Service Category Definition - Ryan White Part B Grant
April 1, 2018 - March 31, 2019

Local Service Category:	**Oral Health Care**
Amount Available:	**To be determined**
Unit Cost**:**	
Budget Requirements or Restrictions **(TRG Only)**:	Maximum of 10% of budget for Administrative Costs
Local Service Category Definition:	Restorative dental services, oral surgery, root canal therapy, fixed and removable prosthodontics; periodontal services includes subgingival scaling, gingival curettage, osseous surgery, gingivectomy, provisional splinting, laser procedures and maintenance. Oral medication (including pain control) for HIV patients 15 years old or older must be based on a comprehensive individual treatment plan. Prosthodontics services to people living with HIV including but not limited to examinations and diagnosis of need for dentures, crowns, bridgework and implants, diagnostic measurements, laboratory services, tooth extraction, relines and denture repairs. Emergency procedures will be treated on a walk-in basis as availability and funding allows. Funded Oral Health Care providers are permitted to provide necessary emergency care regardless of a client's annual benefit balance. If a provider cannot provide adequate services for emergency care, the patient should be referred to a hospital emergency room.
Target Population (age, gender, geographic, race, ethnicity, etc.):	People living with HIV residing in the Houston HIV Service Delivery Area (HSDA).

Services to be Provided:	Services must include, but are not limited to: individual comprehensive treatment plan; diagnosis and treatment of HIV-related oral pathology, including oral Kaposi's Sarcoma, CMV ulceration, hairy leukoplakia, xerostomia, lichen planus, aphthous ulcers and herpetic lesions; diffuse infiltrative lymphocytosis; standard preventive procedures, including oral hygiene instruction, diet counseling and home care program; oral prophylaxis; restorative care; oral surgery including dental implants; root canal therapy; fixed and removable prosthodontics including crowns and bridges; periodontal services, including subgingival scaling, gingival curettage, osseous surgery, gingivectomy, provisional splinting, laser procedures and maintenance. Proposer must have mechanism in place to provide oral pain medication as prescribed for clients by the dentist.
	
	Limitations:
	• Cosmetic dentistry for cosmetic purposes only is prohibited.
	• Maximum amount that may be funded by Ryan White/State Services per patient is $3,000/year.
	  • In cases of emergency, the maximum amount may exceed the above cap
	  • In cases where there is extensive care needed once the procedure has begun, the maximum amount may exceed the above cap.
	• Dental providers must document *via approved waiver* the reason for exceeding the yearly maximum amount.

Service Unit Definition(s) **(TRG Only)**:	General Dentistry: A unit of service is defined as one (1) dental visit which includes restorative dental services, oral surgery, root canal therapy, fixed and removable prosthodontics; periodontal services includes subgingival scaling, gingival curettage, osseous surgery, gingivectomy, provisional splinting, laser procedures and maintenance. Oral medication

	(including pain control) for HIV patients 15 years old or older must be based on a comprehensive individual treatment plan. Prosthodontics: A unit of services is defined as one (1) Prosthodontics visit.
Financial Eligibility:	Income at or below 300% Federal Poverty Guidelines. Maximum amount that may be funded by Ryan White/State Services per patient is $3,000/year.
Client Eligibility:	Person living with HIV; Adult resident of Houston HSDA
Agency Requirements **(TRG Only)**:	**To ensure that Ryan White is payer of last resort, Agency and/or dental providers (clinicians) must be Medicaid certified and enrolled in all Dental Plans offered to Texas STAR+PLUS eligible clients in the Houston EMA/HSDA**. Agency/providers must ensure Medicaid certification and billing capability for STAR+PLUS eligible patients remains current throughout the contract term. Agency must document that the primary patient care dentist has 2 years prior experience treating HIV disease and/or on-going HIV educational programs that are documented in personnel files and updated regularly. Dental facility and appropriate dental staff must maintain Texas licensure/certification and follow all applicable OSHA requirements for patient management and laboratory protocol.
Staff Requirements:	State of Texas dental license; licensed dental hygienist and state radiology certification for dental assistants.
Special Requirements **(TRG Only)**:	Must comply with the Houston EMA/HSDA Standards of Care. The agency must comply with **the DSHS Oral Health Care Standards of Care**. The agency must have policies and procedures in place that comply with the standards ***prior*** to delivery of the service.

FY 2019 RWPC "How to Best Meet the Need" Decision Process

Step in Process: **Council**		Date: **06/14/18**
Recommendations:	Approved: Y_____ No: _____ Approved With Changes:_____	If approved with changes list changes below:
1.		
2.		
3.		

Step in Process: **Steering Committee**		Date: **06/07/18**
Recommendations:	Approved: Y_____ No: _____ Approved With Changes:_____	If approved with changes list changes below:
1.		
2.		
3.		

Step in Process: **Quality Improvement Committee**		Date: **05/15/18**
Recommendations:	Approved: Y_____ No: _____ Approved With Changes:_____	If approved with changes list changes below:
1.		
2.		
3.		

Step in Process: **HTBMN Workgroup**	Date: **04/24/18**
Recommendations:	Financial Eligibility:
1.	
2.	
3.	

FY 2018 Houston EMA/HSDA Ryan White Part A/MAI Service Definition **Oral Health/Rural** (Last Review/Approval Date: 6/3/16)	
HRSA Service Category Title: **RWGA Only**	**Oral Health**
Local Service Category Title:	**Oral Health – <u>Rural (North)</u>**
Budget Type: **RWGA Only**	**Unit Cost**
Budget Requirements or Restrictions: **RWGA Only**	Not Applicable
HRSA Service Category Definition: **RWGA Only**	**Oral health care** includes diagnostic, preventive, and therapeutic services provided by general dental practitioners, dental specialists, dental hygienists and auxiliaries, and other trained primary care providers.
Local Service Category Definition:	Restorative dental services, oral surgery, root canal therapy, fixed and removable prosthodontics; periodontal services includes subgingival scaling, gingival curettage, osseous surgery, gingivectomy, provisional splinting, laser procedures and maintenance. Oral medication (including pain control) for HIV patients 15 years old or older must be based on a comprehensive individual treatment plan. Prosthodontics services to HIV-infected individuals including, but not limited to examinations and diagnosis of need for dentures, diagnostic measurements, laboratory services, tooth extractions, relines and denture repairs.
Target Population (age, gender, geographic, race, ethnicity, etc.):	HIV/AIDS infected individuals residing in Houston Eligible Metropolitan Area (EMA) or Health Service Delivery Area (HSDA) counties other than Harris County. Comprehensive Oral Health services targeted to individuals residing in the northern counties of the EMA/HSDA, including Waller, Walker, Montgomery, Austin, Chambers and Liberty Counties.
Services to be Provided:	Services must include, but are not limited to: individual comprehensive treatment plan; diagnosis and treatment of HIV-related oral pathology, including oral Kaposi's Sarcoma, CMV ulceration, hairy leukoplakia, xerostomia, lichen planus, aphthous ulcers and herpetic lesions; diffuse infiltrative lymphocytosis; standard preventive procedures, including oral hygiene instruction, diet counseling and home care program; oral prophylaxis; restorative care; oral surgery including dental implants; root canal therapy; fixed and removable prosthodontics including crowns, bridges and implants; periodontal services, including subgingival scaling, gingival curettage, osseous surgery, gingivectomy, provisional splinting, laser procedures and maintenance. Proposer must have mechanism in place to provide oral pain medication as prescribed for clients by the dentist.
Service Unit Definition(s): **RWGA Only**	General Dentistry: A unit of service is defined as one (1) dental visit which includes restorative dental services, oral surgery, root

	canal therapy, fixed and removable prosthodontics; periodontal services includes subgingival scaling, gingival curettage, osseous surgery, gingivectomy, provisional splinting, laser procedures and maintenance. Oral medication (including pain control) for HIV patients 15 years old or older must be based on a comprehensive individual treatment plan. Prosthodontics: A unit of services is defined as one (1) Prosthodontics visit.
Financial Eligibility:	Refer to the RWPC's approved *Financial Eligibility for Houston EMA/HSDA Services*.
Client Eligibility:	HIV-infected adults residing in the rural area of Houston EMA/HSDA meeting financial eligibility criteria.
Agency Requirements:	Agency must document that the primary patient care dentist has 2 years prior experience treating HIV disease and/or on-going HIV educational programs that are documented in personnel files and updated regularly. Service delivery site must be located in one of the northern counties of the EMA/HSDA area: Waller, Walker, Montgomery, Austin, Chambers or Liberty Counties
Staff Requirements:	State of Texas dental license; licensed dental hygienist and state radiology certification for dental assistants.
Special Requirements: **RWGA Only**	Agency and/or dental providers (clinicians) must be Medicaid certified and enrolled in all Dental Plans offered to Texas STAR+PLUS eligible clients in the Houston EMA/HSDA. Agency/providers must ensure Medicaid certification and billing capability for STAR+PLUS eligible patients remains current throughout the contract term. Must comply with the joint Part A/B standards of care where applicable.

FY 2019 RWPC "How to Best Meet the Need" Decision Process

Step in Process: **Council**		Date: **06/14/18**
Recommendations:	Approved: Y:_____ No: _____ Approved With Changes:_____	If approved with changes list changes below:
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Recommendations:	Approved: Y: _____ No: _____ Approved With Changes:_____	If approved with changes list changes below:
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Step in Process: **Quality Improvement Committee**		Date: **05/15/18**
Recommendations:	Approved: Y: _____ No: _____ Approved With Changes:_____	If approved with changes list changes below:
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2.		
3.		

Step in Process: **HTBMN Workgroup**	Date: **04/24/18**
Recommendations:	Financial Eligibility:
1.	
2.	
3.	

