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April 1 – 7, 2019

## The Texas Public Health Association & APHA's Public Health Region VI


## Present

# 'Oral Health: Targeting Rural Areas'




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# TPHA and Public Health Region VI Feature Section 'Oral Health: Targeting Rural Areas'

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**Editorial Note:** In keeping with tradition, the Texas Public Health Journal (TPHJ) is once again devoting our spring journal issue to National Public Health Week, April 1-7, 2019. We want to celebrate you, the public health workforce who are working tirelessly to improve the health of Texans and beyond.

Our celebration this year has been expanded to include the states in public health region six. Known by the acronym TALON (Texas, Arkansas, Louisiana, Oklahoma and New Mexico), members of the American Public Health Association living in these states met at the 2018 APHA conference. We wanted to develop a collaborative project that would focus on a specific public health need in all of our states. We all agreed that good health cannot be attained if good oral health care is absent. We realized that although our states had oral health programs, the needs of rural residents were not being fully met. Our plan was to issue a call for papers on the topic of oral healthcare. We asked the authors to include information on targeting rural areas. Our goal was to give an overall view that would detail existing programs in these five states, as well as to include information on limitations of those programs and ideas on how to expand more fully into rural areas. Three of the five states answered our call and submitted papers. Our hope is that public health professionals in the region will use information in this featured section to educate and advocate for expansion of existing programs and creation of new programs in areas where oral healthcare is sparse.

The group decided to partner with the Texas Public Health Association (TPHA) and utilize resources available through their quarterly journal publication process. All papers were reviewed by oral health care specialists who are members of TPHA, with editing provided by the TPHJ editor and editorial board. Additionally, in an effort to make this section more comprehensive, we are reprinting an article from our Fall 2018 issue. Typically our journal is a benefit of membership in TPHA with additional copies provided at a cost. Recognizing the importance of this topic to the overall good health for the public, the TPHA executive board voted to allow distribution of electronic copies to members of our regional work group at no cost.

The APHA Region 6 work group thanks all who answered our call for papers describing innovative approaches targeting rural oral health. We hope you will find the information contained in this featured section on oral health useful as you educate on and advocate for more and better oral healthcare programs in your communities.

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## Emergency Department Utilization for Non-Traumatic Oral Health Conditions by Rural Texas Residents in 2016

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**BACKGROUND:** Texas is a diverse state, both in geography and population. In 2016 the population of Texas was 28,797,290.[1] Of the 254 counties in Texas, 82 are urban counties and 172 are rural counties, with 3,061,090 Texans living in a rural county.[2] Significant differences exist between access to healthcare in rural settings versus urban settings.[3] There have been many studies compiled on the health disparities of rural populations[4] including adverse effects on oral health.[5] This short paper examines the disproportionate rate of Texans who visited the Emergency Department (ED) in rural counties versus urban counties in 2016, suggesting that improvements in access to oral health services for rural residents are needed.

**METHODS:** Researchers used the Texas Emergency Department Public Use Data File (ED PUDF), maintained by the Texas Health Care Information Collection (THCIC).[6] Data extracted from ED PUDF included the patient's diagnostic, demographic, geographic, and payment information. ED visits with ICD 10-CM codes for non-traumatic dental conditions (NTDC), previously identified by the Association of State and Territorial Dental Directors as primary diagnosis were included in the study.[7] Patients admitted to the hospital with a principal diagnosis of cellulitis of the face or neck (L03211-L03212, L03221-L03222) secondary to NTDC's are also included. Patients were divided into two groups: patients who visited the ED from urban counties and those that visited an ED from rural counties. Rural counties as defined by the United States Census Bureau are counties with a population of less than 50,000.[8] Descriptive statistics, crude rates per 100,000 general population and $\chi 2$ statistics were calculated using SAS 9.4.

**RESULTS:**Texas Department of Health and Human Services reports that in 2016 there were 407 hospital systems in Texas, servicing 254 counties.[9] In 2016 there were a total of 122,097 ED NTDC visits in Texas, of these 102,944 were in urban counties and 18,931 were in rural counties. The rate per 100,000 general population who visited the ED due to NTDC was 615.4 for rural counties compared to 415.3 for urban counties. Of rural residents that visited the ED for NTDC,

58.1% were female and 41.9% were male. The data indicated that 66% were between the ages of 18 and 44, 56.7% were non-Hispanic white, and 42.1% were charity/indigent or self-pay cases. In comparing the number of ED visits in rural to urban counties the rate of ED visits for NTDC in rural counties was 48% higher.

**CONCLUSION:** Oral health is an unmet health care need for both rural and urban Texas residents, although rural residents are affected disproportionately. The results of this study indicate that uninsured, non-Hispanic white working adults ages 18-44 years of age living in rural areas are most likely to visit the ED due to NTDC. The numbers of individuals with NTDC conditions in rural areas may be higher than reported as rural hospitals are exempt from reporting ED data and therefore the dataset may not capture all visits. Treatment for dental conditions in the ED is expensive and only palliative care is available, the patient may leave with the same underlying dental condition they had when they arrived. For Texans who visited the ED for NTDC, their condition was mostly preventable. An upstream approach to oral health is needed to prevent dental decay that is so severe that a visit to the ED is required. Improving access to preventive care in rural populations will lead to a more productive rural workforce, lower healthcare expenses, and a better quality of life. Further exploration is needed to identify barriers to preventive oral health care for rural residents.

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**Table 1**. ED visits for NTDC in rural and urban counties of Texas in 2016

| Variable | Rural ED Visits | % | Rate per 100,000 Population | Urban ED Visits | % | Rate per 100,000 Population | P value |
|---|---|---|---|---|---|---|---|
| **Total** | 18931 | | 615.4 | 102944 | | 415.3 | |
| Female | 10908 | 58.1% | 727.0 | 58026 | 57.1% | 464.3 | 0.0286 |
| Male | 7873 | 41.9% | 499.6 | 43595 | 42.9% | 354.8 | |
| **Age Group** | | | | | | | |
| 0 - 17 Yr | 1775 | 9.4% | 241.5 | 12037 | 11.7% | 183.6 | <0.0001 |
| 18 - 44 Yr | 12651 | 66.8% | 1270.3 | 66522 | 64.6% | 696.4 | |
| 45 - 64 Yr | 3608 | 19.1% | 459.4 | 20089 | 19.5% | 340.4 | |
| 65 - 74 Yr | 568 | 3.0% | 174.8 | 2775 | 2.7% | 162.8 | |
| 75 + Yr | 329 | 1.7% | 140.0 | 1521 | 1.5% | 141.7 | |
| **Race/Ethnicity** | | | | | | | |
| Hispanic | 3714 | 19.6% | 356.2 | 27382 | 26.6% | 267.7 | <0.0001 |
| NH - White | 10722 | 56.7% | 623.1 | 39918 | 38.8% | 408.3 | |
| NH-Black | 3596 | 19.0% | 1502.2 | 30239 | 29.4% | 1015.0 | |
| NH-Other | 870 | 4.6% | 1183.6 | 5302 | 5.2% | 294.1 | |
| **Insurance** | | | | | | | |
| Charity | 7962 | 42.1% | | 48811 | 47.4% | | <0.0001 |
| Medicaid | 3259 | 17.2% | | 22358 | 21.7% | | |
| Medicare | 2078 | 11.0% | | 9572 | 9.3% | | |
| Private | 5006 | 26.4% | | 15311 | 14.9% | | |
| Others | 624 | 3.3% | | 6881 | 6.7% | | |

Notes - ED= Emergency Department, NTDC=Non traumatic dental condition, NH=Non-Hispanic.
Frequencies in the columns may not sum up to total numbers because of missing values.

