



Background

The link between oral health and general health has been well established (IOM, 2011), though the conversation surrounding the efficacy of the primary care workforce often fails to include discussion on the dental workforce. Research on the future strength of the dental workforce has produced conflicting reports. Some argue that dentists will soon face a shortage because of an aging workforce (McKinnon, Bresch, Moss, & Valachovic, 2007; CMAJ, 2009) and an increased demand in services (NCHWA, 2015), while others point to historical and projected dentist inflows and dentist outflows as a sign that the supply of dentists is actually increasing (Munson & Vujicic, 2014).

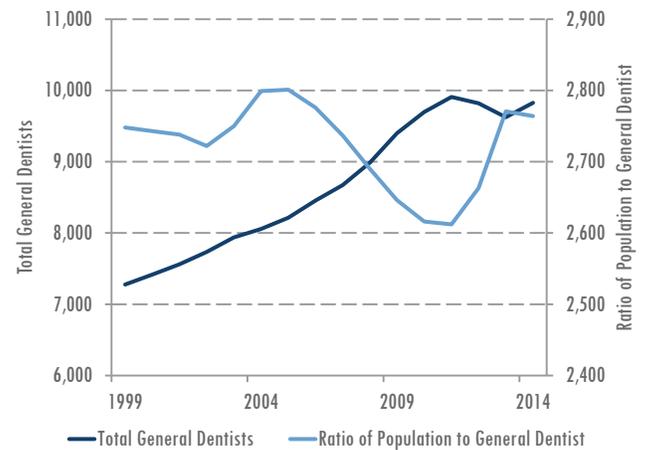
In Texas, access to the dental workforce is an essential consideration: as of June 2015, there were 254 total dental health professional shortage areas (HPSAs) across the state (HRSA, 2015). There is often little incentive for dental providers to practice in these underserved areas since the underserved tend to also be low-income and frequently rely on public assistance for care (McKinnon, et. al, 2007). Public assistance reimbursement rates are generally less lucrative than private insurance, especially for providers who are trying to pay off an average of over \$200,000 in student debt (McKinnon, et al, 2007; ADEA, 2013; AAPD, 2014). Additionally, in Texas, Medicaid dental benefits are only available for people 20 years of age or younger through the Texas Health Steps program and the Children's Health Insurance Program (USDHHS, 2015). The last time Medicaid dental reimbursement rates were raised in Texas was in 2007 (CMS, 2010; TDA, 2015), and both state-funded educational loan repayment programs that included dentists were in effect eliminated due to state budget shortages (TDA, 2015). As of the close of the 84th Texas legislative session, no changes were made to Medicaid dental funding or dental loan-repayment programs (TLO, 2015).

Workforce Description

According to the 2014 health professions files of the Health Professions Resource Center, in September 2014, there were 9,827 actively licensed general, or primary care, dentists (defined as general dentists, pediatric dentists, and public health dentists) practicing in the state of Texas. The projected population of the state of Texas in 2014 was 27,161,942 (CHS, 2015), making the ratio of population to general dentists 2,764 to 1. In 2009, there were 9,401 actively licensed general dentists in Texas, and in 2004, there were 8,057 actively licensed general

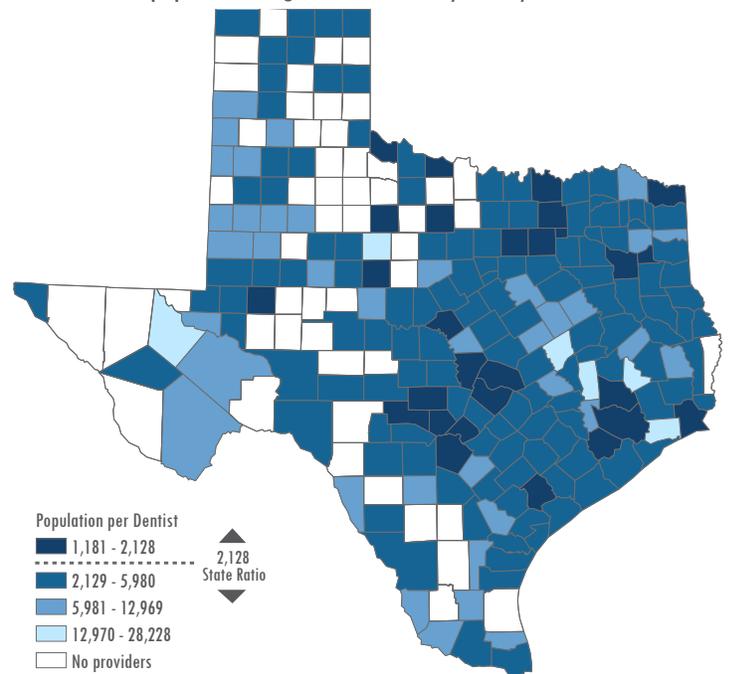
dentists. In 2009, the ratio of population to general dentists was 2,646 to 1, indicating a decline of 4.5% over the past five years. In 2004, the ratio of population to general dentists was 2,799 to 1, indicating an improvement of 1.3% over the past ten years.

