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New or Expanded Oral Health Workforce Models in the U.S.

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The Center for Health Workforce Studies is a not-for-profit research organization whose mission is to provide timely, accurate data and conduct policy-relevant research about the health workforce. The Center's work assists health, professional, and education organizations; policy makers and planners; and other stakeholders to understand issues related to the supply, demand, distribution, and use of health workers.

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Background

While a variety of strategies to achieve improved access to oral health care and enhance oral health outcomes have been implemented in states across the U.S. over recent years, the use of new or alternative workforce models is gaining increased interest. Broadening the capacity of the existing workforce through expanded scopes of practice and reduced levels of dental supervision was a common strategy of state legislatures during the last several decades. However, with ongoing concerns about the lagging oral health status of the U.S. population and impending demographic changes that will affect both the population receiving and needing care and the professionals providing that care, states have proposed and, in some cases, implemented new oral health workforce models to create alternative points of entry for patients to dental care. Currently, dentists generally provide therapeutic, restorative, and palliative services and dental hygienists predominately provide educational, preventive, and prophylactic services. Some of the new workforce models are designed with integrated scopes of practice inclusive of both preventive and basic restorative tasks. Ideally, these professional models would be devised, implemented, and strategically situated to address a wide range of oral health needs, especially those of special populations and in geographic areas with limited availability of oral health care.

The Oral Health Workforce

Current Dental Professionals

The oral health workforce currently consists of four professional categories:

- Dentists
- Dental Hygienists (DHs)
- Dental Assistants (DAs)
- Denturists and Dental Laboratory Technicians

Dentists, DHs, and DAs are well-known and generally have distinct scopes of practice. However, the roles of DHs and DAs may sometimes overlap, especially in states that have enabled expanded functions for DAs. There are acknowledged differences in level of education and competencies between DHs and DAs, which ultimately affect the complexity of permitted tasks and the amount of supervision that is required when a service is rendered. DAs usually work under the direct or indirect supervision of a dentist while DHs are given substantially more latitude when providing patient services. Denturists provide prosthetic services to patients such as full or partial dentures and mouthguards.

Supervisory Relationships among the Oral Health Workforce

Understanding the current interrelationship of oral health providers is critical to understanding professional issues that may impede access to care and the practice landscape in which new or alternative oral health workforce would be situated.

Currently, the oral health workforce in U.S. is mostly practicing in a tiered model of care with the dentist empowered by statute and regulation to direct auxiliary personnel in all aspects of patient care. Auxiliary dental personnel are employed in a "dependent" professional model meaning that their roles are subordinate to their supervising dentist. State-specific statutes and regulations have traditionally included definitions of various levels of dental supervision. While such definitions vary by state, there are enough similarities in regulatory supervisory requirements that a common understanding of levels of supervision has emerged among those who are knowledgeable about dental workforce issues in the U.S.

Four levels of dental supervision generally describe the supervisory relationship between the dentist and auxiliary personnel.

- **Direct supervision** means a dentist with an active license is in the dental office, personally authorizes the procedures to be performed by the auxiliary, and remains in the dental office while the procedures are being performed. Before dismissal of the patient the dentist evaluates the performance of the DH or the DA.
- **Indirect supervision** means a dentist with an active license is in the dental office, authorizes the procedures, and remains in the dental office while the procedures are being performed by the DH or DA and evaluates the performance of the DH or DA at a subsequent appointment.
- **General supervision** means a dentist with an active license has authorized the procedure, the procedures are being carried out in accordance with their diagnosis and treatment plan, and the procedures will be personally evaluated and reviewed by the dentist with the patient at least once in a 12-month period.
- **Personal supervision** is used in some states to describe the care situation in which the dentist and auxiliary are concurrently providing a dental service with the auxiliary offering direct support to the dentist during the procedure. This has also been described as acting as a "second pair of hands" (Michigan, 2011).

More recently, as scope of practice for DHs has advanced and evolved, new levels of dental supervision described in state laws and rules extend more practice autonomy to DHs in certain settings or when providing particular services to underserved populations. These new levels of supervision include public health supervision (also called public access supervision or oral health

access supervision), collaborative practice or affiliated practice, unsupervised practice, or independent practice.

- **Public health supervision** means a dentist with an active license authorized procedures to be carried out by a DH with an active license practicing in a school, hospital, or institution without the dentist having to be present, but the dentist must review the patient records at least once in a 12-month period. In Maine, DHs are permitted to work under public health supervision status in public health settings. DHs are guided by the standing orders of a dentist but that dentist is not responsible for provision of care for patients seen by the DH. DHs working under public health supervision status are required to notify the ME BDE of that status, obtain a supervising dentist and file reports with the ME BDE about the services they provide.

- In **collaborative** or **affiliated** practice, a DH and a dentist establish a protocol for the DH to practice in a location remote from the collaborating dentist or in a setting that is not the usual location of the dentist's practice. The collaborative or affiliation agreement describes the locations where the DH can practice, the kinds of services that can be provided, and the method for providing dental referral and follow-up services.

- In **unsupervised** practice, DHs are allowed to assess the oral health of a patient and initiate treatment without a dentist's order or prescription. The DH establishes a provider patient relationship without the involvement of a dentist. Generally, state legislatures that permit unsupervised practice require the DH to provide a dental referral for patients in need of therapeutic or restorative care or to assure that each patient has been examined by a dentist at some point in the trajectory of care. This referral may be to a dentist with whom the hygienist has an affiliation or collaboration agreement or it may be otherwise enabled through formal or informal referral relationships. California's Registered Dental Hygienist in Alternative Practice (RDHAP) works in unsupervised practice.

- In **independent** practice, the DH has complete autonomy to provide preventive and prophylactic services for a patient. Although referral for therapeutic services or restorative care would likely occur, no dental affiliation is required. DHs practicing independently can own and operate their own DH practice. They can employ other DHs and supervise DAs who assist them. Colorado, which has long offered independent practice to DHs, now permits DHs to also perform dental hygiene diagnosis, and becomes the first state in the U.S. to codify and describe that task (CO DORA, 2011). DHs in Maine who have a bachelor's degree and 2,000 hours of clinical practice experience or an associate degree and 6,000 hours of clinical experience may apply to the BDE for independent status. An independent practice dental hygienist (IPDH) in Maine must present a written plan for patient referral to a dentist in case dental care is needed. An IPDH must also obtain written acknowledgment from a patient that the patient understands that care is being provided by someone who is not a dentist and that the care is neither a treatment nor a restoration.

The level of required supervision for DHs and DAs within a state varies and is determined by several conditions, including the setting in which care is delivered, the patient being treated, the service being provided, and whether or not authorization from a dentist is required. The appropriate level of supervision may also be predicated on the education or professional experience of the DH or DA. For instance, public health supervision may apply only in certain settings (e.g., schools) or for certain patients (e.g., Medicaid insured) and may be limited to particular services (e.g., dental sealants or prophylaxis) under certain conditions (e.g., with the prior examination of a dentist). Regulations are sometimes complex, requiring decision-making on the part of the professionals involved. This complexity can be a source of confusion and variation in care.

Scope of Practice and Regulation of Dental Auxiliaries

An existing strategy to extend oral health workforce capacity in U.S. states is to expand the capability of dental auxiliaries by permitting them to perform new oral health services. Generally dental auxiliaries who are permitted to provide expanded or extended functions must first meet education and experience requirements and then demonstrate competency in the new task through special training and practical evaluation of expertise in the task. Legislative expansion of permitted functions is often accompanied by a reduction in levels of dental supervision for a task that previously interfered with patient access to the services of interest, particularly in public health settings.

In many states, strategies to increase access to oral health care have not only included expanded functions and reductions in incumbent levels of supervision, but have also involved vesting DHs with permission to perform a broader range of services without prior authorization. This enables direct reimbursement to DHs particularly by state Medicaid plans, permitting licensure by endorsement or reciprocity for DHs to increase licensure portability, and in some states, enabling self-regulation for DHs. The role of DAs in a variety of settings has also been expanded. While still under the close supervision of dentists, DAs providing extended function services have the ability to increase access to care and enable dentists to be more efficient and productive in practice. Meaningful change has occurred as a result of these legislative efforts and, in some cases, has moved DHs to unsupervised or independent practice.

In a 2007 survey of a sample of DHs across the U.S. conducted by the Center for Health Workforce Studies for the American Dental Hygienists' Association (ADHA), 44% of responding DHs practiced with some type of expanded function permission in the state of practice. The most common expanded duties were tasks related to administration and monitoring of nitrous oxide or local anesthesia (ADHA, 2008).

However, unlike health care, where expanded permission to perform medical services led to incremental change and eventually to the development of "midlevel" providers such as nurse practitioners (NPs) and physician assistants (PAs), change in oral health has been slow, thereby preventing the emergence of a "midlevel" model of care. One reason that a midlevel in oral health has failed to develop may be the mode of regulation of DHs, which is by state dental boards or boards of dental examiners. These boards are comprised mainly of dentists (although DHs generally have at least minimal representation). Since DHs and DAs are regulated by the profession that supervises their practice, change in scope of practice has historically been a cumbersome process. Even when change has been enabled by a legislature with the engagement, agreement, or sanction of organized dentistry in the state, individual dentists may resist implementation of the change in their private practices. Individual dental compliance is important because more than 90% of dentists and DHs are found in private practice.

In 2012, the ADHA indicated that DHs in 18 states have been legislatively permitted some form of self-regulation most often through committees of dental hygiene (ADHA, 2012). Several states have pending legislation that would provide DHs some form of self-regulation. Maine is among the states with a subcommittee on dental hygiene. There are five members of the subcommittee including three dental hygienists and two dentists. The committee has the power to review DH applications for licensure, CEU submissions, and reports of DHs working under public health supervision status.

While expansion in scope of practice and relaxation of supervisory requirements in many states have permitted DHs and DAs to work with populations and in settings with patients with compromised access thus enabling greater availability of care, concern about the oral health of certain populations persists. One current strategy to address continuing gaps in oral health care is to institute new oral health workforce models with cross functional capabilities to address deficits in available services.

Denturists

Denturists are formally trained professionals who work as part of the oral health care team. They specialize in fitting and constructing removable oral prosthetic devices and prosthodontics. They repair and reline dentures and provide sports mouthguards. Denturists may have backgrounds as dental laboratory technicians.

Denturists are licensed in and provide services directly to the public in five states currently including Idaho, Maine, Montana, Oregon, and Washington. Denturists are regulated in Arizona and Colorado but are required to work under the supervision of a dentist. The Massachusetts legislature is currently considering a bill to license denturists in the state.

Denturists have been authorized to work in Maine since 1977 (Flanders, 1981). In that year, the Maine legislature established a registration program for denturists that required these professionals to practice under the direct supervision of a dentist (Maine, Sunrise Review, 2005). The law was amended in 1995 to permit more autonomy to denturists. The revision permitted denturists to treat patients who had obtained an oral health certificate from a dentist stating that the patient's oral cavity was mainly free from disease and capable of receiving a denture. In 2001, the state changed the registration process to a licensure program and permitted denturists to provide their services directly to the public without the supervision of a dentist (Maine, Sunrise Review, 2005).

New Workforce Models

The customary division of labor in oral health is that dentists deliver services across the spectrum of care but mainly provide therapeutic, restorative, and palliative care involving irremediable or irreversible procedures. While some dentists choose to provide preventive services, these tasks are almost universally performed by dental auxiliaries. DHs commonly provide preventive and prophylactic services, which are considered remediable or reversible. Although in some states, DHs are now permitted to offer some basic restorative or therapeutic services, especially those related to periodontal care. The boundary between what is reversible and what is not has traditionally defined the tasks that can be performed by dentists or dental auxiliaries. Some states actually use this distinctive vocabulary in laws and regulations (see Florida statutes).

That traditional divide is now being bridged by new professional workforce models that specialize in remediation of acute dental problems through provision of basic restorative care and palliative services while also offering certain preventive services. One such bridging profession, the dental health aide therapist in Alaska (DHAT), is the archetype frequently cited as a possible solution to access issues. Internationally, the dental therapist professional model has been in place in many countries for some time and has proved successful in increasing access to care among certain populations. Another model gaining attention in some states is the advanced dental hygiene practitioner (ADHP) proposed by the American Dental Hygiene Association (ADHA), which integrates restorative and preventive care in a midlevel, autonomous professional. This latter model parallels, in some respects, the dental hygienist therapist model (DH-T) that has evolved internationally over recent years. The curriculum, written to train ADHPs, is the basis for the graduate educational program now offered at Metropolitan State University in Minnesota, which is currently training advanced dental therapists for practice in that state.

At the same time that cross-functional professionals are posed as possible solutions to providing more accessible and affordable care, stakeholders are also focusing on the need for public education about oral health and the importance of regular dental care to overall health. Literature suggests that demand for oral health care and need for oral health care are not synonymous

(Haden et al., 2003). One reason for the discrepancy is the number of people without dental insurance. Another reason for the divergence between need and demand is that a portion of the population is unaware of appropriate oral health behaviors (Haden et al., 2003) and does not routinely seek care even when it may be available. Reducing the gap between need and demand requires education and support services that lead patients to seek services and adopt personal behaviors and habits that encourage good oral health. The American Dental Association (ADA) has proposed two new workforce models that emphasize this need for patient education and navigation to services. One is the community dental health coordinator (CDHC) and the other is the oral preventive assistant (OPA).

Implementing New Workforce Models

Expansion of scope of practice for existing oral health workforce is an incremental approach to change, enabling the gradual professionalization of dental auxiliaries. Even measured changes in scopes of practice, however, impact educational pipelines and credentialing and provider organizations that must make program or workflow adjustments before implementation and adoption of the new scopes of practices can occur. Passing legislation is merely the first step in the process of actualizing change and realizing the expected outcomes.

