Teledentistry in Arizona

Initial Development

Arizona Department of Health Services
Office of Oral Health

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Acknowledgements

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Scottsdale Healthcare & Community Health Services Neighborhood Outreach Action for Health Programs

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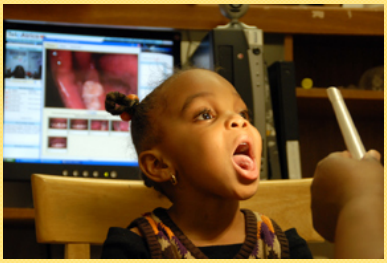

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Section A

Introduction and Background Information

Teledentistry in Arizona
Section A / Chapter 1
Introduction

In 2006, Arizona Department of Health Services, Office of Oral Health (OOH) was awarded a Health Resources and Service Administration (HRSA) grant: *Grants to States to Support Oral Health Workforce Activities*. The grant funded the OOH project to increase access to dental care for underserved and at-risk populations through teledentistry.

This manual describes the experience of the grant project, reports the progress made by the first five teledentistry providers in Arizona, and shares the learned lessons in the installation teledentistry hardware/software and use of teledentistry technology in supporting dental care.

Efforts will continue among the five Arizona teledentistry providers to integrate the technology into their programs to provide quality and efficient care to their patients. With a new HRSA grant awarded to the OOH for 2009-2012, OOH will also continue to advance teledentistry in Arizona.

This teledentistry manual offers a resource for providers, agencies/organizations, community groups, program administrators, decision-makers, funders, and other partners and stakeholders of oral health care to learn together. The manual offers building blocks for further development of teledentistry as a viable approach to improving access to dental care for the underserved and at-risk populations.

The OOH would like to acknowledge and thank the following contributors in their support and development of this manual:

- Health Resources and Services Administration, Bureau of Health Professions, Grants to States to Support Oral Health Workforce Activities, Grant No. T12HP07705
- The five initial teledentistry providers in Arizona:
    - Hopi Health Care Center Dental Program
    - Northern Arizona Council of Governments Head Start
    - Northern Arizona University Dental Hygiene Department
    - North Country HealthCare Dental Services in collaboration with A.T. Still University, Arizona School of Dentistry and Oral Health
    - Scottsdale HealthCare & Community Health Services System Neighborhood Outreach Action for Health Program
- Arizona Department of Health, Office of Oral Health staff and consultants

Teledentistry in Arizona
Section A / Chapter 2
The Basics of Teledentistry

Teledentistry – Definitions and Descriptions

Teledentistry is a developing area of dentistry that integrates electronic health records, telecommunications technology, digital imaging, and the Internet to link dental providers and their patients. Several definitions and descriptions of teledentistry are found in the literature and in communications, each highlighting aspects of teledentistry:

- Teledentistry is the practice of using video-conferencing technologies to diagnose and provide advice about treatment over a distance.[1]
- Teledentistry uses computer-mediated technology for treating individual patients at a distance.[2]
- Teledentistry, through the use of telecommunication and computer technologies, provides interactive access to specialist opinion that is not limited by the constraints of space and time. [3]
- Teledentistry harnesses the real-time capability of modern telecommunications to allow off-site dentists of any specialty to assist their colleagues in providing care.[4]

- Teledentistry has come to mean the use of electronic information and telecommunications technologies to support long-distance clinical oral health care, patient and professional health-related education, public health, and health administration.[5]
- Teledentistry is using the Internet to consult with an expert. This consultation could be direct (between the patient and the expert) or indirect (between the patient's doctor and the expert).[6]
- Teledentistry will be the clinical dimension of the new patient-doctor relationship. A definition of telemedicine helps identify the emerging realm of teledentistry: "…the combined use of telecommunications and computer technologies to improve the efficiency and effectiveness of health care services by liberating caregivers from traditional constraints of space and time and empowering consumers to make informed choices in a competitive marketplace"[7]

Teledentistry's roots lie in telemedicine; therefore, teledentistry fits into several definitions of telemedicine. For example, the Association of American Medical Colleges (AAMC) described

telemedicine as the use of telecommunications technology to send data, graphics, audio, and video images between participants who are physically separated (i.e., at a distance from one another) for the purpose of clinical care.[8] The American Telemedicine Association defined telemedicine as the use of medical information exchanged from one site to another via electronic communications to improve patients' health status.[9] The federal government, in its 1997 Telemedicine Report to Congress, defined telemedicine as the use of electronic communication and information technologies to provide or support clinical care at a distance.[10] Dentistry can look to telehealth and telemedicine to incorporate some of the necessary lessons that will aid teledentistry's evolution into new health delivery models.

Teledentistry Services

Teledentistry can be integrated in general dental practice and specialty practices. Teledentistry services would be part of a larger investment by health care practices, organizations, and institutions in information technology or the delivery of clinical care. Like telemedicine, teledentistry can provide different types of programs and services for the patient. The following teledentistry services could evolve from current telemedicine practices:[11]

- **Specialist referral service** involves a specialist assisting a general practitioner to diagnose and manage a patient. This may involve a patient "seeing" a specialist over a live, remote consult or the transmission of diagnostic images and/or video along with patient data to a specialist for viewing later. (Almost 50 medical subspecialties successfully use telemedicine for referrals.)
- **Patient consultation** uses telecommunications to provide medical and dental/oral health data, which may include audio, still or live images. Data is exchanged between a patient and a health professional for use in rendering a diagnosis and treatment plan. This may originate from a remote site to a "home" dental office/clinic. Communication may use a direct transmission link or the Internet.
- **Remote patient monitoring** uses devices to remotely collect and send data to a monitoring station for interpretation. Telemedicine has used remote monitoring for "home telehealth" applications (e.g., monitoring specific vital signs or other indicators for homebound patients) and to support nursing visits.
- **Professional education** provides continuing education credits for health professionals and delivers special health education seminars for targeted groups in remote locations.
- **Consumer medical and health information** includes the use of the Internet for consumers (patients) to obtain specialized health information and on-line discussion groups to provide peer-to-peer support.

Teledentistry Delivery Mechanisms

The different ways of how providers and patients can connect shows several delivery mechanisms to provide the teledentistry services described above. Telehealth and telemedicine have used the following delivery mechanisms, which could be developed to support teledentistry services:[11]

- **Networked programs** link hospitals and clinics with outlying clinics and community health centers in rural or suburban areas. The links may use dedicated high-speed lines or the Internet for telecommunication links between sites.
- **Point-to-point connections** using private networks. These connections are used by hospitals and clinics that deliver services directly, or contract out specialty services to independent providers, at ambulatory care sites.
- **Primary or specialty care to the home connections** involves connecting primary care providers, specialists and home health nurses with patients using single line phone-video systems for interactive clinical consultations.
- **Home to monitoring center links** are used for patient monitoring, home care and related services that provide care to patients in the home. Often normal phone lines are used to communicate directly between the patient and the center although some systems use the Internet.
- **Web-based e-health patient service sites** provide direct consumer outreach and services over the Internet. Under telemedicine, these include sites that provide direct patient care.

Potential Benefits of Teledentistry

Teledentistry offers innovative prospects in the delivery of dental care and has the potential to enhance the current practice of dentistry. However, teledentistry has been underused as a means of diagnosis and referral in dentistry. Through the exchange of clinical information over distances, teledentistry can facilitate the delivery of dental care in areas underserved by dental practitioners, and therefore overcome social and geographic barriers. A greater number of patients can be assessed and treated. Teledentistry has the potential to achieve the three fundamental benefits of telehealth and telemedicine:[11]

- **Improved access** – For over 40 years, telemedicine has brought healthcare services to patients in distant locations improving access and allowing physicians and health facilities expand their reach.
- **Cost efficiencies** – Adopting telehealth and telemedicine technologies have shown to reduce the cost of healthcare and increase efficiency through better management of chronic diseases, shared health professional staffing, reduced travel times, and fewer or shorter hospital stays.

- **Patient demand** – The greatest impact of telemedicine is on the patient, their family and their community. More than 15 years of studies have documented patients' satisfaction and support for telemedical services that offer access to providers and reduce the need to travel long distances.

Teledentistry has the ability to improve access to care, improve the delivery of health care, and lower its costs. Teledentistry can be a much needed resource for dental consulting, referral for specialized care, dental mentoring, dentist-laboratory communications, and continuing education.[12-19]

References:

1. Cook J. ISDN video conferencing in postgraduate dental education and orthodontic diagnosis. Learning Technology in Medical Education Conference 1997 (CTI Medicine). 1997:111–6.
2. Curts, EK. Exploring teledentistry – a new horizon in dental care? *AGD Impact.* 2009;37(7):34. Available at: http://www.agd.org/publications/articles/?ArtID=5798
3. Joshi V. Teledentistry: E-consultations. *Dentistry Magazine.* 9 February 2002. Available at: http://www.dental-consults.com/dentistry.html
4. Berndt J, Leone P, and King G. Using teledentistry to provide interceptive orthodontic services to disadvantaged children, *Am J Orthod Dentofacial Orthop.* 2008;134(5):700-6. Available at: http://www.nidcr.nih.gov/Research/ResearchResults/ScienceBriefs/Archive/archive2008/December/Teledentistry.htm
5. Douglas Manning, Florida State Oral Health Improvement Plan (SOHIP) Teledentistry Workgroup Chair, in the 2006 Florida Department of Health white paper Teledentistry as a Method to Improve Oral Health Access in Florida.
6. Glenn T. Clark, DDS, MS, Teledentistry: what is it now, and what will it be tomorrow? *J Calif Dent Assoc.* 2000;28(2):121-7. Available at: http://www.cda.org/Library/cda_member/pubs/journal/jour0200/now.html
7. Bauer JC, Brown WT. The digital transformation of oral health care: teledentistry and electronic commerce. *J Am Dent Assoc.* 2001;132(2):204-9. Available at: http://jada.ada.org/cgi/reprint/132/2/204
8. Chen JW, Hobdell MH, Dunn K, Johnson KA, Zhang J. Teledentistry and its Use in Dental Education. *J Am Dent Assoc.* 2003;134(3):342-46.
9. American Telemedicine Association Website. Telemedicine defined. Available at: http://www.americantelemed.org/i4a/pages/index.cfm?pageid=3333. Accessed on October 22, 2009.
10. Telemedicine report to Congress: executive summary. January 1997. Available at: www.ntia.doc.gov/reports/telemed/execsum.htm. Accessed October 22, 2009.
11. American Telemedicine Association. What is telemedicine & telehealth? Available at: http://www.americantelemed.org/files/public/abouttelemedicine/What_Is_Telemedicine.pdf
12. Kopycka-Kedzierawski DT, Billing RJ. Teledentistry in inner-city child-care centers. *J Telemedicine and Telecare.* 2006;12(4):176-82.
13. Sfikas PM. Teledentistry: legal and regulatory issues explored. *Am Dent Assoc.* 1997;128(12):1716-18.
14. Foke LE. Teledentistry: an overview. *Tex Dent J*. 2001;118(1):10-18.
15. Golder DT, Brennan DA. Practicing dentistry in the age of telemedicine. *J Am Dent Assoc.* 2000;131(6):734-44.
16. Allokian M. The neglected epidemic and the surgeons general report: a call to action for better oral health. *Am J Public Health*. 2000; 90(6):843-5.
17. Chang SW, Plotkin DR, Mulligan R, et al. Teledentistry in rural California: a USC initiative. *Calif Dent Assoc J.* 2003;31(8): 601-8.
18. Zeigler J. Telemedicine starts to pay off. *Bus Health* 1995;13(10):47-50.
19. Phase I clinical teledentistry evaluation, S.E. Dental Service Support Area. Available at: http://tdent.tatrc.org/ldl/nfpaper.htm. Accessed March 29, 2000

Teledentistry in Arizona
Section A / Chapter 3
The First Teledentistry Providers in Arizona

Five Arizona Teledentistry Provider Sites

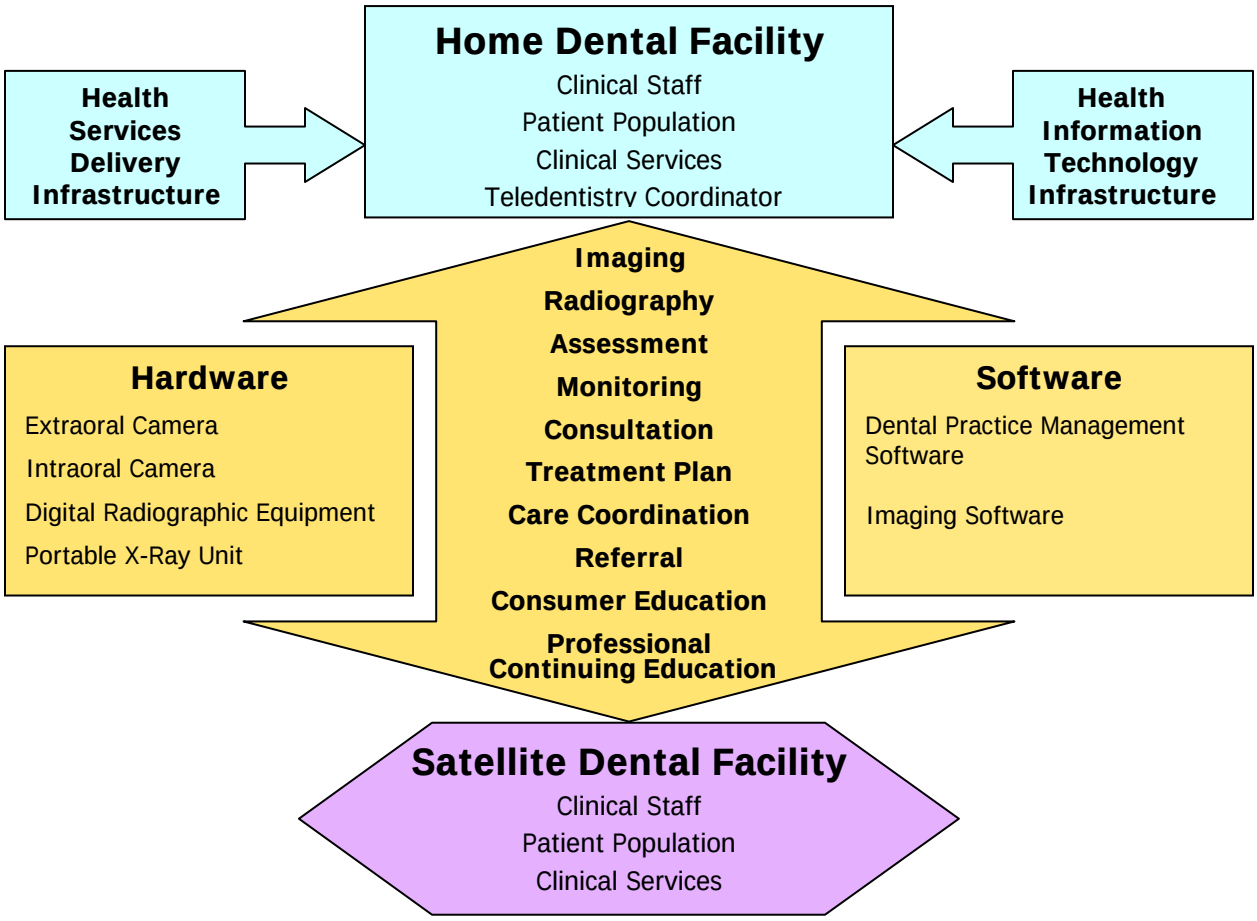
As of November 2009, five dental service delivery sites in Arizona are using teledentistry technology. These are the first Arizona teledentistry providers (see map below):

1. Hopi Health Care Center Dental Program (Hopi)
2. Northern Arizona Council of Governments Head Start (NACOG)
3. Northern Arizona University Dental Hygiene Department (NAU)
4. North Country HealthCare Dental Services in collaboration with Arizona School of Dentistry and Oral Health (NCHC/ASDOH)
5. Scottsdale HealthCare & Community Health Services, Neighborhood Outreach Action for Health Program (NOAH)

These Arizona teledentistry providers, located in rural and urban areas, are in the early stages of developing their teledentistry models. With the support of the HRSA workforce grant (2006-2009), teledentistry equipment, hardware and software programs, were purchased and installed. One of the sites went live with the technology in 2008; the other four sites went live in 2009. All providers will further integrate teledentistry technology into their dental practice and explore approaches to service delivery (e.g., community outreach efforts). These providers, using multiple sites to deliver dental services, have different practice settings such as a portable school-based program, a school-based fixed dental clinic, a community-based health center, and a private dental practice. The five teledentistry providers have identified barriers and indicated that more support and time are needed to advance teledentistry in their programs and practices.

A Framework for Teledentistry

The initial efforts for the first Arizona teledentistry providers varied in their focus of using the technology to build capacity in their program's dental service delivery. Each of the five providers contributed to learning one or more aspects of teledentistry and together supported the following framework for teledentistry.



A diagram for each of the initial Arizona teledentistry models is presented below. The models will evolve for each provider as teledentistry advances for their program.

Hopi Health Care Center's Teledentistry Model

The Hopi Health Care Center (HHCC), an IHS Service Unit, is a critical access hospital that offers diverse services including dental care to 28,000 eligible patients. The HHCC is centrally located on the Hopi Reservation. The HHCC School-based Preventive Dental Program, in full operation since September 2008, uses teledentistry to support diagnostic, preventive and temporary restorative care for children in all six elementary schools on the Hopi Reservation. The Teledentist is a pediatric dentist and the Teledentistry Coordinator is a dental hygienist with a MPH (a Commissioned Corp Officer with the USPHS, IHS Division). At each school, children are provided with dental services onsite (include x-rays, intraoral photographs, prophylaxis/scaling, fluoride applications, dental sealants, temporary fillings, oral hygiene instruction, oral health education, and sport mouthguards). Further care is coordinated with the HHCC dental clinic. The mobile dental program relocates to each of the six schools. The following is HHCC's teledentistry model.

Hopi Health Care Center (HHCC) – IHS Service Unit:

HHCC Dental Clinic

HHCC Dental Program

14-chair dental clinic

1 Pediatric Dentist (Teledentist); 4 General Dentists; 2 Dental Hygienists; 13 Dental Assistants; 1 Receptionist (all FTEs)

Visiting specialists, volunteer dentists and dental/dental hygiene students

Clinical services include preventive, restorative, oral surgery, prosthetic, periodontal, and endodontic care.

Information Technology

HHCC has its own IT Department to support teledentistry.

The Center uses a medical system (RPMS) to manage patient scheduling and billing.

Care Coordination

HHCC School-Based Preventive Dental Program coordinates care for all elementary school children with the HHCC Dental Clinic.

Teledentistry Hardware

Extraoral Camera
Acclaim Intraoral Camera
NOMAD Portable X-ray Unit
ScanX Duo Digital Imaging System

Teledentistry Software

Tigerview (imaging software)
Open Dental (practice management software)

HHCC School-Based Preventive Dental Program Serves 6 Schools on the Hopi Reservation:

Portable dental equipment is brought to the schools, allowing for two dental operatory set-ups at the school facility.

