The Health Resources and Services Administration’s
Health Disparities Collaboratives
A National Quality Effort to Improve Outcomes for All Medically
Underserved People

Oral Health Disparities
Collaborative
Implementation Manual
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Salud Family Health Centers
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High Plains Community Health Center
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INTRODUCTION AND BACKGROUND

Welcome to the HRSA Oral Health Disparities Collaborative. You and your health center are joining others in one of the most groundbreaking initiatives in the history of the Health Disparities Collaboratives – a collaborative focused specifically on oral health. Just as the Health Disparities Collaboratives gave health centers the opportunity to replace episodic, reactive medical care with comprehensive and proactive care, the Oral Health Disparities Collaborative offers the same for health center dental practices.

By changing the way dentistry is practiced in your health center, you will also be changing the lives of the people you serve. One of the most powerful rewarding aspects of this initiative is collaboration. The most successful health centers are those in which everyone - senior leaders, dentists, medical providers, nurses, hygienists, support staff, front-line staff - works together to improve care. Everyone contributes, everyone has good ideas, and everyone plays a valuable part in the new system of care.

This manual is another example of the power of collaboration. We asked the health centers that participated in the Collaborative Pilot to share the changes that worked best, the lessons learned, and the pitfalls to avoid. Our hope is that by benefiting from the experience of those who have gone before you, you will be able to accelerate the pace of change in your own health center.

“The Collaborative brought about a lot of change. There is increased awareness of the importance of oral health, greater integration of care, our patients are more informed and have better access, and we are practicing preventive oral health care.

Collette Robinson, MD
Salud Family Health Centers
Fort Lupton, CO

THE CHALLENGE

Diseases of the oral cavity are some of the some most prevalent health conditions in the United States. Fifty-nine percent of children aged 5-17 and 85% of adults over 18 have caries experience in at least one tooth. Sixty-one percent of adults 25 years and older and 86% of adults 45 and older have at least one site of periodontal disease in the mouth.¹

Scientific knowledge has evolved to consider the mouth and oral cavity as an integral and interrelated part of the human body and view disease through a medical model. Caries and periodontal disease are now understood to be chronic diseases caused by specific transmissible bacteria, in which onset, severity and duration are modulated by multiple factors. Additionally, research has shown associations (but not causality) between chronic periodontal disease and several systemic conditions such as diabetes, low birth weight outcomes and cardiovascular disease.¹

Disparities exist in both the prevalence and severity of oral diseases within the US population. For example, Mexican American and African-American adults and children have more untreated decay than Whites and African-American and Mexican American adults are more likely to have gingivitis or more severe periodontal disease bone loss.¹
For caries and periodontal disease, the traditional paradigm of surgical treatment of disease has historically utilized the majority of resources. In the medical model, this end-stage approach can be viewed as a failure of disease prevention, and while surgical intervention is needed to remove existing disease, it should be complemented by risk assessment and identification of high-risk individuals at the earliest possible stages, in order to deliver appropriate interventions that could prevent, delay or arrest disease progression.

**Early Childhood Caries**

Early Childhood Caries (ECC) in children aged 0-5 is a risk factor for developing caries in later life. Risk assessment for ECC can begin with the pregnant mother and continue once the child is born. Ideally, the goal is to determine if the mother’s oral health status, health care behaviors or the environment are risk factors for her unborn child to develop ECC, and once the child is born to regularly assess caries risk in the infant and if needed, provide preventive interventions and identify incipient carious lesions for non-surgical treatment.

The proceedings of the 2001 NIH Consensus Conference on Diagnosis and Management of Dental Caries and the 2001 Agency for Healthcare Research and Quality Evidence Report on Diagnosis and Management of Dental Caries list the available diagnostic tools and treatments for non-surgical intervention. Caries risk assessment interview tools have been published by the American Dental Association and American Academy of Pediatric Dentistry. Best practices models for delivering ECC risk assessment and management have been developed.

Non-surgical interventions to prevent, delay or arrest caries progression include:

- Fluoride application both personal and professional (varnishes, topical solutions, rinses)
- Chlorhexidine application both personal and professional (varnishes, topicals, rinses)
- Combined chlorhexidine-fluoride applications
- Sealants
- Xylitol
- Lifestyle modification of diet, hygiene

Each intervention has a different, but complimentary objective. Fluoride strengthens enamel and remineralizes decalcified tooth structure in incipient non-cavitated carious lesions. Chlorhexidine suppresses strep mutans and other bacteria. Sealants form a physical barrier between bacteria and the tooth surface. Xylitol suppresses bacterial activity and lifestyle modifications would reduce the amount of sugar substrate available to bacteria from diet and increase ancillary fluoride exposures through oral self-care practices. These interventions should be considered best practices.

**Perinatal Oral Health: Preventing transmission of caries-causing bacteria**

ECC interventions focused on the mother would include education and improved self-management of risk factors, suppression of strep mutans through chemotherapeutic means as well as through surgical removal of existing carious lesions as resources permit. Reducing caries risk for the unborn child makes a convincing case for prioritizing access to preventive and treatment dental services for pregnant women.
THE CARE MODEL APPLIED TO ORAL HEALTH

The Care Model is productively applied to oral health issues when the chronic nature of diseases of the oral cavity is understood. Focused effort to address the principles that underlie each of the six elements of the model will yield improvements in the care and outcomes of children 0-5 years of age and pregnant women. In this section of the manual, the principles underlying each of the six elements of the Care Model will be reviewed followed by some high leverage change ideas identified by the oral health pilot teams. The changes notated with asterisks are described in more detail in “Steps to Success” documents on pages 34-48 of this manual. We encourage you to use the PDSA cycle (details on page 17) to test, adapt and implement some or all of the ideas listed in each element.

Clinical Information Systems (CIS)

To provide good oral health care, clinicians need access to timely, clinically relevant information about each patient in the practice, as well as the population of patients as a whole. Useful information includes recommended services, key outcome measures (e.g., Phase I treatment complete), medications, and patient contact information. A system that records all relevant patient care information is often referred to as a “registry.” The entire care team uses the registry to guide the course of treatment, anticipate problems, and track progress. For example, providers can use the registry to record critical elements of the care plan, produce quick care summaries at the time of a visit, and enter data to alter the care plan as needed. A patient registry is most useful when patient data is available to the provider at the point of the patient visit when decision support is most needed. The registry can remind the care team of needed services, supply feedback on performance of the clinic, the provider and the team, and serve as a source of up-to-date information for encounters. The care team can also use the registry to contact groups of patients with similar care needs and deliver planned care and educational sessions.

CIS High Leverage Changes:

- Develop a database or a registry system to collect, manage and report data on patients*
- Define a clear data tracking, entry and maintenance process*
- Incorporate measures and guidelines into daily, standardized documentation methods*
- Run reports to find patients who are not in compliance with the measures*
- Use a dental balanced scorecard*
- Work toward real time data entry
- Create template for dental (EHR systems)
- Use standardized language in daily processes and documentation
- Develop a direct scheduling system from medical into the dental clinic

Decision Support:

Treatment decisions need to be based on explicit guidelines or standards of care, ideally supported by an evidence base or best practices. Care teams must devise ways to embed these guidelines, standards and best practices into the day-to-day practice of the dental care team in an accessible and easy-to-use manner. Ongoing education for providers and care team members about new protocols of care must occur regularly, referral
mechanisms to and from the medical clinic must be established and monitored, and regular feedback about performance needs to be integrated into standard clinic operations. Standardization of treatment protocols among dentists, dental hygienists and dental assistants is a priority as is ensuring that the care team is using all of its members to the full extent of their licensure or certification. Decision support challenges unique to oral health in relation to the populations addressed in the pilot effort are 1) the need to dispel common myths about providing treatment to women during pregnancy, and 2) hands-on training to increase provider comfort with infants and young children and establish competence in the six-steps of the infant oral care model.

**High Leverage Changes**

- **Provide** education and training for medical and dental staff about the oral health needs and appropriate assessment and management interventions for populations that have traditionally faced barriers in access to care such as children 0-2 years of age and pregnant women*
- **Develop** a referral process from medical for patients 0-5 years of age and pregnant women*
- **Educate** and train dental staff in the treatment of very young children and pregnant women *
- **Adopt** standards of care for children 0-5 years of age and pregnant women*
- **Give** regular feedback to staff about performance/progress*
- Provide education and training for all staff about the importance and techniques of engaging patients in self-management activities to achieve and maintain an improved oral health status
- Establish a dental presence in the medical setting – for example providing infant oral care visits in the medical clinic
- Utilize the *Six Steps of Infant Oral Care* model as standard care for all infants

**Delivery System Design**

Effective promotion and management of oral health necessitates fundamental changes in delivery system design. These changes require a shift of emphasis to “planned” or preventive care visits instead of acute visits. Given that the demand for oral health services exceeds capacity in most clinics, effective practice often requires expansion of staff member roles and responsibilities. These changes include all care team members (e.g., dental assistants, dental hygienists) who have the knowledge, skill and time to carry out certain tasks that are a part of screening, exams and treatment, but don’t require the expertise of the dentist. Care team members also need timely access to key clinical data, enough time to interact with patients, and regular, planned follow-up with patients.

Employing a few basic principles to optimize the functioning of the care team and to redesign scheduling systems and clinic flow can enhance access and provision of oral health services. Creating access for very young children and pregnant women, two populations not typically seen in dental practices unless a dental emergency exists, necessitates a focus on specific redesign principles. Identifying and eliminating waste is a powerful avenue to increase capacity and efficiency in dental practices. Waste is present in the form of waiting – a patient waiting to be seen or waiting for the provider to deal with an interruption, a provider waiting for x-rays, equipment or patient records, or care team members experiencing idle or “down time.” Waste is also present when the dental provider in the clinic is performing tasks that others on the care team can do, thereby impeding the flow of the patient visit. Collecting data on simple metrics, such as patient
visit cycle time, time to the third next available appointment (a measure of access), no-show rate and number of encounters per provider per hour is useful in assessing how your practice is improving over time (see “Delivery System Design Indicators” on page 33 of this manual). It is important to keep the patient perspective in mind when redesigning your system of care. What you may perceive as an improvement may not be seen as such by your patients. Patient satisfaction surveys are a means to monitor how your changes are impacting patient experience.

High Leverage Changes:

- Define the roles of each dental and medical care team member*
- Fast track 0-5 year olds and pregnant women for exams and treatment*
- Employ a dental assistant-run chair for exams, sealants and prophies*
- Use redesign concepts to improve access and service capacity*
- Assess your business case as you improve your system of care*
- Utilize expanded duty dental auxiliaries to the maximum allowed by individual state practice acts
- Improve prevention by allowing time for the “infant oral care visit”
- Process map current processes to identify gaps and areas for improvement
- Dedicate a dental assistant for each dental hygienist to expand capacity
- Provide fluoride varnish at each visit for patients age 5 and younger
- Arrange for dental staff to perform dental exams in medical clinic
- Establish a dental liaison to interface with medical staff and patients
- Place confirmation calls to patients prior to appointments

“We wanted to maximize (“maxpack”) what was accomplished during each patient visit in order to get to completed treatment. We knew we had to create teams and utilize each person on the team to their highest skill and training. Our teams are now comprised of a dentist, a hygienist, two expanded function dental assistants (EFDA) and two dental assistants. Although it has been a struggle for the dentists and hygienists to let go of certain tasks, the benefit of being able to see more patients and the increased numbers of patients that have completed treatment is something that all staff can get behind and be excited about.”

Annie Gibbs, RDH
High Plains Community Health Center
Lamar, CO

Self-Management Support:
Effective self-management is very different from telling patients what to do. Patients have a central role in determining their care, one that fosters a sense of responsibility for their own health. The most successful health center teams use a collaborative approach: one in which providers and patients work together to define problems, set priorities, establish goals, create treatment plans, and solve problems along the way. Patients need information and education along with care team support in order to be effective in managing their oral health. In addition, care team members need to be sensitive to the role that families, caregivers, and communities play in different cultures. Better patient outcomes are achieved through use of evidence-based techniques that emphasize patient activation or empowerment, collaborative goal setting, and problem-solving skills. The care team can use standardized assessments of patient self-management needs and
activities to enhance its ability to support patients. These assessments include questions about self-management knowledge, skills, confidence, supports, and barriers. Self-management support for very young children involves engaging the child’s caregiver in a discussion of behaviors that promote oral health. It may be the caregiver who will collaboratively set the goal with the provider and engage in behavior change to maximize the oral health of the infant (e.g. eliminating behaviors that can transmit strep mutans and/or treating their own oral pathology). For older children, the caregiver and child can act as a team to identify and set self-management goals that the child can work toward with the caregiver’s support (e.g. brushing teeth, decreasing the amount of candy and sugary foods eaten).

**High Leverage Changes:**

- Provide education to increase patient understanding of the importance of oral health
- **Utilize** effective SM techniques and tools (multiple languages; pictures)*
- **Train** care team members on how to help patients with self-management goals*
- Ensure consistency of oral health education provided by care team members
- Utilize motivational interviewing techniques to facilitate collaborative goal setting
- **Establish** a system to follow up on progress toward goals – make a staff member accountable*

**Organization of Healthcare**

The effort to improve oral health care for patients should be woven into the fabric of the organization and aligned with a quality improvement system. Senior leadership must identify the effort to improve oral health services as important work, and translate that into clear goals reflected in the health center’s policies, procedures, business plan, and financial planning. The entire organization must be engaged in the improvement effort. Senior leaders and medical and dental clinician champions must be visible and committed members of the team, and give personnel the resources and support they need to pursue it. A particular challenge to teams addressing oral health is the integration of dental and medical primary care. Leadership will need to communicate the expectation that integration of both services into a cohesive system of care is an organizational goal. This is a unique opportunity to bridge the gap that currently exists between medical and dental in primary care settings.

**High Leverage Changes:**

- **Make** an organizational commitment to see and treat young children and pregnant women (populations not typically seen)*
- **Create** a strong improvement team with provider champions from both medical and dental*
- Elect a “sponsor” from senior leadership to provide support and accountability for the improvement efforts
- Include reports on oral health quality in Board of Director reports
- Integrate dental aims into organizational PI/QI structures

“It is a lot of hard work that may really challenge your concepts about how dental health care is delivered in a health center setting. But the return that you get, and the quality of care that you deliver, far outweighs any of those hardships.”

Patrick Harrison, DDS
Sunrise Community Health Center
Greeley, CO
Community
Community programs and organizations exist that may help expand a health center’s oral health care services for pregnant women and very young children. A care team member or senior leader must assume the responsibility of identifying the resources that are available. To improve access and ultimately patient outcomes, health centers must reach out to form alliances and partnerships with state programs, local agencies, professional networks, schools and businesses.

High Leverage Changes:
• **Increase** access and outreach by partnering with community organizations that provide services to pregnant women, mothers and children (WIC, Head Start)*
• **Raise** community awareness of importance of oral health for pregnant women and young children through education*
• **Partner** with community OB providers (if your health center does not have OB services)*
• Direct outreach to pregnant women (If a clinic without perinatal/OB services)*
• Link with state or county health departments to gain support for outreach and educational efforts
• Find opportunities to inform other dental providers about enhancing oral health access and outcomes for pregnant women and children 0-5 years of age

DENTAL AND MEDICAL PRIMARY CARE INTEGRATION

One of the underlying goals in the HRSA Oral Health Disparities Pilot was to make strides in the integration of dental and medical primary care. The current environment, in which dental is seen as a separate, stand-alone healthcare entity, does not foster quality, comprehensive primary care. With literature to support the link between an individual’s oral health and general health status, medical care that does not address oral health cannot be considered optimal or even adequate care.

The four health center organizations that participated in the pilot were able to build strong relationships with their medical counterparts and experienced varying degrees of success in moving toward a truly integrated model of primary care. Improved communication among departments, greater respect and understanding of their counterparts’ contributions and increased staff satisfaction are just some of the positive results. There is still much work to be done, but the pilot teams have shown that integration is possible and provides benefit to the organization, the staff and patients.

The oral health collaborative pilot made dentistry relevant to the delivery of health care within a community health center. The dental department is at the table and no longer a sideshow.

Patrick Harrison, DDS, Chief Dental Officer
Sunrise Community Health Center
Greeley, CO
What Would Complete Integration Look Like?
From their work in the Oral Health Disparities Pilot, the four pilot centers have
developed a clear understanding of what true dental/medical integration would entail.
Below is a list, categorized by element of the Care Model, of the structures, systems and
characteristics that would support an integrated model of health care. The asterisks
represent aspects of care delivery or organizational characteristics that are already in
place in at least one of the pilot centers.

Clinical Information Systems
- Integrated health record and scheduling system (ideally electronic)
- Close the information loop on referrals; ensure report back to medical with the
date patient was seen, treatment received and plan.

Decision Support
- Greater understanding among medical staff of dental practices*
- Understanding of the importance of oral health for children 0-5 years of age and
  pregnant women*
- Referral mechanisms from medical to dental with access ensured*

Delivery System Design
- Integrated care team pods
- Shared support staff
- Open access to dental services for children 0-5 years of age and pregnant women
  when seen in the medical clinic*
- Dental liaison in medical department (dental packets created and ready to
distribute to patients and staff)*
- Dental screenings during well child visits*
- Medical providers discuss the importance of oral health visits with pregnant
  women and young mothers
- Oral health considerations integrated into every appropriate medical visit
- Dental presence in medical clinic (e.g. dental hygienist present to provide
  screening during a health maintenance or sports physical exam)
- “Patient Navigator” to perform medical, dental and mental health risk assessment

Self-Management
- Patient education materials co-located
- Integrated SM goal sheet
- Shared self-management “message” and interview techniques across departments

Organization of Healthcare
- Co-location*
- Increased respect and understanding of roles and contributions of medical and
dental staff*
- Integrated staff meetings*
- Measurements within medical primary care that address oral health
- System of care coordinated to address medical, dental and mental health needs at
each patient visit
- Integrated case management
• Shared language and understanding between medical and dental (“cultural competency”)
• Structural parity for dental (dental is viewed as having the same level of importance as medical)*

Community Resources
• Creating patient and community awareness that oral health is an integral part of overall health
• Insurance and reimbursement structures adjusted to encompass oral health as part of comprehensive health care
• Dental screenings incorporated into WIC, Head Start and Early Head Start visits

THE BUSINESS CASE FOR ORAL HEALTH

Implementing the Care Model to improve the oral health of children 0-5 years of age and pregnant women does require resource investment by the health center. The resource demands include staff time, direct and indirect costs. The improvement team members need time to attend trainings, participate in regular team meetings, test new ideas and orchestrate the redesign of care, all of which can have a negative impact on productivity. There are direct costs involved in the implementation of electronic databases or registries and allocation of staff to enter and manage clinical data. There are indirect costs associated with the time required to engage patients in self-management activities and other patient services that may not be currently reimbursable. The work of the four pilot centers has suggested a possible business case, however. Through increasing the percent of Medicaid patients seen and increasing productivity by lowering no-show rates and more efficient use of staff, two of the four pilot centers are documenting gains in revenue. Additionally, improved access for populations in need of care and enhanced staff and patient satisfaction are corollary benefits being realized by all four pilot centers.

“We are scheduling 8 days out vs. 4 months out, our no-show rate has gone from 12% to 5%, we have doubled our percentage of patients on Medicaid, productivity has increased from 12 to 18 patients a day and I billed $51,281 in August of 2006 as compared to $16,205 in August of 2005.”

Jane Gillette, DDS
Community Health Partners
Livingston, MT
I. THE MODELS USED IN THE COLLABORATIVE

The Care Model

The Care Model provides a framework consisting of six components that promotes an organizational approach to providing planned, proactive care for people within a primary care setting. Each component embodies a number of general principles, called change concepts, which constitute an effective, comprehensive, and quality system of care. The system is population-based and creates practical, supportive, evidenced-based interactions between an informed, activated patient and a prepared, proactive practice team. The Care Model emphasizes integrated collaborative care. Although initially developed to target chronic conditions, the Care Model has proven to be an effective model for prevention interventions as well. Here is a graphic representation of the six components of the Care Model and their interrelationships. Below this is a representation of the Care Model as it specifically relates to oral health.

[Diagram of the Care Model]

Figure 1 from Wagner EH. Chronic Disease Management: What Will It Take to Improve Care for Chronic Illness? Effective Clinical Practice. 1998;1:2-4
Disclaimer: The above figure is a conceptual adaptation of the Care Model from an oral health perspective. The American College of Physicians is not responsible for its use or accuracy.

**Universal Care Model Change Concepts**

**Health Care Organization**
- Include measurable goals for health care quality improvement in the business plan
- Senior leaders visibly support improvement in health care
- Use effective improvement strategies aimed at comprehensive system change
- Promote improved care through benefit packages
- Encourage better care through provider incentives

**Community Resources and Policies**
- Identify effective programs and encourage patients to participate
- Form partnerships with community organizations to support or develop evidence-based programs

**Self-management Support**
- Emphasize the patient's central role in managing their health
- Assess patient self-management knowledge, behaviors, confidence, and barriers
- Provide effective behavior change interventions and ongoing support with peers or professionals
- Assure collaborative care-planning and problem-solving by the team
Decision Support
- Embed evidence-based guidelines, which describe stepped-care, into daily clinical practice
- Integrate specialist expertise into primary care [Primary care is inclusive of all health disciplines residing within a health center organization (e.g. medical, dental and behavioral health)]
- Use proven provider education modalities to support behavior change
- Inform patients about guidelines pertinent to their care

Delivery System Design
- Define roles and delegate tasks amongst team members
- Use planned visits to support evidence-based care
- Build “effective” case management functionality into practice
- Assure continuity by the multi-disciplinary primary care team
- Assure regular follow-up

Clinical Information Systems
- Include clinically useful and timely information on all patients in a registry
- Provide reminders and feedback for providers and patients
- Identify relevant patient subgroups and provide proactive care
- Facilitate individual patient care planning through the registry

The Model for Improvement
In addition to the Care Model, an improvement model developed by the Associates in Process Improvement has been tested and used in many Collaboratives. When used with the Care Model, the improvement model provides a process to improve the quality of care at an accelerated pace.

![Diagram of the Model for Improvement](image-url)
The improvement model is based on three fundamental questions:

(1) What are we trying to accomplish?
   The first question is meant to establish an aim for improvement that focuses group effort. Using data and what patients and other customers, such as payers, believe is important helps define an aim. Aims should be as concise as possible – sometimes it takes a few trials of testing an aim before it becomes truly focused.

(2) How will we know that a change is an improvement?
   Measures and definitions are necessary to answer this question. Data is needed to assess and understand the impact of changes designed to meet an aim. In a collaborative, shared aims and data are used. In this way, superior performance and best practices are more quickly identified and disseminated through benchmarking.

(3) What changes can we make that will result in an improvement?
   Testing and Learning: The PDSA Cycle - PDSA stands for Plan, Do, Study, Act and is a trial-and-learning (learn by testing) method to discover what is an effective and efficient way to change a process. The “study” part of the cycle may require some clarification; after all, we are used to planning, doing and acting. The emphasis on study is the key to learning and establishes knowledge. It compels the team to learn from the data collected, its effects on other parts of the system and on patients and staff, and under different conditions, such as different practice teams or different sites. Most importantly, the study phase is an ideal time to think through how the Care Model helps to generate new ideas and approaches to positive change. In addition, the PDSA cycles are short and quick.

**II. FORMING AN IMPROVEMENT TEAM**

**Organizational Leadership**
Senior leadership includes the Executive Director, Dental Director, Medical Director, Chief Operating Officer, Chief Financial Officer, and Board of Directors.

The senior leadership has the accountability for the outcome of the improvement initiative. They are responsible for working with the improvement team to target goals, support changes, remove obstacles, communicate changes and priorities to the staff and board, charter the team, and provide support and resources to assure success. They will direct the spread of improvement changes throughout the organization, integrating them into their entire system of care. More detail is provided in the section on Leadership for Improvement in the Resource Section of this manual.

**Selecting the Team**
The formation of the improvement team for this work must be carefully considered. An appropriate and effective team is a key component of successful improvement efforts. Choose your team members based on their knowledge of, and involvement in, the aim and the processes necessary to realize that aim. A productive working relationship between medical and dental will be critical for success as the design for this improvement work necessitates using one or more medical providers’ panel of patients as the target population for the initiative. The team composition will be interdisciplinary and include members willing to try new ways of delivering care within and across the system. Four of these individuals will comprise the core team that will be the primary drivers of the effort. Individuals appropriate for the core team include a senior leader, dentist, medical provider, case/care manager, dental hygienist or nurse, dental or medical assistant and, if available, a staff member with information technology expertise. For optimal results there should be at least one medical staff person on the core team. Depending on your organization’s staffing, there will some variation in the core team composition.

In forming your core team, you will need to fill four roles: senior leader, provider champion, clinical or technical expert, and day-to-day leader. There may be one or more individuals on the
team who occupy the same role, and one individual may fill more than one role, but each component should be represented to successfully drive change in your organization. Note: Your improvement team will be larger than just the four core individuals acting as the primary drivers. Because this work will affect multiple departments and clinical areas, representatives from each area will be needed to enhance the core team’s efforts. Six to eight individuals are a good size for the team.

Composition of the Core Team
The Core Team is composed minimally of the following:

**Senior Leader** (generally an executive within the organization)
The ideal senior leader has ultimate authority to allocate time and resources needed to achieve the team’s aims. In addition, this individual has administrative authority over all areas affected by the changes the team will test and will champion the spread of successful changes throughout the organization. The senior leader is encouraged to visibly support the work of the team.

**Provider Champion(s)** (principal leaders at the pilot site)
It is critical to have both a dental and medical provider champions on the team. These champions should have a good working relationship with colleagues and with the day-to-day leader described below, and be interested in driving change in the system. Look for providers who are opinion leaders in the organization; individuals who are sought out for advice who are not afraid to try new ways of practicing.

**Clinical/technical expert** (subject matter knowledge and processes of care)
A clinical/technical expert is someone who knows the subject well and who understands the processes of care (e.g., patient flow, chart flow, what is involved in performing typical procedures, lab and referral processes, etc.). It is important that this person understand not only the details of the system, but also the various effects of making change(s) in the system. This team member’s knowledge of clinic processes will be valuable in designing tests of change. Individuals who might assume this role could include dental hygienists, nurses, dental or medical assistants, etc. As mentioned previously, some team members may assume more than one role or more than one team member may contribute to a role. Sometimes, the provider champion or team leader may also be the clinical/technical expert.

**Team Leader** (day-to-day leadership and coordination)
The day-to-day leader will be an important force for the improvement team, assuring that tests of change are occurring rapidly, activities such as data collection and reporting are adhering to the pilot timeline, and that records of team activities (meetings, tests being conducted) are kept. The day-to-day leader needs to be able to work effectively with everyone involved in the effort. The day-to-day leader will also be the “key contact” for your organization and will be the point person for communications between your improvement team and the Collaborative faculty.

Team Boundaries and Support
Once the improvement team membership is defined, it is important to ask and answer the following questions in collaboration with senior leadership:

- Who else should be on the team?
- When, where, how often, and for how long will the team meet?
- Who is responsible for generating regular reports (data on measures and a record of activities)?
- Will the team need financial resources? Who will provide them? What limitations are there on budgets?
• What decision-making authority will the team have?
• What authority will the team have to call in co-workers or outside experts, request equipment or information normally inaccessible to them, and make changes in the process?
• How will team members’ normal work get done while they are involved in the project?
• Are there other resources that this team will need?

Responsibilities of the Team
All team members must:

• Consider their participation as a priority responsibility, not an intrusion on their “real jobs”. **The initiative must become part of their day-to-day work.**
• Be responsible for contributing fully to the initiative, sharing knowledge and expertise.
• Participate in all meetings and discussions about the initiative.
• Carry out their assignments between the meetings and meeting deadlines.
• Complete a narrative report and a data report each month.
• Report back to the team at each meeting on their assignments.
• Consider being cross-trained. For example: how to produce monthly summary reports and graphs as well as writing the narrative, data entry into the registry, documenting tests of change and changes implemented, how to lead a team meeting, etc.

III. DEVELOPING AN AIM STATEMENT

The Model for Improvement is based on these three questions:

• What are we trying to accomplish?
• How will we know that a change is an improvement?
• What changes can we make that will result in an improvement?

The first question is meant to establish an Aim for your organization’s improvement effort. To answer this question, you should consider the needs of your patients, your organization’s strategic plan, and what other customers (e.g. payers) and employees believe is important. The Aim should be as concise as possible. In setting the team’s AIM, be sure to do the following:

**Involve senior leaders:** Leadership must align the Aim with the strategic goals of the organization.

**Base the Aim on both data and organizational needs:** Examine the data within the organization to help guide the establishment of an appropriate AIM. Refer to the measurement section and focus on issues that matter to the organization.

**The Aim should mention redesign of the system of care based on the Care Model’s six components, be stated clearly and include numerical goals:** Setting an aim for improvement work is a critical component of success. A very clear statement of what you intend to do, how well and by when will provide a roadmap for the team. The Care Model provides the framework for changing (redesigning) the system of care, measures with explicit goals provide a gauge of progress, and a timeline helps keep the effort on track. In addition, you may want to include some detail about the primary areas of focus.
**Example Aim Statement:** Within the next 12 months, Rural Health will redesign the clinical practice to improve the oral health of our pregnant patients and children under the age of 5 by implementing the Care Model. We will increase the treatment completion rate of patients and implement an active follow-up program to enhance treatment. Our goals are to have current guidelines for care and referral consistently utilized by the medical and dental staff. We will track our progress by using the following measures: (list all or a subset of measures that will be used).

Include a description of the initial group of patients where the changes in care will be tested and implemented. See the POF discussion in this document.

**Example Population of Focus:** Rural Health’s population of focus will be the pregnant women and children 0-5 years of age in Dr. Jones’ practice at the Eagle River site. The initial size of our Population of Focus will be approximately 250 patients. New patients of Dr. Jones’ that are pregnant women or are children 0-5 years of age will be added as they come into his practice.

**IV. DEFINING THE POPULATION OF FOCUS**

Health centers provide care to many hundreds, or even thousands, of young children (0 to 5 years) and pregnant women. All centers have multiple providers and usually more than one site. It is important to understand that the populations in this endeavor are not static; as new patients come in or are no longer pregnant the POF number will fluctuate.

We recommend starting with a sub-population of pregnant women and young children seen by the medical side of the health center as the basis for the improvement effort as much of the system change requires much better integration of medical and dental services. This may involve more than one provider from the medical clinic, or may necessitate reaching out to community providers if you don’t offer perinatal or obstetrical services at your health center.

There are two criteria for selecting the sub-population (which will be referred to as “Population of Focus” or POF).

- First the total size of the population should be at least 100 patients. The recommendation on POF size speaks to manageability of the redesign task. Typically, you should have at least 100 patients in the POF to assure that you have enough patients to adequately illustrate how your team should redesign the system of care. Too small a POF may mean that your team can use short-term fixes that are not system changes to accommodate a handful of patients. Also, you want to have sufficient number of patients in your POF to make a convincing case to other providers and senior leadership when it comes time to spread. Too small a POF (less than 100, in our experience) does not sway others as much as a POF at least 100. (There are challenges in working with initial populations larger than 300, many of which stem from demand on the creation and maintenance of an electronic registry.)

- Secondly, the patients should be selected based on either clinic or provider, or both. For example, if at one clinic there is one medical provider with approximately 500 young patients, we would take this panel of 500 patients as the population of focus. Although there are challenges to such a large population of focus, as noted above, it is strongly recommended that you avoid taking only portions of one medical provider’s panel. For example, if you have only some of Dr X’s young patients in the POF, you add
complexity in providing care, needing to constantly distinguish between those patients who should pass through the new system of care and those who will continue to receive the “ordinary” system of care delivered by Dr X and her provider team.

- Exception: if a medical provider has 95 pregnant women in her panel and that is the entire panel of pregnant patients for the provider at the site, then the population of focus to start would be the 95 pregnant women.

Note that the selection of the population of focus should not be based on risk levels but should be selected by provider or site. Pick the population of focus wisely. Pick the providers and clinics where the changes are most likely to be embraced. It is important to keep in mind that the ultimate goal of the improvement work is to have ALL eligible dental patients in your registry and receiving improved care. The POF is a small subset of your population on which to easily test new ways of doing things and measure improvement. Once you have implemented a system of improved care for the POF, it will be time to spread this new system to your other eligible patients.

V. CREATING AN ELECTRONIC REGISTRY OF YOUR PATIENTS

Background Information
Identifying the patient population is the backbone of a population-based care delivery system. Without identification of the patients included in the population, changes cannot be achieved. To identify patients within the population of focus (as discussed above), a team needs to be able to access data that pertains to this group of patients. The tools used to collect and access information about a specific group of patients is often referred to as a registry. Simply stated, a registry is a mechanism for keeping all pertinent information about a specific group of patients at your fingertips. The information can be used to schedule visits, labs, education sessions, as well as generate reminders and guidance of the care of patients (both in groups and individually).

Improvement work requires regular review of measure data and a mechanism to keep leadership informed of activities, successes and barriers. Ideally, this is done monthly. Measures used in the Collaborative Pilot can be found on pages 24-28 of this manual. For a registry to be efficient for tracking this type of data for over 100 patients, it should be in an electronic form (i.e. computer based).

VI. MEASUREMENT

The Why, What, and How Much of Measurement
This Oral Health Disparities Collaborative was about improvement of oral health care, not measurement. But measurement played the important role of providing information about the impact of changes made to improve care delivery to the population of focus. Always remember that measurement should be designed to accelerate improvement, not slow it down. Your team needs just enough measurement to be convinced that the changes you are making are leading to improvement.
Population-based Care Measurement

The Care Model is population-based. Population-based care is the process of identifying health problems within a defined population of patients, assuring evidence-based interventions for members of the population are reliably used, and regularly monitoring progress and scientific literature to keep interventions state-of-the-art.

Identifying the patient population is the first step. A clinic team needs to be able to access data that can distinguish populations with different health problems. CDT codes (and possibly ICD-10 codes) from billing data are the most common source for making these distinctions. The ability to tie billing codes to individual patients allows lists to be generated to contact and track patients for delivery of proven interventions, and to monitor their progress over time.

Measurements: Guidelines for Getting Started

Some measurement concepts to help keep the use of data simple and effective:

- **Plot data over time.** Improvement in oral health care for pregnant women and children 0-5 years of age will require testing and implementing. Most of the information about performance of your system and how it has improved can be learned by observing trends and patterns in simple time series charts of key measures directly related to the aim. Annotated run charts (time order plots) are typically used. Data points for each measure should be plotted at least monthly on a run chart.

- **Focus on measures directly related to your aim.** Measures that can be used to evaluate performance of the system relative to your team’s aim should be maintained throughout the improvement effort and reported on a regular basis. Additional balancing measures (measures that track the effect that changes in one part of a system have on other parts of the system) and measures of specific components of your system may be required periodically to assess overall performance.

- **Use the registry as the basis for your measures.** This registry is a basic part of the clinical information system that will be part of your practice redesign and will be used to track data on the patient population of interest.

- **Integrate measures into routine processes.** Whenever possible, collect useful data as part of the normal performance of a work. Auditing charts is a very non-productive way to obtain data for measures. Update the registry after each patient visit. Develop simple data recording forms (e.g. flowsheets, encounter notes) that are integrated into the patient visit.

Begin data collection immediately. If historical data are available, plot the data, using whatever frequency is available. If historical data are not available, begin plotting monthly summaries of your measures from the time you begin the improvement effort.
## ORAL HEALTH DISPARITIES COLLABORATIVE MEASURES

### PERINATAL MEASURES

**CORE (REQUIRED)**

<table>
<thead>
<tr>
<th>Measure- Short Description (percent: numerator/denominator x 100)</th>
<th>Measure- Detailed Description</th>
<th>Numerator (count in the clinical information system- for IT staff)</th>
<th>Denominator (count in the clinical information system- for IT staff)</th>
<th>Change trying to drive with measure</th>
<th>Notes/Comments</th>
<th>Goal %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Comprehensive oral exam and treatment plan</td>
<td>Pregnant women with comprehensive dental exam completed while pregnant</td>
<td>Pregnant women in last 12 months with comprehensive dental exam completed while pregnant</td>
<td>Pregnant women in last 12 months</td>
<td>Change previous dental system reluctance to providing dental treatment to pregnant women</td>
<td>Comprehensive dental exam includes periodontal assessment as well as determination of presence of decay.</td>
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</tr>
<tr>
<td>2. Dental Treatment Completed</td>
<td>Pregnant women with completed Phase I dental treatment plan within 6 months of exam</td>
<td>Pregnant women with comprehensive oral health exam while pregnant (12 months)</td>
<td>Pregnant women in last 12 months</td>
<td>Provide routine &amp; emergency dental treatment to pregnant women and drive changes in delivery system (redesign) to allow completion of treatment in a timely manner</td>
<td>OPR measure</td>
<td></td>
</tr>
<tr>
<td>3. Self Management Goal: medical and/ or dental setting</td>
<td>Pregnant women with SMGS developed in either the medical and/or dental setting while pregnant</td>
<td>Pregnant women with SMGS in last 12 months</td>
<td>Pregnant women in registry (12 months)</td>
<td>Drive medical or dental staff to deliver appropriate AG including developing SM Goal</td>
<td></td>
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<tr>
<td>Measure- Short Description (percent: numerator/denominator x 100)</td>
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<td>Numerator (count in the clinical information system- for IT staff)</td>
<td>Denominator (count in the clinical information system- for IT staff)</td>
<td>Change trying to drive with measure</td>
<td>Notes/Comments</td>
<td>Goal %</td>
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<tr>
<td>4. Perinatal Referral by Medical</td>
<td>Pregnant women referred by medical to dental for comprehensive oral health exam</td>
<td>Pregnant women in last 12 months referred by medical to dental for comprehensive oral health exam</td>
<td>Pregnant women in the registry in the last 12 months</td>
<td>Drive medical staff to refer perinatal patients to dental</td>
<td>This is a measure of the medical providers’ attention to oral health.</td>
<td></td>
</tr>
<tr>
<td>5. PCP Dental Counseling: medical setting</td>
<td>Pregnant women who received patient education for oral health and anticipatory guidance in the medical setting while pregnant</td>
<td>Pregnant women in last 12 months who have received patient education for oral health and anticipatory guidance while pregnant</td>
<td>Pregnant women in last 12 months</td>
<td>Drive medical staff to discuss the importance of dental care for mother &amp; child while pregnant to positively influence, support &amp; reinforce pregnant women’s decision to attend dental visits and engage in low risk behaviors</td>
<td>This is a measure of the medical providers’ attention to oral health. In PECS, the PCP typically will be the medical primary care provider</td>
<td></td>
</tr>
<tr>
<td>6. Periodontal Treatment Completed during pregnancy</td>
<td>Pregnant women who completed recommended periodontal treatment while pregnant</td>
<td>Pregnant women who completed periodontal treatment while pregnant (12 months)</td>
<td>Women with periodontal disease while pregnant (12 months)</td>
<td>Assure periodontal treatment is completed before delivery in order to reduce potential risk factors</td>
<td></td>
<td></td>
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<tr>
<td>Measure (percent: numerator/denominator x 100)</td>
<td>Measure-Detailed Description</td>
<td>Numerator (count in the clinical information system- for IT staff)</td>
<td>Denominator (count in the clinical information system- for IT staff)</td>
<td>Change trying to drive with measure</td>
<td>Notes/Comments</td>
<td>Goal %</td>
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<tr>
<td>1a. Dental Exam Measure (by 12 months)</td>
<td>Children with dental exam by age 12 months</td>
<td>Children &lt;= 24 months of age with dental exam by age 12 months</td>
<td>Children &lt;= 24 months of age</td>
<td>Referral of 1 y/o from medical to dental clinic. Reduce dental provider &amp; system barriers to performing exam &amp; ECC risk assessment on 1 y/o</td>
<td></td>
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</tr>
<tr>
<td>1b. Dental Exam Measure (12-60 months)</td>
<td>Children age 12 to 60 months with exam</td>
<td>Children age 12 to 60 months with exam in the last 12 months</td>
<td>Children 12 to 60 months of age</td>
<td>Referral of 2-5 y/o from medical to dental clinic. Reduce dental provider &amp; system barriers to performing exam, ECC risk assessment and dental treatment on 2-5 y/o</td>
<td>The measure is distinct from measure 2a, which emphasizes 1 year olds.</td>
<td></td>
</tr>
<tr>
<td>2. Treatment Plan Completed Measure (12-60 months) (HP 2010 21.2)</td>
<td>Children age 12 to 60 months with completed Phase 1 Treatment plan within 12 months of exam</td>
<td>Children age 12 to 60 months with initial exam and Phase 1 Treatment completed within 12 months of the initial exam</td>
<td>All children age 12 to 60 months with exam</td>
<td>Provide preventive, routine &amp; emergency dental treatment to 2-5 y/o and drive changes in delivery system (redesign) to allow completion of treatment in a timely manner</td>
<td>OPR Measure (Phase 1 treatment includes dental caries treatment)</td>
<td></td>
</tr>
<tr>
<td>3. Self-Management Goal: medical and/ or dental setting</td>
<td>Children ages 12 to 60 months whose caregivers developed SMGS in either the medical or dental setting</td>
<td>Children ages 12 to 60 months whose caregivers developed SMGS in last 12 months</td>
<td>Children ages 12 to 60 months</td>
<td>Drive medical or dental staff to deliver appropriate AG including developing SM Goal to caregivers of POF since caregivers responsible for modulating ECC risk factors in these age groups</td>
<td>(1) Caregivers focus. (2) Agreement to practice good oral health habits (health behavior counseling or contracting) is not the only topic for SM goal setting. (3) In PECS, we will interpret Self Management Goal associated with a child’s registry information as referring to self-management of the caregiver.</td>
<td></td>
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<tr>
<td>Measure</td>
<td>Measure-Detailed Description</td>
<td>Numerator (count in the clinical information system- for IT staff)</td>
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<tr>
<td>4. PCP Dental Counseling: <em>medical setting</em></td>
<td>Children age 12 to 48 months who received patient education for oral health and anticipatory guidance in the medical setting</td>
<td>Children age 12 to 48 months with dental counseling by a primary care provider documented (last 12 months)</td>
<td>Children age 12 to 48 months</td>
<td>Drive medical staff to discuss the importance of early dental care for child to positively influence, support &amp; reinforce caregiver’s decision to take child for dental visits and engage in low risk behaviors</td>
<td>This is a measure of the medical providers’ attention to oral health. In PECS, the PCP typically will be the medical primary care provider</td>
<td></td>
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<tr>
<td>5. Fluoride varnish applications</td>
<td>Children age 12 to 60 months with 1 or more fluoride varnish applications documented</td>
<td>The number of patients age 12 to 60 months with 1 or more fluoride varnish applications documented in the last 12 months</td>
<td>All children 12 to 60 months</td>
<td>Drive delivery of effective ECC intervention treatment</td>
<td></td>
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</tr>
<tr>
<td>6. Dental Home Measure</td>
<td>Children age 6 to 60 months with an initial dental exam and a recall dental exam</td>
<td>Children age 6 to 60 months with an initial dental exam (ever) and recall in last 12 months</td>
<td>Children age 6-60 months with initial dental exam (ever)</td>
<td>Drive system changes that would in insure appropriate recall/maintenance appointments being delivered to POF (evidence of existence of the dental home)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Fluoride needs assessment: medical or dental clinic setting (REQUIRED IN NON-FLUORIDATED COMMUNITIES)</td>
<td>Children age 6 to 60 months with fluoride assessment documented in either the medical or dental setting</td>
<td>Children age 6 to 60 months with fluoride assessment documented in the last 12 months</td>
<td>Children age 6 to 60 months</td>
<td>Drive Fl assessment in the medical and/or dental clinic setting. This should elicit Rx of systemic Fl in the medical setting. If measure percentages are low, this should drive trainings for medical &amp; dental staff, back-up Fl assessment in the dental setting and follow-up and/or Rx by dental</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Fluoride prescribed: medical or dental clinic setting (REQUIRED IN NON-FLUORIDATED COMMUNITIES)</td>
<td>Children age 6 to 60 months assessed as having inadequate fluoride who have been prescribed fluoride in either the medical or dental setting</td>
<td>Children age 6 to 60 months assessed as having inadequate fluoride in the last 12 months who have been prescribed fluoride in the last 12 months</td>
<td>Children age 6 to 60 months assessed as having inadequate fluoride in last 12 months.</td>
<td></td>
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<tr>
<td>9. Medical Referral Measure</td>
<td>Children age 6 to 60 months referred by medical to dental for comprehensive oral health exam</td>
<td>Children age 6 to 60 months in last 12 months referred by medical to dental for comprehensive oral health exam</td>
<td>Children age 6 to 60 months</td>
<td>Drive medical staff to refer children age 6-60 months to dental</td>
<td>This is a measure of the medical providers’ attention to oral health</td>
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</tbody>
</table>

Definitions for phases in RED TEXT are found on the following pages.
DEFINITIONS OF TERMS USED IN MEASURES

I. Phase 1 Treatment

Prevention, maintenance and/or elimination of oral pathology that results from dental caries or periodontal disease. This includes: oral cancer prevention and early diagnosis; prevention education and services; emergency treatment; diagnostic services and treatment planning; restorative treatment; basic periodontal therapy (non surgical); basic oral surgery that includes simple extractions and biopsy; non-surgical endodontic therapy; and space maintenance and tooth eruption guidance for transitional dentition.

