Dental Therapists

A Promising Practice for Frontier Communities

A report by the National Center for Frontier Communities prepared in consultation with the Frontier and Rural Expert Panel.

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Background

An alarming number of Americans lack adequate dental care. Over 47 million Americans live in the one of the 4,000 Dental Health Professional Shortage Areas across the U.S., many of which are located in rural and frontier areas. To address this shortage, several states are developing new workforce models. This paper describes one of these models, called the Dental Therapist (DT) model, which is currently operating in Alaska and Minnesota. The components of the program, competencies and scope of DTs, training requirements, and current funding of DT activities are summarized, and key policy and regulatory issues regarding the DT model are discussed.

Conclusions

The dental therapist profession has existed for over 50 years internationally, however it is an emerging profession in the U.S. The model has shown promise for improving oral health in remote Alaska Native communities, and in the coming years the Minnesota dental therapist program will provide examples of the use of DTs in new rural and urban contexts in the U.S.

The dental community has not yet reached a consensus as to the contexts and conditions in which DTs should practice in the U.S. Dentists, dental schools, and oral health advocates all have an important role to play in defining how to integrate DTs into the oral care system, and the appropriate scope and training requirements for DTs. One strategy that is currently being pursued to ensure the integration of DTs into the dental community is the creation of a set of national accreditation standards for DT training programs.

Several steps need to be taken to ensure that new DT programs are successful. Trainers and dentist supervisors will need to learn new teaching techniques so that they can engage in the competency-based training required for DTs. It is also essential to train dentists on how to work in larger teams with a more diverse mix of skills. Additionally, policies for regulation, reimbursement, and malpractice must be put into place before DTs can enter the workforce.

To date, few studies have been conducted on the outcomes of patients treated by DTs in the U.S. Now is an ideal time to conduct such studies, because DT models are now operating in both Alaska and Minnesota. The cost implications of DTs in the United States for dental practices, payers, and the oral care system overall also merit further study. Cost implications will vary depending on the reimbursement policies that are created by federal agencies, private insurers, and regulatory bodies.

Finally, DTs are intended to improve oral health in underserved communities. Incentives and regulations are needed to ensure that DTs practice in these communities.

1 Introduction

In recent years, increasing attention has been paid to the poor state of oral health in the United States. Between 1999 and 2004, an estimated 24% of children aged 2 to 8 years had untreated dental caries, a bacterial infection which causes tooth decay.[1] According to the Surgeon General, caries is "the single most common chronic childhood disease."[2] Dental caries is a preventable disease which disproportionately affects minority ethnic groups and the poor. In fact, the American Academy of Pediatrics found poverty to be the greatest risk factor for contracting Early Childhood Caries.[3]

The growing concern regarding oral health in the United States has led state and federal policy makers, dental providers and advocates in the United States to consider various ways to expand and enhance the dental workforce, including the implementation of new workforce models. Edelstein (2011) divides the new models in the United States into two categories, namely

1. New dental care providers in the United States: Alaska Dental Health Aide Therapists (DHAT) and the two types of Minnesota Dental Therapists
2. Additional new providers being developed by dental organizations: The ADA's Community Dental Health Coordinator and the American Dental Hygienists' Association's Advanced Dental Hygiene Practitioner (ADHP).

The activities performed by each of these dental professionals are compared to the activities traditionally performed by dentists in

Table 1.

2 Background: Oral health today

Lack of oral care is a problem which affects millions of Americans. According to the Pew Center on the States, over 31 million Americans "have no reasonable expectation of finding a dentist in or near their community."[5] The problem is most severe among racial/ethnic minority groups[6,7] and the poor.[3,8] As of February 1, 2012, there were 47,692,297 people living in a Dental Health Professional area nationally,[9] see Figure 1.

There is a variety of factors which influence an individual's oral health status, including access to oral care, lifestyle factors such as eating habits, and inherent factors such as race.[10] The lack of access to oral care experienced by many Americans has been attributed in part to a dental workforce shortage. Four thousand areas are federally designated as dental professional shortage areas.[5] This shortage can be attributed not only to the absolute number of licensed dentists, but also to their geographic distribution, ethnicity, practice orientations, and education.[11]

Table 1: Scope of Dental Services Delivered by Traditional and Proposed Dental Providers[4]

Provider type	Advanced restorative care	Diagnosis and treatment planning	Basic restorative care	Preventive care including cleaning below gum line	Preventive care including coronal polishing
Dentist					
Dentist	X	X	X	X	X
Combination dental therapist/dental hygienists					
ADHP		X	X		X
MN Advanced DT		Limited	X		X
MN OHCP			X	X	X
Dental therapists					
AK-DHAT		Limited	X		X
MN Basic DT			X		X
Dental hygienists					
DH				X	X
Exp. function DH			Partial	X	X
Dental assistants					
DA			Partial		X
Community dental health coordinator					
CDHC					X

ADHP, Advanced Dental Hygiene Practitioner; MN, Minnesota; DT, Dental Therapists; DH, Dental Hygienists; DA, Dental Assistants; CDHC, Community Dental Health Coordinator; OHCP, Oral Health Care Practitioner.