Once legislation is enacted, regulatory criteria must be determined. Education programs must adjust curriculum to train professionals in the task and certifying or examining agencies must determine standards for competency testing of the newly trained professional. Current providers of the oral health service must then be willing to permit newly trained professionals to also offer the service to patients. Office workflows must be adjusted to accommodate the new patient services. In addition, patients must be educated about and be willing to accept the new provider as capable of offering competent service. Therefore, the time from legal authorization of a change to actual practice integration may be substantial as dental providers and the market respond.

The required infrastructure to accommodate a change in scope of practice for oral health professionals may already be in place but may need to be altered to enable the newly permitted functions. For example, educational programs may be required to integrate new material into the basic curriculum. The existing system eventually adapts and adopts change. The process may be slow occurring in a linear, stepwise manner, and the impact of the modification may not be immediate. Incremental change such as this may not be the optimal strategy when gaps in oral health persist and remain a major concern of providers, patients, and policymakers.

New workforce models are “disruptive innovations” (Christensen et al., 2000) requiring involved stakeholders to accomplish the required environmental changes not in a consecutive manner but simultaneously with other change. Engagement of the existing system is crucial because the infrastructure necessary to implement significant change may not be in place or may need to be

substantially altered. While difficult initially, new workforce models have significant potential to deliver needed care in more efficient and efficacious ways and to break down existing barriers to care.

A number of necessary environmental factors interact, which must be considered along with the concept of creating new workforce in order to assure the success of any new workforce model, including the following:

- a body of knowledge specific to the new profession;
- a curriculum designed to teach appropriate competencies;
- an education program established and accredited to deliver the education;
- a credentialing or certifying body that can attest to the knowledge and clinical competency of the new professional;
- legislative change to legitimize practice;
- a regulatory body to oversee licensure and professional discipline;
- acceptance by the highest licensed profession affected by the change;
- acceptance by patients of the ability of the new professional to provide services;
- practice redesign to enable delivery of services; and
- reimbursement mechanisms to pay for the services provided (MDH, 2009).

Figure 1. Components Necessary to Establish New Oral Health Workforce Models

Source: CHWS, 2011

While existing infrastructure might be accessed and adapted to innovative workforce models, extant programs may not have sufficient capacity to make the substantial changes required to accommodate the requirements of training, licensing, and deploying new professionals. In the following pages, several new types of oral health workforce will be described along with the infrastructure requirements attached to each. A totally new model of care, like the dental

therapist, may cause more disruption than an alternative model, like expanded function DAs. However, the impact of dental therapists on provision of care to at-risk populations is likely to be more substantial than simply expanding the roles of DAs.

The evolution of midlevel practitioners in health care is instructive about the process for implementing new workforce models. NP and PA standards gradually evolved over the last 40 or more years to their current state. Both professions began in pilot programs (in Colorado and North Carolina), which had as their objectives providing primary care to rural populations without current access to primary care physicians.

While the NP and PA models of education and practice vary, with NPs having a nursing and nursing education orientation and PAs being fashioned as physician extenders, the actual practice of each profession contains much that is common to the other. There are significant overlaps in provision of care that make these professions fairly indistinguishable from each other. Patients may be unable to differentiate care provided by an NP or a PA in primary practice.

These professional models were novel and disruptive in the early years, requiring new education programs, new legal standards for practice, new certifying and credentialing bodies, physicians willing to collaborate and supervise, and recognition by insurance carriers to permit billing for their services. As acceptance of these new professionals increased, roles evolved, and the quality of the care they provided was evaluated, initial scopes of practice increased and relationships with physicians, particularly for NPs, changed. Over time, NPs and PAs gained increased prescriptive authority and were permitted less restrictive supervisory requirements, and these professionals moved into specialty medical care. NPs and PAs are now practicing in all mainstream health care settings. While their fundamental missions to treat underserved populations still exist, NPs and PAs are commonly found wherever health care is provided.

The following pages review five innovative oral health workforce models that provide care to certain populations, particularly children, without current or established access to oral health care. This list includes both midlevel models and extended function models. The models considered in this paper are:

- the dental health aide therapist (DHAT)
- the dental hygienist therapist (DH-T)
- the advanced dental hygiene practitioner (ADHP)
- the expanded function dental assistant (EFDA)
- the community dental health coordinator (CDHC)

The Dental Health Aide Therapist (DHAT)

The poor oral health of Alaska's indigenous populations has been of enduring concern. Many of the approximately 85,000 Alaska Natives living in more than 200 villages (Nash et al., 2005) lack regular access to dental care. The villages are small, remote, often sparsely populated, and generally unable to financially support a dental practice (Smith, 2007). About one-third of the children in these villages miss school each year for dental pain. Two-thirds of adults suffer periodontal problems (McKinnon et al., 2007), with one-third demonstrating severe disease (Sekiguchi et al., 2005). The rate of dental disease among children and adolescents in the native population is about two and a half times that of the U.S. population (McKinnon et al., 2007, Sekiguchi et al., 2005). Typically, the populations in these remote locations relied on visiting dentists who traveled to the villages perhaps once a year to host a dental clinic. Ninety percent of these native communities are situated in extremely difficult terrain with physical barriers (Sekugichi et al., 2005), including mountain ranges, glaciers, large stretches of tundra, and impassable river systems (AACDHAP, 2007) limiting access. The severe weather of the winter months is an additional confounding factor constraining dental visits to seasons when plane flights were possible (McKinnon et al., 2007).

Further, sociodemographic factors and lifestyle issues influence oral health status. The Alaska Native population is significantly younger than the U.S. population and a much higher percentage of Alaska Natives live below the federal poverty level than the U.S. population as a whole (AACDHAP, 2007). Public water supplies are not always available or adequate and potable water may not be fluoridated (Sekugichi et al., 2005). One consequence is that villagers consume large amounts of carbonated beverages and preserved foods containing sugar, including candy (Smith, 2007). Soda is often less expensive than water, routinely delivered by cargo planes delivering supplies, and readily available. A dentist survey conducted in the mid-1980s found that the average per person soda consumption in the north coastal region of Alaska was six cans per day (Solovitch, 2011).

These preferences have a negative effect on overall oral health and also contribute to the high rate of diabetes in the indigenous population (Smith, 2007). One co-morbidity of diabetes is periodontal disease. There are also high rates of cigarette and chewing tobacco use amongst Alaska Natives, which impacts the incidence of oral cancer and gum disease (Smith, 2007). Another contributing factor to the dental caries found in village children is a streptococcus virus that lives in the mouth and flourishes on a sugary diet. The virus is transmitted in families through Alaska Native practices, such as caretakers blowing on children's food or chewing food before feeding it to a child (Solovitch, 2011).

Data obtained from prior studies of the overall oral health status of Alaskan Native populations was used to estimate the professional effort that would be required to remediate the problem of dental disease in these villages. One researcher estimated that the average person in an Alaska

Native village needed approximately five hours of dental work to restore their teeth to a healthy condition. In sum, this equated to 425,000 hours of dentistry services requiring 205 dentists working full time for one year to complete (Smith, 2007). Available dental capacity in the state is not remotely adequate to meet this challenge. To address this overwhelming need, the Indian Health Service (IHS) and the Alaska Native Tribal Health Consortium (ANTHC) have enabled DHATs to work in some of these remote villages to provide dental services on an ongoing basis. The history of this effort follows.

The History of the Dental Therapist (DT) Workforce Model

The workforce model known as the DHAT in Alaska was first conceived and deployed in New Zealand's schools in 1923 as a school dental nurse (Nash et al., 2008). Recognizing the need for dental services for the country's children, the New Zealand government established free dental clinics at elementary schools. These clinics were staffed by school dental nurses who worked under the auspices and supervision of public health dentists in the districts served (Nash et al., 2008). Originally, school dental nurses provided comprehensive primary oral health care including prophylaxis, oral health education, extraction of primary teeth, and intracoronal restorations (Nash et al., 2008). As their roles evolved over time, these professionals were called dental therapists (DTs) and were given expanded permissions to provide both preventive and restorative services including pulpal therapy and placement of stainless steel crowns. Each year, DTs in these school-based programs see about 97% of school age children up to age 13 and more than half of the preschoolers (56%) in New Zealand. Older children and adolescents also benefit from dental care provided by private dentists and funded by the government (Nash et al., 2008).

Initially DTs in New Zealand were limited to providing care for children but their scope of practice was extended to include care for adults providing the DT completed additional training. DTs now work in private dental practices and may work independently of a dentist if a consultative agreement with a dentist is in place (Nash et al., 2008). In 2007, there were 660 DTs, 1,836 dentists, and 287 DHs providing care to the approximately four million people living in New Zealand (Nash et al., 2008, citing the Ministry of Health). DTs in New Zealand currently serve children in over 2,000 schools (Nash et al., 2005).

About 50 countries worldwide (ADHA, 2010), both developing and developed nations, have implemented the dental therapy professional model to reach patients with compromised access to oral health care. These countries include Australia (since 1966), Canada (since 1972), Malaysia (since 1949), Tanzania (since 1955), and Great Britain (since 1960) (Nash et al., 2005). While there is variation in the nomenclature used for these professionals, in the duration of training, services permitted, and populations served across the various countries, there are many similarities in contributions to access to oral health care for both children and adults. Evaluations of the services provided to patients consistently show that DTs provide safe and high quality care when benchmarked to the comparable services of dentists.

Canada established an education program for DTs in Saskatchewan in 1972 and there are currently 90 DTs providing oral health services for "First Nation" Canadians in certain regions of the country (Nash et al., 2005). Evaluation of the care delivered by these DTs revealed that the quality of restorations provided by DTs was equivalent to that provided by Canadian dentists (Nash et al., 2005).

Legislative History of the DHAT in Alaska

A discussion of the legislative history of the federal government's involvement in providing health care to Alaska Natives is pertinent to understanding the process by which the DT model was implemented in Alaska Natives' villages. The Snyder Act of 1921 and subsequently the Indian Health Care Act of 1976 authorized federal funding for health care services to Alaska Natives (Sekugichi et al., 2005). Until 1975, the U.S. Indian Health Service (IHS) provided health and dental care directly to native populations as legislated by the U.S. government. However, when the Indian Self Determination and Education Assistance Act enabled tribes to assume direct responsibility for the health care of their tribal members, the structure in which health care was supplied changed. While the U.S. government still provided funding for health services, funding flowed directly to each tribe or regional tribal entity which then assumed responsibility for determining how care was to be delivered.

Each tribe is self-governed per the Alaska Native Claims Settlement Act of 1971 through a native for-profit or not-for-profit corporation recognized by the state (Sekugichi et al., 2005). Management entities may be local or regional in scope. These entities have joined a health care collaborative called the Alaska Native Tribal Health Consortium (ANTHC, referenced above) which negotiated an agreement with the IHS to provide health care to Alaska Native populations in the state. The activities of the consortium are governed by federal not state law.

U.S. public health dentists working for the IHS can be assigned to or contracted by tribal corporations to provide dental care (Sekugichi et al., 2005). Private dentists can also contract with tribal management to offer services to native populations. In 2005, there were 72 dentists serving 120,000 Alaska Natives, more than two-thirds of whom lived in remote regions of the state. In that year, there were 18 vacant dental positions designated for the care of indigenous populations. Historically, there was a 20 to 25 percent annual vacancy rate for dentists working with the IHS in Alaska (Nash et al., 2005). In addition, the turnover rate approached 30 percent annually (Nash et al., 2005). Dentists filling IHS positions were generally not of American Indian or Alaska Native origin (Nash et al., 2005) making culturally competent care elusive.

The persistence of poor oral health among the Alaska Native population led stakeholders to consider alternative models of care to address the concerning lack of access to dental services encountered in so many Alaska Native villages. The ANTHC and the IHS determined that the

DT model that originated in New Zealand was an appropriate alternative for delivering oral health care in Alaska. The New Zealand model was especially suitable because the conditions in Alaska were much like those in developing countries (Balleweg, 2009) where the New Zealand model had been successfully operationalized. The model fitted well conceptually and practically with the population in need of the services.

The ANTHC and the IHS used an already existing program, the community health aide (CHA) program, to deploy the DHAT in Alaska. The CHA program evolved from a tuberculosis control program in the 1950s in which village volunteers and health care workers distributed antibiotics (AACHAPD, 2007). Over time, the program evolved so that CHAs in villages were providing a wide range of health care services to village residents in need of care. This work was accomplished with the guidance and supervision of primary care providers working distantly from the CHAs. The program was officially recognized and funded by the U.S. government in 1968 under the authority of the Snyder Act (AL CHAP, 2011) and again in the reauthorization of the Indian Health Care Improvement Act in 1992 (Heisler et al., 2010; Sekugichi et al., 2005). The CHA program is overseen by a 12 member federal board which includes a dentist (Smith, 2007). The board is responsible for certification of the CHAs (Smith, 2007)

The CHA program is structured to provide primary health care services. In 2007, there were 550 CHAs employed by 27 regional tribal health organizations providing patient services in 178 rural Alaskan villages (AACHAPD, 2007; Smith, 2007). CHAs complete more than 350,000 patient visits annually (McKinnon et al., 2007). CHAs are authorized to offer a range of health care services in coordination with their supervising physicians, many of whom live and work in “hub rural communities” and regularly communicate with the CHAs about their mutual patients (Sekugichi et al., 2005). The overwhelming success of this program made it a logical option for extension of dental care to the same populations (Sekugichi et al., 2005).

