ORAL HEALTH IN TEXAS

THE NEED FOR A VALUE-BASED, SYSTEMS APPROACH TO IMPROVE ORAL HEALTH

A Ten-Year Analysis of Inpatient Hospitalization Trends for Non-Traumatic Dental Conditions in Texas

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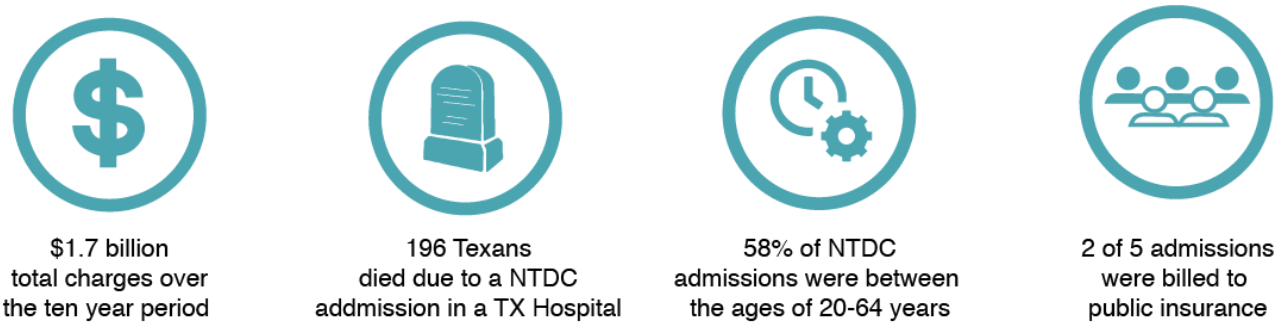
Executive Summary

The healthcare costs continue to rise supporting the need to pursue a systems thinking approach to change the way we perceive and address our health needs. Concurrently, we are experiencing a shift towards a value-based approach. The treatment of dental conditions in a hospital setting is an expensive method of treatment for the patient, the healthcare system, and taxpayers. Some dental conditions are so severe that they cannot be treated with a prescription medication in an emergency department. Therefore, admission to the hospital is required to address the impeding medical emergency. Building upon and strengthening the evidence presented in its earlier report, Texas Health Institute analyzed trends in hospital utilization for treatment of Non-Traumatic Dental Conditions (NTDCs) in Texas over a ten-year period (2007-2016). Through this report, we seek to improve the understanding of the etiology and patterns of hospital utilization for the treatment of NTDCs.



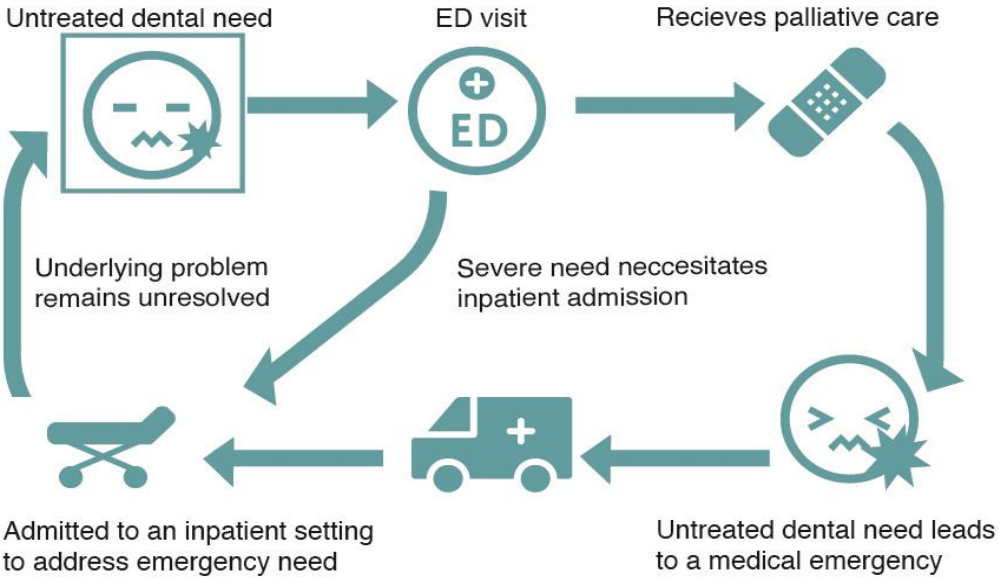
Over the ten-year period (2007-2016) 47,926 NTDC inpatient admissions were identified. Of these, 58% were working-age adults between 20 – 64 years of age. Total charges over the ten year period were calculated at $1.7 billion, with an average charge of $37,022 per admission. Average charge per admission increased by 61% from $28,625 per admission in 2007 to $46,126 per admission in 2016. Of the total, 16.2% of patients were Medicaid beneficiaries, 22% were Medicare beneficiaries, and 19.7% of patients were charity/self-pay. During the ten year period, 196 patients died in an inpatient hospital setting with a primary diagnosis of NTDCs, of which 55 were between 20-64 years of age.

Exploration of inpatient hospital utilization trends for the treatment of NTDCs will allow health care administrators and policy makers to determine the appropriateness of such visits. Further study will also allow for the design of data-driven policies to help systematically move the needle and advance value-based approaches to improve oral health and overall health.

