weeks before scheduled visits

Call (*or mail if not able to reach by phone*) patients who have restorative treatment needs notes in the treatment plan but have no follow up appointment scheduled

PROMPT FOLLOW UP WITH NO-SHOWS

Call patients who missed their visits on the same day to reschedule appointment

Create a standard script for front desk to use when rescheduling patients

Create “failed visit” SMART code to track no show patients over time, generate reports of patients with failed visits and follow up

INNOVATIVE APPROACHES TO SCHEDULING

Set up scheduling blocks for age 0 – <6 patients, keep in mind nap time

Offer non-traditional appointment times—field an extended hours survey with parents



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APPENDIX A-1: STRATEGIES TO CREATE ENGAGEMENT AND PARTNERSHIP AND EVOKE CHANGE TALK

1. OPEN ENDED QUESTIONS FOCUSED ON CHANGE

Open ended questions focused on change can take many forms. They can help explore:

1. goals and values
2. reasons for change
3. pros and cons of change
4. details of change
5. examples of previous successful change
6. what might be different/better if change is made
7. what potential things might need to happen before change is considered or made

Well-designed questions will always create a sense of partnership, and come from a place of true curiosity.

Examples:

- Tell me about a time when you succeeded in changing something? (5)
- What are things that will help you change? (7)
- What are your goals for your teeth? (1)
- If you were successful at taking away the bottle with milk at night, how might you and your child's life be better? (6)
- What's the next step you can take to improve your child's tooth brushing? (4)

2. REFLECTIVE LISTENING STATEMENTS

Reflective listening statements (or more simply, reflections) help patients and parents feel understood and help build empathy. It is important to listen closely, trying to figure out what the parent is saying, and then reflect back what you hear, focusing selectively on the change talk. A reframed version of what they say is known as a simple reflection and a reflection that attempts to continue the conversation by making a guess at what they might say next or what emotions they have behind their statement is known as a complex reflection. Several examples of both simple and complex reflections are below.

Examples:

- **Parent:** "My house is crazy with the kids running around at night."
Care Team Member: "It sounds like it's hard to spend time carefully brushing your child's teeth before bedtime when it's really chaotic" (Simple reflection)

- **Parent:** "I really try to take care of his teeth"
Care Team Member: "You're frustrated that your child has so many cavities." (Complex reflection)
- **Parent:** "I know my kids should stop snacking on chips. They just really like them, and I do too."
Care Team Member: "So it's a snack you both really enjoy, and you understand how it's causing problems right now." (Complex, double sided reflection)
- **Parent:** "There's just no way I can apply that fluoride stuff at home."
Care Team Member: "Gotcha. So stannous fluoride definitely won't work for you right now. I wonder if we could talk about something else you do think would be possible to help achieve your ultimate goal of keep your daughter cavity-free?" (Simple reflection, with focus shift when parent is obviously not ready for change)
- **Parent:** "He really wants the bottle at night. I wish I could take it away from him, I just don't know how to do that."
Care Team Member: "It sounds like it would be good for both him and you if he didn't have to drink milk in the middle of the night. I wonder if it would be helpful to hear what other parents have done about this problem?" (Complex reflection, with ask for permission to share an alternate view when patient is desiring change but is unsure of how it could be accomplished)

3. IMPORTANCE AND CONFIDENCE RULERS

Readiness to change is a dynamic state (not a trait), and it can be helpful to determine where a patient or parent stands with regards to change importance and confidence on that particular day. Rather than taking a traditional approach by telling a parent how important it is to brush their child's teeth every night, you could ask a scaling question to determine how important it seems to them (Remembering to respect their autonomy if it doesn't line up with how important you think it should be).

Example:

- **Care Team Member:** "On a scale of 0-10, where 0 is not important at all, and 10 is extremely important, how important is it to you to brush your child's teeth every night?"
Parent: "I'd say a 7."

Care Team Member: “Great. Why did you pick a 7 and not a 2 or 3?” (*Asking why they didn’t pick a lower number than they did helps them to voice change talk*)

Parent: “Well, I definitely don’t want him to get cavities and go to the hospital like my other son.”