2.1 Number of dentists

There is some disagreement about the extent of the current and future dental workforce shortage. A large group of advocates and researchers believe that there is currently a provider shortage, and that this shortage will continue to increase. For example, the Pew Center on the States has estimated that 6,645 new dentists would be needed to eliminate the current dental professional shortage areas.[5] The dentist-to-population ratio is also expected to increase from 1:1724 in 2009 to between 1:1898 and 1:2222 by 2020.[11] Additionally, 5.3 million children who are currently uninsured will receive dental insurance by 2014 due to the Affordable Care Act, further increasing the demand for oral care.[5] The American Dental Education Association (ADEA) has also noted that while 12 new dental schools have been established in the U.S. since 2000, this is an increase of just 5 schools compared to the number of schools in 1982. ADEA also notes that "[i]ncreases in the U.S.

dentist workforce are not consistent with increases in the U.S. population" and that "[t]he effect of the openings of new dental schools will be in the long-term and not the short-term."[12]

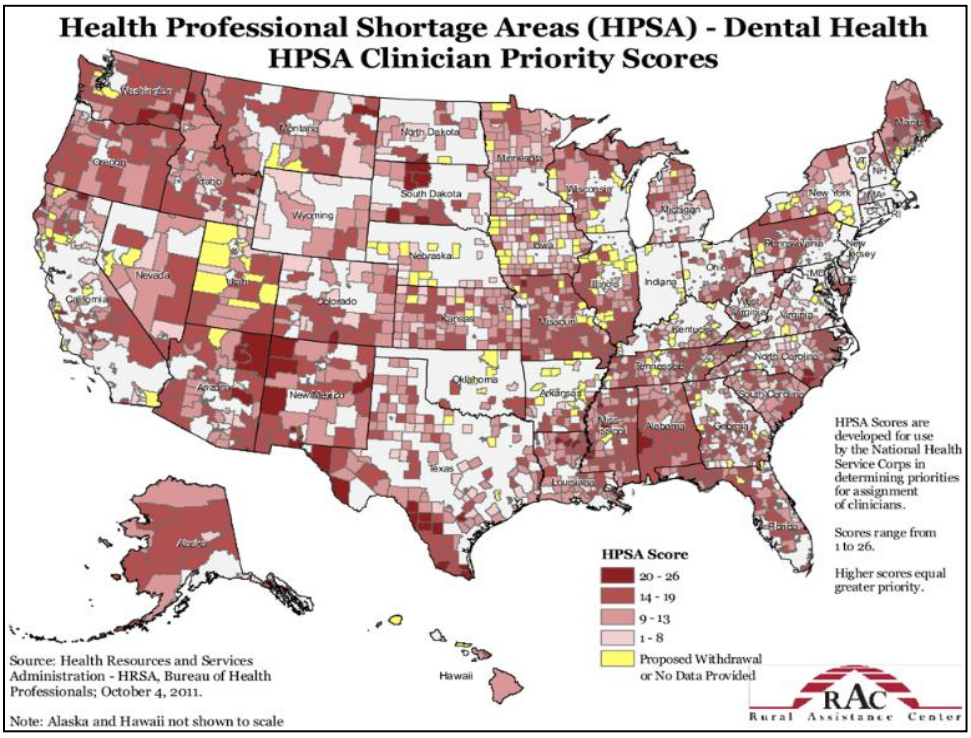

Figure 1: 2011 Dental Health Professional Shortage Areas

On the other hand, a recent American Dental Association (ADA)-sponsored study projects that while the dentist-to-population ratio will increase in the coming decade, the supply of *dental services* nationally will increase. This is because the study projects an increase in workforce productivity due to an expected increase in the use of allied dental personnel.[12] This has led the ADA to argue that the maldistribution of dentists is the real problem, not the number of dentists.[7]

2.2 Distribution of dentists

The majority of dentists practice in suburban areas and affluent urban areas.[11] Poor, rural, and inner-city areas have a hard time recruiting and retaining enough dentists to meet their populations' needs.[3,7] For example, in American Indian and Alaska Native (AI/AN) communities, the dentist-to-population ratio is 1:2800, nearly twice the national average. This shortage leads to "significant issues of access" for AI/AN people,[3] which is also the case in most frontier communities.