Introduction

If left untreated, some dental conditions become so severe that they become a medical emergency and require admission in an inpatient setting to be treated.[1] In most cases, treatment in a hospital setting does not address the complete underlying dental need.[2] Hospitals are not equipped with the treatment-specific dental equipment or dental materials necessary to provide dental treatment.[3] As a result, the treatment available for Non-Traumatic Dental Conditions (NTDC) in a hospital setting may be limited, only offering an acute intervention to treat a specific dental infection or may be only palliative in nature.[4]

To understand this emergent situation, Texas Health Institute (THI) analyzed ten years of inpatient hospital utilization trends for NTDCs from 2007-2016. Understanding the etiology and the patterns of hospital setting utilization for the treatment of NTDCs is essential to private and state sponsored health program administrators, oral health advocates, researchers, funders, and policymakers to understand how services are accessed and delivered as well as to identify opportunities for systems change. The treatment of dental conditions in hospital settings is increasing.[1] By analyzing these trends, targeted approaches to prevent hospital visits for NTDCs can be developed, thereby slowing the upsurge of health care costs and reducing the number of inpatient admissions for NTDCs. The objective of this report is to analyze key trends in inpatient hospital utilization for NTDCs, including but not limited to utilization rates, primary diagnoses, total charges, and demographic characteristics.



Background:

In 2016, the Texas State Data Center projected the state's population to be at 28,240,245.[5] According to the Kaiser Family Foundation, in 2016, Texas had the highest uninsured rate in the country at 17%. 18% of the state's population had health insurance coverage through Medicaid or CHIP, and 10% of the population had health insurance coverage through Medicare.[6] During the study period, there were no comprehensive dental benefits for adults, elderly, or disabled populations in the Texas Medicaid program, only specific pre-defined emergency care for dental treatment was covered. As of 2016, Texas had 407 hospital systems serving 254 counties.[7] Costs incurred for NTDCs, when treated in an inpatient hospital setting, are paid for by private insurance, public insurance programs, self-paid, or remain unpaid as charity care.

The World Health Organization identifies oral diseases as one of the most common non-communicable diseases (NCDs) globally.[8] Untreated dental disease can have adverse effects throughout a person's lifetime, causing pain and discomfort, and in some cases even death, yet most oral diseases are preventable.[9,10] Like many other chronic diseases, when the causative factors of the disease are not managed the disease progression continues. Untreated dental infections either on the tooth or gums have a systemic impact and negatively affect overall health.[9] As the infection progresses, more aggressive treatment is required. Dental infections are a common and potentially life-threatening condition.[10] Periodontal disease is a chronic inflammatory disease that affects the gum tissue and bone supporting the teeth.[11] Dental caries, more commonly known as cavities or tooth decay, are caused by a breakdown of the tooth enamel.[9] A dental infection typically occurs when bacteria invade the dental nerve and spread to tissues surrounding the tooth.[9] Over half (54.1%) of Texas adults between the ages 45-64 years have had tooth loss due to dental caries or periodontal disease.[12] It is also estimated that over 13% of Texas adults age 65 and older are edentulous, no longer having any of their natural teeth.[12] Children in Texas experience tooth decay and dental problems at high rates: two-thirds (66.8%) of third graders in the state have had dental caries.[13]

54.1% of Texas adults have experienced tooth loss due to dental disease.

66.8% of children in Texas experience tooth decay

Methods:

We used the quarterly datasets from Texas Hospital Inpatient Discharge Public Use Data Files (PUDF) from The Texas Health Care Information Council (THCIC) from 2007 to 2016.[7] PUDF includes patients' demographics, diagnostic and geographic information. This analysis included only patients from Texas.[7] Characteristics included in this analysis were age, gender, race/ethnicity, primary diagnosis, primary payer type, total charges per admission, and patient's county of residence. Age groups were reorganized into 0-19, 20-44, 45-64, 65-74, and 75+ years of age. Primary payers were categorized into Charity, Medicaid, Medicare, Private, and Other payers.

This report utilizes the recommended Association of State and Territorial Dental Directors (ASTDD) primary diagnostic code list of NTDCs.[14] In addition, those patients admitted to the hospital with a principal diagnosis of cellulitis of the face or neck (6820, 6821, L03211-L03212, L03221-L03222) secondary to NTDCs were also included.[14] Additionally, 'As Present on Admission' (POA) for principal diagnosis was not available for all years of the study period, hence all diagnosis per the aforementioned criteria were included in our analysis.

ASTDD directives were used for a crosswalk between ICD 9-CM and ICD 10-CM codes.[14] Total charges were adjusted for inflation using the consumer price index (CPI) inflation calculator developed by the Bureau of Labor Statistics.[15] Rates, age, and race-specific rates were calculated using population estimates available through Texas Demographic Center.[5] Descriptive statistics and crude rates per 100,000 populations were calculated using SAS 9.4.