Care Team Member: “Yeah, that negative experience left a mark on you and you don’t want to experience it again.” (*Complex reflection*)

4. SUMMARIZATIONS

Summarizations are helpful in collecting all the change talk a patient or parent has voiced throughout a conversation. Like the visual impact of a bouquet of flowers compared to a single bloom, a good summarization can have a profound impact on the patient. It can often help set up a transitional question that focuses on the next step of change.

Example:

- **Care Team Member:** “So let me see if I can take a step back and summarize everything we’ve talked about. You’re busy, and nights can be chaotic for you. It’s hard to find a free minute at bedtime, and yet, ideally, you’d like to brush your son’s teeth at night. You really want to avoid any future cavities, and you definitely don’t want to have to go back to the hospital for treatment like your other son had to previously. Did I get that about right?”

Parent: “Yeah, that’s exactly right.”

Care Team Member: “Great. Why did you pick a 7 and not a 2 or 3?” (*Asking why they didn’t pick a lower number than they did helps them to voice change talk*)

Parent: “Well, I definitely don’t want him to get cavities and go to the hospital like my other son.”

Care Team Member: “Great. Well I wonder what ideas you have that might make it possible to brush his teeth after dinner.”

5. AFFIRMATIONS

Affirmations help the patient feel appreciated as an individual and helps reinforce their positive characteristics and the good things they are trying to do. Affirmations strengthen the working relationship, enhance empowerment, self-responsibility, and self-esteem, and can help recognize effort and change talk. Try to avoid using the word “I”, instead focusing on “you” language.

Examples:

- “You’re really working on brushing your child’s teeth!”

- “It’s incredibly impressive that you’ve managed to cut back from one soda a day to one soda per week in such a short amount of time. You’re really determined!”
- “You’re an idea person, and you’ve come up with some really good ideas about how you might accomplish your goal today.”
- “You’re generally a confident person, and you can sense the confidence you have in the goal you set today.”

6. SHARING INFORMATION

As health care professionals, we often have important information to share with our patients that they may benefit from knowing. However, it’s important that we share this information in a way that is consistent with everything we have talked about above, honoring a commitment to partnership and autonomy, focused on engagement, and designed to evoke the thoughts and feelings of the patient or parent. In order to do this we can use the framework of “Elicit-Provide-Elicit” (*or in less jargon-y language, “Ask-Share-Ask*). When we share this information in this way, it is helpful to share small bits at a time, avoiding technical terms and jargon, using visual support when possible.

Example:

- **Care Team Member:** “I’d love to talk for a minute about how soda affects your child’s teeth. What do you know about that?” (*Ask*)

Parent: “Well, I know it’s probably not good for her.”

Care Team Member: “Exactly. Would it be okay if I shared a little bit more?”

Parent: “Sure.”

Care Team Member: “Well, one soda has a much sugar as ten sugar packets, as you can see in this chart. This can make teeth really vulnerable to cavities, which is what I think we’re seeing with her teeth right now. (*Share*) What do you think about that? (*Ask*)”

Parent: “Wow. I didn’t know that soda had that much sugar in it. I should probably stop buying soda then. It would probably even be good for me too.”

In review, these MI tools help create a foundation of partnership and autonomy, can help patients and parents feel engaged, and allow the patient and parent to do most of the talking. Developing skills in open ended questions focused on change, reflective listening, affirmations, summarizations, and sharing information effectively can help patients and parents alike increase their motivation for change, as we’ll see in the following example.