2.3 Ethnic backgrounds of dentists

There are relatively few dentists from minority groups. For example, 2.2% of dentists are African American, even though this group makes up 12% of the U.S. population. These percentages are similar for Hispanics and Native Americans.[11] The American Dental Association and others have pointed out that this could form a barrier to accessing dental care, especially if patients' primary language is not English or where cultural differences make effective communication between the dentist and the patient difficult.[7]

2.4 Practice orientations of dentists

Although states are required to cover the costs of dental care for children on Medicaid, it can still be challenging for these children to access care, because many dentists are unwilling to accept low Medicaid payments. According to the Pew Center on the States, "fewer than half of the dentists in 25 states treated any Medicaid patients."[5] and that less than 10% of dentists receive more than $10,000 in Medicaid payments annually.[11] A study of dental residents found that just 55% of students surveyed expected to practice in a clinic which accepted Medicaid patients, with 37% citing inadequate financial compensation as a major barrier to caring for Medicaid patients. The dental residents also cited "lack of personal interest" and "undesirable work environment or location" as barriers to working in a clinic which accepted Medicaid patients.[13] Another study found a correlation between Medicaid payment levels and the number of children and adolescents who received oral care, with more children receiving care where payments were increased.[1]

2.5 Education of dentists

Several studies have shown that many dentists are not prepared to care for children when they graduate. Their training may not include clinical experience performing procedures commonly used on children,[11] and often does not prepare them to deal with young patients.[14] Chinn and Edelstein suggest that one of the reasons for the lack of interest among graduating dentists in alternative dental careers (e.g. careers in public health, Community Health Centers, etc.) is a lack of exposure to these careers during their education and training.[13]

3 Emerging Models

Several states are developing new workforce models to address some of the factors contributing to the current dental care shortage. One type of model, which is currently operating in Alaska and Minnesota, is the Dental Therapist (DT) model. The following sections will describe how DT models operate in these two states, including the components of each program, competencies and scope of DTs in each program, training requirements, and current funding of DT activities.

3.1 The Alaska Dental Health Aide Therapist Model

Alaska has a long history of developing alternative health care workforce models, starting with the Community Health Aide (CHA) program in the 1950s. Initially, this program was aimed at treating the tuberculosis epidemic which was afflicting many of Alaska's rural, mostly Alaska Native communities. The program was highly successful and continues to thrive to this day. The role of the CHA has been expanded to include a wide range of preventive and basic health care activities.

Today, rural Alaska faces a new epidemic: tooth decay. According to the Dental Health Aide Therapist Training Program's website, "The Alaska Native population has the highest tooth decay rate of any population group in the United States. Children aged 6-14 have twice the rate of caries than the general population, while children aged 2-4 years have five times the rate."[15] Lack of access to dental care is often cited as a major reason for these high rates.[15–18] According to Scott Wetterhall, principle investigator of a recent study[18] on Alaska's Dental Health Aide Therapist (DHAT) model, "there is an acute shortage of dentists willing to practice in small, remote villages in

Alaska…Relying on a traditional itinerant care approach leaves people with limited access to emergency and preventive treatment, allows disease and associated pain to worsen and fosters expectations that dental care should be sought only when a person is in pain."[19]

3.2 Program Components

The Alaska Native Tribal Health Consortium (ANTHC) developed Alaska's DHAT model to deal with these chronic dental care shortages, and the first DHATs were certified in 2004. Alaska's DHAT model is the first in the United States, and is based on New Zealand's dental nurse model.[16] Alaska's DHATs practice at remote sites managed by tribal regional health corporations.[20]

An essential part of Alaska's DHAT program is that DHATs are recruited from the rural and frontier areas where they serve. There are two reasons for this. First, locally recruited students are more likely to work and live in these rural and frontier areas on a long-term basis. Most dentists are recruited and trained outside rural and frontier areas, and are less likely to choose to practice in remote areas. Second, because they are from the same culture as their patients, DHATs can provide more culturally sensitive care and education to patients.[16]

DHATs in Alaska are part of a dental health care system with several levels. At the most basic level is Dental Health Aides (DHAs). DHAs are locally recruited dental workers who act as dental health educators and perform very basic preventive services such as fluoride treatments. DHATs have a broader and more complex set of competencies, including providing basic dental care, supervising lower level dental health workers, providing dental education, and developing community prevention strategies. Dentists have the broadest scope and the most complex set of competencies, including performing complex extractions and dental surgeries, assessing and treating complex dental problems, supervising and evaluating DHATs and determining which tasks each individual DHAT under their supervision is allowed to do.[16]

Alaska Dental Therapists are closely tied to their supervising dentists through telemedicine and phone consultations. This relationship of the DHATs is designed to be similar to the supervisory relationships between physician and physician assistants and includes prospective discussion of cases, concurrent availability of consultations, and retrospective quality review of the patients seen by the DHAT.*

3.2.1 Competencies and Scope

In addition to basic preventive and educational competencies, DHATs must demonstrate and maintain competence in a variety of areas, including:

- Dental prophylaxis;
- Dental radiology;
- Atraumatic Restorative Treatment (ART);

* Personal communication, Ruth Ballweg, MEDEX director, August 1, 2012.

