

# The Virtual Dental Home: Bringing Oral Health to Vulnerable and Underserved Populations

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**ABSTRACT** Large and increasing oral health disparities in the U.S. population led the Institute of Medicine to call for expanded research and demonstration of delivery systems that test new methods and technologies. These new methods include delivering oral health services in nontraditional settings, using nondental professionals, expanded roles for existing dental professionals and new types of dental professionals, and incorporating telehealth technologies. The virtual dental home is a system that demonstrates the characteristics called for by the IOM.

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The Pacific Center for Special Care at the University of the Pacific, Arthur A. Dugoni School of Dentistry (Pacific) is demonstrating a new model of care that uses the principles and techniques listed above. By creating a “virtual dental home” in sites throughout California, Pacific is delivering oral health services in locations where people receive educational, general health, and social services. Over the next several years this project will demonstrate the viability and effectiveness of a significant new approach to improving and maintaining oral health that can make a significant difference in the epidemic of dental disease for California’s vulnerable and underserved children and adults.

## Poverty, Race, Disability, and Oral Health

The traditional office and clinic-based oral health delivery system is failing to reach a large and increasing segment of the population. The disparities in access and the resulting health disparities have been well-documented. The 2000 Report of the U.S. Surgeon General indicated that “Although there have been gains in oral health status for the population as a whole, they have not been evenly distributed across subpopulations. Profound health disparities exist among populations including: racial and ethnic minorities, individuals with disabilities, elderly individuals, and individuals with complicated medical and social conditions and situations.”<sup>1</sup>

In 2011, the Institute of Medicine and the National Research Council of the National Academies of Science issued two reports on oral health, “Advancing Oral Health in America” and “Improving Access to Oral Health Care for Vulnerable and Underserved Populations.”<sup>2,3</sup> Both of these reports describe the significant proportion of the U.S. population that do not have access to oral health services and the disparities in oral health among these groups.

A national analysis in 2010 by the Government Accountability Office (GAO) indicated that only about one-third of children enrolled in Medicaid received any dental service during the 2008 fiscal year.<sup>4</sup> In California, oral health disparities are more severe than the national average, particularly among low-income and disabled populations. Just 25 percent of Medi-Cal beneficiaries reported a dental visit in 2007 and among pregnant women with Medi-Cal coverage only one in seven received dental services.<sup>5</sup> Almost one-quarter of all children in California have never seen a dentist and about 40 percent of California black, Latino, and Asian preschoolers and approximately 65 percent of elementary schoolchildren in these groups need dental care.<sup>6,7</sup> In 2011, only 22 percent of the total number of people eligible for Medi-Cal dental services received any service, a decrease of 8 percent from 2009. A decrease was expected for adults since most adults benefits were eliminated in 2009. However, there was also a decrease for children. In 2011, only 27 percent of eligible children received any dental service compared to 34 percent in 2009.<sup>8</sup>

The number of low-income children and adults and those with disabilities or complex medical conditions needing oral health services is rising dramatically. The U.S. Census reported in 2000 that

49.7 million people in the United States population had a long-standing condition or disability.<sup>9</sup> They represented 19.3 percent of 257.2 million people who were aged 5 and older in the civilian noninstitutionalized population — or nearly one person in five. Many reports show that people with disabilities have more dental disease, more missing teeth, and more difficulty obtaining dental care than other members of the general population.<sup>1,10-12</sup>

There are significant personal and economic consequences that result

### IN CALIFORNIA, oral health disparities are more severe than the national average, particularly among low-income and disabled populations.

from the lack of oral health services for low-income and disabled populations. In California, approximately 6.3 million children, or two-thirds of all children in the state, suffer needlessly from poor oral health by the time they reach the third grade.<sup>13</sup> Approximately 7 percent of California children missed school due to a dental problem in 2007, excluding time for cleaning or routine check-up.<sup>14</sup> In 2007, there were more than 83,000 visits to California hospital emergency departments for preventable dental conditions.<sup>15</sup>