APPENDIX A-2

AN EXAMPLE OF A CARIES RISK CONVERSATION BETWEEN A CARE TEAM MEMBER (CTM) AND PARENT

- CTM:** I'd love to chat for a few minutes about your son's teeth and how you take care of them. I'd love to talk some about hygiene habits and things like diet. This can help us determine the likelihood of your son developing cavities in the future. Does that sound okay to you?
- Parent:** Sure. That sounds good to me.
- CTM:** Great. Well, tell me about your son's history of coming to the dentist and any problems he may have had. *(Open ended question)*
- Parent:** Well, he's been coming to the dentist every six months ever since he was about 2 years old, so he's probably been like 5 or six times. He's never had a cavity, and it seems like he likes coming.
- CTM:** It sounds like his experience, and yours, has been good so far as far as his teeth go. *(Reflection)* What about your dental history? And your other son? *(Open ended question)*
- Parent:** Yeah, I've been pretty healthy, but my older son did have to go to the hospital to get his cavities fixed when he was about 3. Apparently he had milk at night for too long, and had a number of cavities when we first came to the dentist. That wasn't a fun experience, and we've really tried to avoid a repeat with our second.
- CTM:** Gotcha. You learned a lot from that negative experience, and have really made some changes. *(Reflection, Affirmation)* That's fantastic.
- Parent:** Thanks. We've tried.
- CTM:** That's obvious based on his x-rays. *(Reflection)* Way to go! *(Affirmation)* I'd love to hear about some of those changes. Tell me about what your son typically eats and drinks during a normal day. *(Open ended question)*
- Parent:** Well, we certainly cut out the milk at night a lot earlier. I'd say around a year. Now, he eats pretty typical stuff for a 4 year old. Eggs for breakfast, sandwiches for lunch, and whatever we eat for dinner, though he does like hot dogs a lot.
- CTM:** Great. It's sounds like he's eating 3 pretty normal meals a day. *(Reflection)* What about snacks? *(Open ended question)*
- Parent:** I mean, once in a while he snacks, but usually it's something like an apple or fruit.
- CTM:** So it's really just those three main meals and if he does snack, it's pretty healthy stuff. *(Reflection)* Tell me about what he drinks during a typical day. *(Open ended question)*
- Parent:** Well, he does like orange juice with breakfast. It's mostly water during the day, and I guess he does have a soda during special occasions, birthdays and whatnot.
- CTM:** Gotcha. So if he does have a sugary drink, it's mostly with meals or at a party, otherwise it's water. *(Reflection)*
- Parent:** Exactly.
- CTM:** Cool. Well tell me about your routine at home as far as cleaning your son's teeth, things like brushing, flossing, rinses, things like that. *(Open ended question)*
- Parent:** We brush his teeth at night, and I usually floss for him. He doesn't rinse with anything either. I'd love to brush his teeth in the morning, but I'm always out the house early for work, and my husband takes them to school and daycare and is usually rushing. It just doesn't happen.

CTM: Yeah, your house is really chaotic in the morning, and it sounds like, ideally, you'd love to find a way to brush those teeth before your husband has to leave for the day. *(Reflection)* On a scale of 0-10, where 0 is not important at all, and 10 is really important, how important would you say this is to you? *(Scaling question)*

Parent: I'd say a 7.

CTM: Great. Why a 7 and not a 4? *(Open ended question)*

Parent: Well, I really don't want him to have cavities like his brother. I just know it's such a rush for my husband.

CTM: On one hand, you totally get that sense of hurry in the morning, and on the other, the hospital left such a mark on you with your other son that you definitely don't want him to go back there. *(Reflection)* What things have you and your husband tried to overcome the rush of the morning routine? *(Open ended question, Ask)*

Parent: Waking up a few minutes earlier. But that never seems to work out.

CTM: It's hard to get out of bed in the morning. *(Reflection)*

Parent: Exactly. It seems like after they have breakfast my husband has to get them in the car almost immediately.

CTM: So after breakfast definitely won't work. *(Reflection)* What does the time before breakfast look like? *(Open ended question)*

Parent: Well, my kids both take a shower, so they do go into the bathroom. I just thought they needed to brush after they ate.

CTM: So you see a potential window of opportunity. You just need some clarification on whether it's okay to brush before he eats. I'd be happy to share some thoughts with you on what I've heard works for other parents if you'd like. *(Reflection, Permission to share)*

Parent: Please!

CTM: Of course. The evidence doesn't tell us a lot about exactly when it's best to brush—but we do know the benefit just comes from doing it. Even if you do it before he eats, it can get off all that bacteria that collects overnight, which is why we can often have bad breath in the morning. I wonder what your thoughts are about that. *(Share, Ask via open ended question)*

Parent: I never would have thought that. But I think that would change things. I definitely think we could brush in the morning right before taking a shower.