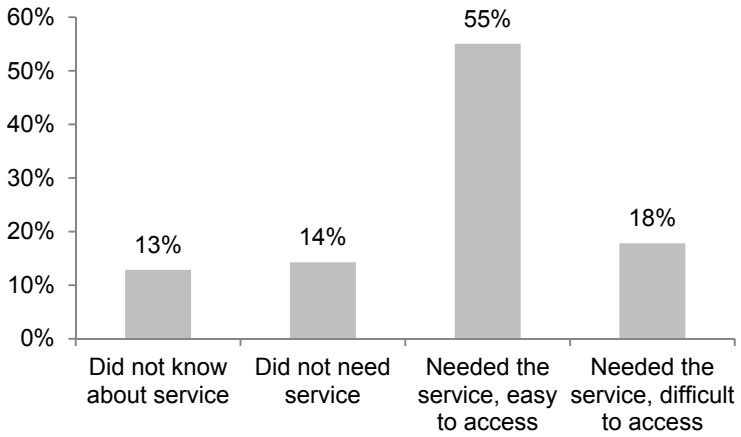
ORAL HEALTH CARE

Oral health care, or *dental services*, refers to the diagnostic, preventative, and therapeutic services provided to persons living with HIV (PLWH) by a dental health care professional (such as a dentist or hygienist). This includes examinations, periodontal services (such as cleanings and fillings), extractions and other oral surgeries, restorative dental procedures, and prosthodontics (or dentures).

(**Graph 1**) In the 2016 Houston HIV Care Services Needs Assessment, 73% of participants indicated a need for *oral health care* in the past 12 months. 55% reported the service was easy to access, and 18% reported difficulty. 13% stated that they did not know the service was available.

(**Table 1**) When barriers to *oral health care* were reported, the most common barrier type was wait-related issues (35%). Wait-related barriers reported include placement on a waitlist, long waits at appointments, being told a wait list was full/unavailable, and long durations between application and approval.

GRAPH 1-Oral Health Care, 2016



(**Table 2 and Table 3**) Need and access to services can be analyzed for needs assessment participants according to demographic and other characteristics, revealing the presence of any potential disparities in access to services. For *oral health care*, this analysis shows the following:

- More females than males found the service accessible.
- More white PLWH found the service accessible than other race/ethnicities.
- More PLWHA age 50+ found the service accessible than other age groups.
- In addition, more rural, unstably housed, and MSM PLWH found the service difficult to access when compared to all participants.

TABLE 1-Top 5 Reported Barrier Types for Oral Health Care, 2016

	No.	%
1. Wait (W)	29	35%
2. Interactions with Staff (S)	11	13%
3. Health Insurance Coverage (I)	10	12%
4. Eligibility (EL)	8	10%
5. Administrative (AD)	7	8%

TABLE 2-Oral Health Care, by Demographic Categories, 2016

	Sex		Race/ethnicity				Age		
Experience with the Service	Male	Female	White	Black	Hispanic	Other	18-24	25-49	50+
Did not know about service	13%	12%	3%	16%	15%	13%	35%	15%	6%
Did not need service	16%	8%	8%	17%	15%	7%	13%	16%	11%
Needed, easy to access	54%	60%	68%	51%	52%	60%	35%	50%	66%
Needed, difficult to access	17%	20%	21%	17%	18%	20%	17%	19%	16%

TABLE 3-Oral Health Care, by Selected Special Populations, 2016

Experience with the Service	Unstably Housed[a]	MSM[b]	Out of Care[c]	Recently Released[d]	Rural[e]	Transgender[f]
Did not know about service	17%	11%	0%	21%	9%	14%
Did not need service	12%	14%	0%	29%	6%	10%
Needed, easy to access	47%	55%	100%	34%	50%	71%
Needed, difficult to access	25%	19%	0%	16%	35%	5%

[a]Persons reporting housing instability [b]Men who have sex with men [c]Persons with no evidence of HIV care for 12 mo.
[d]Persons released from incarceration in the past 12 mo. [e]Non-Houston/Harris County residents [f]Persons with discordant sex assigned at birth and current gender

Ryan White Part A
HIV Performance Measures
FY 2016 Report

Oral Health Care
All Providers

HIV Performance Measures	FY 2016
75% of diagnosed HIV/AIDS-related and general oral pathologies will be resolved, improved or maintained at most recent follow-up	See Oral Pathology Table

Clinical Chart Review Measures*	FY 2014	FY 2015
75% of HIV-infected oral health patients will have a dental health history (initial or updated) at least once in the measurement year	97%	93%
75% of HIV-infected oral health patients will have a medical health history (initial or updated) at least once in the measurement year	81%	83%
90% of HIV-infected oral health patients will have a dental treatment plan developed and/or updated at least once in the measurement year	89%	81%
85% of HIV-infected oral health patients will receive oral health education at least once in the measurement year	87%	80%
90% of HIV-infected oral health patients will have a periodontal screen or examination at least once in the measurement year	91%	92%
60% of HIV-infected oral health patients will have a Phase 1 treatment plan that is completed within 12 months	79%	86%

* To view the full FY 2015 chart review reports, please visit:
http://publichealth.harriscountytx.gov/Services-Programs/Programs/RyanWhite/Quality

Oral Pathology	Number of Diagnoses	Number with Follow-Up	*Resolved at Follow-up		*Improved at Follow-up		*Same at Follow-up		*Worsened at Follow-up	
			#	%	#	%	#	%	#	%
Atrophic candidiasis										
HIV-related periodontal disease										
Idiopathic thrombocytopenia purpura										
Kaposi's sarcoma										
Lymphomas										
Oral hairy leukoplakia										
Oral ulcerations										
Papilloma										
Pseudomembranous candidiasis										
Salivary gland disease										
Squamous cell carcinoma										
Other										
Total	**0**	**0**								

ORAL HEALTH CARE SERVICES
2017 CHART REVIEW

PREFACE

DSHS Monitoring Requirements

The Texas Department of State Health Services (DSHS) contracts with The Houston Regional HIV/AIDS Resource Group, Inc. (TRG) to ensure that Ryan White Part B and State of Texas HIV Services funding is utilized to provide in accordance to negotiated Priorities and Allocations for the designated Health Service Delivery Area (HSDA). In Houston, the HDSA is a ten-county area including the following counties: Austin, Chambers, Colorado, Fort Bend, Harris, Liberty, Montgomery, Walker, Waller, and Wharton. As part of its General Provisions for Grant Agreements, DSHS also requires that TRG ensures that all Subgrantee's comply with statutes and rules, perform client financial assessments, and delivery service in a manner consistent with established protocols and standards.

As part of those requirements, TRG is required to perform annual quality compliance reviews on all Subgrantee's. Quality Compliance Reviews focus on issues of administrative, clinical, consumer involvement, data management, fiscal, programmatic and quality management nature. Administrative review examines Subgrantee operating systems including, but not limited to, non-discrimination, personnel management and Board of Directors. Clinical review includes review of clinical service provision in the framework of established protocols, procedures, standards and guidelines. Consumer involvement review examines the Subgrantee's frame work for gather client feedback and resolving client problems. Data management review examines the Subgrantee's collection of required data elements, service encounter data, and supporting documentation. Fiscal review examines the documentation to support billed units as well as the Subgrantee's fiscal management and control systems. Programmatic review examines non-clinical service provision in the framework of established protocols, procedures, standards and guidelines. Quality management review ensures that each Subgrantee has systems in place to address the mandate for a continuous quality management program.

QM Component of Monitoring

As a result of quality compliance reviews, the Subgrantee receives a list of findings that must be address. The Subgrantee is required to submit an improvement plan to bring the area of the finding into compliance. This plan is monitored as part of the Subgrantee's overall quality management monitoring. Additional follow-up reviews may occur (depending on the nature of the finding) to ensure that the improvement plan is being effectively implemented.

Scope of Funding

TRG contracts with two Subgrantees to provide oral health care services in the Houston HSDA.

INTRODUCTION

Description of Service

Restorative dental services, oral surgery, root canal therapy, fixed and removable prosthodontics; periodontal services includes subgingival scaling, gingival curettage, osseous surgery, gingivectomy, provisional splinting, laser procedures and maintenance. Oral medication (including pain control) for HIV patients 15 years old or older must be based on a comprehensive individual treatment plan. Prosthodontics services to HIV infected individuals including but not limited to examinations and diagnosis of need for dentures, crowns, bridgework and implants, diagnostic measurements, laboratory services, tooth extraction, relines and denture repairs.

Emergency procedures will be treated on a walk-in basis as availability and funding allows. Funded Oral Health Care providers are permitted to provide necessary emergency care regardless of a client's annual benefit balance. If a provider cannot provide adequate services for emergency care, the patient should be referred to a hospital emergency room.

Tool Development

The TRG Oral Healthcare Review tool is based upon the established local and DSHS standards of care.

Chart Review Process

All charts were reviewed by Bachelors-degree registered nurse experienced in treatment, management, and clinical operations in HIV. The collected data for each site was recorded directly into a preformatted computerized database. The data collected during this process is to be used for service improvement.

File Sample Selection Process

File sample was selected from a provider population of 2,918 clients who accessed oral healthcare services in the measurement year. The records of 160 clients were reviewed, representing 5% of the unduplicated population. The demographic makeup of the provider was used as a key to file sample pull.

NOTE: DSHS has changed the file sample percentage which will result in a lower number of files being reviewed in 2017.