For payer type classification, per the Texas Department of State Health Services uncompensated care was defined as "an overall measure of hospital care provided for which no payment was received from the patient or insurer. These payment shortages fall into two different categories. Charity care is unreimbursed costs to hospitals for services provided to low income patients for free or at reduced prices; hospitals assume minimal payment on behalf of the patient. Bad debt is defined as uncollectible inpatient and outpatient charges that result from the extension of credit to the patient after the facility expected payment for the care. There is no absolute standard for what bad debt and charity charges are because each hospital has their own methods and standards to categorize whether or not a patient is medically or financially indigent. Thus, what is charity at one facility may be bad debt at another."[16]

'Other' payer type include insurances which cannot be included in the payer types as mentioned above and contains insurances such as Central Certification, Title V, Veteran Administration Plan, and other non-federal programs etc.

Results:

Over the ten year period, 47,926 NTDC inpatient admissions were identified. These admissions resulted in charges exceeding $1.7 billion over the ten year period (Figure 1). The hospital charges for each admission averaged over $37,022. However, this figure does not represent the total burden to the families or to the state, as most patients (58%) were working-age adults between 20-64 years of age. There is also an economic cost to society due to the lost tax revenue as a result of missed work days. This data indicated that women are disproportionately affected and are 16.5% more likely to be admitted into the hospital for an NTDC than their male counterpart. Also, families often experience secondary effects from having a hospitalized family member, such as the emotional burden and non-health effects such as a disruption of caregiving which are difficult to calculate.[17] The highest inpatient admission rates per county were highest amongst the rural counties in the state (Figure 2).

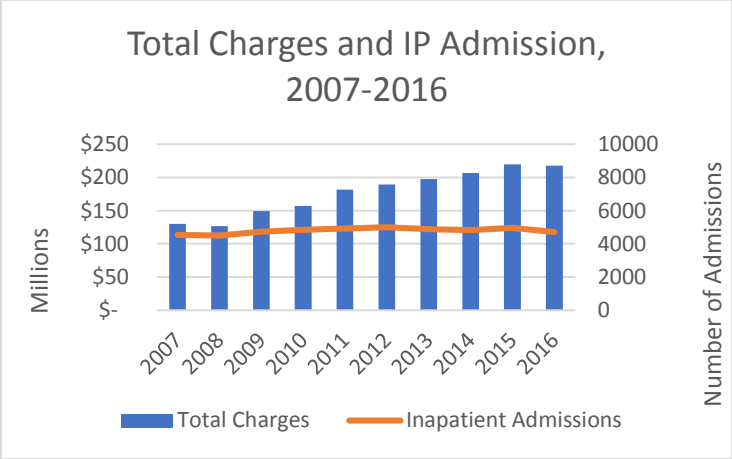


Figure 1: Total Charges and Inpatient Admissions (2007-2016)

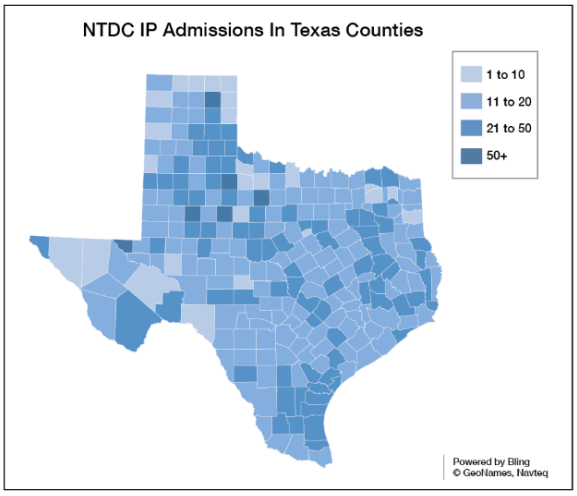


Figure 2 Rate of NTDC IP Admissions for Texas Counties (2007-2016)

Socio-Demographics

Age

Of the total, 58% admissions were from the 20-64 years age groups, indicating the burden being most concentrated on working age Texans (Figure 3). It is important to note that during the ten period, dental services for adults were not covered through the Texas Medicaid program. Rate of admissions per 100,000 population increased as patient's age increased (Figure 4).