CTM: Fantastic. It sounds like you have a potential solution! *(Reflection, Affirmation)* Let's go back to the 0-10 question again, but this time, let's switch importance for confidence. On a scale of 0-10, where 0 is not confident at all and 10 is super confident, how confident are you that you can work with your husband to brush the kids teeth in the morning before showering? *(Scaling question)*

Parent: Well, I don't want to speak for my husband, but I'd say a 9.

CTM: Wow. That's really high *(Reflection, Affirmation)*. You sound like you have a great goal that you're confident of achieving—awesome! Would be okay if we followed up with you at your next visit to see how that's going for you all? *(Closed question)*

Parent: That sounds great to me.

CTM: Perfect. Well thanks for having this conversation with us today. Our goal is to help support you in achieving your goals, so it's great to see where you are and where you want to be. *(Partnership, Closing conversation)*

Parent: Thank you. I really appreciate you taking the time to talk through it with me.

CTM: Of course. Now, we'll take a look at your son's teeth and see how everything looks. **Looks to son and motions to chair.* Jump up here buddy!



APPENDIX A-3: EXPLAINING THE CARIES PROCESS TO PATIENTS AND FAMILIES

Caries is the process of developing cavities. Cavities are the holes in teeth as a result of the caries process.

Caries is caused by bacteria or germs in our mouths. Everyone has bacteria, but we may have different types. In general, the bacteria need sugar or starch to live in the mouth. The sugars come from the foods we eat and drink.

When we have something sugary or starchy to eat or drink, the bacteria use the sugars to make acids (*an example of an acid is vinegar, which can be used to clean windows*). The acids break down the teeth. The strength of the acid is measured by something called the pH in the mouth to fall, which causes minerals to come out from inside the tooth, weakening it. The white spots on the outside of some teeth are the first sign of the caries process. The outer surface of the tooth (*the enamel*) is thin like an eggshell. As a result of the loss of minerals, the thin enamel layer becomes weakened. When the tooth loses enough minerals from the enamel, the thin layer can break and a cavity is formed.

When we eat and drink sugary things, the pH drops and minerals are lost from enamel layer of the tooth to the surrounding plaque and saliva. In about 20 minutes after we stop eating and drinking, the pH goes back up and the minerals are returned from the saliva to inside the tooth. When we brush teeth, we are removing the plaque, which houses the bacteria along with the products and acids made by the bacteria. When we use fluoride toothpaste or drink fluoride water, the fluoride works to move the minerals back inside the teeth.

Since everyone has different types of bacteria, some people can eat and drink sugary foods and will never get a cavity. Some people can eat only a little and seem to get new cavities often. It is not how

much sugar or starches we eat, but how often. The types of bacteria we have in our mouths tend to be the same in families. That is why cavities tend to occur in families. That is why we ask about family history of cavities. The bacteria are often passed from mothers or the primary caretaker to the child when the child is very young, during infancy. This can be done through direct transfer of saliva—e.g., from sharing spoons or mothers cleaning their child's pacifier with their own mouths.

For infants and preschool age children, the reason that bottle or Sippy cup use is a problem is not the bottle or Sippy cup itself. It's what is in them. The design of the Sippy cup allows the child to drink slowly and over time, feeding the bacteria for long periods of times. We want to balance the sugars eaten and drunk with brushing and fluoride use. But bottles and Sippy cups are not the only contributors to cavities in children. Frequently consuming sugary or starchy foods and drinks is constantly feeding the bacteria, keeping the pH at a low level in the mouth and keeping the caries process active.

