COLLABORATION BETWEEN MEDICAL PROVIDERS AND DENTAL HYGIENISTS IN PEDIATRIC HEALTH CARE

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Editor’s Note
Demonstration projects have provided preliminary evidence of the feasibility of locating dental hygienists within the medical home to expand access to early preventive oral services for vulnerable child population. The pediatrician and Delta Dental project manager who co-author this article explain the implementation of this innovative care delivery system in Colorado and describe early outcomes.

ABSTRACT
Basic preventive oral services for children can be provided within the medical home through the collaborative care of medical providers and dental hygienists to expand access for vulnerable populations.

Background
Because dental caries is a largely preventable disease, it is untenable that it remains the most common chronic disease of childhood. Leveraging the multiple visits children have with medical providers has potential to expand access to early preventive oral services. Developing interprofessional relationships between dental providers, including dental hygienists, and medical providers is a strategic approach to symbiotically expand access to dental care. Alternative care delivery models that provide dental services in the medical home expand access to these services for vulnerable populations. The purpose of this article is to explore 4 innovative care models aimed to expand access to dental care.

Methods
Current activities in Colorado and around the nation are described regarding the provision of basic preventive oral health services (eg, fluoride varnish) by medical providers with referral to a dentist (expanded coordinated care), the colocation of dental hygiene services into the medical home (colocated care), the integration of a dental hygienist into the medical care team (integrated care), and the expansion of the dental home into the community setting through telehealth-enabled teams (virtual dental home). Gaps in evidence regarding the impacts of these models are elucidated.

Conclusion
Bringing preventive and restorative dental services to the patient both in the medical home and in the community has potential to reduce long-standing barriers to receive these services, improve oral health outcomes of vulnerable patients, and decrease oral health disparities.

Keywords: Oral health, Medical, Integrated care, Preventive dentistry, Medical-dental integration
INTRODUCTION

Oral Health Disparities

Although largely preventable, caries remains the most common chronic health condition in childhood and can lead to detrimental effects on children’s development, school performance, and behavior. Caries reduces the quality of life for children, and their families experience stress as a result of their inability to access dental care. Caries in all ages results in costly restorations of cavities, pain, infections, emergency department visits, hospitalizations, and rarely death. In National Health and Nutrition Examination Surveys II and III, more than 40% of children 2-11 years old had caries, and striking disparities existed. The dental experiences of Hispanic children reflect some of the most extreme disparities with low-income Hispanic children having twice the level of disease of their white, advantaged counterparts. The rates of dental disease in Native American children are perhaps the most extreme in the world with up to 90% of preschool Native American children having severe early childhood caries or caries in their primary dentition.

Low-income children of all ages insured by Medicaid or lacking any dental insurance have more than twice the rate of dental caries as nonpoor children and are less likely to receive preventive or restorative dental care for their cavities. Dentists working outside of the safety-net health care system are less likely to treat children with public insurance. As the dental and medical communities gain a better understanding of the caries disease process, they are beginning to advocate for earlier access to primary preventive oral health services for children at high risk for developing this disease, especially early childhood caries. Consequently, dental and medical professional groups including the American Association of Pediatric Dentistry, the American Dental Association, and the American Academy of Pediatrics recognize the need for innovative strategies that bring together the interprofessional and collaborative efforts of the various stakeholders to have a collective impact on expanding access to early dental services and reducing oral health disparities.

Coordination vs Colocation vs Integration

Programs aimed at reducing oral disparities are emerging. These focus on building collaborative relationships with dentists and building partnerships across health professions that will benefit populations. The provision of oral health services is being expanded outside of the traditional dental home and into new settings used by vulnerable populations where children can be reached at an early age. A spectrum of programs will be described that bring dental services into medical and/or community settings: (1) coordination where enhanced care by the medical provider includes basic preventive oral health services at the medical visit with a coordinated referral to an outside dentist; (2) colocation of dental hygiene services in the medical practice; (3) integration of dental hygienists within the medical care team with case coordination to a dentist for restorative needs; and (4) telehealth-supported dental hygiene services are provided in the community.