Northern Arizona University dental hygiene students and faculty also provide school-based preventive services.

School Based Preventive Program

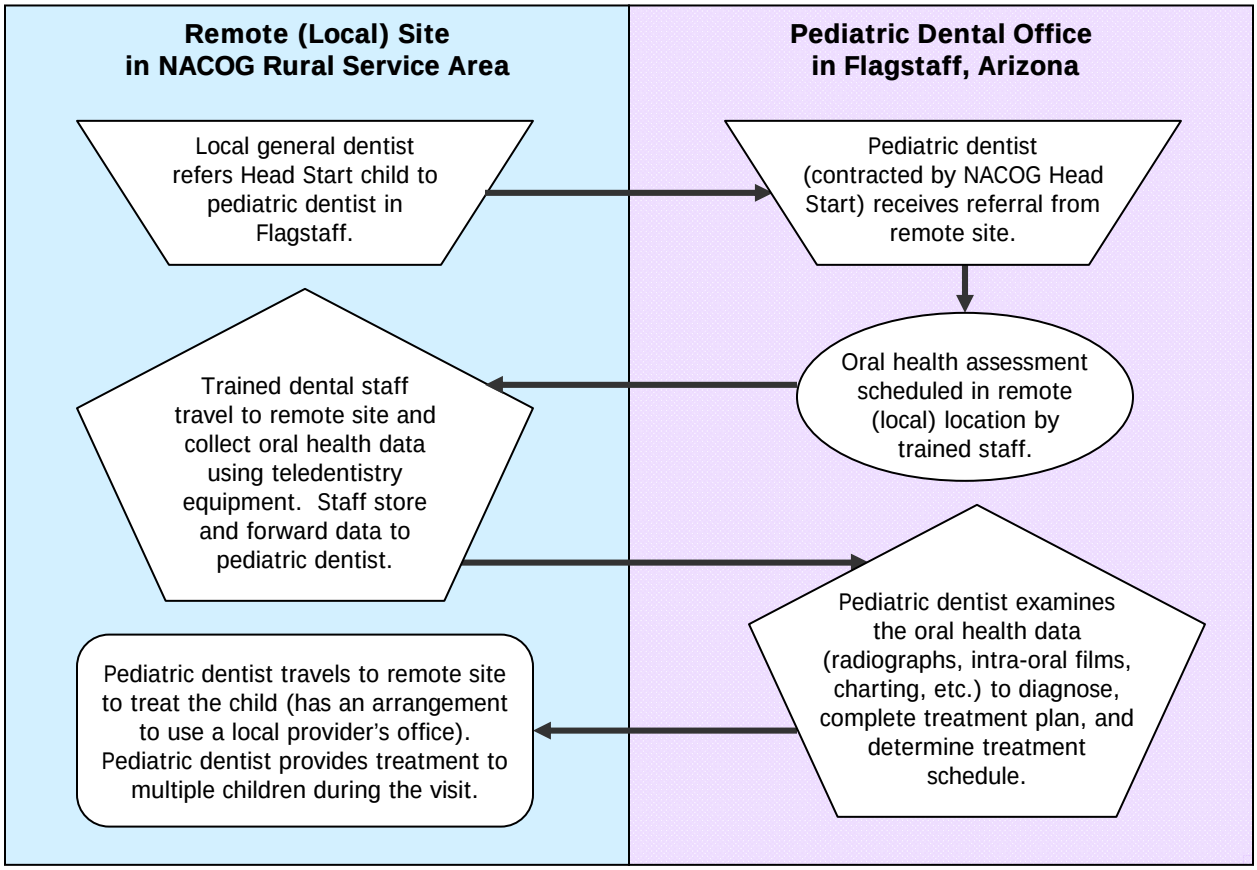
A dental hygienist collects oral health data that includes charting, digital radiographs and intra-oral films.

The data is stored and forwarded to the HHCC pediatric dentist for diagnosis and treatment planning.

Clinical services include diagnostic, preventive, and temporary restorative care.

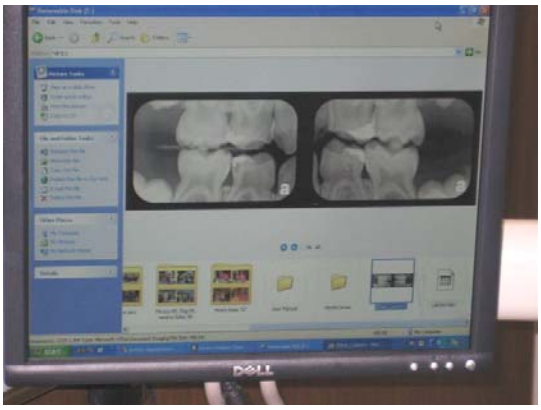
Northern Arizona Council of Governments Head Start's Teledentistry Model

Northern Arizona Council of Governments (NACOG) Head Start program is a non-profit organization providing comprehensive programming to low income children (birth to age five) and families throughout Apache, Navajo, Coconino and Yavapai counties. NACOG Head Start provides services to over 1,585 preschool age children and 124 prenatal moms, infants and toddlers at twenty-six local centers in the four county areas. The program is centrally managed from Flagstaff, AZ. NACOG Head Start's service area covers 27,000 square miles of rural northern Arizona not including the Navajo Nation. While eight of the centers are located within a thirty minute drive from Flagstaff, many centers are located one to more than three hours of drive time from Flagstaff (one-way travel). Currently children living in Navajo or Apache counties who require specialized services from a pediatric dentist must travel to either Flagstaff or Phoenix for care. The following model is NACOG Head Start's first initiative to integrate teledentistry into its program to address pediatric dental care.

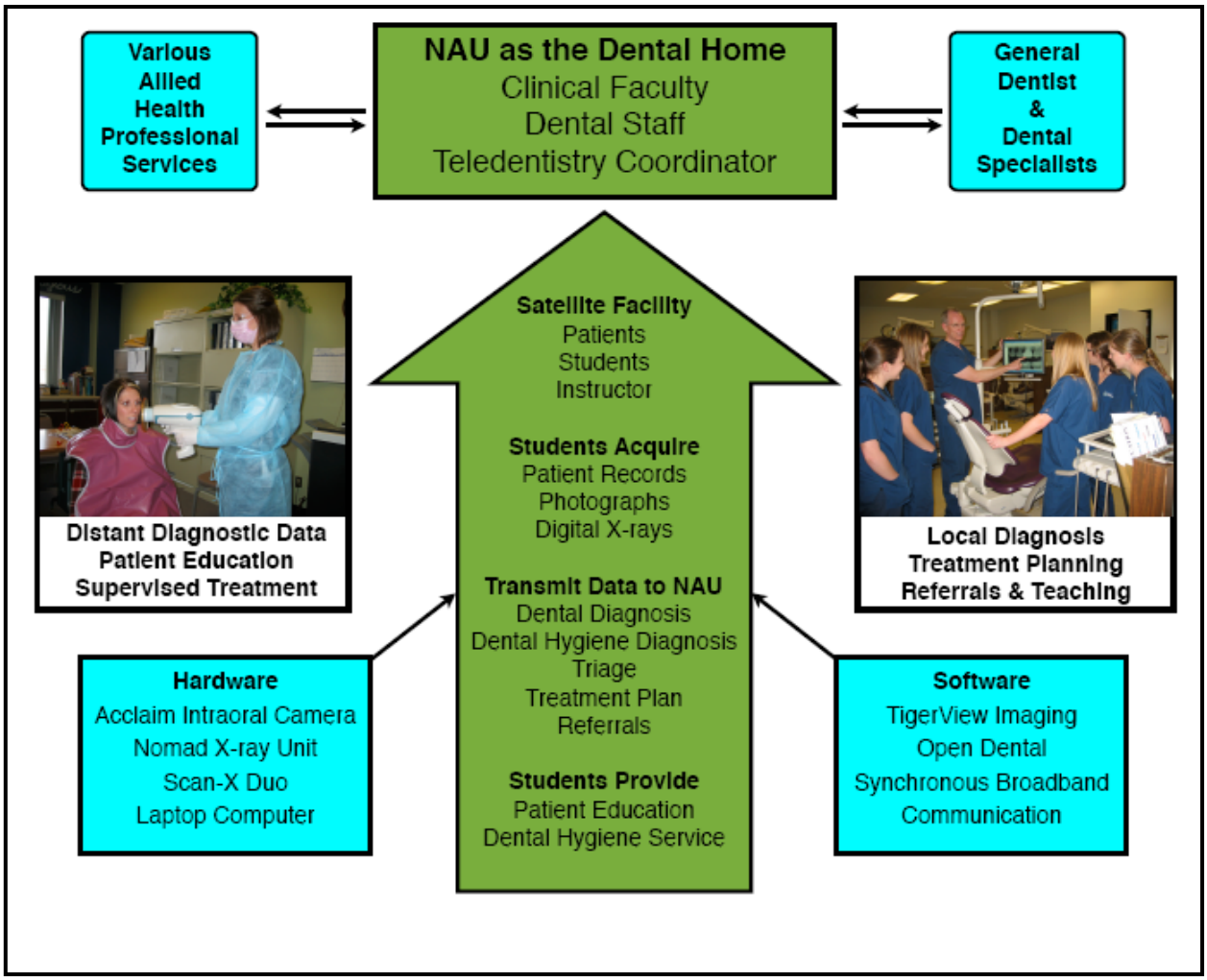


A parent and child having to drive to Flagstaff for a dental examination and one subsequent treatment visit with the pediatric dentist may mean 12+ travel hours and two missed work days with additional transportation cost. NACOG's teledentistry model reduces these barriers to care.

Northern Arizona University's Teledentistry Model



Utilizing technologies that currently exist, a board certified and licensed dental hygienist can collect and digitally transmit all subjective and objective diagnostic data to a distant dentist for diagnosis and prescription of dental hygiene services. Northern Arizona University (NAU) dental hygiene students are being trained to use such teledentistry technology to acquire and transmit charting, intra-oral films, radiographs, etc. to a distant supervising dentist. The NAU faculty dentist will receive all of the digital diagnostic data (including the student's dental hygiene diagnosis), make a dental diagnosis, develop a dental hygiene treatment plan with the distant student, and provide appropriate referrals. Dental hygiene services will then be provided under direct faculty supervision by the student. The patient will be referred as directed by the distant dentist. Teledentistry broadens the scope of dental hygiene practice by allowing properly trained dental hygienists to provide services to new and existing patients of record in underserved communities. The following is NAU's teledentistry model.



North Country HealthCare and Arizona School of Dentistry & Oral Health's Teledentistry Model

North Country HealthCare (NCHC) provides comprehensive, preventive primary care, dental care, outreach programs, and training/education services to people of Northern Arizona. Ten NCHC sites accept Medicaid and offer a sliding fee-scale. Patients range from the very young to seniors, including individuals with special needs as well as the mentally and physically challenged. The NCHC and Arizona School of Dentistry and Oral Health (ASDOH) at A.T. Still University have established a collaboration to integrate teledentistry for the care of patients with special needs and for professional development. ASDOH maintains a Special Care Dental Clinic. Teledentistry will be used to support the care of patients with special needs, allowing NCHC providers to consult with specialists at ASDOH. NCHC is also a training site for the Lutheran Medical Advanced General Dentistry Program, ASDOH and Northern Arizona University Dental Hygiene Program. Teledentistry will be integrated into the training for residents/students and to provide professional continuing education that targets the NCHC telemedicine network/satellite sites. The following NCHC/ASDOH model illustrates the integration of teledentistry:

Health Service and Information Technology (IT) Infrastructure

- North Country HealthCare Dental Clinics
- AZ School of Dentistry & Oral Health Special Dental Care Clinic
- A.T. Still University IT Department
- North Country HealthCare Health IT Director

North Country HealthCare Dental Services

Teledentistry Coordinator
Dr. Kimberly Barnes
Dental Clinic Director

3 Dental Clinics and 5 Staff Dentists

Patients
Children & adult patients including patients with complex medical conditions & special needs

Clinical Services
Full scope of dental care

Training/Rotations at North Country Dental Clinic

Lutheran Medical Advanced General Dentistry Residents

Arizona School of Dentistry and Oral Health Students

Northern Arizona University Dental Hygiene Students

Additional Providers/Facilities

Telemedicine provider network at ten NCHC satellite sites

Hardware

Acclaim Intraoral Camera
ScanX Duo Imaging System

Imaging
Radiography
Assessment
Monitoring
Consultation
Treatment Plan
Care Coordination
Referral
Consumer Education
Professional Continuing Education

Software

DENTRIX
(practice management software)

AZ School of Dentistry & Oral Health at A.T. Still University

Teledentistry Coordinator
Dr. Maureen Romer
Director of Special Care Dentistry

Special Care Dental Clinic
Provides comprehensive dental care to patients with special needs throughout the state.

ASDOH Faculty
Provides consultations to staff dentists, residents and students.

ASDOH Dental Students
Rotations at North Country HealthCare will include training in treating patients with special needs and teledentistry

Professional Continuing Education
Provides presentations and training workshops.

Neighborhood Outreach Action Health Program's Teledentistry Model

Scottsdale HealthCare, a hospital system, operates two health care centers as part of its community outreach, the Neighborhood Outreach Action for Health Program (NOAH). A dental clinic is set up in each center as NOAH's commitment to integrate oral health into primary care. All children seen in the adjacent medical clinic are given a dental appointment after their well-child visit. NOAH provided 2,500 preventive dental visits in 2008-2009. Initially, teledentistry will be integrated into the NOAH system: (1) to share radiographs and intra-oral photographs with specialists for patient referrals, and (2) for care coordination with the two NOAH dental clinics to improve time management and efficiency for care delivery since the dentists are part-time at both sites. Currently, NOAH is calibrating the dental team's use of teledentistry: the affiliated practice dental hygienist collects oral health data for the dentist to diagnose and complete a treatment plan. As NOAH dental services expand, teledentistry will become an integrated part of community outreach efforts. The following model illustrates NOAH's initial teledentistry integration into its school-based and school-linked dental services.

NOAH Health Service Infrastructure
NOAH is part of the Community Outreach for the Scottsdale Healthcare Hospital System. The entire hospital infrastructure is available for support services.

NOAH Information Technology Infrastructure
The Scottsdale Healthcare hospital system's Information Technology Department provides support to the NOAH clinics and teledentistry.

School-linked Dental Clinic at Paiute Neighborhood Center

Clinical Staff
Affiliated Practice Dental Hygienist
Part-time Dental Hygienist
Part-time General Dentists
Dental Assistant

Patient Population
Prior 10/2009: children age 0-18
As of 10/2009: Children <age 21

Clinical Services
Preventive & restorative care

Support Services
Transportation (taxi) for families

Hardware
Acclaim Intraoral Camera
NOMAD Portable X-ray Unit
ScanX Duo Imaging System

Imaging
Radiography
Assessment
Treatment Plan
Monitoring
Consultation
Care Coordination
Referral

Software
Tigerview (imaging software)
Open Dental (practice management software)

School-based Dental Clinic at Palomino Elementary School

Clinical Staff
Affiliated Practice Dental Hygienist
Part-time Dental Hygienist
Part-time General Dentists
Dental Assistant

Patient Population
Prior 10/2009: children age 0-18
As of 10/2009: Children <age 21

Clinical Services
Preventive & restorative care

Support Services
Transportation (taxi) for families

Portable Dental Equipment
Participation in the state's dental sealant program

Additional Dental Care Providers for Referrals
Oral Surgeon / Orthodontist / Pedodontist for sedation services

Teledentistry in Arizona

Section B

Teledentistry Technology:

Lessons Learned

Teledentistry in Arizona
Section B
Installation of Hardware & Software: Lessons Learned

Technology and Equipment for Designing a Teledental Model

There is not a recommended list of equipment, hardware or software for designing a teledental model. As with many technologies today, there is an array of choices. Having so many choices can be better; resulting in improved performance, functionality and price competition. Choosing equipment and technology requires objective detailed research on the part of the purchaser. The decision of which approach to take will depend on many factors including: budget, technology infrastructure, and type of dental services to be delivered. These factors will determine the choices of teledentistry equipment, hardware and software.

Teledentistry is about delivering data from one point (spoke site) to another point (hub site) using telecommunications technology. There is a wide-variety of technologies available to users which can go into the design of a model. These technologies are constantly changing and advancing. When making decisions of what to include in the model one should choose systems and equipment that are not soon to be obsolete and can be easily integrated and adapted with current and emerging technologies.

Components that factor into designing a teledental model include: information technology (IT) infrastructure, networks, telecommunication services, data security, real time video conferencing vs. store and forward communication, and comfort with technology. The following attempts to review the necessary minimal components in the establishment a teledental model and factors to consider when choosing the technology.

1. Information Technology (IT) Infrastructure

IT infrastructure of telecommunications equipment and staff will play a critical role in the success of the teledental model and will impact the selection of methods and technologies. To be successful in implementing a teledental model, having a team approach and building on all resources is critical. Having a strong IT Infrastructure will ensure that the technical structures that support such a model, such as IT staff, networks, computer systems, software and hardware, will enable and support the basic requirements that are needed for the operation of a successful model.

2. Networks

Networks will play a critical role in the transmission of patient data. There are two basic types of computer networks; a local area network (LAN) and a wide area network (WAN). A LAN, also known as the Intranet, connects computers in a building, agency or company together. This allows computers the ability to communicate with each other and also share equipment such as printers, servers, and routers. A Wide Area Networks or WAN, also known as the Internet, connects LANs to other LANs so they can communicate. Computers may be connected using wired or wireless telecommunication connections and a device

known as a router. Other networks to consider include: private networks, public networks and virtual private networks (VPN).

3. Telecommunication Services

Telecommunication services refer to the media used to link computers together. These may be supplied by a wired service or a wireless service. The availability of these services will vary by locale, with fewer options available in remote areas. In addition, the costs of these services vary greatly; the higher the speed of data transmission the higher the associated costs. The most common telecommunication services are through telephone lines, twisted-pair cable, coaxial cable, and fiber-optic cable. Others include infrared light, radio waves, satellites, and additional wireless communication equipment.

4. Data Security

Models should address data security to ensure that data is kept safe from corruption and that access is controlled to ensure data integrity. Software and hardware systems allow for encryption of data to prevent data from being stolen. Hardware based security systems are more secure than protection provided by operating systems that can be vulnerable to outside attacks by viruses and hackers. Backups are also included as part of data security to ensure that data is not permanently lost and can be recovered at moment's notice.