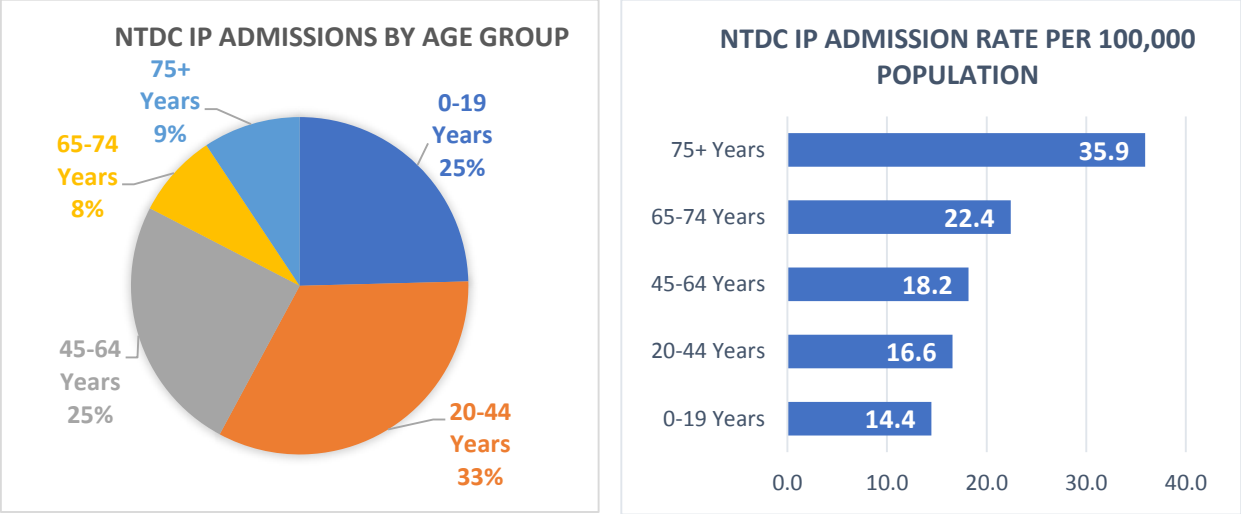


Figure 3: NTDC IP Admissions by Age Group and NTDC IP Admissions Rate by Age Group per 100, 000 Population (2007-2016)

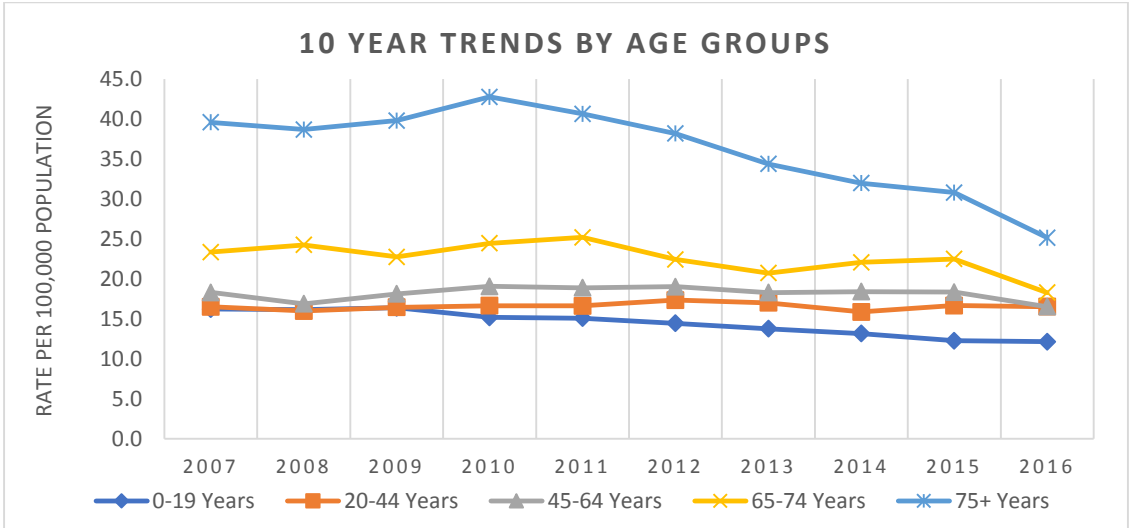


Figure 4: Ten-year trends by age groups (2007-2016)

Race and Ethnicity

As an indication of the systemic impact of the problem, 52% of all admissions in the ten year period were for patients with non-Hispanic white racial and ethnic background. However, NTDC admissions rates were found to be highest in NH-Others race and ethnic population at 22.9 per 100,000 population (Figure 5). Apart from an unclear spike in 2012 for the rates for NH-Others population subgroup, the rates for all other groups remained consistent throughout the ten year period (Figure 6).