Demographics- Oral Healthcare Services

2016 Annual

Total UDC: 3153 **Total New: 2088**

Age	Number of Clients	% of Total
Client's age as of the end of the reporting period		
Less than 2 years	0	0.00%
02 - 12 years	0	0.00%
13 - 24 years	66	2.09%
25 - 44 years	1155	36.63%
45 - 64 years	1719	54.52%
65 years or older	213	6.76%
Unknown	0	0.00%
	3153	100%

Gender	Number of Clients	% of Total
"Other" and "Refused" are counted as "Unknown"		
Female	846	26.83%
Male	2288	72.57%
Transgender FTM	1	0.03%
Transgender MTF	18	0.57%
Unknown	0	0.00%
	3153	100%

Race/Ethnicity	Number of Clients	% of Total
Includes Multi-Racial Clients		
White	554	17.57%
Black	1600	50.75%
Hispanic	950	30.13%
Asian	37	1.17%
Hawaiian/Pacific Islander	3	0.10%
Indian/Alaskan Native	9	0.29%
Unknown	0	0.00%
	3153	100%

From 01/01/16 - 12/31/16

2017 Annual

Total UDC: 2918 **Total New: 783**

Age	Number of Clients	% of Total
Client's age as of the end of the reporting period		
Less than 2 years	0	0.00%
02 - 12 years	0	0.00%
13 - 24 years	66	2.26%
25 - 44 years	1091	37.40%
45 - 64 years	1565	53.62%
65 years or older	196	6.72%
Unknown	0	0.00%
	2918	100%

Gender	Number of Clients	% of Total
"Other" and "Refused" are counted as "Unknown"		
Female	759	26.01%
Male	2132	73.06%
Transgender FTM	1	0.04%
Transgender MTF	26	0.89%
Unknown	0	0.00%
	2918	100%

Race/Ethnicity	Number of Clients	% of Total
Includes Multi-Racial Clients		
White	473	16.21%
Black	1478	50.65%
Hispanic	917	31.43%
Asian	43	1.47%
Hawaiian/Pacific Islander	1	0.04%
Indian/Alaskan Native	6	0.20%
Unknown	0	0%
	2918	100%

From 01/01/17 - 12/31/17

RESULTS OF REVIEW

Client's HIV primary care provider contact information is documented in the client's oral health care record.

	Yes	No	N/A
Number of client records that showed evidence of the measure	156	9	2
Number of clients records that were reviewed.	165	165	-
Rate	**95%**	**5%**	-

An initial or updated dental and medical history within the last year is documented in the client's oral healthcare record (HRSA HAB Measure)

	Yes	No	N/A
Number of client records that showed evidence of the measure	147	13	7
Clients records that were reviewed.	160	160	-
Rate	**92%**	**8%**	-

Periodontal Screening/Examination conducted within the last year is documented in the client's oral healthcare record (HRSA HAB Measure)

	Yes	No	N/A
Number of client records that showed evidence of the measure	126	17	24
Clients records that were reviewed.	143	143	-
Rate	**88%**	**12%**	-

Dental provider obtained an initial baseline blood pressure/pulse reading during the initial limited physical examination and is documented in the client's oral healthcare record. If not obtained, dental provider documented reason.

	Yes	No	N/A
Number of client records that showed evidence of the measure	149	11	7
Clients records that were reviewed.	160	160	-
Rate	**93%**	**7%**	-

Oral examination conducted within the last year is documented in the client's oral healthcare record

	Yes	No	N/A
Number of client records that showed evidence of the measure	138	11	18
Clients records that were reviewed.	149	149	-
Rate	**93%**	**7%**	-

Dental treatment plan to include specific diagnostic, preventive, and therapeutic was established or updated within the last year and signed by the oral healthcare professional providing the services (HRSA HAB Measure)

	Yes	No	N/A
Number of client records that showed evidence of the measure	117	18	32
Clients records that were reviewed.	135	135	-

Rate	**87%**	**13%**	-

Phase 1 treatment plan to include prevention, maintenance and/or elimination of oral pathology resulting from dental caries or periodontal disease was established within one year of initial assessment and signed by the oral healthcare professional providing the services (HRSA HAB Measure)

	Yes	No	N/A
Number of client records that showed evidence of the measure	114	18	35
Clients records that were reviewed.	132	132	-
Rate	**86%**	**14%**	-

Oral health education for oral hygiene instruction and smoking cessation if applicable conducted within the last year is documented in the patient's oral healthcare record (HRSA HAB Measure)

	Yes	No	N/A
Client records that showed evidence of an intraoral exam.	36	112	19
Clients in oral health services that were reviewed.	148	148	-
Rate	**24%**	**76%**	-

CONCLUSIONS

The 2017 data shows a continuation of excellent overall oral healthcare services. All indicators reviewed were modified for the Germane Solutions review, which has a threshold of 50%. All but one indicator was well above the established threshold for DSHS. Treatment plans and completed oral health examinations were well documented. Also, periodontal screening/examination were documented at 88%. The newest data element assessed oral instruction and smoking cessation, which was documented at a compliance rate of 24% will be re-examined this year assess how the provider(s) are documented the indicator.

Umair A. Shah, M.D., M.P.H.
Executive Director

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Oral Health Care-Rural Target Chart Review FY 2016

Ryan White Part A Quality Management Program–Houston EMA

December 2017

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HCPH is the local public health agency for the Harris County, Texas jurisdiction. It provides a wide variety of public health activities and services aimed at improving the health and well-being of the Harris County community.

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Introduction

Part A funds of the Ryan White Care Act are administered in the Houston Eligible Metropolitan Area (EMA) by the Ryan White Grant Administration Section of Harris County Public Health & Environmental Services. During FY 16, a comprehensive review of client dental records was conducted for services provided between 3/1/16 to 2/28/17. This review included one provider of Adult Oral Health Care that received Part A funding for rural-targeted Oral Health Care in the Houston EMA.

The primary purpose of this annual review process is to assess Part A oral health care provided to persons living with HIV in the Houston EMA. Unlike primary care, there are no federal guidelines published by the U.S Health and Human Services Department for oral health care targeting individuals with HIV/AIDS. Therefore, Ryan White Grant Administration has adopted general guidelines from peer-reviewed literature that address oral health care for the HIV/AIDS population, as well as literature published by national dental organizations such as the American Dental Association and the Academy of General Dentistry, to measure the quality of Part A funded oral health care. The Ryan White Grant Administration Project Coordinator for Clinical Quality Improvement (PC/CQI) performed the chart review.

Scope of This Report

This report provides background on the project, supplemental information on the design of the data collection tool, and presents the pertinent findings of the FY 16 oral health care chart review. Any additional data analysis of items or information not included in this report can likely be provided after a request is submitted to Ryan White Grant Administration.

The Data Collection Tool

The data collection tool employed in the review was developed through a period of in-depth research and a series of working meetings between Ryan White Grant Administration. By studying the processes of previous dental record reviews and researching the most recent HIV-related and general oral health practice guidelines, a listing of potential data collection items was developed. Further research provided for the editing of this list to yield what is believed to represent the most pertinent data elements for oral health care in the Houston EMA. Topics covered by the data collection tool include, but are not limited to the following: basic client information, completeness of the health history, hard & soft tissue examinations, disease prevention, and periodontal examinations.

The Chart Review Process

All charts were reviewed by the PC/CQI, a Master's-level registered nurse experienced in identifying documentation issues and assessing adherence to published guidelines. The collected data for each site was recorded directly into a preformatted database. Once all data collection was completed, the database was queried for analysis. The data collected during this process is intended to be used for the purpose of service improvement.

The specific parameters established for the data collection process were developed from HIV-related and general oral health care guidelines available in peer-reviewed literature, and the professional experience of the reviewer on standard record documentation practices. Table 1 summarizes the various documentation criteria employed during the review.

Table 1. Data Collection Parameters

Review Area	Documentation Criteria
Health History	Completeness of Initial Health History: includes but not limited to past medical history, medications, allergies, substance use, HIV MD/primary care status, physician contact info, etc.; Completed updates to the initial health history
Hard/Soft Tissue Exam	Findings—abnormal or normal, diagnoses, treatment plan, treatment plan updates
Disease Prevention	Prophylaxis, oral hygiene instructions
Periodontal screening	Completeness

The Sample Selection Process

The sample population was selected from a pool of 284 unduplicated clients who accessed Part A oral health care between 3/1/16 and 2/28/17. The medical charts of 75 of these clients were used in the review, representing 26% of the pool of unduplicated clients.

In an effort to make the sample population as representative of the actual Part A oral health care population as possible, the EMA's Centralized Patient Care Data Management System (CPCDMS) was used to generate a list of client codes to be reviewed. The demographic make-up (race/ethnicity, gender, age) of clients accessing oral health services between 3/1/16 and 2/28/17 was determined by CPCDMS, which in turn allowed Ryan White Grant Administration to generate a sample of specified size that closely mirrors that same demographic make-up.

Characteristics of the Sample Population

The review sample population was generally comparable to the Part A population receiving rural-targeted oral health care in terms of race/ethnicity, gender, and age. It is important to note that the chart review findings in this report apply only to those who received rural-targeted oral health care from a Part A provider and cannot be generalized to all Ryan White clients or to the broader population of persons with HIV or AIDS. Table 2 compares the review sample population with the Ryan White Part A rural-targeted oral health care population as a whole.

Table 2. Demographic Characteristics of FY 16 Houston EMA Ryan White Part A Oral Health Care Clients

	Sample		**Ryan White Part A EMA**	
Race/Ethnicity	Number	Percent	Number	Percent
African American	35	46.7%	122	43%
White	39	52%	159	56%
Asian	1	1.3%	2	.7%
Native Hawaiian/Pacific Islander	0	0%	0	0%
American Indian/Alaska Native	0	0%	0	0%
Multi-Race	0	0%	1	.4%
	75		**284**	
Hispanic Status				
Hispanic	17	22.7%	71	25%
Non-Hispanic	58	77.3%	213	75%
	75		**284**	
Gender				
Male	47	62.7%	189	68.6%
Female	26	34.7%	93	32.8%
Transgender	2	2.7%	2	.7%
	75		**284**	
Age				
18 – 24	4	5.3%	15	5.3%
25 – 34	15	20%	58	20.4%
35 – 44	21	28%	82	28.9%
45 – 54	20	26.7%	74	26.1%
55 – 64	11	14.7%	45	15.9%
65+	3	4%	10	3.5%
	75		**284**	

Findings

Clinic Visits

Information gathered during the 2016 chart review included the number of visits during the study period. The average number of oral health visits per patient in the sample population was seven.