II. Elements of the Comprehensive Oral Exam, Diagnosis and Treatment Plan

A. Intra/Extra-Oral Exam

The clinical examination should document the oral condition as to:

- Missing and decayed teeth, existing restorations
- Endodontic status
- Occlusal status
- Soft tissue/oral cancer exam
- Periodontal status, including probing
  - *Use of the PSR: The PSR is not a diagnostic tool. Use of the PSR is acceptable for screening, as long as patients scoring a Code 4 in one sextant or Code 3 in two or more sextants receive a complete periodontal examination including full mouth probing.*
- Other findings viewed as pertinent by the examining dentist

B. Diagnosis

Written notation and/or tooth charting shall be used to indicate pathologic conditions including but not limited to:

- Untreated caries, defective restorations
- Soft tissue abnormalities
- Periodontal disease
- Malocclusion or developmental pathology
- Hard tissue pathology observable on available radiographs such as impactions
• Other existing conditions i.e. TMJ, attrition, abrasion etc.

Consultation and referral shall occur where necessary to complete diagnosis. A diagnosis shall be supported by recording clinical symptoms and conditions.

C. Treatment Plan

A complete treatment plan should include the following:

• Provision for relief of pain, elimination of infection
• Preventive plan component
• Periodontal treatment plan if necessary
• Elimination of caries
• Replacement or maintenance of tooth space or function
• Consultation or referral for conditions where treatment is beyond the scope of services offered
• Determination of adequate recall interval
  ‣ Please note that treatment planning for ECC interventions for children 0-5 may also include interventions such as prescribing chlorhexidine for the caregiver, that should be documented in both the caregiver’s and child’s treatment records

III Self-Management Goal:

A collaborative activity in which the patient, or patient/caregiver dyad, and the health care provider establish a goal that:

• is reasonable
• describes what, where, when, how, how much
• the patient has a high level of confidence in achieving
• is something the patient WANTS to do
• has a follow up plan

IV PCP Dental Counseling in the Medical Setting

• Appropriate Anticipatory Guidance for pregnant women or young child (see next 2 pages)
• Reinforcement of the importance of oral health through the life-cycle
• Reinforce and support the importance of attending and completing dental treatment
**Take home message for caregivers**

**Oral health and hygiene**

- Baby teeth are important!
- Parents'/caregivers' oral health affects baby's oral health.
- Parents/caregivers should obtain regular dental check-up and get treatment if necessary.
- Schedule child's first dental appointment by age one.
- Use of fluorides, including tooth brushing with fluoride toothpaste, is the most effective way to prevent tooth decay.

- Encourage parents/caregivers to obtain dental check-up and, if necessary, treatment before birth of baby to reduce cavity-causing bacteria that can be passed to the baby.
- Encourage parents/caregivers to brush teeth with fluoride toothpaste.

<table>
<thead>
<tr>
<th>PRENATAL</th>
<th>BIRTH TO ONE YEAR</th>
<th>TWO TO THREE YEARS</th>
<th>THREE TO FIVE YEARS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baby teeth are important! Parents'/caregivers' oral health affects baby's oral health.</td>
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<td>Baby teeth are important! Parents'/caregivers' oral health affects baby's oral health.</td>
<td>Baby teeth are important! Parents'/caregivers' oral health affects child's overall health.</td>
</tr>
<tr>
<td>Parents/caregivers should obtain regular dental check-up and get treatment if necessary.</td>
<td>Parents/caregivers should obtain regular dental check-up and get treatment if necessary.</td>
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<td>Parents/caregivers should obtain regular dental check-up and get treatment if necessary.</td>
</tr>
<tr>
<td>Schedule child's first dental appointment by age one.</td>
<td>Parents/caregivers should avoid sharing with their child things that have been in their mouths.</td>
<td>Parents/caregivers should avoid sharing with their child things that have been in their mouths.</td>
<td>Parents/caregivers should avoid sharing with their child things that have been in their mouths.</td>
</tr>
<tr>
<td>Use of fluorides, including tooth brushing with fluoride toothpaste, is the most effective way to prevent tooth decay.</td>
<td>Prevention is less costly than treatment. Use of fluorides, including tooth brushing with fluoride toothpaste, is the most effective way to prevent tooth decay.</td>
<td>Prevention is less costly than treatment. Use of fluorides, including tooth brushing with fluoride toothpaste, is the most effective way to prevent tooth decay.</td>
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</tr>
<tr>
<td>Encourage parents/caregivers to maintain good oral health and get treatment, if necessary, to reduce spread of bacteria that can cause tooth decay.</td>
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<td>Encourage parents/caregivers to avoid sharing with their child things that have been in their mouths.</td>
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<tr>
<td>Encourage parents/caregivers to become familiar with the normal appearance of child's gums.</td>
<td>Review parent's/caregiver's role in brushing toddler's teeth.</td>
<td>Discuss brush and toothpaste selection.</td>
<td>Discuss parents/caregivers continued responsibility to help children under age eight to brush their teeth.</td>
</tr>
<tr>
<td>Emphasize using a washcloth or toothbrush to clean teeth and gums with eruption of the first tooth.</td>
<td>Discuss brush and toothpaste selection.</td>
<td>Problem solve on oral hygiene issues.</td>
<td>Encourage parents/caregivers to consider dental sealants for primary and first permanent molars.</td>
</tr>
<tr>
<td>Encourage parents/caregivers to check front and back teeth for white, brown, or black spots (signs of cavities</td>
<td>Schedule child's first dental visit by age one.</td>
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</table>

- Baby teeth are important!
- Parents'/caregivers' oral health affects baby's oral health.
- Parents/caregivers should obtain regular dental check-up and get treatment if necessary.
- Schedule child's first dental appointment by age one.
- Use of fluorides, including tooth brushing with fluoride toothpaste, is the most effective way to prevent tooth decay.

- Encourage parents/caregivers to obtain dental check-up and, if necessary, treatment before birth of baby to reduce cavity-causing bacteria that can be passed to the baby.
- Encourage parents/caregivers to brush teeth with fluoride toothpaste.

- Encourage parents/caregivers to maintain good oral health and get treatment, if necessary, to reduce spread of bacteria that can cause tooth decay.
- Encourage parents/caregivers to avoid sharing with their child things that have been in their mouths.
- Encourage parents/caregivers to become familiar with the normal appearance of child's gums.
- Emphasize using a washcloth or toothbrush to clean teeth and gums with eruption of the first tooth.
- Encourage parents/caregivers to check front and back teeth for white, brown, or black spots (signs of cavities.
Oral development
- Describe primary tooth eruption patterns (first tooth usually erupts between 6-10 months old).
- Emphasize importance of baby teeth for chewing, speaking, jaw development and self-esteem.

Fluoride adequacy
- Evaluate fluoride status in residential water supply.
- Review topical and systemic sources of fluoride.
- Encourage mother to drink fluoridated tap water.
- Emphasize importance of baby teeth for chewing, speaking, jaw development and self-esteem.
- Discuss teething and ways to soothe sore gums, such as chewing on teething rings and washcloths.

Oral habits
- Emphasize eating a healthy diet and limiting number of exposures to sugar snacks and drinks.
- Emphasize that it is the frequency of exposures, not the amount of sugar, that affects susceptibility to caries.
- Encourage breastfeeding.
- Emphasize importance of baby teeth for chewing, speaking, jaw development and self-esteem.
- Discuss teething and ways to soothe sore gums, such as chewing on teething rings and washcloths.

Diet and nutrition
- Emphasize eating a healthy diet and limiting number of exposures to sugar snacks and drinks.
- Emphasize that it is the frequency of exposures, not the amount of sugar, that affects susceptibility to caries.
- Encourage breastfeeding.
- Emphasize importance of baby teeth for chewing, speaking, jaw development and self-esteem.
- Discuss teething and ways to soothe sore gums, such as chewing on teething rings and washcloths.

Injury prevention
- Emphasize eating a healthy diet and limiting number of exposures to sugar snacks and drinks.
- Emphasize that it is the frequency of exposures, not the amount of sugar, that affects susceptibility to caries.
- Encourage breastfeeding.
- Emphasize importance of baby teeth for chewing, speaking, jaw development and self-esteem.
- Discuss teething and ways to soothe sore gums, such as chewing on teething rings and washcloths.

- Review child-proofing of home including electrical cord safety and poison control.
- Emphasize use of properly secured car seat.
- Encourage caregivers to keep emergency numbers handy.
- Emphasize importance of baby teeth for chewing, speaking, jaw development and self-esteem.
- Discuss teething and ways to soothe sore gums, such as chewing on teething rings and washcloths.

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**Overview:** The Oral Health Collaborative pilot includes a focus on clinical care, as well as tools to achieve greater access and efficiency to impact clinical goals. The oral health collaborative pilot developed 6 Delivery System Design (also called redesign) measures to assess practice efficiency and patient care effectiveness.

### CORE INDICATORS

Note: Each team should establish baseline measures, and use that as a starting point for improvement

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<tr>
<th>MEASURE</th>
<th>DEFINITION</th>
<th>MEASUREMENT APPROACH</th>
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</table>
| 1 Office visit cycle time                         | N: Total elapsed minutes from patient arrival at the health center to patient departure for patient visits sampled in the reporting period  
D: Number of visits sampled                       | Sample a minimum of 10-15 patients in a given week using a patient visit cycle tool to capture the various components of total time the patient spent in the office. Sample at various times and on various days to allow for analysis.  
Include all time from patient arrival until patient departure. |
| 1a Value-added time as percent of total cycle time | N: Total value-added time  
D: Visit cycle time  
Multiply by 100 to obtain a percent.  
Office visit cycle time begins at the time of arrival and ends when patient leaves office. It is the sum of non-value-added time plus value-added time. | The patient visit cycle tool should include a breakdown of time intervals in order to be able to identify value-added time components as well as non-value-added time.  
Examples of Non-value-added time include:  
Time waiting before going to an exam room  
Time waiting in exam room  
Time filling out paperwork  
Time waiting for x-rays  
Time waiting for assistant to return with materials  
Examples of Value-added time include:  
Time spent with provider  
Educational time spent with any member of the care team |
| 2a Time to 3rd Next Available Appointment         | N: Sum of number of days between the day a patient makes a request for an appointment with a provider and the third available appointment for a non-urgent/emergent visit with that provider, for each of the providers sampled during the reporting period  
D: Number of providers sampled during the reporting period | Sample each provider(s) the same day of the week, once a week.  
Count number of days between a request for an appointment (e.g. enter dummy patient) with a provider and the third next available appointment for a visit for that provider. Do this for initial exam appointments, hygiene appointments, and restorative appointments  
Count all calendar days, including weekends, holidays, and days off.  
Do not count any saved appointments for urgent visits |
| 3 No show rate                                    | N: Number of patients who miss a scheduled appointment  
D: Number of scheduled appointment slots, whether scheduled in advance or not  
Multiply by 100 to obtain a percent. | Count all of the patient appointments that are missed during the month.  
Count the total number of scheduled appointment slots during the same period.  
If a full month’s data cannot be captured, use a one week sample. |
| 4 Number of Patient Care Encounters per Provider per hour | N: Total number of encounters for provider for the month  
D: The total number of hours worked by provider in that month | Count all of the encounters in a month by provider  
Count the total number of hours each provider worked in the same month  
Include administrative time |
Steps to Success
A compilation of change concepts and ideas that have been recommended by the Oral Health Collaborative Pilot teams*

*Resources and tools referenced in the Steps to Success can be found in the Health Disparities website library: www.healthdisparities.net

- Click on the Library link from the toolbar located at the top of the Health Disparities home page.
- Once on the Search Portal home page, on the right hand side of the screen, click on the 'Natural Language' Search Option.
- In the Search field, enter the document name
- Finally, select the Search button

If you have any questions, comments, and/or concerns, please contact the HDC Webmaster at webmaster@healthdisparities.net.
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<tr>
<th>Clinical Information System Change Concepts</th>
<th>Steps</th>
<th>Tips</th>
<th>Tools/Resources</th>
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</thead>
<tbody>
<tr>
<td>Develop a database or registry system to collect, manage and report data on patients</td>
<td>Choose a computer application that allows for flexible data handling and reporting.</td>
<td>▪ Choose software that can capture needed data from existing computer systems ▪ Visit a center with a well-implemented dental patient registry ▪ Electronic registries are optimal</td>
<td></td>
</tr>
<tr>
<td>Make sure the computer application makes it easy to get patient information into and out of the system</td>
<td></td>
<td>▪ Keep manual data entry to a minimum Whenever possible, transfer information electronically from practice management systems like appointments and billing ▪ For EHR’s: must have IT support for creating templates for collaborative data entry, data retrieval and report generation</td>
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<tr>
<td>Define a clear data tracking, entry and maintenance process</td>
<td>Develop a method to collect data that integrates into daily clinic flow such as a flowsheet, visit note, sticker (see next change idea below)</td>
<td>▪ Flag charts in POF to prompt identification for data entry ▪ Identify team members with good computer skills ▪ Train multiple people to enter data – assign one person primary responsibility and others will be back up ▪ Develop a data entry cheat sheet to assist data entry person ▪ Periodic chart audits to assure accuracy of data entry</td>
<td>Pedo Caries Risk Assessment Sticker.doc ECC Encounter Form PECS Blank. pdf Perinatal Encounter Form PECS blank.pdf</td>
</tr>
<tr>
<td>Incorporate measures and guidelines into daily standardized documentation methods</td>
<td>Review measures, measure definitions and available guidelines and come to consensus among providers</td>
<td>▪ Provide evidence base for guidelines and rationale and data gathering plan for measurement ▪ When guidelines are unavailable,</td>
<td>NYSDOH Perinatal Guidelines.doc CAMBRA ECC Risk Assessment.doc Oral Health and Pregnancy: A Review.pdf</td>
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<tr>
<td>Action</td>
<td>Description</td>
<td>Resource</td>
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<tr>
<td>Embed measures and treatment guidelines into flowsheets, encounter</td>
<td>▪ Test with one provider and one patient to see if appropriate care is</td>
<td>Anticipatory Guidance.doc</td>
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<tr>
<td>notes, stickers, EHR templates</td>
<td>prompted and documented; refine and test again</td>
<td>&quot;First 5&quot; web-based training for dental providers:</td>
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<td><a href="http://www.first5oralhealth.org">http://www.first5oralhealth.org</a></td>
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<td>Clinical Considerations Infant Oral Care Program- Compendium 2005.pdf</td>
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<td>ECC AG-6 step visit.pdf</td>
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<td>Fluoride Varnish Study 2006.pdf</td>
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<td>Run reports to identify patients who are not in compliance with the</td>
<td>▪ Assign person to run reports on a regular basis</td>
<td>Excel Measures Graph Template 3 Feb06</td>
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<td>selected measures (e.g. have not had a dental exam or have not</td>
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<td>completed treatment plan)</td>
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<td>Assign person to run reports on a regular basis</td>
<td>▪ Do this from the beginning of improvement work</td>
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<td>▪ Assign a staff member to place phone calls to patients without exams or</td>
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<td>▪ These reports should be run monthly in an ideal situation</td>
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<td>Create a dental balanced scorecard (also called an instrument panel)</td>
<td>▪ Pick a few easy measures to start with</td>
<td>OHDP Patient Satisfaction Survey.doc</td>
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<td></td>
<td>▪ Test scorecard to ensure data is useful for making improvement</td>
<td>CHP Dental Balanced Scorecard.xls</td>
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<td>decisions</td>
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<td></td>
<td>▪ Gather baseline data on measures before setting goals</td>
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<td>▪ Allot time for data collection</td>
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<td>▪ Review data frequently</td>
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<td>▪ Develop scorecard early on!</td>
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<td>▪ Keep review a standing item in team and management meeting</td>
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<td>▪ Involve IT person, if available, to help with scorecard development</td>
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<tr>
<td>Decision Support Change Concepts</td>
<td>Steps</td>
<td>Tips</td>
<td>Tools/Resources</td>
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<tr>
<td>Provide education and training for medical and dental staff about the oral health needs and appropriate assessment and management interventions for populations that have traditionally faced barriers in access to care such as children 0-2 years of age and pregnant women</td>
<td>Provide inservices to all medical and dental staff</td>
<td>▪ Enlist medical provider champion to present inservice</td>
<td>&quot;First 5” web-based training for dental providers: <a href="http://www.first5oralhealth.org">http://www.first5oralhealth.org</a> NYSDOH Perinatal Guidelines.doc Health Professional’s Guide to Peds Oral Health Management: <a href="http://www.mchoralhealth.org/PediatricOH/index.htm">http://www.mchoralhealth.org/PediatricOH/index.htm</a></td>
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<td></td>
<td>Provide update on activities at medical staff meetings</td>
<td>▪ Use this opportunity to reinforce importance of oral health and patient referrals</td>
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<td></td>
<td>Have a dental presence in medical clinic</td>
<td>▪ Use this opportunity to reinforce importance of oral health and patient referrals</td>
<td>3-D models (typodonts) Child Dental Referral and Education Brochure.pdf Websites for Patient Education Materials: <a href="http://colgateprofessional.com">http://colgateprofessional.com</a> <a href="http://dentalcare.com">http://dentalcare.com</a> <a href="http://www.ada.org">http://www.ada.org</a> <a href="www.nidcr.nih.gov/HealthInformation/SpecialCareResources">www.nidcr.nih.gov/HealthInformation/SpecialCareResources</a> <a href="www.aapd.org">www.aapd.org</a></td>
</tr>
<tr>
<td>Develop a referral process from medical for patients 0-5 years of age and pregnant women</td>
<td>Develop referral form and review with POF provider</td>
<td>▪ Ensure provider is comfortable explaining need for dental referral to POF patients</td>
<td>3-D models (typodonts) Child Dental Referral and Education Brochure.doc Websites for Patient Education Materials: <a href="http://colgateprofessional.com">http://colgateprofessional.com</a> <a href="http://dentalcare.com">http://dentalcare.com</a> <a href="http://www.ada.org">http://www.ada.org</a> <a href="www.nidcr.nih.gov/HealthInformation/SpecialCareResources">www.nidcr.nih.gov/HealthInformation/SpecialCareResources</a> <a href="www.aapd.org">www.aapd.org</a></td>
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<tr>
<td>Map the path the referral must take and talk with all staff involved</td>
<td>Map the path the referral must take and talk with all staff involved</td>
<td>▪ Ensure all staff understand their role in this new process and its importance</td>
<td>Example of Flow_Child.doc</td>
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<tr>
<td>Task</td>
<td>Description</td>
<td>Additional Information</td>
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<tr>
<td>Identify problems early, gain buy-in</td>
<td>Test with POF provider for one day and measure number of referrals successfully made by medical and received by dental providers. Give feedback to all involved in process and ask for their input re: solutions to problems.</td>
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<td>Assess patient barriers</td>
<td>Offer travel assistance (vouchers, volunteer drivers). Consider trying a “warm hand off” to dental clinic when medical visit complete.</td>
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<tr>
<td>Use experts, mentors or specialists for education</td>
<td>Use care management conferences to reinforce new processes of care and to explore barriers/knowledge needs. Face to face interaction and discussion with peers and experts facilitates paradigm change.</td>
<td>National Maternal and Child Oral Health Resource Center: [<a href="http://www.mchoralhealth.org/knwp">http://www.mchoralhealth.org/knwp</a> athoral health.html](<a href="http://www.mchoralhealth.org/knwp">http://www.mchoralhealth.org/knwp</a> athoral health.html)</td>
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<tr>
<td>Provide all current research on which to base discussion of standards of care and standard operating procedures</td>
<td>Recognize that not all providers will be comfortable treating very young children or pregnant women. Involve all care team members that will be affected by standards of care. Ensure everyone understands the rationale for standardizing processes.</td>
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</tbody>
</table>
| **Identify what is currently happening in care and treatment processes and build from there** | ▪ Utilize the six steps of infant oral care model as standard care for all infants  
▪ Utilize the NYSDOH Perinatal Guidelines | NYSDOH Perinatal Guidelines.doc  
"First 5" web-based training for dental providers: [http://www.first5oralhealth.org](http://www.first5oralhealth.org)  
ECC AG-6 step visit.pdf |
|---|---|---|
| **Periodically revisit standards to incorporate new research or evidence based guidelines** | ▪ Consult experts when there is disagreement about what the standard of care should be  
▪ Keep separate from productivity and operational issues |  |
| **Give regular feedback to staff about performance/progress** | **Decide what will be targeted for monitoring and feedback** | **Identify what measures and care processes will be used and run reports/audit charts to get data** | **CHP Dental Balanced Scorecard.xls** |
| **Decide on format of feedback:** | ▪ have all provider stats on one page (blinded or unblinded)  
▪ individual provider feedback  
▪ site level feedback | ▪ Feedback must be accompanied by a discussion of barriers/challenges and strategies to improve |  |
| **Decide who will receive feedback and how often** | ▪ Use staff meetings as a regular opportunity  
▪ Consider tailoring data collection and feedback for the various care team members (front desk staff, dentists, medical staff, hygienists, DA’s) |  |  |
<table>
<thead>
<tr>
<th>Delivery System Design Change Concepts</th>
<th>Steps</th>
<th>Tips</th>
<th>Tools</th>
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</table>
| Define the roles of each dental and medical care team member | Have medical team decide:  
- who will be responsible for putting referral form in patients chart  
- who will educate patient about need for dental visit  
- who will be responsible for getting referral form to dental | Flag charts of POF provider to trigger placement of referral form on chart  
Consider training a RN or MA from the medical team to be a “dental liaison” for the medical clinic |  |
| | Have dental team decide who will carry out various aspects of each visit type (e.g. new exam vs. recall) | Ensure all staff are utilized to the full extent of licensure  
Consider using EDDA’s |  |
| | Cross train staff to expand service capacity | Monitor for competency and retrain/recertify periodically  
Get feedback from staff about new roles and responsibilities  
Don’t rely solely on dentist/medical provider to accomplish patient education; SM goal follow up, etc. |  |
| | Use standing orders for referrals and routine care processes | Educate staff about standing orders and their use |  |
| Fast track young children and pregnant women for exams and treatment | Allocate blocks of time in schedule | Consider an “open access” policy for children 0-5 and pregnant women to be seen anytime they present |  |
| | Utilize hygiene openings | Hygiene overflow chair  
Place POF patients on a short call list |  |
| | Have medical staff schedule dental visit at time of medical visit | If using EHR, develop template for medical to schedule directly into dental clinic  
Computer access in exam rooms to facilitate direct scheduling |  |
| | Run reports from registry to identify patients in need of new exams or treatment | Test having a staff member call these patients to encourage them to schedule |  |
| Employ a dental assistant-run chair for exams, sealants and prophies to increase access for pregnant women and young children | Open schedule for one chair run by a DA | ▪ Designate a specific area of the clinic and make it a “happy place”
▪ Assign one DA to chair for continuity |
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<tr>
<td>Ensure proper training for DA about treatment and use of tools (CAMBRA, self-management goals)</td>
<td>CAMBRA ECC Risk Assessment.doc Anticipatory Guidance.doc</td>
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</tbody>
</table>
| Use redesign concepts to increase access and service capacity | Identify waste in the practice:
▪ waits
▪ staff down time
▪ steps in the patient visit that are not needed or where the flow of the visit slows or stops completely | Monitor simple metrics:
▪ time to 3rd next available appointment
▪ patient visit cycle time
▪ no show rate
▪ provider productivity
▪ unplanned interruptions of DDS |
<p>| Assess your business case as you improve the system of care | Monitor data on improved access, RVU’s and cost per visit | Redesign ExercisesTools.ppt Cycle Time Tool.doc Cycle Time Tool_Spanish.doc Oral Health DSD Indicators.doc |</p>
<table>
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<tr>
<th>Self Management Change Concepts</th>
<th>Steps</th>
<th>Tips</th>
<th>Tools</th>
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</table>
| Utilize effective SM techniques and tools | Provide education to increase patient understanding of the importance of oral health | ▪ Visit websites to find educational materials that can be used as is or adapted for the needs of your patient population | PrenatalBrochure_HP.pdf
Websites for Patient Education Materials:
http://colgateprofessional.com
http://dentalcare.com
http://www.ada.org
www.nidcr.nih.gov/HealthInformation/SpecialCareResources
www.aapd.org |
| Find existing tools and adapt to your specific population’s needs (languages; literacy level, culture) | ▪ Make forms in different colors and duplicates
▪ Use the Anticipatory Guidance Tool or Caries Risk Assessment as an aid in developing a SM goal form | www.colgateprofessional.com
www.nnoha.org
CAMBRA ECC Risk Assessment.doc
Anticipatory Guidance.doc |
| Develop standard mechanism to record SM goals set | ▪ (EHR) Establish dummy code for SM goal setting | HP Perinatal SMGS.doc
HP ECC SMGS.doc
CHP SM Sheet_Child.pdf
CHP SM Sheet_Cargiver.pdf |
| Train care team members on how to help patients with self-management goals | Provide interactive class/inservice on SM principles (include role playing and discussion) | ▪ Conduct pre test to assess baseline knowledge, staff perception of value, and retention of information
▪ Watch an expert conduct a SM interview
▪ Be ready with literature/evidence re: value of SM activities
▪ Explore training in motivational interviewing to enhance staff’s ability to engage patients in SM goal setting | www.miinstitute.com
www.improvingchroniccare.org
SM Bibliography.doc |
<p>| Conduct “refreshers” regularly | Ensure that education and use of tools is consistent among staff and across departments | Give timely and regular |
| Establish a system to follow up on progress toward goals – make a staff member accountable | Review with patients at each visit | - Share goal(s) with patient’s PCP and vice-versa |
| Address barriers and revise goal if needed | Self-management goals should: |
| - be reasonable |
| - describe what, where, when, how, how much |
| - be a goal that the patient has a high level of confidence in achieving |
| - something the patient WANTS to do |
| - have a follow up plan |</p>
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<tr>
<th>Organization of Healthcare Change Concepts</th>
<th>Steps</th>
<th>Tips</th>
<th>Tools</th>
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</table>
| Make an organizational commitment to see and treat pregnant women and young children | Ensure support of senior leadership and BOD in decision | ▪ Embed in organizational QA/QI review  
▪ Engage senior leadership in setting goals for oral health  
▪ Provide regular updates on progress and barriers | CHP Dental Balanced Scorecard.xls |
| Have leadership assign a leadership “sponsor” to the improvement team | Sponsor should:  
▪ communicate the aim of the work  
▪ facilitate dental/medical integration of effort  
▪ communicate with other leaders/departments to remove barriers | Leadership White Paper2005.pdf |
| Educate existing staff about importance of oral health and the care processes involved in treating pregnant women and young children and include this education in new staff orientation | Have an organization-wide “Kick Off” meeting  
▪ Include outreach workers in education  
▪ Have a visible leadership presence  
▪ Back up education with literature re: the importance of oral health | NYSDOH Perinatal Guidelines.doc  
CAMBRA ECC Risk Assessment.doc  
Anticipatory Guidance.doc  
"First 5" web-based training for dental providers: [http://www.first5oralhealth.org](http://www.first5oralhealth.org)  
Improving Women and Children’s Oral Health: [http://www.idph.state.il.us/HealthWellness/oralhlth/](http://www.idph.state.il.us/HealthWellness/oralhlth/) |
| Work with leadership to designate time and resources for the work | Ensure dedicated, protected team meeting time  
▪ Ensure support for data entry and report generation  
▪ Allocate time to run PDSA’s with subsequent immediate review of completed tests | |
| Use operational and fiscal measures to assess impact on organization’s:  
▪ RVU’s  
▪ medicaid reimbursement  
▪ productivity  
▪ cost per visit  
▪ access | |
<p>| Give regular feedback to staff and BOD about performance/progress | Use all staff and BOD meetings as an opportunity to provide updates | |</p>
<table>
<thead>
<tr>
<th>Create a strong improvement team with provider champions from both medical and dental</th>
<th>Create a multidisciplinary team with representation from clinical, operations, finance and IT</th>
<th>Understand that it is the support staff that will help the providers to engage in new behaviors!</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify “star” performers in organization and recruit as team members</td>
<td>Look for interested, motivated staff</td>
<td></td>
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<tr>
<td></td>
<td>Recruit for attitude and train for skill</td>
<td>Identify which providers are more willing to learn to treat very young children pregnant women</td>
</tr>
<tr>
<td></td>
<td>Elicit and address staff concerns (time to do work, access for patients referred from medical, how handle current demand for dental care while providing new access for POF)</td>
<td></td>
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<tr>
<td>Anticipate and prepare for turnover</td>
<td>Begin “succession” planning early</td>
<td></td>
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<tr>
<td></td>
<td>Identify likely “back up” team members and invite them to attend team meetings periodically</td>
<td></td>
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<tr>
<td></td>
<td>Develop orientation materials with tools and a description of staff roles and tasks</td>
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</tr>
<tr>
<td><strong>Community Change Concepts</strong></td>
<td><strong>Steps</strong></td>
<td><strong>Tips</strong></td>
</tr>
<tr>
<td>------------------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Increase access and outreach by partnering with community organizations that provide services to pregnant women, mothers and children</td>
<td>Contact Head Start/Early Head Start programs and schools to offer education and screenings</td>
<td>▪ Hygienist can perform initial exam and schedule at dental clinic for treatment (categorize by: immediate need, need, not urgent)</td>
</tr>
<tr>
<td></td>
<td>Link with county and state health departments to identify opportunities to provide screenings and education</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Use contacts in local agencies to identify and expand to programs in other counties served by dental clinic that may provide support services to pregnant women and young children</td>
<td></td>
</tr>
</tbody>
</table>
| Raise community awareness of importance of oral health for pregnant women and young children through education | Find WIC and Head Start programs in your area and ask for opportunity to collaborate and provide education | ▪ Ask about literacy and cultural characteristics of audience and use appropriate materials  
▪ Standardize the educational materials and verbal information that will be shared with the community | CAMBRA ECC Risk Assessment.doc  
Anticipatory Guidance.doc  
"First 5" web-based training for dental providers: http://www.first5oralhealth.org  
Improving Women and Children’s Oral Health: http://www.idph.state.il.us/HealthWellness/oralhlth/ |
|                                                                                                                                               | Provide Public Service Announcements via local radio and television stations | ▪ Include outreach workers in education  
▪ Identify which providers are more willing to learn to treat very young children pregnant women |                                                                                              |
|                                                                                                                                               | Identify other community dental providers who are willing to learn to treat very young children pregnant women |                                                                                                                                             |                                                                                              |
|                                                                                                                                               | Train/include non-dental outreach workers in education |                                                                                                                                             |                                                                                              |
| Partner with community OB providers (If a clinic without perinatal/OB services)                                                                 | Meet with community providers to explain oral health effort | ▪ Plan to revisit offices to reinforce the process multiple times (over |                                                                                              |
| dental clinic | lunches, at staff meetings, etc.)  
|             | - Designate a key staff person at each office to handle the referrals  
|             | - Make the referral process EASY!  
| Provide flyers, poster or other patient educational materials to place in offices |  
| Direct outreach to pregnant women (If a clinic without perinatal/OB services) | Free exams for pregnant women one day/month  
|             | - Advertise at Wal-Mart, WIC, social service agencies, restaurants, day care sites  
|             | - Solicit grants/donations to cover costs of outreach and treatment |
VIII. GLOSSARY OF TERMS AND CONCEPTS

Aim or Aim statement
A written, measurable, and time sensitive statement of the accomplishments a team expects to make from its improvement efforts. The aim statement contains a general description of the work, the population of focus, and the numerical goals.

Annotated Run Chart
A line chart showing results of improvement efforts plotted over time. The changes made are also noted on the line chart at the time they occur. This allows the viewer to connect changes made with specific results.

Care Model
A model that represents the ideal system of healthcare for people with chronic disease and an approach to redesigning healthcare to mirror that ideal system. The model has six components: community resources and policies, organization of healthcare, self-management support, decision support, delivery system design, and clinical information systems.

Champion
An individual in the organization who believes strongly in quality improvement and is willing to work with others to test, implement, and spread changes. Teams need at least one clinical champion. Champions in other disciplines who work on the process are important as well. This champion should have a good working relationship with colleagues and with the day-to-day leader(s) described below, and be interested in driving change in the system.

Change Concept
A general idea for changing a process, usually developed by an expert panel based on literature and practical application of evidence. Change concepts are usually at a high level of abstraction, but evoke multiple specific ideas for how to change processes. “Simplify,” “reduce handoffs,” “consider all parties as part of the same system,” are all examples of change concepts.

Change Idea
An actionable, specific idea for changing a process. Change ideas can be tested to determine whether they result in improvements in the local environment. An example of a change idea is, “Simplify process for data entry by having front desk staff enter visit information daily from a duplicate copy while the original is filed in the chart.”

Change Package
A collection of change concepts and key changes.

Clinical Information System
A Clinical Information System (CIS) incorporates the development of a comprehensive, integrated information system that is “patient-centered,” includes patient registries, a practice management system including billing system, an electronic health record, personal health records.

**Collaborative**
A systematic approach to healthcare quality improvement in which organizations and providers test and measure practice innovations, then share their experiences in an effort to accelerate learning and widespread implementation of best practices. “Everyone teaches, everyone learns.”

**Collaborative Team**
All individuals from the participating organizations that drive and participate in the improvement process. A core team of three to four individuals attends the learning sessions, but a larger team, often from various disciplines, participates in the improvement process in the organization.

**Core Team Members**
The members are those individuals who drive the improvement effort and are accountable to the senior leadership.

**Cycle**
See “PDSA cycle”

**Data Collection Plan**
A specific description of the data to be collected, the interval of data collection, and the subjects from whom the data will be collected.

**Day-to-Day Leader or Key Contact**
This person manages the team, arranges meetings, assures tests are being completed, and data are collected. The day-to-day leader will be the critical driving component of the team, assuring that tests of change are implemented and overseeing data collection. It is important that this person understand not only the details of the system, but also the various effects of making change(s) in the system. This individual also needs to be able to work effectively with the physician champion(s). The day-to-day is also the “key contact.” This individual should be responsible for coordinating communications between the team, senior leadership, and staff. Usually requires 0.25 FTEs or more to complete this role.

**Getting Started Phase**
The time when organizations and teams prepare for their improvement work. Activities include forming a team, scheduling initial meetings, preparing an aim statement, defining a population of focus, selecting measures, and beginning to populate a registry.

**Implementation**
Taking a change and making it a permanent part of the system. A change may be tested first and then implemented throughout the organization.
IS
Refers to the information system of an organization, usually the computerized information system.

Key Changes
The list of essential process changes that will help lead to breakthrough improvement. Key changes are more focused and detailed than change concepts, but they are not specific to the local environment like change ideas. An example of a key change is, “Enter data into registry regularly.”

Key Contact
The individual on the organization team who takes responsibility for communication between the team leadership and staff, including reporting monthly and disseminating information to team members.

Measure
A focused, reportable unit that will help a team monitor its progress toward achieving its aim. The Collaborative Pilot used a list of required key measures for each condition, as well as a list of additional key measures that have been found to be helpful to the team in achieving excellent results.

Model for Improvement
An approach to process improvement, developed by Associates in Process Improvement, which helps teams accelerate the adoption of proven and effective changes. The model includes use of “rapid-cycle improvement,” successive cycles of planning, doing, studying, and acting (PDSA cycles).

Monthly Report
The standard reporting format which includes the aim statement, measures being used, a data collection plan, a listing of the changes made, and the results displayed graphically on annotated run charts. Reports should be shared with leadership and staff.

PDSA Cycle
Another name for a cycle (structured trial) of a change, which includes four phases: Plan, Do, Study, and Act. The PDSA cycle will naturally lead to the “plan” component of a subsequent cycle.

Pilot Site
The clinic location for focused changes. After implementation and refinement, the process will be spread to additional locations.

Population of Focus (POF)
A designated set of patients who will be tracked to determine whether changes have resulted in improvements. Ideal size for most chronic disease improvement efforts is between 150-300 patients (this is a dynamic number and will fluctuate slightly from
month to month). It is this sub-population that will then be the initial focus of the change in practice.

**Registry**
A list or database set of records that contain individual patient information. The registry should provide the following: clinically useful and timely information, reminders and feedback for providers and patients, identify relevant patient subgroups and support proactive care, and facilitate individual patient care planning. “Registry size” refers to the count of patients represented in the list.

**Run Chart**
See “annotated run chart.”

**Senior Leader**
The executive in the organization who supports the team and controls all the resources employed in the processes to be changed. The Senior Leader works to connect the team’s aim to the organization’s mission, provides resources for the team, and promotes the spread of work of the team to other sites, providers, and conditions.

**Spread**
The intentional and methodical expansion of the number and type of people, units, or organizations using the improvements. The theory and application comes from the literature on the concept of Diffusion of Innovation.

**System Leader**
The core team member who has direct authority to allocate the time and resources to achieve the team’s aim, has direct authority over the particular systems affected by the change, and will champion the spread of successful changes throughout the department or service area.

**Team**
The group of individuals, usually from multiple disciplines, that drive and participate in the improvement process. A core team of three to four individuals are the primary drivers of the work, but a larger team of six to eight people participates in the improvement process in the organization.

**Technical Expert**
The team member in the organization who has a strong understanding of the process to be improved and changes to be made. A technical expert may also provide expertise in process improvement, data collection and analysis, and team function.

**Test**
A small-scale trial of a new approach or a new process. A test is designed to learn if the change results in improvement, and to fine-tune the change to fit the organization and patients. Tests are carried out using one or more PDSA cycles.
IX. RESOURCE SECTION

The resource section includes information on the following items:

- Online Training
- Leadership for Improvement
  - Senior Leadership Roles
  - Senior Leadership Responsibilities
  - Team Dynamics
  - Getting the Most From Your Team
- Organizing the Team
  - The First Team Meeting and Ground Rules
  - General Meeting Rules
  - Effective Discussion Skills for Team Members
  - Project Notebook
- PDSA Worksheet

ONLINE TRAINING

Training for the Health Disparities Collaboratives is now available online! The Texas Association of Community Health Centers and the Health Resources and Services Administration have teamed up to bring learning online with the Health Disparities Collaboratives Distance Learning Courses. The courses can be used by individual team members to become oriented to the Care Model, to learn how to apply the model to targeted health conditions, as a training tool and resource.

Point your browser (Microsoft Internet Explorer version 6.0 or higher) to http://classroom.tachc.org/, click on "Request an account" and fill in the requested information. After clicking "Request Account" you should receive via email your login information in 24-48 hours. When you receive the information, enter your username and password into the prompt at the above address. Click "Log In" and you will be presented with a list of the six courses that are currently available.

It is suggested that your online studies begin with the course titled "Overview". This brief course provides navigation instructions, minimum system requirements and other helpful information. New team members will likely want to follow this up with the "Chronic Care" course as this course provides a great foundation for the Asthma, Depression and Diabetes courses.

LEADERSHIP FOR IMPROVEMENT

The task of the leader is to create a vision that tells people where the team is going and how it will get there. The purpose is to convey the “Big Picture” and to create excitement about working together to achieve an objective. Senior leaders are the ones who best understand that picture of the organization. Their primary responsibility is to lead the organization toward high performance goals. A team well chosen, with senior leadership assistance, can significantly improve the quality and cost of care an organization delivers. As the senior leader of a Collaborative team
there are roles and responsibilities that the senior leader must embrace to help your team achieve success:

SENIOR LEADERSHIP ROLES

Serve as sponsor for the improvement team
The word sponsorship is synonymous with the words backing, support, resources, and protection. Just as any professional ball team requires these from senior management your team will require these from you. When they meet obstacles that impede their progress, they will need you to remove them.

Select a team
Using the team selection information you should be able to select a high performing team.

Serve as champion for spread of positive changes
Your team will generate positive results on a small population of patients. A major role of senior leadership is to guide the spread of these changes through the whole organization. This includes engaging the board and its support, planning for spread, and removing obstacles to change in the organization.

Make improvement a priority
Set the tone for the team and the organization that improvement is important and tie it to the strategic plan of the organization. Provide the team with time to meet. Convey the message that improvement is part of their regular job – not an “add on”.

Monitor the progress of the TEAM
Teams often have a hard time coalescing and sometimes get off track. They can also lose perspective in terms of being sensitive to time and progress. A key role of leadership is to monitor team progress. Check-in with the team leader regularly. Where possible, attend one meeting per month. Expect the team to provide a written report with graphs. Reports are generated monthly and should be complete and on time. The same report should be submitted to the Senior Leader and the Senior Leader should integrate the work into the organization’s quality program and share the work with the Board as part of the quality program

SENIOR LEADERSHIP RESPONSIBILITIES

Responsibilities in the Getting Started phase:

- Communicate to staff how the improvement work reinforces health center strategic goals
- Identify the core team
- Select or facilitate the selection of the team leader
- Determine and acquire needed resources
- Provide feedback to the team during the Getting Started phase to:
✓ Prepare aim statement (must align with the organizational strategic plan)
✓ Identify the population of focus
✓ Prepare for data collection on the key measures

Responsibilities during the project:
- Meets regularly with the core team
- Reads monthly report and provides feedback to the team.
- Develops and improves systems that allow team members to bring about change. This includes opening communication lines between the team and the rest of the organization.
- As necessary, run interference for the core team, representing its interests to the rest of the organization.
- Ensures that changes made by the team are followed up and sustained.
- Implements changes that the team does not have the authority to make.

TEAM DYNAMICS
All teams, as part of their development, go through different stages as they develop into a high performing team. It is helpful to recognize these stages and not let them deter from the improvement work. **Source: The One-Minute Manager Builds High Performance Teams**

Stage 1 Orientation
- Eager with high expectations
- Anxiety about fit and expectations
- Testing situation and central figures
- Depending on authority and hierarchy
- Needing to find a place and establish oneself

Stage 2 Dissatisfaction
- Discrepancy between hopes and reality
- Dissatisfied with dependency on authority
- Angry about goals, tasks and action plans
- Feeling incompetent and confused
- Negative towards leaders and teams
- Competing for power and/or attention
- Experiencing dependence/counter-dependence

Stage 3 Resolution
- Decreasing dissatisfaction
- Resolving discrepancies between expectations and reality
- Resolving animosities and polarities
- Developing harmony, trust, support and respect
- Developing self-esteem and confidence
- Being more open and giving more feedback
- Sharing responsibility and control
- Using team language

**Stage 4 Production**
- Excited about participation
- Work collaboratively and inter-dependently
- Feeling team strength
- Showing high confidence in accomplishing tasks
- Sharing leadership
- Feeling positive about task successes
- Performing at high levels

**Teams are not static**
- Teams can get stuck
- Teams can regress
- Teams can skip stages
- Large teams = more complex relationships and communications – more subgroups
- Team members must move from individual rewards/behavior to team behavior/rewards

**GETTING THE MOST FROM YOUR TEAM**
Leaders have a lot to consider in developing the appropriate environment for improvement. A model for such an infrastructure would contain the following key activities:

- Strategic Planning – establish and communicate the purpose of the organization, conduct planning for improvement and integrate it into the business plan
- Develop a cooperative, connected network - view the organization as a system
- Build capacity for improvement – design and manage a system for gathering information for improvement and sustaining the changes
- Executive Sponsorship – charter and coach individual and team improvement activities
- Technical support-advice from the experts outside the team
- Knowledge Management- developing a system to synthesize, integrated and spread knowledge so everyone in the organization is on the same page

**STRATEGIC PLANNING**
Change requires direction. The leader is responsible for helping to align the work of the team with the key business of the organization. If the work of the team is not linked to the overall strategy, then the work becomes simply a time-limited project. Constancy of purpose requires that every individual in the organization understands the purpose of the organization and how their role helps accomplish that purpose. Linking the work of the team to the strategic vision will help your organization maintain a long-term focus on improving clinical quality. Organizational leadership can support constancy of purpose by doing the following:
Communicating the purpose (mission or vision statement) throughout the organization and how the team’s work helps accomplish the purpose
Incorporating improvement activities into the strategic plan and business plan
Using the mission or vision statement to provide a broad aim for every improvement effort, so as the team develops their AIM statement there should be something in the mission or vision statement that it is connected to
Allocating resources for the team to accomplish the improvements, such as time to meet on a regular basis, a computer with internet access in the clinical area, equipment, or technical assistance from other members of the organization
Balancing short-term needs with long-term improvements, the business plan must include improvement work or the work will never get done
Providing opportunities for everyone in the organization to become involved with the improvement as the team tests and defines the system of care; get everyone involved in the spread of improvement
If the improvement work of the team is not related to the organization’s vision, strategic plan, business plan and performance improvement plan it cannot be sustained.

COOPERATIVE, CONNECTED NETWORK
Whatever it is called in your organization – QA, QI, CQI, PI, TQM – improvement efforts must be continuous, coordinated and focused on the organization’s purpose. The work of the team will be to raise important issues within the organization and to develop and implement changes related to these issues. In order for lasting change to occur the organization must view itself as a system and operate as a system. The interdependent group of departments (dental, medical, mental health, lab, pharmacy, front office, medical records, and nursing to name a few) constitutes the organization. Viewing the organization as a system or connected network requires relating each of these groups back to the common purpose and how the team relates to that purpose. Changes in one area may have impact on another, and as the team tests the changes, they will need cooperation and objective feedback from individuals in these other departments. The team will have a set of measures, related to their improvement focus, that provide indicators of present performance and predictors of how the system will perform in the future. These measures, as well as tests around components of the Care Model are documented in a monthly report. Integrating the report into the organization’s Improvement Committee (whatever it is called) provides the opportunity for everyone to understand the team’s work and provide assistance as needed. This also increases the view that improvement is everyone’s responsibility – not just the team’s. The leader’s role is to make this happen.