# Geriatric Oral Health in Texas is a Public Health Concern

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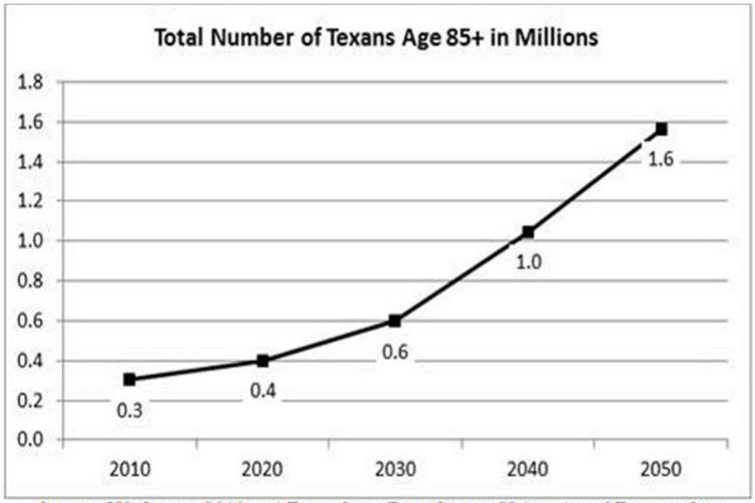
Texas currently hosts 6.7% of the nation's elderly. Only California and Florida have larger geriatric populations.[3] The number of Texans over 65 years of age is growing so rapidly that by 2030 this demographic is expected to be 19.4% of the state's population. The group of 85 plus year old Texans will grow by more than 500 percent within a 40 year span (Figure 1). This growth is expected to cause significant challenges for the already overburdened Social Security, Medicare and healthcare systems, including oral health care.[1,2] This is not a problem unique to Texas, but in anticipation of this growth spurt, the question becomes how will Texas handle the burden of providing for the additional elderly? In general, oral healthcare providers will share a large part of this burden due to scientific advances that will help the elderly retain their teeth longer, but the elderly universally face challenges like decreased skill levels, less disposable income and a lack of resources to provide adequate oral treatment and prevention for themselves, resulting in the loss of teeth after all. This is a serious and expensive public health issue.[4]

The problem is less acute in certain states like Minnesota, Colorado, Washington and New Mexico where the hygienist plays a larger role in dental care. In 2018, forty-two states have provisions allowing some level of direct access to provide dental care by licensed dental hygienists.[13] In Texas, however, dentists are still the main oral healthcare providers, and hygienists have a more restricted range of duties. Addressing the lack or availability of providers to offer coverage is just the first step toward relieving the increased burden on the healthcare system. It has been noted in a recent governmental review that "Older adults in Texas are poised to bear a greater share of Texas' oral health disease burden in coming decades".[7]

Many elderlies live in long-term care (LTC) facilities for independent living; caregivers are available for assistance with daily activities including oral hygiene, personal care and social needs as well as their overall health needs.[5,6] Attempts have been made, as shown in a North Carolina study, to train certified nurse's aides to provide adequate oral care to the nursing homes' populations. The outcomes were not highly successful.[6] Lack of skilled, trained caregivers, and their failure to recognize the importance of oral health in relation to systemic health can result in failure to recognize problems that arise. Overwork and decreased time per patient also increase the risk of poor care.[8] Which systems can be established to provide routine oral healthcare or train unskilled caregivers to be able to provide the daily care needed for the elderly?

Maintaining good oral healthcare is vital since the progression of oral disease adversely affects the quality of life during the aging process. Normal aging affects body functions adversely; these detrimental effects are compounded by long-term chronic conditions, polypharmacy, multi-morbidity and mental disabilities such as dementia.[10] Any number of these factors can put aged individuals at higher risk for dental disease and ultimately, tooth loss. Malnutrition can result from the loss of teeth and inability to chew and has been associated with reduced cognitive function, poor wound healing and higher hospital admission rate. This results in increased monetary and physical costs for the health care system.[9] For example, aspiration pneumonia is a life-threatening systemic infection among the immunocompromised and may be the direct result of microorganism/plaque accumulation from untreated oral disease; therefore, this disease process may be preventable to an extent.

Figure 1. Total Number of Texans Age 85+




Source: US Census 2010 and Texas State Data Center, University of Texas at San Antonio. Population projections based on the 1.0 scenario.

**Figure 2**

| State | DH Agreement | Provider services | Teledentistry Utilization |
|---|---|---|---|
| Minnesota | Collaborative Practice | The most extensive service providers to nursing homes and population with minimum or no access to Oral Health Care. | High |
| Alaska | Collaborative Agreement | dental hygiene scope of practice (patient education, prophylaxis, sealants, radiographs, etc. | High<br>Using smart phone and other forms technology for intraoral photography. |
| Texas | General Supervision | dental hygiene scope of practice (patient education, prophylaxis, sealants, radiographs, etc). in school-based health center, nursing facility or community health center. Patient must see dentist every 6 months. | Low |
| Mississippi | N/A | N/A | Very Low or N/A |

Multiple barriers like insufficient finances, the lack of dental insurance, Medicare's failure to include coverage for oral health, decreased access to dental facilities, and an untrained, unavailable workforce compound the issues of elderly oral and systemic health. So again, what are the answers to treating the growing geriatric population?

One of the answers may lie in the use of modern technology. Telemedicine allows communication, testing, diagnosing and palliative treatment onsite, but teledentistry has not become an established practice. The American Dental Association 2015 House of Delegates passed a resolution creating teledentistry guidelines in anticipation of future needs, and the CDT 2018 book now includes codes for submitting the services for insurance repayment.[17] Teledentistry could provide diagnosis and specialty consultation among other treatments to underserved areas without increasing the workforce. Utilization of dental hygienists in LTC facilities and community health care clinics via teledental programs will increase the opportunity for additional elderly oral healthcare while allowing dentists to supervise, evaluate and recommend treatment, mitigating the effects of the workforce shortage.[14] The system has been shown to be effective in Minnesota and Alaska, but Texas has failed to endorse teledentistry[15] as an alternative to general supervision. (Figure 2) Even if Texas adopted this system, another discussion would need to determine whether Medicaid would reimburse Teledentistry as it has for telemedicine[12] or would there be traditional insurance coverage. Of course, the greatest need is for research to examine whether teledental treatment will provide comparable outcomes to those found in conventional dental care, thus improving the state of oral health in Texas. There is very little research available comparing the use of teledentistry by state. It is interesting to note that Minnesota, which has expanded auxiliary duties and uses Teledentistry for groups with limited access to care, ranked number one in a research project ranking all states according to the overall outcome of oral health.[17] By comparison, Texas ranked number 46 in the same project.[17]

The idea of Teledentistry is an exciting possibility but there should be other plans in place in case there is a delay in its implementation. What if there were comparable positions in dentistry similar to the roles played by registered nurses and physicians assistants in medicine? Redefining the expanded duties of dental auxiliaries or other mid-level providers is still a work in progress, and not all states, including Texas, have fully embraced the idea of expanded duties/positions. Will the solution be to increase the number of dentists and provide more mobile access to the patients? Oral Health in Texas (2018) reports that 41% of the dentists in the work force will be at or past retirement age within a decade.[7] Consequently, Texas will experience a shortage of about 500 dentists by 2025, but simultaneously will have a surplus of over 3,300 dental hygienists. A new Texas dental school is being built to produce more dentists. Time will tell if the geriatric population in Texas will be best served by employing Teledentistry, training more dentists, funding more federally qualified health centers, using auxiliaries with expanded duties or some combination thereof. The state of oral healthcare in Texas and its geriatric population are waiting for the answer.