Explaining Caries in Terms Children and Parents Can Understand (PROVIDED BY DR. CLAY PURSWELL)

The #1 bad guy is Plaque. It gets on your teeth every day no matter what you eat. Plaque has two things in it that cause problems. What are they? Germs and acid. What does an acid do? Eats things up. If plaque has acid in it, and you leave it on a tooth, what will it do? Eat a hole in it. That's called...? A cavity (*cavities*). If plaque has acid in it and you leave it on your gums, what will it do to your gums? Eat them up. It will eat skin off and then your gums bleed That's called...? Gingivitis. Then germs will get gums infected and will eventually eat up gums and bone and teeth will get loose and fall out. That's

called Periodontal Disease. The other problem is that germs don't stop at your mouth. The germ infection gets sent to other parts of your body and can cause problems there. It can increase your chance for heart attacks, strokes, make diabetes harder to control, and if you are pregnant, it can increase the chance of your baby dying... it also it makes your breath stink.

Explaining the Importance of Disease Management for Caries

The caries process has to be under control before we can restore or fix the teeth. If your house is on fire, we would want to put the fire out before we call the carpenter to start fixing it.

Having caries or cavities is like having asthma or diabetes, in that they are all chronic conditions you cannot cure or get rid of. You can only keep them under control. With asthma, it is not recommended that medicines be taken alone, but rather it is also important to control other triggers, such as dust or smoke in the environment. With diabetes, it is important to take medicines but also to exercise and control what's one eats. With caries, it is important to control what and how one eats (*the sugar and starch frequency*) and use medicine (*topical fluorides*).

Defining Individual Risk Factors

In discussing the risk for caries, a conversation might start as "Based on what I learned from talking with you, the factors adding up to high risk for cavities in your child are:" (*choose from the menu*)

1. Family history of cavities
2. Bottle/Sippy cup to bed
3. Drinking juice often and slowly throughout the day
4. Candy or other sugary foods and drinks

5. Not using a fluoride toothpaste
6. Child brushing on his own; no adult brushing for the child; parental guidance
7. Chronic medicines, such as to treat asthma or psychiatric condition
8. Orthodontic treatment/appliances
9. Other

Self-Management Goals for Caregivers

At each visit, if the caries risk is greater than low, patients and /or parents are asked to select one or two self-management goals to work toward until the next visit. During each subsequent visit, patients and /or parents are asked about how well they are meeting the self-management goals. The goals are reaffirmed or new goals are selected for them to work on before the next visit.

Customizing a Preventive and Restorative Treatment Plan

To create a customized prevention and restorative treatment plan:

- Ask the parent about what's important to them, for example, the cavities getting worse or the way the teeth look.
- Talk about the different treatment options, disease management by itself, or with restorative/surgical care (*with possible use of nitrous oxide, sedation or general anesthesia*). Discuss ITR as appropriate.
- Explain that disease management involves dietary changes, improving or optimizing oral hygiene and frequent topical fluoride use. Brushing the teeth well by an adult caregiver or with the guidance of an adult caregiver at least 2 times per day, doing more to balance the eating and drinking frequency, using fluoride toothpaste or Gelkam and not eating, drinking

or rinsing for 30 minutes afterwards, reducing the number of times each day the child snacks, especially on sugary foods or drinks. For example, eliminate juice completely or limit only to meal-times (1-2 X per day only). A child should not be drinking soda or juice like it is water, because these sugary beverages offer little to no nutritional value. Offer fresh fruit and drink milk or water instead. We do not expect these changes to be easy for many families and change will not happen overnight.

- Explain that based only on the first visit, it is very difficult to determine the restorative treatment plan (i.e. *how we would fix the teeth*), because it should be based on the child's risk for cavities. We expect that the risk of cavities can improve, but the only way we would know is to see the child and parent again soon for re-evaluation.
- If a child is at high risk for cavities, we recommend the child and parent come back in about one month so that we can review the risk factors again, re-examine the child and apply fluoride varnish in the office. We will review the self-management goals selected and determine compliance, and decide with patient and/or parents on the need to make additional changes. Our overall goal is for each child to become low risk or at least moderate risk over time. We want to see patients deemed to be high risk return in 1-3 months, moderate risk patients in 3-6 months and low risk patients in 6-12 months for re-evaluation. The in-office fluoride treatments help control the cavity process, as do the fluorides used at home.