General dentist growth trends



Geographically, general dentists were not evenly distributed across the state. In fact, 53.2% of general dentists were located in the five most populated counties of Texas. Harris, Dallas, Bexar, Tarrant, and Travis counties made up 43.0% of the projected population. Further, 92.8% of general dentists practiced in metropolitan areas, while 88.5% of the projected population resided in metropolitan areas.

Ratio of Texas population to general dentist, by county



Geographic Designation	Ratio of Population to General Dentist
Metropolitan	2,627
Non-metropolitan	4,603
Border	5,435
Non-border	2,615
Texas	2,128

Of the 9,763 general dentists for whom gender data were available in 2014, 67.6% were male and 31.7% were female. However, among general dentists under 40 years of age in 2014, 51.5% were male and 48.5% were female.

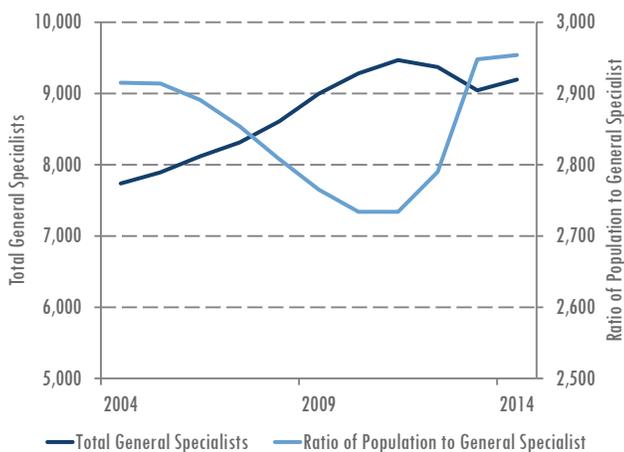
In 2014, over a third (37.1%) of the general dentist workforce was at or approaching retirement age (over 55 years of age). The median age of general dentists was 48 years old, and the mean age was 48.9 years old.

General Dentists - General Specialty

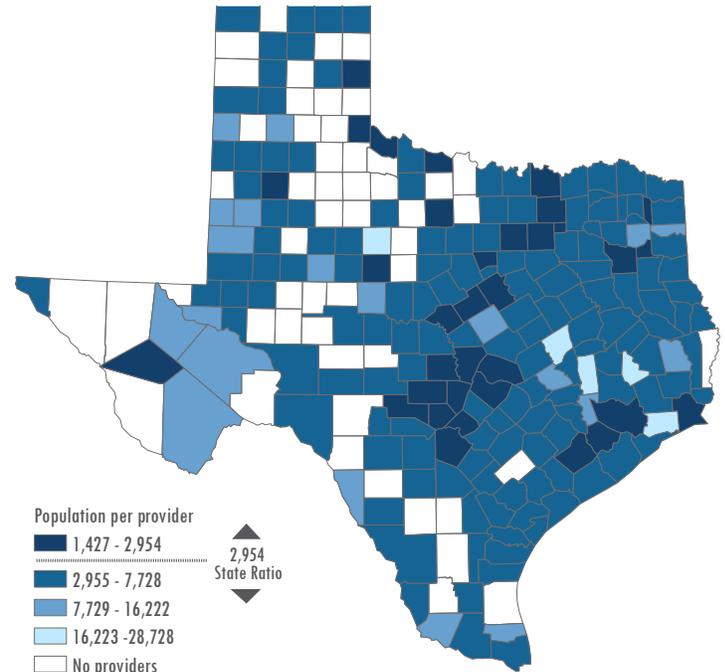
In 2014, 9,194 general dentists indicated a general specialty, an increase of 18.8% from 2004. General specialists represented 93.6% of the general dentist workforce. The ratio of population to general specialty was 2,954 to 1. Among the 9,133 general specialists for whom gender data were available, 30.8% were female and 69.2% were male. Among those under 45 years of age, females made up 45.5% of the workforce, and males made up 54.5% of the workforce. 35.7% of general dentists with a general specialty were at or approaching retirement age in 2014 (55 years of age or older). The median age was 48 years old, and the mean age was 49.1 years old.