Basic Preventive Oral Health Care in the Medical Home

Recognizing that substantial challenges exist in getting young children to a dental provider, and that medical providers have numerous opportunities (up to 12 well-child care visits from birth to 36 months of age) to see infants, toddlers, and preschoolers at frequent and regular intervals, the medical home is being leveraged to expand access to preventive oral health services for children. In response, an oral health movement has been spreading across the nation that promotes the provision of basic preventive oral care to high-risk infants and young children by medical providers in the medical home. Providing the services listed in Box 2 in the medical setting aims to address the severe shortage of dental providers serving vulnerable children and takes advantage of the early
and frequent opportunities medical providers have to impact the health of their patients. It also builds on national interest in integrating all aspects of health care into a comprehensive health home.

In an effort to expand access to preventive oral health services to young children, all US State Medicaid programs (except Indiana) now reimburse medical providers for the provision of basic oral health preventive services, including fluoride varnish application. This change in states’ Medicaid policies began in Washington State in 1998 and has gained significant momentum across the United States in the past decade.

In many states, eligibility for reimbursement requires that medical providers receive oral health education/training. Although Medicaid policies regarding reimbursing medical providers for oral health preventive services have improved in the past decade, the implementation of these policies has varied across states and has had variable impact on changing medical providers’ behaviors.

Oral health education/trainings differ state by state and include use of online curricula [eg, Smiles for Life Oral Health Curriculum, American Academy of Pediatric’s Protecting All Children’s Teeth (PACT), others] Colorado’s Cavity Free at Three Oral Health Promotion Program was developed in 2009 by a team of experts has trained more than 3000 health care providers, and has started to expand access to preventive oral services to Colorado children. However, a variety of barriers to the provision of services in the medical setting have been identified, including lack of time to provide care, lack of adequate reimbursement, conflicting priorities, lack of dentists to whom patients can be referred (especially very young and Medicaid-insured patients), and others. Colorado’s Cavity Free at Three Oral Health Promotion Program continues to grow and now provides technical assistance to health care providers and practices to help them overcome barriers and develop the necessary systems to establish successful care delivery models.

Nationally, better resources are emerging to facilitate an actionable pathway for delivering preventive oral health care in the primary care setting and improve the structure of referrals from primary care to dental care. A recent Qualis Health White Paper put out by a team of experts provides an actionable framework to coordinated care. This actionable framework describes the various oral health-related activities a medical provider can complete during a medical visit. These activities include asking oral health risk factors and symptoms of oral disease, looking for signs that indicate oral health risk or active oral disease, deciding on the most appropriate response to findings, offering preventive interventions and/or referrals for treatment, and documenting activities and findings for decision support and population management.

Colocating Dental Hygienists into Primary Care

Changing the behaviors of medical providers to provide preventive oral health services is complicated and involves the medical provider overcoming barriers such as lack of prioritization or limited time to fit the additional services into a crowded examination schedule. Although busy medical providers are being asked to take on an additional activity and deliver preventive oral health services, additional evidence-based strategies that save the providers time and are effective at improving the oral health-related behaviors of patients and their parents are needed, as is a better understanding of the effectiveness of these strategies at improving patients’ oral health outcomes. A small contingent of medical practices in Colorado tested an innovative model where a dental hygienist was colocated in the medical practice. Colocation of medical and dental services under one roof or within a health care system has existed in community health centers for a few decades.

Colocating dental hygiene services directly into primary care medical practices is a newer concept. Colorado permits dental hygienists to practice independently (without specific authorization from a direct or indirect supervising dentist). In 2009, the provision in Colorado’s dental practice act which allows dental hygienists to practice independently provided the impetus to colocate dental hygienists into 5 Colorado medical practices. The Colorado Dental Hygiene Co-Location Project was funded by Delta Dental of Colorado Foundation. The participating practices included 1 federally qualified health center, 2 not-for-profit practices, and 2 private pediatric medical practices and were situated in both rural and urban settings across Colorado (Figure 1).

In each of these practices, dual-function examination rooms were built in the medical setting to accommodate either the dental hygienist or the medical provider, depending on the needs and schedules of the practice. The rooms were equipped with a dental chair functional for either medical or dental examinations and equipment and supplies for both medical and dental services. Four of the 5 dental hygienists worked part time (1-2 d/wk) in the practice, and 1 worked full-time in the practice.
It was demonstrated that colocating dental hygienists into primary care was feasible, and important lessons were learned along the way. These lessons are seen in Box 3.

Medical-Dental Integration

Learnings from the Colorado Dental Hygiene Co-Location Project have influenced further innovations. In 2014, with renewed support from Delta Dental of Colorado Foundation, the Colorado Medical-Dental Integration (CO MDI) Project was launched. In this work, dental hygiene services are being integrated directly into the medical home to create a “health home,” where both medical and dental health are addressed. Sixteen medical practices/systems were selected through a request-for-proposal process to participate in the CO MDI Project. Box 4 lists the criteria on which practices were selected.