Role of Staff in Dental Caries Management

- The dentists and staff may assume a primary or secondary role in disease management. Ideally, all must be knowledgeable and support the need to have parents informed, knowledgeable and participating in the caries management process.
- In this early testing phase, measurement data is essential to determine improvement of project implementation. Process and outcome data will demonstrate the feasibility and sustainability of employing a disease management approach to DCM in different practice environments. QI procedures are needed to develop, test and sustain processes to support the clinical Framework and the collection of the data to determine its success or failure.

Figures 16-17 (below and on page 50) show an example of a Flip Chart (2nd Edition) developed to help parents understand ECC etiology and disease prevention and management.

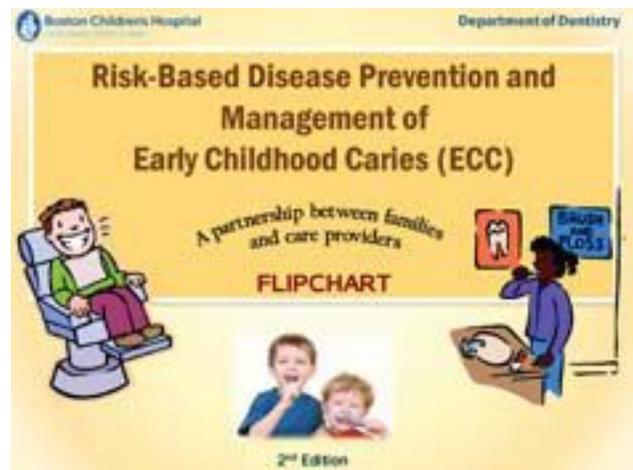


FIGURE 16: FLIP CHART (2ND EDITION)

FIGURE 17: PAGES FROM FLIP CHART (2ND EDITION)

Sugar in Cereals

Cereals high in sugar



Cereals low in sugar



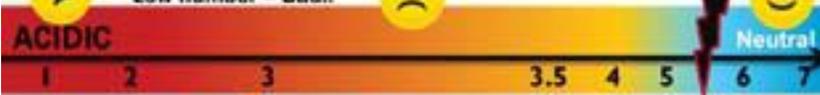
Cereal	Sugar per serving* (g)	Sugar amount (by weight)
Cheerios	1	4%
Corn Flakes	1	7%
Shredded Wheat Original	0	0%

Better for the teeth!!

SODA and JUICE = ACID

pH Scale – Measures the Amount of Acid

Low number = Bad!!



ACIDIC Neutral



Battery Acid (Ouch!)

How does a CAVITY form?



CARBOHYDRATES
(starches and sugars)

+



Bacteria
(from plaque)

=



ACID

If the pH drops below 5.5, the acid attacks the tooth for decay

How much FLUORIDE toothpaste?



<2 years old

SMEAR





2 - 5 year olds

PEA-SIZE



WAIT 30 minutes before eating or drinking and no rinsing!



HEALTHY TOOTH

=



CAVITY!!!



APPENDIX B-1: EXAMPLE OF A CRA FORM FOR CHILDREN AGES 0 - >6

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			Comments:
	1	2	3	
1. Risk Factors (Biological Predisposing Factors)				
(a) Mother/caregiver has active dental decay in past year	YES			
(b) Bottle with fluid <u>other</u> 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 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	YES			
(b) Existing restorations	YES			
(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:	mI/min: Date:
Caregiver: Bacteria/Saliva Test Results:	MS:	LB:	Flow Rate:	mI/min: Date:

Self-management goals:

1. _____
2. _____

Assessment based on provider's judgement of balance between risk factors/disease indicators and progressive factors

Clinician's Signature: _____ Date: _____

(Updated: 5/1/14)



APPENDIX B-2: EXAMPLE OF A CRA FORM FOR CHILDREN AGES 6-20

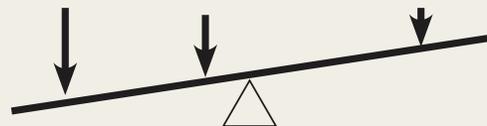
Caries Risk Assessment Form — Children Age 6 and Over/Adults