Additionally, with 53.4% of general specialists practicing in the five most populated counties, the geographic distribution of general dentists with a general specialty was not evenly distributed across the state. 92.8% practiced in metropolitan areas and 95% practiced in non-border areas.

General specialist growth trends



Ratio of Texas population to general specialist, by county



Geographic Designation	Ratio of Population to General Specialist
Metropolitan	2,816
Non-metropolitan	4,742
Border	6,090
Non-border	2,788
Texas	2,954

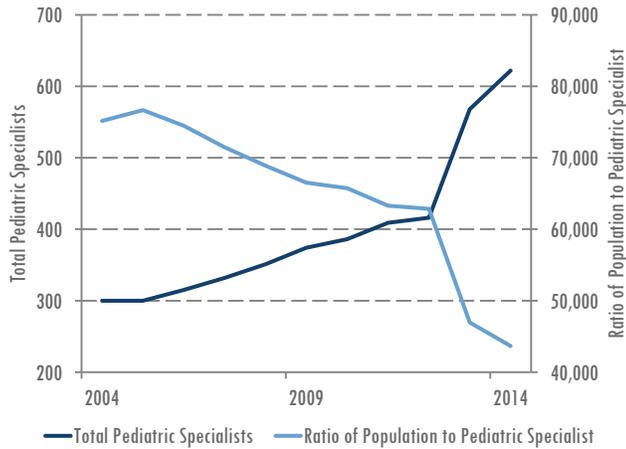
General Dentists - Pediatric Specialty

In 2014, 622 general dentists indicated a pediatric specialty, an increase of 107.3% from 2004. Pediatric specialists represented only 6.3% of the general dentist workforce. Considering only the projected population 18 years of age and younger, the ratio was 12,239 to 1.

Of the 619 pediatric specialists for whom gender data were available in 2014, females represented 48.5% of the pediatric specialist workforce, a percentage much higher than among general specialists. Among those under 45 years of age, 59.5% were female and 40.5% were male. Less than a third (22.9%) of general dentists with a pediatric specialty were at or approaching retirement age in 2014. The median pediatric specialist age was 42 years old, and the mean pediatric specialist age was 45.3 years old.

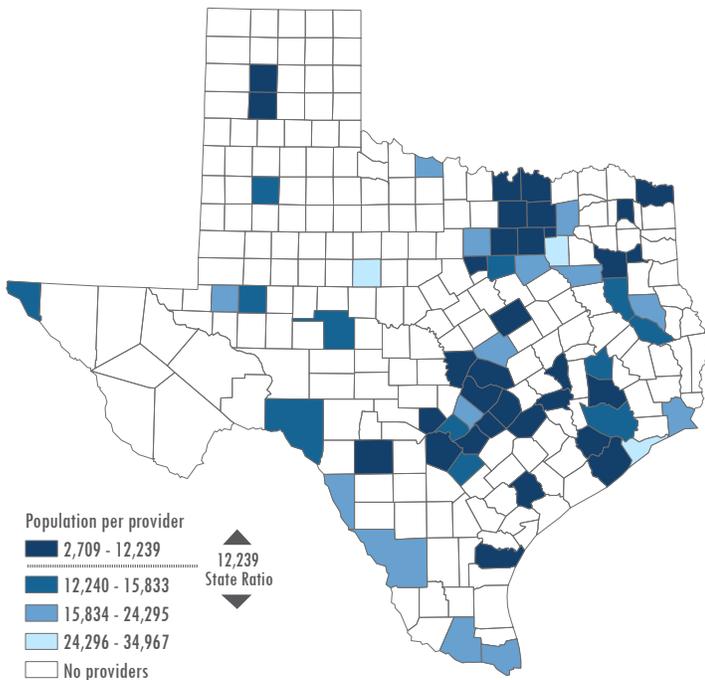


Pediatric specialist growth trends



In geographic terms, general dentists with pediatric specialties were not evenly distributed across the state—49.5% were concentrated in the five most populous counties. 96.9% were located in metropolitan areas, and 91.2% were located in non-border areas.