These practices are distributed across the state and include federally qualified health centers, school-based health clinics, clinics that serve children in foster care and homeless populations, a clinic specializing in care for refugees, for-profit practices, and large provider networks (see Figure 2). Each of the clinics has created a dedicated examination space for the dental hygienist that includes an examination room and/or a portable dental cart, each of which is equipped for fluoride varnish, sealants, scaling/root planing, and a hand-held x-ray unit (see Figure 3).

Each dental hygienist has developed collaborative, referral relationships with 1 or more dentists in their community. Patients with restorative dental needs that require care from a dentist are referred to a dentist and case managed by the dental hygienist. In some locations, the dental space has been built to allow for the dentist(s) to provide restorative care in the medical setting. Expanding the dental home into the medical home aims to better integrate oral health services with primary care medical services. Some characteristics of this integrated care model include face-to-face communication between the dental hygienists and medical team, shared triage and care plans, commonly supported schedules and billing, and medical and dental records that share patient information.

Box 3. Lessons from colocation projects

- Locating the dental hygienist in the medical practice full time better facilitated the colocation/integration model by making them a visible, present member of the care team. (When the dental hygienist was working part time, the medical providers were more apt to forget when the dental hygienist was on-site and available.)
- Working in a medical home is not the standard clinical setting for dental hygienists. Hiring a dental hygienist who is comfortable working in a nontraditional setting, alongside a team of medical providers, rather than with a dentist facilitated interprofessional collaboration.
- Colocating a dental hygienist into a medical practice and teaching medical providers how to maximize the dental hygienist’s services and skills was a culture shift that required increasing medical provider oral health awareness and literacy.
- Creating a business model for the independent-practice dental hygienist was new to the dental hygienists and required significant training and ongoing mentorship.

Box 4. Criteria for selection of medical practices/systems for CO MDI Project.

- Vision for an innovative care model
- Description of their patient need
- Physical space for an additional care team member
- Willingness to participate in a rigorous evaluation
- Proposed sustainable business model
In this integrated model, the ideal goal is for the medical provider to screen all of his/her patients for risk of oral disease. This screening is performed collaboratively by the various members of the primary care team. For instance, the clerical or nursing support staff might ask if the patient has a dental provider, and if so, when he/she last saw this provider. The medical provider then asks the patient about oral health-related risk factors and incorporates oral health-related questions into the current and past medical history, the review of systems, the family history, as well as the social history. Oral health-related risk factors are either assessed with a specific caries risk assessment tool, or the various risk questions are embedded into the medical record. The medical provider then examines the patient’s teeth and gingiva during the examination of the mouth.

For patients determined to be low-to-moderate risk for oral disease based on history and physical examination, the medical provider provides basic preventive oral health services including oral health anticipatory guidance and fluoride varnish application if indicated. Patients determined to be at increased risk for oral disease are then further evaluated and managed by the dental hygienist (see Figure 4). If a patient is determined to be at increased risk for oral disease, for example, lack of optimal oral health behaviors (eg, not brushing, not using fluoridated toothpaste or drinking fluoridated water, others) or is partaking in deleterious oral health behaviors (eg, frequently consuming sugary foods/beverages, sleeping with a bottle, chewing tobacco/smoking, others) or if the patient already has physical findings of oral disease (eg, white spot lesions, cavities, swollen gingiva or gingival loss, others), then the medical provider requests the dental hygienist conduct further assessment and treatment with a referral to a dentist for restorative and/or additional needs. This interprofessional, team-based approach reinforces messages coming from different providers regarding the importance of optimal oral health to patients, fully uses the unique skills of each team member, encourages each team member to work to the top of their skills and/or licensure, and provides opportunities for improved disease management.

Creating Medical-Dental Integration Business Models

Developing sustainable business models for medical-dental integration requires creativity. Three models are beginning to emerge out of the CO MDI Project (see Table 1).