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## Addressing the Oral Health needs in Northeast Texas

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**ABSTRACT:** Addressing oral health disparities in Northeast Texas is a goal for this oral health project. With this project, the group is increasing access to care and treating patients in need through collaboration and community involvement.

**INTRODUCTION:** Success stories are plentiful across the state of how the Texas 1115 Healthcare Transformation Waiver (Waiver) has redesigned the delivery of healthcare to provide more opportunities for all patient populations to receive care. A driving purpose of The Waiver was to improve healthcare through innovative projects directing providers from traditional healthcare delivery to outside of the box healthcare delivery. The University of Texas Health Science Center at Tyler (UTHSCT) did just that by developing a Delivery System Reform Incentive Payment (DSRIP) project to provide dental care to the underserved. As the only Academic Medical Center in Northeast Texas, UTHSCT housed inpatient and outpatient clinics, but was not involved in the delivery of dental services. This void presented a natural opportunity to partner with Tyler Junior College (TJC) to create a DSRIP project with three driving goals: 1) increase the dental workforce 2) integrate dental and medical education and 3) increase access to dental care. While the Waiver mechanics have changed over the last two years, this DSRIP project continues to fulfill a great need in Tyler and surrounding rural communities. This article highlights the work currently taking place based off the original project goals.

***Overview***: TJC and UTHSCT officially partnered in 2013. The partnership was strongly supported by leadership at both institutions. The project is unique in that UTHSCT employs a fulltime dentist and dental hygienist, along with a part-time dental assistant. This dental team is fully embedded within the TJC dental hygiene clinic through teaching and supervising students. As well dental care services are provided two times a week for underinsured and uninsured chronically ill patients referred from UTHSCT. Tyler Junior College offers a state of the art facility that was built in 2015 with 33 dental operatory chairs to be able to deliver these services.

***Increase the Dental Workforce:*** TJC offers an associate's degree in dental hygiene and an online bachelor's degree in dental hygiene. They also offer a 30 credit hour program to obtain a certified dental assistant (CDA) certificate. Our UTHSCT dentist, hygienist and dental assistant supervise clinical academics and introduce the students to public health needs in the community related to oral health especially.

Northeast Texas is primarily rural with only one city having a population greater than 100,000 people. Most counties lack dentists and dental hygienists to serve the population. The need for dental services is substantiated by the overwhelming

response of patients needing emergent dental services who attend the many events that take place throughout the year in this partnership.

***Integrate Dental and Medical Education:*** UTHSCT is instituting four medical residency programs: family medicine, rural family medicine, psychiatry and occupational medicine. The UTHSCT dental team provides dental education yearly to family medicine residents. Topics such as how systemic diseases like diabetes, correlate with and affect the oral health of a person, are offered.

UTHSCT operates a 30 bed residential psychiatry unit. The UTHSCT dentist teaches a weekly class titled "Dental Care and Nutrition" to the 30 residential patients. The residential patients are encouraged to participate in the weekly classes with hands on activities. The residential patients are given incentives for attending the class each week by the behavioral health staff. They are supplied a new toothbrush and toothpaste every month as well. The weekly interaction the dentist and dental team have with the residential patients is vital for relationships and familiarity when they receive dental care. Many of the patients have fear of dental visits and most of them have never received routine or preventative care in their lifetime. On the last Thursday of the month, the dentist performs oral screenings on the behavioral health patients, specifically evaluating the patients for any oral infections. If there is an oral infection present or the patient complains of pain, this establishes a dental referral. The patient is then scheduled in the TJC dental hygiene clinic to receive care. The goal is to replace emergency care for these patients with preventative care by continually educating and accessing their dental needs.

Since the inception of the original project, UTHSCT opened the School of Community and Rural Health and is now accredited to award Master of Public Health (MPH) degrees. The dentist for the project has a faculty position within the school and through the TJC partnership offers practicum and capstone experiences for those students who express an interest in dental care delivery or dental public health.

***Increase Access to Dental Care:*** While it is extremely important to increase workforce and education, a driving project focus was increasing access to dental care. Realizing the magnitude of the issue, the team felt it most important to start with assisting UTHSCT patients. The project team worked with UTHSCT physicians and Informational Technology (IT) to develop an automatic dental referral within the electronic medical record. This referral allows providers to refer patients for dental services at the TJC dental clinic. Services primarily consist of preventive hygiene services; however, two half-day clinics a week are devoted to more extensive care, which is limited to extractions and fillings. Included in the referrals are MD Anderson Cancer Center patients needing dental clearance prior to radiation and chemotherapy. The dentist provides a dental exam, a cleaning, and extractions or fillings to remove disease and infection. This established dental referral process for clearance speeds up the preliminary procedures that are needed, therefore; the patient can move forward with oncology services more quickly. Another component of working with MD Anderson is the dental care given to patients after chemotherapy and radiation. Chemotherapy and radiation have detrimental effects on the dentition and at times leads to rampant decay. These dental services offered after oncology care aid the patient in getting back into the normalcy of life after a long road with fighting cancer.

In addition to clinic referrals, the dental team started a "Sealant Day" program with Tyler Independent School District (TISD) to provide oral health screenings and place sealants and fluoride varnish if needed. Oral health disease plagues children and negatively impacts school attendance and performance.[1] This is a great opportunity to provide dental education to young children and promote dental hygiene. TJC dental hygiene students, who have met competency in sealant placements, accompany the dental team to allow an increase in students served. There are four to five sealant days each semester with approximately 100 kids given dental care at each school at no cost to the children and their parents.

One of the smaller components of patient care with the DSRIP team happens to be one of the largest public health concerns in East Texas. Tobacco Cessation counseling is given to every patient as well as information about the Texas Quitline. A conversation is held with patients who smoke, as well asnon-smokers about the dangers on oral health from smoking, smoke-less tobacco, electronic cigarettes, and vaping on oral health. The DSRIP team is involved in tobacco prevention and control initiatives. Tobacco use is the leading cause of preventable death in the nation.[2] Two strategies have been utilized by the team to combat this growing public health concern and these are prevention and screening.

Lastly, TJC, UTHSCT and Texas A&M College of Dentistry partner yearly to offer outreach events at the TJC dental hygiene clinic. On average, 30 3rd and 4th year dental students travel to Tyler to provide basic extractions and fillings at no cost to the patients. Quarterly outreach events take place and then a weeklong event is offered in August. This last weeklong dental outreach event documented that care was offered to approximately 500 patients in need.