The Institute of Medicine, in its 2011 reports on oral health, called for expanded research and demonstrations of delivery systems that would test new methods and technologies including delivering oral health services in non-

traditional settings, using nondental professionals, expanded roles for existing dental professionals, the use of new types of dental professionals, and incorporation of telehealth technologies.<sup>2,3</sup>

### Health Homes

There is considerable interest and an expanding body of literature on improving health care provided to underserved populations through a “medical home” or “health home” model.<sup>16</sup> A summary of the model and considerations in its implementation were thoroughly reviewed in a supplement to the journal *Pediatrics*.<sup>17</sup> The forward to that issue points out the degree to which the medical home model has been integrated in national health policy including “Healthy People 2010” and the “President’s New Freedom Initiative.”<sup>18</sup> In general, the medical home model encompasses systems that provide:

- Care management over time;
- Health promotion activities;
- Access to technical medical services when needed; and
- In pediatric medical home models, there is also an emphasis on early intervention services.

In contrast to the medical home literature, there is a more recent and much smaller body of published works on adapting this model to improving oral health.<sup>19,20</sup> In 2010, the American Academy of Pediatric Dentistry (AAPD) reaffirmed their “Policy on the Dental Home” in which they described the dental home as “inclusive of all aspects of oral health that result from the interaction of the patient, parents, nondental, and dental professionals.”<sup>21</sup> Also in 2010, the AAPD reaffirmed its definition of the “dental home” in which they described it as “the ongoing relationship between the dentist and the patient, inclusive of all aspects of oral health care delivered in a

comprehensive, continuously accessible, coordinated, and family-centered way.

“Establishment of a dental home begins no later than 12 months of age and includes referral to dental specialists when appropriate.”<sup>22</sup> Other models that describe the “medical home” or “health home,” now recognize that the important functions of these models can be performed by many different types of personnel and settings. In contrast, the AAPD definition emphasizes the role of the dentist in the dental home concept. While some people advocate for the idea that a dental home be centered in a dental office, the reality that most underserved populations do not visit dental offices on a regular basis leads to the conclusion that other solutions need to be developed to provide the essential elements of this model. There is growing recognition that other personnel and settings can be used to provide these essential elements.

### Telemedicine/Teledentistry

During the same time the medical home or health home concept has evolved, there have been parallel advances in the use of distance technology to improve the health of populations at a distance from primary health care providers or specialists.<sup>23-25</sup> The term “telemedicine” has been applied to the use of information technologies, primarily real-time videoconferencing and asynchronous store-and-forward systems to provide care remotely.<sup>26</sup> In California AB 415, which became law Jan. 1, 2012, replaced the term “telemedicine” with “telehealth” throughout California law and made other significant changes designed to facilitate use and adoption of telehealth technology.<sup>27</sup>

As with the medical home concept, there are far fewer reports in the literature on the application of telehealth concepts to oral health. The emphasis of those reports on “teledentistry” has been on the use of these technologies as a means to

share records between dentists and dental specialists or as screening tools to determine the feasibility or urgency of need for dental treatment.<sup>28-35</sup> However, there are a few reports in the literature that describe the use of telehealth technologies to facilitate geographically distributed, collaborative dental care.<sup>36-41</sup> The experience in medicine holds great promise for these technologies in improving the oral health of underserved populations through fostering and facilitating geographically distributed collaborative systems of care.

**IN THE VIRTUAL DENTAL home, the RDHAP, RDH, or RDA collaborates with a dentist who makes diagnostic and treatment decisions to provide care.**

### The Virtual Dental Home

The Pacific Center for Special Care at the University of the Pacific, Arthur A. Dugoni School of Dentistry (Pacific) is demonstrating a new model of care. By creating a “virtual dental home” in a variety of sites throughout California, Pacific is delivering oral health services in locations where people live, work, play, go to school, and receive social services. The Pacific Center has partnered with a number of funding organizations to implement this demonstration project and bring much-needed oral health services to these underserved populations. These populations range from children in Head Start Centers and elementary schools to older or disabled adults in residential care settings or nursing homes.