Data security for teledentistry must address Health Insurance Portability and Accountability Act (HIPAA) compliance. Each model must consider whether or not they fall under the umbrella of the HIPAA. This will help to determine the scope of data security needs. HIPAA provides guidance on most privacy and security issues in health care and seeks to streamline electronic medical record systems while protecting patients, improving health care efficiency, and reducing fraud and abuse. HIPAA's privacy rule deems that any "individually identifiable health information" in any form or medium is to be protected health information (PHI). This information includes, but is not limited to: name, address; date of birth; social security number; payment history; account number; health care provider and/or health insurance plan. HIPAA's privacy rule applies to health providers including dental providers, health plans, and health care clearinghouses that transmit PHI in any form or medium, including electronic, paper, or oral.

Telehealth encounters and consultations are transmissions of protected health information. Protected health information can potentially be sent anywhere in the world in a matter of seconds. HIPAA requires that health care providers protect this individually identifiable health information. Therefore telehealth systems should have security measures such as encryption and dedicated lines where possible that are part of the system. Moreover, HIPAA requires that health care providers obtain consent prior to using or disclosing protected health information to carry out treatment, payment or other health care operations. Before a teledental encounter or consultation takes place, the patient must be made aware of and give his or her consent to the fact that teledentistry involves the electronic transmission of his or her protected health information.

5. Real Time Video Conferencing vs. Store and Forward Communication

Technologies that use real time interaction require broadband connections which is a complex and costly technology. Store and forward communication can be managed successfully with relatively low cost intermediate data storage devices. Such devices include but are not limited to: hard drive, flash drive, jump drive, CD, or DVD**.** Flash drives,

which are removable and rewritable intermediate devices, continue to increase in storage capacity ranging from a few megabytes to multiple gigabytes. Some flash drives allow for multiple write and erase cycles and have 10 year data retention warranties. Flash drives can be used to transport and store personal files such as digital x-rays, patient data, extra-oral photos, and videos. Some flash drives allow for excellent data security using biometrics and encryption. All these factors must be thoroughly researched when selecting technologies.

6. Comfort with Technology

When considering technology, account for training and adaptability to current operators' levels of comfort with new and emerging technologies. In addition, as users of the technology are replaced, systems need to be in place for continued training of new staff. Additionally, training may need to be considered as upgrades are made to systems.

Teledental Application Software

Teledental application software allows the user to accomplish tasks necessary for the acquisition and organization of patient health information. There are two necessary application software components: dental management software and imaging software. The following are factors to consider when choosing application software.

1. Dental Management Software

Dental management software is a tool used to in the delivery of dental services. It allows for the electronic collection and exchange of patient data and the management of typical office or company activities. There are four components to consider when choosing management software.

- Dental records – allows for the collection of data critical in the clinical management of patients, including patient charts and histories.
- Dental billing – may be a factor in choice of software. The billing and revenue component of management software allows for the management of patient financial records.
- Appointment scheduling – management of appointments and scheduling can be a part of the management software. The software is designed to track patients from the moment they are entered into the system and also tracts missed, rescheduled, and canceled appointments.
- Reporting Requirements – Most dental management software has built in reports. If custom or ad hoc reports are required, accommodations must be made to factor in those reports.

Site Choices: After exploring several dental management software packages, Open Dental was chosen through close consultation with IT staff. Open Dental has several advantages for use in these sites. Open Dental is licensed under the GNU, General Public License (GPL), the standard open source license. This license ensures that the software will always remain free increasing sustainability for sites. The GPL requires that the database structure and source code be available and freely modified. This

allows sites to modify the database according to their specific needs. In addition, Open Dental also allows an unlimited number of copies to run on computers without any licensing restrictions or dongles. It utilizes MySQL as the database which is also free software. Open dental will also provide for installation, support and free upgrades for one year. These functions provided for in Open Dental have not been identified in other proprietary dental management software companies. Transfer of image files occurs through store-and-forward technique utilizing CD's, flash drives or secure email. Dental management records can be accessed via Virtual Provider Network (VPN).

2. Imaging Software

In order to view digital images captured through digital radiography, a software program is needed. Some management software comes with the built in imaging software and some management software requires a separate purchase. The selection of imaging software will depend on the management software and its ability to bridge or connect with the management software.

Site Choice: Televere's TigerView Professional package was selected because of the ability to integrate with the existing dental hardware and its capability of bridging to Open Dental software. In addition, TigerView was an affordable option that offers state-of-the-art digital imaging with predefined templates and the ability to enhance, zoom, magnify and measure images. TigerView also provides for installation, on-site training and comprehensive technical support.

Teledental Equipment

This manual is not intended to be an all inclusive list but rather a set of basic components that were used in the teledental prototypes. Equipment requirements will depend on the dental services to be delivered and the facility being equipped. Hub sites will be different from spoke sites. Hub sites may only require viewing technology, whereas spoke sites require the capabilities of capturing digital photos and implementing dental procedures. There are many choices of manufacturers and models and it is not the intent of this manual to promote or recommend one over the other.

The following are basic characteristics to consider when selecting teledental hardware and software technology.

- Accessibility - the level of access to the vendor is critical in terms of training, support, upgrades and maintenance. Vendor access will factor into the overall price of the item. The more support required by the user results in higher associated costs.
- Compatibility- teledental technologies should be compatible with current in-office systems including operating systems, software, hardware and equipment.. For example, if purchasing particular software one needs to consider the current operating system and the software's ability to bridge or communicate with other in-office software.
- Scalability – the technology should be capable of migrating into expanded capabilities without requiring total replacement. Additionally, features and functions should be available as options rather than impacting the base cost of the technology.

- Reliability – or the ability of a technology to perform and maintain its functions is vital in delivering dental services. Networks and equipment should work as intended and the user should be assured that the equipment will perform as needed without operational error. If and when equipment requires maintenance, the system should insure that it can be reliably serviced with minimal downtime.

Teledentistry sites require some or all of the following basic equipment:

1. Extraoral Digital Camera

Extraoral cameras are used for the digital acquisition of photos of the face, lips, profile, and anterior teeth. They are good for documentation of lip lesions and trauma. They are also effective as a reference to linking the patient's photo with their record. Extra-oral cameras come in many forms from the very simple point and shoot models to more complex professional models. The more complex the camera model; the more expensive the camera.

2. Intraoral Digital Camera

Intraoral wand cameras are used for digital documentation of intraoral features. They are especially effective because of the high intensity light and magnification capabilities. Qualities to consider when purchasing an intraoral camera include: weight, built in lighting, handling ease, auto-focus capabilities, and integration with dental imaging software. Intraoral cameras are used for capturing still pictures of individual carious lesions, soft tissues, hard to reach areas, and are excellent for locating early white spot lesions. Some cameras also allow for capturing video images.

Choice of Sites: The camera of choice for the teledental sites was the Air Techniques' Acclaim USB Intraoral Camera. It provided for superior clarity and sharpness of intraoral photos. It is a single hand manipulation and also its flexible shape makes it easily portable.

3. Videoconferencing System

Videoconferencing systems will not be discussed in this volume as the teledental models did not advance to the point of implementing live video conferencing.

4. Digital Radiographic Equipment

There are 3 ways to obtain digital radiographs:

- Converting traditional radiographic films to digital images via a film scanner.
- Photostimulable phosphor (PSP) plates or phosphor plate technology – radiographs are taken using a phosphor plate to store the image, the plate is then fed through a scanner and read by a laser which produces an image which is viewable on a computer.
- Sensors known as CCD (charged-coupled device) powered device or direct digital technology – radiographs are taken using digital sensors and the image is immediately shown on a computer screen.

Pros and Cons: Scanning traditional radiographs requires all the elements of traditional radiograph processing which includes chemicals, processors and supplies. The portability of this equipment is not conducive to moving from site to site. Phosphor plate technology is somewhat slower than sensor technology in that it requires an additional step of running the plate through the scanner and in some cases erasing the plate. However, phosphorus plate technology is less expensive from start-up costs to replacement costs. At the time of this project the phosphorus plate technology allowed for greater adaptability to child size radiographs. In addition, it was much less costly to replace phosphorus plates than sensors when damaged.

Site Choices: The PSP technology was selected for use at all partner sites. Specifically, Air Techniques' ScanX Duo was chosen for acquisition of intra-oral digital radiographs. The ScanX uses the phosphor storage plate as the receptor. The ScanX system works with existing x-ray equipment and provides for an easy, fast, and flexible system that can deliver diagnostic-quality images in a complete range of sizes. These plates mimic a traditional dental film and are available in sizes 0, 1, and 2. These sizes are much more compatible with younger children which is the primary population served at the partner sites. It provides for an ultra-thin, wireless, flexible film that is reusable thousands of times. It is relatively inexpensive and could easily be replaced once funding is no longer available. Because of its size and weight the ScanX is very portable. Providers can easily transport the equipment as needed. The ScanX also provides for in-line erase, thereby saving time and eliminating the extra step that is required of some systems.

5. Portable Dental Radiographic System

A portable x-ray source is needed at remote sites that are not equipped with traditional dental x-ray equipment.

Site Choices: Portable x-ray technology was needed for two sites. The Nomad Portable Hand-Held X-Ray was chosen. In addition to cost as a major factor, the Nomad offers cordless operation, a rechargeable battery pack which allows more than 100 exposures on one battery charge. It comes in an easily transportable case with pull-out handle and wheels and weighs only nine pounds.

6. Laser and Fluorescence Caries Detection Devices

There are current and emerging technologies such as laser fluorescence that are designed to assist the dentist in interpreting visual cues in detecting dental caries. Findings of studies however indicate that these technologies result in the detection of early carious lesions that may result in an increased likelihood that a potentially sound surface will be filled.[1] [2] [3] [4] For purposes of this project these devices were not used.

7. Computer

[1] . Bader JD, Shugars DA, Bonito AJ. Systematic reviews of selected dental caries diagnostic and management methods. J Dent Educ 2001; 65(10):960-968.
[2] Bader JD, Shugars DA, Bonito AJ. A systematic review of the performance of methods for identifying carious lesions. J Public Health Dent 2002;62(4):201-213.
[3] . Bader JD, Shugars DA. A systematic review of the performance of a laser fluorescence device for detecting caries. JADA 2004;135(10): 1413-1426.
[4] Zandoná AF, Zero DT. Diagnostic tools for early caries detection. JADA 2006;137(12):1675-1684.

Every teledentistry site, whether a spoke or hub site, must be equipped with a computer. The computer can be either a laptop or desktop computer. Laptop computers are much simpler to transport and store than desktop computers. The following is a list of minimal computer requirements. It is important to note that these minimal requirements may become obsolete at any moment:

- CPU Speed: 2.8 GHz Pentium 4
- Operating System: Windows 2000 Service Pack 4 or Windows XP Service Pack 1 w/Microsoft knowledge base KB822603 update
- System RAM: 1 KB
- Hard Drive: 80 GB
- CD-ROM Drive: 48x
- Video Display Adapter: 64 MB RAM
- USB Ports: Must be USB 2.0.

Along with the many choices of equipment and technologies, the purchaser must be aware that the standard of today may be the dinosaur of tomorrow. Many of the pieces of equipment, technology and software discussed above may become obsolete or have gone through several upgrades by the time this reaches the reader.

Definitions

Below are definitions used throughout the manual.

Broadband – Refers to telecommunication in which a wide band of frequencies is available to transmit information.

Bandwidth – Is a primary factor in the performance of a network. Wider bandwidth allows for greater information carrying capacity. Bandwidth is supplied by wires, cables, radio waves or satellite transmission. The more sophisticated the bandwidth, the more complex the telecommunication can be. Bandwidth is also positively correlated with cost.
Standard phone lines can support some teledental applications but higher bandwidth technologies are required for more advanced procedures.

Hub site – Is the location of the teledental consulting provider receiving the electronic data.

Media – Refers to the material used to link computers together via a network.

Real time – The interactive, two-way transfer of information and oral health data, occurs at two sites simultaneously: the hub site and the spoke site.

Spoke site – Is the location where the patient is receiving the service and from which the data is being transmitted.

Store and forward – The transfer of patient data from one site to another through the use of an intermediate station. The intermediate station is a data storage device such as a hard drive,

flash drive, jump drive, CD, or DVD. The patient data is is sent to an intermediate station where it is kept and sent at a later time to the final destination.

Teledentistry – The practice of health care delivery, diagnosis, consultation, and treatment with the transfer of oral health data through interactive audio, video or data communications that occur in the physical presence of the member.

Videoconference – Is a live connection that provides transmission of images and text between people located in separate facilities for the purpose of communication. The connection can be site to site or among multiple sites. In its most advanced form, it can provide transmission of full-motion video images and high-quality audio between multiple locations.

Teledentistry in Arizona

Section C

Care Delivery Supported by Teledentistry: Lessons Learned

Teledentistry in Arizona
Section C / Chapter 1
Teledentistry in a School-Based Preventive Program

Chapter contributed by:
Hopi Health Care Center Dental Program

BACKGROUND

The Hopi people occupy more than 1.5 million acres of reservation land they call home. The land is beautiful and vast, set on three Mesas across desert terrain in northern Arizona. Most families living on the reservation receive some type of government assistance and the majority of children are eligible for Medicaid.

Children on the Hopi reservation experience a much higher rate of tooth decay than the national average. The 1999 Indian Health Service (IHS) Oral Health Survey revealed that in the service area where the Hopi people live, 65% of the children age six to fourteen had tooth decay experience. This service area ranked as having the second worst rate of tooth decay of all IHS areas in the United States. A 2007-2008 local assessment showed that of 355 children, ages five to twelve, 87% did not have a current dental exam (within the past 18 months), 84% needed dental sealants, 78% had untreated tooth decay, and 27% had urgent treatment needs (e.g., having an abscess).

Oral health services for the Hopi people are provided by the IHS at the Hopi Health Care Center (HHCC) in Polacca, Arizona. The HHCC Dental Program has a 14-chair operatory clinic currently staffed by four full-time general dentists, one full-time pediatric dentist, two full-time dental hygienists, thirteen dental assistants, and one receptionist. The dentist provider-to-patient ratio is well below the IHS recommendation and national average.

Typically, Hopi children have episodic care and do not visit the dental clinic until there appears to be an immediate need. The lack of regular preventive care, early diagnosis and treatment often result in more invasive dental procedures and poor prognosis for the affected teeth. Furthermore, Hopi children and families experience barriers to accessing oral health services. These barriers include lack of adequate number of dental providers, geographical distance, and lack of transportation. Limited communication between the dental clinic and patients (or their parents/caregivers) makes care coordination and scheduling difficult because not all patients have telephones and there is no mail delivery to their residence.

High tooth decay rates, episodic dental care visits, barriers to accessing dental services and risk factors demanded careful assessment and evaluation of the dental services delivery system and additional solutions to improve the oral health of the Hopi children. This led to the HHCC Dental Program establishing a mobile school-based preventive dental program.

SETUP AND ACTIVITIES

A Pilot School-based Dental Program

Prior to 2008, elementary schools on the Hopi reservation transported students by bus to the HHCC dental clinic for preventive care. Organized by grades, a group of approximately 30 students was brought to the dental clinic and stayed from 9 a.m. to 1 p.m. before returning to the school. During the 4-hour period, each student had a dental visit for 30 to 45 minutes receiving a prophylaxis (teeth cleaning), dental sealant placement, and fluoride application. All elementary schools on the reservation were concerned that this arrangement required a child to miss too many hours of classroom time. The HHCC Dental Program was also concerned with missed classroom time, as well as students who did not get preventive care due to being absent or not having a permission slip, the limited amount of services due to the time constraints, and the very low number children returning for a complete examination and restorative treatment. The dental clinic was able to provide care to only 63% of the total students from the five schools transporting them; one school declined to transport the children to the clinic due to missed school time.

In 2008, the Hopi Health Care Center (HHCC) submitted a proposal to the Inter Tribal Council of Arizona (ITCA) requesting portable dental equipment to develop a new school-based program and was awarded. A pilot school-based dental program was initiated in March 2008 at one of the Hopi elementary schools. The goals of the pilot were to: 1) determine how the program needs to be managed, 2) determine how the scheduling of students could be efficient, 3) identify the challenges in transporting and setting up of portable equipment, and 4) identify missing components for a comprehensive program.

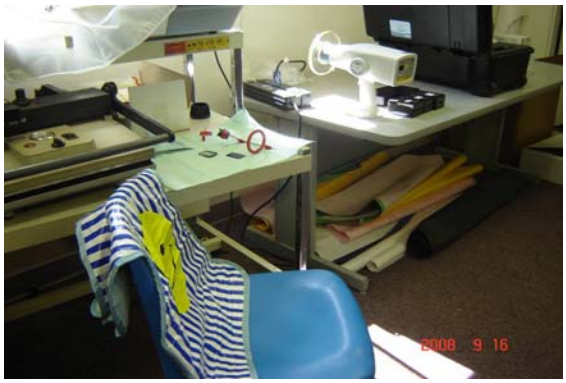
The pilot program had only one portable dental operatory setup and utilized one dental hygienist and two dental assistants from the HHCC Dental Program. The dental hygienist is a Commissioned Corp Officer with the U.S. Public Health Service (USPHS), IHS Division and provides dental care under federal guidelines on Indian reservations. The IHS is congressionally mandated to provide oral health services to members of federally recognized tribes on sovereign land following federal guidelines regarding services provided, state licensure, and billing issues. Services provided at the pilot school consisted of dental screenings, prophylaxes/scalings, dental sealants, and fluoride applications. Each parent received a follow-up letter in the mail with recommendations to visit the HHCC dental clinic to provide his/her child with a complete examination. HHCC does not require an advance appointment for a dental exam; parents can bring their child and walk-in for an examination.

Use of Teledentistry

In 2008, the HHCC Dental Program collaborated with the Arizona Department of Health Services Department, Office of Oral Health (OOH) to participate in the teledentistry project. The HHCC Dental Program recognized the advantage of using teledentistry technology for the school-based preventive dental program. Teledentistry, using information technology and telecommunications for consultation, education and dental care, and exchanging clinical information and intraoral images over remote distances, would have a good fit to the operation of the school-based program. The Hopi Health Care Center Dental Program was chosen to be a teledentistry provider and the grant provided a portable digital x-ray unit, intraoral camera, digital film, digital film scanner, and dental imaging and management software for the school-based preventive dental program.

Expansion of the School-Based Program

With the school-based program receiving additional portable dental equipment and teledentistry equipment, the program was expanded to provide greater access and higher efficiency in delivering dental preventive services. A justification was presented to the HHCC administration to hire an additional dental hygienist based on revenues generated from increased dental services delivered to Medicaid children. The new dental hygienist and the current dental hygienist would provide periodontal treatment in the dental clinic and staff the school-based program. As a result, the HHCC administration approved the hiring of a full-time dental hygienist.



In September 2008, a comprehensive school-based preventive dental program was launched. An agreement between schools and the HHCC was put into place making the schools an extended setting for the HHCC Dental Program to deliver services. In order for a school-based program to work, there needs to be an understanding with all those involved. A Memorandum of Agreement (MOA) was established with each school outlining the school's responsibilities for participation in the program. School responsibilities included: provision of a space for delivering treatment and secured storage of equipment when not in use; coordination between students and the program flow for the day; access to school internet services; and follow up with parents for consent forms and for additional dental care needed by their children.