Patient Name: _____ Chart #: _____ Date: _____

Assessment Date: Is this (please circle) Baseline or Recall

Disease Indicators (Any one "YES" signifies likely "High Risk" and to do a bacteria test**)	YES = CIRCLE	YES = CIRCLE	YES = CIRCLE
Visible cavities or radiographic penetration of the dentin	YES		
Radiographic approximal enamel lesions (not in dentin)	YES		
White spots on smooth surfaces	YES		
Restorations last 3 years	YES		
Risk Factors (Biological predisposing factors)			
MS and LB both medium or high (by culture**)		YES	
Visible heavy plaque on teeth		YES	
Frequent snack (> 3x daily between meals)		YES	
Deep pits and fissures		YES	
Recreational drug use		YES	
Inadequate saliva flow by observation or measurement (**if measured, note the flow rate below)		YES	
Saliva-reducing factors (medications/radiation/systemic)		YES	
Exposed roots		YES	
Orthodontic appliances		YES	
Protective Factors			
Lives/work/school fluoridated community			YES
Fluoride toothpaste at least once daily			YES
Fluoride toothpaste at least 2x daily			YES
Fluoride mouthrinse (0.05% NaF) daily			YES
5,000 ppm F fluoride toothpaste daily			YES
Fluoride varnish in last 6 months			YES
Office F topical in last 6 months			YES
Chlorhexidine prescribed/used one week each of last 6 months			YES
Xylitol gum/lozenges 4x daily last 6 months			YES
Calcium and phosphate paste during last 6 months			YES
Adequate saliva flow (> 1 ml/min stimulated)			YES
**Bacteria/Saliva Test Results: MS: LB: Flow Rate: ml/min. Date:			

VISUALIZE CARIES BALANCE
 (Use circled indicators/factors above)
 (EXTREME RISK = HIGH RISK + SEVERE SALIVARY GLAND HYPOFUNCTION)
 CARIES RISK ASSESSMENT (CIRCLE): EXTREME HIGH MODERATE LOW



Doctor signature/#: _____ Date: _____

ADDITIONAL EXAMPLES OF CRA FORMS ARE AVAILABLE ON THE VIRTUAL PRACTICUM.





APPENDIX C-1: EXAMPLE OF SELF-MANAGEMENT GOALS HANDOUT FOR CHILDREN AGES 0 - <6 YEARS



Department of Dentistry
617-355-6571

Goals for Healthy Teeth (Age 5 and younger)

Patient Name: _____
 Date of Visit: _____
 Dentist: _____
 Hygienist: _____

Your child has been assessed to have the following for caries (cavities):
 High **Medium** **Low**



Next fluoride visit in ____ months



Healthy snacks such as fruit, carrot sticks, yogurt, low fat cheese, pretzels, whole grain crackers



No soda/energy drinks
 No juice
 Juice only with meals



Less or no candy & junk food
 Chew Sugar-free gum (e.g. Trident, Extra)



No sippy cup/bottle
 Only plain milk or water in cup or bottle
 If bottle to bed, use only water



Drink fluoridated water, tap water



Daily flossing with floss string or pick



Brush morning and before bed with fluoride toothpaste:
 Thin smear (<2 years old)
 Pea-size amount (2-5 years old)



Fluoride varnish was applied in clinic today.

* Wait until tomorrow to brush/floss. Avoid hard, crunchy, and sticky foods.



Use Gel-kam ____ a day
 - Apply thin smear to all teeth

* Wait 30 minutes before eating, drinking or rinsing after

On a scale of 1-5, how likely do you think you can help your child meet these goals?

1	2	3	4	5
Not very likely		Not sure		Very likely

Clinician's Comments: _____

Next visit Date: _____

Preventative 1 month follow-up
 Restorative 3 month follow-up
 _____ 6 month checkup



APPENDIX C-2: EXAMPLE OF SELF-MANAGEMENT GOALS HANDOUT FOR CHILDREN AGES 6-20 YEARS



SELF-MANAGEMENT GOALS FOR PATIENTS AGE 6-20

Patient's Name: _____ Age: _____



Dental visits every ___ months



Family receives dental treatment



Healthy snacks (nuts and cheese)



Brush with Fluoride toothpaste at least 2 times daily



Remineralize daily



Limit juice, soda and sports drinks to mealtime



Use Fluoride mouthwash nightly



Chew sugarless gum



Drink tap water (containing Fluoride)



Floss



Use xylitol

IMPORTANT:
Leave toothpaste foam in mouth at bedtime

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 _____

Based on October 2011 Journal of the California Dental Association

ADDITIONAL EXAMPLES OF SMG FORMS ARE AVAILABLE ON THE VIRTUAL PRACTICUM.