### What Is the Virtual Dental Home?

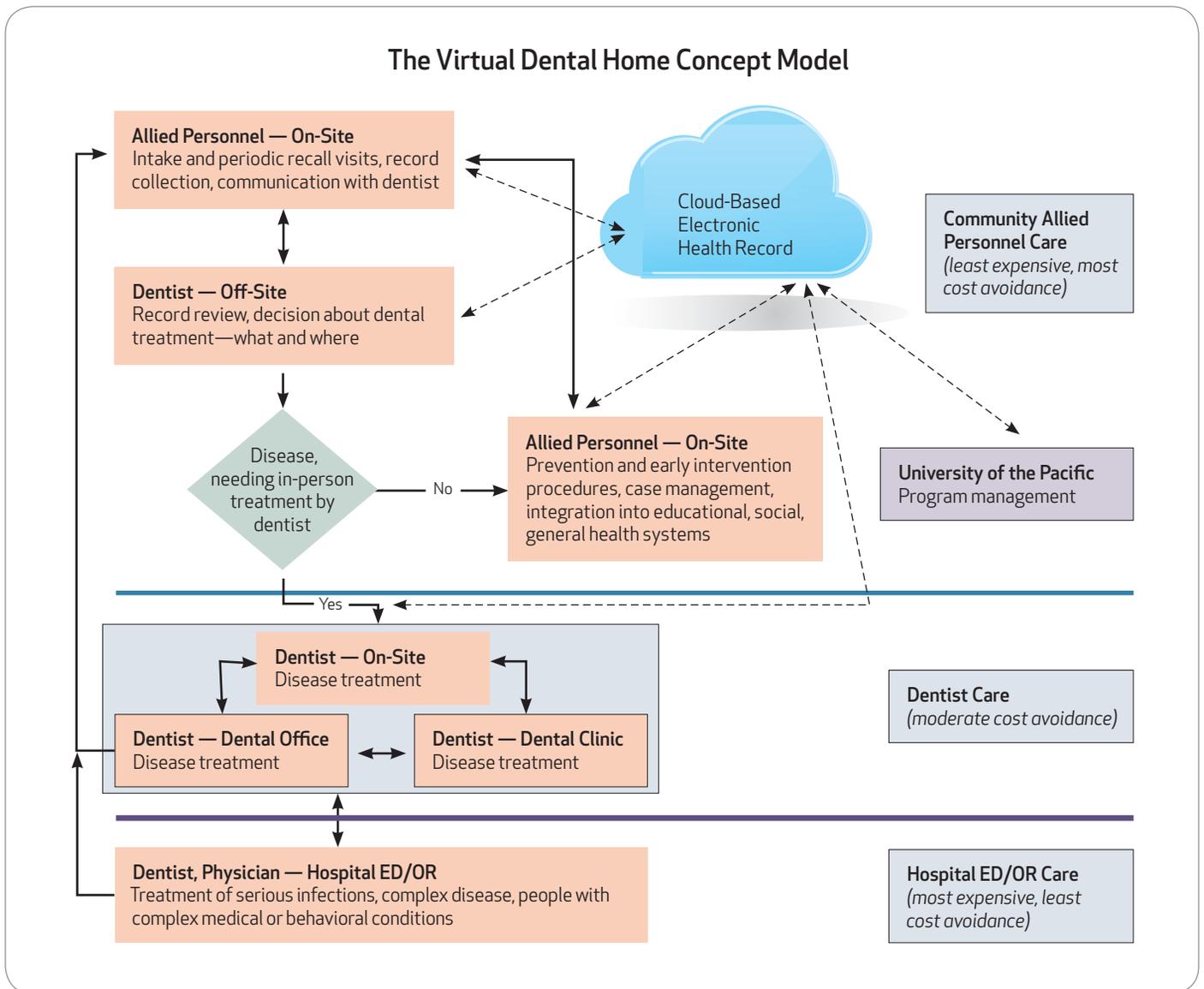
The virtual dental home is a community-based oral health delivery system in which people receive preventive and early intervention therapeutic services in community settings where they live or receive educational, social, or general health services. It utilizes the latest telehealth technology to link practitioners in the community with dentists at remote office sites.