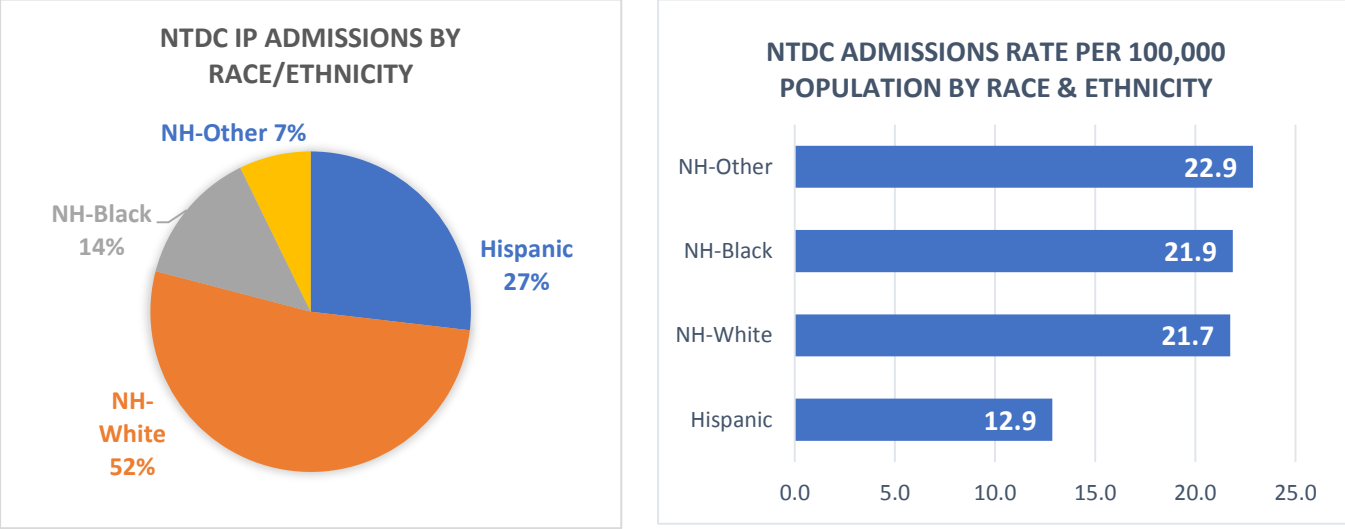


Figure 5: NTDC IP Admissions by Race and Ethnicity and NTDC IP Admissions Rate by Race and Ethnicity per 100,000 Population (2007-2016)

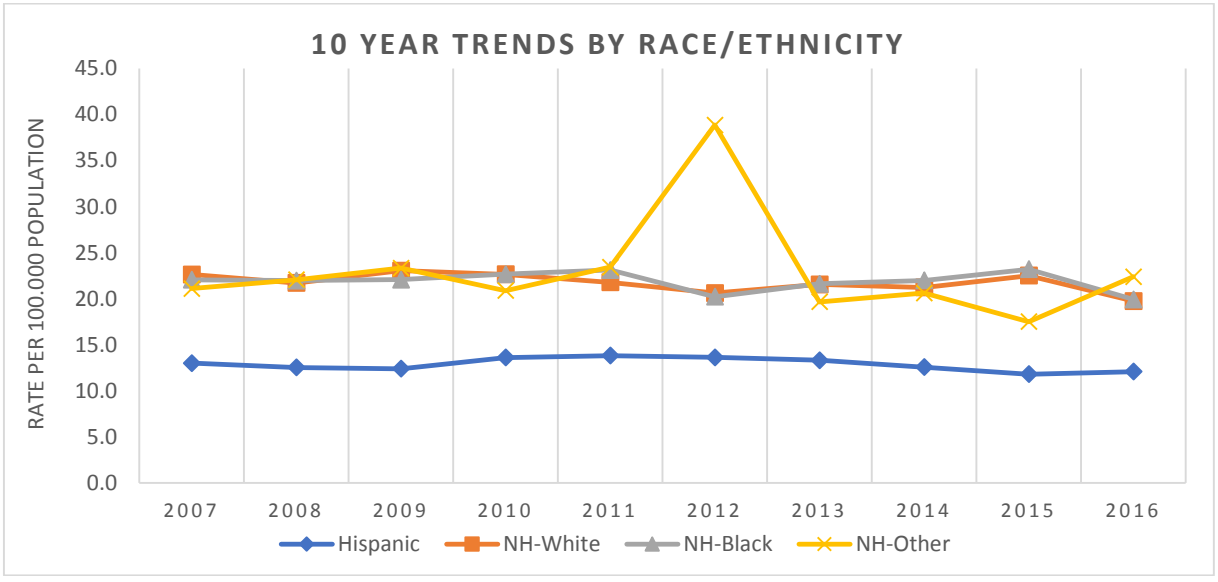


Figure 6: Ten-year trends by Race and Ethnicity (2007-2016)

Diagnosis

For most payer types, cellulitis of the face with secondary NTDC diagnosis (19%) was found to be the most common diagnosis followed by periapical abscess without sinus involvement (14%). However, in Medicare patients, Sailadenitis was the most common diagnosis (22%). The highest percentage of admissions for cellulitis of the face with secondary NTDC was from the charity care category (28%) followed by Medicaid (20%). Also, Medicare (7%) and charity care (5%) had inflammatory conditions of the jaw as one of their top five diagnosis (Figure 7).