The expanded staff for the school-based preventive dental program now includes:

- A teledentist who is the pediatric dentist at the HHCC dental clinic.
- A primary provider of preventive dental services who is a dental hygienist and a Commissioned Corp Officer of USPHS, IHS Division. The dental hygienist also serves as the HHCC teledentistry coordinator who spearheaded the development of the school-based program and its use of teledentistry.
- Dental hygiene students from Northern Arizona University, along with a faculty member, who provide preventive services in the program.
- A dental assistant who rotates to the school program on a volunteer basis.

The expanded school-based program will target five to fifteen year old Native American school children in all six elementary schools on the Hopi reservation. Enrollment for all of the Hopi elementary schools is approximately 790 students.

During the school year, the school-based dental program operates two days per week. Consent forms are sent home in advance. Students with consent are seen for dental preventive services by grade and classroom. Approximately 15 to 20 students are seen each day (from 9 a.m. to 3 p.m.) and each child is seen for approximately 45 minutes to one hour. Typically, each student receives one dental visit at the school site for the preventive services unless additional follow-up is needed. Other treatment needs are scheduled at the HHCC dental clinic. When the school-based program has treated all students with parental permission for preventive dental care, the mobile program then moves to another school.

Each school has a designated area to set up the program's portable equipment. The equipment is set up into three stations – two for treatment and one for x-rays and intraoral photographs. The portable dental and teledentistry equipment is stored on-site at each school.

Children rotate through the x-ray station and then to one of the treatment stations. Children receive the following services from the school-based dental program: x-rays, intraoral photographs, examinations supported by teledentistry (the dental hygienist collects the oral health assessment data and the teledentist completes the diagnosis and treatment plan for each child), prophylaxis/scaling, fluoride applications, dental sealants, caries stabilization (using glass ionomer fluoride-releasing materials as temporary fillings), oral hygiene instructions, oral health education (including tobacco, nutrition and safety), and sport safety mouthguards. A follow-up letter with treatment and referral recommendations is mailed to the parent. When treatment is completed, the child returns to class and provides the teacher with the name of the next student for dental care. Students are out of the classroom for only the time needed for their individual preventive treatment needs.

Teledentistry is used to support the service delivery. The dental hygienist collects the oral health assessment data including digital x-rays, intraoral photographs and charting. The data is stored and forwarded (transmitted through a secured and encrypted channel) to the teledentist for diagnose and treatment planning. When real-time consultation with the teledentist is needed, a VPN line allows the dental hygienist in the field to connect to the HHCC patient management system (RPMS) via an encrypted and secure avenue. Patient information is sent to a secure location to be shared by identified users. The teledentist is able to review the information and provide a consultation.

This school-based preventive dental program utilizes a multidisciplinary approach with school nurses, school substance abuse counselors, and public health nursing (home visits for urgent cases). The program involves teachers, parents, students and the community. Oral health topics are also shared with teachers to help them develop lesson plans.

OUTPUTS AND OUTCOMES

For school year 2008-2009:

- 5 of 6 elementary schools participated in the school-based program
- 607 students were enrolled in the 5 schools
- 533 of 607 (88%) students were seen by the school-based dental program

Dental needs data showed:

- 371 (70%) had untreated decay
- 444 (83%) needed sealants
- 451 (85%) did not have a current dental exam (within the past 18 months)

Each of the 533 students seen by the school-based dental program received x-rays, an examination supported by teledentistry, a prophylaxis, and a fluoride treatment. There were two parents that requested no fluoride application. Caries stabilization was provided on 203 teeth and 2,076 sealants were placed.

When this school-based model was presented to the school administrators and teachers, there was no hesitation in wanting to move forward. Teachers commented that they are under a tremendous amount of pressure to meet testing standards and appreciate the fact that HHCC was looking for a way to decrease the amount of school time being taken to provide dental care. The teachers absolutely value the dental service for their students (they realize the amount of school time missed due to dental problems), so finding a good balance worked for all.

Schools are responding well to the dental program. For the new school year 2009-2010, all of the six elementary schools will be participating in the school-based program. The increase from five to six schools will add approximately 200 students to the program. The program will also increase from two to three days a week in delivering preventive services at the schools.

The new school-based preventive dental program, that started full operation in September 2008, has provided these benefits:

- Prior to 2008, 4 hours of school time per child was missed for limited services. In the school year 2008-2009, the dental program took a child out of class for only one hour and delivered more preventive services. At the early part of the school year 2009-2010, the program already decreased the average “out of class” time to 45 minutes.
- Prior to 2008, 63% of the students were seen. In the first year of the dental program, 88% of the students were seen. In its second year (school year 2009-2010), the program received parental consent for 100% of the children for the first scheduled school; the program completed care for all the students in October 2009. The program provided treatment for 97% (107) of the school’s children. Only 3% (7) parents opted out of the program because their children were in current dental treatment or had just completed their treatment.
- Prior to 2008, five dental providers dedicated four hours per week to seeing school-aged children at the HHCC dental clinic. Currently, an additional 20 hours a week (one hour per provider) is available for other dental services because the children are receiving preventive care onsite at their schools.

A quality assurance (QA) assessment was conducted since the use of teledentistry is new to all involved from the HHCC Dental Program. HHCC wanted to see how the teledentistry examinations compared to a dentist’s traditional examination (an in-person assessment) for the same children. During the first year of the school-based dental program, there were 26 children

that did not need any follow-up treatment based on their examination using teledentistry technology. These children became the focus of the assessment since the other children will be treated by the dentists at the HHCC dental clinic. A dentist, who was not part of the teledentistry team, visited the schools and completed a traditional in-person examination. The dental findings of the traditional examinations were compared to the teledentistry examinations. The QA assessment showed that with the findings of the traditional examinations, there was no change in any of the original treatment plans that were developed by the teledentist for the same children. The HHCC Dental Program and the teledentistry team staffing the school-based program will continue quality assurance efforts to establish and refine clinical protocols for quality oral health data collection and manage issues related to teledental examinations.

LESSONS LEARNED

Lessons learned from the HHCC school-based preventive dental program include the following:

1. The pilot program was a great learning experience. The primary lessons learned were two-fold: (a) the need for additional portable dental units to allow for better efficiency of services and greater access, and (b) the need to redesign charting and data collection forms. A proposal for a second unit was submitted to ITCA and the grant was awarded. Spreadsheets and charting documentation forms were redesigned and streamlined. With the addition of the second unit, it was determined that dental exams and caries stabilization services need to be added to provide a more comprehensive program to address the needs of the Hopi children.

2. The program staff noticed something unexpected. There appeared to be less behavior problems with the children treated in the school-based dental program. Staff attributed this to the children being in a more familiar environment that is less threatening to them.

3. After the first year of the school-based program, all of the schools preferred the dental services to be delivered onsite at the school. Some schools have space issues so there was some juggling in reserving rooms to provide space for the dental program. The noise of the dental equipment created one situation in which the space assigned to the program had to be changed. Also, a few of the schools forgot to include the dental program to receive notices of school closures for the day, testing times, field trips, and cultural activities when the children would not available to receive preventive services.

4. It took time for the mobile dental program to find the best solution in packing equipment and supplies for transport. Many changes in containers and carts for equipment and supplies were made. Now that the school-based dental program knows what is or is not available at each school, the program is well organized. The dental program can now efficiently set up the two dental treatment areas and the x-ray area.

Teledentistry in Arizona
Section C / Chapter 2
Increased Service Delivery Using Teledentistry

Chapter contributed by:
Hopi Health Care Center Dental Program

BACKGROUND

In 2008, after completing a pilot school-based dental program and acquiring additional portable dental and teledentistry equipment, the Hopi Health Care Center (HHCC) Dental Program was ready to expand its school-based preventive dental program to become fully operational for the 2008-2009 school year. The objective was to implement the program as a teledentistry model in delivering preventive dental care to children at five elementary schools on the Hopi reservation. As part of this preparation, a proposal was made to the HHCC administration to hire and add a full-time dental hygienist to the HHCC staff and a justification was presented. It was necessary to demonstrated to the HHCC administration that the school-based program had the potential to increase the capacity to deliver preventive services to all elementary school children on the reservation, free more chair time at the dental clinic since the children will receive care at the schools, increase patient visits per year, and increase revenue from Medicaid reimbursements. This could translate to increased and sustainable revenue that would be available to cover the salary of a new dental hygienist. The new dental hygienist and the current dental hygienist (the HHCC teledentistry coordinator) would work as a team for the HHCC Dental Program. Both dental hygienists would provide coverage to the HHCC dental clinic and the school-based preventive dental program and deliver clinical services. The increase in staff would allow the two dental hygienists more flexibility in meeting the scheduling demands of the clinic for adult periodontal care and of the school-based program.

SETUP AND ACTIVITIES

The justification for a new full-time HHCC dental hygienist included the following analyses:

1. An Overview of the Problem and Solution

Table 1 provides a description of the status during the school year 2007-2008. The Hopi children were transported in groups from their schools to the HHCC dental clinic for preventive care. This resulted in each child missing a half day of school for a 30-minute dental appointment. A school-based program offers a solution that delivers services onsite

at the schools and minimizes time away from class. A child would receive a teledental examination, x-rays, oral health education, cleaning, and temporary filling/mouthguard as needed. Additional benefits include children being comfortable in their school environment.

Table 1. A Proposal for an Additional Dental Hygienist for the HHCC Staff
An Overview of the Problem and Solution

Status for the 2007-2008 School Year:
One half day a week, 20-30 school aged children are transported from school to the dental clinic.
The children arrive at the dental clinic between 8:30am and 9:00am.
The children receive a screening, sealants, fluoride and oral hygiene instructions (OHI).
The children leave the dental clinic between 11:30am and 12:00pm to return to school.

Problem	Solution	Additional Benefits
1. Children miss half a day of school for a 30 minute appointment.	1. Children will only miss class for the length of time needed.	1. Children will be seen in their own environment, less like an actual dental office which can be anxiety provoking.
2. Only those children that showed up for school on the scheduled day can be seen.	2. Children can be seen when they return to school. Being on-site allows this flexibility.	2. There is no school nurse on-site. With dental on-site dental emergencies can be assessed.
3. Only children whose parents returned their permission slips in on-time can be seen.	3. We would be at each school for several weeks allowing parents to have additional time to turn in permission slips	3. Parents, teachers, and students would have access to dental information, education without having to make an appointment.
4. When classrooms of children are bussed to HHCC Dental, the clinic is overloaded and not able to address needs of walk-in and emergency patients efficiently.	4. The HHCC dental clinic will be available for regularly scheduled patients, resulting in increased patient visits. - Approximately 26 additional patients could be seen a day.	4. Walk-in and emergencies would be addressed efficiently.
5. Only limited preventive services can be provided to the children in the 30 minute allotted appointment time.	5. Expanded services will be available and provided based on the child's needs.	5. Children would receive additional services: exams, x-rays, cleanings, Temporary fillings, sport safety mouth guards, tobacco and nutrition education.
6. If the school bussing program cancels last minute, the dental program will have unfilled appointments for half a day. - 3 clinic days were cancelled by schools	6. The entire school will be a pool of patients on site, no lost treatment time.	6. No child will be left out of dental services, except by parent/guardian choice.
7. 4 out of 6 schools participated in the bussing to the dental clinic. - One school chose not to participate due to the amount of time out of class. - One school chose to be our pilot school for the school based-program. - All 4 schools capped the number of bus visits to the dental clinic due to budget issues.	7. Schools will not have to address costly budget issues of bus transportation, maintenance, salaries, etc. - School hours missed will be greatly reduced from 4 hours per student to 1 hour.	7. Long-term plan is to be able to provide oral health preventive services at the school. - All 6 schools were interested in this proposal.
8. Hygienist sees on average 7-10 adult patients a day in the clinic. Adults without private insurance do not have billable services. On average, 1 out of 10 adult patients have private insurance. ACHSS does not cover adult preventive or periodontal procedures. Broken appointment rate is 30-60%.	8. By increasing child visits, M&M dollars can potentially increase. Medicaid reimbursement is at a fixed rate per visit for Medicaid eligible children.	8. 85-90% of school aged children are Medicaid eligible. 5-10% have private insurance.
Note: 292 children from Hopi schools were not seen. (Children who were not transported to the dental clinic.)	**Goal:** All school-aged children will be seen for dental services.	

2. A Comparison of Patients Seen by a HHCC Dental Hygienist in Two Clinical Settings

A HHCC dental hygienist delivers dental care at the HHCC dental clinic and at schools through the preventive dental program.

HHCC Dental Clinic:

A dental hygienist typically sees 7-10 adult patients per day in the dental clinic.

- Arizona Health Care Cost Containment System (AHCCCS), the state's Medicaid program, does not cover most dental procedures for adults.
- Most adult patients do not have private dental insurance.
- The clinic has a high broken appointment rate (30-60%).

School-Based Preventive Program:

A dental hygienist typically sees 12-20 children a day at the school.

- 80-90% of the children are AHCCCS (Medicaid) eligible; all preventive dental services are covered by a fixed Medicaid reimbursement rate for each visit.
- 5-10% of the children have private dental insurance.
- No broken appointments since there is a readily available pool of children at the school to fill the clinical schedule.

A school-based program will increase the level of preventive services HHCC can provide to Hopi children and will free chair time at the dental clinic for the general patient population (children are provided preventive care at the schools instead of the dental clinic). Since a large majority of the children are Medicaid eligible, Medicaid reimbursement for preventive care will establish a sustainable source of revenue. The school-based program will be able to maintain a full daily schedule of child patients.

3. Analysis of Increase in Patient Visits

Based on HHCC dental clinic scheduling patterns, it is estimated that the HHCC Dental Program will experience an increase in patient visits. The increased patient visits come from two sources:

- During a school year, 30 weeks have been reserved for children to be transported to the dental clinic to received preventive care. With the school-based program, these children will receive their preventive care at their schools. This will result in freeing chair time at the dental clinic and allowing 26 dental visits to be filled by other patients. For 30 weeks, there will be a total of 780 additional patient visits that can be filled by the dental clinic patients.

- In 2007-2008, 292 children were not transported from the six elementary schools to the clinic for preventive care. One of the schools declined to transport all their students due to school personnel's concern about missing class time. With the school-based program, it will be easier for these children to receive preventive care. An additional 292 patient visits are expected to provide a preventive visit for each of these children.
- Therefore, a total increase of 1,072 additional patient visits per year (780 + 292 visits) is expected for the HHCC Dental Program (for both the dental clinic and the school-based program).

The increased in patient visits shows increased capacity to deliver services and improved access to care.

4. Analysis of Increase in Revenue

Since the HHCC Dental Program is in a hospital setting, AHCCCS (Medicaid) reimbursement rate is based on a daily rate, rather than based on fee-for-service which is more common for private practices.

Estimates of revenue generated by the HHCC Dental Program include both dental clinic and school-based program:

- For the HHCC dental clinic, 7-10 adult patients will generate approximately $0 - $300 per day.
- For the school-based program, 12-20 AHCCCS eligible child patients will generate approximately $4,000 per day
- Using a conservative estimate that 75% of the 783 students enrolled in all six elementary schools on the Hopi reservation are AHCCCS eligible and the remaining students do not have private dental insurance, the school-based program provide will generate approximately $150,000 in revenue per school year.
- A dental hygienist salary would range from $40,000 to $60,000 a year.

This analysis shows that the new school-based prevention program will increase revenue ($150,000 per year) which will cover the salary for an additional full-time dental hygienist ($40,000 - $60,000 per year). The school-based preventive dental program, using a teledentistry model to deliver preventive care and to coordinate care with the HHCC dental clinic for other unmet treatment, is cost-effective.

OUTPUTS AND OUTCOMES

Data were tracked and compiled to show that the new school-based preventive dental program would cover the salary for an additional full-time dental hygienist and increase access to preventive dental care for the Hopi children. The administration approved hiring a new dental

hygienist for the HHCC Dental Program. A second dental hygienist was hired in October 2008 to provide services for both the HHCC dental clinic and the school-based preventive dental program.

The school-based program had its first year of full operation during 2008-2009 school year, providing two clinical service days a week. The program, staffed by both HHCC dental hygienists, delivered services to 533 children at five Hopi elementary schools. Prior to 2008, 63% of the elementary students were seen; in the first year of the program, 88% of the students were seen. This is a 25% increase in the proportion of all elementary school children on the Hopi reservation receiving dental services.

For the 2009-2010 school year, the school-based program will serve all six elementary schools on the Hopi reservation and will operate three days a week.

LESSONS LEARNED

Lessons learned included the following:

1. The first year (2008-2009) of the new school-based dental program has been successful. The justification provided to hire a new dental hygienist had projected increased preventive services to children, increased patient visits for service delivery, and increased revenue from Medicaid reimbursement. These benefits have been realized during the first year.

2. The second year (2009-2010) of the school-based program has started and the program has completed preventive care to all students in the first scheduled school in October 2009. The program staff has become more efficient; the same preventive services are now delivered in less time (e.g., a 45-minute visit instead of a 60-minute visit in the previous year). School and family support for the program is strong, indicated by a 100% of the students in the first school having parental consent to participate in the program.

3. The success of the first-year operation of the school-based preventive dental program has resulted in interest to replicate the program and the teledentistry model by the Phoenix Area Indian Health Service.

4. The HHCC dental clinic and the school-based program continue to adjust, complement and coordinate services delivered at both clinical settings.

Teledentistry in Arizona
Section C / Chapter 3
Care Coordination Supported by Teledentistry

Chapter contributed by:
Scottsdale HealthCare & Community Health Services
Neighborhood Outreach Action for Health Program

BACKGROUND

Scottsdale, Arizona is known as an affluent, resort community and rarely evokes images of poverty, hunger and need. However, like many urban Arizona communities, Scottsdale is home to a large immigrant population drawn to job opportunities in the construction and support service industries. Conservative estimates predict that more than 3,000 immigrant families live and work in greater Scottsdale.

To meet the health care needs of the large, primarily uninsured immigrant population, Scottsdale Healthcare (a non-profit hospital system) established two health centers to provide primary care medical services in 1997. Scottsdale Healthcare & Community Health Services' Neighborhood Outreach Action for Health (NOAH) Program began with one clinic as a community-based/neighborhood clinic and a second as a school-based clinic. These two centers were staffed by family medicine physicians and pediatric nurse practitioners, who provided primary medical services to more than 3,200 uninsured patients each year.

The NOAH Program began delivering oral health services with oral health screenings and referrals for restorative care services. Today it has evolved to include interdisciplinary, integrated care planning and the provision of preventive and restorative dental health services at both clinic sites. In spring 2006, NOAH built two dental clinics, each adjacent to the medical clinic to enhance the integration of medical and dental services. Each health center houses a medical clinic with two examination rooms and a dental clinic with two dental treatment chairs with x-ray units. Each NOAH clinic is now staffed with family medicine physicians, family practice nurse practitioners, affiliated practice dental hygienists and general dentists. The NOAH Program serves the uninsured and underinsured children and their immediate family members (their parents and older/younger siblings) in the Scottsdale and Paradise Valley School districts; however, dental care services provided to only children.