This project is demonstrating that registered dental hygienists in alternative practice (RDHAP), registered dental hygienists working in public health programs (RDH) and registered dental assistants (RDA), can work in a team led by geographically distant dentists and can keep many people healthy in community settings by providing education, triage, case management, preventive procedures, and early intervention therapeutic services. Where more complex dental treatment is needed, the virtual dental home connects patients with dentists in the area.

This system promotes collaboration between dentists in dental offices and clinics and these community-based allied dental personnel. This system expands the use of the term dental home to include the entire geographically distributed, collaborative, telehealth-facilitated system of care. The virtual dental home provides all the ingredients of the health home, keeps dentists at the head of the dental care team, and most importantly, it brings much-needed services to individuals who might otherwise receive no care.

### How Does It Work?

This model relies on the advanced training and community-based practice of a group of allied oral health professionals. In the virtual dental home, the RDHAP, RDH, or RDA collaborates with a dentist who makes diagnostic and treatment decisions to provide care. Technology



**FIGURE 1.** The virtual dental home concept model (Pacific Center for Special Care, University of the Pacific School of Dentistry, © 2012).

helps bridge the geographic gap between the community provider and dentist.

Equipped with portable imaging equipment and an Internet-based dental record system, the RDHAP, RDH, or RDA collects electronic dental records including radiographs, photographs, charts of dental findings, and dental and medical histories, and uploads the information to a cloud-based software system called Denticon where the records are reviewed by a collaborating dentist.<sup>42</sup> The dentist reviews