Ratio of Texas population ≤18 years to pediatric specialist, by county

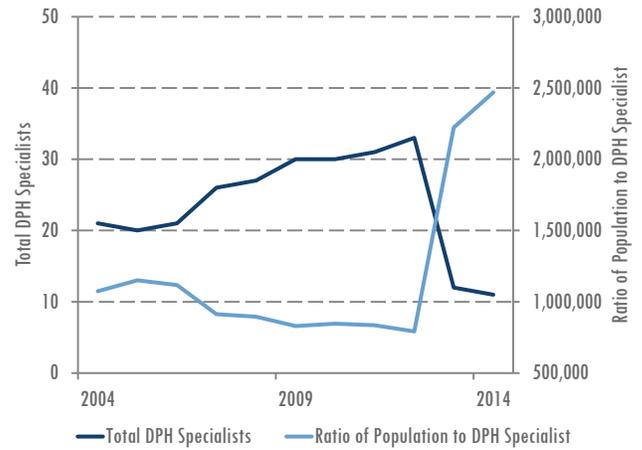


Geographic Designation	Ratio of Population ≤18 years to Pediatric Specialist
Metropolitan	11,296
Non-metropolitan	42,168
Border	16,784
Non-border	11,798
Texas	12,239

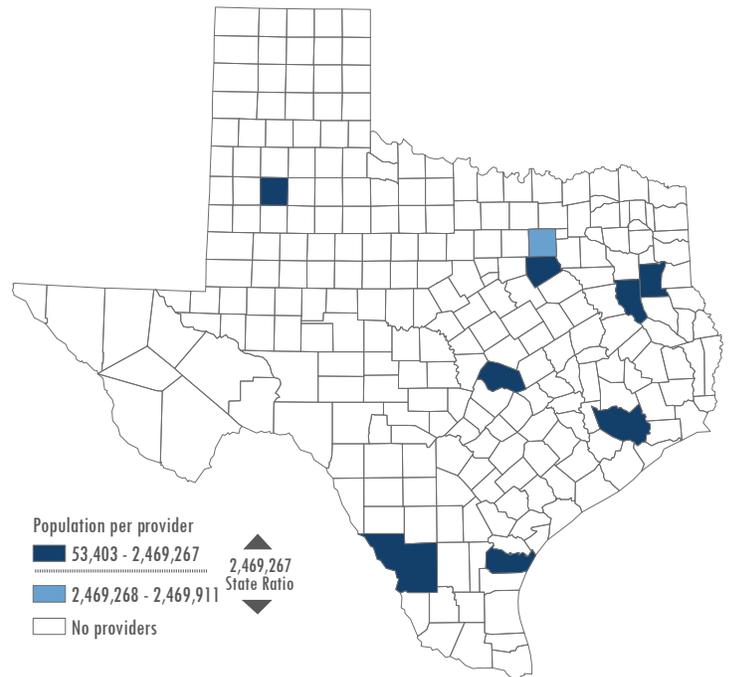
General Dentists - Dental Public Health Specialty

With just 11 actively licensed specialists in 2014, down from 21 in 2004, the dental public health (DPH) specialty made up a much smaller percentage (0.1%) of all general dentists. Five DPH specialists were female, and six were male. The median DPH specialist age was 42 years old, and the mean DPH specialist age was 45.7 years old. DPH specialists practiced in nine counties, including only one border county and only one non-metropolitan county.