The “Hired Dental Hygienist Model” works well when the primary care practice has existing dental services as part of their care delivery model and can hire the dental hygienist and bill for the services they render. This model is ideal for organizations such as community health centers, where dental care is often colocated with medical care. In this model, the dental hygienist is employed by the practice, and the practice owns the dental hygiene equipment and dental software.
The “Independent Dental Hygienist Model” can be developed in states, such as Colorado, where dental hygienists can practice independently (without specific authorization from a direct or indirect supervising dentist). In this model, the dental hygienist owns and operates his/her own dental hygiene practice, which includes owning the equipment and dental software. The medical clinic and the dental hygienist develop and execute a business agreement, and he/she is contracted by the medical practice to provide dental hygiene services. Important aspects to consider in developing this model include lease arrangements, remaining in compliance with laws and regulations to protect personal health information (eg, Health Insurance Portability and Accountability Act), shared access to medical and dental records, formal and informal ways of engaging with the medical practice team to ensure their support and buy-in, ensuring dental hygiene back-up, and others. In this model, the dental hygienist will establish his/her salary, based on revenue.

The “Hub and Spoke Model” requires that a dentist or independent dental hygienist practice acts as the dental hub and employs a dental hygienist whose clinic location is a “spoke” will be integrated within the medical clinic. A business agreement is developed and executed between the medical practice and the dental hub. The dental hub most likely will own the dental equipment (but does not have to) and may lease space within the medical practice while sharing resources such as Internet connection, utilities, front desk staff, and so forth. Similar considerations need to be made as in the Independent Dental Hygienist Model regarding use of the medical/dental record and Health Insurance Portability and Accountability Act waivers. The dental hub organization manages the billing processes and claims submission and reconciliation for services rendered by the dental hygienist.

**Telehealth-Enabled Teams/The Virtual Dental Home**

Although telemedicine is becoming more common and often involves a virtual meeting between the patient and the medical provider through technology, telehealth-enabled teams (teledentistry) more commonly refers to a virtual

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**Table 1. Medical-dental integration business models.**

<table>
<thead>
<tr>
<th>Model</th>
<th>Hired dental hygienist</th>
<th>Independent dental hygienist</th>
<th>Hub and spoke</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment</td>
<td>DH employed by medical practice or Community Health Center</td>
<td>DH is self-employed</td>
<td>DH employed by dental hub</td>
</tr>
<tr>
<td>Equipment ownership</td>
<td>Medical practice</td>
<td>DH</td>
<td>Dental hub</td>
</tr>
<tr>
<td>Rent</td>
<td>None</td>
<td>None or DH pays rent to medical practice</td>
<td>None or dental hub pays rent to medical practice</td>
</tr>
<tr>
<td>HIPAA waiver&lt;sup&gt;b&lt;/sup&gt;</td>
<td>Common</td>
<td>Separate</td>
<td>Separate</td>
</tr>
<tr>
<td>Scheduling</td>
<td>Common</td>
<td>Common/separate</td>
<td>Common/separate</td>
</tr>
<tr>
<td>Billing</td>
<td>Common</td>
<td>Common/separate</td>
<td>Common/separate</td>
</tr>
<tr>
<td>Resource sharing</td>
<td>Unlikely</td>
<td>Possibly</td>
<td>Possibly</td>
</tr>
</tbody>
</table>

<sup>a</sup> These are only examples and are flexible.

<sup>b</sup> The Health Insurance Portability and Accountability Act, also known as HIPAA, was created in 1996 by the US Congress to protect the privacy of health information. The act prohibits health care providers from releasing their patient’s health care information without a waiver signed by the patient.
meeting between a dental hygienist and dentist. The Hub and Spoke Model is ideal for teledentistry. This model has been tested in California and now is being tested in Colorado and Oregon.

Colorado’s Virtual Dental Home Program—the SMILES (Spanning Miles in Linking Everyone to Services) Dental Home Project—has strong foundation support (Caring for Colorado and the Colorado Health Foundations) and will pilot providing dental care in community-based settings across 30 Colorado counties using telehealth-connected dental teams. The SMILES Dental Home Project creates a community-based oral health delivery system in which patients receive preventive and simple therapeutic services in community settings where they live or receive educational, social, or general health services. It uses the latest technology to link dental hygienists in the community with dentists at remote office sites. The goal is to have telehealth-connected dental teams, led by dental hygienists who work in communities, keeping people healthy by providing case management,