The three driving goals of the DSRIP project have been continually achieved each year since the partnership began in 2013. The DSRIP team has increased the dental workforce, integrated dental and medical education and also largely increased access to dental care. The partnership with UTHSCT and TJC has brought awareness, initiated community partnerships, and given to those in need better access to dental care. The lasting effects of the partnership and community collaboration will continue for years to come.

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# Operation East Texas: A Model of Collaborative Dental Public Health Community Outreach

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**INTRODUCTION**: In collaboration with community and academic partners, the Texas A&M College of Dentistry Public Health Sciences Department delivers much-needed dental care to residents of Northeast Texas through the Operation East Texas project. This longstanding community outreach effort improves access to oral health care in an underserved region of the state. Since 2014, the Operation East Texas project has resulted in over 4,400 patient visits and delivered care such as dental screenings, cleanings, fillings, extractions, and sealants. In the same time period, 407 faculty, dental students, hygienists, and dental residents have traveled from Texas A&M College of Dentistry in Dallas to partner with local volunteers in Tyler. Volunteers include those from Tyler Junior College (TJC) Dental Studies and Vocational Nursing departments and the University of Texas, Tyler, Nursing and Pharmacy programs.[1] This inter-professional partnership shows the impact of coordinated oral health outreach events in a rural community, both for patients and dental providers in training.

***Population and Need:*** The demographics of Northeast Texas are more rural, more impoverished, and less Hispanic in comparison to the state as a whole. A total of 1.5 million residents live in the 35-county region, and every county has a median household income below the state average of $57,051.[2] In addition, most of these counties are classified as full or partial Health Professional Shortage Areas (HPSAs), indicating an insufficient number of health care providers to meet the needs of the population. Social determinants of health, such as socioeconomic status and access to care, have a strong influence on oral health outcomes.[3]

Additionally, many risk factors for chronic diseases are shared with oral diseases. Tobacco use, alcohol consumption, and dietary behaviors associated with obesity and diabetes are risk factors for the most common chronic diseases. Likewise, these behaviors are associated with dental caries, periodontal disease, and oral cancers.[4] Combined, these factors have a negative impact on the residents of Northeast Texas. As documented in the 2016 report "The Health Status of Northeast Texas", residents of Northeast Texas have higher smoking rates than the rest of the state – nearly 25%, compared to 15% of Texans.[2]

Northeast Texas also performs poorly on specific oral health outcomes when compared to the state as a whole. "Oral Health in Texas: Bridging Gaps and Filling Needs", a report prepared by the Texas Health Institute, states that 53% of Northeast Texas residents had a dental visit within the past year, compared to 59% of Texans overall. More alarmingly, the ratio of dental providers in Northeast Texas is 3,830 residents to 1 dentist, which is much higher than the state ratio of 2,970 residents to 1 dentist.[3] The disproportionately high burden of poor oral health outcomes, combined with the relatively low number of dental providers, makes the greater Tyler area an opportune location for a program such as Operation East Texas.

***Background and Methods***: The five-year history of the Operation East Texas project includes growth and changes. During the summers of 2014 and 2015, the first East Texas Medical and Dental Outreach programs were held at the Van Jr. High in Van, Texas. The original partnership included the Texas Department of State Health Services, the Northeast Texas Public Health District, and the Texas A&M College of Dentistry.[5] These early events only offered children's dental screenings and sealants. The addition of routine adult dental services - including fillings and extractions – was a response to the high need. As a result, attendance increased dramatically. In 2016, the TJC Dental Studies department joined the collaborative efforts. When TJC opened their new 32 operatory clinic, outreach events were moved from Van to the TJC campus in Tyler. The additional dental chairs and the increase in facility size allowed more patients to be served.

For each Operation East Texas visit, TJC provides the disposables and office supplies while Texas A&M brings the dental students, instruments, and restorative materials from Dallas. TJC hygiene and certified dental assistant students perform patient registration, vitals, check in, clinic support with radiographs, chairside assistance, and exit procedures. Texas A&M dental students provide direct care under the supervision of their faculty. Additional Texas A&M pre-clinical students and department staff also work in sterilization and at the dispensary. During the week-long events staged each summer, the Texas A&M volunteers stay in vacant dorms in Tyler.

**RESULTS:** Operation East Texas delivers oral health care for many residents of rural Northeast Texas who would otherwise not have access. Importantly, the project engages future dental professionals in community-based outreach. Five-day summer trips have taken place each year from 2014 to 2018; additional weekend trips were held in 2015 and 2017. On an average trip, 4-6 supervising Texas A&M faculty travel to Tyler with anywhere from 22 – 58 dental students. In the nine trips over the past five years, the teams have provided over 4,400 patient visits.

As with any successful project, sustainability is important. The Department of Public Health Sciences has a legacy of initiating community outreach efforts and then incorporating these activities into ongoing departmental programs. This history of sustainability aligns with the department's mission to

focus on the science and art of preventing and controlling dental diseases, as well as promoting dental health through organized community efforts. For Operation East Texas, there are a number of factors supporting sustainability. These include the volunteer staffing model, the low overhead and minor expenses for direct activities, and the use of equipment and faculty time that are already accounted for in the department budget. Given the relatively low cost and the compatibility with departmental community priorities, it is likely that Operation East Texas can continue to serve the region for many years in the future.

**DISCUSSION:** The Operation East Texas project provides a model for successfully and collaboratively delivering dental care to underserved communities. Lessons learned involve both logistics and structural barriers. For the weeklong events, obtaining and providing food for volunteers can pose a challenge, especially when this responsibility is added to partners' existing workloads. Additionally, Operation East Texas by nature provides episodic, urgent dental care. While this is an unmet need in the region, there is also a significant need for ongoing, preventive, restorative, and maintenance dental care beyond the short-term events offered by our project. It is clear that social determinants of health affect the overall health status and oral health outcomes in Northeast Texas communities, particularly among rural, low-income populations. As such, there is great value to exposing dental students from a major metropolitan area to new models of care, needs, and opportunities in rural Northeast Texas communities.

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## Texas Tooth Steps


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**ABSTRACT:** Oral health is essential for overall health and numerous studies indicate that pregnant women with good oral health reduce the risk of mother-to-infant transmission of pathogenic bacteria. To maintain a healthy mouth, oral hygiene and regular dental visits are essential. Oral health professionals should engage in preventive education to promote oral health awareness among pregnant women. The Texas Oral Health Coalition, through the training program "Texas Tooth Steps", enhances knowledge and awareness among pregnant women about oral health, general health, and infant oral health needs.