Health History

A complete and thorough assessment of a patient's medical history is essential among individuals infected with HIV or anyone who is medically compromised. Such information, such as current medication or any history of alcoholism for example, offers oral health care providers key information that may determine the appropriateness of prescriptions, oral health treatments and procedures. The form that is used by the agency to assess patient's health history captures a wide range of information; however, for the purposes of this review, this report will focus on the assessment of information that is of particular importance among HIV/AIDS patients compared to patients in the general population.

Assessment of Medical History

	2014	2015	2016
Primary Care Provider	67%	88%	93%
Dental Health History*	97%	93%	87%
Medical Health History*	81%	83%	87%
Medical History 6 month Update	59%	94%	100%
Medication Review	61%	91%	88%
Allergies Recorded	81%	93%	88%
Documentation of HIV Status	6%	71%	88%
Documentation of Opportunistic Infection Status	53%	93%	88%
Tobacco Use	81%	95%	87%
Substance Abuse	80%	95%	87%

*HIV/AIDS Bureau (HAB) Performance Measures

Health Assessments

	2014	2015	2016
Vital Signs	96%	99%	95%
CBC documented	59%	63%	78%
Screening for Antibiotic Prophylaxis	83%	91%	52%

Prevention and Detection of Oral Disease

Maintaining good oral health is vital to the overall quality of life for individuals living with HIV/AIDS because the condition of one's oral health often plays a major role in how well patients are able manage their HIV disease. Poor oral health due to a lack of dental care may lead to the onset and progression of oral manifestations of HIV disease, which makes maintaining proper diet and nutrition or adherence to antiretroviral therapy very difficult to achieve. Furthermore, poor oral health places additional burden on an already compromised immune system.

	2014	2015	2016
Oral Health Education*	87%	80%	88%
Clinical Tooth Chart	100%	99%	94%
Intraoral Exam	92%	88%	88%
Extraoral Exam	91%	88%	86%
Periodontal screening*	91%	92%	84%
X-rays present	94%	92%	91%
Treatment plan*	89%	81%	94%

*HIV/AIDS Bureau (HAB) Performance Measures

Procedures Performed

	2014	2015	2016
Extractions	32%	29%	29%
Fillings	59%	60%	37%
Root Canals	7%	11%	4%
Dentures	13%	11%	15%
Crowns	11%	17%	15%

Conclusions

Overall, oral health care services continues its trend of high quality care. The Houston EMA oral health care program has established a strong foundation for preventative care and we expect continued high levels of care for Houston EMA clients in future.

Appendix A – Resources

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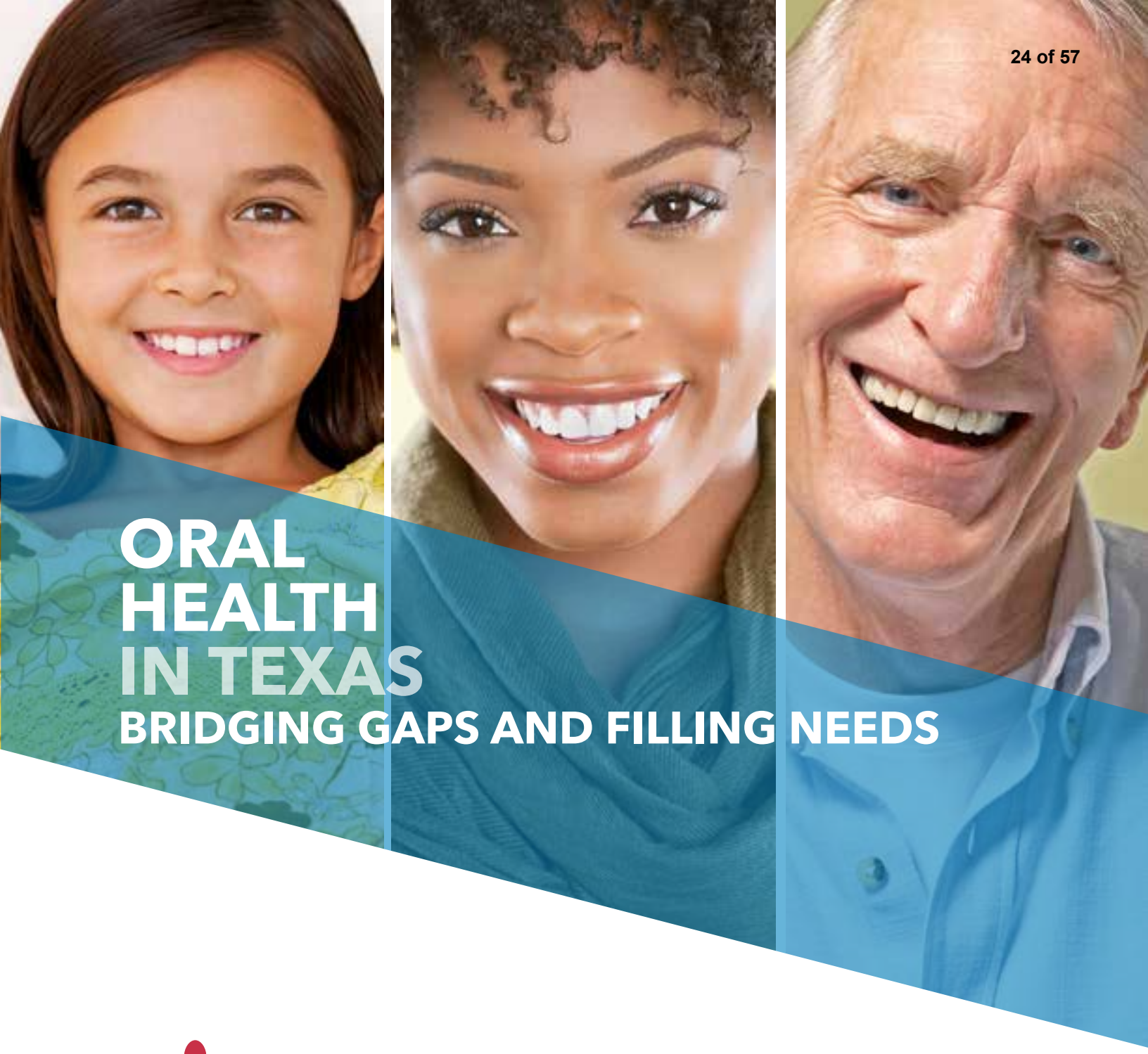

ORAL HEALTH IN TEXAS

BRIDGING GAPS AND FILLING NEEDS

Texas Health Institute

A Report on the Burden of Oral Disease in Texas | 2018

Texas Health Institute

Texas Health Institute has developed this report with support from the DentaQuest Foundation, St. David's Foundation, Delta Dental Community Care Foundation, and The Center for Children's Health led by Cook Children's Health Care System.

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The Center for Children's Health led by Cook Children's

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Table of Contents

Executive Summary

Oral health affects a person's physical, psychological, and social well-being, and is considered a window into the condition of the rest of the body. Oral health problems also account for over $1 billion dollars in state spending in Texas every year, not including costs related to absenteeism and diminished productivity at school and work. Often described as a "silent epidemic," oral health often struggles to command attention and urgency from public health leaders in proportion to its prevalence and cost burden.

Improving the oral health of Texans is within reach thanks to an abundance of safe, effective, and cost-containing measures within and beyond the dentist's chair. *Oral Health in Texas: Bridging Gaps and Filling Needs* provides a portrait of the oral disease burden in Texas and makes the case for a comprehensive public health approach to addressing oral health. The report unites a wealth of state, regional, and county-level data with supporting literature to empower public health leaders to better understand oral health strengths and challenges in their communities and across the state.

How this Report is Organized

A state-level overview of oral health is organized around four guiding questions with implications for public health leaders and policymakers across the state:

- Oral health and overall health: Where does Texas stand?
- What factors contribute to Texas' oral health burden?
- Are Texans accessing the oral health care they need?
- Can Texas' oral health workforce meet demand?

Each section describes the available scientific evidence and provides a thorough, impartial review of associated policy issues. Where possible, Texas' performance on measures of oral health, risk factors for disease, access to care, and workforce capacity are compared to national average and Healthy People 2020 targets.

Following the state-level data and supporting literature, regional and county data profiles for 20 regions and all 254 Texas counties are presented. These profiles display the most recent publicly available data on population and socioeconomic factors, oral health outcomes, risk factors for disease, clinical care, and Medicaid and CHIP enrollment and expenditures. Results are presented at the most granular level the data will allow to promote exploration of oral health on a local scale.

Data Sources & Technical Notes

Findings in this report are based on evidence from several national and state data sources, including but not limited to Behavioral Risk Factor Surveillance System, Youth Risk Behavior Surveillance System, National Survey of Children's Health, National Health and Nutrition Examination Survey, the Texas Department of State Health Services, and Texas Health and Human Services Commission. Refer to the Methodology and Data Sources section for a complete listing of data sources, indicator definitions, and years.

In this report, Texas' Regional Health Partnership (RHP) boundaries have been used to analyze and report oral health outcomes by region. RHP regional boundaries were selected after evaluating several existing statewide regional frameworks. RHPs permitted the most granular regional analysis possible while generally maintaining sufficient sample size to produce valid estimates on measures obtained from survey data.

Key Findings & Discussion

This report's key findings reflect high-level themes observed consistently within regions and throughout the state. While these key findings begin to tell a high-level story on oral health in Texas, they are not intended to be exhaustive or conclusive. Rather, they serve as examples of the type of inquiry the data support, and provide a launch point for conversations around tailored, evidence-informed solutions. The three key findings include:

1 While Texas is lagging in several oral health priorities, it has also shown capacity to lead.

Children in Texas experience tooth decay and dental problems at elevated rates compared to the rest of the nation. Rates of adult oral health problems in Texas more closely resemble national averages, but still reflect a great burden of chronic or severe oral health deterioration with age. More than half of Texans age 45-64 have had tooth loss due to oral disease, and about one in eight Texans age 65 and older have none of their natural teeth remaining.