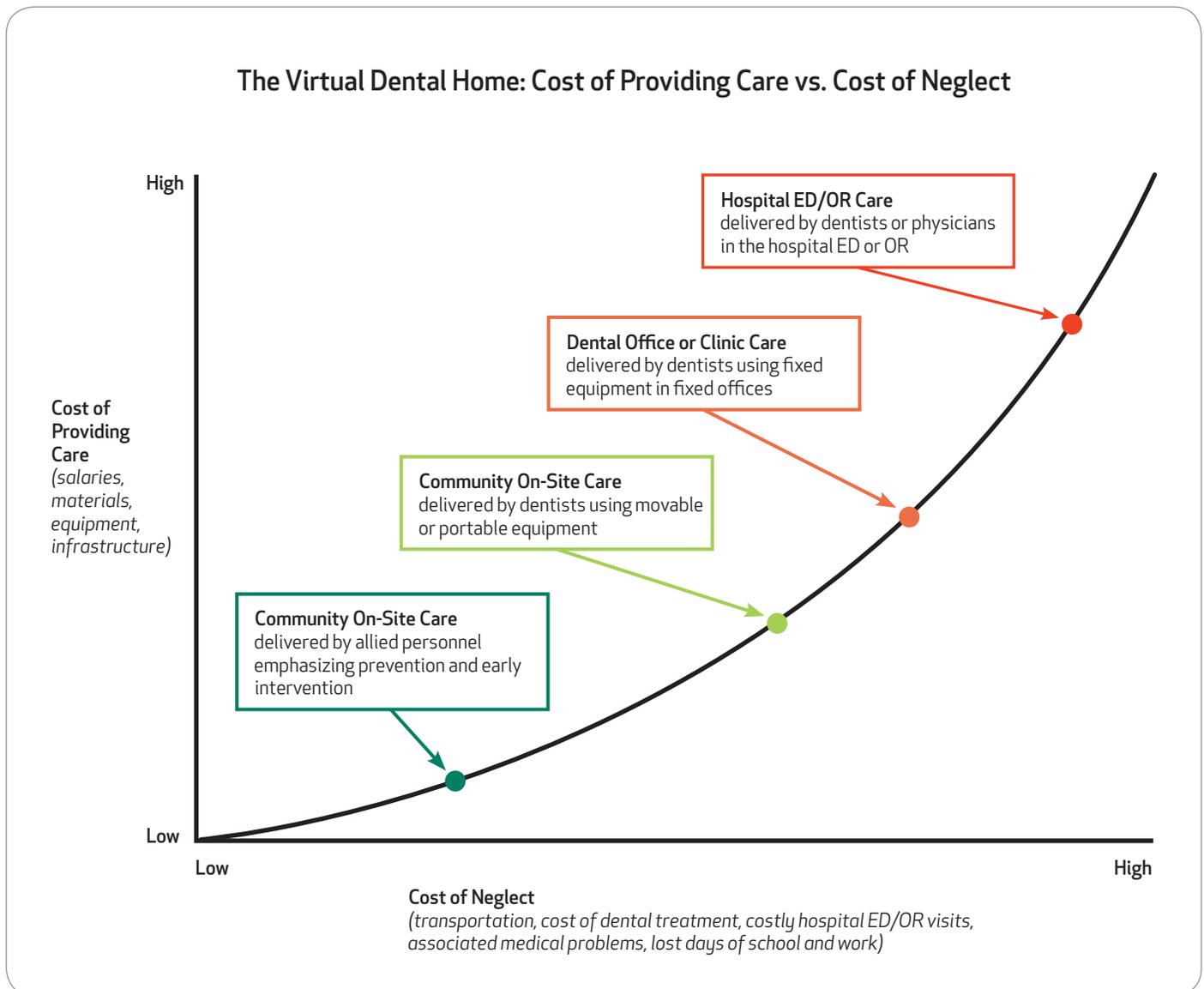
the patient’s information and creates a plan for dental treatment. The RDHAP, RDH, or RDA then carries out the aspects of the plan that can be conducted in the community setting under the general supervision of the dentist. The services included in the demonstration project are:

- Health promotion and prevention education;
- Dental disease risk assessment;
- Preventive procedures such as application of fluoride varnish, dental

sealants and for dental hygienists, dental prophylaxis and periodontal scaling;

- Placing carious teeth in a holding pattern using interim therapeutic restorations (ITR) to stabilize patients until they can be seen by a dentist for definitive care; and
- Tracking and supporting the individual’s need for and compliance with recommendations for additional and follow-up dental services.

It should be noted that “interim



**FIGURE 2.** The virtual dental home: cost of providing care versus cost of neglect (Pacific Center for Special Care, University of the Pacific School of Dentistry, © 2012).

therapeutic restoration” is the term developed by the American Academy of Pediatric Dentistry in its “Policy on Interim Therapeutic Restorations” (ITR).<sup>43</sup> As described in that document, this term is used to describe the technique referred to more broadly in the literature as atraumatic restorative technique (ART), which involves removal of superficial caries using hand or slow-speed rotary instruments and placement of glass-ionomer restorative material. The new term, ITR,

is used to emphasize the provisional nature of the restoration. Allied dental professionals in the virtual dental home demonstration project are placing ITRs under the general supervision of dentists in a health workforce pilot project (HWPP) authorized by the California Office of Statewide Planning and Development (OSHPD).<sup>44,45</sup> In the virtual dental home demonstration project, the technique consists of using hand instruments only to remove soft debris and superfi-

cial caries and obtain clean and sound margins with subsequent placement of glass-ionomer restorative material.