***Keywords:*** Knowledge, awareness, oral hygiene, dental visits, perinatal oral health, Texas Tooth Steps


**INTRODUCTION:** The 2000 U.S. Surgeon General Report on Oral Health in America emphasizes that Oral Health is essential to general health and well-being.[1] Specifically, perinatal oral health is crucial for pregnant women and newborn infants. In pregnancy, there are many physiologic changes which result in changes in the oral cavity or cause oral manifestations.[2,3] Pregnancy gingivitis, benign gingival lesions, periodontitis, tooth erosion, and dental caries are the common oral manifestations in pregnancy.[3] Investigators have found that four in ten women during pregnancy have tooth decay or gum disease.[4] Numerous studies show an association between periodontal disease and pre-term deliveries, low birth weight and preeclampsia.[5] Further, pregnant women with poor oral health status or tooth decay are prone to infect their infants with their cariogenic bacteria.[6]

Training and education of pregnant women can emphasize the importance of oral health and encourage them to recognize oral health problems and to seek dental care.[7,8] Educational webinars, brochures, and text messages help pregnant women to understand the importance of oral health[9], providing them with information on tooth brushing, flossing, and healthy diet habits.[10] Oral health education highlights the importance of oral health during pregnancy and encourages pregnant women to seek prenatal dental checkups and dental care.[11,12]

By partnering with Nurse Family Partnership, Community Health Workers and similar community agencies, Texas Tooth

Steps is able to reach perinatal women in both rural and urban settings in South and Central Texas, to address various demographic categories, and to concentrate on under-resourced groups.

To date, there have been two cohorts of 200 women each. Cohort 1 received services in Houston, San Marcos, and Corpus Christi. Rural women were primarily served in Hays County (San Marcos) and Nueces/San Patricio Counties (Corpus Christi); 29% of Cohort 1 were rural. Cohort 2 is receiving services in Houston, Dallas, Tyler, and Corpus Christi. Rural women are primarily served in Smith County (Tyler) and Nueces/San Patricio Counties (Corpus Christi); 50 % of Cohort 2 are rural. The program is ongoing.

Demographic data shows Cohort 1 to include 48% Hispanic, 31% African American, and 14% Caucasian; 15% were in the teen years and 47% were in their 20's. Cohort 2 shows 57% Hispanic, 23% African American, and 14 % Caucasian; 28.6% were teens and 60% were in their 20's.

**METHODS:** The Texas Oral Health Coalition (TxOHC) (http://www.txohc.org/) initiated and implemented the training program Texas Tooth Steps (http://www.txohc.org/Perinatal.html). The main goal of the program is to enhance the oral health behavior of pregnant women and new mothers around self-care and the care of infants. Texas Tooth Steps (TTS) is an innovative program in Texas addressing this goal. The TTS target audience is under-resourced perinatal women in both urban and rural areas of Texas. Demographic data collected include race/ethnicity, age, and location. Participants are primarily Hispanic and under age 40.

Continued reinforcement of good oral health behaviors is necessary for compliance with improved dental, nutritional and other health standards. TxOHC collaborates with Nurse-Family Partnership and other community agencies to promote knowledge and awareness among perinatal women in both urban and rural settings. TTS trains the trainer and provides educational resources for the target audience. The program works directly with perinatal women and teaches them about oral health, healthy habits, and infant oral care. This training allows participants and their infants, who are at high risk for oral disease, to be educated about preventive oral health practices.

The perinatal program addresses three specific oral health behaviors - a healthy diet for infants, oral hygiene and dental attendance. There are several aspects of the program that are unique and not duplicated by other agencies. First, TxOHC provides an in-person train-the-trainer presentation for collaborating agencies along with educational materials, program documents, and gifts for participating clients. Second, organizational partners ask participants to listen to a brief oral health presentation and then sign a consent form to participate in a series of six short texted survey questions and several oral health messages in English or Spanish until their child is two years of age. The results of the questionnaires are analyzed to assess effectiveness of the oral health education program. Lastly, once consent forms are signed, expectant or new mothers receive a gift bag containing a set of three onesies (3 months, 6 months and 12 months) printed with an age-specific oral health message. Further, the gift bag includes an educational brochure in English and Spanish emphasizing the three target oral health behaviors, along with infant and adult sized toothbrushes to help enforce behaviors in the home.

**RESULTS:** Success is measured via responses to short text message surveys administered over a 24-month period. Survey questions are specific to the three-goal behaviors. Success is also supported by continued interaction between the Nursing Family Partners (NFP)/ Community Health Workers (CHW) and the client around the topic of oral health. The reinforcement of the original message strengthens the expectation for the behavior change with respect to the three specific oral health behaviors. Quarterly reports provide the partners with information on their client's compliance and the need for possible re-education. The average response rate for Cohort 1 was 23%; Cohort 2 shows a 25% rate. Adjustments are continually made in order to maximize effectiveness. One such adjustment is providing NFPs and CHWs with client response data allowing them to repeat the oral health training and reinforce the desired behaviors.

**DISCUSSION:** In pregnancy, there are numerous oral health changes due to hormonal levels (estrogen and progesterone).[13,14] Therefore, education is important to create awareness about oral health. Oral health education is an integral component of oral health promotion.[15] It promotes knowledge, awareness and a positive attitude to continue good oral health behaviors.[16-18] Education is a cost-effective method to reduce the incidence of dental diseases.[18] TxOHC has collaborated with Nursing Family partners and other community health workers to provide education to the pregnant women and teach them preventive oral care methods.

In the presentation, images and visuals are used to assist the audience to recall the lesson. Kouyoumdjian explains that visual cues enhance memory retrieval and decrease the amount of time spent in learning.[19] The brain establishes an association with the image and associates the content with the concise message.[20] Thus, the visual cues promote the ability to retain the content over the long term. Further, to increase the strength and frequency of a behavior, a positive reinforcement technique is used. In addition, praise, prizes or attention can be provided to reinforce the positive behavior. In this project, text messages and rewards are given along with the presentation to motivate the perinatal women.

Jadhav et al. investigated the effectiveness of text messages after oral health education to 400 Indian college students aged 18 to 20 years.[20] The researchers established that reinforcing oral health education through text messages is an effective method.

Geller states that the desired behavior can be improved in individuals or groups by providing rewards.[21] Texas Tooth Step provides gift bags with an educational brochure demonstrating the information about the three target oral health behaviors, along with an infant and an adult-sized toothbrush to help enforce behaviors in the home. When complex messages are simplified using slogans, it helps the audience to connect effectively with the information.[22] The gift bag provides a set of three onesies for the baby printed with an age-specific simple

oral health message.

In conclusion, Texas Tooth Steps addresses three specific oral health behaviors: a healthy diet for infants, oral hygiene and dental attendance. It also expands knowledge and awareness among perinatal women about oral and systemic health. Further, incorporating positive reinforcement techniques such as text messages, visual cues, slogans, and rewards helps in the retention of and compliance with the oral health messages. Finally, it reaches perinatal women in both rural and urban settings in South and Central Texas, addresses various demographic categories, and concentrates on under-resourced groups.