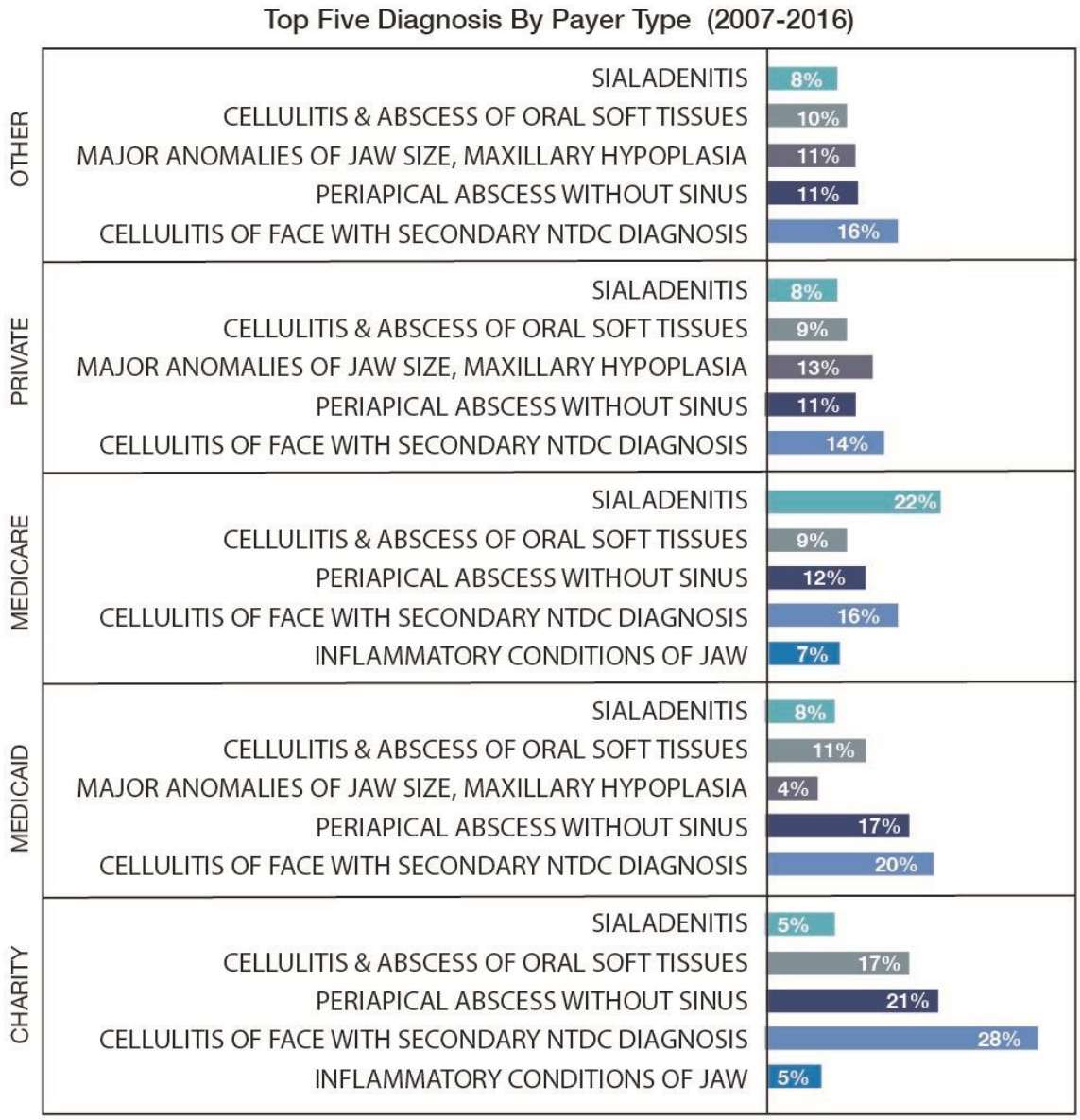


Figure 7: Top Five Diagnosis by Payer Type (2007-2016)

Payers

Public insurances covered approximately 2 out of 5 admissions over the ten year period. Medicaid covered 16.2% and Medicare covered 21.8% of inpatient admissions for NTDCs. Private insurance was the highest payer source and covered 29.1% of admissions whereas charity care covered 19.7% of inpatient admissions (Figure 8). No significant variations were identified between the percentage of admissions by payer type and percentage of payer contribution as part of total charges (Figure 8, 9).

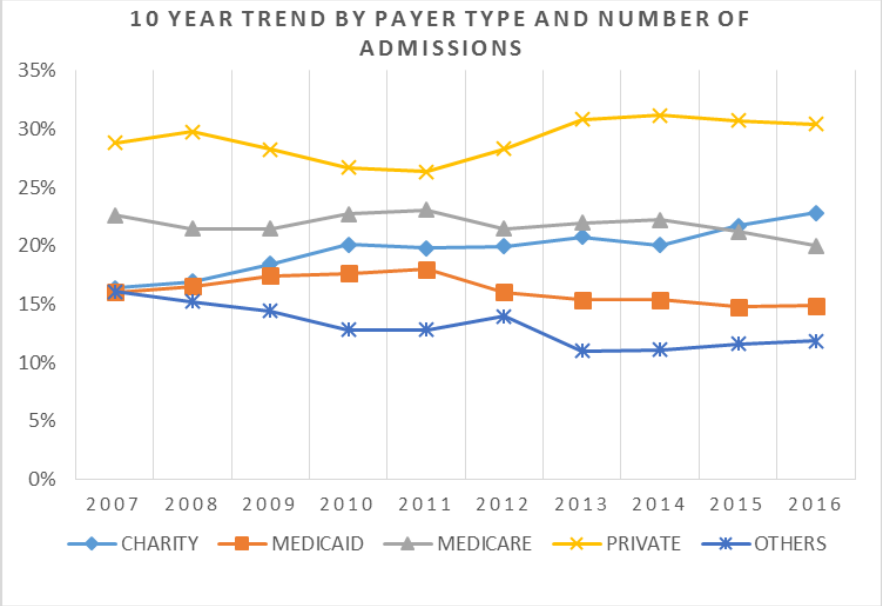


Figure 8: Ten-year Trend by Payer Type (2007-2016)