BUILDING CAPACITY FOR IMPROVEMENT
Occasionally improvement occurs and nobody knows why, then it disappears and nobody knows why. Sustained improvement is accomplished by premeditated planning and testing and by deliberate action to integrate the change into the system. An improvement team may find all the needed improvements, but if the changes are not integrated into the system they won’t produce long-term results. The investment of organizational resources to the team demands that the results are sustainable and duplicable. Teams in organizations just like yours have taken these skills, tools and models, trained other staff
and have made significant improvement in outcomes in a variety of content areas, such as diabetes, asthma, depression, HIV/AIDS and cardiovascular disease. In other words, the skills and models they will learn are applicable to all improvement efforts and need to be incorporated into the performance improvement plan of the organization and everyone needs to learn how to use them. Actions the leader can take to build capacity for improvement:

- Publicize the work of the team – post the monthly reports in the staff break room or bathrooms, include information about the team’s efforts in newsletters
- Involve and train other staff – the core team has a responsibility to train others in the skills and tools of improvement
- Support the team – if the senior leader clearly acknowledges the importance of the work of the team it becomes an organizational priority
- Integrate the models into the performance improvement plan – the models must become a way of organizational improvement life; improvement work cannot be a stand alone if it is to be sustained
- Reporting the team’s progress to the Board provides oversight required for accreditation and external reviews, it also may provide community opportunities the team may be unaware of
- Plan for how you intend to spread the work of your team throughout the whole organization

**TECHNICAL SUPPORT**
The team will need ad hoc members to provide technical expertise that is needed to test improvements. They will also need assistance around computer and software since many clinicians are not ‘computer comfortable’. These are some of the barriers that the executive sponsor will need to address.

**KNOWLEDGE MANAGEMENT**
Improvement efforts provide a wealth of knowledge in lessons learned, failed tests and successful tests. Testing on a small scale creates a low risk environment for learning. This knowledge will be shared in the monthly report and are important for the organization. Important processes to be developed as part of knowledge management:

- Publicize the team’s work for all staff
- Develop an Improvement Notebook that includes the reports, tests and work plans of the team – this historical data will be invaluable to the current team and future teams as well as a means of presenting the improvement work to external reviewers
- Create a process for training other staff in preparation for developing new teams in other parts of the organization as part of spread
- Integrate the models as part of new staff/ provider orientation
- As improvements are made, make sure the “old” way of doing things is not an alternative
ORGANIZING THE TEAM

THE FIRST TEAM MEETING
Establishing the Ground Rules: Ground rules are the rules a team makes to ‘govern’ themselves and their behavior as team members. **THIS IS AN IMPORTANT STEP – DON’T SKIP IT!**

Basic Ground Rules To Be Addressed:

- **Attendance:** a high priority is set on attendance. Discuss what are legitimate reasons for missing a meeting and establish a procedure for informing the team leader of the member’s absence.
- **Promptness:** meetings start and end on time. Everyone is on time for meeting, but no waiting for anyone.
- **Meeting time and place:** specify a regular meeting time and place, establish a procedure for notifying members of the meetings.
- **Participation:** every team member’s contributions are important; establish the importance of speaking freely and listening attentively.
- **Basic conversational courtesies:** listen attentively and respectfully to others, don’t interrupt one conversation at a time; the team leader holds the right to halt members who do not adhere to the rules.
- **Assignments:** since much of the team’s work is done between meetings, members must be accountable for completing their assignments on time and report back to the team.
- **Interruptions:** determine when interruptions will be tolerated and when they won’t (see “100 Mile Rule” under General Meeting Rules).
- **Rotation of chores:** determine a rotation of routine housekeeping chores for all team members, so no one feels overwhelmed or stuck.
- **Agendas, minutes, & records:** although the team leader is ultimately responsible for these activities—others may be assigned the tasks, decide how these will be handled in your team.
- **Other ground rules:** add any others that the team may feel are appropriate.

Note: Team members who show a pattern of breaking the rules of the group may need to be replaced. The intensity, amount of work and timeframe of the Collaborative require ALL members to carry their weight AND be committed to the work of the team.

Set the Meeting Schedule
In order to accomplish the improvement work, the team will need a time and place set aside to meet on a regularly SCHEDULED basis. It is vital that a regular meeting schedule be developed. Haphazard meeting times or hallway meetings will not produce a highly effective team. Initially, the team will need to meet more frequently, but as the work progresses the meetings will be less frequent.

General Meeting Rules
Consider these as you set your ground rules:

- Use and stick to agendas.
- Start and end on time.
- Have a facilitator (team leader’s role) to keep things on track.
- Take minutes.
- Draft next agenda at the end of meeting.
- Evaluate the meeting — obtain feedback at the meeting, were objectives met. Did the meeting move you closer to your aims? Did you plan or study a test cycle?
- Adhere to the 100-MILE RULE - no one should be called from the meeting unless the interruption is so important that it would still occur if the meetings were 100 miles away.

**Effective Discussion Skills for Team Members**
- Ask for clarification - keep it simple and clear.
- Act as gatekeepers - no one dominates the discussion, expect equal participation among members.
- Listen - actively explore other’s ideas rather than debating or defending each idea.
- Summarize - compile what has been said, restate it to the group with a question to check for agreement.
- Contain digression - disallow lengthy examples or irrelevant discussions.
- Manage time - stay on time with the agenda, if items go over recognize that others will be cut short.
- End the discussion - learn to tell when nothing further can be gained and end it.
- Test for consensus - state decisions made and check that team agrees.
- Constantly evaluate the meeting process - ask yourselves:
  1. Are we getting what we want from the discussion? If not, what can we do differently in the remaining time?
  2. Are we on track?
  3. Are we being effective?

**Project Notebook**
This is **not** a requirement of the Collaborative, but it will assist you if you plan to present this as a clinical improvement project for an accreditation body.

Set up a notebook with these tabs:
- Team meetings: agenda for each meeting concurrently dated and signed minutes for each meeting.
- Project Aim
- Situation Analysis: demographics about the impact on your patient population of the particular aspects of health you are trying to improve.
- Data Collection & Analysis: File a copy of your monthly reports behind this tab. Include narrative, registry summary reports, and graphs.
- Action plans: plans developed by the team that provide a roadmap of the improvement effort.

*Note: All information must be integrated into your QI Program if you are seeking accreditation.*
# PDSA Worksheet

Health Center: ____________________________

Date: ____________________________ Initiated by: ____________________________ Cycle # ________

CARE MODEL COMPONENT:  OrgHC  Comm  DelSysD  DecSupp  SelMgt  CIS

Purpose of this cycle:

## PLAN the change, prediction(s) and data collection

### THE CHANGE:
- **What are we testing?**
- **On whom are we testing the change?**
- **When are we testing?**
- **Where are we testing?**

### PREDICTION(s):
- **What do we expect to happen?**

### DATA:
- **What data do we need to collect?**
- **Who will collect the data?**
- **When will the data be collected?**
- **Where will data be collected?**

### DO: Carry out the change/test, collect data, and begin analysis
- **What was actually tested?**
- **What happened?**
- **Observations:**
- **Problems:**

### STUDY: Complete analysis of data. Summarize what was learned and compare to prediction (Use back of form to elaborate).

### ACT
- **What adjustments to the change or method of test should we make before the next cycle?**
- **Are we ready to implement the change we tested?**
- **What will the next test cycle be? (use back of form to elaborate)**
References


4. Agency for Healthcare Research Quality and Research. Evidence Report/Technology Assessment No. 36, Diagnosis and Management of Dental Caries. Publication No. 01-E056


Additional References & Tools
Reference 1:
Pedo Caries Risk Assessment
Charges: □ Comp exam □ Periodic exam □ Prophy □ Fluoride □ 2-BW: standard digital  □ Other Charges: _____________________
Pt. Age/Sex: ____________________ □ No teeth present
Reviewed: □ Medical History □ Medications □ Allergies

Problem/Complaint: Signs/Symptoms

Procedure(s) Performed: □ Fluoride: Na Varnish Neutral gel APF gel
□ Homecare instruction: brush floss
Other ________________________________

Anticipatory Guidance Counseling
□ Brush □ Floss □ Bottle/sippy cup use □ Caries are communicable
□ Snacking frequency □ Healthy foods □ Injury prevention
□ Fluoride: systemic source ____________________ □ Other______________________

Self Management Goal:

Caries Risk Assessment (ages 0-5 years)
Y  N  Mother or primary caregiver has obvious dental caries or states that they have caries
Y  N  Child sleeps with a bottle, nurses on demand, or uses sippy cup on demand
Y  N  Bottle/sippy cup contains fluids other than milk or water
Y  N  Obvious white spots, decalcifications, or obvious decay are present on the child’s teeth
Y  N  Recent dental restorations completed (less than two years)
Y  N  Child’s gums bleed easily and/or plaque is obvious on the teeth
Y  N  Frequent (greater than three times) between meal snacks of sugars/cooked starch
ANY OF THE ABOVE = VERY HIGH RISK FOR CARIES

PROTOCOL: 3 fluoride application in one month, then 6 month reassessment

_____ Month Recare visit     Date __________  Behavior: F1 F2 F3 F4

Next visit:  - ............ +

Charges: □ Comp exam □ Periodic exam □ Prophy □ Fluoride □ 2-BW: standard digital  □ Other Charges: _____________________
Pt. Age/Sex: ____________________ □ No teeth present
Reviewed: □ Medical History □ Medications □ Allergies

Problem/Complaint: Signs/Symptoms

Procedure(s) Performed: □ Fluoride: Na Varnish Neutral gel APF gel
□ Homecare instruction: brush floss
Other ________________________________

Anticipatory Guidance Counseling
□ Brush □ Floss □ Bottle/sippy cup use □ Caries are communicable
□ Snacking frequency □ Healthy foods □ Injury prevention
□ Fluoride: systemic source ____________________ □ Other______________________

Self Management Goal:

Caries Risk Assessment (ages 0-5 years)
Y  N  Mother or primary caregiver has obvious dental caries or states that they have caries
Y  N  Child sleeps with a bottle, nurses on demand, or uses sippy cup on demand
Y  N  Bottle/sippy cup contains fluids other than milk or water
Y  N  Obvious white spots, decalcifications, or obvious decay are present on the child’s teeth
Y  N  Recent dental restorations completed (less than two years)
Y  N  Child’s gums bleed easily and/or plaque is obvious on the teeth
Y  N  Frequent (greater than three times) between meal snacks of sugars/cooked starch
ANY OF THE ABOVE = VERY HIGH RISK FOR CARIES

PROTOCOL: 3 fluoride application in one month, then 6 month reassessment

_____ Month Recare visit     Date __________  Behavior: F1 F2 F3 F4

Next visit:  - ............ +
Reference 2:

CAMBRA Risk Assessment
CARIES RISK ASSESSMENT FORM FOR AGE 0 TO 5 YEARS

Patient Name:_______________________________ I.D. # ________ Age ____ Date ______________

<table>
<thead>
<tr>
<th>Initial/baseline exam date</th>
<th>Recall/POE date</th>
</tr>
</thead>
</table>

Respond to each question in sections 1, 2, and 3 with a check mark in the yes or no column

<table>
<thead>
<tr>
<th>1. Caries Risk Indicators - Parent Interview**</th>
<th>Yes</th>
<th>No</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Mother or primary caregiver has had active dental decay in the past 12 months</td>
<td></td>
<td></td>
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<tr>
<td>(b) Child has recent dental restorations (see 3b below)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(c) Continual bottle use - contains fluids other than water</td>
<td></td>
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<td></td>
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<tr>
<td>(d) Child sleeps with a bottle, or nurses on demand</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>(e) Frequent (greater than three times daily) between-meal snacks of sugars/cooked starch/sugared beverages</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>(f) Saliva-reducing factors are present, including:</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>1. medications (e.g., some for asthma or hyperactivity)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2. medical (cancer treatment) or genetic factors</td>
<td></td>
<td></td>
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<tr>
<td>(g) Child has developmental problems, Past Med Hx</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>(h) Parent and/or caregiver has low SES (Socio-economic status) and/or low health literacy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) No dental home/episodic dental care</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>2. Protective Factors/Indicators – Parent Interview</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Child lives in a fluoridated community or takes fluoride supplements by slowly dissolving or as chewable tablets</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) Teeth cleaned with fluoridated toothpaste (pea size) daily</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(c) Mother/caregiver has caries activity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(d) Mother/caregiver chews/sucks xylitol chewing gum/lozenges 2-4 X daily or dissolving xylitol tablets</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(e) Child has a dental home and regular dental care</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3. Caries Risk Indicators - Clinical Examination of Child**</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Obvious white spots, decalcifications, or obvious decay present on the child’s teeth</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>(b) Restorations placed in the last 2 years</td>
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<td></td>
<td></td>
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<tr>
<td>(c) Plaque is obvious on the teeth and/or gums bleed easily</td>
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<td></td>
<td></td>
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<tr>
<td>(d) Dental or orthodontic appliances present, fixed or removable: e.g., braces, space maintainers, obturators</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>(e) Visually inadequate saliva flow - dry mouth</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**If yes to any one of 1(a), 1(b), 3(a) or 3(b) or any two of 1(c)-1(i), or 3(c)-3(e), consider performing bacterial culture on mother or caregiver and child. Use this as a baseline to follow results of antibacterial intervention.

<table>
<thead>
<tr>
<th>(a) Mutans streptococci (Indicate bacterial level: High, Medium, Low)</th>
<th>Parent/Caregiver Date:</th>
<th>Child Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>(b) Lactobacillus species (Indicate bacterial level: High, Medium, Low)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Child’s overall caries risk status: (CIRCLE)**

<table>
<thead>
<tr>
<th>High</th>
<th>Moderate</th>
<th>Low</th>
</tr>
</thead>
</table>

Recommendations given: yes______ comments ________________________________ no:

Date given:_______ or Date follow up:_______
Practitioner signature ______________________________ Date: ____________________
Instructions for Caries Risk Assessment Form – Children Ages 0 – 5 Years

1. **Answer the questions:** Respond to questions 1(a)–1(i), 2(a)–2(e) and 3(a)-3(e) with yes or no answers. You can make special notations such as the number of caries present, the severity of the lack of oral hygiene, the brand of fluorides used, the type of bottle contents used, the type of snacks eaten, or the names of medications/drugs that may be causing dry mouth.

2. **Determine the overall caries risk of the child:** Add up the yes answers to the high risk indicators from categories 1. and 3. Add up the number of yes answers for the protective factors/indicators, category 2. Make a judgment as to low, medium or high overall caries risk based on the balance between the pathological factors (caries risk indicators) and the protective factors. **Note:** Determining the caries risk for an individual child requires evaluating the number and severity of the risk indicators, not just the number. Certainly a child with caries presently or in the recent past is at high risk for future caries. A patient with low bacterial levels would need to have several other risk factors present to be considered at moderate risk. Some clinical judgment is needed while also considering the protective factors to determine the risk.

3. **Treatment Plan:** Treatment plan the case and decide what antibacterial therapy and fluoride treatments to use. High risk generally indicates that antibacterial therapy as well as additional fluoride therapy are both needed.

4. If the answer is yes to any one of 1(a), 1(b), 3(a) or 3(b) strongly consider using antibacterial therapy for mother/caregiver and the child.

5. Decide what restorative work is needed.

6. **Bacteria testing:** If the answer is yes to any one of 1(a), 1(b), 3(a) or 3(b), or any two of 1(c)-1(i), or 3(c)-3(e), consider performing bacterial cultures on mother or caregiver and child (see **notes in the form). See separate sheet for instructions how to perform these tests. Use these results as a baseline to follow the results of antibacterial intervention and whether to carry out antibacterial therapy for the mother/caregiver or child.

7. **Homecare recommendations:** Fill out the parent/care giver recommendation sheet based on your clinical observations and the responses to the questions and discuss strategies for caries control and management. Give one copy to the parent/caregiver and keep one in the patient’s chart. Give the parent/caregiver the sheet that explains how caries happens (on the back of the home care recommendation sheet).

8. Place the completed caries risk assessment form in the patient’s chart.

9. **Bacteria test results:** After the tests have incubated (72 hours, see separate instructions) inform the parent/care giver of the results of the bacteria tests. e.g. showing the parent the bacteria grown from their mouth (CRT test result) can be a good motivator so have the culture tube handy at the next visit (or schedule one for this purpose - the culture keeps satisfactorily for some weeks), or give/send them a picture, as a photograph or digital image. If the parent/care giver has high cariogenic bacterial counts then work with them and their own dentist to bring them to low caries risk and get their caries under control to eliminate this source of infection and re-infection for the child.

10. **Follow up:** After the parent/care giver/child has been following your recommendations for 3-6 months, have them back to re-assess how well they are doing. Ask them if they are following your instructions – how often. If the bacterial levels were moderate or high initially, repeat the bacterial culture to see if bacterial levels have been reduced by antibacterial therapy. Make changes in your recommendations or reinforce protocol if results are not as good as desired or the patient is not compliant.
**Bacterial testing:**

**Bacterial tests for cariogenic bacteria:** There are two test kits currently available in the USA for “chair-side” testing for cariogenic bacterial challenge. One is the Caries Risk Test (CRT) marketed by Vivadent/Ivoclar (Amherst, NY). The other is the “Dentocult SM” and “Dentocult LB” test, marketed by Edge Dental (www.edgedental.com). Both are is sufficiently sensitive to provide a level of low, medium or high cariogenic bacterial challenge separately for mutans streptococci (MS) and for lactobacilli species (LB). Each has selective media culture “sticks” that test MS and LB levels in saliva sampled from the patient. The CRT kit has a single “media stick” with selective media for MS on one side and LB on the other. The Dentocult slides come as two separate sticks. The results obtained from the test sticks from either supplier can also be used as a motivational tool for patient compliance with an antibacterial regimen. Other bacterial test kits will likely be available in the near future.

The following is the procedure for administering the currently available CRT test. Results are available after 72 hours. The kit comes with two-sided selective media sticks that assess mutans streptococci on the blue side and lactobacilli on the green side. A starter kit, which includes plastic beakers, incubator and kits of 6 tests is available (Ivoclar catalog #NA 6556001). Manufacturers instructions are provided with each kit of 6 “media sticks”. However, incubation for 72 hours rather than the recommended 48 hours, gives better results. The procedure can readily be done in a dental office or community clinic setting.

a) For mother/caregiver and for children old enough to spit (probably 4 or 5 years old), then a bacterial culture should be taken, as follows: The subject chews on the chewing gum (wax) provided in the kit for 3 minutes (accurately timed) and spits all mixed saliva into a measuring beaker. Measure the volume (in ml) and divide by 3 to give ml/minute stimulated saliva flow rate. Normal flow is greater than 1 ml/minute and low is less than 0.7 ml/minute.

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

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

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

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

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

**Bacteria testing for young children:** For children not old enough to spit (aged 3 years or less) the bacterial levels of the parent/caregiver should be used as a rough estimate of the child’s likely bacterial challenge. Children aged 0-3 years are difficult to culture reliably in the fashion described above. However a good approximate indication for the child can be obtained by using a cotton swab to sample the surfaces of all teeth and gums in the mouth, thoroughly dispersing the sample in about 1-2 ml of sterile saline in a test tube (Fisher Scientific), and dispersing it for 1 minute on a laboratory vortex (Fisher Scientific, catalog 12-813-52). The suspension is then coated on the CRT stick as described above for saliva samples, and incubated for 72 hours. This will give a good estimate of the MS and LB challenge in the young child (Fujino et al, 2004).
Intentionally left blank
**Parent/Caregiver Recommendations for Control of Dental Decay in Children 0-5 years**

**Daily Oral Hygiene/Fluoride Treatment** (These procedures reduce the bacteria in the mouth and provide a small amount of fluoride to guard against further tooth decay, as well as to repair early decayed areas)

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

___ selective daily flossing of areas with early caries (white patches)

___ other: __________________________________________

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

___ OK as is
___ limit bottle/nursing (to avoid prolonged contact of milk with teeth)
___ replace juice or sweet liquids in the bottle with water
___ limit snacking (particularly sweets)
___ replace high carbohydrate snacks with cheese and protein snacks
___ other ____________________________________________

**Xylitol** (Xylitol is a sweetener that the bacteria can not feed on. It limits the transfer of decay-causing bacteria from parent/caregiver to baby/toddler. Parents/caregivers with dental decay place their children at high risk. Parent/caregiver requires antibacterial treatment (see below). Using xylitol-containing chewing gum or mints/lozenges is a way that parents/caregivers of high risk children can use to reduce the transfer of decay-causing bacteria. This is most effective when used starting shortly after the child's birth.)

___ Parents of children 3 and under with high bacterial levels should use xylitol mints or xylitol gum 2–4 times daily

**Antibacterial rinse (parents/caregivers)**

___ Parents/caregivers of children 3 years and under with high bacterial levels should rinse with 10 ml of Chlorhexidine gluconate 0.12% (*Periogard, Peridex, Oral Rx* by prescription only). Rinse at bedtime for 1 minute 1X/day for one week. Repeat each month for one week until infection is controlled. Continue for 6 months, or until bacterial levels remain controlled.

Practitioner signature ________________________ Date: ___________________

Parent/caregiver signature ___________________________ Date: __________

CAMBRA forms: JDBF Update 2-25-05 6
**How Tooth Decay Happens**

Tooth decay is caused by certain types of bacteria (bugs) that live in your mouth. When they stick to the film on your teeth called dental plaque, they can do damage. The bacteria feed on what you eat, especially sugars (including fruit sugars) and cooked starch (bread, potatoes, rice, pasta, etc.). Within about 5 minutes after you eat, or drink, the bacteria begin making acids as they digest your food. Those acids can break into the outer surface of the tooth and melt away some of the minerals. Your spit can balance the acid attacks if they don’t happen very often. However if: 1) your mouth is dry, 2) you have a lot of these bacteria, or 3) you snack frequently; then acid causes loss of tooth minerals. This is the start of tooth decay and leads to cavities.

**Methods of Controlling Tooth Decay**

**Diet:** Reducing the number of sugary and starchy foods, snacks, or drinks can help reduce tooth decay. That does not mean you can never eat these types of foods. You should limit the times you eat these foods between main meals. A good rule is 3 meals per day and no more than 3 snacks per day.

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

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

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

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

**Sealants:** Sealants are plastic coatings brushed onto the biting surfaces of back teeth to protect the deep grooves from decay. In some people the grooves on the surfaces of the teeth are too narrow and deep to clean with a toothbrush. They may decay even if you brush them regularly. Sealants are an excellent preventive measure used for children and young adults at risk for this type of decay.
Reference 3:
Anticipatory Guidance
<table>
<thead>
<tr>
<th><strong>Prenatal</strong></th>
<th><strong>Birth to One Year</strong></th>
<th><strong>Two to Three Years</strong></th>
<th><strong>Three to Five Years</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Baby teeth are important!</td>
<td>• Baby teeth are important!</td>
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<td>• Baby teeth are important!</td>
</tr>
<tr>
<td>• Parents/caregivers’ oral health affects baby’s oral health.</td>
<td>• Parents/caregivers’ oral health affects baby’s oral health.</td>
<td>• Parents/caregivers should obtain regular dental check-up and get treatment if necessary.</td>
<td>• Parents/caregivers’ oral health affects child’s overall health.</td>
</tr>
<tr>
<td>• Parents/caregivers should obtain regular dental check-up and get treatment if necessary.</td>
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<td>• Parents/caregivers should avoid sharing with their child things that have been in their mouths.</td>
<td>• Parents/caregivers should avoid sharing with their child things that have been in their mouths.</td>
</tr>
<tr>
<td>• Schedule child’s first dental appointment by age one.</td>
<td>• Schedule child’s first dental appointment by age one.</td>
<td>• Prevention is less costly than treatment.</td>
<td>• Prevention is less costly than treatment.</td>
</tr>
<tr>
<td>• Use of fluorides, including tooth brushing with fluoride toothpaste, is the most effective way to prevent tooth decay</td>
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</tr>
<tr>
<td>• Encourage parents/caregivers to obtain dental check-up and, if necessary, treatment before birth of baby to reduce cavity-causing bacteria that can be passed to the baby.</td>
<td>• Encourage parents/caregivers to maintain good oral health and get treatment, if necessary, to reduce spread of bacteria that can cause tooth decay.</td>
<td>• Encourage parents/caregivers to avoid sharing with their child things that have been in their mouths.</td>
<td>• Encourage parents/caregivers to maintain good oral health and get treatment, if necessary, to reduce spread of bacteria that can cause tooth decay.</td>
</tr>
<tr>
<td>• Encourage parents/caregivers to brush teeth with fluoride toothpaste.</td>
<td>• Encourage parents/caregivers to avoid sharing with their child things that have been in their mouths.</td>
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</tr>
<tr>
<td>• Encourage parents/caregivers to brush teeth with fluoride toothpaste.</td>
<td>• Encourage parents/caregivers to become familiar with the normal appearance of child’s gums.</td>
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</tr>
<tr>
<td>• Encourage parents/caregivers to become familiar with the normal appearance of child’s gums.</td>
<td>• Emphasize using a washcloth or toothbrush to clean teeth and gums with eruption of the first tooth.</td>
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</tr>
<tr>
<td>• Emphasize using a washcloth or toothbrush to clean teeth and gums with eruption of the first tooth.</td>
<td>• Encourage parents/caregivers to check front and back teeth for white, brown, or black spots (signs of cavities)</td>
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</tr>
<tr>
<td>• Discuss primary tooth eruption patterns (first tooth usually erupts between 6-10 months old).</td>
<td>• Discuss primary tooth eruption patterns.</td>
<td>• Emphasize importance of baby teeth for chewing, speaking, jaw development and self-esteem.</td>
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</tr>
<tr>
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<td>• Emphasize importance of baby teeth for chewing, speaking, jaw development and self-esteem.</td>
<td>• Discuss teething and ways to soothe sore gums, such as chewing on teething rings and washcloths.</td>
<td>• Discuss teething and ways to soothe sore gums, such as chewing on teething rings, washcloths.</td>
</tr>
<tr>
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<td>• Discuss teething and ways to soothe sore gums, such as chewing on teething rings, washcloths.</td>
<td>• Discuss problem solving on oral hygiene issues.</td>
<td>• Discuss problem solving on oral hygiene issues.</td>
</tr>
<tr>
<td>• Schedule child’s first dental visit by age one.</td>
<td>• Schedule child’s first dental visit by age one.</td>
<td>• Review parent’s/caregiver’s role in brushing toddler’s teeth.</td>
<td>• Review parent’s/caregiver’s role in brushing toddler’s teeth.</td>
</tr>
<tr>
<td>• Schedule child’s first dental visit by age one.</td>
<td>• Schedule child’s first dental visit by age one.</td>
<td>• Discuss brush and toothpaste selection.</td>
<td>• Discuss brush and toothpaste selection.</td>
</tr>
<tr>
<td>• Schedule child’s first dental visit by age one.</td>
<td>• Schedule child’s first dental visit by age one.</td>
<td>• Problem solve on oral hygiene issues.</td>
<td>• Problem solve on oral hygiene issues.</td>
</tr>
<tr>
<td>• Schedule child’s first dental visit by age one.</td>
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<td>• Schedule child’s first dental visit by age one.</td>
</tr>
</tbody>
</table>

**Take home message for caregivers**

- Baby teeth are important!
- Parents/caregivers’ oral health affects baby’s oral health.
- Parents/caregivers should obtain regular dental check-up and get treatment if necessary.
- Schedule child’s first dental appointment by age one.
- Use of fluorides, including tooth brushing with fluoride toothpaste, is the most effective way to prevent tooth decay.
- Encourage parents/caregivers to obtain dental check-up and, if necessary, treatment before birth of baby to reduce cavity-causing bacteria that can be passed to the baby.
- Encourage parents/caregivers to brush teeth with fluoride toothpaste.
- Emphasize importance of baby teeth for chewing, speaking, jaw development and self-esteem.
- Describe primary tooth eruption patterns (first tooth usually erupts between 6-10 months old).
- Discuss primary tooth eruption patterns.
- Emphasize importance of baby teeth for chewing, speaking, jaw development and self-esteem.
- Discuss teething and ways to soothe sore gums, such as chewing on teething rings and washcloths.

**Oral health and hygiene**

- Baby teeth are important!
- Parents/caregivers’ oral health affects baby’s oral health.
- Parents/caregivers should obtain regular dental check-up and get treatment if necessary.
- Parents/caregivers should avoid sharing with their child things that have been in their mouths.
- Schedule child’s first dental appointment by age one.
- Prevention is less costly than treatment.
- Use of fluorides, including tooth brushing with fluoride toothpaste, is the most effective way to prevent tooth decay.
- Encourage parents/caregivers to maintain good oral health and get treatment, if necessary, to reduce spread of bacteria that can cause tooth decay.
- Encourage parents/caregivers to avoid sharing with their child things that have been in their mouths.
- Encourage parents/caregivers to become familiar with the normal appearance of child’s gums.
- Emphasize using a washcloth or toothbrush to clean teeth and gums with eruption of the first tooth.
- Encourage parents/caregivers to check front and back teeth for white, brown, or black spots (signs of cavities).
- Discuss primary tooth eruption patterns.
- Emphasize importance of baby teeth for chewing, speaking, jaw development and self-esteem.
- Discuss teething and ways to soothe sore gums, such as chewing on teething rings, washcloths.
- Emphasize importance of baby teeth for chewing, speaking, jaw development and self-esteem.

**Oral development**

- Baby teeth are important!
- Parents/caregivers’ oral health affects baby’s oral health.
- Parents/caregivers should obtain regular dental check-up and get treatment if necessary.
- Parents/caregivers should avoid sharing with their child things that have been in their mouths.
- Prevention is less costly than treatment.
- Use of fluorides, including tooth brushing with fluoride toothpaste, is the most effective way to prevent tooth decay.
- Encourage parents/caregivers to maintain good oral health and get treatment, if necessary, to reduce spread of bacteria that can cause tooth decay.
- Encourage parents/caregivers to avoid sharing with their child things that have been in their mouths.
- Review parent’s/caregiver’s role in brushing toddler’s teeth.
- Discuss brush and toothpaste selection.
- Problem solve on oral hygiene issues.
- Schedule child’s first dental visit by age one.
- Schedule child’s first dental visit by age one.
- Schedule child’s first dental visit by age one.
- Schedule child’s first dental visit by age one.
<table>
<thead>
<tr>
<th>Fluoride adequacy</th>
<th>Oral habits</th>
<th>Diet and nutrition</th>
<th>Injury prevention</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Evaluate fluoride status in residential water supply.</td>
<td>• Encourage mother to stop smoking.</td>
<td>• Emphasize eating a healthy diet and limiting number of exposures to sugar snacks and drinks.</td>
<td>• Encourage child-proofing of home including electrical cord safety and poison control.</td>
</tr>
<tr>
<td>• Review topical and systemic sources of fluoride.</td>
<td>• Encourage breastfeeding.</td>
<td>• Emphasize that it is the frequency of exposures, not the amount of sugar, that affects susceptibility to caries.</td>
<td>• Emphasize use of properly secured car seat.</td>
</tr>
<tr>
<td>• Encourage mother to drink fluoridated tap water.</td>
<td>• Advise breastfeeding.</td>
<td>• Encourage breastfeeding. never to put baby to bed with a bottle with anything other than water in it or to allow feeding ‘at will.’</td>
<td>• Emphasize use of electrical cord safety and poison control.</td>
</tr>
<tr>
<td>• Consider topical needs (e.g., toothpaste, fluoride varnish).</td>
<td>• Remind parents/caregivers to keep emergency numbers handy.</td>
<td>• Emphasize that it is the frequency of exposures, not the amount of sugar, that affects susceptibility to caries.</td>
<td>• Encourage caregivers to keep emergency numbers handy.</td>
</tr>
<tr>
<td>• Re-evaluate fluoride status of residential water supply.</td>
<td>• Review pacifier safety.</td>
<td>• Encourage weaning from bottle to cup by 1 year of age.</td>
<td>• Review use of properly secured car seat.</td>
</tr>
<tr>
<td>• Review topical and systemic sources of fluoride.</td>
<td>• Remind parents/caregivers never to put baby to bed with a bottle with anything other than water in it or allow feeding ‘at will.’</td>
<td>• Encourage diluting juices with water.</td>
<td>• Have emergency numbers handy.</td>
</tr>
<tr>
<td>• Encourage drinking fluoridated tap water.</td>
<td>• Discuss healthy diet and oral health.</td>
<td>• Review child-proofing of home including electrical cord safety and poison control.</td>
<td>• Encourage safety in play activities including helmets on bikes and mouth guards in sports.</td>
</tr>
</tbody>
</table>

- Review sources of fluoride.
- Review need for topical or other fluorides.
- Emphasize that child should be completely weaned from bottle and drinking exclusively from a cup.

- Discuss consequences of digit sucking and prolonged non-nutritive sucking (e.g. pacifier) and begin professional intervention if necessary.
- Review snacking choices.
- Emphasize that child should be completely weaned from bottle and drinking exclusively from a cup.

- Encourage caregivers to keep emergency numbers handy.
- Remind caregivers to keep emergency numbers handy.
Reference 4:
Oral Health and Pregnancy
Abstract

Pregnancy is a delicate condition involving complex physical and physiological changes. In recent times, there has been a greater focus on the oral health of pregnant women.

Emerging evidence has shown that periodontal disease may be associated with preterm, low birthweight (LBW) babies. This has caught the attention of prenatal care providers, who often look to the dental community for information about the oral health aspects of pregnancy. Therefore, dental care providers should be well informed and better able to understand the management of different oral health conditions typically seen during pregnancy. In addition, prenatal care providers should forge a link with oral health care providers to prevent adverse outcomes.

This article summarizes the oral health conditions associated with pregnancy.

IN RECENT YEARS we have witnessed an increased emphasis on maintaining good oral health during pregnancy. Pregnancy involves complex physical and psychological changes that have an impact on even healthy women. Hormonal effects cause changes to almost every organ system, including the oral cavity.

In New York State, 257,722 successful pregnancies (live births) occurred in 2000. 1 Prenatal care is an essential part of the ongoing treatment for pregnant women and the fetus/infant. Among the successful pregnancies in New York, 67% of the pregnant women received prenatal care in the first trimester; 19% of the women in the second trimester; and 4.4% of the women in the third trimester. Appropriate management of women during pregnancy can improve the mother’s health and also reduce risk for both the mother and the fetus/infant.
The American College of Obstetricians and Gynecologists encourages women to consult their dentist early in their pregnancy.7

All pregnant women are at risk for infection. It has been postulated that there could be a link between infection of the oral cavity and certain complications that result in adverse pregnancy outcomes. Dental care providers should be aware of the various issues involved in pregnancy in order to assess the different needs and treatment considerations during this vulnerable period.

At the same time, it is imperative that every pregnant woman understands her unique dental needs.

This article provides an overview of the different oral health conditions associated with pregnancy and its appropriate management.

Oral, Dental Problems Associated with Pregnancy

Oral and dental problems associated with pregnancy include dental caries, erosion, pregnancy gingivitis and periodontal infection, pregnancy epulis, increased tooth mobility, and dental problems related to labor and delivery.1

Dental Caries

Although tooth decay is the result of repeated acid attacks on the tooth enamel, and not from pregnancy, some pregnant women still believe that a tooth is lost for every pregnancy.8 Any increase in tooth decay during pregnancy can be attributed to diet and poor oral hygiene.

Many women have food cravings during pregnancy. Some resort to eating snacks high in sugars in an attempt to prevent nausea in the first trimester. Unless additional oral hygiene precautions are taken, there is an increased risk for tooth decay. Drinking liquids between meals may relieve the morning sickness often experienced during pregnancy.9,10 If these drinks contain a high amount of sugars, they can contribute to an increased risk of tooth decay.10

A study conducted by Gunay et al. demonstrated the effectiveness of a primary prevention program for caries initiated during pregnancy, which can significantly improve the oral health of mothers and their children. Use of 0.12% chlorhexidine as part of a preventive regimen during pregnancy brought about a reduction in caries risk both in the mother’s teeth and in the child’s primary dentition.9

Erosion

Nausea and vomiting in pregnancy can cause extensive erosion of teeth. Hunter et al.7 reported that the palatal surfaces of the upper anterior teeth are most commonly affected. It has also been reported that thermal sensitivity occurs because of exposure of the dentine.

The authors advised women suffering from vomiting to rinse their mouth regularly with a fluoride mouthwash, as the acidic nature of the vomit makes the teeth more vulnerable. Immediately after vomiting, it is advisable to avoid tooth brushing, to reduce the risk of abrasion. The use of a dilute neutral fluoride mouthwash to harden the exposed dentine and reduce sensitivity is recommended instead.

Pregnancy Gingivitis and Periodontal Infections

Changes in the gingiva during pregnancy have been well documented.3,7,8 Pregnancy gingivitis is a reversible condition that may be localized or generalized.

According to Hunter et al.,7 pregnancy gingivitis is prominently seen in anterior teeth, with no tissue attachment loss. Muramatsu et al.7 observed that pregnancy gingivitis occurs from the second month of gestation and markedly increases as the pregnancy progresses, reaching a peak in the eighth month. It was found that during the last month, there is a definite decrease.

Hormonal and vascular changes associated with pregnancy may exaggerate the response of the gingiva to bacterial plaque. Studies have shown that 30% to 100% of pregnant women have gingival inflammation.11,12 However, pregnancy can exacerbate an already existing condition. Factors other than plaque accumulation and poor oral hygiene have been implicated in its etiology. Several studies have suggested that gingivitis during pregnancy is a result of increased levels of female sex hormones.7 Progesterone causes increased exudation and affects the integrity of the capillary endothelial cells. It also influences the biosynthesis of prostaglandin in the gingiva. Raber-Durlacher et al.7 found that cell-mediated response is also depressed, which could contribute to the altered response to plaque. In addition, the ratio of anaerobes to aerobes in the sub-gingival tissues increases significantly from 13 to 16 weeks of pregnancy and remains high until the third trimester.3,9

The onset of pregnancy gingivitis in the second month of gestation coincides with an increase in the levels of progestrone and estrogen and recedes by the eighth month, showing perhaps a relationship between the two.7

Periodontal infection is a gram-negative, anaerobic oral infection. Studies have shown how periodontal infection contributes independently to the birth of a preterm baby even if other risk factors are present.10,11,12,13 The bacteria responsible for this condition are capable of producing a variety of chemical inflammatory mediators, such as prostaglandins (PG), interleukins (IL), and tumor necrosis factor (TNF), that can directly affect the host.

The increase in the percentage of the gram-negative bacteria is also attributed to the increased levels of sex hormones. These hormones may substitute naphthaquinone, an essential growth factor for bacteria, which may further promote the growth of these bacteria.9 Offenbacher et al.10,11 found, in human case control studies, that women with severe periodontal disease have elevated levels of these mediators. These molecules appear to be normal physiological mediators of parturition and have been implicated in inducing LBW, preterm babies (Figure 1).10,11,14

![FIGURE 1: Periodontal Disease and Preterm Low Birthweight: Proposed Biological Mechanism](Adapted from “Does periodontal disease relate to pre-term low birth weight babies?” The Colgate Oral Care Report 11(3), 2001: pg. 3.)
It is estimated that more than 18% of preterm, LBW babies can be the result of periodontal diseases. A study in Harlem, New York, reported the effects of periodontal interventions on pregnancy outcomes and preterm LBW. No significant differences in clinical periodontal status were observed between women with preterm, LBW cases and women with normal birth outcomes. There was, however, a reduction in the incidence of preterm LBW with periodontal therapy, from 18.9% in the untreated group to 13.5% in the group that received scaling prior to delivery.

Additionally, pregnant diabetics face a greater threat from severe periodontal disease than non-diabetic pregnant women. Both diabetes and hormonal changes have been implicated as complicating factors for periodontal disease and, hence, maternal and fetal outcomes.

Unplanned pregnancies may result in inadequate prenatal care, causing adverse birth outcomes, such as low birthweight. Groups at highest risk for an unintended pregnancy include women under the age of 20 (84.1%), black women (62.0%), women with less than a high school education (53.6%) and women who are not married (66.0%). Dentists need to understand these situations, in order to reduce morbidity in high-risk groups.

In a cohort study of 1,115 pregnant women, Boggess et al. demonstrated that women were at higher risk for preeclampsia if they had severe periodontal disease at delivery (adjusted odds ratio 2.4, 95% confidence interval 1.1, 5.3) or if they had periodontal disease progression during pregnancy (adjusted odds ratio 2.1, 95% confidence interval 1.0, 4.4). The study hypothesized that transient translocation of oral organisms, predominant in periodontal disease, to the uteroplacental unit may incite placental inflammation or oxidative stress, resulting in placental damage and clinical manifestation of preeclampsia.

**Pregnancy Epulis**

Pregnancy may give rise to an isolated, soft, hyperplastic growth, also known as pregnancy epulis or pregnancy granuloma. Hunter et al. described it as bright red or magenta in color, with a mulberry-like surface and a tendency to bleed profusely. Increased mobility of adjacent teeth may be noted.

This condition may occur in up to 5% of pregnant women, and it affects more commonly the anterior region of the upper jaw. It usually arises in the second trimester and grows rapidly. After delivery, it regresses rapidly and may disappear entirely. Sometimes surgery may be necessary, which is usually delayed until after delivery. Regular professional cleaning and oral hygiene maintenance have been recommended.

**Increased Tooth Mobility**

There may be increased tooth mobility in pregnant women. Studies have shown that tooth mobility is related to the degree of gingival disease and disturbance of the attachment apparatus as well as to some mineral changes in the lamina dura. This condition has been found to be reversible after delivery.

**Problems Related to Labor and Delivery**

Complications could arise because of restorations in the mouth that may be damaged or dislodged during certain procedures related to labor and delivery. The use of orally inhaled nitrous oxide and oxygen to relieve pain in labor and endotracheal intubation used in Caesarian section procedures can bring about complications. This, however, is a concern for any type of procedure involving anesthesia.

Dentists should ascertain if any restorations exist that could lead to problems. Such findings should be communicated to patients. Use of masks for inhalation to prevent such problems has been recommended.

**Dental Care During Pregnancy**

Clearly, given the wide array of problems associated with pregnancy, dental care is essential during pregnancy. There are no evidence-based guidelines available that describe the procedures that can be performed during each trimester. Numerous articles have been written in scientific journals, but, for the most part, health care professionals are unsure about dental care during pregnancy.

An attempt has been made to establish nutritional and oral health guidelines for pregnant women. Although there are gaps in the knowledge base for making recommendations, there are opportunities for improving oral health. Table 1 suggests procedures that can be done during each trimester of pregnancy. There is a strong tendency for dentists to postpone treatment until after delivery because of the added risks imposed by taking radiographs and prescribing drugs. Complications may arise during dental procedures, such as syncope, enhanced gag reflex, supine hypotensive syndrome, seizures and gestational hyperglycemia.

Some authors have recommended certain special considerations for pregnant women while rendering treatment. These include shorter appointments and having the patient change positions often. Treatment that warrants extensive surgical procedures may be delayed until after delivery, if possible.

As with all patients, regarding the use of radiographs, it is advisable to use high-speed films, filtration, collimation and lead

<table>
<thead>
<tr>
<th>TABLE 1</th>
<th>Recommended Timetable (Treatment Protocol) for the Management of Oral Health during Pregnancy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1st Trimester:</strong> Treatment may be limited due to morning sickness. Only emergency treatment should be rendered during this period.</td>
<td></td>
</tr>
<tr>
<td><strong>2nd Trimester:</strong> This is the safest period to perform any necessary dental treatment. Pregnant women should be advised to consult their prenatal care providers about the use of anesthetics and medications.</td>
<td></td>
</tr>
<tr>
<td><strong>3rd Trimester:</strong> Professional evaluation is necessary. Treatment may be impeded due to increased physical discomfort.</td>
<td></td>
</tr>
</tbody>
</table>

Note: Professional and home care is important in all three trimesters of pregnancy. Adapted from www.agd.org/consumer/oralhealthtopics.html and American Dental Association (1998).
X-rays should be taken only of essential areas; and routine, full-mouth X-rays may be avoided.

Ideally, no drug should be administered in the first trimester, except in emergencies. Oral rinses and dentifrices are generally not contraindicated for a pregnant patient. Holder et al. claim that chlorhexidine is a safe and effective mouthrinse to control gingivitis during pregnancy. However, the authors advise caution in the use of mouthwashes with moderate to high levels of alcohol (10% or higher) because of concerns about fetal alcohol syndrome.

Most often, dentists will prescribe two types of drugs during an emergency. These include antibiotics and analgesics for control of infection and pain. Table 2 lists those drugs that are considered safe and those that are contraindicated during pregnancy. The use of tetracycline poses a significant risk to both mother and fetus for the following reasons: 1. It can cause hepatic and pancreatic injury to the pregnant woman; 2. It might cross the placenta and cause malformation and discoloration of deciduous teeth; and 3. It can form chelates with calcium and be deposited in the skeleton of the fetus, resulting in depression of bone growth.

In the case of erythromycin (estolate form), the potential adverse effects are secondary to hepatotoxicity.

Aspirin may cause anemia, hemorrhaging or prolonged gestation or labor. Prolonged use of non-steroidal, anti-inflammatory analgesics has been shown to have detrimental effects on the fetal circulation; they should be avoided during the third trimester, as they delay onset and increase duration of labor.