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## Oral Health Initiatives in Rural Louisiana


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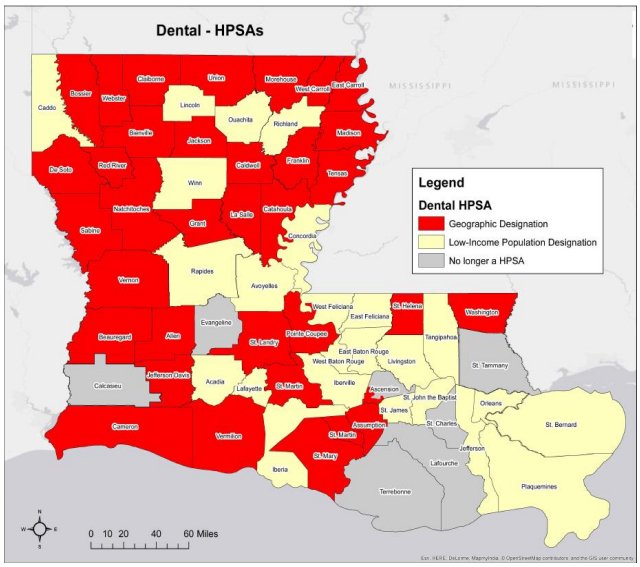
Louisiana is a mid-sized state located in the deep southern region of the United States with an estimated population of 4.68M. The state has a population density of 98.6 persons per square mile and is primarily a rural state. The Bureau of Primary Care and Rural Health (BPCRH) is located within the Louisiana Department of Health/Office of Public Health. The goal of the Bureau is to promote quality health care access to citizens residing in Health Professional Shortage Areas (HPSAs), medically underserved areas (MUAs) and medically underserved populations (MUPs). A HPSA designation implies that there is a population to provider shortage within a particular area. In 2018, all 64 Louisiana parishes were federally- designated as primary care, mental health, and or dental HPSAs. As seen in Figure 1, the darkest areas represent Geographic Designations, white shows Low-Income Population Designations, and gray areas represent parishes that are no longer HPSA-designated.[1]

A Louisiana State Board of Dentistry 2009 report revealed that the state suffers from an unevenly distributed oral health workforce between predominately urban and predominately rural parishes. Not surprisingly, metropolitan areas boast ample numbers of dentists while smaller rural towns have fewer dentists. A February 2015 HRSA National and State-level Projection of Dentist and Dental Hygienists in the U.S., 2012-2025 forecasts a need for 338 more dentists to treat the state's population. This is the 6th highest demand state of the 17 states included in the Southern region.[2]

**Figure 1: Dental-Health Professional Shortage Area Map (2018); Louisiana Department of Health; Office of Public Health; Bureau of Primary Care & Rural Health; Division of Workforce Development**




The major workforce programs instrumental in attracting dental providers to HPSAs have been the Louisiana State Loan Repayment Program (SLRP) and the National Health Services Corp (NHSC). The SLRP currently funds loan repayment to five (5) dentists serving in HPSAs and the NHSC has 16 providers serving in 14 locations. Although combined there are 21 providers serving, it doesn't address the overall need for providers that are willing and trained to work in medically underserved facilities or HPSAs.

The Louisiana Oral Health Coalition produced a 2013-2018 State-Plan-Action Plan, which includes a workforce workgroup, focused on short term goals and objectives.[3] The goal of the workgroup is to support efforts to ensure the preparation of, and the recruitment and retention of, an oral health workforce that is adequate and skilled, so that it may better service the state's population group. Through the Oral Health Workforce Expansion Project funded by the Health Resources and Services Administration (HRSA), the Bureau through partnerships was able to address Oral Health workforce shortages in our state.

In the last five years, LSUHSC School of Dentistry found that nearly 71% of D.D.S. graduates chose to remain in Louisiana to practice general dentistry. However, less than 5% chose to practice in Louisiana HPSA geographic-designated parishes, which are primarily rural. With regard to current LSUSD enrolled D.D.S. students (academic year 2016/17), of the 229 who are from Louisiana, 69% are from parishes that have larger urban cities or towns, i.e., Orleans, Jefferson, East Baton Rouge, Bossier, Ouachita, Lafayette and St. Tammany. Only 7% of current students are from HPSA geographic-designations. For all HPSA geographic- and low-income designations, 31% of the current LSUSD dental students are from these parishes. However, with regard to low-income designations, most of those students are from urban areas.[4]

The Bureau assisted in the development and implementation of the Dental Rural Scholars Track (RST) Program through the collaboration of long-standing partners including the State Oral Health Office, Oral Health Coalition, Louisiana State University School of Medicine and School of Dentistry, Louisiana Primary Care Association, Louisiana Rural Health Association, Medicaid Oral Health, and Area Health Education Centers (AHEC).

The LSUSD RST program was designed to be similar to the LSUHSC School of Medicine (LSUSM) RST program with modifications to fit dental education. Modeled after other states with successful RST programs, the LSUSM rural scholars track program is based on the concept of "rural in, rural out." This approach focuses recruitment efforts on those students from rural areas who express a desire to enter medical school with an emphasis on the practice of primary care and want to return to their hometowns. Curriculum enhancements, tuition exemptions and a concentration of clinical time in rural areas are part of the LSUSM RST program.

During the two-year grant cycle, the LSUSD RST program developed a pilot clinical rotation through RKM Primary Care Clinic in East Feliciana Parish that was established for up to two senior dental students. RKM Primary Care Clinic is a Federally Qualified Health Center (FQHC) in a rural, HPSA. Participant students will also rotate through the LSUSD Interprofessional Education (IPE) Medical and Dental Clinic located on the LSUSD New Orleans campus. Both rotations aim to educate students about the needs of underserved areas and strengthen their skills in working in an interdisciplinary team of healthcare professionals. Long term, the partnership aims to expand clinical rotations across the state in high-need Dental HPSAs in cooperation with Louisiana Area Health Education Centers (AHEC) and eventually enroll up to 12 students in the program (three students in each class). For every year of tuition waiver, participants must agree contractually to practice at least one year in a rural Dental HPSA underserved area. The purpose of the RST is to encourage service in Louisiana's rural and underserved areas. D3 Students interested in practicing dentistry in one of Louisiana's rural areas and reducing educational debt are the target group for the program. In its first implementation year (2017), LSUD select one D3 for participation in the RST. In year 2018 a second D3 was also selected. Funding from the HRSA Oral Health Workforce Expansion grant enabled the LSUD to implement the RST sooner than projected. The LSUD Foundation has identified dedicated funding sources in which interest earned will fund future RST scholarships. In 2017, a $350,000 donation was received from MCNA of Florida. The foundation has a target goal of $1,000,000. The vision is to fund two students for each of the four years of dental school (eight students).

The Dental Recruitment and Placement Program was specifically established to assist with placement of dentists in Dental HPSAs with no cost recruitment assistance. Two recruiters were hired, targeting services to FQHCs, high Medicaid practices in dental HPSAs. Recruiters provided technical assistance to dental providers seeking positions in Dental HPSAs to navigate a difficult placement scenario due to limited expo-

sure of available job opportunities, contract navigation, and overcoming small community biases. Also, to provide technical assistance to dental employers as they expand access or are securing continued access through provider replacement. This is an anticipated occurrence as identified by the Oral Health Coalition as dentists reach retirement. Additionally recruiters assisted practices with retention planning. Partners agreed to promote the service through newsletters, websites, share contact information, social media and job fairs as a way to market this service. As a result of this initiative, three full-time placements were made.

At the end of the grant, the recruitment project was transitioned to the Louisiana Primary Care Association (LPCA) Recruitment and Retention Service for sustainability. All records on candidates, job openings, mailing lists, and recruitment resources were provided to the LPCA recruiter for follow-up. The BPCRH provided LPCA with on-line access to dental candidates and job postings on 3RNet.org.This initiative is poised to expand oral health services as the state faces an aging workforce and Medicaid expansion.