There is also substantial reason for concern about Texans' ability to obtain and afford oral health care. Texas has the highest health uninsured rate in the nation (17%) and the dental uninsured rate, while not publicly tracked, is almost surely higher. Forty percent of the nation's dental care is financed out-of-pocket, yet one-third of Texas households earn incomes at or near the federal poverty level. Families who lack the resources to meet their basic needs are unlikely to be able to bear the full cost of dental services.

Despite challenges, Texas has achieved examples of success worth sustaining. The state performs well on measures of dental care access and utilization for children: 81% percent of Texas children ages 1-17 have made a dental visit in the past year. Approximately 69% of children in Texas' Medicaid and CHIP programs make annual dental visits, the highest rate of any state in the country. In seven of twenty Texas regions, fewer than 10% of adults have poor dental health. Common threads between leading regions include low rates of smoking and oral cancer, higher rates of health insurance coverage, and an adequate supply of oral health professionals.

2 Texas' oral health burden is most concentrated in its rural and border regions.

Texas' oral health burden splits unevenly across urban/rural and border/non-border regional divides. Rural and border regions are home to high proportions of low-income and food insecure populations, with adult health uninsured rates as high as 42% in the border regions.

The rural region containing Abilene has an estimated 28% of adults in poor dental health, a rate nearly four times higher than the top performing urban regions (between 7-8%). The rural regions containing Abilene and Wichita Falls also have some of the state's highest oral cancer rates. All seven rural regions have lower than average rates of past-year dental visits, and many rural and border regions lack an adequate supply of oral health providers.

Oral health problems co-occur with chronic diseases and are made worse by health risk behaviors like smoking. Chronic disease and smoking rates are excessive in rural regions. The rural region containing Abilene has nearly three times the estimated rate of diabetes as the Dallas region, and twice the rate of smoking as the San Antonio region. Diabetes rates are higher in most of Texas' border regions. Obesity appears to be a major problem statewide.

While rural regions and border regions both bear an outsized burden of oral disease, they differ in their use of the public health care safety net. In border regions, approximately 20-28% of the population is enrolled in Medicaid, compared to 13-17% in rural regions. Annual Medicaid costs per enrollee (both dental and non-dental) are among the state's highest in border regions despite a younger overall population, and among the lowest in rural regions despite an older population. Further analysis may be needed to explore underlying drivers of Medicaid enrollment and expenditure differences in rural and border areas.

3 Focusing narrowly on health care neglects other opportunities to improve oral health.

Evidence from this report suggests access to health care is necessary, but not sufficient, to achieve good oral health outcomes. Despite performing well on measures of access to dental care for children, the state's child oral health outcomes are poor. Ninety percent of Texas children have health insurance, with pediatric dental services nearly universally covered. Eighty percent of Texas children visit the dentist annually. However, Texas ranks third-worst in the nation (39th out of 41 ranked states) for the percentage of third graders who have experienced dental caries.

This phenomenon is also observed regionally. The Southeast Texas region containing Beaumont/Galveston performs equal to or better than the rest of the state on several measures of oral health care access, but ranks among the worst in the state for estimated rates of oral cancer mortality, poor adult dental health, and complete tooth loss among older adults. Put another way, oral health outcomes in the Beaumont/Galveston region are no better than regions with measurably greater access limitations.

These findings suggest other factors are undermining the protective effects of access to care, and this report identifies several potential contributors. The percent of Texans served by fluoridated drinking water has decreased from 79% in 2014 to 69% in 2017. Food insecurity, which affects 10% of Texans, is a source of risk for untreated dental caries and dental pain among children. And in regions with poor dental health outcomes – even those with better access to care – smoking, cardiovascular disease, and obesity rates are high.

Summary

This report confirms oral health problems are widespread among Texans of all ages and backgrounds. Oral disease is largely preventable, costs taxpayers millions of dollars in avoidable health care spending, and causes untold pain and suffering. Already a pervasive and expensive issue, demographic and chronic disease-related trends suggest oral health is poised to grow into an increasingly complex and urgent challenge for the state in the coming years.

Abundant opportunities exist within and beyond the context of clinical care to improve oral health. Indeed, there are exemplary areas of the state that achieve aspirational results, uniting clinical care with efforts to minimize adverse health risk behaviors, support chronic disease management, and community-based efforts to protect good oral health. By taking deliberate steps to promote and protect oral health, public health leaders in Texas are well-positioned to reduce the largely preventable consequences of oral disease and improve overall health and quality of life in their communities.

Introduction

The health of the mouth is inseparable from general health and essential for overall well-being at all life stages. Indeed, health care professionals consider oral health a window into the condition of the entire body. Ailing oral tissues often signal the first evidence of infectious disease, cancer, injuries, immune system disorders, or nutritional concerns affecting the rest of the body. Oral diseases also impact a person's functional, psychological, and social well-being. Simple actions people might take for granted like talking, smiling, and eating can be uncomfortable or impossible for those with oral health problems. People who experience embarrassment, bullying, or discrimination based on the appearance of an unhealthy or disfigured mouth may lose self-esteem and withdraw from social relationships.

Despite accounting for $124 billion of nationwide health care costs in 2016, – including $1.4 billion from Texas' Medicaid and Children's Health Insurance Programs (CHIP) – oral health struggles to command urgency from public health leaders in proportion to its prevalence and cost burden.[1] [2] Oral diseases also threaten to undermine the economic vitality of the state by contributing to school and workplace absenteeism, interfering with academic progress and diminishing worker productivity. For these reasons, oral health has been called a "silent epidemic," requiring a decisive, coordinated response from policymakers and professionals within and outside the health sector.[3] Leaders in every community across the state must aspire to create conditions that help all Texans live free of oral disease and attain the highest possible standard of well-being.

How is oral health defined?

Oral health refers to the health of all parts of the mouth and throat, including the teeth, gums, tongue, lips, hard and soft palates, salivary glands, tissues, jaws, and surrounding bones, muscles, and nerves.

Improving the oral health of Texans is within reach thanks to an abundance of safe, effective, and cost-containing prevention measures and policy options. This report aims to convey the most current evidence on the state of oral health in Texas, including disease burden, risk factors, access to care, and information on policy options. Accompanying statewide and local data profiles are intended to stimulate dialogue, inform planning, and motivate leaders to action with the goal of improving oral health in their communities. By taking deliberate steps to promote and protect oral health, Texas is well-positioned to reduce the largely preventable consequences of oral disease in the state.

Oral Health and Overall Health: Where does Texas Stand?

Oral Disease in Texas

Tooth decay, gum disease, and other diseases of the mouth affect millions of Texans at every life stage: 7.5% of Texas children have fair or poor dental health, and 11.6% of Texas adults currently have poor dental health.[4] [5] Most problems with the teeth and gums fall into three major categories – dental caries, periodontitis, and oral cancer.

Tooth Decay & Periodontal Disease. Dental caries is a decay process caused by infectious, transmissible bacteria living in the mouth.[6] These bacteria convert sugars and carbohydrates from the diet into acids, dissolving the mineral surfaces of teeth and eventually producing holes, or cavities, in the tooth enamel. When caries progresses beyond the enamel, infection progresses into the pulp of the tooth. Painful abscesses may result, in severe cases destroying bone and spreading infection to other body systems through the bloodstream.

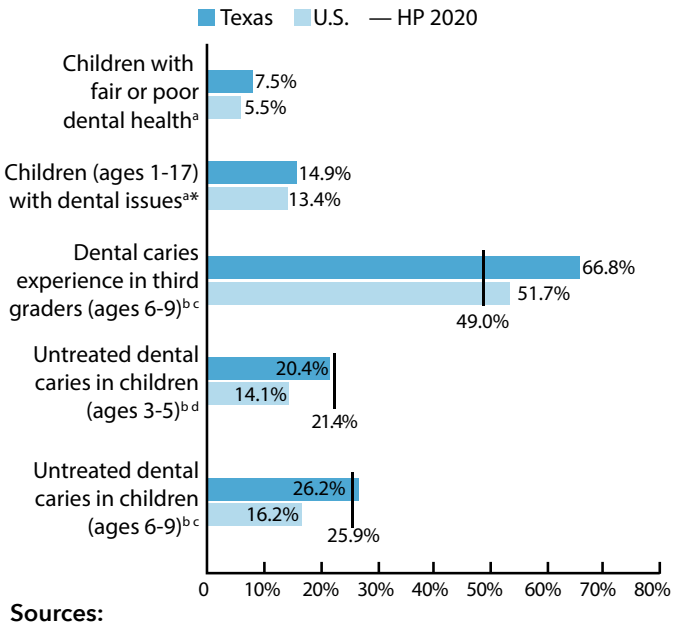
According to Centers for Disease Control and Prevention (CDC) estimates, more than one-third (37%) of children ages 2-8 have experienced dental caries in their primary teeth, and 58% of adolescents ages 12-19 have experienced dental caries in their permanent teeth.[7] Approximately 14% of children ages 2-8 and 15% of adolescents ages 12-19 have untreated tooth decay.[8]

Out of 41 states reporting data to CDC between 2008 and 2013, Texas ranked third worst (39th) for the percent of third graders who have experienced dental caries and seventh worst (35th) for the percent with untreated dental caries.[9] In both cases, Texas' rates of dental caries experience and untreated decay among third graders exceed national averages, indicating worse oral health status (Figure 1).

Periodontal disease, referring to disease of the gums (gingivitis) and tissue and bones surrounding the teeth (periodontitis), occurs when mouth bacteria colonize spaces between gums and teeth.[10] Regular brushing, flossing, and dental care controls bacterial growth, but long periods of exposure to these bacteria can degrade gum tissue and bones stabilizing the teeth. As periodontal disease advances, teeth eventually become loose and infection

Figure 1

Oral Health Outcomes in Children



Sources:

[a] National Survey of Children's Health, 2016
[b] National Health and Nutrition Examination Survey, 2013-2014
[c] Texas Basic Screening Survey, 2012-2013
[d] Texas Basic Screening Survey, 2013-2014
*such as tooth ache, bleeding gums, and dental caries in the past 12 months

By the time American adults reach age 60, 91% will have had a history of tooth decay.