- Scaling and polishing techniques;
- Root planing and periodontal soft tissue curettae;
- Placing sulcular medicinal or therapeutic materials;
- Peridontal probing;
- Administration of local anesthetics and identification and responding to the side effects of local anesthetics;
- Advanced understanding of tooth morphology, structure and function;
- Placement of simple and complex fillings;
- Stainless steel crown placement;
- Diagnosis and treatment of caries and performance of pulpotomies;
- Performance of uncomplicated extractions of primary and permanent teeth;
- Response to emergencies to alleviate pain and infection;
- Recognition of and referring conditions needing space maintenance.

DHATs must know their own scope, understand when a patient's condition is beyond their scope,* and refer these patients to a dentist.[21] For a complete list of DHAT competencies, see *Appendix 1: Complete list of Alaska DHAT core* competencies.

3.2.2 Training

Because Alaska's DHAT model was the first such model in the United States, ANTHC partnered with the University of Otago in New Zealand to train the first DHATs, and sent students to New Zealand for the two-year training program.[16] However, being away from home for two years was difficult for students, and the costs of sending students to New Zealand were high. ANTHC partnered with the University of Washington MEDEX Northwest Physician Assistant Program to create a training program specifically designed for Alaska DHATs. The result was the DENTEX program, which started training DHATs in 2008. In the program, students receive training in a classroom and dental laboratory/office setting in Anchorage, Alaska for the first year of their training. The second year consists of an intensive clinical training in Bethel, Alaska.[22] The program is jointly administered by ANTHC and the University of Washington Physician Assistant Program (MEDEX), with program faculty both in Alaska and at University of Washington.[20]

3.2.3 Funding

In Alaska, DTs bill Medicaid for services provided to Medicaid enrollees. According to the Agency for Healthcare Research and Quality, "[t]his program makes the provision of oral health services under the Medicaid program economically viable, something that many other dentist-based programs have failed to do."[16]

* The ADA has raised concerns about the scope of practice of Alaska DTs. This is because the ADA maintains that it is not possible to know beforehand whether a procedure will be simple or complicated. The ADA has also argued that DTs do not have the knowledge and experience needed to tell if a tooth can be salvaged or requires extraction. For these reasons, the ADA opposes the extraction of teeth by anyone other than a dentist.[7]

3.3 The Minnesota Dental Therapist, Oral Health Care Practitioner and Advanced Dental Therapist Models

3.3.1 Program Components

In 2009, Minnesota became the first state to authorize DTs to practice in the general public. DTs in Minnesota are allowed to practice in all of the state's underserved communities, both urban and rural.[23] Minnesota's DT legislation is the result of negotiations between patient advocates, the Minnesota Dental Association (MDA), and the University of Minnesota. According to then MDA president Lee Jess, "[w]e are confident that with this well-defined scope of practice, level of supervision and patient population, dental therapists will help contribute to addressing the access to dental care challenge faced by many in Minnesota."[24] Minnesota's legislation created two levels of DT: the dental therapist (DTs) and the advanced dental therapist (ADTs). The first class of DTs graduated in the summer of 2011.[23]

There are three DT-type degree programs in Minnesota. Metropolitan State University offers the Oral Health Care Practitioner (OHCP) Master's degree program for dental hygienists who want to become dually certified as a DT and hygienist.[20] The University of Minnesota offers both a Bachelor's and Master's level DT degree which, unlike the OHCP program, does not require students to have a background in oral health.[25] The third degree program, referred to as the Master's degree in Advanced Dental Therapy, is still being developed by the University of Minnesota.[26]

Minnesota DTs and OHCPs work with an on-site dentist under direct or indirect supervision. They are intended to both increase the capacity of existing dental clinics and to decrease the costs of dental care.[20] Advanced DTs will be able to do some of their work under the general supervision of a dentist, enabling them to work outside the clinic of the supervising dentist.[27] This could enable them to practice in areas where there are currently no dental practices, including rural and frontier communities.