Narcotics, when taken in large quantities, cause depression of the fetal central nervous system and produce addiction in the fetus.

Another area of concern is in the use of anesthetics and sedatives during pregnancy. Anesthetics like lidocaine and prilocaine can be safely used during pregnancy. Others like mepivacaine and procaine need to be used with caution. Sedatives like barbiturates and benzodiazepines are contraindicated during pregnancy. However, prudent use of medications and anesthetics would go a long way in overcoming any problem that may arise due to pregnancy.

The American Dental Association recommends that pregnant

<table>
<thead>
<tr>
<th>TABLE 2</th>
<th>Drugs That Can be Prescribed and Those That Are Contraindicated During Pregnancy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ANTIBIOTICS</strong></td>
<td><strong>Those that can be prescribed during pregnancy</strong></td>
</tr>
<tr>
<td>Penicillin, Cephalosporins, Amoxicillin, Clindamycin, Erythromycin (except estolate form)</td>
<td>Tetracyclines, Doxycyclines, Erythromycin (Estolate form)</td>
</tr>
<tr>
<td><strong>ANALGESICS</strong></td>
<td><strong>Acetaminophen, Acetaminophen with codeine in small doses</strong></td>
</tr>
</tbody>
</table>

Source: www.agd.org/consumer/topics/pregnancy/main.html
women eat a balanced diet, brush their teeth thoroughly with ADA-accepted fluoride toothpaste at least twice daily, floss at least once a day, and schedule regular dental visits and periodic professional teeth cleanings. The presence of risk factors such as smoking, alcohol, drug abuse, inadequate prenatal care and systemic conditions like diabetes, hypertension and periodontal infection in pregnant women should alert providers to educate, counsel and rehabilitate pregnant women in order to reduce morbidity and mortality during pregnancy and in infants.

Dental Care Access During Pregnancy

Studies have shown that most women do not access dental care during pregnancy.

An analysis of data from the Pregnancy Risk Assessment Monitoring System (PRAMS) in four states—Arkansas, Illinois, Louisiana and New Mexico—indicated a utilization rate of 22.7% to 34.7%. Among mothers reporting a dental problem, insurance through public funding was significantly associated with their not getting dental care. A utilization rate of 43.2% by pregnant women was also found in a survey done in North Dakota in 1996. The major reason cited by the survey subjects was that they did not have any dental problems.

There seems to be a lack of knowledge regarding the need for this particular aspect of prenatal care. A review of all the educational materials available on oral health and pregnancy in the United States found that there was no material available that encompassed comprehensive information for pregnant women regarding oral health. For the most part, the information was inadequate, and the readability level was much higher than the recommended level.

Very few programs in the United States aim to achieve widespread improvements in the oral health of pregnant women or their infants. As a result of recent studies, researchers and prenatal care providers are advocating for a coordinated effort from the dental and obstetric communities to establish guidelines that could benefit maternal oral health and newborn infant outcomes.

Despite the risks involved, if necessary precautions are taken, pregnant women can receive safe dental care with ease. The various physiological and psychological changes that are involved during pregnancy and the different oral health conditions typically seen during pregnancy must be kept in mind while dealing with a pregnant woman. The American Academy of Periodontology urges health care providers to motivate patients to treat periodontal infections during pregnancy by referral to the patient's dentist or periododontist.

Dentists and dental hygienists should take a proactive role in encouraging all patients of childbearing age to seek oral health counseling, examination and treatment, if necessary. Good communication should be established between the dental care providers and prenatal care providers. It is imperative to inform pregnant women of their dental needs and to motivate them to seek care so that we can have better dental health in mothers and children in the future.

REFERENCES

23. Academy of General Dentistry http://agd.org/consumer/topics/pregnancy/pregnancyhtml
Reference 5:
Clinical Considerations for an Infant Oral Care Program
Clinical Considerations for an Infant Oral Health Care Program

Abstract: The American Academy of Pediatric Dentistry and the American Association of Pediatrics recommend dental assessments and evaluations for children during their first year of life. Early dental intervention evaluates a child’s risk status based on parental interviews and oral examinations. These early screenings present an opportunity to educate parents about the medical, dental, and cost benefits of preventive—rather than restorative—care and may be more effective in reducing early childhood caries than traditional infectious disease models. A comprehensive infant oral care program includes: (1) risk assessments at regularly scheduled dental visits; (2) preventive treatments such as fluoride varnishes or sealants; (3) parental education on the correct methods to clean the baby’s mouth; and (4) incentives to encourage participation in ongoing educational programming. Recruiting mothers during pregnancy improves the likelihood that they will participate in the assessment program. To maximize interest, trust, and success among participating parents, educational and treatment programs must be tailored to the social and cultural norms within the community being served.

A successful infant oral care program is based on early intervention. It improves access to care, provides counseling and anticipatory care guidance for disadvantaged children between the ages of 6 months and 5 years, and helps to prevent early childhood caries. Many children who require emergency dental treatment are affected by early childhood caries (also known as baby-bottle tooth decay or nursing caries). The prevalence of this disease varies from 5% to 72%, depending on diagnostic criteria, age, race, and population. In California, the chance of a child experiencing early childhood caries before entering school is about 1 in 7, and more than half of California’s schoolchildren experience toothaches on a daily basis. Early childhood caries can manifest itself in severe pain, infection, abscesses, chewing difficulty, malnutrition, gastrointestinal disorders, and low self-esteem. The decay of primary teeth can affect children’s growth, lead to malocclusion by adversely affecting the correct guidance of the permanent dentition, and cause poor speech articulation.

Prenatal Care Intervention Programs for Pregnant Women

The earliest opportunity to provide education about infant oral health is during the pregnancy. Pregnant women are especially interested in their children’s overall health and well-being and the cost benefits of preventive care rather than restorative treatments. Because poor maternal periodontal health appears to be associated with preterm labor and low birth weight outcomes, prenatal counseling and dental care for expectant mothers may result in improved pregnancy outcomes. Effective prenatal counseling programs educate parents about healthy feeding habits and the dangers associated with using food to modify their children’s behavior. An expectant mother also must be aware of her own caries balance so that she can understand what puts her at risk, her baby’s health at risk, and what protective measures can give her newborn an early healthy start. Most mothers are not aware that their oral health status affects that of their babies. The transmission of Streptococcus mutans...
occurs at an early age because mothers with poor oral health inoculate their babies’ mouths even before the first tooth appears.

Several studies have shown that reductions in mutans streptococci in pregnant women may result in a delayed or diminished transfer of caries-inducing bacteria to infants. Brambilla et al. showed that a low-cost program of dietary counseling, dental prophylaxis, and appropriate use of topical fluoride and chlorhexidine could delay or prevent S. mutans infection in children of infected mothers, thereby lowering overall rates of dental caries in children.

Of course, the mother’s health during pregnancy has immediate and long-term implications for the baby’s health. Oral health is no exception. Hypoplastic enamel on primary teeth generally has less to do with the infant’s own health and more to do with the mother’s health during pregnancy. Babies born prematurely or with very low birth weight also may have hypoplastic enamel in both primary and permanent teeth as a result of disruptions in enamel formation.

The Center to Address Disparities in Children’s Oral Health (The CAN DO Center) is a partnership between the University of California, San Francisco (UCSF) School of Dentistry and the National Institute for Dental and Craniofacial Research. For the past 4 years, UCSF researchers have been conducting the MAYA Project (Mother and Youth Access Program) at the San Ysidro Community Health Center in San Diego, California, working with women beginning their second trimester of pregnancy to proactively manage S. mutans levels. San Ysidro is a low socioeconomic area with a large migrant Hispanic community that does agricultural work along the US-Mexican border. The program educates mothers about the infectious nature of early childhood caries and monitors their S. mutans levels before, during, and after pregnancy. Threshold levels of S. mutans and Streptococcus lactobacilli are higher for infants and toddlers from migrant, underserved minority communities, which puts them at significantly greater risk for dental disease. Fluoride varnish treatments are provided for a subgroup of children in the MAYA project until age 3. Fluoride varnishes became available in the United States in 1991 when the Food and Drug Administration (FDA) approved them for use as root desensitizers or cavity varnishes but not as a therapeutic topical fluoride. These varnishes are considered by the FDA to fall into a category of drugs and devices that “present minimal risk and is (are) subject to the lowest level of regulation.” However, the American Dental Association and the Centers for Disease Control and Prevention both have been emphatic in their support for the use of fluoride varnishes as safe and efficacious within a caries prevention program that includes caries diagnosis, risk assessment, and regular dental care. The success achieved in San Ysidro and in the UCSF infant oral care programs (IOCP) suggests that such preventive programs effectively and economically provide measurable public health benefits, particularly in disadvantaged and underserved communities. The basic components and guiding principles of the IOCP model are described here.

**Intervention Programs for Infants and Toddlers**

Historically, “intervention” occurs only after disease has been noticed. This is a dangerous approach to oral health because oral disease and early childhood caries can be difficult to detect until significant damage already has been done to the child’s mouth. Early childhood caries is transmissible, preventable, and considered the most prevalent chronic infectious disease in children. The intervention strategies outlined in this article have been implemented and refined at UCSF’s IOCP, and they are designed to prevent the formation of dental caries in the first place.

At the heart of the IOCP strategy is a combination of clinical preventive measures such as fluoride varnishes, antibacterial treatments, xylitol use, and sealants for both the mother and child in conjunction with anticipatory guidance counseling that educates caregivers on proper dental hygiene practices. Almost any child stands to benefit from an early oral care program at age 1 that includes 6 primary components: (1) a preliminary risk assessment interview with the parents or caregivers; (2) use of the knee-to-knee position; (3) use of a dental prophylaxis (toothbrush prophylaxis); (4) conducting an oral assessment (and/or dental exam); (5) providing preventive treatment (fluoride varnish); and (6) anticipatory guidance counseling. This 6-step assessment should be repeated for the child and the mother on at least 3 occasions within a year for a high-risk child, starting during the first year of life and continuing through age 5. The number of dental visits scheduled for the year should be determined by the child’s risk level, determined during the initial risk assessment and examination.
Preliminary Interview and Anticipatory Guidance

While anticipatory guidance counseling is inherent within each of the 6 steps of this program, the preliminary interview is a prime opportunity to either introduce or reintroduce the 7 primary, age-appropriate anticipatory guidance topics: parental role in oral health, oral health and hygiene, oral development, fluoride adequacy, oral habits, diet and nutrition, and injury prevention (see Table 1).

The examiner greets the child and caregiver and presents an overview and expectations of the visit. Verbal positive reinforcement and praise are offered to both the parent and child on their arrival as a means to improve their enthusiasm for participating and, to some extent, reduce their anxiety level. The examiner should use this time to become acquainted with attitudes, behaviors, and beliefs that relate to the child's health by inquiring about: (a) availability of fluoridated water or supplements at home; (b) use of fluoridated toothpaste at home; (c) history of dental exams and/or treatment of both the child and the parent; (d) history of dental disease and caries in the child and the parent; (e) extent to which the child uses a feeding bottle or “sippy cup”; and (f) diet and snacking habits.

While this initial interview design is based on recommendations published by the American Academy of Pediatric Dentistry (AAPD), there has been ample discussion about the most appropriate evidence-based risk assessment measure. The CAMBRA (CAries Management By Risk Assessment) group has developed a risk assessment form that includes parental interview risk indicators, protective factors, and clinical indicators of disease. Regardless of the approach used, it is important to follow an instrument that can reliably identify the children with the highest risk level. A successful initial interview and anticipatory guidance session depends on a respectful, nonjudgmental, and friendly exchange of information between the caregiver and the examiner. Examiners should show respect toward the caregiver, recognizing their role as an adult with knowledge, life experience, valid viewpoints, and values. It is essential to listen carefully to their ideas and perspectives as well as to discuss oral health using culturally and linguistically appropriate methods of communication.

Using the Knee-to-knee Position

After completing the initial interview, the examiner assumes a knee-to-knee position with the parent or caregiver, seating the child in the caregiver’s lap facing the caregiver (Figure 1). Once situated, the examiner lowers the child’s head onto his or her lap. Some examiners may prefer having the child lying on one end of the exam table or sitting next to the exam table. However, the knee-to-knee position makes the parent an active participant in the procedure and tends to make the child feel more secure.

Toothbrush Prophylaxis

The examiner uses the handle of an age-appropriate toothbrush to prop open the child’s mouth while examining the mouth and discussing good brushing technique. “Counting” the teeth aloud and distracting the child with the toothbrush or a toy helps to minimize fuss. The examiner brushes each of the child’s teeth and shows the caregiver how to do the same. The importance of using fluoride toothpaste daily is discussed. This “show-tell-do” method creates an engaging experience for the patient and parent and tends to make subsequent appointments calmer for the child. Each child needs to be approached in a unique way to help them grow comfortable with the tools and practice of brushing,
but praise from the dentist and the parent has proven to be the most effective patient motivator.

**Oral Risk Assessment**

The child’s oral health condition will be ascertained during the oral examination phase by looking for chalky white spots, obvious tooth decay, or tooth defects. Based on the initial interview and the findings of the oral exam, the child’s risk level can be determined (Figure 2).

When facilities and resources permit, the assessment also should include a salivary analysis, which might include a measurement of S mutans, S lactobacilli, calcium, phosphate, and fluoride levels in saliva. Early childhood caries development, effects of drug-induced caries, and a diet evaluation survey also should be considered.

After completing the oral exam, the examiner returns the child to an upright position on the caregiver’s lap and relates the findings of the exam. A Caries Risk Assessment Chart may be filled out and given to the caregiver to quantify and document the risk factors affecting the child.

**Preventive Treatment**

Children categorized as moderate to high risk should be given a full-mouth topical fluoride varnish (Figure 3), even if the child lives in a community that already receives the benefits of water fluoridation.12 Several preventive treatment options are included in a comprehensive ICOFP. One option is the application of fluoride varnish by dental person-
nel at 1- or 3-month intervals. Varnish can reduce caries by 40% to 51% among children aged 4 to 5 and may result in 50% to 70% reductions in pit-and-fissure surfaces. Even greater reductions in approximal surfaces have been demonstrated. Another option is swabbing the teeth with chlorhexidine solution, which can measurably decrease S mutans and S lactobacilli levels. Other studies suggest that povidone-iodine swabbing also can reduce these pathogens. If used in conjunction with counseling, the application of fluoride varnish can be a very effective method in reducing early childhood caries.

Recent study findings by Weintraub and colleagues support using fluoride varnish to prevent early childhood caries and to reduce caries prevalence in very young children. Fluoride varnish efficacy in this age group provides additional rationale for an early dental visit, especially for children in high caries-risk groups, because applying fluoride varnish at this first visit and counseling based on anticipatory guidance can help reduce future dental disease in young children. Guidelines from the AAPD and the American Association of Public Health Dentistry support a dental assessment by a child’s first birthday or first tooth eruption.

**Anticipatory Guidance Counseling**

Following the exam and risk assessment, supplementary counseling for parents is indicated if the child is determined to be at high risk for oral disease and early childhood caries (Figure 4). This anticipatory guidance counseling expands on the same 7 age-specific topics introduced during the initial risk assessment visit (parental role in oral health; oral health and hygiene; oral development; fluoride adequacy; oral habits; diet and nutrition; and injury prevention).

Anticipatory guidance is most effective when it is tailored to the specific community in which it is being provided. Cultural norms and social
behaviors that may be detrimental to the child’s oral health should be considered, but a dictatorial approach is not likely to encourage participation or compliance. Ultimately, the mother has to be in control of the choices she makes for her own oral health and that of her infant. Dental care practitioners who demonstrate an understanding and respect for the perspective of both mother and child are much more likely to have a productive dialogue with the patient.

Diet counseling is a central component to anticipatory guidance. Emphasis should be placed on sugar intake frequency. However, healthy breast-feeding protocols and the risk of nursing caries also should be emphasized during these visits. While the cultural norms and traditions of the family should be acknowledged, nightly breast-feeding should be discouraged after the first primary tooth erupts, and bottle-fed infants should not be put to sleep with the bottle.

While there is much to be discussed during the visit, it is important to maintain a realistic perspective and focus on changes that can be implemented to improve the child’s oral health. Helping the caregiver choose one or two small but beneficial behavior changes for the family increases the likelihood of success and helps the family incrementally build momentum toward a healthier lifestyle.

**Outreach, Case Management, and Incentives**

Outreach, case management, and incentives encourage attendance at the assessments and reinforce healthy habits recommended in the counseling setting. Outreach typically consists of telephone and in-person contact as well as advocacy by a public health educator or hygienist, following the model developed at the Spokane Partnership Program in Washington. Case management should be accomplished by helping the families in need to understand services and the complexity of the health care system and insurance plans. The goal of a good match between the patient and the provider will increase the chances of compliance and effectiveness for the IOCP visit. Incentives can include oral health products such as toothpaste, toothbrushes, and age-appropriate toys. Participants can “earn” incentive rewards based on increases in caregiver knowledge and favorable risk assessment results. Achievement charts can be given to families and monitored at home as a game.

**Oral Health Care Trajectory From Birth to Age 2**

New mothers should take extra care to maintain their own oral health, especially during the first 6 months of the baby’s life when his or her first teeth are likely to erupt. Unfilled cavities should be filled immediately to prevent transmission of S mutans and other pathogens between mother and baby. The baby’s gums and tongue should be cleaned after every feeding. In communities with nonfluoridated water, parents should seek their doctor’s advice about fluoride supplements when the child reaches 6 months of age. Putting the baby to bed without a bottle is a crucial behavior goal during this early phase of life. Sucking during the night allows sugars to cling to teeth and initiate decay.

As the baby’s teeth begin to erupt around the age of 6 months, parents have questions about the role of baby teeth. Counseling visits during this stage should include a discussion about how baby teeth promote biting and chewing for healthy nutrition, hold space for permanent teeth, and permit oral articulation required for developing speaking skills.

Between the age of 6 and 12 months, the...
baby should begin drinking from a sippy cup. At 12 to 14 months, the baby should be weaned off of the bottle. A visit to the dentist should take place at this time. By age 12 to 18 months, the toddler should be off of the bottle and/or breast and the family should be taking the child to the dentist for regular check-ups and maintenance. The dentist might ask about the child’s snacking behavior and warn about risks from constant snacking. Sweet or starchy foods and soda are particularly risky for the toddler to consume because of bacteria that cling and initiate attacks on the teeth. If necessary, the dentist can recommend nutritious foods for snacking. The child’s teeth should be brushed in the morning and before bedtime, and the child can begin to learn how to hold the toothbrush at this age. Most children will need assistance brushing their teeth because they do not develop the coordination to brush effectively by themselves until they are between the ages of 6 and 8.

Conclusion

Early childhood caries can have devastating effects on both primary and secondary dentition and disproportionately affects low-income and underserved children. These effects impose not only immediate discomfort and ill health but also long-term social and economic consequences. Anticipatory guidance counseling refocuses dental care on the prevention of early childhood caries as a strategic measure to improve children’s oral health while reducing overall costs for care—costs generally borne by the parents as well as the public health system. During pregnancy, mothers are especially interested in their own health and the health of their child, presenting a unique and opportune moment to proactively begin a discussion about oral health–related parenting skills with tangible cost and health benefits. Methodical risk assessment, improved parental oral health, and culturally calibrated education tailored to the age of the child can greatly reduce the incidence of early childhood caries and deliver measurable benefits to at-risk vulnerable populations.

References

Reference 6:
ECC AG - 6 step visit
Oral Health Assessment: 6 Steps for the Dental Team

1. **Interview/Anticipatory Guidance**
   
   Elements of the Interview
   - Greet child and caregiver
   - Praise the parent and child
   - Overview and expectations of the visit
   - Risk Assessment
     Use a Risk Assessment Tool (examples in packet) and check the health history to see if the child is taking any medications that might affect salivary components or flow

   As the caregiver answers the questions, the provider offers appropriate AG.

   **AG is provided throughout the 6 Steps.**

2. **Position the child**
   
   Assume the knee to knee position with the child sitting in the caregivers lap and lowering the child’s head onto your lap.

3. **Toothbrush Prophylaxis**
   
   Brush the child’s teeth, showing the caregiver how to do the same at home. This is a good time to remind the family about the importance of using a small dab of fluoride toothpaste daily.

4. **Oral Assessment**
   
   Give the child a toothbrush or toy (distraction) while you “count” the child’s teeth aloud, using the toothbrush handle as a mouth prop. Assess the child’s oral condition, looking for chalky white spots, obvious tooth decay, tooth defects, or other abnormalities.

   Based on your interview with the caregiver and your assessment, decide if the child is at low or high risk for tooth decay. (See “Caries Risk Assessment Chart”)

5. **Fluoride Varnish Treatment**
   
   Provide a full mouth fluoride varnish treatment if the child is at high risk for tooth decay.

6. **Summarize and Review Anticipatory Guidance and Counseling**
   
   Raise the child back up into the caregiver’s lap and discuss your findings and recommendations for follow-up, anticipatory guidance and home care.
Oral Health Assessment: 6 Steps for the Medical Team

1. **Interview/Anticipatory Guidance**
   Ask the following questions:
   - Does your family drink fluoridated water or do your children take fluoride supplements?
   - Have you started cleaning your child’s teeth with a fluoride toothpaste?
   - Have you taken your child to a dentist yet? When was the last visit?
   - Have you or any of your other children had many cavities?
   - Does your child take a bottle or sippy cup to bed at night or frequently walk around with a bottle or sippy cup throughout the day?
   - How often does your child snack throughout the day? On what?

   As the caregiver answers the questions, the provider offers appropriate AG.

   **AG is provided throughout the 6 Steps.**

2. **Position the child**
   Assume the knee-to-knee position with the child sitting in the caregivers lap and lowering the child’s head onto your lap. Some medical team members may prefer having the child lying on one end of the exam table, positioning themselves behind the child’s head, or just sitting on the exam table.

3. **Toothbrush Prophylaxis (optional)**
   Demonstrate how to brush a child’s teeth, showing the caregiver how to do the same at home. This is a good time to remind the family about the importance of using a small dab of fluoride toothpaste daily.

4. **Oral Assessment**
   “Count” the child’s teeth aloud, using a toothbrush or tongue depressor to keep the mouth propped open and to avoid getting bit. Assess the child’s oral condition, looking for chalky white spots, obvious tooth decay, or tooth defects.

   Based on your interview with the caregiver and your assessment, decide if the child is at low or high risk for tooth decay. (See “Caries Risk Assessment Chart”)

5. **Fluoride Varnish Treatment**
   Provide a fluoride varnish treatment if the child is at high risk for tooth decay. Apply the varnish to all surfaces of all of the teeth.

6. **Summarize and Review Anticipatory Guidance and Counseling**
   Discuss your findings and recommendations for follow-up, anticipatory guidance and home care.
Tips for Providing Anticipatory Guidance

- **Respect** for the caregiver as an adult with knowledge, life experience, viewpoints and values.

- Use **multiple learning methods** including discussion, pamphlets, demonstrations, and active participation (let the caregiver practice brushing the child’s teeth while you watch).

- **Ask** both open and closed ended questions. Examples would be “Have you started cleaning your child’s teeth yet?” and “Can you think of a good way to work daily brushing with a fluoride toothpaste into your daily routine?”

- **Listen** to the caregiver and ask the caregiver for ideas about what he/she thinks might work on issues like weaning, daily brushing, and diet modification.

- Use culturally and linguistically **appropriate** methods of communication in working with patients of diverse ethnic, linguistic, cultural, and socio-economic backgrounds and abilities when addressing their oral health needs and behaviors.

- If you remain **non-judgemental and friendly** towards both the child and the caregiver, they will be more likely to trust you and listen to your advice.

- **Small steps** involves choosing 1-2 changes that you want the family to focus on.

- **Positive reinforcement** lets the caregiver know that you are on their side. Keep in mind that health behavior change is a process, not a single event. It usually takes many triggers over time to change health behavior. Try not to get discouraged, but consider each counseling visit as getting one step closer to change.

*The most important tool you have is your own genuine concern and caring for the children and their families.*
Tips for Managing Child Behavior

**Voice Control**
Use a soft voice, pleasant tone, and speak slowly to influence and direct the patient’s behavior.

**Nonverbal Communication**
This includes the use of appropriate touching, paying attention to your own body language, and using pleasant facial expressions.

**Tell-show-do**
This involves verbal explanations of what you plan to do, demonstrations of the noise, smells, visual, and tactile aspects of what is coming next, and then proceeding, trying not to deviate from the explanation and demonstration.

**Positive Reinforcement**
Give positive feedback at each step to reward desired behaviors. Assist children in reaching their full potential by catching them doing something right.

**Distraction**
This is the use of toys, other props, and staff to distract the child with talk, or even silliness, while you work.

Most children with disabilities and other special needs can be managed using traditional behavior management techniques. Keep in mind that some children with autism spectrum disorders may be very sensitive to sensory stimuli and touch. They may need to be approached very slowly using low light and in quiet settings. They do better when things are predictable and routine. This includes putting them in the same dental chair and with the same dental assistant each time they visit the office.

"Behavior management is as much an art form as it is a science."

Adapted from "Clinical Guideline on Behavior Management," Clinical Affairs Committee, AAPD.
# Caries-risk Assessment Chart for Babies and Young Children

## Low Risk
- No carious lesions
- No white spot lesions
- No visible plaque

## What to Do
- Anticipatory Guidance
- 6-12 month recall
- Reinforce daily recall
- Reinforce daily brushing with a fluoride toothpaste
- Consider fluoride drops/tablets

## High Risk
- Carious lesions
- White spot lesions
- Visible plaque
- Mother has active untreated tooth decay
- Older siblings with a history of ECC
- High titers of *mutans streptococci* (testing)
- Impaired saliva composition or flow
- Frequent (3 or more) between-meal exposures to simple sugars or other refined carbohydrates.
- Medications that are sugar-based or cause dry mouth
- Inappropriate use of baby bottle

## What to Do
- Anticipatory Guidance
- 3-4 month recall
- Fluoride varnish tx
- Consider fluoride drops
- Consider anti-bacterials
- Reinforce daily brushing with a fluoride toothpaste
- Consider higher dose of topical fluoride used under strict supervision
**Supply List for the Oral Health Assessment**

1. **2 x 2 gauze squares to clean and dry the teeth**

2. **Direct light source: pen light**

3. **Child-sized toothbrush**

4. **Fluoride Varnish (use individual dose with applicator included)**
   - CavityShield: Omni Oral Pharmaceuticals, 1-800-445-3386
   - Duraflor: Medicom, 1-800-361-2862
   - Duraphat: Colgate-Palmolive, 1-800-372-4346

5. **Vinyl/latex gloves**

**Optional Items**

**Dental Puppets**
These are plush animals with large teeth that can be brushed. Dental puppets are helpful to demonstrate brushing and also as a distraction during the oral health assessment.

**Treasure Chest and Toys**

“**Tenders**” to clean a baby’s teeth. These are soft covers that are put on the caregiver’s finger and then the caregiver wipes the baby’s teeth. Some people prefer this to a child’s toothbrush for babies.

**Infant-Toddler Safety Toothbrushes**
These toothbrushes are set on large circular or triangular handles so that the toothbrush handle can’t be poked into the child’s mouth.
Supply List for the Oral Health Assessment (cont.)

**Vendors for the Optional Items:** There are many sources for these products if you search the internet. We have listed three here for your convenience:

Practicon  
www.practicon.com

SmileMakers  
www.smilemakers.com

Plaksmackers  
www.plaksmackkers.com  
(800) 558-6684

**Carefree Koolerz® gum with xylitol:** This gum can be purchased at most grocery stores, Walmart, Target, and other discount stores. We have listed two online sources for discounted prices:

www.itsalldirect2u.com  
Click on “candy store” and then “sugar-free” to view Carefree Koolerz® gum.

www.otcretail.com  
Click on “confections” and then type in Carefree Koolerz® gum.

* There are also many other xylitol gums available from dental supply companies and direct over the internet. Keep in mind that Carefree Koolerz® has more xylitol per piece than most gums, and it can be easily purchased by your patients. It’s a good idea to provide a sample pack of the gum so that people know what to look for in the store.

**Peridex: Chlorhexidine Gluconate 0.12%,** Omni Oral Pharmaceuticals, 1-800-445-3386.
RISK ASSESSMENT

Child’s Name _________________________________                             Date ______________
Child’s Age    _____                             Birth Date      _________________________
                             Child’s next dental care visit: __________

HEALTH HISTORY
Did birthmother have any problems during pregnancy?     Yes □  No □
Was child premature? □ □
Was child’s birth weight low? □ □
Were there any complications at birth? □ □
Has your infant been ill? □ □
Is your child on any medications? □ □

DIET AND NUTRITION
Is/ was your child breastfed? □ □
Does your child sleep with a bottle? □ □
Does your child drink from a cup? □ □
Is your child on a special diet? □ □

FLUORIDE ADEQUACY
Do you know the fluoride level of your water? □ □
Do you have well water? □ □
If yes, has the water been tested? □ □
Do you use bottled water? □ □
Do you use a water conditioner or filtration system? □ □
If yes, please list__________________
Do you use a fluoridated toothpaste for your child? □ □

ORAL HABITS
Does your child use a pacifier? □ □
Does your child suck a thumb or fingers? □ □
Does your child grind teeth day or night? □ □

INJURY PREVENTION
Is your child walking? □ □
Is your home childproofed? □ □
Do you use a car seat for your child? □ □
Has your child had an oral/facial injury? □ □

ORAL DEVELOPMENT
Does your child have any teeth? □ □
Child’s age (in months) when first tooth erupted? ______
Has your child experienced teething problems? □ □
Have you noticed any oral problems in your child? □ □

ORAL HYGIENE
Do you clean your child’s teeth / gums? □ □
Do you use a toothbrush to clean your child’s teeth? □ □
Do you use toothpaste to clean your child’s teeth? □ □
Oral Health History Questionnaire

Parents and caregivers – use this form to document the oral health of each of your children. This will be part of your child’s health record.

Parent’s/Guardian’s Name

Child’s Name __________________________________________ Child’s Age____________

Date __________

Yes  No Does your family drink fluoridated water or do your children take fluoride supplements? (To find out if you reside in a fluoridated area, ask your health care provider or call your local water district.)

Yes  No Does your child use a toothpaste with fluoride in it?

Yes  No Do you help your child under six years with toothbrushing?

Yes  No Have you or your children ever had a bad dental experience?

Yes  No Have any of your children ever had cavities?

Yes  No Does your child complain of mouth pain?

Yes  No Does your child take a bottle to bed?

Yes  No Does your child walk around with a bottle or cup?

_______ How many times does your child snack each day?

_______ How many bottles does your child have each day?

Health care providers and well-child professionals may photocopy this age-specific prevention checklist and distribute it to parents/caregivers.

Adapted from U.S. Public Health Service/Indian Health Service.
Reference 7:
Fluoride Varnish Study 2006
Fluoride Varnish Efficacy in Preventing Early Childhood Caries

INTRODUCTION

Early childhood caries is a public health problem sometimes affecting young children almost as soon as their teeth erupt. In severe cases, pediatric dental services may require anesthesia in the operating room, services often unavailable, especially for low-income, underserved groups. In California, the early childhood caries prevalence is particularly high in some low-income racial/ethnic populations. Findings from the 1993-94 statewide oral health needs assessment (Pollick et al., 1999; Shiboski et al., 2003) showed early childhood caries prevalence (≥ 1 decayed, extracted, or filled primary maxillary incisor) was 14% among all preschool children, but higher in children from low-income families enrolled in Head Start programs: 44% among Asians and 39% among Latinos.

Fluoride varnish is a concentrated topical fluoride with a resin or synthetic base. At least 19 fluoride varnish reviews (Weintraub, 2003), including a systematic review (Bader et al., 2001) and three meta-analyses (Helfenstein and Steiner, 1994; Strohmenger and Brambilla, 2001; Marinho et al., 2002) have been published in English. Most studies examined fluoride varnish efficacy in the permanent teeth of school-aged children. Consensus statements (NIH, 2001) regarding fluoride varnish differed for permanent and primary teeth. They stated, "The evidence for the benefit of applying fluoride varnish to permanent teeth is generally positive. In contrast, the evidence for the effectiveness of fluoride varnish applied to primary teeth is incomplete and inconsistent."

The objective of this two-year randomized controlled trial was to determine the efficacy of different fluoride varnish application frequencies with parental/caregiver oral health counseling vs. counseling alone in preventing early childhood caries incidence in young, initially caries-free children.

MATERIALS & METHODS

Before implementation, the University of California, San Francisco Institutional Review Board approved this study. An NIH-appointed Data and Safety Monitoring Board provided additional oversight.

Participants

This trial occurred at two public health centers, the Family Dental Center at San Francisco General Hospital (SFGH), and the San Francisco Department of Public Health's Chinatown Public Health Center (CPHC), serving primarily low-income, underserved Hispanic and Chinese populations, respectively. San Francisco has been optimally fluoridated (~1 ppm) since 1952.

Inclusion criteria for children at enrollment were: four erupted maxillary incisors; all primary teeth caries-free without demineralized, white spots; age 6-44 months; born in San Francisco or a fluoridated community in the San Francisco Bay Area and planning to reside in San Francisco for at least two years (eliminating water fluoridation as a potential confounder and
demonstrating geographic stability); and a parent providing informed consent in English, Spanish, or Chinese. Children were excluded from the study if they had: medical problems or medications possibly affecting oral health; cleft lip/palate; developmental disabilities; transient residence; or another household member participating.

**Recruitment and Follow-up**

Between October, 2000, and August, 2002, families were recruited primarily from Well Child Clinics, Women, Infants and Children Supplemental Nutrition Programs, and dental clinics. Follow-up was completed in August, 2004.

**Randomization**

Children with parental consent were randomly assigned to one of three arms: parental counseling plus fluoride varnish twice/year (baseline, 6, 12, and 18 months) with four intended applications (4FV); parental counseling plus fluoride varnish once/year (baseline and 12 months) with two intended applications (2FV); or counseling only, with no fluoride varnish (0FV). The study team's biostatisticians conducted the computer-generated random assignment of participants, stratified by center, using permuted blocks of various sizes unknown to the clinicians. Assignment was concealed in sealed, opaque, labeled envelopes, unopened until time for treatment by the clinician.

**Intervention and Measurements**

**Dental Examinations**

Dental examinations, without radiographs, were conducted three times: at baseline prior to the intervention, and one and two years post-intervention. Older children's examinations were conducted in a dental office; very young children had a knee-to-knee examination (Ramos-Gomez et al., 2002). Universal infection control procedures were followed. Children's saliva samples were collected during dental examinations, before any fluoride varnish application, for the assessment of salivary mutans streptococci (MS), lactobacilli (LB), and fluoride concentrations. Salivary assay results will be reported separately.

**Parental Interview**

The Project Director trained and calibrated staff in conducting interviews. Questionnaires were translated into Spanish and Cantonese, back translated into English for the assessment accuracy, and revised if necessary. The family member/caregiver was interviewed about factors associated with early childhood caries or dental caries, potential confounders, and effect modifiers, including sociodemographic, biologic, and behavioral factors, including questions about bottle use, diet, and dental utilization.

**Parental Counseling**

The annual counseling protocol followed the American Academy of Pediatric Dentistry's (AAPD) anticipatory guidance recommendations (Nowak and Casamassimo, 1995; Nowak, 1998). Thus, it was inappropriate for the control group to receive an examination without counseling or education having been provided. Individualized counseling visits followed these age-specific recommendations (6-12 months, 12-24 months, 2-5 years), in the parents' preferred language, by a trained team member.

**Fluoride Varnish Application**

Duraphat® (Colgate Oral Pharmaceuticals, New York, NY, USA) fluoride varnish was used with 0.1 mL (1 drop) applied per arch. Parents/caregivers were asked to refrain from brushing their children's teeth with a fluoride dentifrice the day of varnish treatment, to minimize total fluoride exposure that day. Teeth were dried with gauze, and varnish was brushed onto all surfaces of the maxillary and mandibular anterior teeth, and the proximal and occlusal surfaces of the posteriors. One dentist (BJ) who spoke English, Spanish, and Cantonese provided clinical interventions at both sites. Masking accompanying caregivers to the control group assignment was attempted. The control group's tray set-up was the same. For children in this group, fluoride varnish was placed on gauze, which was then folded. The dry area was used to wipe the child's teeth, and no fluoride varnish was applied.

**Primary Outcome Measures**

The primary outcome was any caries incidence. We used the NIDCR diagnostic criteria for dental caries (USDHHS, 1991) for assessing cavitated, decayed (d1+), and filled surfaces on primary teeth (d2+fs). We used supplemental criteria (Drury et al., 1999) to diagnosis pre-cavitated lesions (d1). One pediatric dentist (FRG), masked to treatment group, conducted all dental examinations. Intra-examiner reliability, from repeat examinations of 21 children, yielded a kappa statistic of 0.96, indicating excellent agreement. Two years of follow-up were planned unless caries was detected at the one-year follow-up examination, in which case children were considered treatment failures and were referred for dental care.

**Sample Size**

We planned a sample size of 384 participants (128/study arm) (alpha = 0.05, power = 90%, 50% attrition, chi^2 test) to detect caries incidence differences, based on caries incidence in the literature (20% to 50% over two years). A similar study (Weinstein et al., 1994) reported 53% attrition in six months.

**Data Analysis**

For primary analysis, we used the intention-to-treat (ITT) approach (Fisher et al., 1990). Protocol-compatible analyses used number of actual active fluoride varnish applications. Analyses used data from all children with a follow-up dental examination. Primary analysis tested two-year caries incidence among treatment groups, with a two-degree-of-freedom (d.f.) non-parametric extended Mantel-Haenszel (EMH) test stratifying on center (Koch and Edwards, 1988). A priori step-down comparisons (Koch and Gansky, 1996) of each varnish group vs. control were performed, each at p ≤ 0.05: (1) 4FV vs. 0FV and (2) 2FV vs. 0FV; step (2) was performed only if step (1) was significant. A 1 d.f. EMH test, stratifying on center, tested trends across intended and actual number of applications. Logistic regression tested treatment group differences in incidence, with adjustment for covariates and treatment x center homogeneity. Supplemental analyses used linear regression to compare log (d1+fs +1) and log (d1+fs +1) among groups, adjusted for covariates (since d1+fs is skewed). Confounders were defined as changing model treatment coefficients by ≥ 20%. Since 96 children had no follow-up examination, multiple imputation (Schafer, 1997) with the Markov Chain Monte Carlo estimation (20 imputations) used center, assigned group, number of actual fluoride varnish applications, factors related to loss-to-follow-up (mother's age, dental pain barrier, dental fear barrier, and fluoride toothpaste use), and salivary measures (log10 MS and log10 LB) to impute log (d1+fs +1) scores.

**RESULTS**

**Enrollment and Retention**

There were 376 children enrolled and randomized, with a mean
(standard deviation) age of 1.8 (0.6) yrs: 200 at SFGH and 176 at CPHC. Overall, 53% were girls, 47% were Hispanic, 46% were Asian, and 7% were other race/ethnicity. No randomization imbalances were apparent. About 60% of those screened and found to be ineligible had existing dental caries. At the 12-month follow-up examination, 70% of enrolled children (n = 261) were seen; 51 of them were discontinued from the study due to caries, and were referred for care (Fig. 1). Twenty-seven caries-free children seen at 12 months were not seen at 24 months. Thus, 78 children had their last follow-up examination at 12 months. At the final, 24-month follow-up, 202 children were seen (67% retention, including the 51 children with caries at 12 months). There were 280 (74%) children with a 12- or 24-month follow-up visit.

Protocol Deviation
Due to an unexpected protocol violation (see APPENDIX), children unintentionally received a placebo varnish instead of active product during a 10-month period, even though this study had no planned placebo varnish. Among children with follow-up examinations, most (75%) who were intended to receive two applications received only one with active product; 15% received two. About half (49%) who were intended to receive four applications received only two, and 29% received three. Only one child received four active applications. For five weeks, a total of 21 varnish applications could not be confirmed as active. We conservatively assumed, for analytical purposes, that they were placebo applications.

Clinical Outcomes
Primary analysis showed a statistically significant reduced percentage of children with any caries incidence (any decayed or filled surfaces at the last follow-up examination), when children in groups with any intended fluoride (2 or 4 treatments) were compared with the control group (Fig. 2) (2 d.f. EMH p < 0.001; 1 d.f. step-down 4FV vs. 0FV and 2FV vs. 0FV both p < 0.003; multiple imputation 2 d.f. p < 0.034), or actual active applications vs. none (3 d.f. EMH p < 0.001; multiple imputation 3.d.f. p < 0.001). The percentage of children with caries decreased with increasing numbers of intended or actual active applications linearly (both p < 0.001).

Supplemental analyses showed that the child who received four fluoride varnish applications had no caries, but did have a pre-cavitated lesion at the final visit. The magnitude of caries experience at the last examination, by intended treatment group and number of active fluoride varnish applications, was analyzed two ways, with and without pre-cavitated lesions (d1+fs and d2+fs). For both, results showed significant inverse dose-response effects (Table 1). Linear regression of log (d2+fs +1) and log (d1+fs +1), adjusted for center, showed statistically significant decreases in caries experience with increasing number of intended or actual active fluoride varnish treatments (both p < 0.001; both multiple imputation p < 0.002). Of the 79 children with d2+fs, only 12 had any restorations. The magnitude of caries experience was also reduced for a single dose of fluoride against none (p = 0.004). However, this comparison is not significant when the proportion of children with caries is compared (p = 0.121). Significant odds ratios

Figure 1. Flow of study participants. Children with and without dental caries at each examination by intended (randomized) fluoride varnish (FV) treatment group. * 27 children with no caries at 12 months were not seen at 24 months; 19 children with a 24-month examination missed the 12-month examination.

Figure 2. Caries incidence at last follow-up examination by intended treatment group and number of active fluoride varnish applications (n = 280). * 3 active applications + one child with 4 active applications. Intended groups are the groups randomized to receive 0, 2, or 4 fluoride varnish applications. Active groups are the children stratified by number of actual fluoride-containing varnish applications received (see text and APPENDIX).
were obtained when the caries incidence in the counseling only group was compared with the intended and actual number of fluoride varnish applications (Table 2). Center was never a significant predictor or effect modifier of caries incidence or magnitude (p > 0.540). No adverse events or safety issues resulting from the fluoride varnish use were reported by accompanying adults.

DISCUSSION
Study findings support the use of fluoride varnish to prevent early childhood caries and reduce caries increment in very young children. AAPD (www.aapd.org, 2004) and AAPHD (www.aaphd.org, 2004) guidelines support a dental assessment by a child’s first birthday or first tooth eruption. Fluoride varnish efficacy in this age group provides additional rationale for an early dental visit, especially for high-caries-risk children, since the application of fluoride varnish at this first visit will help reduce future disease. Some children were even younger than age 1 at the first visit. We had little difficulty with cooperation of the young infants with the fluoride varnish. Collecting saliva was more problematic, but was possible with parental help. Public facilities sometimes find it difficult to see children at regular six-month intervals. Thus, determining the efficacy of only one application of varnish a year was important. Although more frequent varnish applications were more beneficial, one application was preferable to none.

The Cochrane collaboration meta-analysis (Marinho et al., 2002) obtained a pooled d(e/m)fS prevented fraction of 33% (95% CI, 19-48%) based on three clinical trials. In our study, it ranged from 52 to 92%, by treatment group. The systematic review (Rozier, 2001) for the NIH Consensus Conference compared seven studies of fluoride varnish showing mixed effectiveness on primary teeth. Some were not randomized clinical trials, and none included children as young as those in our study (see APPENDIX).

The Cochrane reviewers (Marinho et al., 2002) recommended that fluoride varnish studies include reports of adverse events or safety concerns. At each visit, families were asked about adverse events; only 1 adverse event was noted for a child in the four-fluoride-varnish group, with "ulcer on the cheek" at the 18-month visit having onset 2 months after the last fluoride varnish application, which was "fluoride-free". The ulcer was gone at the 24-month visit. Some concerns about applying fluoride varnish to asthmatic children have been noted (Blinkhorn and Davies, 1998). However, from parental report, of the 21 children with asthma, none of the fluoride varnish recipients had adverse events. A 95% upper bound on adverse event incidence in asthmatic children was 0.14 (Hanley and Lippman-Hand, 1983).

Many children with caries at the screening examination were ineligible. This study was intended to determine the success of preventing caries incidence, not increment. It did not address fluoride varnish efficacy for children with extant caries.