In 2001, the CHA program was modified to include several different levels of dental health aides (DHAs) providing both basic and complex oral health services within their communities. The dental aide program included six different designations (Sekugichi et al., 2005). Some of the proposed DHA workforce has been trained and deployed while other workforce titles remain conceptual. The level of allowed services depends on the education and training of the DHA. The DHA workforce works under the supervision of a dentist with levels of required supervision varying from direct for the primary DHA-1 to general or remote for the DHAT. Whereas the primary DHA is deployed to work with the supervising dentists in established hub clinics, the DHAT is deployed to work in rural villages where dentists are generally not available (Sekugichi et al., 2005). While DHATs have been trained and installed in villages, implementation of this program for lower level DHA personnel encountered some stumbling blocks but was recently revived with changes in Medicaid law that now permit dental clinics to bill for the services of DHAs (Solovitch, 2011).

The six levels of DHAs are described as follows:

- The primary DHA-I provides oral health education, topical fluoride applications, cleaning with a toothbrush, and can do oral cancer screenings. These aides are trained in Alaska using a curriculum written at the University of Kentucky. In 2005, 20 people were working in their home villages in this capacity (Sekugichi et al., 2005).
- The primary DHA-II provides the same services as the DHA-I but can also provide dental sealants, intraoral radiographs, prophylaxes, manage dental emergencies, provide atraumatic restorative care for decay, and also assist visiting dentists with care. This level of health aide remains conceptual with the curriculum still to be written (Sekugichi et al., 2005).
- Expanded functions DHA-I work in regional "hub clinics" assisting dentists and providing expanded functions including prophylaxes, placing restorative materials in already prepared "simple" cavities, and placing stainless steel crowns. In 2005, 35 people had been trained at this level in a curriculum designed by the IHS (Sekugichi et al., 2005).
- Expanded functions DHA-II can do all of the above and in addition can place filling materials in complex as well as simple cavities. In 2005, a curriculum was developed by the IHS but no training occurred (Sekugichi et al., 2005).
- DHA hygienists are DHs and are empowered to provide services typically delivered by DHs including administration of local anesthesia. In 2005, no one had applied through this program for this designation (Sekugichi et al., 2005).
- The newest of the DHA categories is the DHAT. DHATs are located in local villages or in hub clinics to provide education and preventive services, diagnosis and treatment of dental caries, uncomplicated tooth extraction, and pulpotomies (Sekugichi et al., 2005). While DHATs are themselves supervised by dentists, DHATs can supervise all other levels of DHAs (Sekugichi et al., 2005).

The DHAT workforce model is designed such that the job candidate must be a resident of and recommended by the community that will be served. This recruitment model was adopted to ensure that the DHAT workforce would provide culturally competent care. The CDHC workforce model, which is discussed later in this paper, also uses this local recruitment model. Program designers assumed that an indigenous recruitment model would result in greater DHAT retention by producing professionals who were highly motivated to return to, remain in, and serve the community of origin. The training program requires a two-year commitment away from family and village to complete the didactic and clinical curriculum. This has been difficult for some DHAT trainees with retention among the first groups of trained DHAT graduates lower than anticipated. Program administrators are currently exercising more discernment when

selecting candidates for the education program (Solovitch, 2011). An important secondary benefit of the CHA and the DHA programs is that they provide new job and career opportunities for the local population (Edelstein, 2009).

The Denali Commission, an independent federal agency, is responsible for building both medical and other public infrastructure in Alaska (Solovitch, 2011). The commission has joined with local village partners to erect over 100 health clinics in the state (Solovitch, 2011) in which health and dental services are delivered. These clinics usually participate in the village-built clinic leasing program of the IHS, which was federally authorized in 1969 to provide funds to support the operation and maintenance expenses of village clinics (AACDHAP, 2011). Funding for the program comes from tribal, federal, private, and state sources as well as Medicaid, Medicare, and other public and private insurance reimbursement for services. Tribal health programs supplement funds when necessary to meet deficits in funding for the clinics and their programs (AACDHAP, 2011). In villages where the population is too small to sustain clinics, dentists and DTs provide services in available spaces, like school gyms, using portable dental chairs and portable equipment (Solovitch, 2011). Currently some DHATs in Alaska are physically located in a single village clinic while others travel to two or more villages to provide care.

Education

The issue of where to find appropriate training arose with the decision to implement the DHAT model. This was problematic since there was no established DHAT curriculum in a U.S.-based education program. In 2003, the consortium supporting the DHAT effort arranged to send six students to the highly respected University at Otago, New Zealand to study in the established dental therapy program. This cohort was followed by another six students in 2004 (Nash et al., 2005).

DHATS are trained in an intensive two-year didactic and clinical curriculum that includes instruction in assessment and prevention, motivational interviewing and behavioral modification, and prophylactic and restorative care. Students complete coursework in both general health and oral health sciences, in societal health, in clinical therapy and dental therapy practice (AHRQ, Willard, 2011). The course requires 2,400 hours of study, 760 of which are devoted to clinical experiences working with children in local clinics as well as four weeks spent in the field in the company of a practicing DT to learn about the responsibilities of the DHAT role (AHRQ, Willard, 2011).

After completion of the New Zealand education program and their return to Alaska, DHATs spent three months with a supervising dentist under their direct supervision providing patient services in a hub clinic in Alaska (Smith, 2007, Edelstein, 2009). Eventually the DHAT in training is authorized by the supervising dentist to provide services under a competency

evaluation and credentialing model. This means that the supervising dentist performs a skills assessment and determines what services can be safely provided to patients by the DHAT and under what form of supervision (general or remote) once the DHAT is deployed to a village or villages. The permitted scope of practice considers the clinical skills and capability of the individual DHAT as well as the dental needs within the village to which the DHAT is assigned.

The relationship between the dentist and the DHAT that is established during training continues throughout employment. DHAT competency is assessed every two years by the supervising dentist. The DHAT is also required to complete ongoing continuing education courses to maintain certification. The DHAT is expected to have an understanding of medical and dental evaluation, periodontal techniques, restorative care, oral surgery, local anesthesia, infection control, community and preventive dentistry, and such things as clinic management and maintenance and repair of equipment (Edelstein, 2009) before deployment.

Dentists have expressed concerns that DHATs are providing services that require extensive education and training. Dentists complete a lengthy educational curriculum that teaches an inclusive body of knowledge in oral health and prepares them with a comprehensive skill set in dentistry. DHATs are taught in a protracted didactic and clinical curriculum that mainly focuses on reparative skills and relies on constant repetition to ensure proficiency. DHATs repeatedly perform specific critical tasks to obtain expertise in a few focused skills of dental care (Edelstein, 2009).

Substantial international evidence attests to the safety and quality of care provided by DHATs and their acceptance by the patients served (Edelstein, 2009). A study examining patient dental records in Alaska evaluated irreversible procedures performed by DHATs compared to dentists in a control group. That study found that there were no significant differences in incidence of complications from dental treatment between the two groups (Bolin, 2008; McKinnon et al., 2007). A later case study of the DHAT program in Alaska also confirmed that there were no significant differences found between the services provided by dentists and those provided by DHATs in the diagnosis and treatment of dental conditions or in the development of complications related to the treatments provided (Wetterhall et al., 2010).

As the program in Alaska evolved, the ANTHC worked with MEDEX Northwest of the University of Washington (a PA education program) and the Yuut Elitnaurviat Dental Clinic in Bethel, Alaska to establish a U.S. training site for dental therapists. The initial plan was that the DHAT education program would be hosted by the dental school at the University of Washington but amid strong local dental opposition in that state, the education program was moved to a training site in Anchorage, Alaska (Solovitch, 2011). The Alaska-based education program began training students in 2007.

The education program employs a dentist as its permanent director while relying on more than 20 visiting dental professors from a variety of U.S. dental schools who travel to Anchorage on a rotating basis to offer a one- or two-week module of instruction (Solovitch, 2011). In the third year after training began at the Anchorage site, there were 14 students enrolled in the program (Edelstein, 2009). In that same year, there were 23 credentialed DTs serving 42 villages in Alaska (AHRQ, Willard, 2011)

The curriculum for the Alaskan program is modeled on the New Zealand course of study with some adjustments to better meet the particular needs of the rural Alaska populations receiving treatment. Students spend a year studying didactic materials and preclinical skills in the DENTEX training center in Anchorage (Edelstein, 2009) and a second year in the Yuut Elitnauviat Dental Training Clinic in Bethel. The clinical year in Bethel includes three weeks of travel to village clinics for on-site training (AHRQ, Willard, 2011).

When the DHAT has completed the educational program, the DHAT returns to the respective home village or to a hub clinic to complete supervised training with a dentist who is employed by the appropriate tribal organization and who is affiliated with the hospital that serves the village. The dentist observes the work of the DHAT, provides standing orders, and evaluates the services that can be provided. Under standing orders of that supervising dentist, the DHAT is then permitted to provide x-rays, gingival scaling, prophylaxis, fluoride treatments, dental sealants, extractions, restorations, stainless steel crowns, etc. Dentists review x-rays and treatment plans of the deployed DHAT remotely through a telehealth network that permits the transfer of real time digital images (McKinnon et al., 2007; AHRQ, Willard, 2011).

In 2010, The Kellogg Foundation provided funding to the American Association of Public Health Dentistry to support the development of a prototype of a university-based curriculum to train DTs in the U.S (ASDA, 2010). Several articles addressing the DT professional model and an appropriate curriculum for training DTs were published in a special edition of the *Journal of Public Health Dentistry* in the spring of 2011 (AAPHD, 2011). These papers can be accessed at http://onlinelibrary.wiley.com/doi/10.1111/jphd.2011.71.issue-s2/issuetoc.

Opposition to the New Workforce Model

Use of DHATs in Alaska was strongly opposed by the ADA and the Alaska Board of Dentistry because DHAT professionals were permitted to provide irreversible services including extraction and cutting of teeth, which were historically considered the exclusive purview of dentists. Originally, the Alaska Board of Dentistry sought an opinion from the state's Attorney General about the legality of the DHAT program. The Attorney General responded that the DHAT program was legal because it was enabled under federal law and therefore, subject to federal pre-emption of state law based on the supremacy clause in the U.S. Constitution (Smith, 2007).

Dissatisfied with this opinion, organized dentistry, including the ADA and the Alaska dental board subsequently instituted a suit in state court against the state of Alaska, the ANTHC, and eight individuals from Alaska who were DHATs seeking an injunction on the program and charging the state with failing to enforce the provisions of the dental practice act. The suit questioned the ability of DHATs to make appropriate clinical decisions to perform restorative services safely and to provide quality care (Edelstein, 2009). In addition, the suit stated that DHATs were practicing dentistry controverting Alaska state law. The superior court in Alaska eventually upheld the exemption of DHATs from the state's dental practice act (Bolin, 2008) declaring that the DHAT program was governed by federal law addressing the delivery of health services to native populations.

The Process for Implementing the DHAT Program in Alaska

In a paper written for the Agency for Healthcare Research and Quality (AHRQ), Dr. Mary Willard, who is both the Alaska Area Dental Director for IHS and the DHAT training director in Anchorage, detailed the process by which the DHAT program was created.

- The first step was the planning and development process that included conceptualizing the model, reaching an agreement for training of the DHATs in New Zealand, obtaining funding to finance the students, recruiting and sending candidates to the educational program, and then gathering human and funding resources to support the program oversight and the cost of the DHAT training in Alaska, and finally obtaining the necessary dental supervision for DHATs.
- The adoption process required securing commitment to the program from the communities where care was to be provided to ensure that local populations were engaged, generating buy in from the dental community who were essential to the effort to expand services using this new workforce, and ensuring that a solid legal framework was in place to support and sustain the initiative.
- Lastly, ensuring the sustainability of the model required creation of a viable economic and reimbursement model to remunerate the services to ensure the program would continue in native villages (AHRQ, Willard, 2011).

The Dental Therapist (DT) in Minnesota

The issue of compromised access to dental services affects many people across the U.S. In Minnesota nearly half of the 87 counties, mainly in the north and west of the state, were designated as dental health profession shortage areas (DHPSAs) by the U.S. government (Benson, 2011), meaning that the ratio of dentists-to-population fell below the desirable level. In addition, even in large metropolitan areas like the twin cities there were also dental shortages (Benson, 2011). In 2008, a group of Minnesota's health care providers and other stakeholders,

the Minnesota Safety Net Coalition, gathered supporters from more than 40 organizations to advocate for the introduction of legislation to place the advanced dental hygiene practitioner (ADHP), a conceptual new oral health workforce model, into safety net settings to provide oral health services to those without sustained access to oral health care (ADHAb, 2011). At the time, Metropolitan State University, part of the state college system, was planning to offer an educational program to train ADHPs using a curriculum developed by the ADHA. This was the first education program in the country to do so. In many respects, the ADHP model developed by ADHA mirrored the NP model in health care (Scandrett, 2009). The ADHP professional would provide care in settings where dentists were not currently available.

This initial proposal generated opposition from other stakeholders resulting in the formation of a coalition that included those who had initially supported the ADHP legislation including the Minnesota Safety Net Coalition and the Minnesota Dental Hygienists' Association and other stakeholders including the Minnesota Dental Society and the University of Minnesota Dental School. This coalition worked to reach a compromise agreement. Ultimately, the group settled on advocating for an oral health practitioner (OHP) in the state, a new workforce model that would extend care beyond the current capabilities of the oral health workforce in Minnesota. The OHP scope of practice "mirrored" that of the ADHP (ADHA b, 2011) and included basic restorative tasks, extractions, and other clinical services. The OHP would be permitted to practice in certain underserved settings without the presence of a dentist (ADHAb, 2011). The compromise legislation proposed a "skeleton framework" (Scandrett, 2009) for an alternative workforce model and the legislation was signed into law by the Minnesota legislature in 2008. A task force was then assembled at legislative direction to determine parameters for OHP practice.