SETUP AND ACTIVITIES

NOAH's School-based and School-linked Dental Clinics

The dental clinic at the Palomino school-based health center operates five days a week. Four days are devoted to delivering preventive dental services by the dental hygienist; one day a week is scheduled for the dentist to deliver restorative dental care. The Paiute neighborhood dental clinic (a school-linked dental clinic) provides dental hygiene services 2-3 days per week and restorative dental care by the dentist two days per month.

Affiliated Practice Dental Hygienist Model

Typically, practice laws require a dentist to provide direct or general supervision of a dental hygienist, as well as require an examination before any treatment services can be delivered by a dental hygienist. However, the Arizona Dental Hygiene Affiliated Practice Act provided a new opportunity for the NOAH Program to develop a cost-effective dental care model.

Legislation HB-2214 that passed in late 2004, allowed for a registered dental hygienist to provide dental hygiene services under an affiliated practice relationship, as prescribed in Arizona Revised Statutes section (A.R.S.) §32-1289 and §32-1281. The legislation allows a public health agency or institution, or a public or private school authority, to employ a dental hygienist to perform dental hygiene procedures under either general or direct supervision, or to enter into a contract for dental hygiene services with licensees who have entered into an affiliated practice relationship with a licensed dentist. Statute (A.R.S.) §32-1289 and §32-1281 for affiliated practice also limited the scope of practice to children aged 18 and under. This change in Arizona's practice laws enabled dental hygienists to initiate treatment based on their assessment of patient's needs without specific authorization of a dentist, to treat the patient without the direct supervision of a dentist, and to maintain a provider-patient relationship.

In October 2009, new changes to the AZ dental statutes (Legislation SB 1400) lifted the age restriction for dental hygiene affiliated practice. While plans for the near future do not include adults, the NOAH program will provide oral health care for children below the age of 21.

NOAH currently employs two affiliated practice dental hygienists. One dental hygienist (the lead dental hygienist) is full time working four clinical days per week; the other dental hygienist (the on-call dental hygienist) is part-time working 2-3 clinical days per week. The lead dental hygienist typically covers both dental clinics, while the on-call hygienist is available for days when both clinics have appointments. In addition to clinical duties, the lead dental hygienist also performs managerial duties, such as ordering supplies, posting work schedules, grant management, case management, and equipment repair/maintenance oversight.

Clinically, the dental hygienist sees all new patients, gathering and recording diagnostic data that needed by the dentist, such as digital radiographs, intraoral photographs, and pertinent discussion with the parent and/or the child. The dental hygienist is responsible for scheduling the patient with the dentist for the examination and restorative treatment. At this time, the

hygienist triages the clinical needs of the child, getting those with urgent needs appointed as soon as possible. Preventive dental care includes: extensive oral hygiene instructions provided in a one-on-one interactive format with the child and the parent; scaling and polishing; dental sealants; and fluoride varnish. The affiliated practice legislation allows the dental hygienist to assess the need for sealants without a dental examination.

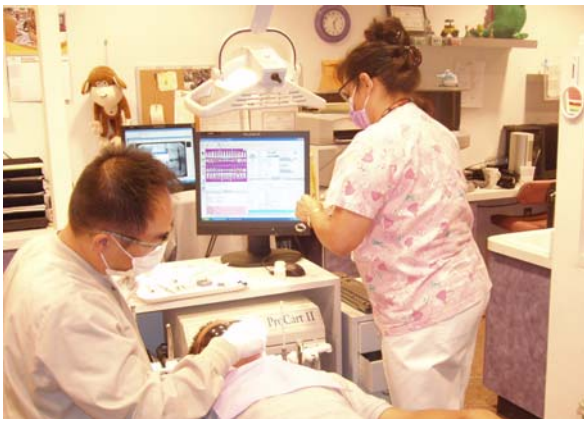
Clinical Staff

The clinical staffing at each of NOAH's two dental clinic is as follows:

1. At the Paiute school-linked dental clinic:
   1 dental hygienist – affiliated practice 2-3 days per week
   1 part-time contracted dentist provides 2 days of restorative services per month.
   1 FTE dental assistant

2. At the Palomino school-based dental clinic:
   1 dental hygienist – affiliated practice 4 days per week
   1 part-time contracted dentist provides 1 day of restorative services per week.
   1 FTE dental assistant

In 2009, the NOAH Program also became a Medicaid (Arizona Health Care Cost Containment System or AHCCCS) provider and planned to broaden program services to address community-wide oral health needs.



Patient Population

NOAH serves families with incomes less than 200% of the Federal Poverty Level. Annually, NOAH Health Care Centers serve approximately 3,200 uninsured children and their family members.

Prior to 2009, the NOAH dental clinics accepted children 0-18 of age, treating children from preschool through high school. After October 2009, due to new legislation allowing affiliated practice dental hygienists to see adults, the dental clinics have now increased the age level to children below age 21. Future plans to increase the adult population in a controlled manner are being developed.

The NOAH Program has also implemented a change in geographic eligibility for patients. Prior to August 2009, eligibility to receive care in the NOAH Program required a family to live within the borders of Scottsdale Unified School District, Paradise Valley Unified School District, or Cave Creek Unified School District. Now there is no geographic requirement for eligibility.

The NOAH school-based clinic is located in the Palomino Elementary School. As a result, the majority of dental patients are the school children from the Palomino Primary School (Pre-Kindergarten through 3rd Grade) and the adjacent Palomino Intermediate School (4th Grade through 6th Grade).

Dental Services

Both dental clinics provide the following services: oral health assessments by affiliated practice dental hygienists, dental examinations by dentists, x-rays, treatment planning, prophylaxis (teeth cleaning), dental sealants, fluoride varnish, restorative care, and referrals to specialists.

Affiliated practice dental hygienists provide preventive services. Every child is assessed according to clinical need for the frequency of fluoride varnish treatments (up to 4 applications) per year and is seen on a minimum of a 6-month recare schedule.

Care Coordination Between the Two NOAH Dental Clinics

Since the dentist and the dental hygienist provide care on different days, communication between them is crucial. The utilization of teledentistry can support critical communication for the dental team with digital radiography, electronic patient records, and intra-oral photography.

Case management is a key component of the affiliated practice model. With this model, the affiliated practice dental hygienist can see the patient first, providing a screening examination, oral hygiene instruction, prophylaxis and fluoride varnish. The affiliated practice hygienist can then triage the need for dental care, getting those children with the greatest need scheduled with the dentist as soon as possible. The use of teledentistry allows the dental hygienist to compile data for the patient record and send that data to the dentist for review and consultation.

By compiling an electronic record of the patient at the hygiene appointment, the dentist is able to see improvement or deterioration of the child's oral condition at the time of the dental examination appointment. Teledental consultation also serves to eliminate travel time and transportation issues for the patient. Consultation can also take place between the dental hygienist and the dentist to determine the need for further referral to outside specialists. Consultation can occur with specialists, so they have a more accurate and complete record to determine their course of treatment.

Children are at times referred and scheduled to receive care from one NOAH dental clinic to the other clinic when patient care needs to be scheduled at an earlier date or for specialized procedures provided by the dentist at the Palomino clinic, who performs endodontic treatment and 3rd molar extraction. Children from the school-based Paiute clinic are often referred to the school-linked Palomino clinic. Computerized clinical records from both clinics can be viewed at either clinic at any time, thus allowing the dentists to view any and all records that have been recorded. At this time, only the Palomino clinic has digital radiography and intra-oral photography capability, so the teledental exchange of oral health data is not yet at full capacity.

NOAH provides taxi services for families with hardship in reaching either of the dental clinics. The city of Scottsdale provides free shuttle services throughout the city with a scheduled stop at the Paiute Neighborhood Center. This support service provides a viable option for families and children to have care coordinated at both dental clinics.

Referrals to Specialists

Both NOAH dental clinics refer children to dental specialists in the community. Only endodontic treatment (e.g., root canals) is provided at the Palomino clinic with most specialist referrals made to oral surgeons, pedodontists and orthodontists.

The oral surgeon referrals are usually for 3rd molar extraction and mesiodens (a supernumerary tooth between the upper central incisors), although as more children are obtaining orthodontic treatment (e.g., braces to correct the alignment of teeth), referrals have been made for orthodontic extractions. The NOAH Program currently has one oral surgeon who donates eight cases per month and two others who donate to a lesser degree.

Very young children and those who are difficult to manage are referred to the pedodontist. As the focus for treating 0 to 5 year-olds is expanded, the need for this type of referral will also increase. Currently, one pedodontist has committed to donating at least one case per month.

Referrals for orthodontics are the most numerous. It is interesting to observe that the desire for "straight teeth" crosses socio-economic status. When provided an opportunity, parents are making the investment for orthodontic services for their children. The NOAH clinics have three orthodontic offices, each providing care at reduced fees.

Dental referrals to specialists are routinely made by the NOAH clinics to achieve optimal care for the children. The lead dental hygienist serves as a case manager for the dental referrals to specialists. Teledentistry will support for referrals to specialists and will improve care coordination that will maximize the quality and efficiency of the referrals.

Calibration

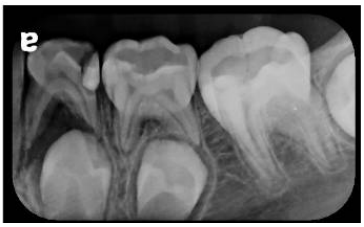
Another needed step in integrating teledentistry into the NOAH Program is to assure that the dentist and affiliated practice dental hygienist are calibrated in their teledentistry communication and data sharing. With calibration, the dental hygienist will assure that all the necessary and appropriate oral health assessment data is collected for the dentists to complete the dental examination. It is critical to assure that diagnoses and treatment planning provided for the patient after the dentist reviews the teledentistry oral health data is comparable to diagnoses and treatment planning the dentist would provide after a traditional "face-to-face" dental examination.

The calibrating efforts for both the dentist and dental hygienist will diminish inconsistencies, allow both professionals to function as a coordinated dental team, and increase chair time for the dentist to deliver treatment. Also, once the dentist and dental hygienist are calibrated, the dental team can increase its productivity in delivering care and improve patient scheduling.

OUTPUTS AND OUTCOMES

The NOAH Program is in the early stage of integrating teledentistry for care coordination. Teledentistry technology went live in 2009. The first stage of integrating teledentistry into NOAH's dental care delivery system is to use the technology to support care coordination between the two dental clinics, make referrals to specialists, and calibrate how the dental team (dentists and affiliated practice dental hygienists) will use teledentistry to provide efficient and quality patient care.

Care Coordination Between the NOAH Dental Clinics



The NOAH Program has utilized teledentistry multiple times for consultations and care coordination (e.g., consulting with the clinic dentist and scheduling patients). For example:

> One such instance involved a 6 year-old boy who presented at his dental hygiene recare appointment in pain with a dental abscess. The dentist would not be in the clinic for two weeks. Digital radiographs and intraoral photographs were taken and sent via secured email to the dentist for a consultation. Rather than place the child on a course of antibiotics and reschedule in two weeks, the dentist found time to come into the clinic and extracted the tooth.

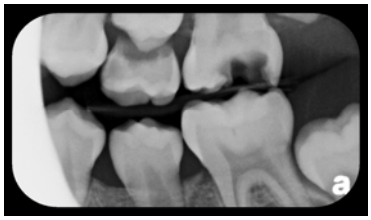
Referrals to Specialists

Referrals to specialists often present challenges to parents and their children due to transportation issues and lost time from work and school. The NOAH Program, in its first efforts to use teledentistry to support referrals to specialists, has found better efficiency in making referrals and reducing lost time for families. The following story illustrates the advantages that teledentistry has provided:

> A 4 year-old child arrived in the NOAH clinic for his first intake well-child appointment. The physician noted that he was in a great deal of pain, listless, and running a fever. The parents and child were walked down the hall to the adjacent dental clinic for consultation with the affiliated practice dental hygienist. The dental hygienist observed signs and symptoms consistent with early childhood tooth decay and a dental abscess but cannot make the diagnosis due to the state practice act. The dental hygienist discussed and showed the physician the decayed teeth and the area with swelling. The physician prescribed antibiotics for the fever and signs of infection. The dental hygienist initiated a referral to the pedodontist. With teledentistry technology, intraoral photographs were taken and transmitted to the pedodontist's office. The specialist agreed to accept the child in his practice. With further care coordination, after several phone calls between the pre-school community liaison, the parents, the NOAH dental hygienist and the pedodontist's office, the child was seen by the specialist for emergency care.

With teledentistry support, the NOAH Program has also noted that referrals to an oral surgeon have been simpler with transmitting digital radiographies. For example:

NOAH referred a child for extraction of a molar tooth (#14) due to severe tooth decay. The ability to quickly send the radiograph via secured email to the oral surgeon enabled him to assess needed treatment and appropriately plan for the children's first appointment to his office. This also let the NOAH providers prepare the parent and child for their appointment with the specialist.



Calibration

For the NOAH Program, calibration efforts are in the early stages and in progress. However, the dental team has noted that the intraoral photographs together with the digital radiographs prove to be very beneficial to improving communication between the dentist and the dental hygienist. Since the NOAH Program's dental care model rarely schedules the affiliated practice dental hygienist with the dentist on the same day together at the same clinic, the teledentistry technology provides higher efficiency in the exchange of a patient's oral health information for care management by the dental team. The ability to view the same chart (with digital images) from either of the two NOAH dental clinics is most helpful when the dentist is scheduled at one clinic and the affiliated practice dental hygienist is scheduled at the other. The dentists and dental hygienist can both pull up the chart and discuss the patient management and clinical issues over the phone. The NOAH Program anticipates that more opportunities will present to the dental team and calibration will be refined.

LESSONS LEARNED

1. All NOAH clinics and the mobile unit have strong Information Technology (IT) support for the electronic medical/dental record system. This IT support was very helpful to address teledentistry interfacing issues with the medical record system.

2. There is a need to train all staff personnel on the teledentistry hardware and software. This has been a challenge for the NOAH Program since some of NOAH's clinical staff work part time and have different schedules of work days.

3. There are questions regarding putting teledentistry into practice related to (a) legal issues related to practice laws for teledentistry, (b) supervision via teledentistry such as the role of the distant teledentist and affiliated practice dental hygienist in supervising dental assistants.

4. More time is needed for the NOAH Program to consider how best to expand the teledentistry model. The program will aim to include more services that have been are part of telehealth (e.g., real time patient consultations and consumer education).

Teledentistry in Arizona
Section C / Chapter 4
Teledentistry for Care of Patients with Special Needs

Chapter contributed by:
North Country HealthCare and Arizona School of Dentistry and Oral Health

BACKGROUND

The utilization of teledentistry has been a welcomed challenge for North Country HealthCare (NCHC). While NCHC has been a pacesetter in the field of telemedicine, challenges with the teledentistry model have reflected the difference in the delivery of medical care versus dental care. Dentistry, with its nearly exclusive "hands-on" model of care delivery, differs from the traditional model of medicine with its emphasis on diagnosis and pharmaceutical management. NCHC's use of the teledentistry model is skewed towards patient management and information dissemination.

NCHC patients are from all walks of life with varying income levels. NCHC accepts most insurance plans and Medicaid. There is also a sliding fee-scale option for eligible patients. Patients range from the very young to seniors. Individuals with special health care needs, including mentally and physically challenged, are also a part of NCHC's patient population.

The NCHC Dental Services and the Arizona School of Dentistry and Oral Health (ASDOH) at A.T. Still University has established a collaboration to integrate teledentistry for the care of patients with special needs and for professional development. ASDOH maintains a Special Care Dental Clinic to offer comprehensive special care dentistry for patients with intellectual, physical, and emotional disabilities, and other special healthcare needs. Teledentistry will be used to support the care of patients with special needs, allowing NCHC providers, residents and students to consult with specialists at ASDOH.

SETUP AND ACTIVITIES

North Country HealthCare's Dental Clinic and Clinical Staff

NCHC presently employs seven oral health providers comprised of two dental hygienists, four general dentists, and one locum tenens general dentist (temporary substitute). All dentists work

full-time with the exception of the locum dentist. The Dental Director is a full-time clinician. Of the ten NCHC facilities, three clinics offer dental services. The Flagstaff clinic provides dental care five days per week. The Winslow clinic provides care four days per week. Dental providers rotate to the Ashfork clinic one day per week alternating between dental hygienists and dentists. Each clinic maintains its own schedule of dental patients and medical services are provided at each clinic.

The NCHC clinical staff provide preventive dental services including dental cleanings, comprehensive examinations, x-rays, fluoride treatments and oral cancer screenings. The clinical dental staff also provide restorative care such as fillings, crowns, bridges and dentures.

Students and Residents

Dental hygiene students from Northern Arizona University (NAU) in Flagstaff have rotated to NCHC for eleven years. At the present time, two senior dental hygiene students rotate one day per week to the Flagstaff clinic. The health center also serves as a summer extern site for rising senior dental hygiene students. The typical summer externship is six to eight weeks in length. Both of NCHC's dental hygienists serve as faculty for the NAU dental hygiene program.

NCHC has served as a residency site for the Lutheran Medical Advanced Education in General Dentistry Program (AEGD) since 2002. The dental department at NCHC and the dental department of Winslow Indian Health Center have partnered together to provide Lutheran dental residents an opportunity to work in two unique public health organizations. The dental resident stationed at NCHC rotates three to four times per month to the Winslow Indian Health Center. At the center, they work with specialists in the areas of Oral Surgery, Orthodontics, Periodontics and Endodontics. All residents in the Northern Arizona area convene at NCHC, one day per week, for video educational conferencing. This meeting provides residents with "classroom" instruction by Lutheran staff and includes various topics of dental interest.

NCHC also serves as a rotation site for students from the Arizona School of Dental and Oral Health (ASDOH). Students from ASDOH can choose from a number of clinical sites, where they are "graded", by adjunct faculty, on specific clinical competencies. Students rotate between two to eight weeks in a chosen site. Students that come to NCHC rotate between the Flagstaff and Winslow clinic sites.

Dental hygiene students, dental students and dental residents are mentored by all NCHC dental providers. Patients are not pre-selected for students or residents. It is hoped that this results in students and residents receiving a more "realistic" patient care experience.

Patients with Special Health Care Needs

The NCHC tries to increase the number of patients seen and treated in the three dental clinics on an on-going basis; particularly for the largest dental clinic in Flagstaff. Many patients at NCHC are medically complex. They have advanced disease processes that are "managed" by medication. This may be largely due to the lack of access to routine care and thus, early identification and treatment of disease does not occur.