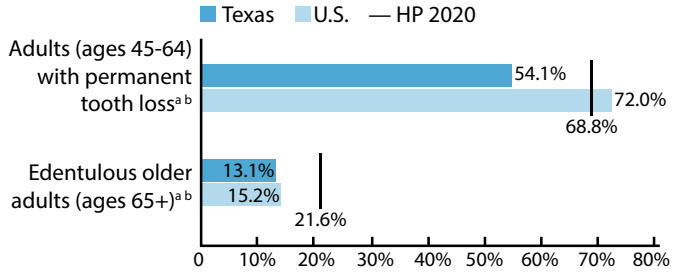
risk increases. Gingivitis can begin as early as adolescence, while periodontitis tends to begin in adulthood and is a leading cause of tooth loss among older adults.[11] Periodontitis affects about 65 million adults over age 30, or 46% of the U.S. adult population.[12] Periodontal disease prevalence is not publicly tracked at the state level.

A decline in national rates of tooth decay and periodontal disease over the last three decades amounts to a major public health success; however, not all groups have enjoyed equal oral health status improvements.[13] Seven in ten Hispanic adults in the U.S. today

have periodontitis, compared to six in ten Blacks and four in ten Whites.[14] And as dental problems accumulate with age, poor oral health remains a pervasive concern for older adults, especially older adults of color and those who are economically disadvantaged.[15] By the time American adults reach age 60, 91% will have had a history of tooth decay.[16] Nearly 70% of adults over age 65 have periodontitis, and those with severe periodontitis have an average of just 21 teeth remaining (out of 32).[17] More than one out of every seven American adults age 65-74 are completely edentulous, meaning they no longer have any of their natural teeth (Figure 2).

Figure 2

Oral Health Outcomes in Middle Age and Older Adults



Sources:
[a] Texas Behavioral Risk Factor Surveillance System, 2012, 2014, 2016 (edentulism data for age 65+ years)
[b] National Health and Nutrition Examination Survey, 2013-2014 (edentulism data for age 65-74 years)

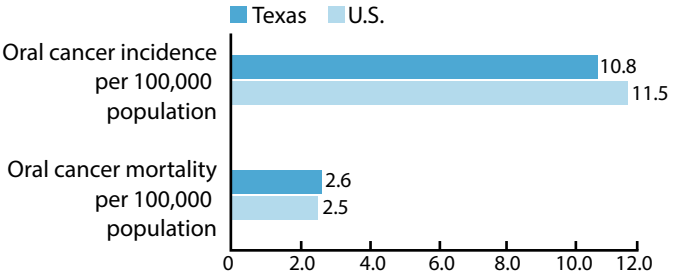
Currently, 54.1% of Texans age 45-64 have had at least one tooth extracted due to tooth decay or gum disease, better than the national rate of 72.0%. The rate of completely edentulous adults in Texas (13.1%) also falls slightly below the national rate of 15.2% (Figure 2). However, older adults in Texas are poised to bear a greater share of Texas' oral disease burden in coming decades. Adults over age 65 are the fastest growing age group in the state, with their numbers expected to more than triple in size from 2010 to 2050.[18] In addition, life expectancies in Texas have consistently trended upward from 1989 to 2014.[19] It appears more Texans will advance further into old age than ever before, and live more years of life during a period when the health of the mouth is naturally deteriorating.

Oral Cancer. Oral cancer is the eighth most common cancer worldwide, and includes cancers of the lip, mouth, and pharynx.[20] The American Cancer Society has estimated nearly 50,000 Americans will be diagnosed with oral cancer in 2018, and of those, 10,000 will ultimately die of the disease.[21] Similar estimates from the year 2000 predicted 30,000 new oral cancer cases and 8,000 deaths.[22] Accounting for population growth, these data suggest new cases of oral cancer are decreasing and survivorship has increased over the past two decades.

Oral cancer incidence in Texas decreased 9% over a nine-year period from 2000-2008, mirroring the direction of national trends during that time.[23] Adjusted for age, Texas currently has an annual oral cancer incidence rate of 10.8 new cases per 100,000 population, lower than the national rate of 11.5 cases per 100,000 population. Texas' oral cancer mortality rate is also similar to the national rate (Figure 3).

Figure 3

Oral Cancer Incidence and Mortality



Source:
Surveillance, Epidemiology, and End Results, 2010-2014

Craniofacial Conditions. Oral or facial injuries, genetic disorders such as cleft lip and palate, or severe malocclusion (misalignment of teeth) can impact both function and appearance of the mouth. In Texas, 15.1 oral clefts occurred per every 10,000 live births from 2010-2014.[24]

Children bear a substantial burden of craniofacial injuries and disorders. While some children are born with abnormalities, children are also most vulnerable to acquiring craniofacial conditions through accidental injuries, sports injuries, motor vehicle accidents, and child abuse.[25]

While uncommon, craniofacial conditions can have lifelong negative social and quality-of-life impacts.[26] Cleft lips and palates usually require multiple surgeries and can be extraordinarily expensive to treat. A child born with a craniofacial defect will likely incur a minimum of $100,000 in treatment costs over a lifetime.[27]

Health Conditions Beyond the Mouth

The U.S. Surgeon General's landmark report *Oral Health in America*, released in the year 2000, described the mouth as both "a portal of entry for infection" and "a mirror of health and disease." The report made explicit the mouth's major role in gatekeeping and signaling pathology, and ushered in further examination of the relationship between oral and systemic health in the years since its publication.[28] While current evidence does not confirm oral health problems directly cause chronic disease, or vice versa, it does support a bidirectional relationship where risks and symptoms of oral diseases and other diseases are made worse by co-occurring with one another.[29] [30]

Connections between oral health and cardiovascular disease, diabetes, hypertension, respiratory disease, obesity, AIDS, mental health and substance use disorders, and infectious disease are plentiful and thoroughly supported by research. As examples, inflammation associated with periodontal disease increases risk for stroke, cardiovascular disease, obesity, respiratory infection, and premature birth.[31] [32] [33] Periodontitis is also a routine complication of diabetes, and makes blood sugar more difficult to control.[34] Pneumonia and other respiratory infections can result when bacteria from mouth are aspirated into the lower respiratory tract.[35] [36] While chronic obstructive pulmonary disease is largely attributable to smoking, bacteria from the mouth play a role in advancing the progression of the disease.[37]

Medications and medical treatments are often an underlying reason for the association between oral health problems and chronic disease. For example, dry mouth – a common side effect of medication – decreases saliva flow, which has a protective effect on the mouth and teeth.[38]

For these reasons, medically complex and immune-compromised individuals are especially susceptible to oral disease.

Between 7% and 15% of adults say oral problems have limited them from laughing, smiling, or conversing with others in the past year.

Beyond specific diseases and diagnoses, oral health has the potential to severely diminish overall quality of life, with negative psychological and social impacts.[39] [40] About one in five adults experience embarrassment in social interactions due to the appearance of their mouth, which can diminish self-esteem and lead to social withdrawal. Between 7% and 15% of adults say oral problems have limited them from laughing, smiling, or conversing with others in the past year, and one quarter of edentulous adults have avoided close relationships because of fear of rejection.[41] [42] Children with dental caries and gum disease have more frequent pain due to toothaches, increased school absenteeism due to dental problems, and report often feeling worried or upset about their mouths.[43] [44]

In older adults, oral disease accelerates physical decline and disability. In a large international survey of older adults, respondents said having eight or fewer teeth impacted quality of life more than having cancer.[45] Tooth loss can lead to nutrition deficiencies and weight loss as it becomes more difficult to chew and swallow food, sometimes termed the "anorexia of aging."[46] Softer and easily chewable foods tend to be high in fat, sugar, and starch content, putting those with heart disease or diabetes at increased risk of further complications.[47]

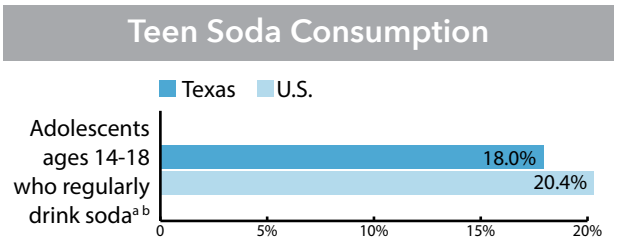
What Factors Contribute to Texas' Oral Disease Burden?

Sugary Beverage Consumption

Decreasing consumption of sugary beverages – especially among young people – is a key public health aspiration. Soda, sports drinks, energy drinks, and 100% fruit juice are the largest source of added sugar in the typical American diet, with approximately 50 gallons of sugary beverages consumed per person per year.[48] Currently, 18% of adolescents in Texas consume soda at least once per week, compared to 20.4% of teens nationally (Figure 4). Comparable soda consumption data for young children and adults in Texas are not available.

Sugar degrades the surface of tooth enamel by stimulating bacterial acid production. Risk for dental caries increases as sugary beverage intake increases. Children who begin drinking large quantities of sugary beverages when they are as young as 2 years old experience more dental caries by ages 4-7 than children with lower sugary beverage consumption.[49] Risk for dental caries among those with high sugary beverage intake remains consistent regardless of age, education, and use of fluoride toothpaste.[50]

Figure 4



Sources:
[a] Youth Risk Behavior Surveillance System, 2015
[b] Texas Youth Risk Behavior Surveillance System, 2017

Public health and oral health leaders nationwide have explored policy interventions to limit sugary beverage consumption, a leading cause of dental caries. Restrictions on offering sugary beverages in schools, so-called "soda taxes," or restrictions on supplemental nutrition assistance benefits for low-income populations have been considered or implemented in Texas and elsewhere.