The OHP workgroup consisted of 13 people selected from an inclusive group of stakeholders. The task force was to make recommendations on the educational requirements for the OHP, conditions for licensure, and levels of required supervision, and to then introduce revised legislation. In late 2008 and in the early months of 2009, legislation containing the workgroup's recommendations was drafted and introduced to both the House and the Senate of the Minnesota Legislature. The legislation was supported by more than 50 organizations in the state (ADHAb, 2011).

The Minnesota Dental Association which had participated in the OHP workgroup opted not to support the final OHP legislation and instead introduced a bill to create a dental therapist (DT) in the state. The proposed DT was to be educated at the dental school at the University of Minnesota (ADHAb, 2011). This proposed model was similar to a PA model with the therapist providing services under the supervision of an on-site dentist. As in medicine where PA training often occurs in a medical school, the DT would be trained in a dental school (Scandrett, 2009). This proposed DT professional had a more limited scope of practice than the OHP with restorative services provided only under on-site supervision of a dentist. The DT would be

permitted to offer some services, especially educational and preventive services, under general supervision.

The two pieces of legislation differed in the permitted scope of practice and in the incumbent level of supervision for each of the new workforce models. However a point of agreement in both was that the new professional would only be permitted to practice in underserved areas or with patients without access to regular dental care (ADHAb, 2011).

To keep the legislation alive, the two proposals were combined into a single bill incorporating both workforce models and thereby permitting the bills to advance in the legislative process. Eventually compromise legislation was authored proposing that the Minnesota legislature enable two different levels of new oral health workforce, a DT and an advanced dental therapist (ADT). The final bill incorporated features of each of the proposals. The combined bill was passed by the legislature in May 2009 (ADHAb, 2011).

DTs and ADTs work under mandated collaborative management agreements with dentists that include:

- Practice settings where the DT or ADT will work (Minn. Statute, Sec. 24 (150A.105), 54.29-55.24, Subd. 3);
- Protocols or limitations on services to be provided;
- supervision requirements;
- record management routines and quality assurance plans (Minn. Statute);
- procedures for referral to dental, specialty, or emergency care (Scandrett, 2009, MDH, 2009);
- financial arrangements (MDH, 2009) between the DT or ADT and the dentist; and
- the process for acquiring, dispensing, and administering prescription medications (MDH, 2009).

The DT is educated in an entry level program at the University of Minnesota Dental School in a four-year, 40-month program awarding a bachelor's degree (MDH, 2009). The dental school will also offer a 26-month master's degree to permit the DT to advance to the ADT. A DT must have 2,400 hours of clinical experience before advancing to ADT practice. Prerequisites for admission to the ADT master's degree program at the dental school include a bachelor's degree and completion of a pre- professional core curriculum (MDH, 2009).

The DT in Minnesota can provide education and counseling, patient charting, x-rays, polishing of teeth, pulp vitality testing, desensitization, removal of spacers, and fabrication of athletic

mouthguards under the general supervision of a dentist and in accord with the collaborative agreement. The DT must be supervised by an on-site dentist (indirect supervision) when drilling and filling cavities, placing temporary fillings and crowns, scaling and root planing, doing pulpotomies on primary teeth, pulp capping, providing soft tissue relines, repairing of dental prosthetics, and administering nitrous oxide or injecting local anesthesia (Scandrett, 2009).

The ADT is currently educated in the ADHP curriculum at Metropolitan State University in a 26-month master's degree program (MDH, 2009). The program uses the state of the art dental laboratory and clinic at Normandale Community College (also part of the state college system) to do much of the clinical training (MDH, 2009) for the ADT students. Prerequisites for admission to the ADT program include a bachelor's degree, an active Minnesota license to practice dental hygiene, restorative functions certification in Minnesota, and 2,400 hours of clinical practice experience (MDH, 2009). Since 2003, DHs, and DAs in Minnesota who are qualified by training are permitted to perform restorative functions including placing amalgam, composite, glass ionomer, and stainless steel crowns under the restorative functions permit (Cooper et al., 2007).

The scope of practice for the ADT includes all of the tasks permitted to the DT. However, those tasks permitted to the DT only under indirect supervision can be performed by the ADT under general supervision in accordance with the collaborative management agreement with the collaborating dentist. ADTs are also permitted to perform some advanced clinical skills including oral evaluation and assessment, formulating a treatment plan, and performing simple extractions of diseased teeth (Scandrett, 2009) that are not permitted to DTs. ADTs can provide, dispense, and administer analgesics, anti-inflammatory medications and antibiotics but are not permitted to prescribe.

Dental hygiene services (e.g., prophylaxis) are not within the legislated scope of practice for DTs in the state. Providing dental hygiene services requires a separate license as a DH in Minnesota (Scandrett, 2009). However, an ADT who is a graduate of the Metropolitan State program is also a licensed DH and can therefore provide prophylactic and preventive services not within the ADT scope of practice (Scandrett, 2009).

Both the DT and ADT education programs began accepting students in the fall of 2009. The first graduates of the ADT master's degree program completed their education and entered the workforce in the spring of 2011. The Minnesota legislature has mandated an evaluation of the impact of DTs and ADTs by the Minnesota Board of Dentistry with a report due to the legislature by 2014. Since there is currently no established accreditation for dental therapy programs, the Minnesota Board of Dentistry has assumed this function until a formal accreditation process can be established (MDH, 2009).

The Minnesota legislation also requires third party competency testing for graduates of the two education programs. Again, no formal competency assessment currently exists so the board of dentistry in the state has contacted established testing agencies with an interest in developing an appropriate didactic and clinical examination for these new professionals (MDH, 2009). The board of dentistry has also been charged with developing the appropriate continuing education requirements for renewal of DT and ADT licenses.

The DT and ADT are considered part of a larger strategy to reduce disparities in access to oral health care and are not intended as a "silver bullet" that will solve all issues related to compromised access to care (Scandrett, 2009). The selection of the DT and ADT models made sense in light of the workforce supply in Minnesota where there was a shortage of dentists but a surplus of DHs (Scandrett, 2009).

There were also "widespread access issues" for patients in need of dental services based on the geography and the demographics of the state's population (Scandrett, 2009).

Dental Therapist (DT) and Advanced Dental Therapist (ADT) Practice

DT and ADT professionals are licensed through the state board of dentistry and are limited to working with the underserved populations in Minnesota (Scandrett, 2009). They are permitted to work in all settings that are authorized by the state for collaborative dental hygiene practice including community clinics; Head Start programs; schools; nursing homes; group homes serving the elderly, the disabled, or juveniles; state-operated facilities such as correctional facilities; public health clinics; hospital emergency rooms; homeless shelters, patient homes; and also in rural communities (Scandrett, 2009). DTs and ADTs are also authorized to work in DHPSAs; military or veterans hospitals and clinics; tribal clinics and settings where greater than 50% of the population are low income, disabled, chronically ill or uninsured (Scandrett, 2009). A dentist is not permitted to supervise more than five DTs or ADTs at any one time (Minn. Statute, Sec. 24 (150A.105), 54.27-54.28, Subd. 3).

Evaluation of the Initiative

Evaluation of the impact of the DT/ADT workforce model was required in the initiating legislation and this is currently in process. There are five outcome measures of interest:

- Measure 1 – the number of new patients served by the DT or ADT and by the dental clinic
- Measure 2 – reduction in wait time for appointment for needed services
- Measure 3 – decreased travel time for patients
- Measure 4 – impact on emergency room utilization for dental reasons
- Measure 5 – costs to the public health care system (Nordgren, 2012)

Some of the data that is being examined during the evaluation process include state Medicaid data, hospital emergency room data, patient survey questionnaires, data from individual clinics, data from the Minnesota Department of Human Services (DHS), complaints filed with the Board of Dentistry (BOD), data on the number and distribution of DTs and ADTs from the BOD, and data from DHS on the number and type of dental services provided by DTs and ADTs. Data collection began in June 2012 and will continue for the next year. The report is expected to be submitted in January 2014 (Nordgren, 2012).

The Advanced Dental Hygiene Practitioner (ADHP)

Since 2005, the ADHA has been advocating for the establishment of the ADHP. The ADHP is a midlevel, expanded practice model for DHs. The scope of practice for the ADHP closely resembles the international DH-T model, although the required level of education (at the graduate level) differs significantly from that adopted in most other countries (three to four years in entry level education).

While DHs currently mostly provide preventive and prophylactic services, the ADHP would provide diagnostic, preventive, restorative, and therapeutic services in rural and underserved settings (McKinnon et al., 2007) to populations with limited access to dental services including those who are medically compromised and to the youngest and oldest patients who are at high risk for not receiving care (McKinnon et al., 2007). The ADHP would act as part of an oral health team, making referrals to dentists for patients in need of more extensive, comprehensive care (McKinnon et al., 2007).

Over recent years, many states have expanded practice permissions for DHs to provide preventive and prophylactic services under lower degrees of supervision and in some states, without the prior order of a dentist. In 2011, 40 states permit some form of direct access to DH services and 44 states permit DHs to administer local anesthesia (ADHA, 2011). In addition, 29 states permit DHs to administer and monitor nitrous oxide analgesia (ADHA, 2011). Fifteen states now directly reimburse DHs through their Medicaid programs (ADHA, 2011). In 31 states, DHs are permitted to provide at least one basic restorative service, although the supervision and circumstances under which that occurs varies by state regulation (ADHA, 2011).

There is some precedent for training DHs in restorative procedures. In the 1970s at the Forsyth Institute in Boston, DHs were given an extra year of training in their dental hygiene education program to learn basic restorative care (Edelstein, 2009). For several years, DHs provided those services to patients free of charge in the clinic at the Institute. An evaluation of those services showed that the restorative care provided by DHs was “indistinguishable” from that provided by dentists (Edelstein, 2009). This demonstration project was stopped by a court injunction several years after it was initiated. The injunction was requested by the state dental society which held that DHs were practicing dentistry without a license.

The proposed ADHP model requires a graduate level education (McKinnon et al., 2007). A prerequisite for admission to the graduate program would be graduation from a Commission on Dental Accreditation (CODA) accredited dental hygiene education program and completion of a bachelor's degree. The curriculum would cover five domains:

- Provision of primary oral health care
- Health care policy and advocacy
- Management of oral care delivery
- Translational research
- Professionalism (ADHA, 2008)

To achieve competency in those areas, coursework would include:

- foundations of advanced practice
- community based primary oral health care
- management of dental emergencies
- cultural issues in health and illness
- advanced assessment and diagnosis
- pharmacological principals
- management of care delivery
- health care policy
- translational research
- community practice (ADHA, 2008)

The scope of services permitted to the ADHP would include:

- health education and promotion and patient counseling
- diagnosis and treatment of oral diseases and referral for complicated conditions
- cavity preparation
- atraumatic restorative care of primary and secondary teeth
- temporary restorations
- placement of pre-formed crowns
- non-surgical periodontal therapy
- pulpotomies on primary teeth
- pulp capping in primary and permanent teeth
- extractions of primary teeth or uncomplicated extractions of permanent teeth
- placing and removing sutures
- palliation and pain management
- prescribing medications from a select formulary
- nutritional interventions
- case management services
- collaboration with other health and dental professions

Possible practice settings include community clinics, migrant health clinics, rural health clinics, hospital and ambulatory clinics, mobile dental clinics, long term care facilities, group homes for the disabled, hospices, homeless shelters, retirement homes, pediatric physician practices, school-based clinics, Head Start programs, day care facilities, institutions including prisons, WIC centers, etc. (ADHA, 2008).

The curriculum developed by the ADHA to train the ADHP is the basis of the ADT education program at Metropolitan State University in Minnesota. While the ADHP remains a conceptual model, some states are currently considering implementation. Legislation has been introduced in Connecticut to enable ADHP professionals to work in the state to address access issues.

The Dental Hygienist Therapist (DH-T)

A recent trend in countries that educate and deploy DTs has been to combine training as a DT with training as a DH resulting in a dually qualified practitioner--the DH-T (Edelstein, 2009). The titles used for this class of professional vary by country. The DH-T is called an oral health therapist in Australia, an oral health practitioner in New Zealand, a dental hygiene therapist in Great Britain, and a dental hygienist in the Netherlands (Edelstein, 2009). The DH-T is qualified to provide preventive, prophylactic, and basic restorative services although particular permissions to perform tasks vary somewhat by country.

New Zealand

For many years, dental therapy education programs and dental hygiene programs in New Zealand were offered as separate academic programs in different locations. However, in 1999 the government consolidated the training programs for DTs and moved them to the dental school at the University of Otago. In 2006, the dental therapy program merged with the dental hygiene program at the university. As a result, students are now admitted to a three-year combined degree granting program with graduating students qualified as DH-Ts. A dental therapy program that was established in Auckland in 2002 has also merged with a dental hygiene program and follows the same educational model (Nash et al., 2008). Professionals trained in these programs provide both preventive and restorative services.

Australia

Australia is training dental auxiliaries in an education program that incorporates didactic and clinical instruction in both dental hygiene and dental therapy skills (Edelstein, 2009). Historically, DTs in Australia were educated in a two-year program. With the inclusion of dental hygiene education in the curriculum the program has changed to three years. Students graduate as an oral health therapist (OHT) with the ability to perform both prophylactic and basic restorative care. Currently, seven education programs in Australia offer training as an OHT and one remaining program offers training as a DT. Previously educated DTs can return to school to train in the dental hygiene curriculum to also qualify as an OHT (Edelstein, 2009).