An important lesson in efficacy trials is always to test the presence and quantity of the product's active ingredient prior to and during study implementation, and to implement quality control measures to identify and correct protocol deviations as soon as possible. Most studies’ non-compliance/non-adherence is participant-generated. In this study, only the entry time was related to number of active treatments, making results more generalizable. This study provides support for the conduct of future caries-prevention clinical research in community health centers serving vulnerable and minority populations. Because the study occurred at these sites, findings are more generalizable to settings serving many high-caries-risk children than other potential locations. Similar results from the two

| Table 1. Mean dfs and dfs + Pre-cavitated Lesions at Last Follow-up Visit by Intended Treatment Group and Number of Active Fluoride Varnish Applications (n = 280) |
|---------------------------------|--------|-----------------|-----------------|-----------------|-----------------|
|                                | n      | Mean dfs* SD    | Mean dfs* SD    | Mean dfs* SD    | Mean dfs* SD    |
| Intended Treatment Group       |        |                 |                 |                 |                 |
| 0                               | 100    | 1.77**          | 3.1             | 2.74**          | 3.4             |
| 2                               | 93     | 0.7**           | 1.8             | 1.3**           | 2.3             |
| 4                               | 87     | 0.7             | 2.1             | 1.4**           | 3.1             |
| # Active Fluoride Varnish Applications |        |                 |                 |                 |                 |
| 0                               | 118    | 1.6**           | 3.0             | 2.84**          | 3.7             |
| 1                               | 79     | 0.8             | 2.1             | 1.2             | 2.3             |
| 2                               | 57     | 0.7             | 2.1             | 1.2             | 2.4             |
| 3-4                             | 26     | 0.1             | 0.6             | 0.6             | 1.6             |

* ddfs = number of cavitated decayed or filled surfaces.
 dfs = number of pre-cavitated or cavitated decayed or filled surfaces.
 SD = standard deviation.
 PF% = prevented fraction: [(control mean - intervention mean)/control mean] x 100.
 Intended Group = as randomized, intention-to-treat analysis.
 # Active Applications = number of varnish applications containing fluoride actually received (see text and APPENDIX).
 3-4 includes one child with 4 applications.
 ** p-values ≤ 0.01 for comparisons with group receiving no fluoride varnish applications.

| Table 2. Caries Incidence Comparisons, Adjusted for Center, by Intended Treatment Group and Actual # Active Fluoride Varnish Applications (n = 280) |
|---------------------------------|--------|-----------------|-----------------|-----------------|
| Comparison by Intended Treatment Group | Odds Ratio | 95% Confidence Interval |
| 0 vs. 4                         | 3.8    | 1.9, 7.6        |
| 0 vs. 2                         | 2.2    | 1.2, 4.1        |

Comparison by # Active Fluoride Varnish Applications

| Comparison by # Active Fluoride Varnish Applications | Odds Ratio | 95% Confidence Interval |
| 0 vs. 3-4* | 18.3 | 2.4, 138.5 |
| 0 vs. 2    | 3.4  | 1.6, 7.5  |
| 0 vs. 1    | 2.5  | 1.3, 4.7  |

* Includes one child with 4 active fluoride applications.
clinical sites with different populations increase generalizability of the findings. Fluoride varnish and parental counseling should be recommended as part of caries prevention programs targeting infants and toddlers.

ACKNOWLEDGMENTS

The authors thank the staffs at the San Francisco General Hospital and Chinatown Public Health Center for all their assistance in helping to make the trial run go smoothly at these health centers. Ms. Marcia Rapozo-Hilo tested the varnish for fluoride content at UCSF, and Dr. Gary Whitford did likewise at the Medical College of Georgia. We thank Dr. Ruth Nowjack-Raymer, who served as the NIH Project Officer, and Dr. Gary Rozier, who served as Chair of the Data and Safety Monitoring Board (DSMB), and the rest of the DSMB for their guidance during the study. This investigation was supported by USPHS Research Grants P60 DE13058 and U54 DE142501 from the National Institute of Dental and Craniofacial Research and the National Center for Minority Health and Health Disparities, National Institutes of Health, Bethesda, MD 20892, and by the UCSF Department of Preventive and Restorative Dental Sciences. Colgate Oral Pharmaceuticals provided the fluoride varnish. The information was presented, in part, at the 2005 IADR meeting, Baltimore, MD.

REFERENCES


Reference 8:
OHDP Patient Satisfaction Survey
Patient Satisfaction Survey: (Insert Name) Dental Clinic

We would like to get your feedback about your experience in our dental clinic. Please take a few minutes to provide your answers to the questions below. Your information will help us to provide better care for all of our patients. Thank you!

<table>
<thead>
<tr>
<th>How satisfied were you with:</th>
<th>Not Satisfied</th>
<th>Satisfied</th>
<th>Very Satisfied</th>
<th>Don’t know</th>
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<tr>
<td>The care provided by the dental clinic staff?</td>
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<td>The education you received?</td>
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<td>The process of making an appointment?</td>
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<td>The waiting time in the clinic?</td>
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<tr>
<td>The time it took to complete your visit?</td>
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</table>

Would you recommend this dental clinic to others?  Yes______ No_____

Please feel free to provide additional comments below:
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
Reference 9:

CHP Dental Balanced Scorecard
Dental Balance Score Card

Staff satisfaction

RVU - Encounters

No Show Rate

Paycode 13

DDS pt visits per day

DTPC

supplies < 1 year

Payor Mix Percentage - Dental

Daily Collections by check out desk

Daily Collections by check out desk

Goal Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Linear (Goal) Log (Goal)
Reference 10:
Perinatal Oral Health
HRSA Vision for Oral Health

To improve the nation’s health by assuring access to comprehensive, culturally competent, quality oral health care for all, as an integral component of comprehensive health care.
“Oral health is essential to the general health and well-being of all Americans and... improved oral health can be achieved by all Americans... 

Great progress has been made in reducing the extent and severity of common oral diseases ...however, not everyone is experiencing the same degree of improvement.”
Current Trends Among Pregnant Women in Dental Service Utilization

- Generally poor dental service utilization
- Limited or lack of dental insurance
- Perceived need for services diminished
- Lack of medical and dental provider referral*
- Dental provider uncertainty due to gaps in evidence-based SOC*
- Tendency to postpone treatment
Goals

• Integrate oral health into primary health care services

• Expand the availability of dental care for pregnant women

• Increase awareness among the general public about the importance of oral health care for pregnant women, new mothers, infants and toddlers
Oral Health Care Model

Health System – Oral Health System

Health Care Organization
- Private Practice, Public and Community Coordination
- Clinical Information Systems
- Decision Support
- Delivery System Design
- Workforce Models
- Patient Self-Management Support

Resources and Policies, HP2010, State Oral Health Plans, Surveillance & Data, Oral Public Health Infrastructure, Organized Dentistry, Dental Education

Informed, Activated Patient/Consumer

Productive Interactions

Prepared, Proactive Oral Health Team

Improved Oral Health Status, Functional and Clinical Outcomes
What oral diseases affect pregnant women?

- Dental disease - tooth decay
- Periodontal disease
  - Gingivitis
  - Pregnancy Gingivitis
  - Periodontitis
  - Periodontosis
Dental Disease – Dental Caries

- NOT Synonymous with cavities
- Ongoing Disease PROCESS (similar to diabetes)
- Cavities: RESULT or Outcome of untreated dental caries
- Process: demineralization $\leftrightarrow$ remineralization
- Multifactorial
- Primary cariogenic organisms
  - Strep mutans
  - Lactobacilli
Dental Caries Management

• Microorganisms colonize
  ▪ Once organisms are established, ongoing infectious disease (process) must be managed by balancing risk factors with protective factors
  ▪ Dental caries can exist when no obvious cavities are present
  ▪ Only through continuous disease management can we prevent new cavities and the need for restorative (surgical) services

• Individual risk assessment is KEY!

• One size fits all protocols don’t work anymore!
Dental Caries

Risk Factors
• High SM levels
• Frequent ingestion of fermentable carbohydrates
• Limited access to fluoride
• Compromised salivary flow

Protective Factors
• Chlorhexidine*
• Access to fluoride*
  ▪ Fluoridation
  ▪ F Dentifrice 2x daily
  ▪ F Mouthrinse
• Xylitol
• Routine professional dental care
• Daily oral hygiene
PROGRESS OF TOOTH DECAY
How can dental caries in a new mother affect her young child?

• Dental caries is an infectious disease where SM microorganisms are passed from mother to child
• Infectivity potentially begins with eruption of the first tooth

Therefore…

• Interventions should be aimed at minimizing the level of microorganisms in the mother and breaking the route of transmission to the child
• Oral health education and anticipatory guidance must include information on the need for ongoing balancing of risk and protective factors
• All primary care visits should include education and AG
Periodontal Disease

• Oral infection
• Caused by anaerobic bacteria in the plaque bio-film that forms on dental surfaces
• Gingivitis – Inflammation and infection of the gums
• Periodontitis- Inflammation and infection of gums and bone
• These bacteria have the potential to colonize sub- gingival plaque and generate by-products that directly injure tissue and elicit inflammatory or immune responses
Biologic Mechanisms for PTLBW Infants

Preterm Births
Periodontal Disease Connection Theory

Hematogenous Transmigration

Periodontal Bacteria (LPS)
Cytokines (PGE,)

Entry of inflammatory products (PGF2, IL-6, TNF-α), endotoxin, and/or periodontal bacteria into the bloodstream and their translocation to the fetus and decidual tissues (i.e., placenta)
Periodontal disease is a Pro-Inflammatory Response

Periodontitis – Inflammatory Process

Pro-inflammatory cytokines (IL-1, IL-6, TNF-A) and prostaglandins (PgE2) accumulate in the gum tissues in active periodontitis at extraordinary levels and can enter the circulation.

Salvi et al, Annals of Perio 97

Periodontitis is an anaerobic infection flooding the blood stream 24 hours a day with endotoxins and inflammatory mediators.

Offenbacher, 1998

Following dental scaling, the low grade bacteremia resulted in increased circulating cytokines (TNF-a and IL-6).

Ide 2004
Facts about Pre-term Birth and Low Birth Weight

• In the United States, 12% of newborns are born low birth weight
  ▪ LBW is defined as < 2500 g
• 25% of preterm low birth weight cases occur without any known risk factors
  ▪ PTB is defined as < 37 weeks gestation
• The number of low birth weight babies increased 6% between 1985 and 1993
• Each year, more than $5 billion dollars are spent for the health care of low birth weight children
• Low birth weight is related to 60% of infant mortality
Facts about Pre-term Birth and Low Birth Weight

• While efforts to rescue low birth weight infants are excellent, efforts to prevent low birth weight or preterm births have generally been unsuccessful.

• African American infants are twice as likely as infants of nearly all other ethnic/racial groups in America to be born low birth weight and to be born preterm.
Risk Factors for Pre-term, Low Birth Weight Infants (PLBW)

Age
Hypertension
Diabetes
Inadequate prenatal care
Drugs, alcohol and tobacco abuse
African American ancestry
25% unknown

Low SES
GTI
Multiple pregnancies

25% unknown
What’s the link?

• Researchers are focusing on the possibility that periodontal infections interfere with normal physiological regulation of labor and delivery

• Throughout pregnancy, levels of prostaglandins and cytokines steadily increase until a critical threshold level is reached inducing labor, cervical dilation and delivery

What’s the link?

- The bacteria associated with periodontal disease are capable of stimulating excessive production of cytokines and prostaglandins, potentially initiating pre-term labor and delivery.

Literature Review

- 1994-1995 Offenbacher (animal studies)
- 1996 Offenbacher (case control study)
- 1998 Offenbacher (case-control study)
- 1999 Offenbacher (case-control-laboratory)
- 2001 Jeffcoat (prospective study)
- 2002 Madianos meta analysis
Jeffcoat Study Design

Three Treatment Groups

• Double blind, randomized assignment to one of three treatment groups
  ▪ Dental Prophylaxis + placebo pill
  ▪ Scaling and root planing + placebo pill
  ▪ Scaling and root planing + metronidazole

2002
Study Patient Population

- 22 weeks of gestation
- Signed informed consent
- Willing to participate in OB and dental portions of study
- No medical contraindication to participation
- Not participating in another clinical trial
Incidence of Preterm Births at Less Than 37 Weeks

- 13.7% Reference group with periodontitis
- 8.9% Prophylaxis + Placebo
- 4.0% Scaling and root planing + Placebo
- 12.5% Scaling and root planing + Metronidazole
Incidence of Preterm Birth Relative to the Reference Group
(preterm birth at less than 37 weeks)

Ref=Reference group with periodontitis; Pl=Placebo; Met=Metronidazole
Results

• Periodontal treatment appeared to reduce the incidence of preterm birth in study subjects

• Scaling and root planing provided the greatest reduction in the incidence of preterm birth

• *This study represents a trend – a potential association which suggests the need for further research to prove causality
Additional Studies – Evidence Needed

- MOTOR and O??? Studies due for completion in 2006
- Large study populations, multi-site
Clinical Considerations
Overview of Pregnancy

- Complex physiological and psychological changes
- Hormonal effects cause changes in nearly all organs and systems
- Oral cavity is no exception
- Numerous oral conditions and diseases
- Myths about oral conditions and Tx services
- Dental service utilization poor
- Clinical guidelines and policies sparse
Oral Conditions and Diseases

- Enamel Erosion
- Dental Caries*
- Pregnancy Gingivitis*
- Periodontal Disease*
Enamel Erosion

- Vomiting
- Palatal surfaces of maxillary teeth
- Thermal sensitivity
- Dentin exposure

- Recommended Therapy
  - Avoid tooth brushing
  - Use of neutral NaF mouthrinse
Dental Caries in Pregnant Women

- All pregnant women are at risk
- Risk is no greater than that of non-pregnant women
- Food cravings may increase desire for sugar-sweetened foods and beverages
- Risk Factors include:
  - Frequent ingestion of fermentable carbohydrates
  - Presence of SM
  - Compromised salivary flow
  - Limited fluoride
Pregnancy Gingivitis

- Inflammation of gums
  - Redness, swelling, heat and pain
  - Caused by plaque, bacteria on tooth surfaces adjacent the gum tissue
  - Commonly observed in second trimester due to rise in estrogen levels in blood
  - Preventable with 2x daily brushing with F tooth paste and flossing
Periodontal Disease

• All pregnant women are at risk
• Risk is no greater than for women who are not pregnant
• Gram-negative anaerobic bacteria
• Infection and inflammation of soft tissues >> gingivitis
• Progression to hard tissue: periodontitis
  ▪ Bone loss >> tooth mobility >> potential premature tooth loss
AHRQ Guidelines

- American Academy of Periodontology
AHRQ: Periodontal Treatment Consideration for Pregnant Women

• Diagnosis of the patient's periodontal condition.

• Consideration of consultation with patient's physician to advise of the presence of periodontal infection and proposed treatment.

• Consideration of gestational period; status of pregnancy; and risk factors for periodontitis which may influence pregnancy outcomes.

• Education of the patient regarding the possible impact of periodontal infection on pregnancy outcomes.

• Periodontal therapy and patient motivation to establish and maintain periodontal health.
AHRQ
MAJOR RECOMMENDATIONS

• Diagnosis

• *Patient Evaluation*

• A comprehensive periodontal evaluation should be performed as described in the “Parameter on Comprehensive Periodontal Examination”.

• The medical history should be evaluated for existing systemic diseases or conditions, medications, and risk factors for systemic diseases.

• Other health care providers may be consulted as indicated by the patient's systemic health status, periodontal condition, and proposed treatment. Any consultation should be documented.
Therapeutic Goals

• The therapeutic goals are to diagnose periodontal infections which may impact on the patient's systemic health; to inform the patient of possible interactions between the patient's periodontal disease and systemic condition; and to establish periodontal health which may minimize potential negative influences of periodontal infections.

• Research and clinical experience indicate that periodontal infections may have an impact on the following diseases or conditions:
  • Diabetes mellitus
  • Pregnancy
  • Cardiovascular diseases
Outcomes Assessment

• The desired outcome of therapy is to prevent adverse systemic consequences of existing periodontal infection via:

• Knowledge of the patient's medical history and systemic status, the periodontal condition, and the possible interactions between oral and systemic health or disease

• Reduction of clinically detectable plaque and periodontal pathogens to a level compatible with periodontal health.

• Reduction of clinical signs of gingival inflammation

• Reduction of probing depths

• Stabilization or gain of clinical attachment

• Control of acute periodontal infections

• Addressing the risk factors for periodontal disease as they affect the systemic condition.
Indian Health Service Periodontal Disease Quick Screening Tool
Important Screening Signs & Questions

**Screening Signs of Periodontal Disease:**
- Loose Teeth
- Red, Swollen, Bleeding, or Receding Gums
- Possible Pain & Discomfort when Chewing

**SCREENING QUESTIONS:**
- Do your gums bleed, especially when you brush or floss your teeth?
- Are any of your teeth loose?
- Do you have bad breath, or been told you have bad breath?
- Do you have a bad taste in your mouth that won’t go away?
- If you have young children...are you aware that bad bacteria from your mouth can be passed from you to your children?
Visual Clinical Assessment

Healthy Gums & Periodontal Tissues
Visual Clinical Assessment

Moderate Periodontal (Gum) Disease

Pregnancy Tumor (Pyogenic Granulomas)
Visual Clinical Assessment

Severe Periodontal (Gum) Disease

Severe Gum Disease with Recession
Oral Health Myths of Pregnant Women

• Unborn child robs the mother of her calcium
• Osteoporosis
• Tooth loss for every pregnancy
Myths about Dental Care During Pregnancy of Dentists
Patient Management Considerations
First Trimester

- Most fetal organ development occurs at this time
- Increased fatigue
- Syncope
- Postural hypotension
- Nausea and vomiting
Patient Management Considerations
Second Trimester

• Symptoms dissipate
• Moderate comfort level
• Development of fetal dentition
  ▪ Susceptibility to tetracycline
Patient Management Considerations
Third Trimester

- Increased fatigue
- Increased physical discomfort
- Mild depression
Professional Dental Care

• Regular dental visits should be continued throughout pregnancy
• A complete health and dental history should be taken to determine the general health of the pregnant woman
• Minimal health assessments at each visit should include:
  - Blood Pressure
  - Pulse
  - Respiration
Timetable for the Management of Oral Health during Pregnancy

1st Trimester: Treatment may need to be limited due to morning sickness. Considerations for first trimester should be observed. Dental care may include Phase 1 dental care services. Dental providers and pregnant women should consult prenatal care providers about the use of anesthetics and medications.

2nd Trimester: Traditionally dental care is administered during this time. Considerations for second trimester should be observed. Dental care may include Phase 1 dental care services. Dental providers and pregnant women should consult prenatal care providers about the use of antibiotic, anesthetics and other medications.

3rd Trimester: Considerations for third trimester should be observed. Dental care may include Phase 1 dental care services. Dental providers and pregnant women should consult prenatal care providers about the use of antibiotic, anesthetics and other medications. Treatment may be impeded due to increased physical discomfort.
NUTRITION

• Effect on fetal tooth development

• Primary tooth development begins between the second and third month of pregnancy, and permanent teeth begin to form several months before birth.

• A well-balanced diet with enough protein, calcium, phosphorus, and vitamins (especially A, C, and D) is recommended.

• Vitamin A helps to develop the tooth enamel

• Vitamin C is important in the formation of dentin

• Vitamin D aids in the absorption of calcium and phosphorus.

  ▪ A very low intake of these nutrients can result in malformation of the mouth and in the development of teeth that are more likely to decay.
Use of Radiographs

• No established professional clinical guidelines
• ADA: Decision of the examining dentist based on individual patient risk assessment
• Only when essential
• Observe safety:
  ▪ High speed films
  ▪ Filtration
  ▪ Collimation
  ▪ Lead aprons*
• Routine radiographs (BWX and FMX) should be avoided
Drugs that can be Prescribed and Those that are Contraindicated During Pregnancy

Source: www.agd.org/consumer/topics/pregnancy/main.html

<table>
<thead>
<tr>
<th>Drugs that can be prescribed during pregnancy</th>
<th>Drugs that are Contraindicated during pregnancy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Antibiotics:</strong> Penecillin, Cephalosporins, Amoxicillin, Clindamycin, Erythromycin (except estolate form)</td>
<td>Tetracyclines, Doxycyclines, Erythromycin estolate form</td>
</tr>
<tr>
<td><strong>Analgesics:</strong> Acetaminophen, Acetaminophen with codeine (in small doses)</td>
<td>Aspirin, Difunisl, Etodolac</td>
</tr>
</tbody>
</table>
Take Home Message

- Pregnant women should establish and maintain oral health for own benefit and for the oral health of her child;
- Dental caries should be managed during pregnancy;
- Restorative treatment can be safely performed on pregnant women;
- There is no known downside risk of addressing inflammatory periodontal disease in pregnant women;
- There is a potential upside benefit to acting on the association;
- And the upside benefit can significantly prevent ECC in children.
A Framework for Action

Targets
National, State, Local

Strategies
Change Perceptions of Oral Health
Accelerate Building and Use of Science
Build Effective Health Infrastructure
Remove Barriers to Oral Health Services

Partnerships
Federal agencies
States
Grantmakers
Professions
Academics
Business
Public
Policy Development

• Develop policies to incorporate oral health screening into Ob-Gyn visits

• Develop programs to train non-dental and dental providers on important issues for pregnant women

• State Medicaid coverage to include dental services for pregnant women:
  ▪ examination
  ▪ dental prophylaxis; scaling and root planing
  ▪ CHX and fluoride therapies (prevention services)
References

• Gaffield et al., *Trends* 2002
• Jeffcoat et al., *JADA* 2001:131
• Jeffcoat, et al., *J Periodontol* 2003
• Krejci et al., *Clinical Practice* 2002
• Madianos et al., *Obstetrics*, 58:7
• Madianos et al., J Periodontology Supplement, 29:3, 2002
• McGaw, *JCDA* 2002
Resources and References

Resources and References


• Health Disparities Chronic Care Model
  http://www.healthdisparities.net/about_chronic.html

• Periodontal Infection and Preterm Birth: Results of a Prospective Study. Obstetrical & Gynecological Survey. 57(1):5-6, January 2002.
  Jeffcoat, Marjorie K.; Geurs, Nico C.; Reddy, Michael S.; Cliver, Suzanne P.; Goldenberg, Robert L.; Hauth, John C.

Resources and References

• HRSA Programs
  ▪ http://www.hrsa.gov

• National Maternal and Child Health Resource Centers
  ▪ http://www.hrsa.gov
  ▪ http://www.mchoralhealth.org

• Jay Anderson
  ▪ JAnderson@HRSA.GOV
Reference 11:
Example of Flow Child
Example of Flow for Children 12 January 2006

1. Recruitment/referral (“What are the steps to get young children into the dental clinic?”)
   1.1 medical clinic assess whether patient has dental home
   1.2 for patients with no dental home, patient is referred to dental
   1.3 appointment is made [could mean patient is seen same day “instant appointment”]

   [Fall off between appointments and first exam]

2. Initial exam (“What are the steps of the initial exam?”)
   2.1 complete registration/paperwork of patient if necessary
   2.2 risk and fluoride assessment—checking the 10 risk factors
   2.3 do exam (dentist and dental assistant)
   2.4 record observations and create treatment plan (dentist and dental assistant)
   2.5 establish recall protocol (how often and when to see patient)

   [and handoff to treatment according to treatment plan; could be immediate flow from 2.4 to 3.1, extending the initial exam into the initial treatment]

   [fall off between initial exam and follow up]

3. Phase 1 Treatment
   3.1 deliver prophylaxis and fluoride treatment (depends on behavior and appropriateness of treatment)
   3.2 provide patient/caregiver education
   3.3 provide treatment as required beyond prophylaxis and fluoride
   [may be several cycles through 3.3 before step 3.4]
   3.4 judge and record that Phase 1 treatment is complete

4. Recall
   4.1 Mail recall card
   4.2 Appointment is made            Issue: patients don’t respond 100% to prompts from the clinic
   4.3 Go back to process 2
Reference 12:
Redesign Tools Exercises
Redesign Exercises & Assessment Tools

Oral Health Pilot Collaborative
June 29, 2006
Exercise #1a: Measuring Demand

• Track the number of telephone calls for appointments (& types of appointment)
• Plus number of calls/requests from medical clinic to see patients
• Plus number of walk-ins
• Plus, any other sources?
• Then add the number of patients you see that you ask to return
Demand

External

- Appointments
- Walk-ins
- Referrals
- Deflections
- Other

Internal

- Returns
This tracking form can assist in identifying the reasons for all of the calls that come into the practice. Keep track of each call and the reason for the call for each day of the week as well as time of day.

<table>
<thead>
<tr>
<th>Week of:</th>
<th>Appointment for Today AM PM</th>
<th>Appointment for Tomorrow AM PM</th>
<th>Appt. for Future AM PM</th>
<th>Work sent out ready? AM PM</th>
<th>Hygienist Care AM PM</th>
<th>Talk to Hygienist AM PM</th>
<th>Referral Information AM PM</th>
<th>Need Information AM PM</th>
<th>Message for Dentist AM PM</th>
<th>Talk with Dentist AM PM</th>
<th>Other AM PM</th>
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<td>Friday</td>
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</table>
Exercise #1b: Measuring Capacity

- Available appointment slots by provider by day of week
Analysis: And when they don’t match???

- Work down the backlog
- Reduce demand
- Increase capacity
Exercise #2a: What is the work of the practice? Visit Work

– 1st Time Visit-New Problem Assessments
– Follow-up Visits
– Examinations
– X-rays
– Patient education
– Prophylaxis
– Procedures
Exercise #2b: What is the work of the practice? Non-visit Work

- Making appointments
- Post-emergency follow-up
- Telephone and E-mail responses
- Phone follow-ups
- Prescription renewals
- Insurance and billing requirements
- Imaging results evaluation and reporting
- Referrals
- Nursing Home visits
What do you spend YOUR time doing? What is your best estimation of how much time you spend doing it? The goal is to have the right person doing the right thing at the right time. The group can discuss which activities are or are not appropriate for the individual’s level of education, training, and licensure.

Complete this form for each group of professionals such as dentists, hygienists, assistants or clerical staff, assessing their activities using the Activity Survey. This estimate of who does what is intended to reveal, at a high level, where there might be mismatches between education, training, licensure and actual activities. It is good to eventually have all roles and functions complete this survey for review and consideration. Be sure to create the same categories for each functional role. Some groups may hesitate to make time estimates; if this happens, just ask them to list their activities for the first review.

### Primary Care Practice Activity Survey Sheet

<table>
<thead>
<tr>
<th>Position: Dentist</th>
<th>% of Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity:</td>
<td></td>
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<tr>
<td>Specific Items Involved:</td>
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<td>Activity:</td>
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<td>Specific Items Involved:</td>
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<td>Specific Items Involved:</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Position: Hygienist</th>
<th>% of Time</th>
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<tbody>
<tr>
<td>Activity:</td>
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<td>Specific Items Involved:</td>
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<td>Specific Items Involved:</td>
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<td>Activity:</td>
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<td>Specific Items Involved:</td>
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<td>Specific Items Involved:</td>
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<td>Specific Items Involved:</td>
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</table>

### Activity Occurrence Example:

What’s the next step? Insert the activities from the Activity Survey Here.

Activities are combined by role from the data collected above. This creates a master list of activities by role. Fill-in THE NUMBER OF TIMES PER SESSION (AM and PM) THAT YOU PERFORM THE ACTIVITY. Make a mark by the activity each time it happens, per session. Use one sheet for each day of the week. Once the frequency of activities is collected, the practice should review the volumes and variations by session, day of week, and month of year. This evaluation increases knowledge of predictable variation and supports improved matching of resources based on demand.

<table>
<thead>
<tr>
<th>Role: Hygienist</th>
<th>Date:</th>
<th>AM</th>
<th>PM</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visit Activities</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Triage Patient Concerns</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family/Patient Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direct Patient Care</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Visit Activities</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Follow-up Phone Calls</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complete Forms</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintain supplies</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Miscellaneous</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total</th>
</tr>
</thead>
</table>
The Unplanned Activity Form assists the team in identifying waits and delays in the process of providing smooth and uninterrupted patient care. Each provider carries the card during a patient session and documents when and why patient care is delayed or interrupted. This data collection form can be modified for any member of the team. Put a "tic" mark for each incident of unplanned activity.

### Unplanned Activity Form

<table>
<thead>
<tr>
<th>Unplanned Activity</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phone Interruptions</td>
<td></td>
</tr>
<tr>
<td>Support Staff Interruptions</td>
<td></td>
</tr>
<tr>
<td>Prep not complete</td>
<td></td>
</tr>
<tr>
<td>Provider Interruptions</td>
<td></td>
</tr>
<tr>
<td>X-rays not available</td>
<td></td>
</tr>
<tr>
<td>Patient Phone Calls</td>
<td></td>
</tr>
<tr>
<td>Pager</td>
<td></td>
</tr>
<tr>
<td>Missing Equipment</td>
<td></td>
</tr>
<tr>
<td>Missing Supplies</td>
<td></td>
</tr>
</tbody>
</table>

**Example**

Dr. Pierce

- **8:30 - 12:00**
- **8**
- **3**
- **6**
- **11**
- **1**
- **2**
- **6**
- **5**
- **7**

<table>
<thead>
<tr>
<th>Dentist Name</th>
<th>Date: 05-24-2006</th>
<th>Time: 8:30 - 12:00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Pierce</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Place a "tic" mark for each incident of an unplanned activity.

**Tool: Track Unplanned Activities**
Analysis: Understand the way you currently do the work

• Who is your current team
  – List team members and roles
  – List FTEs and hours worked/week

• Measure current activities by role in
  • Visit activities
    – Non-visit activities
    – Other activities

• Determine scope of practice in your state for ancillary practitioners
**Analysis: What Should the Care Team be Doing?**

*Explore the Mismatch:*

- Between role and activity
- State/Professional guidelines and current role
- Between activity and patient needs
- Between volume of resources and activity demands
- Between staffing and demand by hour of day, days of week, month of year

*Things to look for:*

- Where do you see variation?
- Are the right people doing the right things?
- Are roles commensurate with education, training and licensure?
- Are staff trained to the highest level of capability?
- Are there systems to support and monitor performance?
### Tool: Return on Investment Worksheet

<table>
<thead>
<tr>
<th>Process step #</th>
<th>Description</th>
<th>Duration of process step in minutes</th>
<th>Staff hourly rate</th>
<th>Annual frequency of process step</th>
<th>Annual cost of process step</th>
<th>VA or NVA</th>
<th>Additional billable visits/yr</th>
<th>ROI</th>
</tr>
</thead>
<tbody>
<tr>
<td>example</td>
<td>dentist does SMG setting</td>
<td>15</td>
<td>$60.00</td>
<td>624+</td>
<td>$9,360</td>
<td>VA</td>
<td>-0-</td>
<td>-0-</td>
</tr>
<tr>
<td></td>
<td>So dentist can see patients</td>
<td>15</td>
<td>$40.00</td>
<td>624+</td>
<td>$6,240</td>
<td>VA</td>
<td>NA</td>
<td>$3,120</td>
</tr>
<tr>
<td></td>
<td>hygienist does pt SMG setting</td>
<td>15</td>
<td>$60.00</td>
<td>624+</td>
<td>$9,360</td>
<td>VA</td>
<td>624</td>
<td>$53,040</td>
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<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$56,160</td>
</tr>
</tbody>
</table>

**TOTAL RETURN ON INVESTMENT THROUGH CARE TEAM REDESIGN**

$56,160

### Legend

1. **Step #**
2. **Duration**
3. **Staff hourly rate**
4. **Annual frequency**
5. **Annual cost of step**
6. **NVA or VA**
7. **Additional billable visits/yr**
8. **ROI**

**Definitions**

- **Step from process map**
- **Time to perform the process in minutes**
- **Hourly rate of staff member performing the process**
- **Number of times the step is performed in a year**
- **Calculated based on duration, frequency and staff rate**
- **designation of whether process adds value or not**
- **# additional billable visits generated/yr**
- **Return on investment to organization (revenue - cost of step = ROI)**

**Additional Notes**

+ based on 15 minute SMG setting with patients 12 times/week = 180 min/wk x 52 weeks = 156 hours/year

++ based on $100/billable visit
Exercise #3: Value Stream Process Mapping

• A visual snapshot of the current flow of the process
• An opportunity to identify the 7 forms of waste and where constraints and barriers exist
• A discipline of linking waste to impact on productivity and cost
Definitions

• **Value**: What is important to the customer, viewed through the eyes of the patient

• **Continuous flow**: Doing work as it comes along with no waits, no delays, no waste

• **Waste**: Everything that does not bring value to the patient
7 Forms of Waste and Examples

1. Overproduction---Producing more than needed or producing faster than needed (*exam rooms not in use)*
2. Waiting---Time when a person is idle (*everywhere!*)
3. Transportation---Any movement of material or information not essential for the process (*chart handoffs*)
4. Processing---Operations that in reality do nothing (*the patient providing information to multiple people*)
5. Inventory---Anything more than immediate needs (*supplies that are brought to an exam room and not used*)
6. Motion---Motion of man or machine that is unnecessary (*patient walking to another room for x-rays*)
7. Defects---Anything requiring correction, rework or inspection (*mixing up films*)
Simple Steps

• Establish the mapping team
• Walk through the process one time as a team and take notes
• Subgroup walk through a second time for new observations and cycle time measurements
• Flow the process using Post-it Notes for each step of the process on a series of flip charts or brown paper
• Complete a Value Stream map and post it where team can review over several days and add thoughts and observations
Patient walks in and introduces himself. Staff asks patient to sign log

Step # 1
Time: 30 seconds  Who: Registration Clerk Jones
Value/NVA: NVA
Value Analysis using the Brown Paper Mapping approach

- Shows the “Big Picture”
- Describes a process as it works today; an “as-is” model
- High touch, low-tech
- Identifies strengths and opportunities
- Captures the complexity and disconnects of key operational issues
- Identifies outside areas involved in the process
Analysis: How do we get anything done?
Exercise #4: Waste Analysis

- Explore your flow through the lens of each type of waste:
  - **Overproduction** - what examples of staff waiting, too many supplies, etc.
  - **Inventory** - where are supplies unnecessarily stored
  - **Extra processing** - which steps can be eliminated
  - **Motion** - draw the actual movement of staff and patients
  - **Defects** - what errors or delays can occur at each step
  - **Waiting** - where are there bottlenecks causing waits
  - **Transportation** - where do you move the patient or information unnecessarily
Analysis: Look through the Patient’s eyes for value

• Observation “through the patient’s eyes”
• Details to look for:
  ➢ Patient’s time with both dentists and hygienists
  ➢ Facility barriers & equipment inadequacies
  ➢ Paperwork
  ➢ Duplication and re-work: questions/processes
  ➢ Handoffs that may reduce continuity
  ➢ Where waits occur
Reference 13:
Cycle Time Tool
### Patient Cycle Tool

One key measure of office efficiency is the patient cycle time. This is defined as the time a patient enters the practice until they leave. The Patient Cycle Tool can be used in several ways. Patients can carry the clipboard through their visit and note the times or staff can write the times as the patient travels through the practice. Another method is to have patients "shadowed" by a person to document the times. There is space to write in comments along the way.

1. Patient is given clipboard with form and watch (or a staff member can shadow patient)
2. Staff enter start time and instruct the patient fill in the times until they check out.

<table>
<thead>
<tr>
<th>Instructions: Please fill in the time at each point during your visit</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Time you Checked In</strong> (e.g. 1:53 pm)</td>
<td></td>
</tr>
<tr>
<td><strong>2. Time you sat in the waiting room</strong> (e.g. 2:03 pm)</td>
<td></td>
</tr>
<tr>
<td><strong>3. Time staff came to get you</strong> (e.g. 2:12 pm)</td>
<td></td>
</tr>
<tr>
<td><strong>4. Time staff member left you</strong> (e.g. 2:17 pm)</td>
<td></td>
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<tr>
<td><strong>5. Time provider came in room</strong> (e.g. 2:32 pm)</td>
<td></td>
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<tr>
<td><strong>6. Time provider left the room</strong> (e.g. 2:47 pm)</td>
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<tr>
<td><strong>7. Time you left the exam room</strong> (e.g. 2:50 pm)</td>
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</tr>
<tr>
<td><strong>8. Time you arrived at check out</strong> (e.g. 2:51 pm)</td>
<td></td>
</tr>
<tr>
<td><strong>9. Time you left practice</strong> (e.g. 2:55 pm)</td>
<td></td>
</tr>
</tbody>
</table>

COMMENTS:
Reference 14:
Cycle Time Tool Spanish
Patient Cycle Tool

One key measure of office efficiency is the patient cycle time. This is defined as the time a patient enters the practice until they leave. The Patient Cycle Tool can be used in several ways. Patients can carry the clipboard through their visit and note the times or staff can write the times as the patient travels through the practice. Another method is to have patients "shadowed" by a person to document the times. There is space to write in comments along the way.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Patient is given clipboard with form and watch (or a staff member can shadow patient)</td>
<td>Scheduled Appt. Time:</td>
</tr>
<tr>
<td>2. Staff enter start time and instruct the patient fill in the times until they check out.</td>
<td>Provider:</td>
</tr>
</tbody>
</table>

**Instrucciones: Porfavor completar el tiempo en cada punto durante su visita.**

<table>
<thead>
<tr>
<th></th>
<th>Hora</th>
</tr>
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<tbody>
<tr>
<td>1. La hora que checo para su cita (ejem. 1:53 pm)</td>
<td></td>
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<tr>
<td>2. El tiempo que espero en la sala de espera (ejem. 2:03 pm)</td>
<td></td>
</tr>
<tr>
<td>3. La hora en que lo/a atendieron (ejem. 2:12 pm)</td>
<td></td>
</tr>
<tr>
<td>4. La hora en que se fue el assistente (ejem. 2:17 pm)</td>
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<tr>
<td>5. La hora en que el Dentista lo/a atendio (ejem. 2:32 pm)</td>
<td></td>
</tr>
<tr>
<td>6. La hora en que el Dentista termino su tratamiento (ejem. 2:47 pm)</td>
<td></td>
</tr>
<tr>
<td>7. La hora en la que salio del cuarto de examinacion (ejem. 2:50 pm)</td>
<td></td>
</tr>
<tr>
<td>8. La hora en la que checo fuera (ejem. 2:51 pm)</td>
<td></td>
</tr>
<tr>
<td>9. La hora en la que se fue de la oficina (ejem. 2:55 pm)</td>
<td></td>
</tr>
</tbody>
</table>

**COMENTARIOS:**
Reference 15:
Oral Health DSD Indicators
Oral Health Collaborative Pilot
Delivery System Design Definitions

Overview: The Oral Health Collaborative pilot includes a focus on clinical care, as well as tools to achieve greater access and efficiency to impact clinical goals. The oral health collaborative pilot developed 6 Delivery System Design (also called redesign) measures to assess practice efficiency and patient care effectiveness.

<table>
<thead>
<tr>
<th>MEASURE</th>
<th>DEFINITION</th>
<th>MEASUREMENT APPROACH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Office visit cycle time</td>
<td>N: Total elapsed minutes from patient arrival at the health center to patient departure for patient visits sampled in the reporting period D: Number of visits sampled</td>
</tr>
<tr>
<td>1a</td>
<td>Value-added time as percent of total cycle time</td>
<td>N: Total value-added time D: Visit cycle time</td>
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<tr>
<td>2a</td>
<td>Time to 3rd Next Available Appointment</td>
<td>N: Sum of number of days between the day a patient makes a request for an appointment with a provider and the third available appointment for a non-urgent/emergent visit with that provider, for each of the providers sampled during the reporting period D: Number of providers sampled during the reporting period</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>No show rate</td>
<td>N: Number of patients who miss a scheduled appointment D: Number of scheduled appointment slots, whether scheduled in advance or not</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Number of Patient Care Encounters per Provider per hour</td>
<td>N: Total number of encounters for provider for the month D: The total number of hours worked by provider in that month</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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</tr>
</tbody>
</table>

CORE INDICATORS
Note: Each team should establish baseline measures, and use that as a starting point for improvement.
Reference 16:
Improving Access and Efficiency Dental
But how can we see any more patients?

Oral Health Pilot Collaborative
June 29, 2006
We’ve done a great job getting moms and children in...

• Come October, what will we do when the telephone rings?
Objectives for our sessions

• Focus on delivery system design
• Review rationale for changing the delivery system
• Introduce high leverage changes that can improve access or efficiency
• Relate access and efficiency to increased capacity in your system
• Share ideas for specific changes that can be tested in your practice
What the current system looks like

- More patients than we can see
- Long waits for appointments
- Long waits in the office
- It’s all about the dentist
- Working harder all the time
The reality

• In health care organizations, up to 40% of all cost may represent waste
• In most systems only 5% of activities add value; 35% are necessary and don’t add value; and 60% add no value
“Every system is perfectly designed to achieve the results it achieves...”

Don Berwick
IHI
So we change the system...

Start with understanding where you are, and where you want to be...then look for change concepts that can be applied to help you get there
Questions we need to answer

- Is our demand really infinite? How do we know?
- Is there any hidden capacity in the system? Are we as efficient as possible? Is there waste that can be eliminated? If I add capacity will there be a return on investment?
- What can we do to impact either demand or capacity or both?
Demand

External
- Appointments
- Walk-ins
- Referrals
- Deflections
- Other

Internal
- Returns
Measuring Demand

- Track the number of telephone calls for appointments
- Plus number of calls/requests from medical clinic to see patients
- Plus number of walk-ins
- Plus, any other sources?
- Then add the number of patients you see that you ask to return
This tracking form can assist in identifying the reasons for all of the calls that come into the practice. Keep track of each call and the reason for the call for each day of the week as well as time of day.

<table>
<thead>
<tr>
<th>Week of:</th>
<th>Appointment for Today</th>
<th>Appointment for Tomorrow</th>
<th>Appt. for Future</th>
<th>Work sent out ready?</th>
<th>Hygienist Care</th>
<th>Talk to Hygienist</th>
<th>Referral Information</th>
<th>Need Information</th>
<th>Message for Dentist</th>
<th>Talk with Dentist</th>
<th>Other</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM</td>
<td>PM</td>
<td>AM</td>
<td>PM</td>
<td>AM</td>
<td>PM</td>
<td>AM</td>
<td>PM</td>
<td>AM</td>
<td>PM</td>
<td>AM</td>
<td>PM</td>
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<tr>
<td>Monday</td>
<td>Total</td>
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<tr>
<td>Tuesday</td>
<td>Total</td>
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<tr>
<td>Wednesday</td>
<td>Total</td>
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<tr>
<td>Thursday</td>
<td>Total</td>
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<tr>
<td>Friday</td>
<td>Total</td>
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<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Saturday/Sunday</td>
<td>Total</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weekly Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Capacity

• Available appointment slots by provider by day of week
And when they don’t match???

- Increase capacity
- Reduce demand
- Work down the backlog
Backlog

- **Good backlog**
  - Created when a patient needs to be seen at regular intervals to manage a condition

- **Bad backlog**
  - Created when a patient wants to be seen and cannot get in
  - Goal is to eliminate bad backlog
Backlog elimination—a temporary phenomenon

- **Add capacity**
  - Start earlier/finish later/shorten lunch/schedule an off day
- **Find capacity**
  - Fill cancellations from wait list
  - Manage no shows
- **Save capacity**
  - Carve out appointments for same day
- **Set the rules as well as start and end dates**
Reduce demand

- Eliminate unnecessary visits
- Extend visit intervals
- Maximize scope of each visit, if viable
- Group visits
Unnecessary visits

- Think about each reason for an appointment. Are there any that can be handled by phone? Are there any return visits that can be eliminated?
Extend visit intervals

- Guidelines driven intervals
- Rethink any personal preferences
Maximize visit scope

- Can more be done in a single visit rather than split into multiple visits?
- Save prep time and eliminate possible no shows
- Be sure to consider revenue impact. This only works in a fee for service environment.
Alternate visit types

- Group visits
  - Education and prevention
- Phone follow up possible?
Increase capacity

- Adjust schedules
- Optimize use of care team
- Streamline workflow to improve productivity
Increasing Capacity by Optimizing the Care Team
What needs to be done?

Who can do it?
How we start? DSD Change Concepts for Optimizing the Care Team and Providing Coordinated Care to Patients

• Match skill sets with work
• Assign a panel to each dental provider and manage panel size
• Maximize dentist productivity for each visit
• Redesign the care team
• Create a planned visit for each encounter
• Use a care manager to coordinate care and follow up
Match work to skill sets

- Improves employee morale
- Economical
- Reduces chances for errors
What is the work of the practice?

Visit Work

- 1st Time Visit-New Problem Assessments
- Follow-up Visits
- Examinations
- X-rays
- Patient education
- Prophylaxis
- Procedures
What is the work of the practice?

Non-visit Work

- Making appointments
- Post-emergency follow-up
- Telephone and E-mail responses
- Phone follow-ups
- Prescription renewals
- Insurance and billing requirements
- Imaging results evaluation and reporting
- Referrals
- External site visits
Understand the way you currently do the work (your capacity)

- Who is your current team
  - List team members and roles
  - List FTEs and hours worked/week
- Measure current activities by role in
  - Visit activities
    - Non-visit activities
    - Other activities
- Determine scope of practice in your state for ancillary practitioners
What do you spend YOUR time doing? What is your best estimation of how much time you spend doing it? The goal is to have the right person doing the right thing at the right time. The group can discuss which activities are or are not appropriate for the individual's level of education, training, and licensure.

Complete this form for each group of professionals such as dentists, hygienists, assistants or clerical staff, assessing their activities using the Activity Survey. This estimate of who does what is intended to reveal, at a high level, where there might be mismatches between education, training, licensure and actual activities. It is good to eventually have all roles and functions complete this survey for review and consideration. Be sure to create the same categories for each functional role. Some groups may hesitate to make time estimates; if this happens, just ask them to list their activities for the first review.

<table>
<thead>
<tr>
<th>Position</th>
<th>% of Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dentist</td>
<td></td>
</tr>
<tr>
<td>Hygienist</td>
<td></td>
</tr>
</tbody>
</table>

### Primary Care Practice Activity Survey Sheet

#### Activity Occurrence Example:

*What's the next step? Insert the activities from the Activity Survey Here.*

Activities are combined by role from the data collected above. This creates a master list of activities by role. Fill-in THE NUMBER OF TIMES PER SESSION (AM and PM) THAT YOU PERFORM THE ACTIVITY. Make a mark by the activity each time it happens, per session. Use one sheet for each day of the week. Once the frequency of activities is collected, the practice should review the volumes and variations by session, day of week, and month of year. This evaluation increases knowledge of predictable variation and supports improved matching of resources based on demand.
The Unplanned Activity Form assists the team in identifying waits and delays in the process of providing smooth and uninterrupted patient care. Each provider carries the card during a patient session and documents when and why patient care is delayed or interrupted. This data collection form can be modified for any member of the team. Put a “tic” mark for each incident of unplanned activity.