Current sales tax levels – typically about 5-10% of purchase price – do not increase the price of sugary beverages enough to produce substantial behavior change.[51] [52] Eight urban U.S. cities and counties have passed an excise tax on sugar-sweetened beverages, none located in Texas.[53] The most common tax, a penny per ounce, further increases the price of single units of soda 10-20%.[54] Evidence suggests these excise taxes have decreased consumption of soda and other sugary beverages.[55] However, municipal and local taxes may do more to displace sugary beverage purchases than decrease them, since consumers can buy sugary beverages in neighboring areas without such taxes.[56] Some evidence suggests taxes enacted across a larger geographic area are less susceptible to this problem and achieve closer to the desired effect. In 2013, Mexico passed the first nationwide excise tax on sugary drinks, and within the first year of implementation soda sales decreased by 12%, with the sharpest decline among low-income residents.[57] Aside from the potential public health benefits of discouraging soda consumption, sugary beverage taxes generate revenues that many municipalities have earmarked specifically to fund public health, health care, or education initiatives.[58]

Public health advocacy groups have questioned allowing sugary beverages to be purchased through the federal Supplemental Nutrition Assistance Program (SNAP). Federal SNAP benefits can be used like cash at most grocery stores to purchase eligible foods. A 2016 United States Department of Agriculture (USDA) report finds nearly 10% of grocery dollars spent by SNAP beneficiaries are on sugary beverages.[59] The USDA has historically denied state requests to remove sugary beverages from the list of SNAP-eligible foods, preferring instead to encourage reduced sugary beverage consumption and increased intake of water through nutrition education and health promotion.

SNAP restrictions and sugary beverage taxes have been criticized for targeting the poor, with effects concentrated predominantly or exclusively in the low-income population. Proponents contend this reflects a proportional response to the unequal burden of disease affecting low-income populations, and taxes or SNAP benefit restrictions could have the biggest positive impact on low-income families whose risk for many types of oral disease is elevated.[60]

Sugary beverage taxes and restrictions have not gained much traction in Texas' cities, counties, or the state legislature to date. Since 2011, the Texas legislature has considered six different bills taxing or restricting sugary beverages, but none have become law.[61] The Texas Department of Agriculture, which administers nutritional funding and guidelines to Texas' public schools, enforced a strict ban on most soda sales in schools beginning in 2005, regulations that were later lifted in 2015.[62] [63]

Tobacco, Alcohol, and Drug Use

Currently, 14.3% of Texans age 18 or older smoke cigarettes, a behavior shown to increase susceptibility to oral disease.[64] [65] Additionally, 4.3% of adults in the state regularly use smokeless tobacco products like chewing, dipping, and snuffing tobacco, which are leading risk factors for oral cancers (Figure 5).[66] The toxic ingredients of cigarette smoke and smokeless tobacco products damage mouth tissues, triggering healthy cells to become cancerous.[67]

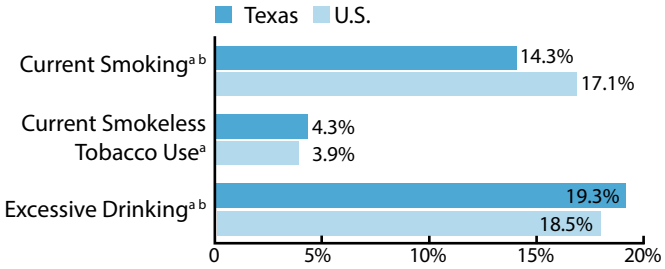
Cigarette smokers fare worse than non-smokers on multiple oral health outcomes. Smokers have over twice the rate of edentulism (15%) as those who have never smoked (7%), and are less likely than non-smokers to have sought dental care in the past year.[68] Despite no differences in tooth brushing frequency, current smokers are significantly more likely than non-smokers to say they have sensitivity in their teeth, toothaches, oral pain, bad breath, or a social limitation because of their teeth.[69] Forty-four percent of smokers perceive their oral health as excellent or very good, compared to 60% of non-smokers.[70] Gingivitis and dental caries are significantly more common in smokers, and approximately half of the periodontitis risk observed in American adults is attributable to smoking.[71]

In Texas, 19.3% of adults consume excessive amounts of alcohol, which includes either episodic binge drinking or chronic heavy drinking (Figure 5). Excessive alcohol use is associated with a high risk of developing dental caries, periodontal disease, and edentulism.[72] The acid and carbohydrate content of alcoholic beverages erodes tooth enamel similar to the effect of sugar-sweetened beverages.[73] Episodes of vomiting after binge drinking bring stomach acids into contact with the mouth and teeth, which can also accelerate decay.[74] Chronic alcohol users are also less likely to brush and floss frequently or with proper technique, possibly as a direct result of being impaired.[75] In one study, people with alcohol use disorders showed significantly more damage to their teeth compared to people of the same age and sex who consumed little to no alcohol.[76]

Several studies have found people who consume large amounts of alcohol also have a small but significantly higher risk of developing oral cancers. The connection between alcohol consumption and oral cancer risk is not well understood. It is possible the correlation can be explained by tobacco use, since alcohol and tobacco products are often used at the same time.[77] [78]

Figure 5

Oral Health Risk Behaviors in Adults



Sources:

[a] Behavioral Risk Factor Surveillance System, 2016

[b] Texas Behavioral Risk Factor Surveillance System, 2016

Oral health problems are some of the most common conditions to co-occur with substance use disorders, including addictions to Texas' most common illicit drugs, including methamphetamine, opioids, and cocaine.[79] Not only do people with substance use disorders have higher rates of tooth decay, gum disease, tooth loss, facial traumas, and oral cancers, they experience worse access to care and less commonly receive the restorative oral care they need.[80] [81] [82]

Many people are prescribed legal opioids for pain after dental procedures. For some patients, an initial exposure to opioids prescribed for

dental pain becomes an addiction.[83] Texas has one of the lowest rates of opioids prescribed per capita of any state, a finding correlated strongly with low drug overdose mortality rates relative to other states in 2015.[84] [85] However, multiple studies find dentists are either the third or fourth most frequent prescribers of opioids among all types of physicians, and are the leading source of opioid prescriptions for children ages 10-19.[86] [87] [88]

19.4 million Texas residents receive fluoridated water from their public water system, equal to 68.8% of the state's population.

Absence of Water Fluoridation

Fluoridated drinking water is considered one of the ten greatest public health achievements of the 20th century – on par with vaccinations and public sanitation – and has done more to avert tooth decay and disease than any other public health intervention. People living in areas with fluoridated drinking water experience 25% fewer cavities than those who do not.[89]

Fluoridated drinking water deposits small amounts of fluoride onto the teeth when consumed, counteracting the effects of acid in the mouth by re-mineralizing tooth surfaces. The CDC recommends all public drinking water supplies contain low levels of fluoride to provide a barrier against tooth decay. As of 2017, 19.4 million Texas residents receive fluoridated water from their public water system, equal to 68.8% of the state's population. Fewer than half (44%) of the state's public water systems contain natural or added fluoride.[90]

While fluoride is an ingredient in most toothpastes and can be supplemented clinically with fluoride varnishes, fluoridated drinking water remains the best method to maximize the number of people receiving a regular, sufficient dose of fluoride to prevent disease. Fluoridation does not require individuals to change their behavior and benefits all recipients similarly regardless of income, education, race and ethnicity, or age. For people with limited or no access to dental care, fluoridated drinking water is an essential measure for averting tooth decay. In communities that have removed fluoride from their water, differences in rates of tooth decay between socioeconomically advantaged and disadvantaged populations widened after fluoride was removed.[91]

Water fluoridation is highly cost-efficient. The estimated annual installation cost of fluoridation ranges from $0.71 to $1.90 per person, with under $0.35 per person in maintenance costs, but costs can go much lower in some communities.[92] In Lufkin, Texas, for example, water fluoridation cost just $0.095 per person per year, totaling less than $8.00 per resident for a lifetime of community water fluoridation.[93] And in Austin, the cost of fluoridation is $0.17 per person per year, totaling a lifetime cost of less than $14.00 per resident.[94] The Texas Department of State Health Services supplies detailed cost analyses of water fluoridation to communities across Texas to inform local leaders of the exact costs associated with fluoridating their municipal water supply.

In return for every $1 invested in water fluoridation, communities save about $38 in averted dental treatment costs.[95] A Texas Department of State Health Services analysis predicted savings from water fluoridation of $19 per child per year in dental expenditures from Texas' Medicaid program, a total savings of $70 million annually.[96] To help communities maximize the full value of their investment in water fluoridation, the Texas Fluoridation Program financed through the Public Health and Health Services block grant provides technical assistance, training, engineering, inspections, monitoring, and promotion of fluoridated water across the state.

The number of Texans served by fluoridated drinking water has declined 13% since 2014, a major concern resulting in part from public skepticism toward water fluoridation.[97] [98] Organized campaigns disputing the safety of fluoride can be quite vocal and influential, but criticism is almost wholly grounded in unscientific claims. No credible research supports an

association between fluoride and other health problems, including cancer, heart disease, allergic reactions, or diminished intellectual functioning.[99] Other critics simply doubt the need to invest in fluoride, incorrectly perceiving water fluoridation to be unnecessary if people brush and floss regularly. The CDC affirms water fluoridation is unequivocally safe, and does not accumulate in the body at toxic levels if concentrations are kept within an optimal range.[100] Fluoride's protective effects cannot be effectively replicated by brushing and flossing alone.[101]

Food Insecurity

Food insecurity occurs when people have limited or unreliable availability of nutritious food to eat, either due to lack of ability to afford food or limited access to retail outlets selling nutritious food.[102] Nearly one in ten Texans experiences food insecurity, and household food insecurity prevalence exceeds 60% in some lower-income neighborhoods and rural areas of the state.[103] [104] Food insecurity is associated with poor oral health in children and adults.[105] Children from food-insecure households have significantly higher rates of untreated dental caries and dental pain resulting from caries, and receive more restorative dental services, such as tooth extractions.[106] [107] Most significantly, food insecure families lacking money to pay for basic needs like food are unlikely to have enough money to afford dental or health care.