The OHT in Australia studies in a broad-based curriculum that includes not only dental therapy and dental hygiene clinical skills but also training in treatment decisions, public and community health, patient behavior, health promotion, and professional ethics and practice (Edelstein, 2009). There are differences in the scope of practice between a DH, a DT, and an OHT. While a DH and an OHT can provide subgingival scaling of teeth, DTs cannot. Both a DT and an OHT can diagnose and treat caries or traumatic injury to teeth and can provide preventive treatments but a DH cannot. Neither the DT nor the OHT can provide advanced restorative services although some states do permit the DT or the OHT to remove permanent teeth (Edelstein, 2009). DTs and OHTs can work in schools, dental offices, hospitals, and community health clinics. They are permitted to provide restorative care to children up to age 18 (and in some states young adults up to age 25) and preventive and orthodontic services to patients of any age.

Great Britain

In Great Britain, all education programs combine training in dental hygiene and dental therapy although the length of the programs varies from two and a half years to four years and the award is either a diploma or a degree (Edelstein, 2009). Some programs award dual diplomas in each discipline. Some of the institutions training DTs in Great Britain are not authorized to grant degrees (e.g., hospitals) (Edelstein, 2009). The educational programs in Great Britain are entry level with students matriculating directly from high school (Edelstein, 2009). Much of the clinical training occurs in the last year of the program. Students trained in the dental hygiene therapy programs are given advanced standing if they wish to progress to an educational program in dentistry (Edelstein, 2009).

Specific scopes of practices for DHs and DTs are defined by the regulatory agency in Great Britain. Topical fluoride, sealant services, and health promotion services are common to both. DHs provide health promotion services, preventive services, and treat gum disease under the prescription of a dentist. DTs also work under the prescription of a dentist and provide basic restorative care which includes extraction of primary teeth. The dental council has developed a detailed description of competencies for DH-Ts that requires instruction in oral disease, plaque related disease, gum diseases, oral pathology, dental caries, microbiology, children's oral health, geriatric care, public health, oral surgery, medications, restorative dentistry, implants, orthodontics, preventive services, pediatric dentistry, radiography, palliation, etc. (Edelstein, 2009).

All patients must first be examined by a dentist who determines the treatment plan and the services to be performed by the DT or DH-T (MDH, 2009). DH-Ts scale and polish teeth, treat and prevent periodontal disease, take dental radiographs, monitor and screen for oral health conditions, apply prophylactic and antimicrobial materials, provide simple restorations, place crowns, perform pulpotomies on primary teeth, place stainless steel crowns on primary teeth, do

inferior nerve blocks, apply fluoride varnishes, and dental sealants as well as provide oral health and hygiene education and dietary counseling (MDH, 2009). Since 2006, DH-Ts are allowed to practice in any setting under the general or indirect supervision of a dentist (MDH, 2009).

Netherlands

In the Netherlands, the dually trained professional is called a hygienist but the professional has a scope of practice that includes both preventive services and primary restorative care (Edelstein, 2009). Hygienists provide preventive services, screening and monitoring, and basic dental care. While the hygienist can practice independently or be employed by a dentist, all services provided to patients require the prior order of a dentist (Edelstein, 2009). Education of the hygienist in the Netherlands is longer than in most countries that educated DH-Ts. The Dutch Ministry of Education requires four years of study after high school graduation to become a hygienist. The required training closely mirrored that required of dentists when the model was first introduced. As a result training for the dental profession was expanded from five to six years in 2007 to differentiate the professions and to incorporate more specialty training and skills for dentists, and for dentists to learn more about complex patient care (Edelstein, 2009).

The Expanded Function Dental Assistants (EFDAs)

One of the most common alternative oral health workforce models is the expanded function dental assistant (EFDA). As the terminology suggests, DAs with extra training and certificates of competency are permitted to perform tasks not usually associated with basic dental assisting. Over the last four decades, states have variously expanded permissions for dental auxiliaries through the legislative process so that currently most states have enabled one or more expanded duties to dental assistants. In the 1970s, the U.S. Navy began using DAs working in expanded functions to increase productivity and to permit the dentists with whom they worked to do other more intricate tasks (Durley, 2010). The success of this model has now been extended to mainstream practice.

Currently there are about 2 DAs for every dentist and about 1.25 DHs per dentist in the U.S (Durley, 2010). In less than 10 years, there are expected to be 2.4 DAs and 1.4 DHs per dentist in the U.S. (Durley, 2010). The increasing supply of dental auxiliaries is an important oral health resource and expanding their permissions to practice has been shown to be an effective strategy to increase the volume of patient services, especially in private dental practices (Beazaglou et al., 2009). The EFDA workforce model permits regulators to take an incremental approach to increasing permissions for tasks to be performed by dental auxiliaries.

It is important to any discussion of the EFDA workforce model to understand that nationally there are no uniform guidelines that address the practice of dental assisting across states and no consistent education, registration, or licensure requirements (DANB, 2005). The practice of DAs is described variously in state specific dental practice acts and board regulations. Some

regulations permit dentists to delegate all reversible tasks to DAs (DANB, 2005), while others specifically limit what DAs can do under dental delegation (DANB, 2005). Therefore, the definition of expanded functions differs by state. One example is radiography. In some states, there are no special training requirements for a DA to place, expose, and evaluate the quality of dental radiographs. However, in other states, radiography is considered an extended function that requires special didactic and clinical training and competency evaluation outside the dental office before the DA is certified or authorized to take x-rays.

States may describe only one type of DA in dental regulation or multiple levels of DA practice. A basic DA might be defined as an assistant who is trained on-the-job. Almost half of all DAs in the U.S. received most or all of their skills training on the job (DANB, 2005). DAs with formal education in CODA accredited programs or with national certification, called certified dental assistants (CDAs) or sometimes registered dental assistants (RDAs) are generally provided with more permissive scopes of practice under the supervision and delegation of a dentist. Some states describe three or more different levels of dental assisting in their regulations.

States may limit DAs who are trained on-the-job from seeking EFDA certification until they have acquired work experience or additional training. Generally, states that permit EFDAs to provide dental services require some level of professional experience, formal didactic and clinical training in a particular or multiple skills, and competency assessment before providing permission to the DA to perform the extended function(s).

Education programs in extended functions may be offered through established dental, dental hygiene, or dental assisting education programs; private vocational or proprietary schools; state dental boards, or continuing education providers approved by the regulatory boards. States generally maintain a rigorous approval process to assure that the educational provider can offer the required didactic and clinical training and appropriately assess student competency to assure that the DA can provide quality services.

Extending permission for new functions to an appropriately trained oral health workforce has impacted both the capacity and productivity of dental practices that have leveraged auxiliaries and increasingly capable technology. Of all the models considered in this paper, this is the most integrated workforce model. EFDAs are working in many private dental practices and public health settings across the U.S. Employment of EFDAs has been shown to extend dental capacity by permitting dentists to focus on higher level dental services. A 2009 study of expanded function DAs in Colorado found that private dental practices using EFDAs appropriately substantially increased efficiency, the number of patient visits, and both gross billings and practice net incomes in the state (Beazoglou et al., 2009).

Currently about 40 states (including Maine) and the District of Columbia have enabled extended function to DAs using either the EFDA title or another similar title (Durley, 2010). In six states, CDAs automatically qualify as EFDAs, but in others, a CDA must still specifically qualify to perform extended functions. Another variation is that in some states a DA may qualify to perform all extended functions through a single certification pathway, while in others the DA must qualify separately to perform each extended function task through focused education and competency testing in the particular task.

In 2005, 38 states either required or recognized the DANB national exams as qualifying exams to attest to competency to perform the various dental assisting functions (DANB, 2005). The three examinations required for certification as a DA by the DANB include chairside dental assisting, radiation health and safety, and infection control. Passage of the DANB radiation health and safety exam is cited in several states as a prerequisite to perform radiography. DANB also offers examinations to qualify as a certified orthodontic assistant, a certified DA in oral and maxillofacial surgery, and a certified DA dental practice manager (Durley, 2010). The DANB is also planning to offer a certification examination for certified oral preventive assistants, which will assess knowledge of coronal polishing, sealants, topical fluoride, and topical anesthetics (Durley, 2010). This certification will include the clinical tasks permitted to the community dental health coordinator (CDHC) which is discussed later in this paper.

The Dental Assisting National Board compiled a list of the more than 30 titles given to DAs working in expanded roles by states. These included (DANB, 2006):

- Expanded function dental assistant (EFDA) (FL, ID, ME, OH, OR, PA, VT)
- Expanded duties dental assistant (EDDA) (CO, GA, LA, OK, SC)
- Dental assistant qualified in or to perform expanded duties/functions (IL, MO, NH, TX, WV)
- Dental assistant with state certification in expanded functions (NM)
- Dental assistant with expanded duties training (KS)
- Advanced dental assistant (SD)
- Dental assistant qualified in general duties (MD)
- Licensed expanded function dental auxiliary (WA)
- Registered dental assistant qualified in or to perform expanded/extended duties/functions (CA, MI, MN, TN)
- Registered dental assistant with expanded duties training (IA)
- Registered restorative assistant in extended functions (CA) (DANB, 2006)

Some states described board certified DAs or registered DAs in regulation under the following titles (DANB, 2006):

- DANB certified dental assistant (CDA) (MA, ME, MO, NC, NH, NY, OH, RI, VT)
- Registered dental assistant (RDA) (AR, CA, IA, MI, MN, ND, NJ, TN, TX, WA)

- Registered restorative assistant (CA)
- Dental assistant II (NC)
- Graduate dental assistant (NH)
- Formally trained dental assistant (MA)
- Certified Ohio dental assistant (OH)
- State-licensed certified dental assistant (NY)

States may issue specific permits, certifications, or endorsements to DAs. An example is the coronal polishing DA in Kansas. Specific state certifications included (DANB, 2006):

- Monitoring nitrous oxide or oxygen analgesia (or sedation) administration (AR, CA, IL, MI,NC, NH, OK,SC, SD, TN, TX, WV)
- Administering and monitoring nitrous oxide or oxygen analgesia (or sedation) (KS, MN)
- Inducing, administering, and monitoring nitrous oxide or oxygen analgesia (or sedation) (CO)
- Coronal polishing (AZ, AR, CA, CO, IL, KY, KS, NC, NE, NH, NM, OK, TN)
- Pit and fissure sealants or fluoride varnish (CA, IL, MN, ND, NM, OK, TN, TX, WA)
- Place, condense, and carve amalgam (MI)
- Application of temporary soft relines to full dentures (OR)
- Take final impressions for indirect restorations (MI)
- Provisional crown and bridge restorations (NH)
- Restorative and prosthetic duties (TN)
- Anesthesia administration (VA)
- In-office whitening (NH)

The DANB identified the most common expanded duties across states. They included (Durley, 2010):

- Dental radiography
- Placing retraction chords
- Applying sealants
- Taking impressions for mouthguards, removable prostheses, etc. Some states are adding final impressions as well
- Monitoring nitrous oxide with some states expanding permissions to other types of sedation or analgesia
- Placing and removing dental dams
- Placing and removing matrices
- Coronal polishing
- Removing sutures
- Placing temporary restorations with some states permitting carving and placing of amalgams and composites

The following tables illustrate the significant variation in permitted and non-permitted DA tasks across states. These tables report all tasks permitted to qualified DAs in each state including those permitted to basic and EFDAs. Not all tasks in a state are permitted to every DA but DAs who are appropriately qualified in each state are permitted to provide the indicated services. Tasks specifically prohibited to any DA in the state are also noted in cases where that information was available. This information was originally compiled by the DANB and is available on their Web site at http://www.danb.org/main/statespecificinfo.asp.

Table 1. Tasks Permitted to Qualified Dental Assistants by State (Alabama to Kentucky)

Tasks	AL	AK	AZ	AR	CA	CT*	CO	DE	DC	FL	GA	HI	ID	IL*	IN	IA	KS*	KY
Perform mouth mirror inspection of the oral cavity	X				●X		X			●X		X						X
Chart existing restorations or conditions	X		X		●X		X		●	●X			X					
Phone in prescriptions at the direction of the dentist																		
Receive and prepare patients for treatment including seating, positioning chair, and placing napkin																		
Complete laboratory authorization form																		
Place and remove retraction cord					●X				●X	●X	●X	●	X			●X		●X
Perform routine maintenance of dental equipment																		
Monitor and respond to post surgical bleeding																		
Perform coronal polishing procedures		●X	●X	●X	●X		X		●	●X	X	●	●X	●X	X		●X	●X
Apply effective communication techniques with a variety of patients																		
Transfer dental instruments																		
Place amalgam for condensation by dentists		X							●									●X
Remove sutures	X		X		X				●X	●X	X	X	X					●X
Dry canals					●X						X	●						
Tie in archwires					●X				●	●X	X	X	X					
Demonstrate knowledge of ethics/jurisprudence/patient confidentiality																		
Identify features of rotary instruments																		
Apply topical fluoride	X	X	X		X		X			●X	●X		X		X			●X
Select and manipulate gypsums and waxes																		
Perform supragingival scaling		●		●			●							●		●	●X	●
Mix dental materials																		
Expose radiographs	X	X	●X	X	X	●X	●X	X	X	●X	X	X	X	X	●X	●X	X	X
Evaluate radiographs for diagnostic quality			●X			●X			X					X			X	
Provide patient preventive education and oral hygiene instruction	X		X					X	●	X		X	X					
Perform sterilization and disinfection procedures																		
Provide pre-and post-operative instructions			X					X				X						
X = Permitted ● = Forbidden ●X = Under Certain Circumstances																		
* Dentist may delegate to DAs dental procedures dentist deems advisable																		

Source: DANB, 2012, CHWS, 2012

Table 1. Tasks Permitted to Qualified Dental Assistants by State (Alabama to Kentucky) (cont.)