The RDHAP, RDH, or RDA refers patients to dental offices for procedures where a dentist has determined that the skills of a dentist are required. When such visits occur, the patient arrives with health history and consent arrangements completed, a diagnosis and treatment plan already determined, preventive practices in place and preven-

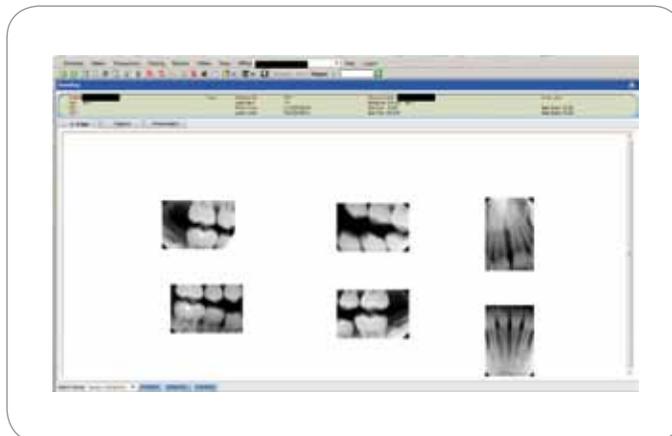


**FIGURE 3.** Capturing radiographs in the virtual dental home system.

tive procedures having been performed. The patient is likely to receive a successful first visit with the dentist as the patient's dental records and images have already been reviewed and preventive procedures performed. All of this adds up to a more successful dentist visit.

In some cases, the dentist may come to the community site and use movable or portable equipment to provide restorations or other services that only a dentist can provide. In either case, the majority of patient interactions and efforts to keep people healthy are performed by the RDHAP, RDH, or RDA in the community setting after a telehealth consultation with a collaborating dentist who makes diagnostic and treatment decisions and determines the best location for treatment, thus creating a true community-based dental home.

**FIGURE 1** is a diagram illustrating the virtual dental home concept model. **FIGURE 2** is a diagram illustrating the cost of providing oral health services versus the impact of those services on the cost of neglect of dental disease. As illustrated in **FIGURE 1**, the emphasis of the virtual dental home model is the delivery of diagnostic, preventive, and early intervention services by allied dental personnel in community settings under general supervision of dentists who have reviewed patient records and determined a plan of treatment for that patient. These services, delivered under these circumstances, are the least costly methods for delivering diagnostic, preventive and early intervention services and, as illustrated in **FIGURE 2**, the most likely to drive down the cost



**FIGURE 4.** Radiographs displayed in the Denticon electronic dental record.

of neglect. Neglecting oral diseases until they require the restorative and surgical services that must be provided directly by dentists is more costly and less likely to impact the overall cost of neglect. As also illustrated in **FIGURE 2**, waiting until oral diseases are so advanced that they require visits to a hospital emergency department or operating room is the most expensive of the options displayed and does very little to lower the overall costs of neglecting oral diseases.

#### *What Is the Current Status of the Project?*

Phase 1 of this project is now completed and has included development of the project concept and design, and creation and implementation of all of the components and infrastructure for the virtual dental home system. The legal framework for the project has been created including agreements, consent forms, liability coverage, and Institutional Review Board (IRB) approval. The project technology hardware and software systems have been created or adapted for this system. Training materials and methods, site protocols, and operational guidelines have been developed. A study validating the ability of dentists to make treatment decisions after evaluating digital oral health records without an in-person examination has been completed.<sup>46</sup> Providers and sites in nine communities have been enlisted and trained. A Health

Workforce Pilot Project (HWPP) from the California Office of Statewide Health Planning and Development (OSHPD) was approved. The HWPP authorizes two new duties for allied dental personnel (RDHAPs, RDHs and RDAs). These are:

- Make the decision about which radiographs to take, if any, to facilitate an oral evaluation by a dentist; and
- Place interim therapeutic restorations (ITR).

#### *What Are the Results From the First Phase of the Demonstration Project?*

The virtual dental home demonstration program has clearly demonstrated the ability to establish a community-based, geographically distributed, collaborative, telehealth-facilitated system of care. There are nine sites currently operating under this model of care in California. Patients are being seen in community settings, dentists are reviewing records and determining the best course of treatment for the patient, preventive and early intervention care is being provided in the community, and patients with advanced disease requiring the services of a dentist are being referred to dental offices and clinics.