3.3.2 Competencies and Scope

The scope defined in Minnesota's DT and ADT models was developed in by the University of Minnesota School of Dentistry, oral health advocates, and state lawmakers.[20] DTs and OHCPs are intended to expand the capacities of dental clinics, with DT/OHCP working closely with an on-site dentist. As such, the activities a DT/OHCP is allowed to carry out under general supervision are limited to mostly preventive activities and dental health education.* A complete list of Minnesota DT

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* OHCPs are dually certified at both a DT *and* a dental hygienist. The competencies listed in this section are DT competencies only, and do not include the competencies and scope of a dental hygienist. For an overview of the roles of the OHCP compared to the dental hygienist and DT, see

competencies can be found in *Appendix 2: Complete list of Minnesota DT and* Advanced DT competencies*.* These include nutritional counseling and dietary analysis, radiographs, application of fluoride and sealants, temporary restorations and pain alleviation, and making mouthguards.[27] Like DHATs in Alaska, Minnesota DTs are also allowed to extract teeth. However, they are limited to primary teeth and may only do extractions under indirect supervision, whereas Alaska DHATs can also extract permanent teeth and may do so under general supervision. The scope of the Minnesota ADT is similar to that of the Alaska DHAT. ADTs may provide the same services as a DT under *general* supervision (DTs require *indirect* supervision). In addition, ADTs may assess patients and create treatment plans, and perform simple extractions of *permanent* teeth.[27]

3.3.3 Training

Currently, two universities in Minnesota, both of them in Minneapolis-St. Paul, offer a DT degree program. The University of Minnesota has both a Bachelor's level and Master's level DT program. The Bachelor's program lasts 40 months in total. Students must first complete a year of prerequisite courses before starting the two-year, year-round DT intensive training program.[25] The Master's DT program lasts for 28 months. To enter the program, students must have already completed a Bachelor's degree in another field and eight prerequisite science courses.[28]

The University of Minnesota DT programs can enroll a maximum of 10 students per year.[29] DT students follow many of the same courses, and are trained by the same faculty and at the same facilities as students in the dentistry and dental hygiene programs.[20] Students who successfully complete either the Bachelor's or Master's DT program are awarded a license to practice as a DT in Minnesota.

Metropolitan State University offers the Oral Health Care Practitioner (OHCP) degree (MSc) for dental hygienists who want to become dually certified as a DT and hygienist. Hygienists who complete the degree are eligible for licensure as a DT-hygienist (aka OHCP) in Minnesota.[20] Before entering the two-year program, hygienists must complete 3 prerequisite courses on dental care. The program lasts seven semesters.[30]

According to Minnesota's DT statutes, a licensed DT who completes 2000 hours of supervised clinical practice as a DT and completes a Master's degree in Advanced Dental Therapy can apply for licensure as an ADT.[27] However, at present there is no school or university which offers a Master of Advanced Dental Therapy program, presumably because there are not any licensed DTs with 2000 hours of experience yet. According to the Pew Center on the States, the University of Minnesota "may develop an ADT program in the future."[26]

3.3.4 Funding

In Minnesota, DTs are reimbursed for the services they provide to Minnesota Health Care Plan enrollees using a fee-for-service payment model. The state is also working with CMS, the National

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Table 1.

Plan and Provider Enumeration System, and the National Uniform Claim Committee to establish a distinct taxonomy for DTs to enable them to bill for services provided to enrollees in other health care plans, such as Medicaid, in the future.[31]

4 Issues for Policy and Regulation

4.1 The Role of Dentists

To ensure that DTs are integrated into the oral health system, cooperation with dentists is key. Both Alaska's and Minnesota's DT models rely on dentists to help train, supervise, and collaborate with DTs. Dentists and dental schools can play an important role in defining how to integrate DTs into the oral care system by helping to:

- Identify the gaps in local oral health systems which DTs can fill;
- Identify how dentists and DTs will collaborate, and how this collaboration will be integrated into curricula for both dentists and DTs (supervision, training, referrals, etc.);
- Develop a scope of practice for DTs;
- Develop curricula to train DTs;
- Develop criteria for quality assurance regulations;
- Develop systems for remote supervision, especially via telehealth and;
- Conduct further research on the DT model and outcomes of DT care.