Dental public health specialist growth trends



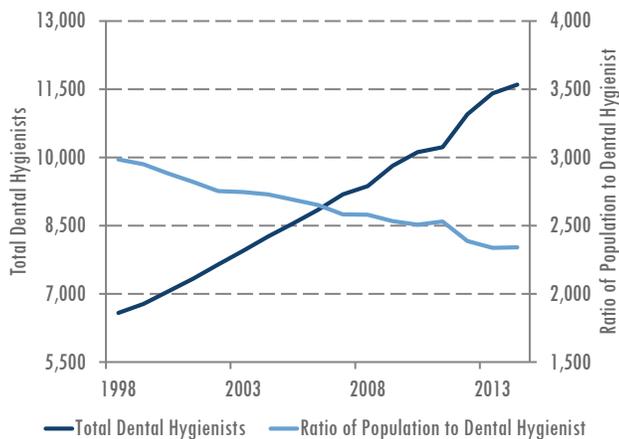
Ratio of Texas population to DPH specialist, by county



Dental Hygienists

There were 11,603 actively licensed dental hygienists providing care in Texas in 2014. The ratio of population to dental hygienist in 2014 was 2,340.9 to 1. In 2009, the total number of dental hygienists was 9,820 and the ratio of population to dental hygienist was 2,533 to 1. These numbers indicate an 18.2% increase in the total number of dental hygienists and a 7.6% improvement in the ratio of population to dental hygienist. In 2004, the total number of dental hygienists was 8,261 and the ratio of population to dental hygienist was 2,730 to 1. These numbers indicate a 40.5% improvement in the total number of dental hygienists and a 14.3% improvement in the ratio of population to dental hygienist.

Dental hygienist growth trends

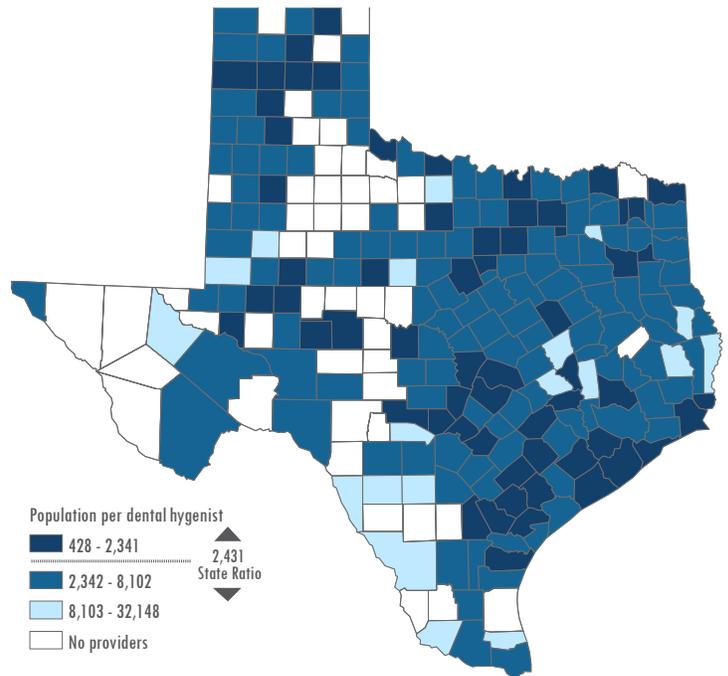


Unlike dentists, in 2014, dental hygienists were overwhelmingly female. Of the dental hygienists for whom gender data were available, 97.7% were female and 2.3% were male. Since 2004, the percentage of male dental hygienists has risen from 1.5%.

The geographic distribution of dental hygienists in 2014 was not evenly distributed. 91.4% were located in metropolitan areas, and 95.1% were located in non-border areas.

Geographic Designation	Ratio of Population to Dental Hygienist
Metropolitan	2,267
Non-metropolitan	3,125
Border	4,949
Non-border	2,206
Texas	2,431

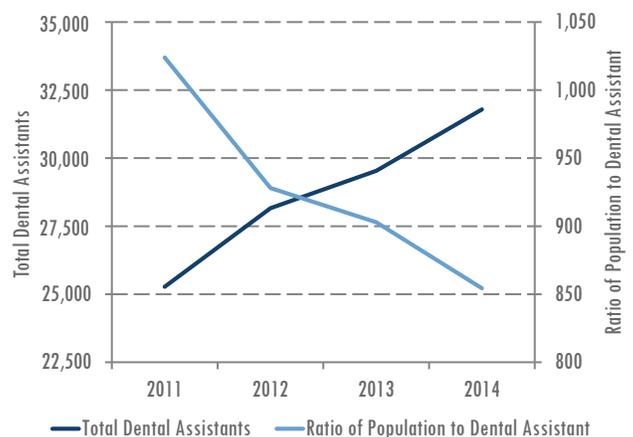
Ratio of Texas population to dental hygienist, by county



Dental Assistants

There were 31,791 active dental assistants in Texas in 2014. The ratio of population to dental assistant was 854.4 to 1. Similar to dental hygienists, the dental assistant workforce was overwhelmingly female. Of dental assistants for whom 2014 gender data were available, 94.2% were female and 5.8% were male. Additionally, the dental assistant workforce was young in 2014. 72.1% of the workforce was 40 years old or younger in 2014, and only 5.7% of the population was at or approaching retirement age (over 55 years of age).