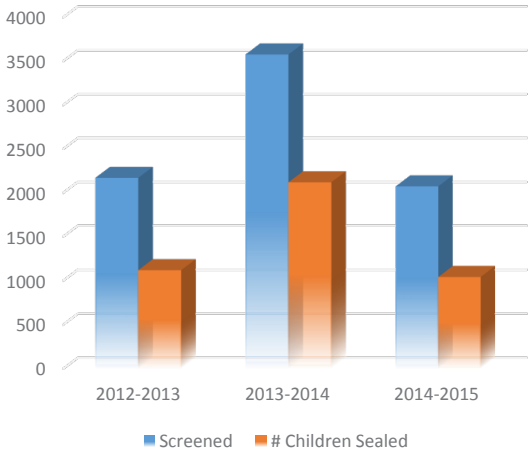
FQHCs are designed to be safety nets within our communities to provide primary care services in underserved areas. Our state's FQHCs have served as our strongest partners and play a major role in targeting the Oral Health professional shortage in Louisiana. Aside from filling gaps in the healthcare workforce, many FQHCs manage School Based Health Centers. These clinics are located in schools and provide age appropriate health care services, which include dental sealants to school-aged children.

***Louisiana Seals Smiles Program***

The Office of Public Health's Well-Ahead Louisiana Oral Health Promotion operates a school-based dental sealant program, Louisiana Seals Smiles, a school-based/linked program that targeted first, second, and sixth grade children in Louisiana. School dental sealant programs, like Louisiana Seals Smiles, have offered an effective approach for children with unmet need. The six-year program provided dental sealants and fluoride varnish to eligible children throughout the state free of charge by meeting the children in their school settings. The program collaborated with several key providers (*The Health Enrichment Network, Health Centers in Schools, University of Louisiana at Monroe, the Louisiana State University School of Dentistry, Primary Care Providers of East Feliciana, and Dental Caravan, Inc.*) in 2014 to serve schools in various parishes of the state. During 2012-2015, 7,824 children were screened and 4,283 received dental sealants in over fifteen parishes.[5]

In 2018, Well-Ahead received a five-year cooperative agreement grant opportunity from the Centers for Disease Control (CDC), State Actions to Improve Oral Health Outcomes. Over the next five years, Louisiana Seals Smiles is collaborating with Federally Qualified Health Centers (FQHCs) to develop, coordinate and implement school sealant programs (SSP) statewide. Recently, four FQHCs have been selected to expand access to dental sealants for underserved children ages 6-14 that attend schools located within a dental HPSA.

**Figure 2.: Number of Children Who Received Preventative Dental Services 2012-2015**
***(Source: Sealant Efficiency Assessment for Locals and States (SEALS) 2012-2015)***




Ninety percent of Louisiana parishes are classified as a dental health professional shortage area (HPSA), which means a lack of dental providers to serve our children who need care the most.[6] FQHCs are designed to meet the needs of underserved populations and provide sustainable primary care for children and families as a medical home, which makes them well positioned to offer a dental home for their patients as well. This collaboration between the health department and FQHCs will expand school sealant enrollment (short-term goal), increase the number of children ages 6-14 receiving sealants on one or more of their permanent molars through school sealant programs (Intermediate goal), while ultimately decreasing dental caries and oral health disparities among children.

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# Oral Health in Oklahoma Rural Communities

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## OVERVIEW

Although Oklahoma ranked number one for being the politest state in America,[1] the state continually struggles with health rankings. With an estimated 2017 population of 3.9 million people, only 58 percent of Oklahoma adults visited a dentist in the past year, putting the state near last at 47th in comparison with other states.[2,3] Oklahoma children are especially vulnerable. The most recent basic screening survey of Oklahoma third grade children (2015-2016) revealed that 66 percent of the students had one or more episodes of caries, over one in five students had active (untreated) decay, and only a quarter of students had a sealant on a permanent molar (back tooth).[4] The state's high percentage of poverty contributes to these numbers, ranking it the 16th poorest in the nation.[5] Oklahoma's Medicaid covers basic dental services for children under 21, but for adults, services are limited to emergency extractions. Although most Oklahoma children are eligible for Medicaid, finding a dental provider can be challenging in rural areas. Geographically, approximately 45 percent of the population resides within the four most populous counties: Oklahoma, Tulsa, Cleveland, and Comanche.[2] The majority, however, live in the other 73 counties, rural communities in which residents generally have less access to dental care; there are seven counties without a general or pediatric dentist.[6] On top of poverty and lack of available resources, Oklahoma ranks 42nd lowest for persons with a bachelor's degree and 44th lowest for persons with an advanced degree.[5] This is problematic, because high rates of poverty and low rates of educational achievement are correlated with higher rates of disease.[2] Further, minority populations in Oklahoma consist of 13 percent American Indian, 10 percent Hispanic, and 9 percent African American. Research has demonstrated that low income, minority and rural children disproportionally suffer from dental health problems.[5,8]

## PUBLIC HEALTH INTERVENTIONS

### *Community Water Fluoridation*

Community water fluoridation is the single most effective public health intervention to prevent tooth decay, reducing decay by more than 25% across the lifespan.[4] In Oklahoma, approximately 70 percent of the population receives fluoridated water in comparison to 75 percent of the U. S. population.[6] There is no state mandate to fluoridate nor are there rules requiring notification if a community ceases the practice. The most populous cities of Oklahoma City and Tulsa fluoridate, which encompasses almost half of Oklahomans on public water supplies. There are many challenges for the continuation of water fluoridation: maintenance costs, infrastructure costs, poor economy, and lack of perceived value by city officials and the public. In rural areas it is more difficult to identify a local champion resulting in a town quitting with no notice to or input from health advocates. Education and advocacy for community water fluoridation is encouraged through distribution of materials from the American Dental Association, the Campaign for Dental Health, and the Centers for Disease and Control and Prevention. In Oklahoma, dental and medical professionals, health organizations, coalitions, health departments, academic institutions, and public health advocates are united in supporting community water fluoridation.

### *Surveillance and Oral Health Education*

The Oklahoma Nursing Home Oral Care Project began in 2018 to assess the oral health needs of older adult nursing home residents in rural and metropolitan areas. The project is ongoing, with a goal to visit 40 nursing homes across the state. A dental hygienist is providing oral health lessons to the nursing home staff, followed by pre and posttests. The hygienist leaves the residents with a tool kit designed to assist with retention of the knowledge and skill sets gained through the education session. The objective is to improve the dental health of residents. This project is supported with Civil Monetary Penalty (CMP) funds and administered by the Long Term Care Service of the Oklahoma State Department of Health.

The Oklahoma Oral Health Needs Assessment of third grade children was last conducted in 2016. This survey, conducted in 36 schools, collected prevalence data on untreated dental decay, total caries episodes, sealants on molar teeth, and missing teeth. Dental hygienists conducted the basic screening survey and provided dental health education to the students. The study design allowed for comparisons of different regions of the state. With very few exceptions of some indicators, the rural quadrants ranked lower in oral health indicators than Tulsa and Oklahoma counties. Although this survey reports on areas of the state that have poorer oral health, the fact is, the entire state needs to improve. The survey also revealed that all areas failed to reach the total caries episode goal set by Healthy People (HP) 2020. The HP2020 Goal is 49%, while the OK2016 data reported 66%. This survey is administered by the state's oral health program at the Oklahoma State Department of Health.