4.2 Training the Whole Dental Team

In contrast to the training of traditional dental care providers in the U.S., the training of DTs is competency-based. Curricula are focused on honing a narrow set of skills through community-based learning experiences and integrating knowledge and skills into observable outcomes that supervisors can use to assess students' abilities. Trainers and dentist supervisors will need to learn new teaching techniques so that they can engage in the competency-based training required for DTs.[4,32]

It is also essential to train of both dentists and DTs to facilitate the integration of DTs into the broader dental care system. Ballweg[32] and Ward[33] recommend training dentists on how to work in larger teams with a more diverse mix of skills, the skills each level of DT has, the types of supervision DTs require, and how to use the skills of DTs in a team. In addition, combining classes for dentists, DTs and hygienists when possible and appropriate, as is currently being done in Minnesota, can help these professionals learn to cooperate in the workplace.[20,33]

4.3 The "Receptive Framework"

Creating a DT workforce necessarily involves much more than just training DTs. The DENTEX program has noted that "policies for regulation, reimbursement, and malpractice must be created ahead of or simultaneously with the development of the training programs themselves."[32] Leaders in the development of a DT workforce will need the support of Medicaid and other insurance companies to insure that DT services are reimbursed. In addition, the communities that will be

receiving DTs need to understand the value of these new providers so that they will be welcomed and accepted by clients.[32,33]

4.4 Accreditation

In August 2011, the Commission on Dental Accreditation (CODA) took the first step in the process to establish accreditation standards for dental therapy education programs. The CODA, which is an independent agency in the ADA, has appointed a taskforce which is developing the new accreditation standards in a process which will take about two years. The University of Minnesota had requested that the CODA develop a national set of DT accreditation standards to ensure patient safety and avoid fragmentation of accreditation standards.[24] This has led to important questions around accreditation standards for DTs.

The most basic question is whether or not national accreditation standards are appropriate for the DT profession. National accreditation standards have advantages and disadvantages. On the one hand, national standards could make it easier for states to put the DT model into practice because they will not have to develop their own standards and accreditation process. National standards can also help ensure that DTs nationwide provide the same services and quality of care. On the other hand, physical, political and oral health conditions vary widely across the U.S. The oral health needs of Alaska Native communities are very different from the needs of underserved communities in Minnesota, and the roles of DTs vary accordingly between these two states. Any national standard will have to take these differences between states into account, which will be a challenging task. In this respect, there are advantages to creating DT standards on a state-by-state basis to take the unique conditions in each state into account.

A second question that has arisen since CODA began considering developing accreditation standards for DTs is what body should be developing these standards. Many medical professions have their own, independent accreditation body. Whether accreditation standards are set by CODA or by an independent organization could have a large impact on the DT profession.[4,32]

4.5 Ensuring That DTs Practice Where They Are Most Needed

DTs are intended to improve oral health in underserved communities, so it is important that they end up working in these communities once they complete their training. A variety of strategies and incentives can be used to ensure that DTs practice where they are needed, for example:[32]

- Linking students with preceptors who commit to hire them after graduation;
- Funding the costs of students' education in exchange for a post-training service obligation in underserved communities;
- Recruiting DT students from underserved communities;
- Legislation requiring DTs to practice in underserved areas.

4.6 Appropriate scope for community needs

"Decisions about scope, training, and supervision will influence important policy determinations regarding curricula and training philosophy, program locations, designation of qualified training institutions, length and cost of training, and accessibility by applicants."

The appropriate scope and training requirements for DTs are very important policy and regulatory issues to consider. Experts in the field caution that if the scope of DTs is too broad, they will require more extensive training. This can deter potential DTs from rural and frontier communities from enrolling in DT programs that require them to spend extended periods away from their home. Extensive training also reduces some of the major advantages of DTs, namely that they are faster and less expensive to train than dentists.[4,32] In addition, supervision requirements that are too restrictive can make it difficult for DTs to practice in underserved areas.[4]

4.7 Distribution of Cost Savings

In the U.S., DTs are paid about half as much as dentists.[34] However, at the time of writing of this report, no studies assessing the cost-effectiveness of DTs in the United States have been published. It is important to consider where in the oral care system the costs and savings resulting from the use of DTs will occur. For example, research on the cost-effectiveness of DTs working in dental practices in the United Kingdom suggest that while the use of DTs in dental practices may save money for the oral health system overall, it may not save money for dental practices themselves and can even result in financial losses.[33,35] The cost implications of DTs in the United States for dental practices, payers, and the oral care system overall are as yet unknown and will vary depending on the reimbursement policies that are created by federal agencies (e.g. Medicare and Medicaid), private insurers, and regulatory bodies (e.g. state insurance commissioners.) More research is needed to assess the long-term cost-effectiveness of DTs in the U.S..

The ADA has suggested that a study should be done to compare the impact of funds dedicated to DT programs versus the same amount of funds being invested other programs to reduce oral health disparities. Examples of such programs include offering student loan forgiveness to dentists who practice in underserved areas, rotations in rural and community health center settings during dental education, increased Medicaid payments for dentists, and other incentives to attract dentists to underserved areas.[7]

4.8 Evidence Base

There is a strong evidence base for various types of DT programs abroad. However, since the use of DTs in the U.S. is a recent development, few studies have been conducted to date on the outcomes of patients treated by DTs in the U.S. Now is an ideal time to conduct such studies, because DT models are now operating in both Alaska and Minnesota. To ensure the acceptance of DTs in the dental community, very rigorous, quantitative, qualitative, and peer-reviewed studies will need to be conducted regarding the outcomes of patients treated by DTs in Minnesota and Alaska. Such studies can also help determine the appropriate scope for DTs, which could be used to help create national accreditation standards for DTs.