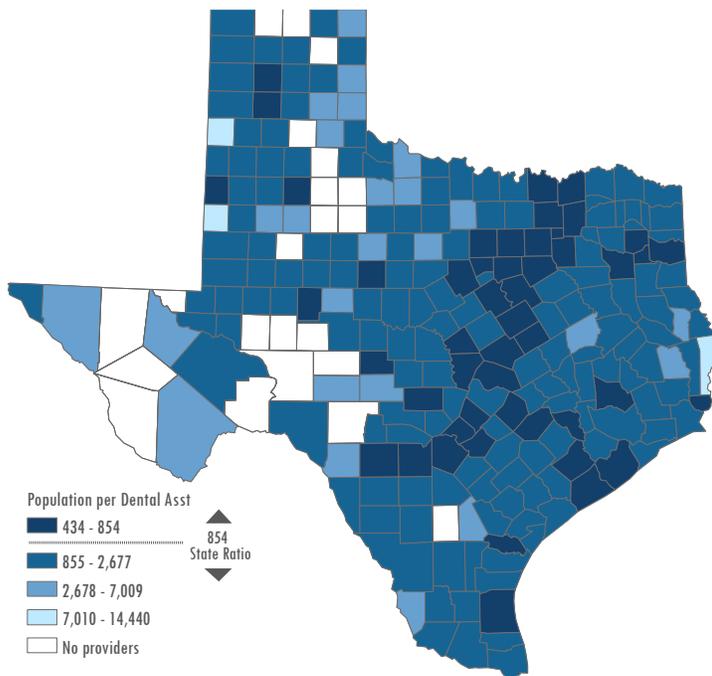
Dental assistant growth trends



With nearly half (45.8%) located in just five counties, the geographic distribution of dental assistants was not even. Furthermore, 91.8% of dental assistants in 2014 were located in metropolitan areas, and 91.5% were located in non-border areas.

Geographic Designation	Ratio of Population to Dental Assistant
Metropolitan	823
Non-metropolitan	1,209
Border	1,050
Non-border	836
Texas	854

Ratio of Texas population to dental assistant, by county



Emerging Trends

Mid-level Providers

Across the country, new workforce models are emerging to target projected dentist supply shortages and accessibility issues. Many of these models involve incorporating new mid-level dental providers. For example, the American Association of Public Health Dentistry, citing programs in Alaska and Minnesota, as well as programs in New Zealand and Canada, has developed an educational framework to train dental therapists to enter the workforce in a capacity similar to the physician assistant. This framework allows potential dental therapists to work as part of a dental team to provide services such as the application of local

anesthetic, uncomplicated restorative treatment, and extraction of primary teeth (Evans, 2011). Additionally, the American Dental Hygiene Association (ADHA) proposed an advanced practice dental hygienist in 2004 to provide preventative and some restorative care for underserved communities, citing an existing educational system in dental hygiene education and an existing workforce in dental hygienists (ADHA, 2015). While scope of practice and supervision varies, eight states (Minnesota, Maine, Connecticut, Kansas, Vermont, Washington, Massachusetts, and New Mexico) currently have some form of mid-level provider workforce model in practice. (NGA, 2014; ADHA, 2015)