Tasks	AL	AK	AZ	AR	CA	CT*	CO	DE	DC	FL	GA	HI	ID	IL*	IN	IA	KS	KY
Place and remove dental dam	X		X		X			X		●X	X	X	X					●X
Pour, trim, and evaluate the quality of diagnostic casts																		X
Size and place orthodontic bands and brackets	X			●	X				●	●X	X	X						●X
Using the concepts of four handed dentistry, assist with basic restorative procedures, including prosthodontics and restorative dentistry												X				X		
Identify intraoral anatomy																		
Demonstrate understanding of the OSHA Hazard Communication Standard																		
Place, cure, and finish composite resin restorations				●	●	●	●		●			●	●	●				●X
Place liners and bases	X				●X	●	●		●	●X	●X	●	X	●		X		●X
Place periodontal dressings	X				●X				●X	●X	●X		X			X		●X
Demonstrate understanding of the OSHA Bloodborne Pathogens Standard																		
Take and record vital signs	X									X		X						X
Monitor vital signs																		●X
Clean and polish removable appliances and prostheses																		
Apply pit and fissure sealants		X	X		●X				●	●X	●X		●X	X		●		●X
Prepare procedural trays/armamentaria set-ups																		
Place orthodontic separators					X					●X	X	X	X					
Size and fit stainless steel crowns	X					●	●											
Take preliminary impressions	X				X	●	●X	X	●X	●X	X	X	X					X
Place and remove matrix bands	X		X		X					●X	X	X	X					●X
Take final impressions			●		●X	●	●X			●X		●		●		X		●
Fabricate and place temporary crowns	X		X		●X	●	●		●	X	X	●	●X					●X
Maintain field of operation during dental procedures through the use of retraction, suction, irrigation, drying, placing, and removing cotton balls, etc.					X			X		X		X	X					
Perform vitality tests					●X							●		●		X		●
Place temporary fillings	X		X		●X	●			●	●X	X					X		
Carve amalgams		X	●						●			●	●	●				
Process dental radiographs	X	X	●X	●X	●X	●X	●X	X	X	●X	●X	X	X	X	●X	●X	X	●X
Mount and label dental radiographs																		
X = Permitted ● = Forbidden ●X = Under Certain Circumstances																		
* Dentist may delegate to DAs dental procedures dentist deems advisable																		

Source: DANB, 2012, CHWS, 2012

Table 1. Tasks Permitted to Qualified Dental Assistants by State (Alabama to Kentucky) (cont.)

Tasks	AL	AK	AZ	AR	CA	CT*	CO	DE	DC	FL	GA	HI	ID	IL*	IN	IA	KS	KY
Remove temporary crowns and cements	X		X		X	●		X		X	X							X
Remove temporary fillings	X		X		X	●			X									
Apply topical anesthetic to the injection site	X				X			X		X	X	X	X					X
Demonstrate understanding of the CDC guidelines																		
Using the concepts of four handed dentistry, assist with basic intraoral surgical procedures including extractions, periodontics, endodontics, and implants																		
Monitor nitrous oxide/ oxygen analgesia	X		X	X	X		X		●	X	X	X	X	X		X	X	X
Maintain emergency kit																		
Remove permanent cement from supragingival surfaces	X		X		X						X	X						X
Remove periodontal dressings			X		X			X			X		X					X
Place post-extraction dressings	X							X		X						X		
Fabricate custom trays to include impression and bleaching trays, and athletic mouthguards										X								
Recognize basic medical emergencies																		
Recognize basic dental emergencies																		
Respond to basic medical emergencies																		
Respond to basic dental emergencies																		
Remove post extraction dressings	X				X					X	X	X						
Place stainless steel crowns					●													
X = Permitted ● = Forbidden ●X = Under Certain Circumstances																		
* Dentist may delegate to DAs dental procedures dentist deems advisable																		

Source: DANB, 2012, CHWS, 2012

Table 2. Tasks Permitted to Qualified Dental Assistants by State (Louisiana to Ohio)

Tasks	LA	ME	MD	MA	MI	MN	MS	MO	MT	NE*	NV	NH	NJ	NM	NY	NC	ND	OH
Perform mouth mirror inspection of the oral cavity	X				●X		●					●X						
Chart existing restorations or conditions	X			●	●X		●		X						●		●X	X
Phone in prescriptions at the direction of the dentist																		
Receive and prepare patients for treatment including seating, positioning chair, and placing napkin												X						X
Complete laboratory authorization form													X			X		
Place and remove retraction cord		**X**	●X	X			X	X			X	●X	●X			●X	●X	●
Perform routine maintenance of dental equipment																		
Monitor and respond to post surgical bleeding																		
Perform coronal polishing procedures		●**X**	●	●X		●X	X	X	X	X	X	●X		X	●	●X	●X	●X
Apply effective communication techniques with a variety of patients																		
Transfer dental instruments																		X
Place amalgam for condensation by dentists	●	**X**		X	●X	●X	X	X	●	●		●X	●X	●X		X		●X
Remove sutures	X	**X**	●X	X	●X	●X	X		X		X	●X	●X		●X	●X	●X	X
Dry canals		**X**	●X	X	●X	●X										●X	●X	X
Tie in archwires	X	**X**	●	X	X	●X					X					●X	●X	X
Demonstrate knowledge of ethics/jurisprudence/patient confidentiality																		
Identify features of rotary instruments																		
Apply topical fluoride	X	●**X**	●X	X	●X	●X	X		X		X	●X		X	●X	X	●X	X
Select and manipulate gypsums and waxes																		
Perform supragingival scaling	●		●	●			●	●		●							●	
Mix dental materials																		
Expose radiographs	●X	●**X**	●X	●X	●X	●X	X	X	X		X	●X	X	●X	X	X	●X	●X
Evaluate radiographs for diagnostic quality															X			
Provide patient preventive education and oral hygiene instruction	X	**X**	X	X					X		X	X	X		●X	X		X
Perform sterilization and disinfection procedures												X						X
Provide pre-and post-operative instructions		**X**			X													X
X = Permitted ● = Forbidden ●X = Under Certain Circumstances																		
* Dentist may delegate to DAs dental procedures dentist deems advisable																		

Source: DANB, 2012, CHWS, 2012

Table 2. Tasks Permitted to Qualified Dental Assistants by State (Louisiana to Ohio)(cont.)

Tasks	LA	ME	MD	MA	MI	MN	MS	MO	MT	NE*	NV	NH	NJ	NM	NY	NC	ND	OH
Place and remove dental dam	X		●X	X	X	●X	X		X			X	●X		●X	●X	●X	X
Pour, trim, and evaluate the quality of diagnostic casts												●X						
Size and place orthodontic bands and brackets	●	**X**	●	X	X	●X		X			X	●X	X		●X	●X	●X	X
Using the concepts of four handed dentistry, assist with basic restorative procedures, including prosthodontics and restorative dentistry	X			●X														X
Identify intraoral anatomy																		
Demonstrate understanding of the OSHA Hazard Communication Standard																		
Place, cure, and finish composite resin restorations	●	●**X**	●	●X			●	X	●	●						●	●	●X
Place liners and bases		**X**		X	X		●					●X				●X	●	
Place periodontal dressings		●**X**	●	●X	X	●X	X	X			X	●X	●X		●		●X	X
Demonstrate understanding of the OSHA Bloodborne Pathogens Standard																		
Take and record vital signs	X	**X**		X								●X	X		●X	X	X	X
Monitor vital signs																		X
Clean and polish removable appliances and prostheses	X															X	X	
Apply pit and fissure sealants		●**X**	●	●X		●X	X		X		X	●X		X	●	●X	●	●X
Prepare procedural trays/armamentaria set-ups												X						
Place orthodontic separators	X	●**X**		X		●X									●X	●X	●X	X
Size and fit stainless steel crowns	X	**X**	●X	X				X					X					X
Take preliminary impressions	X	**X**	X	X	X	●X	X		X		X	●X	●X		●X	●X	X	X
Place and remove matrix bands		**X**	●X	X	●X	●X			X			●X	●X		●X	●X	●X	
Take final impressions	●			●	●X		●	X	●			●X		●X		●		●
Fabricate and place temporary crowns	X	●**X**	●X	X	●X	●X	X		X		X		●X	●X	●X	●X	●X	X
Maintain field of operation during dental procedures through the use of retraction, suction, irrigation, drying, placing, and removing cotton balls, etc.		**X**	X	X		X					X	X	X					
Perform vitality tests		●**X**	●X	●	X	●X	●					●X					●X	X
Place temporary fillings		●**X**	X	X	X	●X	X		X			●X		●X		●X		X
Carve amalgams	●		●				●	X	●								●	
Process dental radiographs	●X	●**X**	●X	●X	●X	●X	●X	X	X		X	X	X	●X	X	X	●X	●X
Mount and label dental radiographs				X														
X = Permitted ● = Forbidden ●X = Under Certain Circumstances																		
* Dentist may delegate to DAs dental procedures dentist deems advisable																		

Source: DANB, 2012, CHWS, 2012

Table 2. Tasks Permitted to Qualified Dental Assistants by State (Louisiana to Ohio)(cont.)

Tasks	LA	ME	MD	MA	MI	MN	MS	MO	MT	NE*	NV	NH	NJ	NM	NY	NC	ND	OH
Remove temporary crowns and cements	X	X	●X	X	●X	●X	X		X				●X		●X	●X	●X	X
Remove temporary fillings				●X			X		X			●X	●X					X
Apply topical anesthetic to the injection site	X	X	X	X	X		X		X		X	●X	X			X	X	X
Demonstrate understanding of the CDC guidelines																		
Using the concepts of four handed dentistry, assist with basic intraoral surgical procedures including extractions, periodontics, endodontics, and implants				X														
Monitor nitrous oxide/ oxygen analgesia				X	X	●X	X	X	X							X	●X	X
Maintain emergency kit																		
Remove permanent cement from supragingival surfaces	X	X	X	X	X	●X	X		X		X	●X		●X	●	●X	●X	
Remove periodontal dressings		●X	●X	X		●X			X		X		●X		●X	●X		
Place post-extraction dressings								X					●X					X
Fabricate custom trays to include impression and bleaching trays, and athletic mouthguards		X	X	●X			X						●X					
Recognize basic medical emergencies																		
Recognize basic dental emergencies																		
Respond to basic medical emergencies																		X
Respond to basic dental emergencies				X								●X						
Remove post extraction dressings													●X					X
Place stainless steel crowns				●														
X = Permitted ● = Forbidden ●X = Under Certain Circumstances																		
* Dentist may delegate to DAs dental procedures dentist deems advisable																		

Source: DANB, 2012, CHWS, 2012

Table 3. Tasks Permitted to Qualified Dental Assistants by State (Oklahoma to Wyoming)

Tasks	OK*	OR*	PA*	RI*	SC	SD*	TN	TX	UT*	VT*	VA*	WA	WV	WI*	WY
Perform mouth mirror inspection of the oral cavity											X	X	X		
Chart existing restorations or conditions					X		•X				X		X		
Phone in prescriptions at the direction of the dentist							•X								
Receive and prepare patients for treatment including seating, positioning chair, and placing napkin											X				
Complete laboratory authorization form											X				
Place and remove retraction cord		•			•X		•X				•X	X	•X		
Perform routine maintenance of dental equipment											X				
Monitor and respond to post surgical bleeding											X				
Perform coronal polishing procedures	•X	•X	•X		•X		•X	•X			X	X	•X		X
Apply effective communication techniques with a variety of patients															
Transfer dental instruments											X				
Place amalgam for condensation by dentists	•		•X			•	•X		•		X	•X			
Remove sutures					X		•X				X	X	X		X
Dry canals							•X				X				
Tie in archwires					X		•X					X			X
Demonstrate knowledge of ethics/jurisprudence/patient confidentiality															
Identify features of rotary instruments															
Apply topical fluoride	•X		•X	•X			•X	•X		X	X	X			X
Select and manipulate gypsums and waxes											X				
Perform supragingival scaling								•			•	•			
Mix dental materials											X				X
Expose radiographs	•X	•X	•X	•X	•X	•X	•X	•X	•X	•X	•X	•X	X	X	•X
Evaluate radiographs for diagnostic quality														X	
Provide patient preventive education and oral hygiene instruction							•X				X	X			X
Perform sterilization and disinfection procedures							•X				X				
Provide pre-and post-operative instructions											X	X	X		
X = Permitted • = Forbidden •X = Under Certain Circumstances															
* Dentist may delegate to DAs dental procedures dentist deems advisable															

Source: DANB, 2012, CHWS, 2012

Table 3. Tasks Permitted to Qualified Dental Assistants by State (Oklahoma to Wyoming) (cont.)

Tasks	OK*	OR*	PA*	RI*	SC	SD*	TN	TX	UT*	VT*	VA*	WA	WV	WI*	WY
Place and remove dental dam			X		X		X								X
Pour, trim, and evaluate the quality of diagnostic casts															
Size and place orthodontic bands and brackets				●	X		X					X	X		
Using the concepts of four handed dentistry, assist with basic restorative procedures, including prosthodontics and restorative dentistry															
Identify intraoral anatomy															
Demonstrate understanding of the OSHA Hazard Communication Standard															
Place, cure, and finish composite resin restorations		●	X	●		●		●			●	●	X		
Place liners and bases			X				X								
Place periodontal dressings		●			X		X					X			X
Demonstrate understanding of the OSHA Bloodborne Pathogens Standard															
Take and record vital signs					X		X					X			X
Monitor vital signs															
Clean and polish removable appliances and prostheses															
Apply pit and fissure sealants	X	X		X	X		X	X		X		X	X		
Prepare procedural trays/armamentaria set-ups							X								
Place orthodontic separators							X					X	X		X
Size and fit stainless steel crowns							X								
Take preliminary impressions					X		X					X	X		X
Place and remove matrix bands		X	X		X		X					X	X		X
Take final impressions		●	●	●			X	●	●		●	●X	X		X
Fabricate and place temporary crowns		X			X							X	X		
Maintain field of operation during dental procedures through the use of retraction, suction, irrigation, drying, placing, and removing cotton balls, etc.					X		X								X
Perform vitality tests							X						X		
Place temporary fillings		X	X		X				●			X	X		
Carve amalgams		●		●					●		●	X			
Process dental radiographs													X	X	X
Mount and label dental radiographs													X		
X = Permitted ● = Forbidden ●X = Under Certain Circumstances															
* Dentist may delegate to DAs dental procedures dentist deems advisable															

Source: DANB, 2012, CHWS, 2012

Table 3. Tasks Permitted to Qualified Dental Assistants by State (Oklahoma to Wyoming) (cont.)