### Unplanned Activity Form

<table>
<thead>
<tr>
<th>Dentist Name</th>
<th>Date: _____________</th>
<th>Time: _____________</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Unplanned Activity</th>
<th>Tics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phone Interruptions</td>
<td></td>
</tr>
<tr>
<td>Support Staff Interruptions</td>
<td></td>
</tr>
<tr>
<td>Prep not complete</td>
<td></td>
</tr>
<tr>
<td>Provider Interruptions</td>
<td></td>
</tr>
<tr>
<td>X-rays not available</td>
<td></td>
</tr>
<tr>
<td>Patient Phone Calls</td>
<td></td>
</tr>
<tr>
<td>Pager</td>
<td></td>
</tr>
<tr>
<td>Missing Equipment</td>
<td></td>
</tr>
<tr>
<td>Missing Supplies</td>
<td></td>
</tr>
</tbody>
</table>

**Total**: 

<table>
<thead>
<tr>
<th>Beer</th>
<th>Cheese</th>
<th>Bread</th>
<th>Wine</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>19</td>
<td>15</td>
<td>43</td>
</tr>
</tbody>
</table>

**Dr. Pierce**

<table>
<thead>
<tr>
<th>Dentist Name</th>
<th>Date: 05-24-2006</th>
<th>Time: 8:30 - 12:00</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Unplanned Activity</th>
<th>Tics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phone Interruptions</td>
<td></td>
</tr>
<tr>
<td>Support Staff Interruptions</td>
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<tr>
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<td></td>
</tr>
<tr>
<td>Pager</td>
<td></td>
</tr>
<tr>
<td>Missing Equipment</td>
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</tr>
<tr>
<td>Missing Supplies</td>
<td></td>
</tr>
</tbody>
</table>

**Total**: 

<table>
<thead>
<tr>
<th>Beer</th>
<th>Cheese</th>
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<th>Wine</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>19</td>
<td>15</td>
<td>43</td>
</tr>
</tbody>
</table>

**Track Unplanned Activities**
What Should the Care Team be Doing?

Explore the Mismatch:

- Between role and activity
- State/Professional guidelines and current role
- Between activity and patient needs
- Between volume of resources and activity demands
- Between staffing and demand by hour of day, days of week, month of year

Things to look for:

- Where do you see variation?
- Are the right people doing the right things?
- Are roles commensurate with education, training and licensure?
- Are staff trained to the highest level of capability?
- Are there systems to support and monitor performance?
What does this analysis tell you about the work your office staff currently perform? Are the activities being performed by the “right” person currently?
Assign patients to a panel

- Translation: Match each patient with a provider so that they see the same provider with each visit
- Promotes continuity of care
- Improved efficiency as a result of prior knowledge base
- Improves patient satisfaction and employee satisfaction
- Reduces errors
More on “Patient panels”

• Make the goal of continuity well understood by the care teams
• Use an appointment script to reinforce the concept of matching patients with providers
• Have policies in place for assigning new patients
Maximize dentist productivity at each visit

- Move work away from the dentist
- Use huddles to prepare the care team
- Use planned visits to anticipate patient needs
- Assure that supplies, equipment, data, diagnostics, and staff are available at the time of the visit
- Max pack where possible
- Use protocols to substitute other staff for the dentist
Redesign the care team

• Create an action plan to match the staff with the work
• Explore adding staff/look at financial return
• Cross train staff
• Create cross functional teams around a patient panel
• Investigate matrix organization
• Blur front and back office lines
• Incorporate innovations
Create a planned visit for every encounter

• Use registry data to determine patient needs and plan accordingly
• Use visit agendas with patients
• Huddle with the care team so that everyone on the team is prepared
Use a care manager to coordinate care

- Coordinate logistics and care team needs prior to the visit
- Manage referrals
- Manage reminders and callbacks for follow up
- Take on tasks now done by dentist and make the dentist’s life easier
Building the “Right” Team

“A team is a small number of people with complimentary skills who are committed to a common purpose, set of performance goals, and an approach for which they hold themselves mutually accountable.”

Wisdom of Teams by Katzenbach
### Return on Investment Worksheet

<table>
<thead>
<tr>
<th>Process step #</th>
<th>Description</th>
<th>Duration of process step in minutes</th>
<th>Staff hourly rate</th>
<th>Annual frequency of process step</th>
<th>Annual cost of process step</th>
<th>VA or NVA</th>
<th>Additional billable visits/yr ++</th>
<th>ROI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>example</strong></td>
<td>dentist does SMG setting</td>
<td>15</td>
<td>$60.00</td>
<td>624+</td>
<td>$9,360</td>
<td>VA</td>
<td>-0-</td>
<td>-0-</td>
</tr>
<tr>
<td></td>
<td>hygienist does pt SMG setting</td>
<td>15</td>
<td>$40.00</td>
<td>624+</td>
<td>$6,240</td>
<td>VA</td>
<td>NA</td>
<td>$3,120</td>
</tr>
<tr>
<td></td>
<td>So dentist can see patients</td>
<td>15</td>
<td>$60.00</td>
<td>624+</td>
<td>$9,360</td>
<td>VA</td>
<td>624</td>
<td>$53,040</td>
</tr>
</tbody>
</table>

**TOTAL RETURN ON INVESTMENT THROUGH CARE TEAM REDESIGN**

$56,160

---

### Definitions

1. **Step #**
   - Step from process map
2. **Duration**
   - Time to perform the process in minutes
3. **Staff hourly rate**
   - Hourly rate of staff member performing the process
4. **Annual frequency**
   - Number of times the step is performed in a year
5. **Annual cost of step**
   - Calculated based on duration, frequency and staff rate
6. **NVA or VA**
   - designation of whether process adds value or not
7. **Additional billable visits/yr**
   - # additional billable visits generated/yr
8. **ROI**
   - Return on investment to organization (revenue - cost of step = ROI)

---

* based on 15 minute SMG setting with patients 12 times/week = 180 min/wk x 52 weeks = 156 hours/year

++ based on $100/billable visit
Increasing Capacity by Eliminating Waste and Improving Flow
What is continuous flow?

• Doing work as it comes along with no waits, no delays, no waste
What is value?

- Value is what is important to the customer
- Value is viewed through the eyes of the patient
What is waste?

- Everything that does not bring value to the patient
7 Forms of Waste and Examples

- Overproduction---Producing more than needed or producing faster than needed (*exam rooms not in use*)
- Waiting---Time when a person is idle (*everywhere!*)
- Transportation---Any movement of material or information not essential for the process (*chart handoffs*)
- Processing---Operations that in reality do nothing (*the patient providing information to multiple people*)
- Inventory---Anything more than immediate needs (*supplies that are brought to an exam room and not used*)
- Motion---Motion of man or machine that is unnecessary (*patient walking to another room for x-rays*)
- Defects---Anything requiring correction, rework or inspection (*mixing up films*)
Why do these things matter?

• Remember that in health care organizations, up to 40% of all cost may represent waste and in most systems 60% of activities add no value…

• If you can eliminate these things, think of how much time you’ll have!
The Theory

• Theories behind these changes relate to lean thinking

• *Lean Principles* derive from the Toyota Production System

• Designed by Taiichi Ohno; made famous by Womack, Jones and Roos “The Machine that Ruled the World”
Principles of Lean

• Focus on *Value*-From the Customer’s perspective
• Understand the *Value Stream*
• Seek *Perfection*
• Optimize *Flow*
• Design systems to *Pull* demand
The Practical:
What’s a health center to do?
Change concepts

• Standardize the environment
• Find and remove bottlenecks
• Drive work away from the constraint
• Remove intermediaries
• Move process steps closer together
• Eliminate unnecessary process steps
• Use technology
• Synchronize clinicians, patients, and information
Find and remove bottlenecks

- People
- Facility/space
- Paperwork
- Re-work
- Hand-offs
- Equipment/supplies
Drive work away from the constraint

- Disruptions and distractions
- Work someone else can perform
- Waiting for x-rays
- Searching for supplies
- Waiting to get patients in rooms
- Getting off-track with certain patients
Eliminate unnecessary process steps

- Checking another’s work
- Multiple sign-offs
- Making multiple copies
Synchronize patients, providers, and information

- Start the first appointment of the day on time
- Check charts for completeness in advance
- Use standard checklists for supplies
- Room criteria should have the patient ready before the dentist walks in
- Use technology prompts to anticipate potential needs
- Use huddles to plan as well as make mid-course corrections
How can we get started?
Value Stream Process Mapping

• A visual snapshot of the current flow of the process
• An opportunity to identify the 7 forms of waste and where constraints and barriers exist
• A discipline of linking waste to impact on productivity and cost
Simple Steps

- Establish the mapping team
- Walk through the process one time as a team and take notes
- Subgroup walk through a second time for new observations and cycle time measurements
- Flow the process using Post-it Notes for each step of the process on a series of flip charts or brown paper
- Complete a Value Stream map and post it where team can review over several days and add thoughts and observations
Post-it Notes

Patient walks in and introduces himself. Staff asks patient to sign log

Step # 1
Time: 30 seconds       Who: Registration Clerk Jones
Value/NVA: NVA
Value Analysis using the Brown Paper Mapping approach

- Shows the “Big Picture”
- Describes a process as it works today; an “as-is” model
- High touch, low-tech
- Identifies strengths and opportunities
- Captures the complexity and disconnects of key operational issues
- Identifies outside areas involved in the process
How do we get anything done?

Process  Inspect  Wait  Administrative  Move
Next steps: Waste Analysis

- Explore your flow through the lens of each type of waste:
  - **Overproduction** - what examples of staff waiting, too many supplies, etc.
  - **Inventory** - where are supplies unnecessarily stored
  - **Extra processing** - which steps can be eliminated
  - **Motion** - draw the actual movement of staff and patients
  - **Defects** - what errors or delays can occur at each step
  - **Waiting** - where are there bottlenecks causing waits
  - **Transportation** - where do you move the patient or information unnecessarily
Next steps: Look for value and time savings

• What steps add value?
• Can non-value-added steps be eliminated?
• What people time (and what cost) can be saved for each step that can be removed from the process?
Remember: Look through the Patient’s eyes for value

- Observation “through the patient’s eyes”
- Details to look for:
  - Patient’s time with both dentists and hygienists
  - Facility barriers & equipment inadequacies
  - Paperwork
  - Duplication and re-work: questions/processes
  - Handoffs that may reduce continuity
  - Where waits occur
The results

• Increased efficiency that optimizes resource use and minimizes waste
• Allows for substitution of value added processes in place of those that add no value
• Leads to more time for the productive patient interactions of planned care
Reference 17:
Prenatal Brochure HP
WHAT DOES YOUR ORAL HEALTH MEAN FOR YOUR BABY?

New research shows that pregnant women who have gum disease are more likely to have babies born before their due dates, and more likely to have low birth weight babies. Low birth weight babies are born before the 9th month and weigh less than 5 pounds 8 ounces.

The germ that causes gum infection can travel through your blood stream to places far from your mouth, even into the uterus (womb). Chemicals produced by the germs might cause early labor, which might cause your baby to be born too soon.

Every year as many as 45,500 premature (early) births may be caused by gum disease. That is 18% of the 250,000 early term babies born every year. Gum disease causes more early term births than smoking and alcohol use together.

As you make your way through the “to do list” for your pregnancy, remember to check off a visit to the hygienist or dentist. Your good oral health can make a difference to your baby!

Oral Health Awareness Colorado!
4300 Cherry Creek Drive South PSD-OH-A4
Denver, CO 80246-1530
Phone (303) 692-2569
Fax (303) 782-5557

WHAT EVERY PREGNANT WOMAN SHOULD KNOW

How your oral health can affect the well-being of your unborn baby
What to Expect in Your Oral Health When You Are Pregnant

When you are pregnant you will have many changes in your body, and will also have changes in your oral health. The hormone changes that occur during pregnancy cause more reaction to the normal germs in your mouth, and you may have more gum swelling, bleeding and a change of gum color from pink to red.

“Pregnancy gingivitis” is a gum disease that often happens in the second or third month of pregnancy and can become worse up through the eighth month. Until recently, doctors and dentists didn’t worry too much about this disease because they thought that when the baby was born, it would go away. However, now there is new information and a new reason to pay attention to your oral health.

What Can You Do?
Since your oral health can make a difference in your pregnancy, it is very important that you watch for signs of gum disease.

Brush and Floss at least twice a day!

It is important to have at least one dental cleaning when you are pregnant. Go to the dentist as early as you can in your pregnancy. It is also important to brush and floss at least twice a day.

- Stop eating sugar and foods that have sugar in them (soda, sugar cereal, desserts and others)
- Eat foods high in calcium and vitamin C. (oranges and other citrus fruit, broccoli and other green vegetables)
- Stop Smoking.

If your gums swell, bleed or hurt at any time during your pregnancy, see your dentist or hygienist as soon as you can.

What to Tell Your Dental Professional
- Is your pregnancy high-risk?
- In which month of pregnancy are you?
- Have you noticed any changes in your oral health?
- Are you taking any medicines? Are you taking medicine for Diabetes?
- Have you noticed any swelling, redness, or bleeding of your gums?
- Have you noticed any loose teeth?

Taking care of your teeth and gums when you are pregnant will help your baby to be born when it is due and at a healthy weight.

Good health starts with a smart mouth, take care of yours, so you can take care of your baby’s.
Reference 18:
HP Perinatal SMGS
Pt Name: ___________________________ DOB: ___________________________

See OBGYN provider regularly

Take Pre-Natal Vitamins daily

Eat better

Exercise

Stop bad habits

Brush teeth with flouride toothpaste

Reduce stress

Use flouride rinse after morning sickness

See your dental provider

Attend Pre-Natal Class

Floss nightly

Chew Xylitol Gum

What I want to do (my goal)____________________________________________________________________

When will I do this: ________________________________________________________________________

Where will I do this: ________________________________________________________________________

How often will I do this: _____________________________________________________________________

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

My promise: I agree to this goal and understand that the High Plains CHC staff may ask me how I am doing with this goal.

Date: _____________ Signed by: __________________________ Witnessed by:__________________________

Copy given to the patient Yes No Staff Initials____________

Review Date: ___________ Comments: __________________ Staff Initials:____________

Review Date: ___________ Comments: __________________ Staff Initials:____________

Review Date: ___________ Comments: __________________ Staff Initials:____________

Review Date: ___________ Comments: __________________ Staff Initials:____________

Common on hpserv/Originals/Nursing or Backoffice/Self Mngt Goals 3/2/04
Reference 19:
HP ECC SMGS
Parents receive dental treatment

Healthy Snacks

Regular dental visits

Keep teeth clean

Floss

Use fluoride rinse

Wean off bottle

Only put water in sippy cup

Chew Xylitol Gum

What I want to do (my goal)____________________________________________________________________

When will I do this: __________

Where will I do this:__________________________________________________________________________

How often will I do this:____________________________________________________________________

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

My promise: I agree to this goal and understand that the High Plains CHC staff may ask me how I am doing with this goal.

Date:________________ Signed by:__________________________________ Witnessed by:________________

Copy given to the patient     Yes   No     Staff Initials____________

Review Date:________________ Comments:_________________________________Staff Initials:_________

Review Date:________________ Comments:_________________________________Staff Initials:_________

Review Date:________________ Comments:_________________________________Staff Initials:_________

Review Date:________________ Comments:_________________________________Staff Initials:_________

Common on hpserver/Originals/Nursing or Backoffice/Self Mgmt Goals 3/2/04
Reference 20:
CHP SM Sheet Child
complete dental treatment

Brush with fluoridated toothpaste before bed

floss

limit sugary snacks

help with child's brushing

decrease sweetened drinks

only water to bed in a bottle or no nursing through out the night

chew 3-4 pieces of xylitol gum per day

my own goal ____________________
Reference 21:

CHP SM Sheet Caregiver
use an electric toothbrush

brush for 2 minutes

Brush with fluoridated toothpaste before bed

complete dental treatment

limit sugary snacks

Use a prescription mouth wash (for bleeding gums only)

floss

decrease sweetened drinks

my own goal

chew 3-4 pieces of xylitol gum per day
Reference 22:
SM Bibliography
Self-Management Support: Self-Management Support and the Chronic Care Model Bibliography

Journal Articles


This review article provides an overview of the types of self-management interventions used and their effectiveness for different chronic conditions. It summarizes the results of randomized trials and contains implications for practice as well as a good definition of self-management and a nice reference list.


Health habit advice and counseling was not associated with any decrease in patient satisfaction. In fact, tobacco counseling was associated with an increase in satisfaction.


This article and the following one represent classic work on the notion of ‘personal models’ of illness or ‘representations’ that patients have of their condition.


Discusses principles and application of self-management in health care and presents a model of the medical staff initiating self-management support and then linking with community resources and group programs to deliver SMS.

Contains an excellent literature review in all areas, including self-management.


This article focuses on reducing the barriers to effective asthma control including recognizing the range of influences on patients, assisting patients in developing their self-regulation skills, focusing on the patients' asthma management goals (as opposed to clinical objectives) and overlooking signs that indicate follow-up education is needed.


This article presents a model of patient management of chronic disease that accounts for intrapersonal and environmental influences on management and emphasizes the central role of self-regulatory processes in disease control. Asthma serves as a case for exploration of the model.


Article reviews behavioral theory-based dietary intervention programs for adults and children and discusses how they achieve better results than knowledge-based programs. They describe a 4-step goal-setting process that includes: recognizing the need for change; setting a goal; adopting a goal-directed activity & monitoring it; and rewarding oneself for goal attainment.


The purpose of this paper is to provide a brief overview of MI and to identify and discuss the key issues that are likely to arise when adapting this approach to health care and public health settings.


A reflection on progress and challenges over the past two decades and reflections on likely issues ahead.

Glasgow RE, Anderson RM (1999). In diabetes care, moving from compliance to adherence is not enough. Something entirely different is needed. Diabetes Care, 22(12): 2090-2092.

Article on the worldview and philosophical implications of providing care that is truly patient centered and realizes that patients are in charge.


Article describing the impact of different patient-physician interaction styles on patients’ diabetes self-management. Assessed the influence of patients’ evaluation of their physicians’ participatory decision making style, rating of physician communication, and reported understanding of diabetes self-care on their self-reported diabetes self-management. Concluded that ratings of providers’ communication effectiveness were more important than a participatory decision making style in predicting diabetes self-management.


A “real-world” report of the experience in implementing the authors’ chronic disease self-management program in many different settings throughout many different Kaiser Permanente managed care organizations and with professional and lay group leaders.


This report presents the results of a systematic review of the effectiveness and economic efficiency of disease management and case management for people with diabetes. Twenty-seven interventions for disease management and 15 for case management are reported.


This article summarizes research on self-initiated and professionally facilitated change of addictive behaviors using the key trans-theoretical constructs of stages and processes of change.


Discusses using other resources to support the “one minute” that these authors argue is realistic for primary care providers.

*Toelle BG, Ram FSF. Written, individualized management plans for asthma in children and adults. (Cochrane Review)*


One of the earliest papers on the Chronic Care Model- describes how the CCM was developed using evidence synthesis and the need for such an organizing framework.
Describes how primary care offices can implement self-management programs in a way consistent with the Chronic Care Model.

Books & Chapters

Based on sound principles of counseling and educational psychology, this chapter examines the roles of provider and patient based on the significant differences between the treatment of acute diseases and diabetes.


This is a low-technology, people-intensive manual aimed at health workers looking for proven health promotion and prevention interventions that they can use in their community. The handbook reviews information on the theory of behavior change and general principles of community health, but the bulk of the guide contains step-by-step plans and examples for specific behavioral interventions related to heart disease, cancer, injury and other conditions. The handbook also provides information on improving health at each stage of the life cycle.


This book contains a series of tips for providing self-management education for people who have diabetes. Tips are included for both individual and group teaching and across the patient’s lifespan. The information in these tips reflects the philosophy, experiences and practice of the authors. This book is published by the American Diabetes Association (www.diabetes.org).


Describes the gap between the current acute illness care model and the needs of patients with chronic illness. Describes the characteristics of a new chronic care model needed that is patient centered and features self-management support.


**Videos/Media**

*Integration of Depression Care into Chronic Disease Management (Steven Cole MD and Daniel Ford MD) and Self-Management Support (Kate Lorig, RN, DPH).*

This video contains presentations at previous Improving Chronic Illness Care Collaborative by the above faculty members. The Depression management video presents concrete ways to integrate care for mental health (especially depression) into practice; the self-management section presents evidence for and key aspects (with emphasis on group problem-solving models) of implementing self-management support. (44 min. total running time)

*Improving Chronic Illness Care presents: The Planned Care Visit (Institute for Health Care Innovation, Group health Cooperative)*
This 33 min. video explores for the patient and provider points of view related to the differences between a typical ‘acute care’ oriented visit’ and a CCM based planned care visit. Includes a model self-management support patient interview.

Websites

[www.cochrane.org](http://www.cochrane.org)
Website of the Cochrane Collaboration, an international project devoted to conducting and maintaining updated reviews of the evidence in many different areas of health care. Also contains reviews of self-management and behavior change evidence on topics such as physical activity, healthy eating, and smoking cessation.

Washington State Diabetes Collaborative website

[http://www.healthdisparities.net](http://www.healthdisparities.net)
Bureau of Primary Health Care collaborative site contains tools for the chronic care model

[www.improvingchroniccare.org](http://www.improvingchroniccare.org)
Website of the Robert Wood Johnson Foundation supported Improving Chronic Illness Care program. Contains information on the applications of the Chronic Care Model of Wagner and colleagues.

Maine Health website that has links to diabetes education materials that providers can use including goals-setting contracts and diabetes self-management forms.

[www.med.umich.edu/mdrtc](http://www.med.umich.edu/mdrtc)
University of Michigan website has links to self-management assessments such as the Diabetes Empowerment Scale (DES and DES-SF) and other tools and publications related to self-management and patient empowerment.

Other Materials
-Presentations & Training Materials

Power Point presentation summarizing the research supporting self-management support.

Supporting Patient Self-Management: Strategies and Tools* (Goldstein, 2002)

Presentation on general definition self-management support and how-to’s for engaging in self-management support. Describes method and tools for supporting self-management and principles of patient-centered counseling.


Training for self-management, including mock visit and goal setting exercise with patients.

-Assessments, Tools & Instruments

Assessment of Chronic Illness Care (ACIC)*
Developed by Bonomi and colleagues at Group Health Cooperative (assessment section references) the ACIC has clinician teams rate their current status on application of practices from the ChronicCare Model. Used to document improvement and to identify possible areas for change in many QI programs. Available at www.improvingchroniccare.org

Patient Assessment of Chronic Illness Care (PACIC)*
The PACIC is a relatively brief instrument to assess patient report of extent to which they have received care consistent with the 5 A’s. This scale was developed by investigators working at and with the Institute for Healthcare Innovation in Seattle under Ed Wagner.

Self management action planning forms*
Various examples of goal setting, problem solving forms in different formats for use with patients.

5 As Matrix*
A tool listing examples and ideas for PDSA cycles for each of the 5 As at each of three levels: patient practice, and community.

Plate Method for Meal Planning/ Metodo del plato para planear las comidas: Denver Health. & Hospital Authority 2002*
Action Plans:
1) Action plan worksheet, Michael Goldstein*
2) Diabetes Care Plan*, Glasgow et al., 1999
5) Eating and physical activity action plan from Diabetes Health Connection Program*
6) Multiple chronic illness action plan*
   Goal setting and strategies sheet used by Clinica Campesina’s chronic illness care program. Adapted from Kate Lorig model that includes components of: what, how much, when, how often, and how confident.
7) Patient, provider and care manager reports from Diabetes Priority Program*
9) Physical activity patient action plan from Active Lives Program* for patients with diabetes.
12) Self management tools from health disparities collaboratives, including goal setting sheets for different chronic conditions and information on provider support for patient self-management. Tools available in different languages and written for lower literacy populations. CV-DEMS electronic patient registry software for managing care of patients with diabetes and cardiovascular disease also available online. http://www.healthdisparities.net/resources.html.

A summary of evidence based community focused interventions for healthcare, including
counseling, for interventions conducted outside the clinic setting (e.g. community resources)

*National Diabetes Education Program: Team care: comprehensive lifetime
management for diabetes. National Institutes of Health and the Centers for Disease
Control and Prevention, Bethesda, MD, 2001.*

This booklet describes the importance of team care for improving outcomes and
includes strategies for team development and team building.
Reference 23:
Dental SM Tool
Name: _________________________________  Date of Exam: _________________________________

Please select a goal(s) from the following list that you would like to work on before you next dental visit on ______________ Date

- Brush Twice Daily
- Floss Daily
- See dentist twice A year
- Oral Cancer Screenings yearly
- See Nutritionist
- See Dentist for Follow up exams
- Fluoride Rinse Daily
- Remove Dentures Nightly and clean daily
- See physicians regularly
- Stop Smoking or chewing tobacco
My goal: __________________________________________ My action plan: ________________________________ My promise: I, __________________________________________ agree on ___/___/____ to _________________ by next dental exam on ___/___/____

My goal: __________________________________________ My action plan: ________________________________ My promise: I, __________________________________________ agree on ___/___/____ to _________________ by next dental exam on ___/___/____

My goal: __________________________________________ My action plan: ________________________________ My promise: I, __________________________________________ agree on ___/___/____ to _________________ by next dental exam on ___/___/____

My goal: __________________________________________ My action plan: ________________________________ My promise: I, __________________________________________ agree on ___/___/____ to _________________ by next dental exam on ___/___/____

My goal: __________________________________________ My action plan: ________________________________ My promise: I, __________________________________________ agree on ___/___/____ to _________________ by next dental exam on ___/___/____

My goal: __________________________________________ My action plan: ________________________________ My promise: I, __________________________________________ agree on ___/___/____ to _________________ by next dental exam on ___/___/____

My goal: __________________________________________ My action plan: ________________________________ My promise: I, __________________________________________ agree on ___/___/____ to _________________ by next dental exam on ___/___/____

My goal: __________________________________________ My action plan: ________________________________ My promise: I, __________________________________________ agree on ___/___/____ to _________________ by next dental exam on ___/___/____
Reference 24:
NYSDOH Perinatal Guidelines
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Executive Summary

Health care professionals should recognize the importance of good oral health and make certain that the need for dental care during pregnancy and early childhood is met. Pregnancy is a unique time in a woman’s life and is characterized by complex physiological changes. These changes can adversely affect oral health during pregnancy. Pregnancy is also an opportune time to educate women about preventing dental caries in young children, one of the most common childhood problems. Evidence suggests that most young children acquire caries-causing bacteria from mothers. Improving the oral health of expectant and new mothers and providing oral health counseling may reduce the transmission of such bacteria from mothers to children, thereby delaying the onset of caries.

Emerging evidence shows an association between periodontal infection and adverse pregnancy outcomes, such as premature delivery and low birth weight. While some studies have shown that interventions to treat periodontal disease will improve pregnancy outcomes, conclusive clinical interventional trials are not yet available to confirm the preliminary results. Nevertheless, control of oral diseases improves a woman’s quality of life and has the potential to reduce the transmission of oral bacteria from mothers to children.

Several organizations have undertaken efforts to promote oral health. The National Center for Education in Maternal and Child Health published The Bright Futures in Practice: Oral Health to promote and improve the health and well being of infants, children and adolescents. The American Dental Association, the American Academy of Pediatric Dentistry, the American Academy of Periodontology and the American Academy of Pediatrics have issued statements and recommendations for improving the oral health of pregnant women and young children.

To reinforce these recommendations and to provide guidance, the New York State Department of Health convened an expert panel of health care professionals who are involved in promoting the health of pregnant women and children. The panel reviewed literature, identified existing interventions, practices and guidelines, assessed issues of concern, and developed recommendations. Since it is highly unlikely that a sufficient number of studies will be available in the near future to make evidence-based recommendations for all clinical situations, the group relied on expert consensus when controlled studies were not available to address specific issues and concerns.

The panel developed separate recommendations for prenatal, oral health and child health professionals. While specific treatments require attention to individual clinical situations, these recommendations are intended to bring about changes in the health care delivery system and to improve the overall standard of care. The panel anticipates that these recommendations will be reviewed periodically and updated as new information becomes available. The panel recommendations are summarized on the following pages.
RECOMMENDATIONS FOR ALL HEALTH CARE PROFESSIONALS

All health care professionals should advise women that:

■ Dental care is safe and effective during pregnancy. Oral health care should be coordinated among prenatal and oral health care providers.

■ First trimester diagnosis and treatment, including needed dental x-rays, can be undertaken safely to diagnose disease processes that need immediate treatment.

■ Needed treatment can be provided throughout pregnancy; however, the time period between the 14th and 20th week is ideal.

■ Elective treatment can be deferred until after delivery.

■ Delay in necessary treatment could result in significant risk to the mother and indirectly to the fetus.

All health care professionals should advise women that the following actions will improve their health:

■ Brush teeth twice daily with a fluoride toothpaste and floss daily.

■ Limit foods containing sugar to mealtimes only.

■ Choose water or low-fat milk as a beverage. Avoid carbonated beverages during pregnancy.

■ Choose fruit rather than fruit juice to meet the recommended daily fruit intake.

■ Obtain necessary dental treatment before delivery.

All health care professionals should advise women that the following actions may reduce the risk of caries in children:

■ Wipe an infant’s teeth after feeding, especially along the gum line, with a soft cloth or soft bristled toothbrush.

■ Supervise children’s brushing and use a small (size of child's pinky nail) amount of toothpaste.

■ Avoid putting the child to bed with a bottle or sippy cup containing anything other than water.

■ Limit foods containing sugar to mealtimes only.

■ Avoid saliva-sharing behaviors, such as sharing a spoon when tasting baby food, cleaning a dropped pacifier by mouth or wiping the baby’s mouth with saliva.

■ Avoid saliva-sharing behaviors between children via their toys, pacifiers, etc.

■ Visit an oral health professional with child between six and 12 months of age.
RECOMMENDATIONS FOR PREGNATAL CARE PROVIDERS

Prenatal care providers are encouraged to integrate oral health into prenatal services by taking the following actions:

■ Assess problems with teeth and gums and make appropriate referral to an oral health care provider.

■ Encourage all women at the first prenatal visit to schedule an oral health examination if one has not been performed in the last six months, or if a new condition has occurred.

■ Encourage all women to adhere to the oral health professional’s recommendations regarding appropriate follow-up.

■ Document in the prenatal care plan whether the woman is already under the care of an oral health professional or a referral is made.

■ Facilitate treatment by providing written consultation for the oral health referral (Appendix A).

■ Develop a list of oral health referral sources that will provide services to pregnant women.

■ Share appropriate clinical information with oral health professionals.

■ Respond to any questions that the oral health professional may ask.

Prenatal care providers may suggest the following to reduce tooth decay in pregnant women experiencing frequent nausea and vomiting:

■ Eat small amounts of nutritious foods throughout the day (Appendix B).

■ Use a teaspoon of baking soda (sodium bicarbonate) in a cup of water as a rinse after vomiting to neutralize acid.

■ Chew sugarless or xylitol-containing gum after eating.

■ Use gentle tooth brushing and fluoride toothpaste to prevent damage to demineralized tooth surfaces.
RECOMMENDATIONS FOR ORAL HEALTH PROFESSIONALS

Oral health professionals should render all needed services to pregnant women because:

■ Pregnancy by itself is not a reason to defer routine dental care and necessary treatment for oral health problems.
■ First trimester diagnosis and treatment, including needed dental x-rays, can be undertaken safely to diagnose disease processes that need immediate treatment.
■ Needed treatment can be provided throughout the remainder of the pregnancy; however, the time period between the 14th and 20th week is ideal.

Oral health professionals are encouraged to take the following actions for pregnant women:

■ Plan definitive treatment based on customary oral health considerations including:
  • Chief complaint and medical history
  • History of tobacco, alcohol and other substance use
  • Clinical evaluation
  • Radiographs when needed

■ Develop and discuss a comprehensive treatment plan that includes preventive, restorative and maintenance care.

■ Provide emergency care at any time during pregnancy as indicated by oral condition.

■ Provide dental prophylaxis and treatment during pregnancy, preferably during early second trimester but definitely prior to delivery.

Oral health professionals are encouraged to take the following actions for infants and young children:

■ Assess the risk for oral diseases in children beginning at six months by identifying risk indicators including:
  • Inadequate fluoride exposure (Appendix C)
  • Past or current caries experience of siblings, parents and other household members
  • Lack of age-appropriate oral hygiene efforts by parents
  • Frequent and prolonged exposure to sugary substances or use of night time bottle or sippy cup containing anything other than water
  • Medications that contain sugar
  • Clinical findings of heavy maxillary anterior plaque or any signs of decalcification (white spot lesions)
  • Special health care needs

■ Provide necessary treatment or facilitate appropriate referral for children assessed to be at increased risk for oral disease or in whom carious lesions or white spot lesions are identified.
RECOMMENDATIONS FOR CHILD HEALTH PROFESSIONALS

Child health professionals are encouraged to take the following actions:

■ Provide counseling and anticipatory guidance to parents and caretakers concerning oral health during well child visits.

■ Assess the risk for oral diseases in children beginning at six months of age by identifying risk indicators including:
  • Inadequate fluoride exposure (Appendix C)
  • Past or current caries experience of siblings, parents and other household members
  • Lack of age-appropriate oral hygiene efforts by parents
  • Frequent and prolonged exposure to sugary substances or use of night time bottle or sippy cup containing anything other than water
  • Medications that contain sugar
  • Clinical findings of heavy maxillary anterior plaque or any signs of decalcification (white spot lesions)
  • Special health care needs

■ Refer and follow-up children with moderate and high risk indicators as soon as possible. See AAPD recommendations in Appendix D.

■ Facilitate appropriate referral for disease management of children assessed to be at increased risk for oral disease or in whom carious lesions or white spot lesions are identified.

■ Assist parents/caretakers in establishing a dental home for the children and for themselves.

■ Develop a list of oral health referral sources that will provide services to young children and children with special health care needs.
CHAPTER 1: Oral Health Care in Pregnancy and Early Childhood

INTRODUCTION

According to the Surgeon General’s report, *Oral Health in America*, perceptions must change to improve oral health and to make it an accepted component of general health (1). A follow-up report titled *A National Call to Action to Promote Oral Health* urges actions to reduce health disparities (2). Strategies to change the perceptions of health care professionals include updating health curricula and continuing education courses, training health care providers to conduct oral screenings as part of routine physical examinations and to make appropriate referrals and promoting interdisciplinary training in counseling patients about how to reduce risk factors common to oral and general health. Two population groups that can benefit immensely from these changes are pregnant women and young children (3).

Pregnancy and early childhood are particularly important times to access oral health care because the consequences of poor oral health can have a lifelong impact (1;2;4-9). Several national organizations have provided recommendations for improving oral health during pregnancy and early childhood. The National Center for Maternal and Child Health published *Bright Futures in Practice: Oral Health* to promote and improve the health and well being of infants, children and adolescents (5). The Community Preventive Services Task Force, the American Dental Association, the American Academy of Pediatric Dentistry, the American Academy of Periodontology and the American Academy of Pediatrics have issued statements and recommendations for improving oral health (10-14). Improving the oral health of pregnant women prevents complications of dental diseases during pregnancy, has the potential to decrease early childhood caries and may reduce preterm and low birth weight deliveries. Assessment of oral health risks in infants and young children, along with anticipatory guidance, has the potential to prevent early childhood caries. No comprehensive guidelines exist that address the oral health needs of pregnant women. The Institute of Medicine suggests that it is appropriate to develop guidelines when a problem is common or expensive, great variation exists in practice patterns, and sufficient scientific evidence exists to determine appropriate and/or optimal practice (15). Guidelines are, therefore, needed to assist health care professionals in improving clinical practice and to promote oral health in pregnant women and children.

For many women, pregnancy is the only time they have medical and dental insurance and thus provides a unique opportunity to access care (16). It is also a time when women are more receptive to changing behaviors that have been associated with an increased risk of poor pregnancy outcomes. Once the pregnancy is completed, some women may have difficulty accessing dental care due to loss of insurance coverage and preoccupation with childcare (17;18). In addition, children have multiple preventive health care visits during the first year of life, which provide an opportunity for child health professionals to improve the oral health of children.

Oral health problems are common in pregnant women and in young children (1;18-20). Gingivitis, characterized by bleeding gums, is a reversible process. About one-quarter of women of reproductive age have tooth decay. Periodontal disease, that is, breakdown of tooth attachment to the bone, can be detected in 37 to 46 percent of women of reproductive age and in up to 30 percent of pregnant women.
Tooth decay is the single most common chronic disease of childhood, causing untold misery for children and their families (21). Dental caries among preschoolers is common, affecting 28 percent of two to five year old children. According to the National Health and Nutrition Examination Survey, approximately 46.9 percent of tooth surfaces among females 18 years of age and older show signs of decay (18). Estimates concerning the prevalence of untreated tooth decay among women of reproductive age range from 22 percent among those 15 years of age to 25 percent among those aged 35 to 44. In New York State, 39 percent of pregnant women are enrolled in the Medicaid program. Among the Medicaid enrollees, only 34 percent had visited a dentist and about 30 percent reported dental problems during pregnancy. In contrast, 55 percent of pregnant women with other insurance had visited a dentist, while 22 percent reported a dental problem (3).

Variations in oral health practice patterns reflect several factors (1;3;22). First, oral health screening and referral are not routinely included in prenatal care. Second, many oral health professionals are hesitant to treat pregnant women. Third, while most children do not visit a dentist until age three, these same children usually have visited a child health professional 11 times for well-child visits during the same time period.

Although there are gaps in knowledge, there is sufficient evidence to recommend appropriate oral health care for pregnant women and young children. For these reasons, the New York State Department of Health convened an expert panel to develop clinical practice guidelines for health care professionals.

**ORAL HEALTH AND PREGNANCY**

**Effect of Pregnancy on Oral Health**

Dental problems such as caries, erosion, epulis, periodontal infection, loose teeth, and ill-fitting crowns, bridges, and dentures (prostheses) may have special significance during pregnancy (5;8;9;19;23-25). Tooth decay is the result of repeated acid attacks on the tooth enamel. Any increase in tooth decay during pregnancy may be due to changes in diet and oral hygiene. Nausea and vomiting in pregnancy can cause extensive erosion. Pregnancy gingivitis is present in over 30 percent of pregnant women. At the time of labor and delivery, dislodged teeth or prostheses could cause complications.

**Effect of Oral Health On Pregnancy: Association Between Periodontal Disease and Preterm/Low Birth Weight**

Periodontal disease is caused by gram-negative anaerobic bacteria. Studies have suggested that periodontal infection may contribute to the birth of preterm/low birth weight babies (26-43).

The bacteria responsible for periodontal disease are capable of producing a variety of chemical inflammatory mediators such as prostaglandins, interleukins and tumor necrosis factor that can directly affect the pregnant woman (Figure 1). The individual host response, partially mediated by specific genotype, also plays an important role as a determinant of disease expression (44).

In a recent systematic review, Scannapieco et al. reported that several studies implicated periodontal disease as a risk factor for preterm/low birth weight (43). They found, however, that few of the studies assessed the impact of prevention and treatment of periodontal disease on birth outcomes. Although the authors stated that it was not clear whether periodontal diseases played a causal role in adverse pregnancy outcomes, preliminary evidence suggested that periodontal intervention might reduce these adverse outcomes.

Three prospective intervention studies have tested the effect of periodontal treatment on the outcome of preterm delivery/low birth weight (45-48). Lopez and colleagues published two studies conducted
Figure 1. Periodontal Disease and Preterm Low Birthweight: Proposed Biological Mechanism

- **PERIODONTAL INFECTION**: A reservoir of gram negative anaerobes

- **HOST RESPONSE**: Elevated levels of chemical mediators (PG, IL, TNF)

- **PREMATURE LABOR**: Mediators of parturation (PG, IL, TNF) that consequently may induce low birth weight preterm babies

(Adapted from “Does periodontal disease relate to pre-term low birth weight babies?”: The Colgate Oral Care Report 11(3);2001:page 3).

In Santiago, Chile (47). In one study, pregnant women with gingivitis were randomized to receive periodontal treatment prior to 28 weeks gestation (early) or postpartum (delayed). The rate of preterm/low birth weight delivery was 9.5 percent in the delayed treatment group and 1.5 percent in the early treatment group. In another study, 400 women were randomly assigned to either the experimental group, which received periodontal treatment before 28 weeks of gestation or to a control group that received treatment after delivery. The rate of preterm/low birth weight delivery in the control group was 8.6 percent, while the rate in the treatment group was 2.5 percent. Jeffcoat et al. published preliminary results of an on-going trial that randomized women in the second trimester to one of three treatment groups: dental prophylaxis and placebo, periodontal treatment and placebo, and periodontal treatment and antibiotics. Preliminary data indicated that delivery at less than 35 weeks occurred among 6.3 percent of a referent control group, 4.9 percent of those that received prophylaxis and placebo, 3.3 percent of those that received periodontal treatment and antibiotics and 0.8 percent of those that received periodontal treatment with placebo (46). Mitchell-Lewis et al. compared 74 pregnant teenagers who received periodontal treatment to 90 teenagers who did not receive treatment during pregnancy. The rate of preterm/low birth weight delivery was 18.9 percent in the control group and 13.5 percent in the treatment group (48).

In a recent systematic review of periodontal disease and adverse pregnancy outcomes by Xiong et al., 25 studies were identified (49). Adverse pregnancy outcomes included not only preterm/low birth weight but also miscarriage and preeclampsia. Eighteen studies suggested an association between periodontal disease and increased risk of adverse pregnancy outcomes (OR 1.1 - 20.0) and 7 studies found no evidence of an association (OR 0.78 - 2.54).

The results of ongoing intervention trials will provide more definitive data to help craft future guidelines for oral health care during pregnancy. Without waiting for the outcome of these clinical trials, health care professionals can take actions now to address oral health problems in pregnant women.

**Magnitude of Public Health Burden of Preterm/Low Birth Weight Babies**

Preterm birth is a leading cause of neonatal mortality in the United States (50). Preterm birth is defined as delivery prior to 37 weeks gestation; low birth weight is defined as newborns weighing
less than 2500 grams or 5.5 pounds. On a national level, in 2001, 11.1 percent of all births were preterm and 7.7 percent were low birth weight. In fact, New York State ranked 20th nationally in percent of preterm births in 2002 (51). It is important to note that not all premature infants are low birth weight and that not all low birth weight infants are premature. Preterm births account for 35 percent of all US health care spending for infants and 10 percent of all such spending for children. Preterm births are responsible for three-quarters of neonatal mortality and one half of long-term neurologic impairments in children. Despite the numerous management methods proposed, the incidence of preterm birth has changed little over the past 40 years (52).

**Maternal Oral Health and Early Childhood Caries**

Dental caries is the most prevalent chronic infectious disease of our nation's children (1). Severe dental caries is a particular problem in young children because of the difficulty in managing them in a dental office, as well as the multiple visits required to treat them. Caries in primary teeth is also predictive of future caries risk. A review of the literature shows that there are several critical events in the causation of caries in young children (23;24;53). The first event is the acquisition of infection with *Streptococcus mutans*, the bacteria most responsible for caries initiation (53). The second event is the accumulation of *Streptococcus mutans* to pathogenic levels secondary to frequent and prolonged exposure to caries-promoting carbohydrates, particularly common sugar. The third event is rapid demineralization of enamel, which if unchecked leads to cavitations.

Cariogenic or decay-causing bacteria are typically transmitted from mother or caregiver to child by behaviors that directly pass saliva, such as sharing a spoon when tasting baby food, cleaning a dropped pacifier by mouth or wiping the baby's mouth with saliva (24;53;54). Colonization can occur any time after the child is born, but the bacteria have the greatest potential for being retained in the mouth after a tooth or other hard surface, such as an obturator in a child with cleft palate, is present in the mouth. The earlier that cariogenic bacteria occupy ecological niches in the child's mouth, the greater the percentage of the child's plaque that will be comprised of these bacteria. As the child grows older, cariogenic bacteria become less able to colonize within a child's mouth, as the available ecological niches are filled with other organisms. The mother is the most common donor as noted in DNA fingerprinting studies that show genotype matches between mothers and infants in over 70 percent of cases (54;55). For this reason, mothers who themselves have experienced extensive past or current caries have a particularly strong need for counseling on how to avoid early transmission of cariogenic bacteria to their offspring.

Reducing transmission of cariogenic bacteria can be accomplished by reducing the maternal reservoir, avoiding vectors, and increasing the child's resistance to colonization (53;56;57). Maternal *Streptococcus mutans* reservoirs can be suppressed by applying topical chlorhexidine or fluoride, chewing xylitol-containing gums, and dietary counseling to reduce frequency of simple carbohydrate ingestion (58). Transmission vectors can be identified and managed through anticipatory guidance about healthy behaviors like minimizing saliva-sharing activities. Resistance to colonization can be accomplished by limiting the child's frequency of carbohydrate intake or application of fluoride varnish. A daily rinse with a combination of 0.05 percent sodium fluoride and 0.12 percent chlorhexidine beginning in the sixth month of pregnancy and continuing until delivery has been reported to result in significant reductions in levels of dental caries-causing bacteria, consequently delaying the colonization of such bacteria among offspring (59). A study conducted by Gunay et al. demonstrated the effectiveness of a primary prevention program initiated during pregnancy that significantly improved the oral health of mothers and their children (60). One longitudinal study
showed that chewing xylitol-containing gum three to five times a day interfered with the transmission of bacteria from mother to child (61;62). Thus, interventions for the mother, which may decrease the spread of cavity causing bacteria to their infant or young child, have the potential to control dental caries in children.