## WORKFORCE AND ACCESS TO CARE

The leveraging of resources and opportunities have been supported by dedicated partners on the local, state, tribal, regional and national levels. Unfortunately, the resources fall short in meeting the dental access needs of Oklahomans especially in rural areas.

***Delta Dental of Oklahoma Foundation***
(www.ddokfoundation.org)
The Delta Dental of Oklahoma Foundation publishes *Resource for Dental Care, A guide to Free and Low-Cost Dental Care* which is posted online on their website. Dental providers include nonprofit low-cost clinics, charitable clinics, programs for the elderly and disabled, student clinics, and federally qualified health centers. There are brief descriptions of each program, eligibility requirements, services provided and contact information. The guide lists resources by regions of the state and is updated quarterly.

During the 2016-2017 school year, The Delta Dental of Oklahoma Foundation conducted the Cavity Prevention Clinic, a school-based cavity prevention pilot program. The goal was to serve 1,000 second grade and sixth grade students by placing sealants on their permanent molars, as applicable, and applying fluoride varnish on all students. In addition, the students received oral health instructions. The Clinic intends to serve rural and metropolitan schools where 80-100 percent of the children receive free or reduced lunches. For the 2016-2017 pilot, thirty schools were visited, and 898 unique students were served.

***MobileSmiles Oklahoma***
(www.mobilesmilesok.com)
MobileSmiles Oklahoma is a nonprofit dental care program dedicated to building partnerships to improve and advance oral healthcare in Oklahoma. MobileSmiles utilizes volunteer dental professionals and two RV-style mobile dental units to travel across the entire state of Oklahoma delivering free dental care and education. The MobileSmiles program was created to address the overwhelming need in the rural areas of the state. In 2017, MobileSmiles provided dental treatment to 2,114 patients valued at $537,607 during 196 mobile unit treatment days for the year.

***Dental and Dental Hygiene Schools***
The University of Oklahoma Health Sciences Center located in Oklahoma City, has a dental school and a hygiene school. The OU Hygiene School also has satellite campuses in the rural communities of Bartlesville, Ardmore, and Weatherford. Patients in the student clinics receive low-cost quality care in an educational environment. The fees are approximately one-third the cost of a private dental practice visit.[9] In addition, Tulsa Community College and Rose State College (in Midwest City) have Dental Hygiene programs which offer preventive services to children and adults at reduced fees.[10,11]

***Oklahoma Mission of Mercy***
(www.okmom.org)
The Oklahoma Mission of Mercy (OKMOM) is an annual, two-day, free dental clinic which began in 2010. It is sponsored by the Oklahoma Dental Association, the Oklahoma Dental Foundation and the Delta Dental of Oklahoma Foundation, and is endorsed by the Oklahoma State Department of Health. It is designed to meet the oral needs of dental patients of all ages by providing treatment to as many people as dentists, supplies and time allows, Services include cleanings, restorations, extractions and limited anterior root canals, crowns and dental lab cases. Other services include immunizations and health education. No income or eligibility requirements or identification are required. The OKMOM is committed to the challenges of rural dental health, half the annual events are in smaller communities, while in other years the event alternates between the metropolitan areas of Oklahoma City and Tulsa. Rural areas have fewer dentists and the issue is compounded with many who will not accept Medicaid patients. Consequently, many Oklahomans struggle with access to dental care. Since the first OKMOM in 2010 through last year's event in 2018, OKMOM has provided 83,337 dental services, received donation of $822.52 on average dental care per patient, 1,606 patients treated on an average each year and approximately 11.4 million dollars in donated dental services.

***Indian Health Service Loan Repayment Program***
(www.ihs.gov/loanrepayment)
The LRP funds Indian Health Service (IHS) clinicians to repay their eligible health profession education loans, up to $40,000, in exchange for an initial two-year service commitment to practice in health facilities serving American Indian and Alaska Native communities. Opportunities are based on Indian health program facilities with the greatest staffing needs in specific health profession disciplines. Loan repayment program (LRP) participants are eligible to extend their contracts annually until the qualified student debt is paid. The Supplemental Loan Repayment Program (SLRP) is an additional innovative loan repayment vehicle available through IHS and is designed to attract health professionals to facilities that otherwise wouldn't be able to offer loan repayment as an incentive. This program is supported by specific area offices and individual facilities and aids in the recruitment and retention of valuable health professionals across several disciplines. Contact the IHS LRP branch office at (301) 443-3396 for more information about LRP opportunities.

***Oklahoma Dental Loan Repayment Program***
(www.ok.gov/health/Family_Health/Dental_Health_Service/index.html)
The Oklahoma Dental Loan Repayment Program Act was created to make dental care accessible to underserved metropolitan and rural areas by providing educational loan repayment assistance to qualified dentists. The program is state funded, and the participating dentists generally receive $25,000 per year. Depending on funding, up to 25 dentists may participate in the Oklahoma Dental Loan Repayment Program (ODLRP) each year. All dentists agree to a one-year service obligation with the option to renew for up to five years. Ideally, the program will support three dentists working as faculty at the University of Oklahoma College of Dentistry (OUCOD). Other dentists will practice in designated shortage areas seeing a minimum of 30% Medicaid clients. A major goal of the ODLRP is to increase access to dental care for those dependent on Medicaid. ODLRP recipients serve predominantly low-income children (Medicaid) because services reimbursed by Medicare are limited to emergency extractions for adults in Oklahoma. A second goal of the ODLRP is to improve dental student education by enhancing faculty recruitment at the OUCOD. Oklahoma is predominantly a rural state and geographic diversity is considered when candidates are selected for the ODLRP. Each year, dental students receive information from state health depart-

ment staff about the ODLRP. Additionally, dentists from rural areas lecture about the benefits of practicing in a smaller town as part of the Oklahoma Dental Association rural initiative. The ODLRP is enhanced through partnerships with the OUCOD, the OK Dental Association, the OK Oral Health Coalition, the OK Health Care Authority, and the OK Board of Dentistry.

***National Health Service Corps Loan Repayment Program*** (www.nhsc.hrsa.gov/loan-repayment/index.html)

The National Health Service Corps Loan Repayment Program (NHSC) is administered by the Health Resources and Services Administration (HRSA) of the U.S. Department of Health and Human Services (HHS). The NHSC LRP seeks dentists and dental hygienists, along with other primary care providers, who provide culturally competent, interdisciplinary primary health care services to underserved populations located in designated health professional shortage areas (HPSAs) identified by the Secretary of HHS. HPSAs can be found in rural and urban communities across the nation. If awarded, the NHSC LRP assists clinicians in their repayment of outstanding qualifying education loans. By statute, NHSC Loan Repayment funds are exempt from federal income and employment taxes. These funds are not included as wages when determining benefits under the Social Security Act.

## CONCLUSION

The Oklahoma dental community is committed to improving the oral health of all Oklahomans. Rural areas have unique healthcare needs that are recognized and addressed by local, state and national efforts. Ecological and economic factors impact health, and these issues must be considered in order to improve the oral health and overall health of Oklahomans.

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