Patients with special needs, e.g. cerebral palsy, those with severe brain injury; have historically been seen by a limited number of local dentists and by providers in the Phoenix area. Travel to Phoenix is costly and time consuming for many families. NCHC's goal is to serve as the northern most medical and dental service "hub" for the patients with special needs and their families. The goal of this model is to prevent further oral disease rather than manage advanced oral disease.

Training for the Management of Dental Patients with Special Health Care Needs

The management of oral disease may vary slightly in the special needs population, but more importantly, the appropriate physical and emotional management of the individuals will assure their continued relationship in seeking care with competent medical and oral health care providers. General dentists have very low exposure to patients with special health care needs during their formal training. The Arizona Dental Association, Arizona Department of Health Services Office of Oral Health, and ASDOH have responded to this through sponsoring 30+ hours of continuing education in the treatment of the special needs patient. Two of the dentists currently employed by NCHC have completed this course.

NCHC's linkage to specialists at ASDOH will fill in "experiential gaps" (e.g., understanding by experience) when serving the special needs population. Relevant oral health topics will be presented by specialists from ASDOH to both physicians and dentists. Rotating dental and medical students as well as dental residents will have access to the wealth of knowledge present at ASDOH.

The success of this training effort will accomplish two major goals: (1) the provision of dental care to an overlooked population, and (2) the education of oral health and medical professionals who will be competent in treating all members of the community.

ASDOH Special Care Faculty is experienced in training students/residents, practicing general dentists and support staff in patient management of children and adults with special health care needs. In 2007, ASDOH provided an intensive training program targeting general dentists and their support staff at three geographically diverse sites. The course provided hands-on training on the dental treatment of developmentally disabled patients. NCHC's collaborative partnership with ASDOH will provide added benefits to their students/residents, staff dentists and patients with special needs.

Integrating Teledentistry into the Care for Patients with Special Health Care Needs

The NCHC Dental Services and ASDOH are partners in developing a teledentistry program that will provide training, consultation and technical support for the care of patients with special health care needs. Since an objective of the ASDOH Special Care Dental Clinic is to increase access to care for persons with special health care needs throughout the state of Arizona,

teledentistry will further develop ASDOH's role as a hub providing consultation to distant dental clinics.

NCHC would use this technology to record and transmit a patient's vital information to specialists at ASDOH. This information would include routine medical histories. Subtle information, traditionally gleaned from personal contact, could be transmitted. This information would include a physical and emotional assessment. For example, is the patient easily agitated? Does the patient exhibit spastic or sudden movements? Is the patient communicative or combative? How might the caregiver be able to help in the treatment process?

Recommendations could be made by ASDOH specialty staff concerning issues such as sedation suggestions, appropriate use of acceptable restraining techniques and sequencing of needed treatment, specifically for a patient. Dental provider staff would then oversee the treatment of these patients by ASDOH students and Lutheran dental residents.

There will undoubtedly be some patients that will require care beyond the scope of a health center. Specialists at ASDOH and the patient's physician will be instrumental in the treatment delivery decision(s) for those patients that require more specialized care.

The initial patient visit would be recorded and then reviewed by ASDOH faculty, a NCHC provider and the student/resident, at a pre-scheduled time. The student/resident would prepare a case presentation for ASDOH faculty. At this time a recommendation for care would be made. This model would be an extension of the educational mission of ASDOH and NCHC and would incur little, if any, cost to the patient or their family. "Real time" care consultation will be limited and will likely incur a clinical consultation charge since an appointment will be required to secure provider time.

Linking Teledentistry and Telehealth

NCHC presents a special environment to integrate teledentistry with the telemedicine/telehealth network in Arizona. Since NCHC has an extensive telemedicine/telehealth network of providers through their ten satellite clinics in the state, linking teledentistry program with physicians, nurses and allied health professional will present opportunities to improve the care of their medical and dental patients, including patients with special needs.

Building linkages has already begun. The NCHC teledentistry program has initiated oral health continuing education (CE) through their NCHC telehealth CE program. In partnership with ASDOH, the ASDOH Director of Special Care Dentistry (who is also the Co-Director of Advanced Education in General Dentistry Program) has provided two presentations in October/November 2009. These presentations were the first oral health topics provided by the NCHC telehealth CE program. NCHC connected their distant learning center and telehealth provider network to the oral health CE presentations.

OUTPUTS AND OUTCOMES

Efforts to Address Security Issues Related to Teledentistry

NCHC, with the support of its Health Information Technology Director, has identified two primary issues to address in order to establish full telecommunication with ASDOH as teledentistry partners:

1. It is likely that there will be outsiders or non-clinical persons present in teleconsultations (may include non-clinical technicians, camera people, schedulers who may be located on either side of a telemedicine consultation or at the site of a service provider, either physically or via the technology they support). Also, clinical personnel who may not be visible or observable by the patient in a teleconsultation may be present. NCHC and ASDOH each must be fully covered through the Health Insurance Portability and Accountability Act of 1996 (HIPAA) compliant sign-offs.

2. Encryption of patient data during transmission. All data shared between NCHC and ASDOH must be encrypted and decrypted during the transmission process to assure continued protection of sensitive information. A protocol that is amenable to each party must be established.

The NCHC Dental Director is working with the Health Information Technology Director to set up the necessary procedures, measures and documents to manage HIPAA and security issues.

Oral Health Continuing Education for the Telehealth Providers

In addition, two oral health continuing education events have been held in October and November 2009. The presentations were titled:

1. Review of Evidence-based Oral Health Guidelines for the Medical Providers

2. Fluoride Varnish – What's New? What's True?

Participants for the two events totaled 34 (individuals who attended in person at the HCHC Learning Center in Flagstaff and who used a website connection). Participants included medical/dental providers and support staff in the telehealth network. Evaluation showed that the presentations were well received. This is the first effort in building linkages with NCHC telemedicine network and initial Arizona teledentistry network. In addition, the NCHC distant learning center has a website that that archive the CE presentations to provide open access to providers to view the videos any time.

There is potential to continue an "oral health integration" series of CE presentations for telehealth providers if the NCHC and ASDOH teledentistry partnership. Furthermore, ideas are developing in connecting with the full Arizona Telemedicine Network by starting with oral health integration presentations for medical providers.

LESSONS LEARNED

Fiscal Challenges in Dental Care for Patients with Special Needs

Due to the current economic climate, state Medicaid programs have reduced budgets for health care. The State of Arizona piloted a program to provide individuals with long-term disabilities fifteen hundred dollars ($1,500) for dental services. It was hoped that the pilot's innovation in oral health care delivery may reduce a portion of the healthcare costs for citizens with long-term disabilities. During this time, the dental clinic at NCHC began to see an increase in the individuals targeted by this pilot program. Unfortunately, many of the treatment plans for these individuals were not completed due to additional administrative time required by the pilot that took away needed treatment time during dental visits. The pilot had specific registration prerequisites that required the front operations personnel to acquire "prior authorization" from the program before the patient's first examination visit. This process proved time-consuming, cumbersome and confusing. Patient care time was lost and families and patients became frustrated with the administrative procedures. The pilot program ended in 2008, resulting in patients and their families now having to pay a larger portion of oral healthcare costs.

Teledentistry Security Challenges

As mandated by HIPAA, health care providers who engage in HIPAA standard electronic transactions must comply with the protection of patients' individually identifiable health information. These electronic transactions include the use of telehealth technologies.

In order for NCHC to participate fully in any electronic sharing of patient data or telehealth programs including patient diagnosis, all participants must be trained about security and designate a grant privacy officer. A Trading Partner Agreement (a formal legal document validating the legality of the business transactions which will be electronically processed.) must also be developed that extends privacy protections to third party business associates. Finally, a protocol will need to be developed to obtain patient consent for most disclosures of protected health information which assures NCHC transmits and provides the minimum amount of information necessary.

Before NCHC can share information using telehealth modalities, NCHC must assure that Arizona State laws work to preempt Federal laws. Federal laws preempt state laws that are in conflict with regulatory requirements or those that provide less stringent privacy protections, but those states that have more stringent privacy laws would preempt Federal law. Under these circumstances, telehealth practitioners will be faced with complicated privacy standards. It is important to have a heightened level of concern for patient privacy in the telemedicine environment, especially where patient visits are occurring in real-time. The potential for more complicated informed consent requirements under HIPAA that could inhibit obtaining the necessary patient consent signatures which are necessary prior to initiating telehealth activities.

Teledentistry in Arizona
Section C / Chapter 5
Training of Dental Hygiene Students in Teledentistry

Chapter contributed by:
Northern Arizona University Department of Dental Hygiene

BACKGROUND

The teledentistry program at the Northern Arizona University (NAU) Dental Hygiene Department is developing an educational framework (for both distance and face-to-face environments) to train students to acquire and digitally transmit all necessary diagnostic data to a dentist at a remote site. The distant dentist will diagnose and prescribe dental hygiene treatment to new or existing patients of record and make referrals for additional dental treatment as necessary. The NAU Dental Hygiene Department is in a unique position to develop face-to-face and distance educational frameworks, facilitate training, and promote the use of teledentistry to provide remote diagnosis, appropriate referrals, and dental hygiene services for underserved populations.

SETUP AND ACTIVITIES

Teledentistry Hardware and Software

NAU received delivery of all of the teledentistry equipment (hardware) and computer programs (software) in March 2009. The teledentistry hardware and software included:

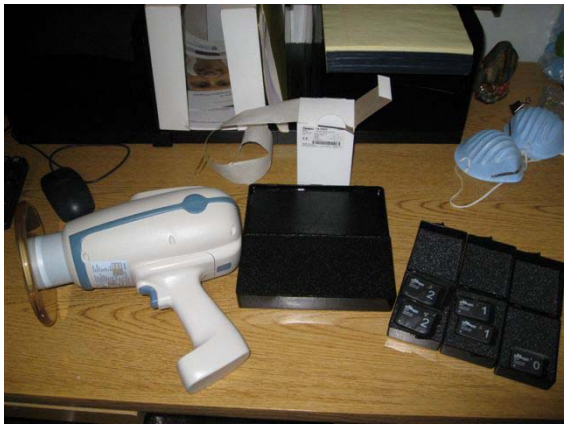
- Two Dell laptop computers
- Two Nomad X-ray units included training software (for dental radiographs)
- Two Scan-X Duo digital film processors and installation software
- Scan-X Duo digital film processor cleaning strips
- Two Acclaim intraoral cameras included installation software (for intraoral photographs)
- Phosphor films (#2, #1 and #0), film barriers, and film transfer boxes
- One Velscope (oral cancer screening system)
- One Spectra (fluorescence based caries detection system)
- Open Dental software (open source dental management software)
- TigerView software (digital imaging software)

A technical representative from TigerView came to NAU and installed the appropriate software on the laptop computers and made sure all of the appropriate hardware worked correctly.

First Group of Students Trained

Ten senior students, two months from their graduation, began working with the NAU Teledentistry Coordinator/Principal Investigator to learn how to use the teledentistry equipment.

The first step was to view all the technical data and training materials for the Nomad X-ray unit. In addition to the training materials, Nomad provided a certification examination, which the ten students successfully completed.



The next step was to teach the students to use the TigerView software and import digital images from both the Scan-X Duo digital x-ray film processors and the Acclaim Intraoral Camera. This was very easy to accomplish because the students are already comfortable with digital technologies.

Once the students learned how to use the Scan-X Duo and the TigerView software basics, the students began taking digital x-rays on a DXTRR mannequin.

Individually, the students took several digital x-rays and intraoral photographs and imported them into appropriate patient files. Each student then exported all of the patient's digital data using various store-and-forward techniques such as e-mail, burning discs, and thumb drives. Every student participated in eight hours of training and all were able to demonstrate complete competency in all aspects of teledentistry techniques including the ability to assemble and disassemble all of the equipment.

OUTPUTS AND OUTCOMES

Ten senior NAU dental hygiene students have been trained in the use of teledentistry equipment. They have become proficient in using teledentistry technology in collecting oral health assessment data (using a digital x-ray unit and an intra-oral camera) and transmitting images.

Two alumni have been hired by a private practice pediatric dentist who will use teledentistry to provide community outreach services.

The conclusions of the Teledentistry Program Coordinator/Principal Investigator on the initial training is that the students were receptive to learning new technology, easily learned the use of the equipment, and were enthusiastic in incorporating the technology into practice.

Based on the ease of training, the successful outcomes of the initial teledentistry endeavors, and the treatment advantages teledentistry offers patients, NAU plans to move forward

incorporating teledentistry into the dental hygiene curricula. Several senior students will be trained in teledentistry during the fall semester; the entire senior class will be trained during the 2010 spring semester.

The Teledentistry Program Coordinator/Principal Investigator will be the lead instructor of a spring semester course, DH-470 Professional Seminar, and will teach all aspects of teledentistry to the senior students. Additionally, senior students will accompany the Teledentistry Program Coordinator/Principal Investigator into the community to provide teledentistry-assisted dental hygiene treatment for children and adults from the dental hygiene affiliated practice demographic.

Several senior students and NAU dental hygiene graduates will be assisting the Teledentistry Program Coordinator/Principal Investigator with teledentistry-assisted dental hygiene services provided to Coconino County First Things First children beginning in October, 2009 and will be continued through May, 2010. In May 2010, members of the Class of 2011 will accompany the PI to several remote areas in Arizona to provide teledentistry-assisted dental hygiene services to First Things First children. In all cases, data will be acquired as to number of children treated, diagnostic outcomes, etc.

LESSONS LEARNED

The initial student training in teledentistry has provided these lessons:

1. Unlike many older people, today's students have grown up in the digital era. Coupled with the fact that the NAU senior students are well educated in dental hygiene and ready to enter the professional world, their familiarity with digital technologies makes for a non-intimidating learning environment, teledentistry simply makes sense to these students.

2. The TigerView software has an easy-to-use, intuitive user interface. Although TigerView provides a complete user's manual, the students were able to teach themselves how to utilize the software by simply exploring the various interface options and experimenting.

3. The learning process for using the Scan-X Duo was equally as easy. By reading through the Scan-X Duo user manual, the students quickly learned how to set the unit to process digital films. Additionally, the students learned the importance of running a cleaning strip through the Scan-X Duo on a regular basis as dust can accumulate within the Scan-X Duo and compromise the quality of the scanned image.

4. In taking digital x-rays on a DXTRR mannequin, an important lesson learned is that standard XCP x-ray film placement devices are not appropriate for use with the Nomad X-ray unit. The arm on the XCP that allows the positioning ring to slide to and from the patient's face is too long and prevents the operator from being able to have the lead-lined glass shield placed at the most distal position on the Nomad's collimator. With the lead-lined glass shield placed somewhat proximal on the collimator, the operator is less protected from scatter

radiation. If the film is exposed with the lead-lined glass shield in its most correct position, and an XCP is used, the distal end of the collimator is a few inches farther from the patient's facial area than it should be, thus exposing more of the patient's face and neck to radiation than is necessary. Upon investigation, there are a number of x-ray film positioning devices available with a shorter arm, which allow the Nomad's lead-lined glass shield to be properly positioned for maximum safety.

5. Placement of films utilizing bitewing tabs and Stabe Styrofoam positioning devices for periapical and occlusal views work well. Utilizing bitewing tabs and Stabes in the field prevents the need for on-site sterilization of XCP type devices. Although NAU have since obtained several XCP-type devices appropriate for use with the Nomad, the NAU students use bitewing tabs and Stabes as their first choice of film positioning devices — specifically because there is no sterilization required, which facilitates extending services to remote areas.

6. Because the Nomad X-ray unit has factory settings for traditional x-ray film, x-ray sensors, phosphor plates, patient size, and bitewing or periapical film placement, it was not necessary to calibrate exposure times. The students were able to take diagnostically appropriate x-rays on DXTRR at their first endeavor. The students easily created a patient file for DXTRR within TigerView, processed their films with the Scan-X Duo, and easily imported the films to DXTRR's file. Once the film images were stored within DXTRR's TigerView file, the students easily created a variety of x-ray film mounts for the diagnosing dentist.

7. Learning to use the Acclaim Intraoral Camera was also easy. The Acclaim intraoral images are viewed on the laptop screen while in the TigerView environment. Capturing an image requires only the push of a button and the image is stored within the patient's file. These images can then be exported separately or included within a typical x-ray mount view. Images collected via the Acclaim Intraoral Camera are extremely high quality. While viewing through the camera, it is possible to have the intraoral image visible full-screen on the laptop computer screen. A projector can also be attached to the laptop computer to project the images to a screen or on a wall for easier viewing by the operator. The use of a projector will be further discussed in this document.

Teledentistry in Arizona
Section C / Chapter 6
Teledentistry at a Free Annual Kiddie Clinic

Chapter contributed by:
Northern Arizona University Dental Hygiene Department

BACKGROUND

Northern Arizona University (NAU) hosts an annual Kiddie Clinic to provide dental hygiene services and complete dental examinations for local children. The annual Kiddie Clinic, which has been in existence for twenty-five years, is supported through community donations and the services of local volunteer dentists. The Kiddie Clinic provides head-and-neck examinations, dental examinations, radiographs, prophylactic dental hygiene services, dental sealants, fluoride varnish, and appropriate dental referrals to all participants.

In years past, a Kiddie Clinic provided services for up to 140 children during the all day event. Typically, processing the x-ray films for so many children caused significant delay. In 2009, the Kiddie Clinic integrated teledentistry technology to improve efficiency.

SETUP AND ACTIVITIES

The 2009 Kiddie Clinic was held in the middle of April. Ten senior students, with several weeks of training in using teledentistry equipment, were ready to provide digital radiographs and appropriate intraoral photographs to facilitate the event.

NAU uses Dentrix in the dental hygiene clinic but has not yet linked the teledentistry software to Dentrix. However, the NAU Teledentistry Program Coordinator/Principal Investigator decided it would be appropriate to store and forward the digital images to Dentrix using small, portable thumb drives.

The Kiddie Clinic would be an excellent opportunity to use teledentistry technology and to share the digital images with several volunteer dentists that provide their services in Kiddie Clinic, which would allow for evaluation of diagnostic quality. Although NAU has two complete sets of teledentistry equipment, the Teledentistry Program Coordinator/Principal Investigator decided to use only one set for the Kiddie Clinic in order to closely supervise each patient's data acquisition.

At the Kiddie Clinic, the Teledentistry Program Coordinator/Principal Investigator managed all data input. Students took the radiographs and intraoral photographs. The patients' data were exported to a thumb drive and the students opened the images for the dentists on the computer at their individual operatory.

OUTPUTS AND OUTCOMES

There were 117 children (patients) served at the 2009 Kiddie Clinic, 46 sets of digital x-rays, bitewings and occlusal views were collected, and a few intraoral photographs were taken.

Several positive outcomes occurred. The clinic dentists found the digital diagnostic data very acceptable for diagnosis. Students who had no training with the teledentistry equipment were able to use the Nomad X-ray unit and easily acquired the appropriate x-rays under the guidance of the teledentistry-trained students. Throughout the day, all of the clinic dentists visited the digital diagnostic data acquisition area and had no negative comments about the procedures they viewed. In fact, two dentists inquired about adding teledentistry to their practice.