Table 2. Knowledge gaps regarding innovative care models

<table>
<thead>
<tr>
<th>Model</th>
<th>Community</th>
<th>Dental provider</th>
<th>Medical provider</th>
<th>Patient/caregiver</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coordinated care: preventive oral health services provided by medical professional</td>
<td>What tools are needed to facilitate coordinated care delivery?</td>
<td>Given the rapid spread of this movement across the US, what are dentists’ current perspectives regarding medical providers providing basic preventive oral health services?</td>
<td>What strategies are successful at transforming medical care delivery systems to provide preventive oral health services?</td>
<td>What is the impact of this model on caregiver oral health-related characteristics? What is the impact of model on preventing dental disease?</td>
</tr>
<tr>
<td>Colocating dental hygienists into primary care</td>
<td>How can the oral health literacy of communities be improved? How can communities be empowered to expect dental care alongside medical care?</td>
<td>What is the feasibility of dentists providing care within the medical setting: medical providers providing care within the dental setting?</td>
<td>What are the barriers to getting patients from the medical provider to the colocated dental provider; what are effective strategies to overcome these barriers?</td>
<td>Are caregivers/patients satisfied with colocated care?</td>
</tr>
<tr>
<td>Medical-dental integration</td>
<td>What is the acceptability of medical-dental integration to the community-at-large?</td>
<td>What is the right ratio of medical providers to dental providers to meet the population’s oral health needs?</td>
<td>What lessons from medical-behavioral health integration can be translated to medical-dental integration?</td>
<td>What is the comparative effectiveness of coordinated care vs colocated care vs integrated care at improving oral health outcomes?</td>
</tr>
<tr>
<td>Telehealth-connected teams/virtual dental home</td>
<td>How do communities react to the telehealth-connected team care model? Does the virtual dental home successfully expand access to comprehensive dental care?</td>
<td>What are the essential ingredients to a healthy and collaborative dentist-dental hygienist relationship?</td>
<td>What lessons from telemedicine can be translated to teledentistry?</td>
<td>How satisfied are patients with telehealth-connected care compared to traditional dental care?</td>
</tr>
</tbody>
</table>
trage, education, preventive care, and interim therapeutic restorations (see Byrd, in this issue).

Where more complex, restorative dental treatment is needed, the SMILES Dental Home Project will physically (rather than virtually) connect patients with dentists at the dental hub. This model relies on the advanced training and community-based practice of a group of oral health professionals.

In the SMILES Dental Home, the dental hygienist collaborates with a dentist to provide care. Technology helps bridge the geographic gap between the community-based dental hygienist and dentist. Equipped with portable imaging equipment and software and an electronic dental record system, the dental hygienist collects electronic dental records including the dental and medical histories, dental examination findings, intraoral x-rays, and/or oral digital photographs. This information is uploaded to a secure electronic dental record where they are reviewed by the collaborating dentist at the dental hub. The dentist reviews the patient’s dental examination information and works with the dental hygienist to develop a treatment plan, in many cases, one that can be provided by the dental hygienist in the community setting. If the treatment plan includes dental restorations by the dentist, the dental hygienist will provide case management to get the patient to the treating dentist; or alternatively, the dentist may complete the procedure(s) at the community setting.

Gaps in Our Knowledge

All the models described here are innovative and relatively unstudied; all aim to increase access to preventive and restorative dental services by providing care in settings outside of the traditional dental clinic; settings that are convenient and comfortable for patients. Evidence is needed to better understand the multilevel influences and impacts of these various models and their comparative effectiveness.

The characteristics of the practice providers and leadership and how they view their role in providing oral health care must be studied, as well as identifying strategies for how to best integrate a dental provider into the medical care team. The patients’ perspectives regarding their needs and how best to meet them must be ascertained. It will be important to learn how to empower the patient to advocate for themselves and their oral health (see Table 2).

CONCLUSION

Dental disease, especially caries, is the most common disease of children. Low-income children carry the burden of disease yet are often challenged in finding a dental provider who will treat them. Alternatively, children (including low-income children) successfully access medical care at an early age and access it often. Taking advantage of the many opportunities medical providers have to provide preventive services to children and incorporating basic preventive oral health services into medical visits is a strategy now being implemented across the US models that coordinate, colocate, and integrate medical and dental care hold promise to reducing the burden of dental disease carried by patients most at risk. All these models require that medical providers gain the necessary oral health education regarding their role in identifying dental disease and risk factors for dental disease in their patients. Each model has its inherent benefits and challenges to implementation, and all models lack broad evidence of their impacts on various levels of influence on the oral health of various populations. Opportunities are needed to both implement these various care models and evaluate their effectiveness at improving the oral health-related characteristics of communities, dental and medical providers, and patients.

REFERENCES