There are concerns that mid-level providers might lead to a “two-tiered” system of care in which the neediest patients receive care from less-educated and less-experienced providers (AAPD, 2014; TDA, 2015). Many of the current mid-level provider models do not mandate more than two years of education, while physician assistants can require up to six years of education after high school (Parker, 2012). Additionally, there is concern that mid-level providers are not economically viable for dentists to incorporate into practice, since mid-level salaries would have to be significantly lower than dentists in order to justify employment as a cost-saving measure (Solomon, 2012). Patient affordability remains an issue, as well, and there is no information on whether mid-level providers would be covered by public services such as Medicaid (Solomon, 2012). Further, some argue that patient fees would have to be lower for services provided by mid-level practitioners in order to have an effect on the cost of dental care. (Hilton and Lester, 2010). As of the 84th Texas legislature, no new legislation regarding mid-level dental providers has passed. HB 1409, HB 1940, SB 571, and SB 787 were introduced to regulate the practice of dental hygiene therapy in the state, but none became law. (TLO, 2015)

The American Dental Association (ADA) implemented a pilot program in 2006 to create a Community Dental Health Coordinator (CDHC), modeled after the existing Community Health Worker (CHW). The CDHC receives 1,872 hours of instruction in curriculum developed by dentists in order to serve as a link to the rural and otherwise underserved communities throughout the country (ADA, 2012a). While CDHCs can provide basic preventative services, the overwhelming focus is on educating the neediest on how to navigate the existing dental healthcare system (ADA, 2012a). CDHCs are generally recruited from communities that resemble those in which they will eventually serve, thus reducing many of the language and cultural barriers that can affect access to dental care. Eight states, including Texas, Arizona, California, Montana, Minnesota, Oklahoma, Pennsylvania, and Wisconsin, employ 34 CDHCs as of 2014 (ADA, 2012a).

Teledentistry

Telemedicine combines telecommunications and information technology to provide remote medical care (Jampani, Nutalapati, Dontula, & Boyapati, 2011). Teledentistry, or remote access to dental care via technology, is another developing workforce model with applications in everything from dental specialist consultation to remote diagnosis (Jampani, et al., 2011). For example, a recent program in Arizona allowed dental hygiene students at Northern Arizona University to participate in a “teledentistry-assisted, affiliated practice” model in which students could practice preventative oral screenings in remote areas, and then, using teledentistry technology, pass x-rays and other diagnostic information along to affiliated dentists for diagnoses and referrals for further treatment (Summerfelt, 2011). To address the issue of cost for patients, the Arizona state legislature passed SB1282 in 2015, allowing for insurance coverage of teledentistry, and four other states (Arkansas, Colorado, Tennessee, and Washington) also enacted laws in 2015 encouraging telemedicine and insurance coverage (ADEA, 2015). California went even further, passing a law requiring Medicaid coverage of teledentistry services effective January 1st, 2015 (Hernandez, 2014). In Texas, Medicaid has provided reimbursement for telemedicine services initiated by a physician since 1998, and data show an increase in providers and use of services (HHSC, 2014). Similarly, teledentistry services initiated by dentists may have the potential to reach underserved populations, but as of the close of the 84th legislature, SB 787, which would have regulated dental hygiene therapy, including teledentistry practice, did not become law (TLO, 2015).

Dental Support Organizations

Over the past several years, the dental industry has been undergoing an evolution from solo practice to group practice. From 1990 to 2009, the percentage of dentists in solo practice went from 85.1% to 78.7% nationally, while the percentage of dentists in a practice with three or more other dentists went from 3.3% to 6.0% nationally (ADA, 2012b). Anecdotally, reasons for this evolution range from the ability of group practices to negotiate better rates on equipment and insurance reimbursement to the economic difficulty of opening a solo practice for new dentists (Parker, 2012). In Texas, one of the emerging group practice models is the dental support organization (DSO). DSOs are outside corporate entities that contract with dentists to deliver administrative services, such as accounting and human resources, thus freeing more time for patient care (TCDSO, 2015a). As of June 2015, the Texas Coalition of Dental Support Organizations had 387 member organizations across the state (TCDSO, 2015b). There is concern among stakeholders, however, that the use of DSOs

can lead to pressure on dentists to prioritize profits rather than patients (Aaronson, 2012). The 83rd Texas legislature passed HB 3201 in 2013 partly to allow the Texas State Board of Dental Examiners the authority to collect copies of contracts between dentists and employers in order to avoid any undue influence from non-dentists, including dental support organizations (TDA, 2015). As of the close of the 84th legislature, further steps were taken to regulate dental support organizations with the passage of SB 519 (TLO, 2015). Effective September 1, 2015, SB 519 requires dental support organizations to register annually with the secretary of state in order to promote more transparent business practices.

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