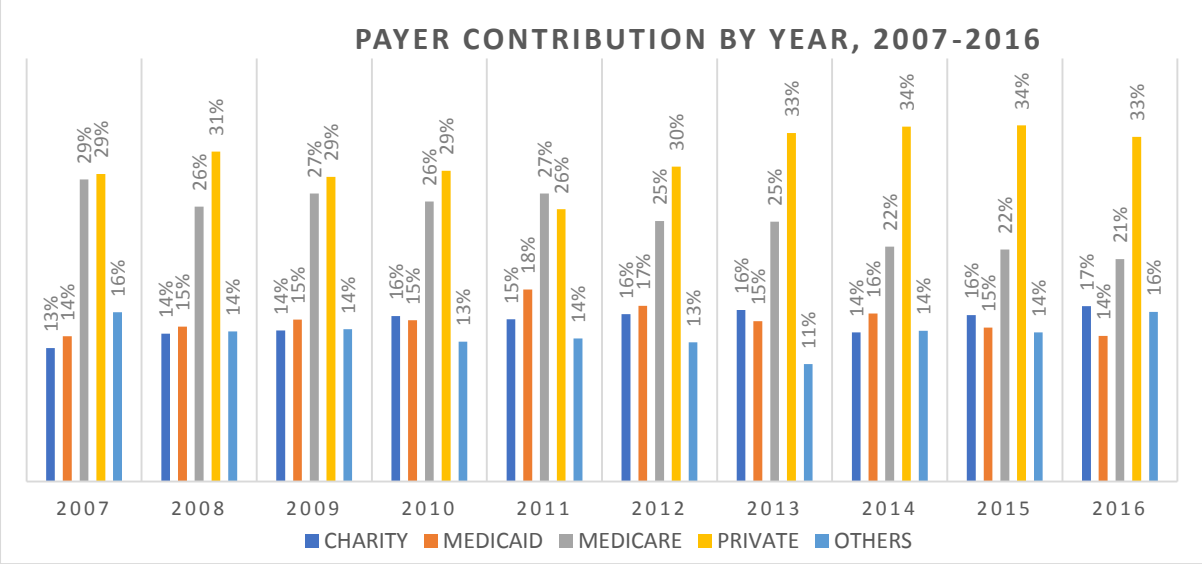


Figure 9: Payer Contribution by Year (2007-2016)

However, it is important to note, even though the percentage of Medicaid beneficiaries with an inpatient admission for NTDCs remained fairly consistent (15%), its actual contribution per year increased from approximately $18 million in 2007 to $30 million in 2016. Similarly, the annual Medicare contribution increased from approximately $37 million in 2007 to $45 million in 2016. Also, both Medicaid and Medicare made their highest contribution in 2011 at $33 million and $49 million respectively (*Figure 10*).

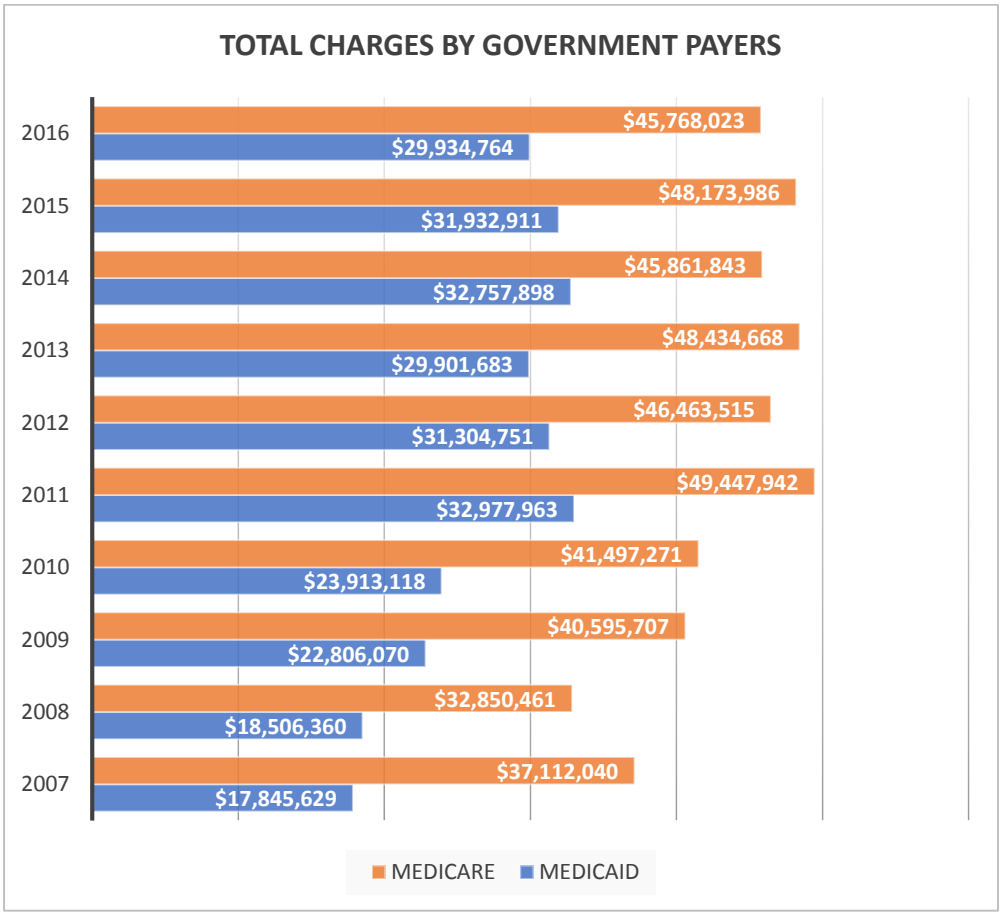


Figure 10: Total Charges by Government Payers (2007-216)