Tasks	OK*	OR*	PA*	RI*	SC	SD*	TN	TX	UT*	VT*	VA*	WA	WV	WI*	WY
Remove temporary crowns and cements		●X									X	X	X		
Remove temporary fillings							●X						X		
Apply topical anesthetic to the injection site							●X				X	X	X		X
Demonstrate understanding of the CDC guidelines											X				
Using the concepts of four handed dentistry, assist with basic intraoral surgical procedures including extractions, periodontics, endodontics, and implants											●X				X
Monitor nitrous oxide/ oxygen analgesia	●X				●X	X	●X	●X		●X	X	X	●X		
Maintain emergency kit											X				
Remove permanent cement from supragingival surfaces	●	●X			●X		●X				X	X	X		X
Remove periodontal dressings					X						X		X		X
Place post-extraction dressings					●X		●X					X			
Fabricate custom trays to include impression and bleaching trays, and athletic mouthguards											X	X			
Recognize basic medical emergencies															
Recognize basic dental emergencies															
Respond to basic medical emergencies															
Respond to basic dental emergencies															
Remove post extraction dressings					X		●X								
Place stainless steel crowns															
X = Permitted ● = Forbidden ●X = Under Certain Circumstances															
* Dentist may delegate to DAs dental procedures dentist deems advisable															

Source: DANB, 2012, CHWS, 2012

The Community Dental Health Coordinator (CDHC)

Recognizing the need to improve access to oral health services for certain populations, the ADA proposed a dental auxiliary workforce model that emphasizes the need to educate people about the importance of oral health and to navigate patients in need of dental care to providers who can offer necessary services. The CDHC is modeled as a community health worker (CHW) who also has training in clinical skills.

The CHW model has been widely adopted in health care programs across the country to increase community education and access to health services. CHWs are typically community members who have been trained to provide health education and support to people in their home communities in need of health care, environmental services, counseling, etc. CHWs commonly work in urban and rural areas where health access issues are pronounced or in racial and ethnic communities at risk for diminished access to care. CHWs are frequently found in local, state, and national programs addressing diabetes, asthma, HIV/AIDS, and other chronic illnesses. They also work in lead abatement programs and in mental health programs. CHWs assume roles as

translators and patient navigators helping members of their communities to find and obtain care. The patient navigator model is common in breast cancer programs where patients interface with multiple provider types or organizations over the course of an illness. CHWs are recruited from the communities that they serve and often share language or culture with the patients with whom they work. This enables more culturally competent care.

Unlike the other workforce models discussed in this paper that are fashioned as clinical providers, the CDHC mainly focuses on community outreach, education, social intervention, and coordination of care for patients in their local communities (Feldman, 2008). However, in addition to those roles, CDHCs are clinically trained to provide basic preventive care. Clinical tasks permitted to the CDHC include:

- Screening services including visual inspections
- Oral hygiene assessment
- Oral health education
- Taking radiographs
- Triaging patient care based on the urgency of the oral health problem
- Identifying need for emergency care
- Finding and coordinating care
- Patient advocacy
- Facilitating Medicaid or other insurance enrollment
- Online communication with supervising dentists
- Gross scaling
- Coronal polishing using a slow-speed handpiece
- Removing high spots on temporary restorations or sealants
- Application of topical fluorides and dental sealants (Grover et al., 2007)

CDHCs will work with special populations like pregnant women and infants, patients with mental and physical disabilities, those with dental anxiety, patients with substance abuse issues, and oral cancer patients (Grover et al., 2007). CDHCs will also provide tobacco cessation and nutrition education (Grover et al., 2007). They will work in community settings like schools and Head Start programs, WIC programs, nursing homes, emergency rooms in hospitals, and in medical clinics as well as in the neighborhoods in their communities of origin (Grover et al., 2007). CDHCs are expected to improve oral health literacy, increase access to dental care, improve efficiencies for dental providers, improve patient satisfaction, decrease the severity of oral health disease in their local communities, and build networks and teams of professionals within the community interested in improving oral health outcomes (Grover et al., 2007).

The ADA (with additional funding from Henry Schein, Inc.) established three pilot education programs for the CDHC–one each in Oklahoma, California, and Pennsylvania. In March 2009, 12 students began training at the University of Oklahoma and the University of California in Los

Angeles. The following year, a program at Temple University also accepted students. Rio Salado College in Tempe, Arizona manages the online portion of the education program for all three pilot sites (ADA, 2010). Clinical training occurs in IHS facilities and federally qualified health clinics (ADAb, 2010)

Students trained in the Oklahoma program are expected to work in remote rural communities (ADA, 2010). Students in the California program, which was conducted in conjunction with Salish Kootenai College in Montana, will work in American Indian communities (ADA, 2010). Students educated in the Temple University program will mainly work in urban areas (ADA, 2010).

The first cohort of 11 CDHCs (ADAb, 2010) are now trained and deployed to clinics, schools, and other public health settings in their home communities (Hawaii News, 2011). A third cohort of students began training as CDHCs in March 2011 in the programs in Oklahoma and Pennsylvania and at A.T. Still University Arizona School of Dentistry and Oral Health in Mesa, Arizona. Graduates from the Arizona program will eventually work in American Indian communities (Hawaii News, 2011).

The CDHC education program recruits high school graduates for a 24-month program that includes over 1,870 hours of total instruction including 670 hours of didactic instruction, 1,040 hours of clinical internships, and 160 hours of assessment training. The course of instruction includes 12 months of online course work in human psychology, sociology, communications, biomedical sciences, dental sciences, and clinical sciences (ADAa, 2010).

The ADHA funded pilot program for CDHCs ended in 2012. As of September 2012, the pilot project had graduated 18 students who are now working in underserved areas including American Indian communities, rural areas and urban centers. There are an additional 16 CDHC students in the pipeline who are expected to graduate in 2012 (ADAc, 2012).

Recent and Proposed Legislation Regarding Oral Health Workforce

The following two tables provide a summary of oral health workforce legislation that was passed in 2012 and proposed oral health workforce legislation currently in the legislative process in various states.

Table 4. Oral Health Workforce Legislation Promulgated in 2012 by State

Bills Passed 2012		
State	**Description**	**Date Passed**
Alaska	Dental hygienists can administer nitrous oxide, perform a dental hygiene assessment, and formulate a dental hygiene treatment plan	6/1/2012
Arizona	Dental hygienists can administer local anesthesia under general supervision	3/13/2012
Florida	Dental hygienists can adminster local anesthesia under direct supervision	3/13/2012
Kansas	Legislation created a third level of the extended care permit. Level 1 (2007) enabled treatment of children; Level II enabled treatment of seniors and disabled persons; Level III professionals wil be permitted a broader scope including temporary fillings, extraction of mobile teeth, and to do soft denture relines for seniors, disabled persons, or disadvantaged children in many settings	5/8/2012
Maine	Independent practice dental hygienists can take x-rays including panoramic, full-mouth series, bitweings, and periapical in a two year pilot program.	4/9/2012
Michigan	A bill allowing a "second pair of hands"(a dental assistant) to assist a dental hygienist provided she is so assigned by the supervising dentist.	8/1/2012
Missouri	A bill that proposes authorization of dental therapy practice with two separate educational pathways. A dental hygienist would complete a 12 month education program accredited by CODA. An unlicensed person would complete either a bachelor's or master's degree program. There is also a proposal to create an advanced practice dental hygienist which would allow bachelor's degree educated dental hygienists to practice collaboratively.	
New Hampshire	A bill creating a certified public health dental hygienist that can provide services in a school, hospital or other institution, or for a homebound person without presence or prior exam by a dentist under written authorization and standing protocols and can also provide treatment planning and atraumatic restorative treatment.	6/11/2012
Tennessee	Dental hygienists who qualify by experience may provide dental hygiene services under general supervision through a written protocol in nursing homes, skilled care facilities, non-profit clinics, and public health programs.	4/29/2012
Utah	Authorizes the state Medicaid program to create pilot dental health care payment and delivery to increase the number of dentists participating with Medicaid.	3/22/2012
Virginia	Dental hygienists employed by the Department of Health can provide educational and preventive dental care under remote supervision of a dentist pursuant to a protocol. Dentist must have regular periodic communication with the DH.	3/6/2012
West Virginia	Allows public health practice permit dental hygienists to place sealants on the teeth of patients that have not been previously examined by a dentist.	3/9/2012

Source: American Dental Hygienists Association, 2012, CHWS, 2102

Table 5. Proposed Oral Health Workforce Legislation Still Under Consideration by State

Proposed Legislation	
State	**Description**
Connecticut	Bill to establish an advanced dental hygiene practitioner in the state.
California	A feasibility study demonstrating need for an additional education program would be required to open any new dental hygiene education programs. Registered dental hygienists in alternative practice who practice independently would be able to operate a mobile dental hygiene clinic as their office.
Iowa	A bill to include dental hygienists as approved providers under managed care contracts under the Medicaid program
Kansas	A dental hygienist who completes anadditional 14 month college program could register as a registered dental practitioner to practice in collaboration with a dentist to provide dental hygiene services and a variety of basic restorative services to people in counties where no dentists or very few dentists practice
Massachusetts	A bill to allow regulation and licensing of denturists.
New Jersey	Bill to require public schools to include an educational program instructing students on the importance of oral health
	Bill to allow dental hygienists to work under general supervision in an office,clinic or institution but only for patients of record. Services are limited to fluoride application, pit and fissure sealants, and topical agents for prevention of oral disease.
New York	Bill would authorize dental hygienists to provide services without supervision in collaboration with a dentist under a collaborative practice agreement. The dental hygienist would be required to notify a patient that the services are not a subsitute for the services of a dentist.
Tennessee	Bill would permit collaborative practice between dentists and dental hygienists outside the private dental office.
Vermont	Bill would ask the commissioner of health to design a community dental health coordinator pilot project. The scope of practice would permit the CDHC to place temporary and sedative restorative material in unexcavated carious lesion or tooth fractures, to collect and transmit diagnostic data bia telemetric connection, to dispense and apply medications ordered by a dentist, and to provide limited emergency services.
	A bill to create a dental therapist with two academic years of dental therapy curriculum and at least 100 hours of clinical practice under the general supervision of a licensed dentist.
West Virginia	Considering a bill to create a state loan repayment program for dentists and dental hygienists.
Washington	Two separate bills to license dental practitioners (DP) or dental hygiene practitioners (DHP) both of whom would be permitted to provide basic restorative services based on a plan made with a dentist. The DP would complete a two year didactic and clinical education program and a 400 hour preceptorship program with a dentist. The DHP would complete a one year post bachelor's degree program and 250 hours of clinical practice under dental supervision. Both would practice under a practice plan but the DP would also need off site supervision.

Source: American Dental Hygienists Association, 2012, CHWS, 2012

Summary

While the workforce models discussed in this paper have distinct scopes of practice and different education requirements, each is conceptually designed as a model to increase access to oral health care in communities and for populations where dental care is not widely available. The selection of an appropriate workforce model to address disparities in oral health care must be guided by an assessment of the patients to be served, an evaluation of the current inventory and placement of dental providers in the community of interest, consideration of the availability and sufficiency of the community safety net, and the kinds of dental services that are needed. There is no single solution to address the needs of all communities. In some states, these conceptual models have been used as a basis for the workforce model that is eventually adopted. For instance, New Mexico has enabled DHs in the state to work as CDHCs. The Minnesota ADT model is closely aligned with the ADHP but does not exactly replicate the model. States are demonstrating flexibility as they design appropriate interventions relevant to the needs of their populations that have potential to improve disparate access to oral health care.

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Appendix A.

The following tables and graphics are presented to show the educational requirements, practice settings, supervisory relationships, and scopes of practice for the various workforce models discussed in this report.

The abbreviations used in these tables and figures include the following:

ADHP	Advanced Dental Hygiene Practitioner
ADT	Advanced Dental Therapist
CDHC	Community Dental Health Coordinator
DA	Dental Assistant
DH	Dental Hygienist
DHAT	Dental Health Aide Therapist
DH-T	Dental Hygienist Therapist
DT	Dental Therapist
EFDA	Expanded or Extended Function Dental Assistant
IPDH	Independent Practice Dental Hygienist
PHDH	Public Health Dental Hygienist

Table 6. Education Requirements and Practice Settings Auxiliary Oral Health Workforce Models

Profession	Entry	Education	Settings Where Care Is Provided
Dentist	Post baccalaureate (generally)	4 years of professional study resulting in a **professional degree.**	Any setting where dental care is provided.
Dental Therapist (Alaska)	Post high school	**Certificate** program two years including lst year mainly didactic and 2nd year clinical instruction	Remote Native Alaskan village clinics and hub clinics where dentists practice
Dental Therapist (International)	Post high school	**Diploma, associate degree, bachelor's degree** depending on country. Curriculum lasting usually about 2 years.	Schools, Native American villages, private practices, community settings
Dental Therapist (Minnesota)	Pre requisite of one year of college	**Bachelor's** degree	Community clinics, Head Start programs, schools, nursing homes, group homes, state-operated facilities, public health clinics, hospital emergency rooms, homeless shelters patient homes, rural communities
Advanced Dental Therapist (Minnesota)	Post college	**Master's** degree requires graduation from a CODA accredited DH program and bachelor's degree or bachelor's in any field and 2,000 hours of experience as a DT	All settings listed for the DT in Minnesota but also DHPSAs, militray or veternas hospitals and clinics, tribal clinics, and other settinge where greater than 50% of the population are low income, disabled, chronically ill or uninsured

Source: CHWS, 2012

Table 6. Education Requirements and Practice Settings Auxiliary Oral Health Workforce Models (cont.)