This first experience of using teledentistry technology in the 2009 Kiddie Clinic has helped the planning for the next Kiddie Clinic in 2010. For the next event, students will use both sets of teledentistry equipment and will acquire digital diagnostic data from all of the participating children. Two separate areas will be used. By the time of the next Kiddie Clinic, students may be able to import the images directly into the clinic's Dentrix program. Data will be gathered on the number of patients seen, the dentists' opinions of the diagnostic quality of the images, students' opinions of ease of use, and suggestions from the dentists on ways to improve the outcomes.

Beginning in 2010, NAU's Kiddie Clinic will be able to routinely provide teledentistry-assisted digital radiographs and appropriate intraoral photographs – all will be acquired by students. The Spectra caries detection device will be utilized as much as possible; the use may be limited since NAU only has one Spectra at this time. Additionally, parents can be screened with the Velscope for intraoral cancer if they choose to participate.

LESSONS LEARNED

Several lessons were learned with integrating teledentistry technology at the 2009 Kiddie Clinic:

1. It became apparent that the small screen on the laptop computer was not conducive for easy viewing when trying to take intraoral photographs and the thought of utilizing a projector to project a large view of the computer screen seemed appropriate.

2. Too many people present at the event hindered the data acquisition process.

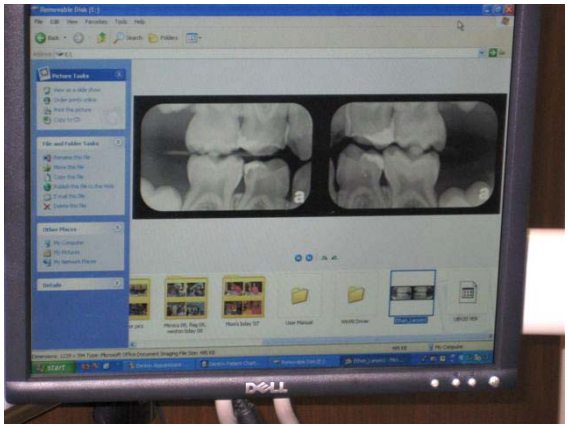
3. Young children tended to bite the occlusally-placed phosphor plates and damaged them.

4. The success of this limited first endeavor to use teledentistry in a “free dental clinic event” proved that teledentistry-assisted data acquisition is very successful in providing diagnostic data to the clinic at a much improved and efficient pace. In the future, NAU’s Kiddie Clinic may be able to serve more children during the one day event with a fixed amount of time for dental treatment.

Teledentistry in Arizona
Section C / Chapter 7
Teledentistry for Head Start & Community Outreach

Chapter contributed by:
Northern Arizona University Dental Hygiene Department and
Northern Arizona Council of Governments Head Start

BACKGROUND



Annually, Northern Arizona Council of Governments (NACOG) Head Start provides services to more than 1,500 preschool age children (including 100+ prenatal moms, infants and toddlers) at twenty-six local centers in four counties covering 27,000 square miles of rural northern Arizona. Only eight centers are located within a thirty minute drive from Flagstaff; the other centers are located one to more than three hours drive one way from Flagstaff. Currently, children living in Navajo or Apache counties who require specialized services from a pediatric dentist must be referred to a pediatric provider in either Flagstaff or Phoenix with Flagstaff being the closest. NACOG Head Start has contracted a pediatric dentist, who has a private practice located in Flagstaff, as a specialist provider.

Discussions between the Northern Arizona University (NAU) Teledentistry Program Coordinator/Principal Investigator, the NACOG Health Start Health Services Manager, and the NACOG contracted pediatric dentist led to piloting a Head Start community outreach model for teledentistry. A partnership of NAU and NACOG was established to conduct the pilot project in June 2009. The community outreach model was set up to bring teledentistry equipment to local United Way of Northern Arizona KinderCamps in Flagstaff. (KinderCamp children include both Head Start children and preschool children from the Flagstaff unified school district who are ready to transition into Kindergarten.) A teledentistry team collected oral health assessment data, delivered preventive care (applied fluoride varnish), stored and forwarded oral data to the pediatric dentist, and facilitated entry to a dental care delivery system (NACOG Head Start and the contracted pediatric dentist).

SETUP AND ACTIVITES

As part of the NACOG Head Start and NAU partnership, NACOG's contracted pediatric dentist and the NAU Teledentistry Coordinator/Principal Investigator (an Affiliated Practice Dental Hygienist) established an affiliated practice. This allowed the NAU Teledentistry Coordinator/Principal Investigator the option of delivering preventive services typically provided by dental hygienists at the Head Start Kindercamps.

Joining the teledentistry team was one of pediatric dentist's newly employed dental hygienists, a 2009 NAU dental hygienist graduate who was trained in teledentistry. She traveled with the NAU Teledentistry Coordinator/Principal Investigator to the Kindercamps to support service delivery and brought the store and forward oral health data back to the pediatric dental office.

The pediatric dentist provided medical history and permission-to-treat forms to the NACOG Head Start Health Services Manager. The Health Services Manager had all of the documents completed prior to the arrival of the teledentistry team.

The equipment was setup in an empty classroom and KinderCamp children were brought in for an oral health assessment. Each child also received fluoride varnish application. Small chairs and small tables from the kindergarten classroom were used to accommodate the children. Parents were not present during the procedures. The dental hygienist from the pediatric practice had high skills in pediatric patient-management, which were of significant value to the teledentistry process of collecting oral health data. Data acquired included a review of the medical history, questions regarding the young patients' chief complaints and current home care, a head-and-neck assessment, charting existing conditions, intraoral photographs, occlusal and bitewing digital x-rays. Digital information was transmitted via a store and forward mechanism (along with paper forms used to record other oral health information) to the pediatric dentist.

OUTPUTS AND OUTCOMES

During two five-hour periods at the Kindercamps, 28 five-year-old patients were seen and all onsite services originally planned were provided by the teledentistry team.

After the store and forward oral health data (e.g., digital radiographs and intraoral photographs) and other dental forms (e.g., medical/dental histories and dental chartings) were provided to the pediatric dentist, he completed the dental examinations, made diagnoses, and developed treatment plans for all 28 children. The parents/primary caregivers of the children needing further dental treatment were contacted by the pediatric dental office and the children were scheduled with the pediatric dentist in his Flagstaff office. The pediatric dentist believes that the Head Start community outreach model using teledentistry is efficient and plans to further integrate and expand the use of the technology in his practice.

The children, with a few exceptions, were very cooperative with the teledentistry team. Those who were uncooperative were afraid because they had previous and extensive dental procedures. One child, who was very anxious, asked if we were going to, "give [him] a shot." The teledentistry team obtained digital diagnostic data from almost all of the children and did not push procedures for those who were overly anxious.

When the teledentistry team began bringing the children in small groups, rather than individually, the children all behaved more cooperatively. They liked the Nomad X-ray unit, which we referred to as our camera. Size-one digital x-ray films were appropriate for the bitewing x-rays, size-two films were appropriate for the occlusal films. All of the children liked seeing their own and their peers' digital x-rays and intraoral images. The teledentistry team quickly learned it was appropriate to seat the children in a position so they could easily see their digital images, which helped keep the children seated in an appropriate position to gather the data.

LESSONS LEARNED

Several lessons were learned from the Head Start community outreach pilot project:

1. To avoid phosphor plate damage while taking occlusal films, film-holding devices were used to prevent the children from biting the phosphor plates. This presented a problem in that the film-holding devices required sterilization for repeated use. A sufficient number of film-holding devices were available so that the process was not hindered. The NAU Teledentistry Coordinator/Principal Investigator has since purchased Stabe styrofoam film-holding blocks, which are inexpensive and disposable.

2. During the first screening session, children were brought to the examination area one at a time; this was time consuming and perhaps a bit frightening for the children. An adjustment was made in the following session and the children were brought in groups of three, which was less intimidating for the children and more time efficient for the teledentistry team.

3. A projector was used to display the intraoral images on the wall, which allowed much easier image acquisition for the operator. This also entertained and engaged the children in the process of gathering their intraoral photographs.

4. The NACOG contracted pediatric dentist was able to efficiently triaged and diagnosed from the acquired oral health data (digital data and dental forms) and has began seeing the children in his dental office to provide needed dental care.

Teledentistry in Arizona
Section C / Chapter 8
Introducing Teledentistry Through a Business Model

Chapter contributed by:
Northern Arizona Council of Governments Head Start

BACKGROUND

Northern Arizona Council of Governments (NACOG) Head Start, a non-profit organization, provides comprehensive programming to children and families throughout Apache, Navajo, Coconino and Yavapai counties in Northern Arizona. Program services include dental care for Head Start children and are coordinated in 26 local Head Start centers in the four rural counties. One challenge to providing dental care for preschool children is access to pediatric dental specialists. For example, in Navajo and Apache counties, there are no pediatric dentists.

Children living in Navajo or Apache counties who require specialized pediatric services must be referred to a pediatric provider in either Flagstaff or Phoenix. Although Flagstaff is the closest, for some families, a one-way drive can take three hours. Typically, pediatric referrals require a minimum of two trips: the first trip for a dental examination and the second trip for treatment. These travel distances present barriers for families in obtaining dental care for their preschool children:

- low income families typically have less reliable transportation to travel these distances and the travel expense may be a hardship.
- parents cannot afford to miss two full days of work in order to travel to Flagstaff.

SETUP AND ACTIVITIES

NACOG's Vision of Using Teledentistry

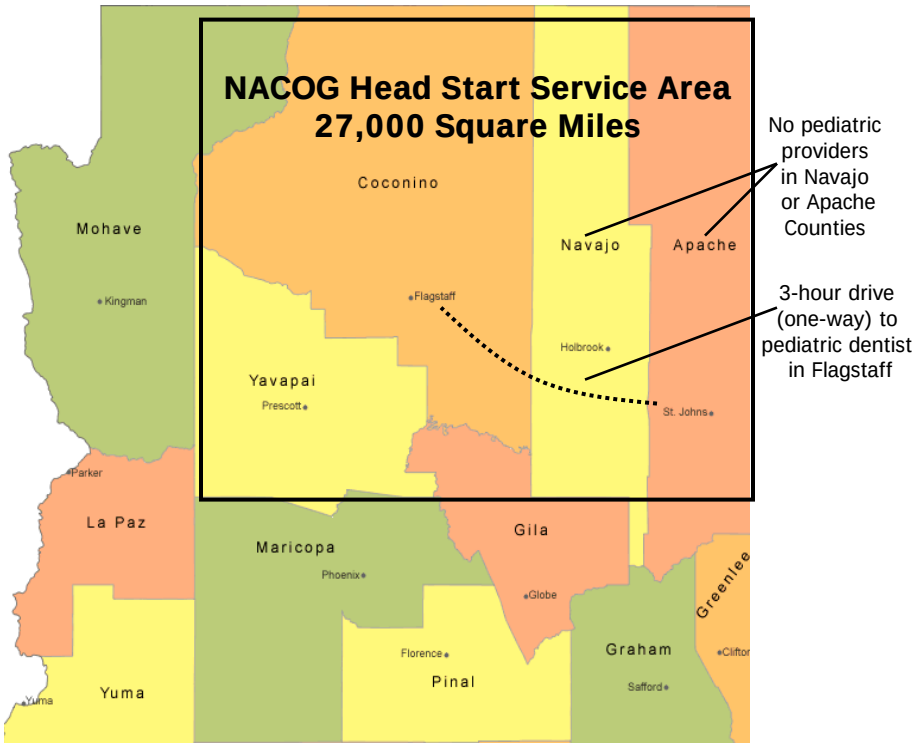
Through the use of teledentistry equipment provided by the State of Arizona's Office of Oral Health, NACOG Head Start's proposal was to solicit a Flagstaff, Arizona based pediatric dentist to provide specialized services in the underserved areas of Northern Arizona. The teledentistry equipment would enable the pediatric dentist to send out trained dental staff to the local underserved area on a routine basis.

The dental staff would provide an oral assessment of the preschool child by collecting data using teledentistry equipment (including digital radiographs and intraoral photographs) as well as record other dental data such as a medical/dental history and tooth charting (including suspected tooth decay, existing fillings, tooth mobility and adjacent soft tissue observations). Oral data would then be either transmitted real time or via a store and forward mechanism to the primary office for the pediatric dentist to establish an appropriate treatment plan for the child. The use of teledentistry technology would eliminate the need for travel to Flagstaff for the first dental visit and would provide a mechanism for triage and scheduling of the second visit for treatment.

The pediatric dentist would have the option to schedule the child for treatment at either of two locations:

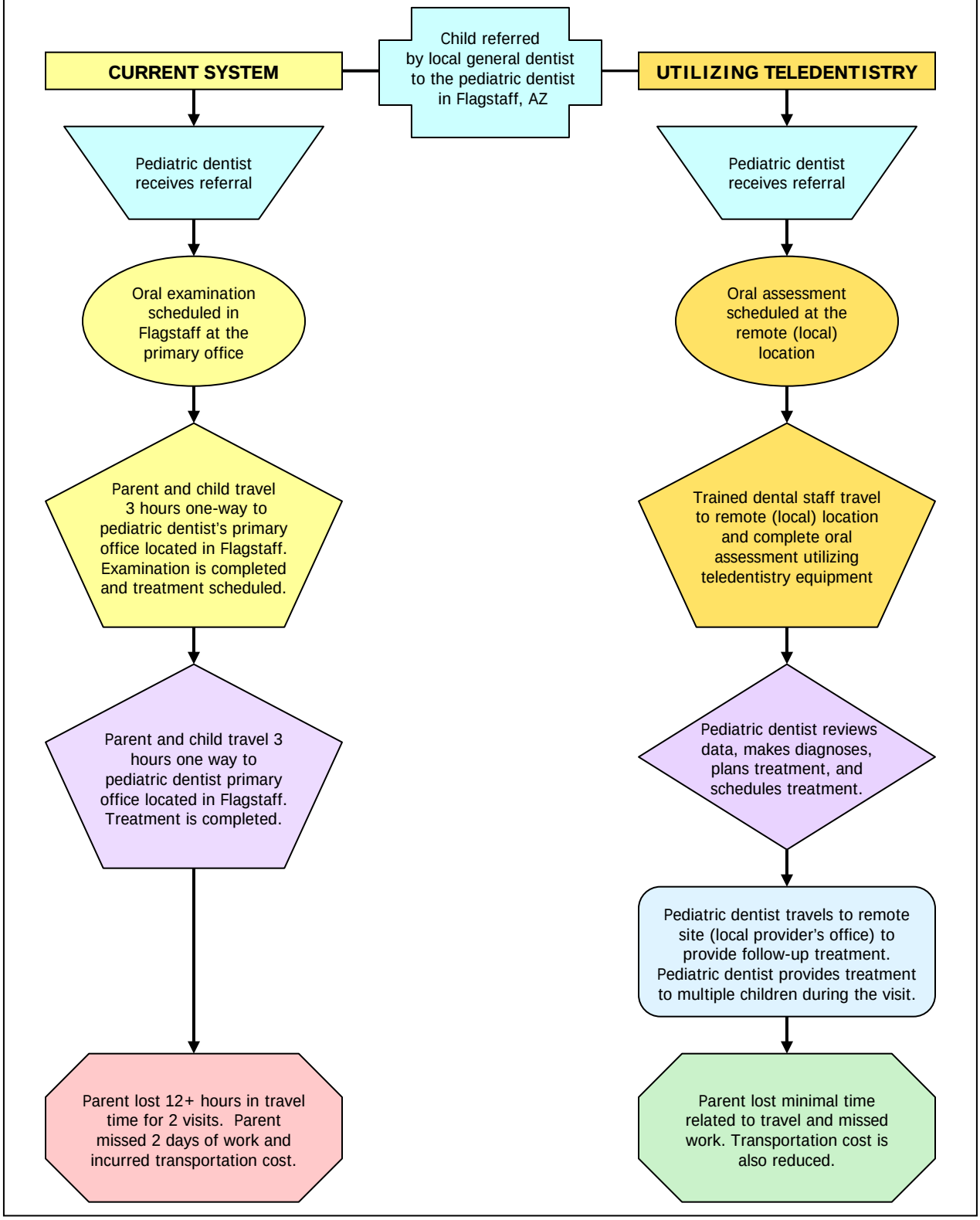
1. The primary office – The pediatric dentist can treat the child in his Flagstaff dental office.

2. The remote office – The pediatric dentist can established a partnership with a dentist to utilize a local dental office (e.g., in Navajo or Apache counties) to deliver treatment. This local office would mean shorter travel distances for the parent and child. To maximize efficiency, the pediatric dentist could schedule several children during his treatment day at the remote office.



The figure below illustrates the NACOG Head Start's current system to obtain pediatric dental care. A local dentist refers a child to the pediatric dentist in Flagstaff. The parent and child must travel to the pediatric dental office for an examination and return for a treatment visit. The figure below also compares this current system to the vision of integrating teledentistry for pediatric dental care.

A Comparison of NACOG Head Start's
Current System and Utilization of Teledentistry for Pediatric Dental Care



Current Relationship with a Pediatric Provider Group for Teledentistry

NACOG Head Start currently has dental service contracts with twelve (12) dental providers throughout Northern Arizona including three (3) pediatric dentists. In 2006, a local pediatric dentist joined NACOG Head Start's Health Services Advisory Committee and his dental group was contracted as a dental provider – Flagstaff Pediatric Dentistry (a private practice with three pediatric dentists). The provider group agreed to support the NACOG teledentistry project. Several delays occurred since the initial agreement including a change in ownership of the practice. In January 2009, the transfer of ownership was completed and the practice, now called the Around the Mountain Pediatric Dentistry (ATMPD), continued its support of the NACOG teledentistry project.

A Need for a Tool to Introduce Teledentistry and to Structure Discussion

In contracting a pediatric dentist for the NACOG teledentistry initiative, the NACOG Health Services Manager had negotiated with three pediatric dentists over a span of two years. For each provider, the Health Service Manager needed to have a series of discussions to convey information about the purpose of the teledentistry project, the vision of how teledentistry can be integrated into a private practice, and how the pediatric dentist and support staff would use the technology to improve access to care for Head Start children. As a result, it became evident that a tool was needed to help private dental practitioners learn and understand how teledentistry can fit into their practices. The Health Services Manager decided that a business model should be developed for this purpose.

Developing a Business Model

During this period, discussions and conversations continued on how to best utilize the teledentistry equipment to create a win/win situation for both the dental provider and NACOG Head Start. One of the most important questions considered when approaching teledentistry in a private practice setting is the "WHY?". The business aspect of private practices will require the dental practitioners to give full consideration to WHY should teledentistry be integrated into the practice. Reasons include the following:

1. Business Expansion – In some instances, a provider may be considering expanding their client base but wants to build up the client base before investing significant startup capital. The utilization of teledentistry is a way of performing basic clinical services in a desired market area to establish the dental practice. It is also a way to determine if the local market will sustain the expansion and provide for the recoupment of the capital investment over the desired period, such as establishing another "bricks and mortar" dental office.