**ORAL HEALTH AND EARLY CHILDHOOD**

Dental caries is a common childhood problem. It is five times more prevalent than asthma. Although dental caries is preventable, almost 28 percent of children aged two to five years experience the disease (21). A virulent form of dental caries in children younger than six is generally defined as early childhood caries (ECC). Because management of these children in dental offices is difficult, treatment is often rendered in operating rooms, increasing the cost of care. Furthermore, there is a high rate of relapse of caries in these children. According to the Medical Expenditure Panel Survey, the cost of dental services account for almost one fourth of total health care expenditures in children (19;63).

Child health professionals, including but not limited to physicians, physician assistants, nurse practitioners and nurses, can play a significant role in reducing the burden of this disease. While most children do not visit a dentist until age three, children have visited a child health professional up to eleven times for well-child visits by this age. Dental caries impacts children’s functioning including eating, sleeping, speaking, learning and growth. Other dental conditions such as oral clefts and orthodontic problems can jeopardize their physical growth, self-esteem and capacity to socialize. Thus, well-child visits provide an opportunity for oral health risk assessment, counseling, early detection and referral. Recently the American Academy of Pediatrics adopted new recommendations regarding the inclusion of oral health in anticipatory guidance during well-child care visits (13). The recommendations specify that the first dental risk assessment should occur as early as six months of age. The establishment of a dental home should occur by approximately one year of age.

**USE OF THESE GUIDELINES**

These recommendations have been developed to assist health care professionals to educate women about oral health and to improve the overall health of women and children. These guidelines can be used by: 1) prenatal care providers to integrate oral health risk assessment and referral into routine prenatal care; 2) oral health professionals to provide appropriate treatment for pregnant women; 3) child health professionals to include oral health risk assessment as part of well-child care and to provide referral.

These guidelines will enable health care professionals to work together as a team to improve the care delivered to mothers and children. This improved integration of care is expected to have significant health benefits.
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47. Lopez NJ, Smith PC, Gutierrez J. Periodontal therapy may reduce the risk of preterm low birth weight in women with periodontal disease: a randomized controlled trial. J Periodontol 2002; 73(8):911-924.


CHAPTER 2: Recommendations for Prenatal Care Providers

BACKGROUND
Oral health should be an integral part of prenatal care (1;2). Although we have known for a long time that oral health is important, some pregnant women are not receiving oral health care services (2;3). Prenatal care providers can play a crucial role in breaking down barriers to access and raising awareness about the importance of oral health. Furthermore, they can dispel misconceptions, such as the belief that bleeding in the mouth is “normal” during pregnancy, pain during dental procedures is unavoidable, x-rays during pregnancy are harmful to the fetus and postponing treatment until after pregnancy is safer for the fetus and mother. Some oral health professionals also have concerns about the effects of x-rays and medications including anesthetic agents, antibiotics and analgesics on the fetus. While structural, financial, personal and cultural barriers may present problems in finding appropriate sources of dental care for pregnant women, prenatal care providers can play a significant role by educating pregnant women and advocating for appropriate oral health care in their communities.

Improving oral health during pregnancy not only enhances the overall health of women but also contributes to improving the oral health of their children. In the past, some oral health professionals have postponed treatment because of the uncertainty about the risk of x-rays and bacteremia (4;5). However, deferring appropriate treatment may cause unforeseen harm to the woman and possibly to the fetus for several reasons. First, women may self-medicate with over the counter medications like acetaminophen to control pain. Second, untreated cavities in mothers may increase the risk of caries in children. Finally, untreated oral infection may become a systemic problem during pregnancy and may contribute to preterm and/or low birth weight deliveries. Recently, the American Academy of Periodontology urged oral health professionals to provide preventive services as early in pregnancy as possible and to provide treatment for acute infection or sources of sepsis irrespective of the stage of pregnancy (6). For many women, completing treatment of oral diseases during pregnancy assumes greater importance because health and dental insurance may be available only during pregnancy. Consequently, the prenatal period is a unique opportunity for obtaining oral health services.

ROLE OF PRENATAL CARE PROVIDER
Pregnancy is a “teachable moment” when women are motivated to change behaviors that have been associated with poor pregnancy outcomes. The prenatal care team can be very influential in encouraging women to maintain a high level of oral hygiene, to visit an oral health professional, and to promote completion of all needed treatment during the pregnancy. Oral health care services should be integrated with prenatal services for all pregnant women. The prenatal care provider is encouraged to:

- Assess problems with teeth and gums and make appropriate referral to an oral health professional.
- Encourage all women at the first prenatal visit to schedule an oral health examination if one has not been performed in the last six months, or if a new condition has occurred.
- Encourage all women to adhere to the oral health professional’s recommendations regarding appropriate follow-up.
Document in the prenatal care plan whether the patient is already under the care of an oral health professional or a referral is made.

Facilitate treatment by providing written consultation for the oral health referral (Appendix A).

Develop a list of referral sources in the community who will provide services to pregnant women.

Share appropriate clinical information with oral health professional.

Answer questions that the oral health professional may ask.

Educate pregnant women about care that will improve their oral health:
- Brush teeth twice daily with a fluoride toothpaste and floss daily.
- Limit foods containing sugar to mealtimes only.
- Choose water or low-fat milk as a beverage. Avoid carbonated beverages during pregnancy.
- Choose fruit rather than fruit juice to meet the recommended daily fruit intake for you and your child.
- Obtain necessary dental treatment before delivery.

Assist pregnant women in dealing with nausea and vomiting:
- Eat small amounts of nutritious yet noncariogenic foods throughout the day (Appendix B).
- Use a teaspoon of baking soda (sodium bicarbonate) in a cup of water as a rinse after vomiting to neutralize acid.
- Chew sugarless or xylitol-containing gum after eating.
- Use gentle tooth brushing and fluoride toothpaste to prevent damage to demineralized tooth surfaces.

Advise women that the following actions may reduce the risk of caries in children:
- Wipe an infant’s teeth after feeding, especially along the gum line, with a soft cloth or soft bristled toothbrush.
- Supervise children’s brushing and use a small (size of child’s pinky nail) amount of toothpaste.
- Avoid putting the child to bed with a bottle or sippy cup containing anything other than water.
- Limit foods containing sugar to mealtimes only.
- Avoid saliva-sharing behaviors, such as sharing a spoon when tasting baby food, cleaning a dropped pacifier by mouth or wiping the baby’s mouth with saliva.
- Avoid saliva-sharing behaviors between children via their toys, pacifiers, etc.
- Visit an oral health professional with child between six and 12 months of age.
**WHAT SHOULD HAPPEN AT THE PRENATAL VISIT?**

At the first prenatal visit, the prenatal care provider should conduct an assessment to identify patients who require immediate oral health care and make appropriate referrals. This assessment should include interviewing the patient regarding problems in the mouth, previous dental visits and the availability of a dental provider.

**Interview**

The following two interview questions are recommended for incorporation into the initial prenatal visit (See Figure 2):

1. Do you have bleeding gums, toothache, cavities, loose teeth, teeth that do not look right or other problems in your mouth?

   If the woman answers yes, the prenatal care provider should:
   - Refer the patient to a dentist.
   - Stress the importance of a dental visit within one month.
   - Assist the pregnant woman in accessing dental care, as needed.

   If the woman answers no to the above question, the prenatal care provider should ask the following question:

2. Have you had a dental visit in the last six months?

   If the woman answers yes, the prenatal care provider should encourage her to keep the next appointment, which may occur during pregnancy, and reassure her that dental care during pregnancy is safe and essential. Counsel her that delaying treatment may result in significant risk to her and indirectly to the fetus.

   If the woman answers no, the prenatal care provider should encourage the pregnant woman to make a dental appointment as soon as possible, preferably before 20 weeks of gestation.

**Figure 2. Questions the Prenatal Provider Should Ask**

- **Do you have bleeding gums, toothache, cavities, loose teeth, teeth that do not look right or other problems in your mouth?**
  - **YES**
    - Refer patient to a dentist.
    - Stress the importance of a timely visit (within one month).
    - Assist in accessing dental care as needed.
  - **NO**
    - Ask: Have you had a dental visit in the last 6 months?
  - **YES**
    - Encourage the pregnant woman to keep the next appointment.
    - Reassure that dental care during pregnancy is safe and essential for her and the fetus.
  - **NO**
    - Encourage the pregnant woman to make a dental appointment as soon as possible.
**Education**

The prenatal care provider should include the following in the education of pregnant women.

- Educate the pregnant woman about the importance of her oral health, not only for her overall health, but also for the oral health of her children and possibly to improve the outcome of her current pregnancy. A list of resources for educational materials is provided in Appendix E.

- Advise the pregnant woman that:
  - Dental care is safe and effective during pregnancy. Oral health care should be coordinated among prenatal and oral health care providers.
  - First trimester diagnosis and treatment, including needed dental x-rays, can be undertaken safely to diagnose disease processes that need immediate treatment.
  - Needed treatment can be provided throughout pregnancy; however, the time period between the 14th and 20th week is ideal.
  - Elective care can be deferred until after delivery.
  - Delay in obtaining necessary treatment could result in significant risk to her and indirectly to the fetus.

**ORAL HEALTH CARE AT THE DENTAL OFFICE**

During a visit to the dental office, patients are examined for dental caries, periodontal or gum disease, impacted, erupted or destructed teeth and other problems. Some patients may require more extensive treatment, such as scaling and root planing to control periodontal disease, root-canal therapy or extractions of teeth. Dental procedures such as bridgework and cosmetic dentistry are generally deferred until after the pregnancy.

**QUESTIONS THE ORAL HEALTH PROFESSIONAL MAY ASK**

**Can I take x-rays?**

Yes. Diagnostic x-rays can be used during pregnancy (7-11).

Generally, dentists advise intraoral x-rays at intervals ranging from every six to thirty-six months (12). One to four intraoral bitewing or periapical views are taken with the x-ray film in the mouth. If additional information is needed, a dentist may want to take a panoral x-ray (extraoral) that gives a good picture of all teeth.

X-ray imaging of the mouth is not contraindicated in pregnancy and should be utilized as required to complete a full examination and treatment. Diagnostic x-rays are safe during pregnancy (7-12). The number and type of x-rays will depend upon the clinical conditions. The mean skin exposure from a typical dental x-ray is approximately 0.1mrad. A full mouth series of 22 dental x-rays will result in a total exposure of 2.2mrad. The oral health professional should provide shielding for the pregnant woman’s abdomen and neck from x-ray exposure in the dental office.

The Food and Drug Administration has provided detailed guidelines for the use of radiographs in dental offices. These guidelines are found in Appendix F.
Can I inject local anesthetic with epinephrine?
Yes. Local anesthetic with epinephrine can be used during pregnancy.

Lidocaine with epinephrine is considered safe during pregnancy. Lidocaine (2%) is a category B drug in contrast to mepivicaine (3%) which is a category C drug. Lidocaine with epinephrine prolongs the length of anesthesia because the drug is absorbed slowly. There is a theoretical concern about the effect of epinephrine on uterine muscle. No scientific studies, however, could be found to confirm this effect in pregnant women. The frequency of malformations was not increased among reviews of almost 300 children whose mothers were given lidocaine during early pregnancy (11;13).

Can I use 30 percent nitrous oxide in the dental office?
The use of nitrous oxide should be limited to cases where topical and local anesthetics are inadequate. In such situations, consultation with the prenatal care provider would be prudent. Adequate precautions must be taken to prevent hypoxia, hypotension and aspiration (13). Alterations in anatomy and physiology induced by pregnancy have anesthetic implications and present potential hazards for the mother and the fetus. Therefore, most anesthesiologists prefer to use local and regional anesthetics for pregnant women.

Pregnant women require lower levels of nitrous oxide to achieve sedation. Therapeutic dosage of standard drugs for monitored anesthetic care (MAC) for intravenous and inhalation sedation is markedly reduced in pregnancy. Thus, the pregnant woman may become obtunded when the usual dosages of drugs for conscious sedation are administered. A pulse oximeter should always be used for pregnant women receiving MAC. In addition, maternal oxygen saturation should be maintained at 95 percent or higher to ensure adequate oxygenation of the fetus.

A pregnant woman is considered to always have a “full stomach” due to delayed gastric emptying and incompetent lower esophageal sphincter. Thus, pregnant women are at increased risk for aspiration (13;14). Therefore, prophylactic measures to prevent aspiration should be used, particularly during the third trimester. A woman with multiple gestation is at increased risk for aspiration in the mid-second trimester because of the large uterus. Maintaining a semi-seated position and avoiding excessive sedation are required to prevent aspiration. Conscious sedation should be the last possible alternative in the third trimester. These women may be best treated with general anesthesia in the hospital setting (13).

What medications can I prescribe?
Appropriate treatment of pain and infection is important. Definitive treatment should not be postponed because of pregnancy. Dentists typically use antibiotics and analgesics for treating infection and controlling pain. Pharmacotherapeutics should not be a substitute for appropriate and timely dental procedures. Recommendations for some commonly used drugs (15) are summarized in Table 1.
Table 1. Acceptable and Unacceptable Drugs for Pregnant Women

<table>
<thead>
<tr>
<th>Drugs Used During Pregnancy</th>
<th>FDA Category</th>
<th>Drugs Not to Be Used During Pregnancy</th>
<th>FDA Category</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ANTIBIOTICS</strong></td>
<td></td>
<td><strong>ANTIBIOTICS</strong></td>
<td></td>
</tr>
<tr>
<td>Penicillin</td>
<td>B</td>
<td>Tetracyclines</td>
<td>D</td>
</tr>
<tr>
<td>Amoxicillin</td>
<td>B</td>
<td>Erythromycin in the estolate form</td>
<td>B</td>
</tr>
<tr>
<td>Cephalosporins</td>
<td>B</td>
<td>Quinolones</td>
<td>C</td>
</tr>
<tr>
<td>Clindamycin</td>
<td>B</td>
<td>Clarithromycin</td>
<td>C</td>
</tr>
<tr>
<td>Erythromycin (except for estolate form)</td>
<td>B</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ANALGESICS</strong></td>
<td></td>
<td><strong>ANALGESICS</strong></td>
<td></td>
</tr>
<tr>
<td>Acetaminophen</td>
<td>B</td>
<td>Aspirin</td>
<td>C</td>
</tr>
<tr>
<td>Acetaminophen with codeine</td>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Codeine</td>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydrocodone</td>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meperidine</td>
<td>B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morphine</td>
<td>B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>After 1st trimester for 24 to 72 hrs only</td>
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<td></td>
<td></td>
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<tr>
<td>Ibuprofen</td>
<td>B</td>
<td></td>
<td></td>
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<tr>
<td>Naprosyn</td>
<td>B</td>
<td></td>
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</tr>
</tbody>
</table>

Should the pregnant woman be positioned in a special way?

When the pregnant woman lies flat on her back, the uterus in the third trimester can press on the inferior vena cava and impede venous return to the heart. This decrease in venous return can cause decreased oxygen to the brain and uterus. The pregnant woman may complain of dizziness and/or nausea. Placing a small pillow under the woman’s right hip, so called left uterine displacement, or having the woman lean on her left side moves the uterus off the vena cava (16). This intervention can easily be done in the dental chair. In addition, it is recommended that a pregnant woman’s head should not be lower than her feet while performing dental procedures.

When should restorations (fillings for cavities in teeth) and other necessary dental treatment be performed?

Needed oral health treatment should be provided any time during the pregnancy (11). Prenatal care providers have traditionally postponed non-emergent medical treatment until the first trimester has passed. This practice has been based on theoretical concerns for potential harm to the fetus during the period of organogenesis. There is no compelling evidence that precludes dental treatment any time during pregnancy including the first trimester. The early second trimester (14 to 20 weeks) is the ideal time to perform all dental procedures. At this stage in gestation, the threat for teratogenicity has passed, nausea and vomiting are less common and the uterus is not large enough to cause discomfort. Another reason for completing treatment is that some pregnant women may require general anesthesia with intubation at delivery. Because pre-anesthesia evaluation usually occurs at the time of labor, problems such as loose teeth and temporary restorations should be remedied prior to the estimated date of delivery.
What advice should I give about the use of dental amalgam (silver-mercury) fillings during pregnancy?

All health professionals should educate women about the potential harm that can accrue from untreated caries during pregnancy. Women with symptomatic caries or deep decay should be treated promptly, including in the first trimester. The oral health professional and the pregnant woman should determine the best treatment options based on an evaluation of the benefits, risks and alternatives of using dental amalgam fillings.

At present, there is no evidence that the exposure of the fetus to mercury released from the mother's existing amalgam fillings causes any adverse effect (17-21). There is international agreement that the scientific data do not confirm the presence of a significant health hazard from use of dental amalgam. Nevertheless, Germany, Austria and Canada have restricted the use of amalgams in certain populations including pregnant women. In addition, Sweden and Denmark are phasing out all mercury containing materials because of environmental concerns (17).

Dental amalgam is the most common material used for repairing a posterior tooth. Resins (composites), glass-ionomer, gold or porcelain restorations are alternative materials. Dental amalgams are often more durable than resin or glass-ionomer fillings and less costly than gold or porcelain restorations, but little is known about any of these materials in relation to pregnancy. Bisphenol-A, one of the chemicals in the resin, has been shown to be an endocrine disrupter in animal studies (22). If one were to apply the Food and Drug Administration (FDA) Use-In-Pregnancy Ratings for Drugs (23) to dental amalgam or resin material, each could be considered as Category B (i.e., penicillin and acetaminophen) or C (i.e., acetaminophen with codeine).

Mercury vapor (elemental mercury, a form of inorganic mercury) is released during amalgam removal or placement and may be inhaled and absorbed into the bloodstream through which it crosses the placental barrier. This procedure may temporarily increase the mercury level in blood. However, use of rubber dam and high speed evacuation (suction) can markedly reduce such vapor inhalation (21). According to a recent systematic review, there is insufficient evidence to support or refute the hypothesis that mercury exposure from dental amalgam restorations contributes to adverse pregnancy outcomes (17). A study conducted by Hujoel et al. found that the placement of dental amalgams during pregnancy did not increase the risk of low birth weight babies (19).

The elemental mercury found in dental amalgams is different from methyl mercury, a form of organic mercury. The consumption of fish and seafood is the major source of organic mercury (17;20). The ingestion of methyl mercury during pregnancy is more of a concern than mercury vapor released from dental amalgams.
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on Dec 15, 2005.
BACKGROUND
In developing a treatment plan for the pregnant woman, oral health professionals should consider the gestational age of the fetus, harmful maternal behaviors and other medical conditions. Because the second trimester is considered the safest time to provide oral health and other surgical care, oral health professionals need to know the estimated date of delivery. After the baby is born, the mother may be too busy to attend to dental appointments and may lose her health insurance coverage. In addition, oral health professionals should be aware of certain physiological changes that occur during pregnancy. Every pregnant woman is expected to receive a comprehensive oral evaluation at some time during the pregnancy, as regular six-month examinations is the standard of care for the general population.

Time Line of Pregnancy
The estimated date of delivery is calculated by counting 40 weeks from the first day of the last menstrual period (1). Pregnancy is divided into three trimesters, roughly three months for each trimester or 14 weeks based on a 42-week gestation. Because of the current widespread use of ultrasound, it is more common for women to report the number of completed weeks of gestation. The first trimester, defined as starting at the first day of the last menstrual period and continuing until 13 weeks and six days, is when organogenesis takes place. Technically, the conceptus is called an embryo until the ninth week, when it becomes a fetus. It is during the embryonic period when the risk of teratogenicity exists (2). The second trimester and the third trimester start at 14 weeks and at 28 weeks of gestation respectively.

First Trimester: Pregnancy Loss and Teratogenesis
Sporadic pregnancy loss occurs in 10 to 15% of all clinically recognized pregnancies in the first trimester (3). Most of these losses are due to karyotypic abnormalities. Organogenesis, development of the organs, takes place in the first ten weeks of gestation. Usually, in order for an environmental factor to be considered a teratogen, exposure must occur during the first ten weeks of gestation. Malformations are present in two to three percent of live full-term newborn babies (1;4;5). Performing dental procedures during early pregnancy has never been reported to increase the rate of malformations.

Second Trimester
The safest time to perform procedures during pregnancy is in the early second trimester, 14 to 20 weeks gestation. The risk of pregnancy loss is lower compared to that in first trimester and organogenesis is completed. For example, cervical cerclage and thyroidectomy are two relatively common surgical procedures performed on pregnant women typically in the early second trimester (1;4). The pregnant uterus is below the umbilicus until 20 weeks gestation and the woman is generally more comfortable than she will be as the pregnancy progresses.
Third Trimester
In the third trimester, the uterus can press on the inferior vena cava and pelvic veins, which impedes venous return to the heart. This decrease in venous return can cause a decrease in the amount of oxygen delivered to the brain and uterus (1). Women who are supine may have nausea or vomiting.

Harmful Maternal Behaviors: Tobacco, Alcohol and Recreational Drugs
Oral health professionals play a significant role in counseling patients concerning the harmful effects of tobacco, alcohol and recreational drugs. During the pregnancy, the consequences of these behaviors are profound. Multiple studies have demonstrated a clear association between maternal smoking and perinatal morbidity and mortality (6-10). Women who smoke are at increased risk for low birth weight babies, bleeding during pregnancy, premature labor and preterm rupture of membranes. Infant health risks associated with maternal smoking include sudden infant death syndrome, hospitalization and neurodevelopmental abnormalities.

There is no known safe amount of alcohol consumption during pregnancy. Fetal alcohol syndrome is a preventable birth defect characterized by growth restriction, facial abnormalities and central nervous dysfunction. Many more babies, however, are diagnosed with fetal alcohol effect, which is a lesser degree of the syndrome. Fetuses of women who ingest six drinks per day are at a 40 percent risk of developing some features of the fetal alcohol syndrome (5;9). Some data suggest that binge drinking, for example on the weekend, is more likely to cause this syndrome than daily intake of alcohol (1). It is safest to consider all use of alcohol during pregnancy as harmful, including some alcohol-containing mouth rinses.

Depending on the geographic location, it is estimated that 1 to 40 percent of pregnant women have used cocaine, marijuana, diazepam or other prescription drugs at some time during the pregnancy while one in ten neonates are exposed to mood-altering drugs during pregnancy (5;7). For these reasons, oral health evaluation during pregnancy presents a unique opportunity to counsel women concerning these high-risk behaviors.

PREGNANCY AND TREATMENT CONSIDERATIONS
Hypertensive Disorders of Pregnancy
Oral health professionals should be aware of hypertensive disorders because of increased risk of bleeding during procedures and should consult with the prenatal care provider before initiating dental procedures in women with uncontrolled severe hypertension. Blood pressure values of greater than or equal to 140/90 mmHg are considered mild hypertension and values greater than or equal to 160/110 mmHg are considered severe hypertension. Hypertensive disorders of pregnancy, including chronic or preexisting hypertension and the development of hypertension during pregnancy, occur in 12 to 22 percent of pregnancies (11). Up to 5 percent of pregnant women have chronic hypertension (12). By definition, chronic hypertension is diagnosed prior to pregnancy or during the first 20 weeks of gestation.

Preeclampsia is a syndrome defined by hypertension and proteinuria during pregnancy. Eclampsia is defined as the new onset of grand mal seizures in a woman with preeclampsia. The diagnostic criteria for superimposed preeclampsia include new onset proteinuria in a woman with diagnosed chronic hypertension. Preeclampsia occurs in 5 to 8 percent of pregnancies. Hypertensive disorders are associated with adverse outcomes including premature birth, intrauterine growth restriction, fetal demise, placental abruption and cesarean delivery (11).
Several physiologic changes occur during pregnancy that can affect chronic hypertension. Two of the most significant changes are the increase in blood volume and the decrease in blood pressure that begin by the end of the first trimester. The blood pressure reaches its lowest level at 16 to 18 weeks. This decrease in blood pressure is the result of changes in the renin-angiotensin system and the development of physiologic anemia of pregnancy (1).

**Diabetes and Pregnancy**

Gestational diabetes or type III diabetes occurs in 2 to 5% of pregnant women in the United States (13) and is most commonly diagnosed after 24 weeks of gestation. Pre-existing type II diabetes, characterized by insulin resistance, is more likely to continue after delivery especially if the woman is obese. Up to 50% of women with gestational diabetes will go on to develop type II diabetes in middle age, especially with risk factors of a positive family history and obesity. Type I diabetes, with underlying autoimmune pathogenesis, may also be initially diagnosed during pregnancy.

For women with diabetes diagnosed prior to pregnancy, oral health is particularly important as acute and chronic infections make control of diabetes more difficult (14). Diabetes control is particularly important during the first trimester. Rates of congenital anomalies increase as the degree of uncontrolled diabetes increases. Ideally, all women should be seen for oral health care prior to conception. Oral health care is even more important for women with diabetes who require meticulous pre-conception control of the disease to reduce the risk of congenital malformations (1). Ongoing control of diabetes during pregnancy further decreases the risk of adverse pregnancy outcomes such as preeclampsia and large-for-gestational age (macrosomic) newborns (1;4).

**Heparin and Pregnancy**

A small number of pregnant women with a diagnosis of thrombophilia may be given one or two injections of heparin daily to improve pregnancy outcome. Thrombophilia is a genetic or acquired hematologic condition that predisposes women to blood clots, pregnancy loss and/or fetal growth restriction. Heparin increases the risk for bleeding complications during dental procedures (15-17).

**Risk of Aspiration**

Pregnant women have delayed gastric emptying due to hormonal changes and an incompetent esophageal valve. As a result, pregnant women are considered to always have a “full stomach” and thus are at increased risk for aspiration (1;4;18).

**Food and Drug Administration (FDA) Use-in-Pregnancy Ratings for Drugs**

Most people are exposed to a variety of chemicals. Although a few agents have been shown to be teratogenic in humans, the teratogenic potential of many of these agents is not known (1;19). In 1979, the FDA developed a classification system to provide therapeutic guidance for the use of drugs during pregnancy. This system combines assessment of several kinds of risk, including congenital anomalies, fetal effects, perinatal risks and therapeutic risk-benefit ratio. Few research studies of drugs have included pregnant women. Most medications prescribed for common diseases can be used with relative safety (with a few notable exceptions like thalidomide) because there have been few adverse drug reports. Moreover, the untreated disease or condition itself may pose more serious risks to both mother and fetus than any unsubstantiated risks from the medications. It is important that health care professionals who care for pregnant women are familiar with the following
classification of drugs (1;19). Most drugs are category C (66%) or B (19%) while only 0.7% are category A (20).

**FDA Use-in-Pregnancy Ratings for Drugs (21)**

**Category A** – Controlled studies show no risk – Adequate, well-controlled studies in pregnant women have failed to demonstrate risk to the fetus.

**Category B** – No evidence of risk in humans – Either animal studies show risk (but human findings do not) or, if no adequate human studies have been done, animal findings are negative.

**Category C** – Human studies are lacking and animal studies are either positive for fetal risk or lacking as well. However, potential benefits may justify the potential risk.

**Category D** – Positive evidence of risk – Investigational or post marketing data show risk to the fetus. Nevertheless, potential benefits may outweigh the risk, such as some anticonvulsive medications.

**Category X** – Contraindicated in pregnancy – Studies in animals or humans, or investigational or post marketing reports have shown fetal risk, which clearly outweighs any possible benefit to the patient, such as isotretinoin and thalidomide.

**Considerations for Nitrous Oxide Use in the Dental Office**

The use of nitrous oxide should be limited to cases where topical and local anesthetics are inadequate. In such situations, consultation with the prenatal care provider would be prudent. Adequate precautions must be taken to prevent hypoxia, hypotension and aspiration (18). Alterations in anatomy and physiology induced by pregnancy have anesthetic implications and present potential hazards for the mother and the fetus. Therefore, most anesthesiologists prefer to use local and regional anesthetics for pregnant women.

Pregnant women require lower levels of nitrous oxide to achieve sedation. Therapeutic dosage of standards drugs for monitored anesthetic care (MAC) for intravenous and inhalation sedation is markedly reduced in pregnancy. Thus, the pregnant woman may become obtunded, when the usual dosages of drugs for conscious sedation are administered. A pulse oximeter should always be used for pregnant women receiving MAC. In addition, maternal oxygen saturation should be maintained at 95 percent or higher to ensure adequate oxygenation of the fetus.

A pregnant woman is considered to always have a “full stomach” due to delayed gastric emptying and incompetent lower esophageal sphincter. Thus, pregnant women are at increased risk for aspiration (4;18). Therefore, prophylactic measures to prevent aspiration should be used particularly during the third trimester. A woman with multiple gestation is at increased risk for aspiration in the mid-second trimester because of the large uterus. Maintaining a semi-seated position and avoiding excessive sedation are required to prevent aspiration. Conscious sedation should be the last possible alternative in the third trimester. These women may be best treated with general anesthesia in the hospital setting (18).

**Use of Diagnostic X-rays During Pregnancy**

According to the American College of Radiology, no single diagnostic procedure results in a radiation dose significant enough to threaten the well being of the developing embryo and fetus (22). Current evidence suggests that there is no increased risk to the fetus with regard to congenital malformation, growth retardation, or abortion from ionizing radiation at a dose of less than five rad (23;24).
According to Matteson et al., the recommended guidelines need not be altered for a pregnant patient (25). Uterine doses for a full-mouth radiographic series have been shown to be less than one mrem. On the other hand, the uterine doses from naturally occurring background radiation during the nine months of pregnancy can be expected to be about 75 mrem. The goal is to minimize x-ray exposure to the fetus.

Hujoel et al. recently reported an association between dental x-rays in the first trimester and term low birth weight babies (26). The authors hypothesized that the total x-ray exposure to the maternal thyroid gland could cause low birth weight. Several weaknesses in the study indicate that it is highly unlikely that this association is causal (27-29). There is no reason, at this time, to believe that the risk of low birth weight babies outweighs the benefits of exposing pregnant women to a limited number of dental x-rays with appropriate thyroid collar and apron.

The U.S. Food and Drug Administration has provided detailed guidelines for prescribing dental radiographs (Appendix F). The guidelines recommend the use of health history and clinical judgment to determine the need for and type of radiographic images for diagnosis. Every precaution should be taken to minimize radiation exposures by using protective thyroid collars and aprons whenever possible.

Mercury Fillings and Human Health Problems

Mercury vapor (elemental mercury, a form of inorganic mercury) is released during amalgam removal or placement and may be inhaled and absorbed into the bloodstream through which it crosses the placental barrier. This procedure may temporarily increase the mercury level in blood. However, use of rubber dam and high speed evacuation (suction) can markedly reduce such vapor inhalation. According to a recent systematic review, there is insufficient evidence to support or refute the hypothesis that mercury exposure from dental amalgam restorations contributes to adverse pregnancy outcomes (30). A study conducted by Hujoel et al. found that the placement of dental amalgams during pregnancy did not increase the risk for low birth weight babies (32).

The elemental mercury found in dental amalgams is different from methyl mercury, a form of organic mercury. The consumption of fish and seafood is the major source of organic mercury (30;33). The ingestion of methylmercury during pregnancy is more of a concern than mercury released from dental amalgams.
All health professionals should educate women about the potential harm that can accrue from untreated caries during pregnancy. Women with symptomatic caries or deep decay should be treated promptly at any time during pregnancy. The oral health professional and the pregnant woman should determine the best treatment options based on an evaluation of the benefits, risks and alternatives of using dental amalgams.

**Prophylactic Antibiotics During Pregnancy**

Pregnancy in and of itself is not an indication for prophylactic antibiotics during dental procedures, although bacteremia can occur as a result of dental procedures. Transient bacteremia is well documented following such procedures as tooth extractions, gingivectomy, supra- and subgingival scaling, ultrasonic scaling and subgingival irrigation (37). While the occurrence of bacteremia is common following dental procedures, clinical trials have not reported any adverse effects of dental interventions on pregnant women.

Criteria for prescribing antibiotics to prevent subacute bacterial endocarditis are the same for pregnant women as they are for all individuals. Antibiotics are used prophylactically to prevent subacute bacterial endocarditis in all patients at increased risk as delineated in the American College of Cardiology guidelines (38).

**Xylitol-Containing Chewing Gum**

The role of sucrose and other fermentable carbohydrates in the causation of dental caries is well known (39;40). Xylitol, a naturally occurring sweetener, has been added to chewing gums, candy, toothpastes and chewable fluoride tablets because of its potential to reduce dental caries. A National Institutes of Health consensus development conference on the diagnosis and management of dental caries identified xylitol-containing products as an effective caries preventive agent (41). Significant reduction of mother-child transmission of *Streptococcus mutans* occurred in a group of Finnish mothers chewing xylitol-containing gum two to three times a day, while their children were between three and 24 months of age (42). Although xylitol-containing chewing gum is promising as a caries preventive agent, there is still uncertainty, however, as to the frequency, amount and duration of chewing required for reducing bacterial transmission.

**ROLE OF ORAL HEALTH PROFESSIONAL**

The role of the oral health professional includes providing preventive and treatment care, and anticipatory guidance for pregnant women. Oral health professionals should render all needed services to pregnant women because:

- Pregnancy by itself is not a reason to defer routine dental care and necessary treatment for oral health problems.
- First trimester diagnosis and treatment, including needed dental x-rays, can be undertaken safely to diagnose disease processes that need immediate treatment.
- Needed treatment can be provided throughout pregnancy; however, the time period between the 14th and 20th week is ideal.
WHAT SHOULD HAPPEN AT THE ORAL HEALTH CARE VISIT?

The oral health professional is encouraged to:

■ Consider the following when planning definitive treatment:
  • Chief complaint and medical history
  • History of tobacco, alcohol and other substance use
  • Clinical evaluation
  • Radiographs when needed

■ Develop and discuss a comprehensive treatment plan that includes preventive and maintenance care.

■ Educate pregnant women about care that will improve their oral health:
  • Brush teeth twice daily with a fluoride toothpaste and floss daily.
  • Limit foods containing sugar to mealtimes only.
  • Choose water or low-fat milk as a beverage. Avoid carbonated beverages during pregnancy.
  • Choose fruit rather than fruit juice to meet the recommended daily fruit intake.
  • Obtain necessary dental treatment before delivery.

MANAGEMENT OF ORAL HEALTH PROBLEMS IN PREGNANT WOMEN

The oral health professional is encouraged to:

■ Implement best practices in the assessment of caries risk and management of caries in pregnant women.

■ Perform a comprehensive gingival and periodontal examination, which includes a periodontal probing depth record.

■ Consider the following as strategies to decrease maternal cariogenic bacterial load:
  • Suggest fluoride toothpaste along with fluoride mouth rinses depending on the fluoridation status of water.
  • Restore untreated caries.
  • Recommend chlorhexidene mouth rinses and fluoride varnish as appropriate.
  • Recommend the use of xylitol-containing chewing gum.

■ Use the following when clinically indicated (See Table 1 for acceptable and unacceptable drugs):
  • Local anesthetic with epinephrine
  • Analgesics such as acetaminophen and/or codeine, antibiotics including penicillins, cephalosporins and erythromycins, excluding erythromycin estolate
- Radiographs with thyroid collar and abdominal apron
- Non-steroidal anti-inflammatory drugs for 48 to 72 hours.

- Avoid aspirin, aspirin-containing products, erythromycin estolate and tetracycline.
- Discuss the benefits, risks and alternatives to treatments prior to fourteen weeks gestation including prophylaxis, root planing and scaling.
- Complete restorations with permanent materials, if possible, during pregnancy.
- Complete all necessary dental procedures prior to delivery.
- Consult with the prenatal care provider when considering:
  - Deferring treatment because of pregnancy
  - Co-morbid conditions that may affect management of dental problems such as diabetes, hypertension or heparin treated thrombophilia
  - An anesthesia other than a local block such as intravenous sedation or general anesthesia to complete the dental procedure

### Table 1. Acceptable and Unacceptable Drugs for Pregnant Women

<table>
<thead>
<tr>
<th>These drugs may be used during pregnancy.</th>
<th>FDA Category</th>
<th>These drugs should NOT be used during pregnancy.</th>
<th>FDA Category</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ANTIBIOTICS</strong></td>
<td></td>
<td><strong>ANTIBIOTICS</strong></td>
<td></td>
</tr>
<tr>
<td>Penicillin</td>
<td>B</td>
<td>Tetracyclines</td>
<td>D</td>
</tr>
<tr>
<td>Amoxicillin</td>
<td>B</td>
<td>Erythromycin in the estolate form</td>
<td>B</td>
</tr>
<tr>
<td>Cephalosporins</td>
<td>B</td>
<td>Quinolones</td>
<td>C</td>
</tr>
<tr>
<td>Clindamycin</td>
<td>B</td>
<td>Clarithromycin</td>
<td>C</td>
</tr>
<tr>
<td>Erythromycin (except for estolate form)</td>
<td>B</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ANALGESICS</strong></td>
<td></td>
<td><strong>ANALGESICS</strong></td>
<td></td>
</tr>
<tr>
<td>Acetaminophen</td>
<td>B</td>
<td>Aspirin</td>
<td>C</td>
</tr>
<tr>
<td>Acetaminophen with codeine</td>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Codeine</td>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydrocodone</td>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meperidine</td>
<td>B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morphine</td>
<td>B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>After 1st trimester for 24 to 72 hrs only</td>
<td>B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ibuprofen</td>
<td>B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Naprosyn</td>
<td>B</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
ORAL HEALTH DURING EARLY CHILDHOOD

Oral health professionals are encouraged to take the following actions for infants and children:

■ Assess the risk for oral diseases in children beginning at six months by identifying risk indicators including:
  • Inadequate fluoride exposure (Appendix C)
  • Past or current caries experience of siblings, parents and other household members
  • Lack of age-appropriate oral hygiene efforts by parents
  • Frequent and prolonged exposure to sugary substances or use of night time bottle or sippy cup containing anything other than water
  • Medications that contain sugar
  • Clinical findings of heavy maxillary anterior plaque or any signs of decalcification (white spot lesions)
  • Special health care needs

■ Provide necessary treatment or facilitate appropriate referral for children assessed to be at increased risk for oral disease or in whom carious lesions or white spot lesions are identified.

Although there is insufficient evidence to make definitive recommendations to prevent early childhood dental caries, many clinicians recommend interventions to disrupt the chain of events that is implicated in the development of caries. These include:

■ Reducing the bacterial reservoir in mothers and intimate caretakers by restoring carious lesions and using therapeutic agents such as fluorides and chlorhexidine solutions.

■ Avoiding saliva-sharing behaviors of mothers and other intimate caregivers, such as tasting food before feeding, cleaning a dropped pacifier by mouth and wiping the baby's mouth with saliva.

■ Avoiding saliva-sharing behaviors between children via their toys, pacifiers etc.

■ Encouraging feeding choices that reduce the frequency and amount of caries- promoting sugars such as those contained in fruit juices and infant formula preparations (See Appendix G).

■ Avoiding bottles and sippy cups, especially just before sleep, and encouraging the use of water as an alternative to sugary liquids.

■ Wiping an infant's teeth after feeding, especially along the gum line, with a soft cloth or soft bristled toothbrush.

■ Beginning to wean children from bottle and sippy cup by nine to ten months of age.

■ Supervising children's tooth brushing with a small amount of fluoride toothpaste (size of child's pinky finger nail).

■ Applying antimicrobial agents such as 10% povidone-iodine solution periodically to the dentition of babies at high risk for early childhood caries.

■ Applying fluoride varnishes two to three times per year.
REFERENCES


BACKGROUND

Dental caries is a common childhood condition. It is five times more prevalent than asthma. Although dental caries is preventable, almost 28 percent of children aged two to five years experience the disease (1-3). A virulent form of dental caries in young children less than six years of age is generally defined as early childhood caries (ECC). Because it is difficult to manage these children in dental offices, treatment is often rendered in operating rooms, increasing the cost of care. Furthermore, there is a high rate of relapse of caries in these children. According to the Medical Expenditure Panel Survey, the cost of dental services accounts for almost one fourth of total health care expenditures in children (4).

Child health professionals, including but not limited to physicians, physician assistants, nurse practitioners and nurses, can play a significant role in reducing the burden of this disease (5;6). While most children do not visit a dentist until age three, these same children usually have visited a child health professional 11 times for well-child visits during the same time period. Dental caries impacts children’s functioning, including eating, speaking, learning and growth (1;2;7-10). Other dental conditions such as oral clefts and orthodontic problems can jeopardize their physical growth, self-esteem and capacity to socialize. Therefore, integrating oral health evaluation into well-child visits provides an opportunity for risk assessment, counseling, early detection and referral. Recently, the American Academy of Pediatrics adopted new recommendations about the inclusion of oral health in preventive guidance during well-child visits (11). The recommendations specify that the first dental risk assessment should occur beginning at six months of age and that the establishment of a dental home should occur by approximately one year of age for children considered to be at risk for caries. The dental home concept is modeled after the medical home concept, which is defined as care that is accessible, family centered, continuous, comprehensive, coordinated, compassionate and culturally competent. Establishment of the dental home provides an opportunity to foster the development of preventive oral health habits that can help keep children free from oral disease.

Dental caries, which can begin as early as 12 months of age, is now recognized as a bacterial infection that can be transmitted from a parent or another intimate caregiver to an infant or child (11-14). Therefore, health professionals should identify women at high risk for dental caries as early as possible, preferably during pregnancy, to provide anticipatory guidance and early intervention.

Evaluation of existing literature leads to several conclusions about prevention of caries. First, it is important to recognize the therapeutic value of a small amount of fluoride introduced through brushing two to three times a day (15). Parents or caregivers of children under six years of age should brush children’s teeth or supervise brushing. Because children under six years of age have not fully developed the swallowing reflex, using large quantities of toothpaste should be discouraged to avoid enamel fluorosis. Children under the age of two should use fluoride toothpastes only after consultation with a dentist. Second, children should be protected from adult transmission of \textit{Streptococcus mutans} early in their lives, especially before two years of age (14). Third, mothers and other caregivers should be advised that caries is an infectious disease. The caries-causing bacteria, including \textit{Streptococcus mutans}, can be spread from mother, intimate caregiver, siblings, and other children by saliva-sharing.
behaviors. Fourth, feeding sugary liquids especially at night may increase the risk for caries. Therefore, child health care professionals should focus on the message to reduce the exposure to common sugars (16;17). Fifth, mothers and other caregivers should be advised to begin the process of weaning children from the bottle and sippy cup by nine to ten months of age. Health care professionals should exercise cultural sensitivity when discussing this topic with women in communities where extended bottle usage is normative. Sixth, while every child should be seen by a dentist before the first birthday, it is particularly important to refer and follow-up on children who have risk indicators (11). Finally, child health professionals should utilize community resources such as caseworkers and community health workers for conducting follow-up and facilitating transportation to dental appointments.

**ROLE OF CHILD HEALTH PROFESSIONAL**

Child health professionals should incorporate interview questions, risk assessment, screening and anticipatory guidance during well-child check ups. Because the *Streptococcus mutans* may colonize the child’s mouth anytime after the first tooth erupts, appropriate interventions can alter the risk for tooth decay (14). By six months of age, every infant should receive an oral health risk assessment from a child health professional. One of the most important ways for health professionals to ensure that infants and young children enjoy optimal oral health is by performing risk assessments to identify those at risk for oral health problems, including dental caries, malocclusion and injury (11;16;18). Risk assessment of infants and young children for oral health problems is based on the premise that all infants and children are not equally likely to develop such problems. Performing a risk assessment for infants and young children can help child health professionals develop plans to meet each infant’s or young child’s preventive and treatment needs. During each visit, child health professionals can include questions about oral health issues and provide anticipatory guidance while discussing other age appropriate concerns. Children with chronic disease may require special assessment and treatment of oral diseases.

The American Academy of Pediatrics recommends that all child health care professionals develop the knowledge to perform oral health risk assessments on all patients beginning at six months of age. In addition, children at significant risk for caries should be entered into an aggressive anticipatory guidance and intervention program (11).
Child health professionals are encouraged to take the following actions:

- Assess the risk for oral diseases in the child beginning at six months of age by identifying the risk indicators such as:
  - Inadequate fluoride exposure
  - Caries in siblings, parents and other household members
  - Lack of age-appropriate oral hygiene efforts by parents
  - Frequent and prolonged exposure to sugary substances or use of night time bottle or sippy cup containing anything other than water
  - Medications that contain sugar
  - Clinical findings of heavy maxillary anterior plaque or any signs of decalcification (white spot lesions)
  - Special health care needs

- Facilitate appropriate referral for management for children assessed to be at increased risk for oral disease or in whom carious lesions or white spot lesions are identified.

- Develop a list of oral health referral sources who will provide services to young children and children with special health care needs

- Assist parents/caretakers in establishing a dental home for the child and for themselves.