Conclusion:

Public insurance and uninsured Texans make up a majority of the burden of inpatient admissions for NTDC's. An upstream, proactive approach to oral health is needed to prevent dental conditions from becoming so severe that an expensive visit to the emergency department or inpatient admission to a hospital is required. The direct costs (i.e., the money spent on the treatment of NTDC in a hospital setting) and indirect costs (i.e., the number of lost days of productivity at work and school) of inpatient hospitalization for NTDCs place a considerable burden on society. Improving access to preventive care for high-risk populations will lead to a more productive Texas workforce, lower healthcare expenses, and improved quality of life.

The evidence presented in this report will serve as a unique resource to help systematically move the needle and advance value-based approaches that improve oral health and overall health. These include, but are not limited to a proactive approach to health including upstream thinking, prevention, early intervention, adoption of outcome-based models, and focus on the causative factors associated with health disparities.

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References

1. Robertson Douglas P, Keys William, Rautemaa-Richardson Riina, Burns Ronnie, Smith Andrew J. *Management of severe acute dental infections.* BMJ 2015; 350 :h1300
2. Figueiredo, R., Dempster, L., Quiñonez, C., & Hwang, S. W. (2016). *Emergency Department Use for Dental Problems among Homeless Individuals: A Population-Based Cohort Study*. Journal of health care for the poor and underserved, 27(2), 860–868. Doi:10.1353/hpu.2016.0081
3. Verma, S. and Chambers, I. (2014), *Dental emergencies presenting to a general hospital emergency department in Hobart, Australia*. Aust Dent J, 59: 329-333. doi:10.1111/adj.12202
4. Fish-Parcham, Cheryl. Treating Pain Is Not Enough: Why States' Emergency-Only Dental Benefits Fall Short. Families USA, 12 July 2018, familiesusa.org/product/treating-pain-not-enough-why-states-emergency-only-dental-benefits-fall-short.
5. Texas Department of State Health Services. "Texas Population, 2016 Projections." Texas Department of State Health Services, www.dshs.texas.gov/chs/popdat/ST2016p.shtm.
6. Henry J. Keiser Family Foundation. (n.d.). *Health Insurance Coverage of the Total Population.* Retrieved from https://www.kff.org/state-category/health-coverage-uninsured/health-insurance-status
7. Texas Hospital Inpatient Discharge Public Use Data File, 1st-4th quarters, 2007-2016. Texas Department of State Health Services, Austin, Texas. April 2019
8. World Health Organization. (n.d.). Oral health. Retrieved from https://www.who.int/news-room/fact-sheets/detail/oral-health
9. Centers for Disease Control and Prevention. (n.d.). Hygiene-related Diseases | Hygiene-related Diseases | Hygiene | Healthy Water | CDC. Retrieved from https://www.cdc.gov/healthywater/hygiene/disease/dental_caries.html
10. Robertson D. P, Keys W, Rautemaa-R.R., Burns R., Smith A., *Management of severe acute dental infections*. BMJ 2015; 350 :h1300
11. American Academy of Periodontology. (2012, September 04). Retrieved from https://www.perio.org/consumer/cdc-study.htm
12. Texas Behavioral Risk Factor Surveillance System (BRFSS). (2016). Texas Department of State Health Services, Austin, TX. Retrieved from https://www.dshs.texas.gov/chs/brfss/

13. Texas Third Grade Oral Health Basic Screening Survey (BSS) Results. (2012-2013). Texas Department of State Health Services, Austin, TX.
14. Manz, M. C. (2017, September). *Recommended Guidelines for Surveillance of Non-Traumatic Dental Care in Emergency Departments*. Retrieved February 6, 2019, from Association of State & Territorial Dental Directors, Data Collection, Assessment and Surveillance Committee website: https://www.astdd.org/docs/ed-dental-care-protocols-w-appendices-july-6-2017.pdf
15. U.S. Bureau of Labor Statistics. CPI Inflation Calculator, Washington, DC; 2019. Available from: http://www.bls.gov/data/inflation_calculator.htm
16. *Texas Hospital Uncompensated Care Report. Texas Health and Human Services Commission*. 2018, Texas Hospital Uncompensated Care Report, hhs.texas.gov/sites/default/files/documents/laws-regulations/reports-presentations/2018/rider-10-hospital-uncompensated-care-report-dec-2018.pdf. (Revised January 16, 2019)
17. Wittenberg, E., Saada, A., & Prosser, L. A. (2013). *How illness affects family members: a qualitative interview survey*. The patient, 6(4), 257–268. doi:10.1007/s40271-013-0030-3