5 Conclusions

The dental therapist profession has existed for over 50 years internationally, however it is an emerging profession in the U.S. The model has shown promise for improving oral health in remote Alaska Native communities, and in the coming years the Minnesota dental therapist program will provide examples of the use of dental therapists in new rural and urban contexts in the U.S.

The dental community has not yet reached a consensus as to the contexts and conditions in which DTs should practice in the U.S. Dentists, dental schools, and oral health advocates all have an important role to play in defining how to integrate DTs into the oral care system, and the appropriate scope and training requirements for DTs.

Several steps need to be taken to ensure that new DT programs are successful. Trainers and supervisors of DTs will need to learn new techniques and skills necessary for teaching and working with DTs. Policies for regulation, reimbursement, and malpractice must also be put into place before DTs can enter the workforce. One strategy that is being pursued to ensure the integration of DTs into the dental community is the creation of a set of national accreditation standards for DT training programs.

To date, few studies have been conducted on the outcomes of patients treated by DTs in the U.S. Now is an ideal time to conduct such studies, because DT models are now operating in both Alaska and Minnesota. The cost implications of DTs in the United States for dental practices, payers, and the oral care system overall are also uncertain and merit further study. Cost implications will vary depending on the reimbursement policies that are created by federal agencies, private insurers, and regulatory bodies.

Finally, DTs are intended to improve oral health in underserved communities. Incentives and regulations are needed to ensure that DTs practice in these communities.

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Appendix 1: Complete list of Alaska DHAT core competencies

Quoted from Community Health Aide Program Certification Board, 2008[21]

- DHA I:
    - use of Community Health Aide Manual;
    - general medical history taking;
    - patient education including:
        - oral hygiene instruction,
        - diet education,
        - explanation of prevention strategies, including fluoride and sealants;
    - tooth brush prophylaxis;
    - providing topical fluorides, including gels, foam, varnish and rinses;
    - clean/sterile techniques;
    - universal precautions; and
    - handwashing.
- DHA II:
    - problem-specific medical and dental history taking;
    - recognition of medical and dental conditions that may require direct dental supervision or services;
    - dental charting and patient record documentation;
    - instrument handling and sterilization procedures;
    - intra- and extra-oral photographs, if equipment is available;
- Sealants:
    - understanding and following dental orders;
    - reviewing medical history and identifying contraindications for sealant treatment;
    - explaining sealant procedure and responding to questions from patient regarding sealants;
    - proper patient and provider safety procedures;
        - proper use and safety procedures related to curing light;
        - proper use of etchant material;
    - isolating and drying teeth to be sealed;
    - identifying and correcting occlusal discrepancies caused by excess sealant;
    - ensuring retention of the sealant.
- Dental Prophylaxis:
    - understanding and following dental orders;
    - reviewing medical history and identifying contraindications for performing prophylaxis;
    - understanding when the patient should be referred to a dentist prior to carrying out prophylaxis;
    - explaining prophylaxis procedure and respond to questions from patient regarding prophylaxis;
    - proper patient and provider safety procedures;

        - proper use dental instruments for safety of patient and provider;
        - proper use of ultrasonic and piezoeletric scalers;
    - scaling and polishing to remove calcereous deposits, accretions, and stains from
    - the coronal or exposed surface of the tooth; and
    - consistent with direct orders from the dentist after a dental examination, sulcular irrigation.
- Dental Radiology:
    - radiological protection of operator and patient;
    - use and storage of the lead apron and thyroid collar;
    - review medical history and identify contraindications for performing x-rays;
    - dosimeter (film badge) and radiology reports;
    - recognition and correction of:
        - distortion,
        - overlap,
        - cone-cutting
        - automatic processing problems;
    - use of film holding devices
    - positioning and exposing intra-oral radiographs;
    - troubleshooting
        - technique errors
        - processing errors;
    - film handling during processing;
    - film labeling;
    - use of landmarks to mount film; and
    - use of daylight loader.
- Atraumatic Restorative Treatment (ART):
    - understanding and following dental orders;
    - reviewing medical history and identifying contraindications for performing ART;
    - identify cases appropriate for referral for ART;
    - understanding when the patient should be referred to a dentist;
    - explaining ART procedure and responding to questions from patient regarding ART;
    - proper patient and provider safety procedures, including proper use dental instruments;
    - isolating the tooth/teeth;
    - removing gross caries with hand instruments;
    - mixing, placing and contouring appropriate restorative material; and
    - recognizing potential and actual procedural complications and consulting appropriately with the dentist.
- Dental Health Aide Hygienist:
    - removing calculus deposits, accretions and stains from the surfaces of teeth by scaling and polishing techniques;
    - root planing and periodontal soft tissue curettae;