2. Enhancement of Operational Efficiency – Another consideration for utilizing teledentistry is the improvement of overall operational efficiency. This is particularly useful when

serving remote clients or when the number of failed appointments is high. By taking the services to the client instead of expecting the client to drive significant distances for basic services can generate higher appointment compliance. Further, when serving low income families, reliable and affordable transportation is often a barrier to services.

3. Charitable Benefits – A provider may wish to provide free services at health fairs and health promotion events. By utilizing teledentistry equipment, the provider is able to provide a more thorough examination and utilize the immediate results to converse with clients and the parents of children on dental needs.

While the original concept was to reduce the number of trips the parent and child had to travel to a pediatric dental practice in Flagstaff for care, the project evolved over time to incorporate more business considerations including the expansion of the current ATMPD practice into NACOG's eastern service region. The plan has continued to evolve into a broader concept with future plans of having a "bricks and mortar" facility with eventually opening a remote or satellite office in the eastern service region and someday recruiting and permanently placing a pediatric dentist in the region.

Having no practical experience utilizing the teledentistry equipment, ATMPD was able to utilize the Northern Arizona University Teledentistry Coordinator to provide onsite training to staff during the summer of 2009. The collaboration and partnering between NACOG Head Start (with ATMPD) and NAU have not only initiated the development of the business model but have also developed a training protocol for private practices who will implement teledentistry.

OUTPUTS AND OUTCOMES

NACOG Head Start is developing a business model for introducing teledentistry to private practice. In order for NACOG to make the teledentistry project sustainable for the long term, a business model is needed in order to substantiate that teledentistry is a financially viable means to conduct business for the private provider.

One of the primary considerations for the business model is "can you build a plane while in flight without crashing". In other words, is it financially feasible to integrate teledentistry into an existing dental practice without causing negative financial and operational outcomes? Will existing and future referral sources be threatened by the possibility of services being provided in their "back yard"?

1. A Business Model Template in Development:

   As part of the ongoing process, NACOG Head Start and ATMPD have developed core questions to be answered during the implementation of teledentistry in a private practice. The questions are not all inclusive and are only the beginning of a full business analysis model that is in development. These questions, listed in **Attachment 1**, are only the

beginning of what will be used to create spreadsheet data models for future private providers to use when considering the integration of teledentistry in their practices.

2. Future Plans for the Business Model Template

   NACOG Head Start will continue the development of the business model with these next steps:

   - Work with ATMPD and additional providers to answer the questions in **Attachment 1** with actual practice financial data. This will lead to the development and vetting/selection of an Excel spreadsheet data analysis model. It is anticipated that the model will allow prospective teledentistry providers to load their existing data and also make certain assumptions. The model can then help dental practitioners make informed decisions about integrating teledentistry into their practices.
   - Develop a marketing video "Introduction to Teledentistry" to inform and educate dental practitioners.
   - Explore and enlist partners to support and develop a "loaner" program for providers to initiate teledentistry with lower startup capital equipment costs.
   - Address policy development to allow teledentistry to advance in Arizona (e.g., Medicaid reimbursement policies and practice laws).

   By developing and field testing this business model, NACOG plans to have a full model completed in 2010. Having an operational model in place will allow for the introduction of teledentistry to other private dentists throughout Arizona. NACOG Head Start will seek out additional partnerships and collaboration with other teledentistry pilot programs to promote the exchange of ideas and information to better promote teledentistry.

   When the business model is completed along with supplemental spreadsheet for data analysis, NACOG Head Start anticipates using it to introduce teledentistry to other general dentists and specialists contracted by NACOG; these practitioners may become additional partners who will utilize teledentistry in their practices to improve dental access for not only Head Start children but other underserved populations. In addition, NACOG will share this business model statewide as a tool to help practitioners in the private and public sectors learn about teledentistry by considering the business aspects of integrating the technology into dental practices.

   While the current teledentistry project has been focused on the provision of services to children, the business model will be developed with an "open end" structure that will allow it to be utilized by dental providers outside the pediatric specialty. Dental professional serving the geriatric population could utilize the teledentistry business model to explore the provision of services to resident in long term nursing facilities and assisted living facilities where access to dental services has historically been limited.

LESSONS LEARNED

Several lessons were learned:

1. The utilization of teledentistry to bridge long distance between providers and patients opens up possibilities and considerations in how a remote (spoke) dental site should operate and connect with the primary (hub) site for maximum efficiency. For example,

NACOG Head Start and its teledentistry providers will need to consider the “best” setup of a remote/spoke site in terms staffing, facility, equipment and administrative tasks:

- What will be the ideal dental team at a remote/satellite site and how will they connect with the primary office or hub site? Will a core 3-staff team be the most efficient and which combination of dentist, dental hygienist, dental assistant, and administrative staff will work best with the primary office?
- A preview of each remote/spoke site will provide an advantage in assuring adequate space for the dental examination/treatment area, access to electrical outlets, and appropriate furniture for setting up the teledentistry equipment.
- In addition to teledentistry equipment, portable dental chairs and dental lights may be needed for easier and efficient delivery of dental care services. For example, taking digital radiographs with the child sitting in a portable dental chair instead of a regular office chair will improve positioning.
- Having Internet access will allow completing same-day insurance verifications. Head Start centers can provide online access via their computers but other community settings may not provide such access.

2. The teledentistry dental team (dentist, dental hygienist, dental assistant and other support staff) will have a learning curve in becoming competent in the use of the teledentistry equipment, efficient in the setup of equipment and the dental treatment area, and proficient in the scheduling and time management of patients in a remote site. For example, initially the teledentistry team took about 30-45 minutes to complete their setup to receive the first patient but the process became easier and more efficient with each child.

3. Implementing teledentistry in a private practice setting took longer because of the pediatric dentist had time constraints and could only allot limited time for the project during clinical days. A longer timeline than expected may be needed for planning and setting up teledentistry due to other clinical demands on the dental providers and support staff.

4. Teledentistry provides additional options to introduce dental care and manage young children. For example, Head Start children are at ease in the Head Start centers, which are more familiar space and surroundings. Further, more points of entry to the NACOG dental care delivery system can be created by bringing teledentistry equipment and technology into other remote settings as efforts in community outreach.

Attachment 1

A Business Model Introducing Teledentistry in a Private Practice Data Analysis Questions

The following questions will guide an analysis to compare the benefits and costs related to integrating teledentistry into a private dental practice. The questions are representative of general dental practices and do not include additional cost/revenue assumptions that may be relevant to specialized services.

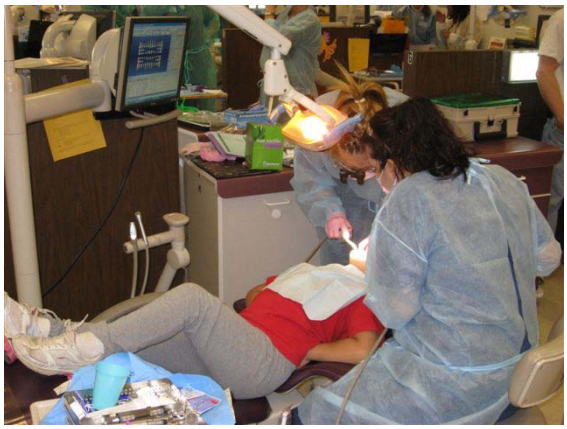
Question	Pre-Teledentistry	Post-Teledentistry
1. Staffing patterns: a. Dentist b. Dental Hygienist c. Dental Assistants d. Support/Administrative Staff		
2. Number of new patients per 30 days being added to the practice		
3. Number of procedures delivered per hour: a. Dentist b. Dental Hygienist c. Dental Assistant		
4. Average number of procedures per patient		
5. Total number of work hours available by category: a. Dentist b. Dental Hygienist c. Dental Assistant		
6. Non-Clinical Operating Costs		
7. Clinical Operating Costs		
8. What is the overhead cost per patient?		
9. What is the cost per patient ratio to handle X number of new patients?		
10. Can you increase number of procedures provided at remote location without a direct increase in overhead costs? Does the increase in procedures delivered provide a higher rate of return?		
11. How much capital equipment costs is needed to start up teledentistry in my practice and what indirect costs are associated – such as software and computer upgrades?		
12. What is the rate of return for the capital investment? How long will it take to recover the investment in the teledentistry equipment?		
13. Other indirect costs such as training?		

Teledentistry in Arizona
Section C / Chapter 9
Teledentistry Communication

Chapter contributed by:
Northern Arizona University Dental Hygiene Department

BACKGROUND

In Arizona, teledentistry was initiated in 2006 with the support of a three-year oral health workforce grant from the Health Resources and Services Administration (HRSA) Bureau of Health Professions. During the course of the grant, five provider sites developed their teledentistry program. For this early stage of teledentistry, it is important to communicate the progress made, lessons learned and plans for future efforts to a wide range of audiences who may become supporters in expanding teledentistry in the state.



Northern Arizona University (NAU) Dental Hygiene Department, one of the first five teledentistry providers in Arizona, has provided communication on their teledentistry model and experience. NAU's communication is educating stakeholders on teledentistry and building linkages with potential partners.

SETUP AND ACTIVITIES

The NAU communication on teledentistry included presentations at the following events:

1. NAU College of Health and Human Services' Leadership Council Meeting – June 2009
2. The State of Arizona Head Start's 2009 Oral Health Forum
3. The Arizona Public Health Association's 2009 Annual Conference
4. Arizona Telemedicine Council Meeting – October 2009

An example of how NAU's communication can help advance teledentistry in Arizona is the linkage established with the Arizona Telemedicine Council. The Arizona Telemedicine Council

has been created by the Joint Legislative Budget Committee of the Arizona State Legislature and chaired by the Chairs of the House and Senate Appropriations Committees. The Council provides oversight for the Arizona Telemedicine Program and the development of its telecommunications network. When the Arizona Telemedicine Council invited NAU to present teledentistry at one of their meetings during the fall of 2009, an opportunity presented to NAU to network with this leadership group and to connect teledentistry and telemedicine in the state.

The NAU teledentistry presentation was well received by the Arizona Telemedicine Council and its various allied members including the Arizona Senate President Bob Burn. Following the presentation, NAU's Dental Hygiene Program Chair had the opportunity to discuss teledentistry-assisted affiliated practice dental hygiene with Senator Burn.

OUTPUTS AND OUTCOMES

NAU's communication on teledentistry has resulted in these added linkages:

1. The NAU Dental Hygiene Department has been asked to provide teledentistry-facilitated oral cancer screenings for the NAU athletes on an ongoing basis beginning in the fall semester of 2009.

2. NAU has been asked to facilitate teledentistry screenings and services for Coconino County Health Department. This will engage NAU dental hygiene students in public health projects for their training.

To further teledentistry, NAU will be gathering data to analyze outcomes and track opportunities to provide teledentistry services resulting from various communications. A coordinated effort in communications and building linkages will be explored with the other Arizona teledentistry providers.

LESSONS LEARNED

Several lessons were learned:

1. More communication on teledentistry is needed for providers, program administrators, policymakers and funders to establish linkages, form partnerships, and build infrastructure for teledentistry in Arizona. Further coordination with all teledentistry providers in Arizona on developing key messages will be beneficial in helping a wide range of audiences understand the teledentistry efforts in Arizona.

2. The current teledentistry providers in Arizona can help allay any hesitation on the part of the dental community to provide teledentistry services based on their experiences. The teledentistry providers can share their successes to help acknowledged the advantage of having multiple dental professionals form a teledentistry team and using available technology to connect providers and patients over distance to improve access to dental care.

Teledentistry in Arizona

Section D

Future Efforts

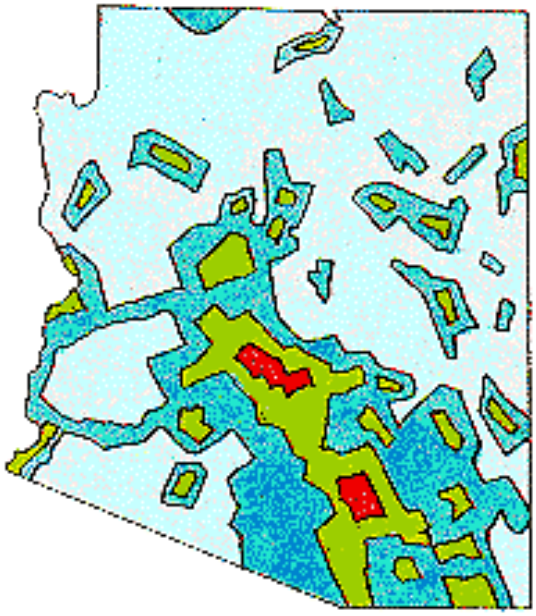
Teledentistry in Arizona
Section D / Chapter 1
Future Efforts to Advance Teledentistry in Arizona

Future Efforts to Advance Teledentistry in Arizona

Future efforts in the advancement of teledentistry in Arizona will address these needs as reported by the initial five teledentistry providers:

- *Infrastructure Needs:* Establish advisory committee/council; develop linkages with state leadership, existing oral health coalitions and other influential stakeholders; develop provider retention and recruitment strategies.
- *Policy Needs:* Develop a policy agenda; clarify practice laws; assess the need of legislation changes.
- *Communication Needs:* Raise awareness of teledentistry practice; develop, gather and provide access to resource materials for enhancing their practices; disseminate information to replicate improved access to care strategies.

Arizona Population Density



New HRSA Grant Supporting Teledentistry in Arizona

In 2009, the Arizona Department of Health Services, Bureau of Women's and Children's Health, Office of Oral Health responded to the HRSA Oral Health Workforce grant announcement and submitted a program proposal to improve accessibility of oral health services for underserved populations and areas in Arizona by improving the oral health workforce. A grant was awarded to Arizona and will begin in FY 2009-2010.

The grant funding will support a 3-year program, *Improving Arizona's Oral Health Workforce through the Promotion of Enhanced Dental Teams Utilizing Teledentistry Practice and/or Affiliated Practice*. The proposed program goal is to promote and develop enhanced dental teams, utilizing teledentistry practice and/or affiliated practice, to improve workforce capacity, diversity and flexibility for providing oral health services to underserved populations and underserved areas. The program objectives are:

1. Build and expand regional/local program development infrastructure;

2. Train providers for enhanced dental teams and increase provider understanding and competencies for teledentistry practice and affiliated practice;

3. Educate and increase awareness of program administrators, policymakers and funders about enhanced dental teams and how teledentistry practice and affiliated practice can increase workforce capacity and flexibility in community settings;

4. Increase the number of enhanced dental teams at the state, regional and local levels;

5. Develop and gather resource materials, tools and lessons to support development of practice models, making this information accessible to providers, programs and communities.

Activities will include developing advisory committees to address barriers/challenges for teledentistry practice and affiliated practice; building linkage with the state's oral health coalition; training providers on teledentistry technology; and gaining the support of regional partnership councils for enhanced dental teams. Activities will also include implementing three demonstration practice models striving for best practices to serve preschool/school-aged children and educate their parents/primary caregivers. The program will use communications to develop support networks, provide resource information on a Website, and share lessons/successes at the national, state and local levels.

All of the initial five teledentistry providers have committed to being an integral partner of this new grant program. They will build and support the leadership needed to advance teledentistry and will work together to address the infrastructure, policy and communication needs of teledentistry in Arizona.

Teledentistry in Arizona

Section E

Appendices

Teledentistry in Arizona
Section E
Appendix A: Regulations

Regulations

The goal of this grant is to provide underserved populations with examination, consultation, and referral services for both basic and specialized oral healthcare. In addition to the main goal the grant's intent is to deliver these services under the state statutes, rules and regulations.

The Arizona Statute 32-1281 for dental hygienists reads as follows:

Article 4 Licensing and Regulation of Dental Hygienists
32-1281 Practicing as dental hygienist; supervision requirements; definitions
Sec E.a dental hygienist shall practice under the general supervision of a dentist licensed pursuant to this chapter.

Sec I.
#2. "General Supervision" means that the dentist is available for consultation, whether or not the dentist is in his office, over procedures which the dentist has authorized and for which the dentist remains responsible.

3) Arizona Revised Statutes 32-1281,

Sec B.
Only a licensed dental hygienist or dentist may perform the following:
1. Prophylaxis
2. Scaling
3. Closed subgingival curettage
4. Root planning
5. Administering local anesthetics and nitrous oxide
6. Placing of periodontal sutures as prescribed in subsection F
7. Examining the oral cavity and surrounding structures
8. Periodontal examination
9. Recording of clinical findings
10. Compiling case histories.

Sec C.
A licensed dental hygienist may:
1. Expose and process dental radiographs
2. Perform all functions authorized and deemed appropriate for dental assistants.

Sec D.
The Board by rule shall prescribe the circumstances under which a licensed dental hygienist may:

1. Apply preventative and therapeutic agents, used in relation to dental hygiene procedures, to the hard and soft tissues.
2. Use emerging scientific technology and prescribe the necessary training, experience and supervision to operate newly developed scientific technology.
3. Perform other procedures not specifically authorized by this section.

Arizona Statutes and Arizona Administrative code do not directly address teledentistry. However, both the statutes and rules read together may support the need for teledentistry in a limited fashion.

Whether a dentist may utilize teledentistry to examine a patient, diagnose a condition to be treated, and authorize procedures that a dental hygienist may perform and satisfy the general supervision requirement is not addressed in either the State statutes or administrative code.

Teledentistry in Arizona
Section E
Appendix B: Reimbursement

Reimbursement

The ability of providers to bill and collect fees for dental services provided through teledentistry is a primary issue for sustaining such models. If reimbursement systems are not in place these models are not likely to continue.

Reimbursement for telehealth services is limited and reimbursement for teledental services is almost non-existent. The U.S. Department of Health and Human Services, Centers for Medicare and Medicaid Services (CMS) administers Medicare and Medicaid programs in the United States. CMS recognizes telemedicine not as a discrete medical procedure, but rather as a method for delivering care.

The Medicare program, permits reimbursement for telehealth in rural health professional shortage areas (HPSAs) in three areas: remote real time patient-to-provider services seen via live video conferencing; non face-to-face services that can be conducted either through live video conferencing or via store and forward telecommunication services; and for home telehealth services. Dental services for Medicare patients are not required of states and therefore teledental services are not reimbursable under Medicare.

In the Medicaid program, which covers dental services for eligible children, pregnant mothers and some adults, allows each state to elect whether they will reimburse for telehealth and teledental services. As such, Medicaid reimbursement for telehealth services varies from state to state. In 2003, 34 states had some reimbursement for telehealth services. Arizona's Medicaid program the Arizona Health Care Cost Containment System (AHCCCS) does reimburse for telehealth services. Currently there is no policy at AHCCCS that addresses teledental services.