APPENDIX D-1: TEAM LEADER GUIDE

As Team Leader, you are leading the charge for your practice to assure that chronic disease management doesn't fall to the wayside—how can you lead the charge and 'Model the Way' on a daily basis?

Use this guide as a reference, whether you are just getting started or if you're an experienced team leader.

INFLUENCE YOUR TEAM'S:	WAYS TO LEAD	TIPS
<p>Time <i>Regular check-ins help drive the work, influence the value and encourage accountability.</i></p>	<ul style="list-style-type: none"> □ Carve out regular Huddle time, dispersed between or part of your “normal” AM Huddle (<i>once a day</i>) □ Schedule and lead regular team meetings (<i>weekly is ideal</i>) □ Start meetings on time. End early. 	<p>Stand-up Huddle Tips:</p> <ul style="list-style-type: none"> • Check-in on your PDSAs • Strategize together • Clarify coding • Quick Motivational Interviewing role play • Keep it short (< 5 min) & end with energy • Designate an area of your clinic for Huddles. Include your team aim and data on a board for easy reference. • AM and PM Huddles are helpful to some clinics: <ul style="list-style-type: none"> ◦ AM Huddles: set goals for the day ◦ PM Huddles: review barriers/ challenges and identify areas for improvement <p>Team Meeting Tips:</p> <ul style="list-style-type: none"> • Have an agenda, but be ready to make adjustments if needed. • Review clinic improvement data. Identify strengths and opportunities for improvement. Set goals. • Review PDSAs and plan for new ones. Adapt, adopt, or abandon? • Decide on next steps

INFLUENCE YOUR TEAM'S:	WAYS TO LEAD	TIPS
<p>Vision <i>Competing priorities are a reality; focus on what you can change and the why.</i></p>	<ul style="list-style-type: none"> <input type="checkbox"/> Share the vision to create buy-in. Communicate why doing this work. <input type="checkbox"/> Engage your team by figuring out what and how they want to contribute—what are their priorities? <input type="checkbox"/> Delegate tasks. Figure who can do what and when. <input type="checkbox"/> Encourage staff to bring ideas to the table. 	<ul style="list-style-type: none"> • Identify what is most meaningful to staff/clinic and try to speak to how this work aligns to what is most important to them. • Focus on what can be done right now (<i>don't let perfect be the enemy of good</i>).
<p>Enthusiasm <i>Keep the fire burning! Continue the momentum.</i></p>	<ul style="list-style-type: none"> <input type="checkbox"/> Establish a sense of urgency by generating short-term wins. <input type="checkbox"/> Recognize burn out in your team. Check-in with others for a “recharge.” <input type="checkbox"/> Emotions trickle down. If you are feeling down, it will be more difficult to be effective with team. 	<ul style="list-style-type: none"> • Recognize small successes of staff and team members. • Have staff share patient stories to help recharge (<i>encourages the heart</i>).
<p>Teamwork <i>Create an environment in which it is safe to try new ideas.</i></p>	<ul style="list-style-type: none"> <input type="checkbox"/> Know how other leaders on your team can help <input type="checkbox"/> Support other's creativity to generate new ideas for change. <input type="checkbox"/> Sketch the current workflow and try to streamline new tasks with tasks that are already being done. 	<ul style="list-style-type: none"> • Team member leaving? Recruit new providers from within. Give warm hand-off so that new leaders feel prepared.



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Thank You

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**The DentaQuest Institute is an affiliate of DentaQuest
whose mission is to improve the oral health of all.**

*This resource is the product oral health professionals who
are working to prevent and stop cavities.*