Patients enrolled in the virtual dental home project are being seen in a variety of settings: two elementary schools in low-income communities of Sacramento and San Diego County, a consortium of Head Start centers in San Francisco



**FIGURE 5.** Radiograph displayed in the Denticon electronic dental record.

and San Diego, residential facilities associated with three regional centers for persons with developmental disabilities, four long-term care facilities for vulnerable elders, and one community clinic.

**FIGURES 3 AND 6** depict allied dental personnel capturing dental radiographs and photographs into a laptop computer. These images are uploaded to a secure Internet web server for review by a dentist. In **FIGURE 3** it is possible to see the simple and low-cost environment where allied personnel can set up portable equipment gather records and perform prevention and early intervention procedures. **FIGURES 4 THROUGH 8** depict sample screen shots of radiographs and photographs from this system.

Pacific has calibrated and trained eight RDHAPs and one RDA on the use of the



**FIGURE 6.** Capturing digital photographs in the virtual dental home system.

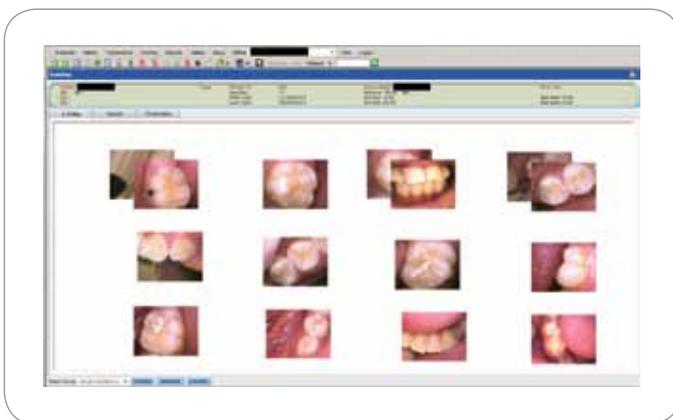
telehealth technology and the two new duties available under the HWPP. More than 750 patients have been enrolled in the virtual dental home project and have received a telehealth-enabled consultation by a dentist. Of these patients, almost 40 percent are children, 24 percent are adults living in rural or low-income communities, 17 percent are patients in long-term care facilities, and 15 percent are disabled adults living in residential care settings. The RDHAPs have provided more than 300 prophylaxes for both children and adults and more than 500 applications of fluoride varnish. These allied dental personnel have successfully placed more than 170 ITRs. Dentists have determined that almost half of the patients seen to date can be kept healthy through the services of the allied dental personnel performing preventive and early intervention services in the community. The other half are being referred to dental offices or clinics for the services only dentists can provide.

The virtual dental home system has

integrated oral health services into the activities of institutions such as preschools, elementary schools, group homes and long-term care facilities. This begins the process of normalizing daily oral care and emphasizes the importance of oral health. Feedback from allied dental personnel and staff at virtual dental home sites indicates that staff, caregiver, and parent education is occurring as community-based oral health professional and oral health activities become part of the fabric of these institutions. The consequence is an increase in dental literacy and increased willingness to comply with referrals, daily oral hygiene practices, and the role of nutrition in oral health.

### New Roles for the Dental Team

The virtual dental home project is demonstrating the value of expanding the roles of all members of the dental team and training them to work in a new and unique system of care. Dentists' roles are expanded as they learn to work with a geographically distributed team of allied dental personnel and use telehealth technology to evaluate patients, make treatment decisions, and communicate with the dental team. Dentists in this project are also able to manage and



**FIGURE 7.** Digital photographs displayed in the Denticon electronic dental record.



**FIGURE 8.** Digital photograph displayed in the Denticon electronic dental record.

provide care for an increased population of patients through these expanded dental teams. Many of the patients these dentists are now serving would not have received any dental services at all without this community-based system of care.