Profession	Entry	Education	Settings Where Care Is Provided
Advanced Dental Hygiene Practitioner	Post baccalaureate	**Master's** degree requires graduation from a CODA accredited DH program and bachelor's degree	Underserved communities
Dental Hygienist-Therapist	Post high school or post other training program	**Diploma** or **bachelor's** degree depending on country. Curriculum lasting 2 1/2 to 4 years.	Depends on the country. May serve both children and adults. May be found in any setting where oral health services are provided but may also be limited to working with underserved communities.
Dental Hygienist	Post high school	**Associate** or **Bachelor's** degree from CODA accredited program	Any setting where dental care is provided and a dentist is available for supervision.
Public Health Dental Hygienist	Post college	Usually requires experience working as a DH and competency in special areas. May require **extra training or education at the certificate or non-certificate level.**	Settings depend on the state that authorizes practice. In MA, PHDH work in residences of the homebound, schools, head start programs, nursing homes and long term care facilities, clinics, community health ceters, hospitals and medical facilities, prison, residential treatment facilities, federal, state or local public health programs, mobile dental facilities, portable dental programs, others locations reviewed by DOH

Source: CHWS, 2012

Table 6. Education Requirements and Practice Settings Auxiliary Oral Health Workforce Models (cont.)

Profession	Entry	Education	Settings Where Care Is Provided
Dental Assistant	Post high school	**On the job training**, **Certificate (1 year program)** or **Associate** degree (2 year program) from CODA accredited program	Any setting where dental care is provided and a dentist is available for supervision.
Expanded Function Dental Assistant	Post high school	**On the job training** and special course work, **Certificate (1 year)** or **Associate** degree (2 year) from CODA accredtied program	Any setting where dental care is provided both private practice and community or public health settings in which a dentist is available for supervision
Community Dental Health Coordinator	Post high school	Pilot education programs awarding **certificates**. Training takes 18 months. in Oklahoma, Arizona, Pennsylvania	With special populations like pregnant women and infants, patient with mental and physical disabilities, patients with dental anxiety, substance abuse issues and oral cancer in community settings including schools, Head Start programs, WIC programs, nursing homes, ERs in hospitals, medical clinics, neighborhoods or origin

Source: CHWS, 2012

Table 7. Settings, Supervision, Education, and Licensure of Oral Health Workforce Professionals

Type	DAs	EFDAs	CDHCs	DTs (Intl)	DHATs	MN DT	DHs	PHDH	DH-Ts	ADHP	MN ADT
Patients Served	All	All	Underserved	Varies	Underserved	Underserved	All	Underserved	Varies	Underserved	Underserved
Practice Settings	All	All	Public Health	Varies	Public Health	Public Health	All	Public Health	Varies	Public Health	Public Health
Supervision											
Personal	X	X									
Direct	X	X	X			X	X	X			
Indirect	X	X	X	X		X	X	X			
General	X	Rarely	X	X	X	X	X	X	X		X
Remote			X	X	X			X	X		X
Public Health/ Collaborative				X		X		X	X	X	X
Unsupervised								X		X	
Independent								X		X	
Education											
None Required	X										
Continuing Education	X	X									
Diploma/ Certificate	X		X	X	X				X		
Associate	X			X			X	X			
Bachelor's				X		X	X	X	X		
Master's								X		X	X
Licensed	No	No	No	By Country	No- Federal Program	Yes	Yes	Yes	By Country	Yes	Yes (2 licenses DH and DT)
Registered	In some states	In some states	No				Yes	Yes		Yes	Yes
Certified	Optional	Optional			Yes						

Source, CHWS, 2008

Table 8. Salary, Tuition Costs, Reimbursement, and Scope of Practice of Oral Health Workforce Professionals

Type	DAs	EFDAs	CDHCs	DTs (Intl)	DHATs	MN DT	DHs	PHDH	DH-Ts	ADHP	MN ADT
Salary Costs	Mean Salary Alaska $41,830^		New Model		Mean Salary Alaska $70,000^	New Model	Mean Salary Alaska $92,300^			Estimated Salary $113,010^	New Model
Tuition Costs	Mean Annual Tuition between $7,613 and $11,680ǂ				Annual Tuition $50,645^	Annual Tuition $10,033 (In State)^	Mean Annual Tuition between $14,325 and $3,488+ǂ				
Reimbursement	Yes	Yes	Not yet available	Government Programs	Yes	Yes	Yes-in some states direct reimbursement	Yes -in some states direct reimbursement	Government Programs	Theoretical Model	Yes
Scope											
Preventive	Some+	Some*	Some*	Some*	Some*	Some*	X	X	X	X	X
Restorative		Some Basic*	Temporization	X	X	Some Basic*	Some Basic*	Some Basic*	Some Basic*	Some Basic*	Some Basic*
Educational	X	X		X	X	X	X	X	X	X	X
Care Management				X*	X*			X	X	X	X*
Palliative				X						X	X

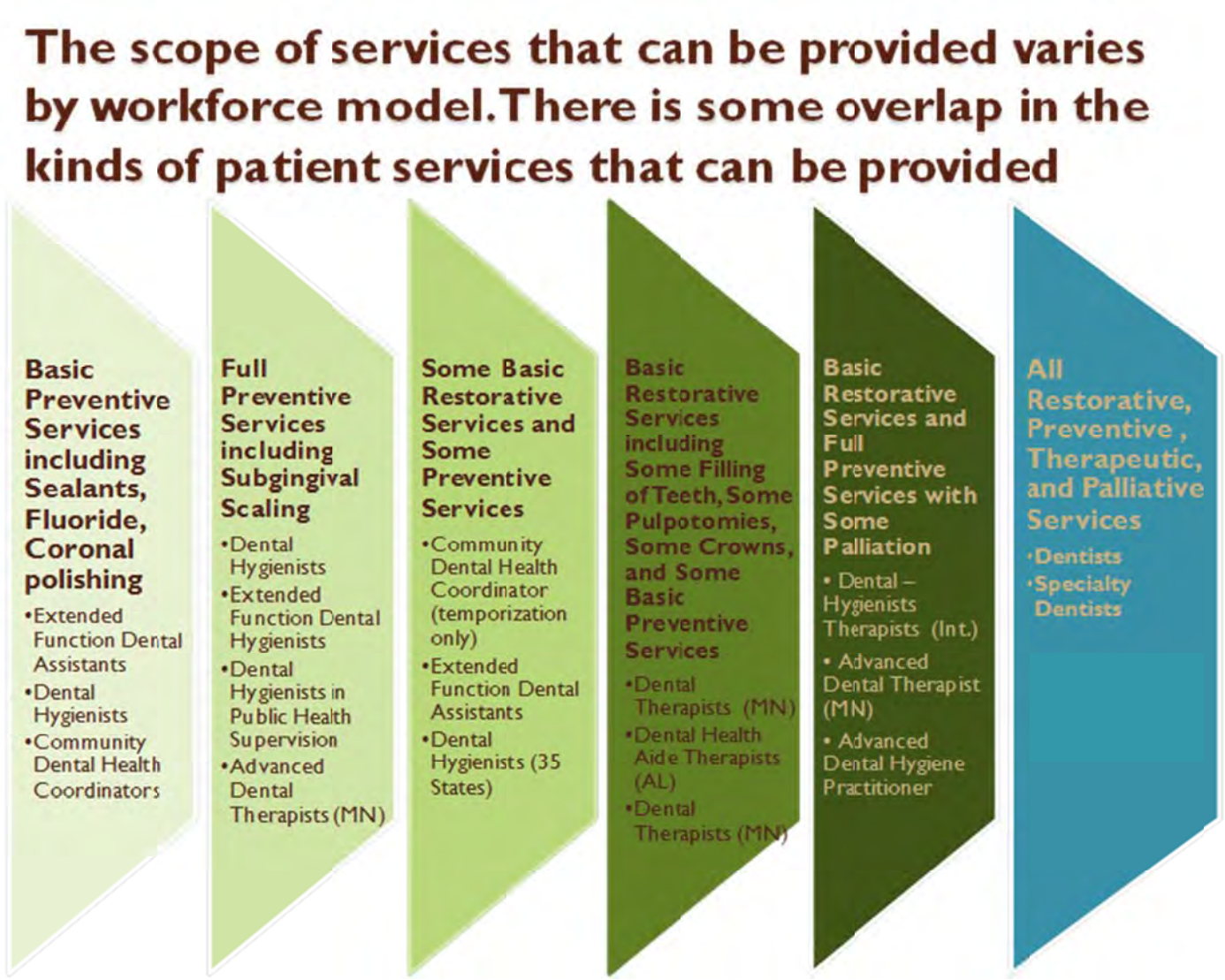
* Some preventive services may include coronal polishing, sealant application, and fluoride varnish application.

* Basic restorative may include temporizing decay with GIC, pulpotomies on primary teeth, filling primary and secondary teeth, stainless steel crowns, etc.

* Limited dental hygiene assessment or diagnosis and treatment planning permitted

^ Source: ECG Management Consultants

Figure 2. Scope of Services by Type of Workforce Model

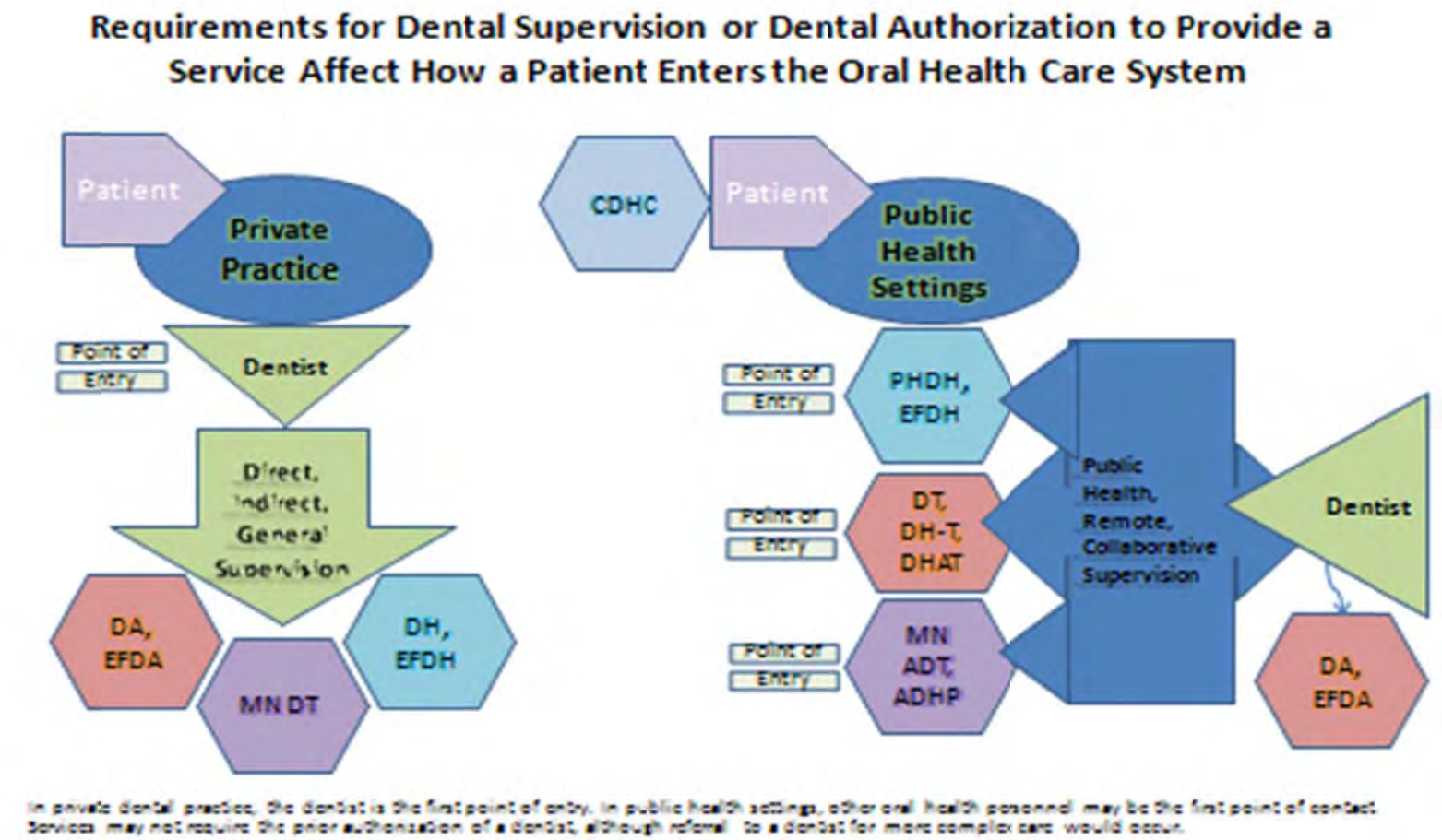


Source: CHWS, 2012

Figure 3. Type of Oral Health Workforce Model by Generally Required Level of Dental Supervision

Source: CHWS, 2012

Figure 4. Points of Patient Entry to Oral Health Services, by Type of Required Dental Supervision



Source: CHWS, 2012