    - placing sulcular medicinal or therapeutic materials;
    - peridontal probing; and
    - administration of local anesthetics and identification and responding to the side effects of local anesthetics.
- Expanded Function Dental Health Aide I:
    - advanced understanding of tooth morphology, structure and function; and
    - an ability to discriminate between acceptable and unacceptable restoration; and
    - competency in and satisfactory performance of the following skills:
        - placement and finishing of Class I, II and V dental amalgams (simple fillings) after preparation by the dentist or dental health aide therapist; and
        - dental composite placement Class I, III and V (simple fillings) after preparation by a dentist or dental health aide therapist; and
        - provide appropriate post-procedure instructions;
- Expanded Function Dental Health Aide II:
    - placement and finishing of cusp protected amalgam and complex Class II amalgams (complex fillings);
    - placement and finishing of dental composite Class II and IV (complex fillings); and
    - provide appropriate post-procedure instructions.
- Stainless Steel Crown Placement:
    - selecting the appropriate stainless steel crown;
    - modifying the crown, as necessary;
    - checking and correcting occlusion, contact and margins of stainless steel crown;
    - cementing and removing excess cement;
    - reverifying the occlusion; and
    - providing appropriate post-procedure instructions.
- diagnosis and treatment of caries and performance of pulpotomies on deciduous teeth;
- performance of uncomplicated extractions of primary and permanent teeth;
- response to emergencies to alleviate pain and infection;
- administration of local anesthetic;
- recognition of and referring conditions needing space maintenance;
- maintenance of and repair of dental equipment;
- development of and carrying out community health prevention and education program.

Appendix 2: Complete list of Minnesota DT and Advanced DT competencies

Quoted from Minnesota Dentistry Practice Acts, 2009[27]

Dental Therapist Competencies

Subd. 4. Scope of practice.

(a) A licensed dental therapist may perform dental services as authorized under this section within the parameters of the collaborative management agreement.

(b) The services authorized to be performed by a licensed dental therapist include the oral health services, as specified in paragraphs (c) and (d), and within the parameters of the collaborative management agreement.

(c) A licensed dental therapist may perform the following services under general supervision, unless restricted or prohibited in the collaborative management agreement:

1. oral health instruction and disease prevention education, including nutritional counseling and dietary analysis;
2. preliminary charting of the oral cavity;
3. making radiographs;
4. mechanical polishing;
5. application of topical preventive or prophylactic agents, including fluoride varnishes and pit and fissure sealants;
6. pulp vitality testing;
7. application of desensitizing medication or resin;
8. fabrication of athletic mouthguards;
9. placement of temporary restorations;
10. fabrication of soft occlusal guards;
11. tissue conditioning and soft reline;
12. atraumatic restorative therapy;
13. dressing changes;
14. tooth reimplantation;
15. administration of local anesthetic; and
16. administration of nitrous oxide.

(d) A licensed dental therapist may perform the following services under indirect supervision:

1. emergency palliative treatment of dental pain;
2. the placement and removal of space maintainers;
3. cavity preparation;
4. restoration of primary and permanent teeth;
5. placement of temporary crowns;

6. preparation and placement of preformed crowns; and
7. pulpotomies on primary teeth;
8. indirect and direct pulp capping on primary and permanent teeth;
9. stabilization of reimplanted teeth;
10. extractions of primary teeth;
11. suture removal;
12. brush biopsies;
13. repair of defective prosthetic devices; and
14. recementing of permanent crowns.

(e) For purposes of this section and section 150A.106, "general supervision" and "indirect supervision" have the meanings given in Minnesota Rules, part 3100.0100, subpart 21.

Advanced DT Competencies

Subd. 2. Scope of practice. (a) An advanced dental therapist certified by the board under this section may perform the following services and procedures pursuant to the written collaborative management agreement:

(1) an oral evaluation and assessment of dental disease and the formulation of an individualized treatment plan authorized by the collaborating dentist;

(2) the services and procedures described under section 150A.105, subdivision 4, paragraphs (c) and (d); and

(3) nonsurgical extractions of permanent teeth as limited in subdivision 3, paragraph (b).

(b) The services and procedures described under this subdivision may be performed under general supervision.