- Advise women that the following actions may reduce the risk of caries in children:
  - Wipe an infant’s teeth after feeding, especially along the gum line, with a soft cloth or soft bristled toothbrush.
  - Supervise children’s brushing and use a small (size of child’s pinky nail) amount of toothpaste.
  - Avoid putting the child to bed with a bottle or sippy cup containing anything other than water.
  - Feed foods containing sugar at mealtimes only and limit the amount.
  - Avoid saliva-sharing behaviors, such as sharing a spoon when tasting baby food, cleaning a dropped pacifier by mouth, or wiping the baby’s mouth with saliva.
  - Avoid saliva-sharing behaviors between children via their toys, pacifiers etc.
  - Visit an oral health professional with child between six and 12 months of age.

- Educate pregnant women and new parents about care that will improve their oral health:
  - Brush teeth twice daily with a fluoride toothpaste and floss daily.
  - Eat foods containing sugar at mealtimes only and in limited amounts.
  - Choose water or low-fat milk as a beverage. Avoid carbonated beverages during pregnancy.
  - Choose fruit rather than fruit juice to meet the recommended daily fruit intake.
  - When possible, obtain necessary dental treatment before delivery.
WHAT SHOULD HAPPEN IN AN OFFICE VISIT?
According to the American Academy of Pediatrics, every child should receive an oral health risk assessment by six months of age by a child health professional. In addition, children at significant risk for caries should be entered into an aggressive anticipatory guidance and intervention program. The American Academy of Pediatric Dentistry encourages parents and other health care providers to help establish a dental home by 12 months of age (11). The American Academy of Pediatric Dentistry has developed a tool to determine risk based on history and physical examination (Table 1). Although every child should have a dental visit as soon as the first tooth erupts, children with moderate and high risk indicators should be referred and followed up as soon as possible (19).

Some interview questions that can assist in identifying the risk classification are presented below:

Interview questions to ask parents of infants and young children:

■ Does your child have special health care needs?
■ Does your child take medications that may change the flow and/or composition of the saliva, such as asthma medications?
■ Do you have a family dentist? Does your dentist provide care for young children? Have you made an appointment for your infant’s first dental visit?
■ Has this child had a cavity in the last one or two years?
■ Have your other children had any dental problems? Have you had any problems with your own teeth?
■ Does your child go to bed with a bottle containing anything other than water? Does your child drink from a cup?
■ Is your child exposed to fluoride in drinking water, fluoride supplements or toothpaste?

Clinical Evaluation
The American Academy of Pediatrics has provided guidelines for conducting clinical evaluation of children (20). A dental chair is not needed to perform an oral examination. For infants and children younger than three years, place the child in the parent’s lap facing the parent. The provider and parent should sit face to face with knees touching. The child should then lie back (with the child’s legs around the parent’s waist) laying his or her head in the provider’s lap with the head nestled in the provider’s abdomen (Figure 1). An alternative position is to have the parent nestle the child in the parent’s arm, while the provider examines the child’s mouth. By age three years, children are able to lie on

Figure 1. Position of the child for conducting clinical evaluation

Table 1. American Academy of Pediatric Dentistry Caries-Risk Assessment Tool*

<table>
<thead>
<tr>
<th>RISK FACTOR TO CONSIDER</th>
<th>HIGH</th>
<th>RISK INDICATORS</th>
<th>MODERATE</th>
<th>LOW</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PART 1 – HISTORY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Determined by interviewing the parent/primary caregiver)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child has special health care needs</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child has condition that impairs salivary flow/composition</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child’s use of dental home</td>
<td>None</td>
<td>Irregular</td>
<td>Regular</td>
<td></td>
</tr>
<tr>
<td>Time lapsed since child’s last cavity</td>
<td>&lt;12 months</td>
<td>12 to 24 months</td>
<td>&gt;24 months</td>
<td></td>
</tr>
<tr>
<td>Child wears braces or orthodontic/oral appliances</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child’s mother has active decay present</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Socioeconomic status of child’s caregiver</td>
<td>Low</td>
<td>Mid-level</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td>Frequency of exposure to between meal sugars/cariogenic foods (include ad lib use of bottle/sippy cup containing juice or carbonated beverage)</td>
<td>&gt;3</td>
<td>1 to 2</td>
<td>Mealtime only</td>
<td></td>
</tr>
<tr>
<td>Child’s exposure to fluoride</td>
<td>Does not use fluoridated toothpaste; drinking water is not fluoridated; not taking fluoride supplements</td>
<td>Uses fluoridated toothpaste; usually does not drink fluoridated water; does not take fluoride supplements</td>
<td>Uses fluoridated toothpaste; drinks fluoridated water or takes fluoride supplements</td>
<td></td>
</tr>
<tr>
<td><strong>PART 2 – CLINICAL EVALUATION</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Determined by examining the child’s mouth)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visible plaque on anterior teeth</td>
<td>Present</td>
<td>Absent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gingivitis</td>
<td>Present</td>
<td>Absent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Areas of demineralization (white-spot lesions)</td>
<td>More than one</td>
<td>One</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Enamel characteristics: hypoplasia, defects, retentive pits/fissures</td>
<td>Present</td>
<td>Absent</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PART 3 – SUPPLEMENTAL ASSESSMENT</strong> (Optional)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radiographic enamel caries</td>
<td>Present</td>
<td>Absent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Levels of mutans streptococci</td>
<td>High</td>
<td>Moderate</td>
<td>Low</td>
<td></td>
</tr>
</tbody>
</table>

Each child’s overall assessed risk for developing decay is based on the highest level of risk indicator circled above (i.e. a single risk indicator in any area of the “high-risk” category classifies a child as being “high-risk.”
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an examination table or sit on the lap of the caregiver (with child and caregiver facing the provider) so that the caregiver can steady the child. Regardless of the method used to look in the child’s mouth, a good light source is essential. All teeth should be examined.

When examining a child’s mouth, the child health professional should:

- Assess oral hygiene (e.g., presence of plaque or debris on the teeth).
- Provide education about removal of plaque and debris using the appropriate-sized toothbrush.
- Inspect all tooth surfaces using a mouth mirror.
- Assess for white spots or tooth decay.

**ORAL HEALTH CARE FOR YOUNG CHILDREN**

Infant oral health care begins ideally with prenatal oral health counseling for parents, a service that should be provided by all health professionals. This early involvement will form the foundation on which positive experiences can be built. In its early stages, the effects of dental caries are largely reversible through existing interventions like the application of topical fluorides. Once a child is determined to be at risk for caries, a referral to a dentist is required. According to the Department of Health and Human Services, primary pediatric oral health care is best delivered in a “dental home,” where competent oral health professionals provide continuous and comprehensive services. Ideally a dental home should be established at a young age (i.e., not later than 12 months of age in high-risk populations), while caries and other disease processes can be managed effectively with minimal or no restorative or surgical treatment (18). The recommendations for preventive dental care are provided in Appendix H.

An adequate dental home should be expected to provide children and their parents with:

- An accurate examination and risk assessment for dental diseases.
- An individualized preventive dental health program based upon the examination and risk assessment.
- Anticipatory guidance about growth and developmental issues (e.g., teething, thumb sucking, or pacifier habits).
- Advice for injury prevention and a plan for dealing with dental emergencies.
- Information about proper care of the child’s teeth and supporting structures.
- Information about proper diet and nutrition practices.
- Pit and fissure sealants.
- A continuing care provider who accomplishes restorative and surgical dental care when necessary in a manner consistent with the parents’ and child’s psychological needs.
- Interceptive orthodontic care for children with developing malocclusions.
- A place for the child and parent to establish a positive attitude about dental health.
- Referrals to dental specialists, such as endodontists, oral surgeons, orthodontists, pediatric dentists and periodontists, when care cannot be directly provided within the dental home, and
- Coordination of care with the infant/child’s primary care medical provider.
REFERENCES


APPENDIX A:
Consultation Form for Pregnant Women to Receive Oral Health Care

<table>
<thead>
<tr>
<th>Referred To:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Patient Name: Last</th>
<th>First</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DOB:</th>
<th>Estimated Delivery Date:</th>
<th>Week of Gestation Today:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Known Allergies:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Precautions:</th>
<th>None □</th>
<th>Specify (If any):</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This patient may have routine dental evaluation and care, including but not limited to:

- Oral health examination
- Dental prophylaxis
- Scaling and root planing
- Extraction
- Dental x-ray with abdominal and neck lead shield
- Local anesthetic with epinephrine
- Root canal
- Restorations (amalgam or composite) filling cavities

<table>
<thead>
<tr>
<th>Patient may have: (Check all that apply)</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Acetaminophen with codeine for pain control</td>
</tr>
<tr>
<td>□ Alternative pain control medication: (Specify)</td>
</tr>
<tr>
<td>□ Penicillin</td>
</tr>
<tr>
<td>□ Amoxicillin</td>
</tr>
<tr>
<td>□ Clindamycin</td>
</tr>
<tr>
<td>□ Cephalosporins</td>
</tr>
<tr>
<td>□ Erythromycin (Not estolate form)</td>
</tr>
</tbody>
</table>

| Prenatal Care Provider: Phone: |
|-------------------------------|------------------|
|                               |                  |

<table>
<thead>
<tr>
<th>Signature:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DO NOT HESITATE TO CALL FOR QUESTIONS

DENTIST’S REPORT
(for the Prenatal Care Provider)

<table>
<thead>
<tr>
<th>Diagnosis:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Treatment Plan:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name:</th>
<th>Date:</th>
<th>Phone:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Signature of Dentist:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>
EATING FOR TWO

What You Need To Know
You don’t have to give up all the foods you love when you’re pregnant. You just need to eat smart and make sure that most of your choices are healthy ones. You only need 300 extra calories per day to support your baby’s growth and development.

What You Can Do
Follow the serving recommendations. And watch your portions – you may be eating more than you think! Avoid too much sugar and fat in your diet.

Your Healthy Diet
In January 2005, the federal government issued new dietary guidelines for Americans. The guidelines are for people who aren’t pregnant and who eat about 2,000 calories per day. New recommendations for pregnant women haven’t come out yet.

Check with you health care provider to see if you need to make any changes to the guidelines below during pregnancy.

Fruit: 2-4 servings per day. Sample of 1 serving:
- ½ cup fresh, frozen or canned fruit
- 1 medium whole fruit (orange, apple, banana)
- ¾ cup fruit juice (avoid unpasteurized juices)

Vegetables: 3-5 servings per day. Sample of 1 serving:
- ½ cup raw or cooked vegetables
- 1 small baked potato
- ¾ cup vegetable juice (avoid unpasteurized juices)

Grains: 6-11 servings per day. Sample of 1 serving:
- 1 slice bread
- 1 cup dry cereal
- ½ cup cooked rice, pasta or cereal

Proteins: 3-4 servings per day. Sample of 1 serving:
- 2 ounces meat, poultry or fish (see Note 1)
- 2 tablespoons peanut butter
- ½ cup beans
Milk Products: 3-4 servings per day. Sample of 1 serving:

- 1 cup milk
- 1 cup yogurt
- 2 1-inch cubes cheese (see Note 2)

The Food Pyramid

In April 2005, the federal government issued its new food pyramid. The pyramid helps people choose healthy foods and the amounts that are right for them. It takes into account how much physical activity a person does every day.

The pyramid is for people who aren’t pregnant. New recommendations for pregnant women haven’t come out yet.

Check with you health care provider about using the pyramid during pregnancy.

Notes

1. Some fish are unhealthy to eat during pregnancy. Avoid swordfish, shark, king mackerel and tile fish. These fish can contain potentially risky levels of mercury. Mercury can be transferred to the growing fetus and cause serious health problems. According to the U.S. Food and Drug Administration (FDA) and the Environmental Protection Agency (EPA), a pregnant woman can safely eat up to 12 ounces (two average meals) a week of a variety of fish and shellfish that are low in mercury. These include shrimp, canned light tuna, salmon, pollock and catfish. But you should eat no more than 6 ounces of canned albacore (white) tuna per week. Canned white tuna has more mercury than canned light tuna. For the same reason, eat no more than 6 ounces of tuna steak per week. Also avoid game fish until you check its safety with your local health department. (A game fish is any fish caught for sport, such as trout, salmon or bass.) Also avoid raw fish, especially shellfish such as oysters and clams. If you eat raw fish, you could get an infection that could hurt your baby.

2. Avoid soft cheeses such as Brie, feta, Camembert, Roquefort and Mexican-style, unless they are labeled as made with pasteurized milk.

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1. **PREVENTIVE SERVICES**

a) **Use of Fluorides**

Use of fluorides for the prevention and control of dental caries is documented to be both safe and highly effective. Optimizing fluoride levels in water supplies in many ways is an ideal public health measure because it is effective, relatively inexpensive, and does not require conscious daily cooperation from individuals. Daily fluoride exposure through water supplies or supplemental tablets, and monitored use of fluoride dentifrice (“pea-size” amount on brush) should be recommended for all children as a primary preventive procedure. Professional fluoride treatments should be based on caries risk. Home protocols should be advised for children considered at higher caries risk.

**Systemically Administered Fluoride Supplements** – Fluoride supplements should be considered for all children drinking fluoride deficient water (<0.6 ppm F). Before supplements are prescribed, it is essential to know the fluoride concentration of the patient’s drinking water. Review and, if necessary, testing of all sources of drinking water (i.e., home, day care, and school) are essential to determining the patient’s need for fluoride supplements. Once the fluoride level of the water supply has been evaluated, either through contacting public health officials or independent water analysis (especially important for families relying on well water or homes with in-house filtration systems), and other sources of dietary fluoride have been assessed, the daily dosage schedule can be recommended and reviewed with parents in the context of appropriate fluoride usage.

**Dietary Fluoride Supplementation Schedule**

<table>
<thead>
<tr>
<th>Age</th>
<th>Less than 0.3 ppm F</th>
<th>Fluoride in Drinking Water</th>
<th>More than 0.6 ppm F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birth to 6 mos.</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6 mos. to 3 yrs.</td>
<td>0.25 mg</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3 yrs. to 6 yrs.</td>
<td>0.50 mg</td>
<td>0.25 mg</td>
<td>0</td>
</tr>
<tr>
<td>6 yrs. to 16 yrs.</td>
<td>1.00 mg</td>
<td>0.50 mg</td>
<td>0</td>
</tr>
</tbody>
</table>

**Professionally Applied Topical Fluoride Treatment** – Eight percent stannous fluoride solution, 1.23% acidulated phosphate fluoride (APF) solution or gel and 5% sodium fluoride varnish are clinically proven agents for professionally applied fluoride treatments. Selection of an agent for a specific treatment generally depends on provider preference, setting and available equipment, and factors related to the child (e.g., age, level of development). APF is widely used because of better stability, patient acceptance and ease of application. Fluoride varnish has physical properties that may minimize ingestion by young children and children with disabilities. Appropriate precautionary measures should be taken to prevent or minimize swallowing of professionally applied topical fluorides.

**Self- or Parentally-Applied Fluoride** – The use of fluoride containing toothpaste should be recommended as a primary preventive procedure. However, the use of fluoridated toothpaste in children who cannot expectorate consistently carries an increased risk of dental fluorosis (alteration of tooth appearance...
or structure due to high levels of fluoride in the outer enamel layer of a tooth). Therefore, the risk of fluorosis must be weighed against the benefit of caries prevention in determining the use of a fluoride-containing toothpaste by a child. Parents/caregivers should be counseled on the frequency of tooth brushing and use of no more than a “pea-sized” amount of toothpaste.

Children at high risk for caries (e.g., children with orthodontic/prosthodontic appliances, with special health care needs, with reduced salivary function, who are unable to clean teeth properly, who are at dietary risk, or who have high oral levels of Streptococcus mutans. (S. mutans) or who are caries active should be considered for additional fluoride treatment. Daily home fluoride programs using fluoride mouth rinses or brush-on fluoride gels should be considered. If a high caries risk patient cannot or will not comply with home fluoride therapy, frequent professional fluoride treatments may be necessary.

References

b) Pit and Fissure Sealants
Sealants are plastic-like materials that are bonded to caries-susceptible pits and fissures on tooth surfaces that remain decay-prone even when exposed to fluoride and are used to protect these areas from caries development or progression. Ideally, sealants should be placed as soon as technically possible after teeth erupt for maximum decay prevention; however, newly or partially erupted teeth are often hard to keep dry enough to promote good bonding of the sealant to the tooth. Sealants may be applied in conjunction with small composite resin restorations in localized areas of decay to provide protection against caries while preserving tooth structure (sometimes referred to as preventive resin restorations).

Indications/Diagnoses: Sealants are indicated as a preventive measure for high-risk primary molars, permanent molars and premolars with deep pits and/or fissures, and in the cingulum area of maxillary incisors with deep lingual pits and/or fissures. Sealants also are generally recommended as a preventive measure for permanent molars. Sealants can be applied to teeth with evidence of decay to arrest the progress of decay; however, all sealed teeth and especially those with evidence of early signs of decay need to be monitored regularly to ensure that the sealants are retained and performing effectively to arrest decay. Sealants also are often applied in conjunction with the placement of resin restorations in cases of one or more small areas of decay on fissured surfaces to provide protection against caries while preserving tooth structure.

'Selected references are provided for various sections. Additional references and information related to various sections can be found in the AAPD Reference Manual, available on the Internet at www.aapd.org or from the American Academy of Pediatric Dentistry, Chicago, IL. Source: Centers for Medicare and Medicaid Services, U.S. Department of Human and Health Services. Guide to Children's Dental Care in Medicaid. Available at: www.cms.hhs.gov/MedicaidDentalCoverage/Downloads/dentalguide.pdf
PERIODICITY OF EXAMINATION, PREVENTIVE DENTAL SERVICES, ANTICIPATORY GUIDANCE AND ORAL TREATMENT FOR CHILDREN

Birth to 12 Months (For Children With Special Health Care Needs or At High Risk for Caries)

1. Complete the clinical oral assessment and appropriate diagnostic tests to assess oral growth and development and/or pathology.
2. Provide oral hygiene counseling for parents, guardians, and caregivers, including the implications of the oral health of the caregiver.
3. Remove supra- and subgingival stains or deposits as indicated.
4. Assess the child’s systemic and topical fluoride status (including type of infant formula used, if any, and exposure to fluoridated toothpaste), and provide counseling regarding fluoride. Prescribe systemic fluoride supplements if indicated, following assessment of total fluoride intake from drinking water, diet, and oral hygiene products.
5. Assess appropriateness of feeding practices, including bottle and breast-feeding, and provide counseling as indicated.
6. Provide dietary counseling related to oral health.
7. Provide age-appropriate injury prevention counseling for orofacial trauma.
8. Provide counseling for non-nutritive oral habits (digit, pacifiers, etc.).
9. Provide diagnosis and required treatment and/or appropriate referral for any oral diseases or injuries.
11. Consult with the child’s physician as needed.
12. Based on evaluation and history, assess the patient’s risk for oral disease.
13. Determine the interval for periodic reevaluation.

12 to 24 Months

1. Repeat Birth-12 month procedures every six months or as indicated by individual patient’s needs/susceptibility to disease.
2. Review patient’s fluoride status, including any childcare arrangements, which may impact on systemic fluoride intake and provide parental counseling.
3. Provide topical fluoride treatments every six months or as indicated by the individual patient’s needs.
2 to 6 Years
1. Repeat 12-24 month procedures every six months or as indicated by individual patient’s needs/susceptibility to disease. Provide age-appropriate oral hygiene instructions.
2. Complete a radiographic assessment of pathology and/or abnormal growth and development, as indicated by individual patient’s needs.
3. Scale and clean the teeth every six months or as indicated by the individual patient’s needs.
4. Provide topical fluoride treatments every six months or as indicated by the individual patient’s needs.
5. Provide pit and fissure sealants for primary and permanent teeth as indicated by individual patient’s needs.
6. Provide counseling and services (athletic mouth guards) as needed for orofacial trauma prevention.
7. Provide assessment/treatment or referral of developing malocclusion as indicated by individual patient’s needs.
8. Provide diagnosis and required treatment and/or appropriate referral for any oral diseases, habits, or injuries as indicated.
9. Assess speech and language development, and provide appropriate referral as indicated.

6 to 12 Years
1. Repeat 2-6 year procedures every six months or as indicated by individual patient’s needs/susceptibility to disease.
2. Provide substance abuse counseling (smoking, smokeless tobacco, etc.).

12 to 18 Years
1. Repeat 6-12 year procedures every six months or as indicated by individual patient’s needs/susceptibility to disease.
2. At an age determined by patient, parent, and dentist, refer the patient to a general dentist for continuing oral care. Infant Oral Health Care

2 All children should have established a dental home during this period.

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APPENDIX E: Resources

WEB SITES

Healthy People 2010: Section 21, Oral Health
This site provides background information on oral health as well as the actual Oral Health 2010 objectives.

NIDCR National Oral Health Information Clearing House
http://www.nidcr.nih.gov
Clicking on the “Health Information” icon at the top brings up an indexed list of oral health topics.

CDC Oral Health Resources
http://www.cdc.gov/oralhealth/
This site is set up to permit searches and to browse by topic.

Oral Health America
http://www.oralhealthamerica.org
Oral Health America is a fully independent non-profit for public benefit that follows a path of broad-based public advocacy through targeted programs and communications efforts to improve oral health for all Americans. Of particular use at this site are the “Report Cards” that include topics such as the oral health of older Americans.

Maternal and Child Health Library: Knowledge Path – Oral Health and Children and Adolescents
http://www.mchlibrary.info/KnowledgePaths/kp_oralhealth.html
This knowledge path offers a comprehensive collection of links and resources, although it may not be easy to identify the most useful resources.

Children’s Dental Health Project
http://www.cdhp.org
This site contains a wealth of resources about children’s oral health, particularly issues involving access to care, financing programs, and health disparities. Of particular note is the Interfaces project that explores the relationship between medicine and dentistry in meeting the oral health needs of young children.
American Academy of Pediatric Dentistry http://www.aapd.org
American Dental Association http://www.ada.org
American Academy of Pediatrics has developed a comprehensive Web site on infant and child oral health. It is scheduled to go live November 1, 2004. Contact Wendy Nelson in the AAP Division of Community Pediatrics at 1-800-433-9016 x7789.

ADDITIONAL RESOURCES

http://www.mchoralhealth.org/
Search the entire National Maternal and Child Oral Health Resource Center collection of print and electronic materials. Examples of the types of materials that can be found include fact sheets, curricula, manuals, standards/guidelines, conference proceedings, reports, and surveys.

A Health Professional's Guide to Pediatric Oral Health Management
A series of seven self-contained modules designed to assist health professionals (for example, physicians, physician assistants, nurses and dietitians) in managing the oral health of infants and young children.

Open Wide: Oral Health Training for Health Professionals
A series of four self-contained modules designed to help health and early childhood professionals working in community settings (for example, Head Start and WIC staff) promote oral health for infants and young children.

Bright Futures in Practice: Oral Health
National Center for Education in Maternal and Child Health
This guide is designed to help health professionals implement specific oral health guidelines during infancy, early childhood, middle childhood, and adolescence

SCREENING/RISK ASSESSMENT

Clinical Caries Risk Assessment
Kids Get Care
This assessment tool is designed to help clinicians assess children's oral health and habits. It is intended for use in both community and clinical settings, and it includes guidance for parents and other caregivers on preventive oral health practices.

http://www.aapd.org/media/policies.asp
The American Academy of Pediatric Dentistry's Reference Manual is divided into 5 sections: (1) definitions; (2) oral health policies; (3) clinical guidelines; (4) endorsements; and (5) resources. Oral health policies are statements relating to AAPD positions on various public health issues. Clinical guidelines are practice recommendations designed to assist the dental provider in making decisions concerning direct patient care. Adherence to the guidelines increases the probability of a favorable practice outcome and decreases the likelihood of an unfavorable practice outcome.

The American Academy of Pediatrics in partnership with the federal Maternal and Child Health Bureau (MCHB), have implemented the Pediatrics Collaborative Care (PedsCare) Program, Oral
Health Initiative. The purpose of the program is to promote improved child oral health by offering pediatricians the tools and support they need to provide community-based, collaborative care. The goal of the first stage of the initiative is to provide training on oral health care.

Oral Health Risk Assessment Training for Pediatricians and Other Child Health Professionals
This training is designed to support pediatricians and child health providers as they implement oral health risk assessments during well-child visits.

The training provides participants with an understanding of:

- The role of the child health care professional in assessing children’s oral health
- The pathogenesis of caries
- Conducting an oral health risk assessment (including oral screening exam)
- Providing appropriate oral health education to families
- Developing a management plan with referrals to a dental home
Guidelines for prescribing dental radiographs (x-rays) have been developed by an expert panel from the dental profession under the auspices of the Food and Drug Administration (FDA). The panel was convened by the FDA to reach a consensus on standardizing dental radiographic procedures because dental radiographs rank second in frequency of use and in total cost to the public. The panel was also concerned about saving the patient from unwarranted exposure to radiation. The guidelines serve as recommendations that dentists can use to determine when they should take a radiograph. They help determine the type of radiograph needed, how frequently and under what conditions radiographs should be taken. Under these guidelines, a dentist will take an X-ray based on clinical observation and the patient's health history. Dental radiographs serve only as adjuncts to a comprehensive oral examination and evaluation and by themselves or in conjunction with photographs do not provide adequate information to determine a properly developed treatment plan. Radiographs taken only for administrative purposes expose the child to unnecessary radiation, and therefore are inappropriate, unethical, and violate ADA and FDA policies.

The guidelines are based on patient selection criteria, which are descriptions of clinical conditions derived from patient signs, symptoms and history that identify patients who are likely to benefit from a particular radiographic examination. The guidelines are illustrated in a chart designed to serve as a convenient reference and are offered as a supplement to professional expertise (see Table below). The recommendations in this chart are subject to clinical judgment and may not apply to every patient. They are to be used by dentists only after reviewing the patient’s health history and completing a clinical examination. The recommendations do not need to be altered because of pregnancy.
### Guidelines for Prescribing Dental Radiographs

<table>
<thead>
<tr>
<th>Patient Category</th>
<th>Child</th>
<th>Transitional Dentition (following eruption of first permanent tooth)</th>
<th>Adolescent</th>
<th>Adult</th>
<th>Edentulous</th>
</tr>
</thead>
<tbody>
<tr>
<td>New patient*</td>
<td>Posterior bite-wing examination if proximal surfaces of primary teeth cannot be visualized or probed</td>
<td>Individualized radiographic examination consisting of periapical/occlusal views and posterior bite-wings or panoramographic examination and posterior bite-wings</td>
<td>Individualized radiographic examination consisting of posterior bite-wings and selected pareriapicals. A full month intraoral radiographic examination is appropriate when the patient presents with clinical evidence of generalized dental disease or a history of extensive dental treatment</td>
<td>Full mouth intraoral radiographic examination or panoramic examination</td>
<td></td>
</tr>
<tr>
<td>Recall patient*</td>
<td>Posterior bite-wing examination at 6-month intervals or until no carious lesions are evident.</td>
<td>Posterior bite-wing examination at 6- to 12-month intervals or until no carious lesions are evident.</td>
<td>Posterior bite-wing examination at 12- to 18-month intervals</td>
<td>Not applicable</td>
<td></td>
</tr>
<tr>
<td>No clinical caries and no high-risk factors for caries’</td>
<td>Posterior bite-wing examination at 12- to 24-month intervals if proximal surfaces of primary teeth cannot be visualized or probed</td>
<td>Posterior bite-wing examination at 12- to 24-month intervals</td>
<td>Posterior bite-wing examination at 18- to 36-month intervals</td>
<td>Posterior bite-wing examination at 24- to 36-month intervals</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Periodontal disease or a history of periodontal treatment</td>
<td>Individualized radiographic examination consisting of selected periapical and/or bite-wing radiographs for areas where periodontal disease (other than nonspecific gingivitis) can be demonstrated clinically</td>
<td>Individualized radiographic examination consisting of selected periapical and/or bite-wing radiographs for areas where periodontal disease (other than nonspecific gingivitis) can be demonstrated clinically</td>
<td>Not applicable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Growth and development assessment</td>
<td>Usually not indicated</td>
<td>Individualized radiographic examination consisting of a periapical/occlusal panoramic examination</td>
<td>Usually not indicated</td>
<td>Usually not indicated</td>
<td></td>
</tr>
</tbody>
</table>

*Clinical situations for which radiographs may be indicated include:

A. Positive Historical Findings
1. Previous periodontal or endodontic therapy
2. History of pain or trauma
3. Familial history of dental anomalies
4. Postoperative evaluation of healing
5. Presence of implants

B. Positive Clinical Signs/Symptoms
1. Clinical evidence of periodontal disease
2. Large or deep restorations
3. Deep carious lesions
4. Malposed or clinically impacted teeth
5. Swelling
6. Evidence of facial trauma
7. Mobility of teeth
8. Fistula or sinus tract infection
9. Clinically suspected sinus pathology
10. Growth abnormalities
11. Oral involvement in known or suspected systemic disease
12. Positive neurologic findings in the head and neck
13. Evidence of foreign objects
14. Pain and/or dysfunction of the temporomandibular joint
15. Facial asymmetry
16. Abutment teeth for fixed or removable partial prosthesis
17. Unexplained bleeding
18. Unexplained sensitivity of teeth
19. Unusual eruption, spacing or migration of teeth
20. Unusual tooth morphology, calcification or color
21. Missing teeth with unknown reason

*Patients at high risk for caries may demonstrate any of the following:

1. High level of caries experience
2. History of recurrent caries
3. Existing restoration of poor quality
4. Poor oral hygiene
5. Inadequate fluoride exposure
6. Prolonged nursing (bottle or breast)
7. Diet with high sucrose frequency
8. Poor family dental health
9. Developmental enamel defects
10. Developmental disability
11. Xerostomia
12. Genetic abnormality of teeth
13. Many multisurface restorations
14. Chemo/radiation therapy

The recommendations contained in this table were developed by an expert dental panel comprised of representatives from the Academy of General Dentistry, American Academy of Dental Radiology, American Academy of Oral Medicine, American Academy of Pediatric Dentistry, American Academy of Periodontology, and the American Dental Association under the sponsorship of the Food and Drug Administration (FDA). The chart is being reproduced and distributed to the dental community by Eastman Kodak Company in cooperation with the FDA.

Source: American Dental Association, U.S. Food & Drug Administration. The Selection of Patients for Dental Radiograph Examinations. Available at: www.ada.org
Do not put the infant or child to sleep with a bottle or sippy cup or allow frequent and prolonged bottle feedings or use of a sippy cup containing beverages high in sugar (for example, fruit drinks, soda, or fruit juice), milk, or formula during the day or at night.

Do not use a bottle to calm an infant or to put an infant to bed. Instead of a bottle try:

- Giving the infant a favorite blanket or toy.
- Offering the infant a clean pacifier.
- Holding, patting, or rocking the infant.
- Reading to the infant.
- Softly talking or singing to the infant.

If an infant is accustomed to being put to bed with a bottle, offer a bottle filled with plain water. If the infant does not adapt initially to the plain water, it may be necessary to fill the bottle with a mixture of juice and water, reducing the amount of juice slightly each night until only water is used.

Hold the infant or child while feeding. Never prop a bottle (that is, use pillows or any other objects to hold a bottle in the infant’s mouth).

Never add cereal to a bottle. This causes sugary fluids to pool around the teeth and can also cause choking if the infant is unable to swallow the extra food. Instead, always feed infants and children solid foods with a spoon or fork, or, if the infant or child is coordinated enough, encourage self-feeding.

Introduce a small cup when the infant can sit up without support.

As the infant begins to eat more solid foods and drink from a cup, the infant can be weaned from the bottle. Begin to wean the infant gradually, at about 9 to 10 months. By 12 to 14 months, most infants can drink from a cup.

Do not dip pacifiers in sweetened foods like sugar or honey.

Serve age-appropriate healthy snacks such as fruit, vegetables, grain products (especially whole grain), and dairy products instead of foods high in sugar such as candy, cookies, or cake. (See Module 4, section 4.6.)

Offer snacks at regular times between meals only. If a child snacks frequently, brush the child’s teeth three times a day.
- Make sure the child drinks plenty of water throughout the day, especially between meals and snacks.

- Don’t offer food in return for good behavior. This teaches children that foods are rewards and can lead to the development of unhealthy habits.

Source: Open Wide: Oral Health Training for Health Professionals, National Center for Education in Maternal and Clinical Health and Georgetown University. Used with permission.
Oral Health in America: A Report of the Surgeon General

“As a remote gram-negative infection, periodontal disease may have the potential to affect pregnancy outcome.”


“Preventive oral care services should be provided as early in pregnancy as possible. However, women should be encouraged to achieve a high level of oral hygiene prior to becoming pregnant and throughout their pregnancies. If examination indicates a need for periodontal scaling and root planning or more involved periodontal treatment, these procedures are usually scheduled early in the second trimester. The presence of acute infection, abscess, or other potentially disseminating sources of sepsis may warrant prompt intervention, irrespective of the stage of pregnancy.”

American Academy of Pediatrics Policy Statement
Oral Health Risk Assessment Timing and Establishment of the Dental Home

“Pediatricians and pediatric health care professionals should develop the knowledge base to perform oral health risk assessments on all patients beginning at six months of age. Patients who have been determined to be at risk of development of dental caries or who fall into recognized risk groups should be directed to establish a dental home six months after the first tooth erupts or by one year of age (whichever comes first). The ideal deterrence to early childhood caries is the establishment of the dental home when indicated by the unique needs of the child. Although not always feasible because of manpower and participation issues, best practice dictates that whenever feasible, all patients should have a comprehensive dental examination by a dentist in the early toddler years.”

Guide To Children’s Dental Care In Medicaid – CMS, DHHS
Emphasis on Early Initiation of Oral Health Care

“Science has provided a clear understanding that tooth decay is an infectious, transmissible, destructive disease caused by acid-forming bacteria acquired by toddlers from their mothers shortly after their first teeth erupt (generally around six months of age). In its early stages, the effects of dental caries are largely reversible through existing interventions (e.g., fluorides) that promote replacement of lost minerals from the outer layer of the tooth (enamel). These findings, combined with epidemiological data on the occurrence of tooth decay in infants and young children, suggest that true primary prevention must begin in the first to second year of life. This evidence also suggests that particular attention should be paid to the oral health of expectant and new mothers.”

Infant Oral Health Care

“Infant oral health care begins ideally with prenatal oral health counseling for parents, a service that should be provided by knowledgeable health care providers such as obstetricians, family physicians, pediatricians and nurse practitioners, as well as dental providers. Actual infant oral health care visits
focusing on relevant history taking, clinical examination of oral structures, risk assessment, counseling, anticipatory guidance and necessary follow-up interventions should begin early, ideally before dental diseases are established. This early involvement is viewed as the foundation on which a lifetime of positive oral health and dental care experiences can be built, thus minimizing costs associated with treatment of dental diseases.”

First Dental Visit
“Despite growing recognition of the above [importance of oral health care in infants], a discrepancy exists between dental and public health organizations’ versus the American Academy of Pediatrics’ recommended age for a first dental visit. American Academy of Pediatric Dentistry (AAPD) policy, as reflected in its “Periodicity of Examination, Preventive Dental Services, and Oral Treatment for Children,” recommends that children be seen by a dentist following the eruption of the first tooth, but not later than 12 months of age. The AAPD recommendation is embraced by the Bright Futures consortium of 28 child health organizations and is consistent with the policies of the dental and public health groups including the American Dental Association, American Dental Hygienists Association and the American Public Health Association. In contrast, the American Academy of Pediatrics (AAP) recommends that every child should begin to receive oral health risk assessments by six months of age from a pediatrician or a qualified pediatric health care professional, and that infants identified as having significant risk of caries or being in a high-risk group should be entered into an aggressive anticipatory guidance and intervention program provided by a dentist between six and twelve months of age. NOTE: Under the Medicaid program, states are required to develop their own dental periodicity schedules after appropriate consultations with dental groups involved in child health care or states may adopt a nationally recognized dental periodicity schedule.”

DENTAL X-RAYS
American Dental Association and U.S. Department of Health and Human Services (Revised: 2004)
“Once a decision to obtain radiographs is made, it is the dentist’s responsibility to follow the ALARA Principle (As Low as Reasonably Achievable) to minimize the patient’s exposure to radiation. Examples of good radiologic practice include:

■ Use of the fastest image receptor compatible with the diagnostic task
■ Collimation of the beam to the size of the receptor whenever feasible
■ Proper film exposure and processing techniques
■ Use of leaded aprons and thyroid collars

The amount of scattered radiation striking the patient’s abdomen during a properly conducted radiographic examination is negligible. However, there is some evidence that radiation exposure to the thyroid during pregnancy is associated with low birth weight. Protective thyroid collars substantially reduce radiation exposure to the thyroid during dental radiographic procedures. Because every precaution should be taken to minimize radiation exposure, protective thyroid collars and aprons should be used whenever possible. This practice is strongly recommended for children, women of childbearing age and pregnant women.”
U.S. Preventive Services Task Force Summary of Recommendations

“The USPSTF recommends that primary care clinicians prescribe oral fluoride supplementation at currently recommended doses to preschool children older than six months of age whose primary water source is deficient in fluoride.

The USPSTF found fair evidence that, in preschool children with low fluoride exposure, prescription of oral fluoride supplements by primary care clinicians leads to reduced dental caries. The USPSTF concluded that the benefits of caries prevention using oral fluoride supplementation outweigh the potential harms of dental fluorosis, which in the United States are primarily observed as a mild cosmetic discoloration of the teeth.

The USPSTF concludes that the evidence is insufficient to recommend for or against routine risk assessment of preschool children by primary care clinicians for the prevention of dental disease.

The USPSTF found no validated risk-assessment tools or algorithms for assessing dental disease risk by primary care clinicians and little evidence that primary care clinicians are able to systematically assess risk for dental disease among preschool-aged children. The USPSTF further found little evidence that either counseling of parents or referring high-risk children to dental care providers results in fewer caries or reduced dental disease. Thus, the USPSTF concluded there is insufficient evidence to determine the balance between the benefits and harms of routine risk assessment to prevent dental disease among preschool children.”


Table 4. Quality of evidence, strength of recommendation, and target population of recommendation for each fluoride modality to prevent and control dental caries

<table>
<thead>
<tr>
<th>Modality</th>
<th>Quality of evidence (grade)</th>
<th>Strength of recommendation (code)</th>
<th>Target population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community water fluoridation</td>
<td>II-1</td>
<td>A</td>
<td>All areas</td>
</tr>
<tr>
<td>School water fluoridation</td>
<td>II-3</td>
<td>C</td>
<td>Rural, nonfluoridated areas</td>
</tr>
<tr>
<td>Fluoride toothpaste</td>
<td>I</td>
<td>A</td>
<td>All persons</td>
</tr>
<tr>
<td>Fluoride mouthrinse</td>
<td>I</td>
<td>A</td>
<td>High risk</td>
</tr>
<tr>
<td>Fluoride supplements</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pregnant women</td>
<td>I</td>
<td>E</td>
<td>None</td>
</tr>
<tr>
<td>Children aged &lt;6 years</td>
<td>II-3</td>
<td>C</td>
<td>High risk</td>
</tr>
<tr>
<td>Children aged 6 to 16 years</td>
<td>I</td>
<td>A</td>
<td>High risk</td>
</tr>
<tr>
<td>Persons aged &gt;16 years</td>
<td>[1]</td>
<td>C</td>
<td>High risk</td>
</tr>
<tr>
<td>Fluoride gel</td>
<td>I</td>
<td>A</td>
<td>High risk</td>
</tr>
<tr>
<td>Fluoride varnish</td>
<td>I</td>
<td>A</td>
<td>High risk</td>
</tr>
</tbody>
</table>

1Modalities are assumed to be used as directed in terms of dosage and age of user.

2Quality of evidence for targeting some modalities to persons at high risk is grade III (i.e., representing the opinion of respected authorities) and is based on considerations of cost-effectiveness that were not included in the studies establishing efficacy or effectiveness.

3Populations believed to be at increased risk for dental caries are those with low socioeconomic status or low levels of parental education, those who do not seek regular dental care, and those without dental insurance or access to dental services. Individual factors that possibly increase risk include active dental caries; a history of high caries experience in older siblings or caregivers; root surfaces exposed by gingival recession; high levels of infection with cariogenic bacteria; impaired ability to maintain oral hygiene; malformed enamel or dentin; reduced salivary flow because of medications, radiation treatment, or disease; low salivary buffering capacity (i.e., decreased ability of saliva to neutralize acids); and the wearing of space maintainers, orthodontic appliances, or dental prostheses. Risk can increase if any of these factors are combined with dietary practices conducive to dental caries (i.e., frequent consumption of refined carbohydrates). Risk decreases with adequate exposure to fluoride.

4No published studies confirm the effectiveness of fluoride supplements in controlling dental caries among persons aged >16 years.
ADA Statement On Dental Amalgam (Revised January 8, 2002)

Dental amalgam (silver filling) is considered a safe, affordable and durable material that has been used to restore the teeth of more than 100 million Americans. It contains a mixture of metals such as silver, copper and tin, in addition to mercury, which chemically binds these components into a hard, stable and safe substance. Dental amalgam has been studied and reviewed extensively, and has established a record of safety and effectiveness.

Issued in late 1997, the FDI World Dental Federation and the World Health Organization consensus statement on dental amalgam stated, “No controlled studies have been published demonstrating systemic adverse effects from amalgam restorations.” The document also states that, aside from rare instances of local side effects of allergic reactions, “the small amount of mercury released from amalgam restorations, especially during placement and removal, has not been shown to cause any adverse health effects.”

The ADA’s Council on Scientific Affairs’ 1998 report on its review of the recent scientific literature on amalgam states: “The Council concludes that, based on available scientific information, amalgam continues to be a safe and effective restorative material.” The Council’s report also states, “There currently appears to be no justification for discontinuing the use of dental amalgam.”

In an article published in the February 1999 issue of the Journal of the American Dental Association, researchers report finding “no significant association of Alzheimer’s Disease with the number, surface area or history of having dental amalgam restorations,” and “no statistically significant differences in brain mercury levels between subjects with Alzheimer’s Disease and control subjects.”

The U.S. Public Health Service issued a report in 1993 stating there is no health reason not to use amalgam, except in the extremely rare case of the patient who is allergic to a component of amalgam. This supports the findings of the Food and Drug Administration (FDA), the National Institutes of Health Technology Assessment Conference and the National Institute of Dental and Craniofacial Research, that dental amalgam is a safe and effective restorative material. In addition, in 1991, Consumer Reports noted, “Given their solid track record . . . amalgam fillings are still your best bet.”

In 1991, the FDA’s Dental Products Panel found no valid data to demonstrate clinical harm to patients from amalgams or that having them removed would prevent adverse health effects or reverse the course of existing diseases. The FDA’s most recent reaffirmation of amalgam’s safety was published on December 31, 2002.

The reaffirmation reads, “FDA and other organizations of the U.S. Public Health Service (USPHS) continue to investigate the safety of amalgams used in dental restorations (fillings). However, no valid scientific evidence has ever shown that amalgams cause harm to patients.”

It continues, “Also, USPHS scientists analyzed about 175 peer-reviewed studies submitted in support of three citizen petitions received by FDA after the 1993 report. They concluded that data in these studies did not support claims that individuals with dental amalgam restorations will experience problems, including neurologic, renal or developmental effects, except for rare allergic or hypersensitivity reactions.”

The U.S. Public Health Service found in 1993 “no persuasive reason to believe that avoiding amalgams or having them removed will have a beneficial effect on health.” In fact, it is inadvisable to have amalgams removed unnecessarily because it can cause structural damage to healthy teeth.
The ADA supports ongoing research in the development of new materials that it hopes will someday prove to be as safe and effective as dental amalgam. However, the ADA continues to believe that amalgam is a valuable, viable and safe choice for dental patients and concurs with the findings of the U.S. Public Health Service that amalgam has “continuing value in maintaining oral health.”

American Dental Association Statement On “Ante Partum Dental Radiography and Infant Low Birth Weight” (JAMA, April 28, 2004)

Recently published research associating pregnant women’s exposure to dental X-rays with low-weight births reinforces the importance of the American Dental Association’s long-standing recommendation that, in addition to abdominal shielding (e.g., protective aprons), dentists should use thyroid collars on all patients whenever practical to minimize radiation exposure. ADA recommendations for using leaded aprons and collars were first published in 1989 and reinforced in updated guidelines in 2001.*

The American Dental Association recommends that pregnant women postpone elective dental x-rays until after delivery; however, there are times when an x-ray may be required during pregnancy to help dentists diagnose and treat oral disease.

Maintaining good oral health during pregnancy can be critical to the overall health of both expectant mothers and their babies. As such, pregnant women should continue to see a dentist regularly for oral exams and professional teeth cleanings. Left untreated, some maternal oral problems can potentially threaten the health of unborn children. For example, studies have shown that pregnant women with severe gum disease may be at increased risk for pre-term delivery. Preliminary follow up studies have shown professional oral health care administered during pregnancy to this at-risk group actually improved pregnancy outcomes.

Women should inform their dentists if they are pregnant, might be pregnant or plan to become pregnant. Should dental x-rays be required during pregnancy, the American Dental Association recommends that a protective thyroid collar and apron be used, unless specific clinical conditions indicate otherwise.

The not-for-profit ADA is the nation’s largest dental association, representing more than 149,000 members. The premier source of oral health information, the ADA has advocated for the public’s health and promoted the art and science of dentistry since 1859. The ADA’s state-of-the-art research facilities develop and test dental products and materials that have advanced the practice of dentistry and made the patient experience more positive. The ADA Seal of Acceptance long has been a valuable and respected guide to consumer and professional products.