The role of allied dental personnel is also expanded as they work in a geographically distributed team, perform procedures under remote general supervision of dentists, and communicate with dentists and other members of the team using telehealth technology. Allied dental personnel are also expanding their roles as they perform case management activities, work to integrate oral health services into the fabric of social, educational, and general health systems, and function as an integral part of a geographically distributed, telehealth-enabled dental home, one aspect of the “health home.”

### *What Are the Expected Long-Term Outcomes of This Project?*

The virtual dental home project is demonstrating a new system of care that is more likely to improve oral health of underserved and vulnerable populations at a lower cost than other systems of care. The demonstration project has located allied dental personnel in community sites where underserved children and adults receive educational, social, and general health services. It has expanded the role and reach of dentists and allied dental personnel. It has established telehealth-enabled collaboration and communication systems that allow dentists to work and communicate with geographically distributed allied personnel to create a virtual dental home for underserved populations. It is now allowing allied dental personnel to provide education, triage, case management, preventive procedures, and interim therapeutic restorations in these community locations under

general supervision of dentists. The data collected from this demonstration will support regulatory and reimbursement change needed to allow and facilitate spread of the model. There are indications that the next several years of this project will demonstrate the viability and effectiveness of a significant new approach to improving and maintaining oral health of underserved populations that can make a significant difference in the epidemic of dental disease for California's vulnerable children and adults. ■■■■

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## DELTA: Where do we go from here?

My last article discussed why the Delta policy is worse than originally believed and how it possibly affects more patients in the "Premier only" practices than we thought. I believe the new policy should open our eyes to the reality of our relationship with Delta Dental. Delta was originally formed by dentists back in 1950-1960 with an intent to try to balance quality patient care with reasonable fee schedules.

Now, Delta is acting no differently than any "for profit" organization, slashing payments to its providers in a stealthy fashion with this latest policy change.

As a group and an organized society, dentists have always been concerned about "anti-trust" suits while addressing these types of issues with insurance providers. If we attack this problem from a patient's rights and patient's freedom perspective, we will not need to worry about this "anti-trust" threat any longer. My proposed "Patient's Freedom of Choice Dental Insurance Act" should demand the following:

1. Patients are free to take their dental insurance plan or fee schedule to any provider they wish and the insurance company WILL pay the provider directly. (This Currently does not happen with Delta or Blue Cross) The patient has the choice to make up the difference with the provider if the provider's fee schedule is higher.
2. Dentists and patients are free to negotiate any fee schedule or payment arrangement directly with the provider. Dentists are no longer forced to collect pre-arranged payments under threat of "insurance fraud" if they choose not to collect the entire "co-pay". (Of course, the insurance companies can continue to have arrangements with providers who agree to the fee schedule. In this case, patients can still get a list of providers who agree to the schedule.)
3. Remove the punitive language towards dentists in the insurance contracts.
4. Providers should have the freedom to charge whatever they desire and let the patient decide on the type of care the patient desires and who should deliver that care.

Insurance companies claim that costs will increase if patients have more freedom with their insurance plans and begin utilizing them more. I say, SO BE IT!!! Whose side are we on anyway? Don't we want patients to seek out care? I believe that under-utilization of dental insurance is still primarily due to patient's fear of dentistry. The insurance companies limit their financial exposure two ways: (1) through the fee schedule, and (2) by imposing a maximum annual benefit per patient. They are covered on every angle. This maximum benefit has not kept up with inflation for more than 30 years, making the current coverage practically a joke!!! The entire annual allowance can almost be used by a single molar endo procedure! Instead insurance should be simply viewed as a sort of "medical savings account" that will help defray some of the costs of dental care.

Delta can certainly cut its costs by eliminating its ridiculous audit process. Again, our proposed "Patient Freedom of Choice Dental Act", designed to encourage patient's rights will eliminate the necessity of the audits. This is not a collective threat, just common sense.

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