Nearly one in ten Texans experiences food insecurity, and household food insecurity prevalence exceeds 60% in some lower-income neighborhoods and rural areas of the state.

The link between oral health and food insecurity has several possible explanations.[108] Food insecurity may force caregivers and children to buy foods that maximize quantity over quality, incentivizing inexpensive and widely available items high in sugar or starch. Second, food insecure households may live in food deserts, or neighborhoods where retail outlets are limited to convenience stores or fast-food restaurants with minimal selections of fresh vegetables and fruits, non-processed proteins, and dairy products. Third, people living in food insecure households may alter their eating habits in response to uncertainty of the source of their next meal; for example, eating smaller amounts more often to stave off hunger or consuming food in excess when it is available in anticipation of going hungry later. Frequent, constant, or excess exposure to sugary or starchy foods can increase risk for tooth decay.

Are Texans Accessing the Oral Health Care They Need?

Barriers to Accessing Care

Having access to oral health services when needed is a hallmark of an efficient, effective, and equitable health system. However, many barriers stand between Texans and the care they need. Some barriers are financial, while others are tied to location, attitudes, information, culture, and institutional practices. People with low incomes, disabilities, limited English proficiency, and complex health care needs are particularly susceptible to access barriers within the health care system.

Lack of Resources. Cost is a primary reason people delay or forego health care they need, regardless of whether they have health insurance coverage.[110] In 2016, 18% of Texans did not see a doctor when they needed to because of cost, a rate nearly 50% higher than the national average.[111] Not having insurance often puts the cost of health care out of reach. Expenses other than the direct cost of services also factor into the decision to seek care, including lost wages, transit, or childcare.

Many Texans do not have the flexibility to take time away from work or caregiving to attend appointments, and securing transportation to and from medical offices can be a challenge. In rural areas, these barriers are further amplified by the lack of oral health care facilities and transportation infrastructure. In a 2017 analysis, Texas ranked 44th for rural access to dental care and 46th for rural access to primary care out of 47 states with rural counties.[112]

Low Health Literacy. The degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions is defined as health literacy.[113] Skills in reading, writing, numeracy, listening and speaking are components of health literacy, with lower health literacy associated with the reduced ability to manage medication correctly and interpret health information and labels.[114] [115] Overcoming obstacles of insufficient health literacy requires broad health promotion and education efforts to ensure people (1) have accurate information on health, and (2) know how to act on that information.[116] Poor oral health literacy can make the process of accessing care less efficient, and potentially worsen disease. For example, many older adults who no longer have teeth mistakenly believe they do not need to visit a dentist, while in fact dental visits for edentulous adults are essential to monitor the health of the tongue, gums, and other tissues. Lack of public awareness of the relationship between oral and overall health is another effect of low oral health literacy, and leads people to skip dental visits or prioritize other health care needs over the health of their mouth.[117]

What is Access to Care?

Seamless access to care can be achieved when health care is:

1. **Approachable**. People can identify they have a health care need and know what to do next.
2. **Acceptable**. People are confident seeking health care is good for them to do, and believe they will be treated with dignity and respect.
3. **Available**. People can physically reach services in a timely manner.
4. **Affordable**. People have a means to pay for care they need.
5. **Appropriate**. People receive a quality service suitable for their medical circumstances.

Source: Levesque, J., Harris, M. F., and Russell, G. (2013). Patient-centred access to health care: Conceptualising access at the interface of systems and populations. *International Journal for Equity in Health, 12*(18), 1-9.

Perceptions, Beliefs, and Experiences. Attitudes, past experiences, and cultural beliefs can all affect willingness to seek care.[118] Many people are afraid of dental procedures, while others are worried oral health providers will make them feel ashamed for the condition of their teeth and mouth. Comfort with mainstream American medical care can vary based on one's cultural background, and research documents experiences of people who have been treated poorly in health care and oral health settings due to their race or ethnicity, immigration status, ability to pay, and other characteristics.[119] [120] [121] People may also avoid seeking care if their past care experiences were ineffective or caused unintended harm.[122] Delivering care in an inclusive, patient-centered, culturally and linguistically competent manner forms the foundation of a healing relationship between clinician and patient, and ultimately results in better patient outcomes.[123]

How Texans are Paying for Oral Health Care

Having health and dental insurance increases access to oral health care. On the private market, dental insurance is sold separately from health insurance and many public health insurance programs offer few or no dental benefits. Though separate health and dental care systems are an established feature of health care delivery, it unfortunately reinforces a perception that the mouth is detached from or less important than other body systems.

Out of Pocket Spending. Data on the nation's health care expenditures show consumers are bearing a much greater share of dental costs out of pocket than other health care costs. In 2016, 40% of the nation's dental costs were paid out of pocket, 46% by private insurance, and 12% by federal programs (Medicare, Medicaid, and CHIP). In contrast, just 11% of overall health care expenditures were paid out of pocket, 34% by private insurance and 38% by federal programs.[124] Corresponding dental expenditures data for Texas are not publicly available.

Paying for the full cost of health and dental care out of pocket can become prohibitively expensive after just a few procedures, and even those enrolled in health and dental insurance must still be able to afford their plan's out-of-pocket cost sharing requirements. Between 37-47% of U.S. households do not have enough liquid assets at any given time to be able to pay a $2,000 health insurance deductible.[125]

Approximately 62% of Texas' 4.5 million remaining uninsured are Hispanic, and 56% live in households with incomes less than $50,000 per year.

Health Insurance. Health insurance that excludes dental care is still crucial for good oral health, as it permits access to care with direct positive impacts on oral health, such as primary care, support for tobacco cessation, pain and infection care, and cancer treatment. As of 2016, 16.6% of Texans had no health insurance of any kind, the highest rate of any state in the nation.[126] Of those with health insurance, about three-quarters have private insurance (usually provided through an employer or purchased on the individual market).[127] The remaining one-quarter are covered under public health insurance programs including Medicare, Medicaid, CHIP, and U.S. Department of Veterans Affairs (VA) health benefits.[128]

The Affordable Care Act (ACA), passed in 2010, has coincided with historic reductions in uninsured rates in Texas and the nation. In 2017, between 8 and 9 million Americans – including 1.1 million Texans – obtained private coverage through public health insurance marketplaces.[129] An additional 11 million people nationwide are now covered by Medicaid due in part to 33 states expanding their eligibility limit to 138% of the federal poverty level for low-income adults (about $16,750 per year for an individual and $34,630 for a family of four in 2018).[130] Texas is among 19 states that have not expanded Medicaid eligibility and has some of the most restrictive Medicaid eligibility criteria in the nation.[131]

Disparities in health insurance coverage by race, ethnicity, and income have narrowed since 2013, but still persist.[132] [133] In Texas, over 90% of

Whites and Asians and 84% of Blacks have health insurance, compared to just 59% of Hispanics. Approximately 62% of Texas' 4.5 million remaining uninsured are Hispanic, and 56% live in households with incomes less than $50,000 per year.[134] Texans living on lower incomes also tend to cycle frequently or "churn" between different types of public and private coverage as they experience fluctuations in income or employment, or housing instability, leading to potential disruptions in care.[135]

Dental Insurance. Dental insurance coverage rates have grown steadily over time, but still trail rates of health insurance coverage nationally. Between 2010 and 2016 when the ACA's major health insurance expansions took effect, the proportion of Americans with dental coverage rose from 57% to 77%.[136] Estimates of the number of Texans with dental coverage are not publicly available.

Gains in the national dental insured rate may be attributable to the sale of stand-alone dental plans on the ACA marketplaces, inclusion of pediatric dental care among the ten essential health benefits all insurers must cover, and expansion of dependent coverage allowing children to remain on a parent's dental plan until age 26. About 16% of people without insurance made a dental visit within the past year, compared to 53-64% of Texans with dental insurance, indicating (1) having dental coverage is strongly predictive of receiving routine dental treatment, and (2) barely half of Texans with dental insurance are using it, highlighting a broad opportunity to move the remainder from coverage into care.[137] [138]

Despite recent progress, the estimated dental uninsured rate is still about three times higher than the health uninsured rate nationwide.[139] [140] The gap between the nation's health and dental uninsured rates can in part be explained by the absence of dental benefits in several public health insurance programs. Medicare does not provide dental benefits, Medicaid covers only emergency dental care for adults (except pregnant women) in many states including Texas, and few veterans receiving health benefits from the VA are eligible for dental care.[141] [142] [143] [144]

Medicaid & CHIP in Texas. Medicaid dental benefits are administered to children, teens, and young adults under age 21 through the Texas Health Steps (THSteps) program, ensuring enrollees Early and Periodic Screening, Diagnostic, and Treatment (EPSDT) services required under federal law.[145] Several of Texas' Medicaid managed care plans also cover dental services for pregnant women.[146] Covered services include initial and routine dental examinations, cleanings, oral health education, topical fluoride, and sealants for most enrollees, as well as restorative interventions and oral surgery for children who need it.[147] Texas' CHIP program has included dental benefits since 2006, and covers lower-income children from households with incomes above the threshold to qualify for Medicaid. Together, CHIP and THSteps cover about 3.6 million children – about 46% of all children in Texas – and 2016 data reveal 69.2% of children enrolled make an annual dental visit, the highest rate of any state.[148] [149]

Medicaid's low reimbursement rates relative to private coverage discourage many providers from accepting patients enrolled in Medicaid, a potential threat to timely availability of care for beneficiaries. In a 2009 survey of pediatricians, three-fourths thought the lack of dentists who accept Medicaid presented a "moderate to severe" barrier for young children enrolled.[150] Based on current provider acceptance rates and utilization data, it is not clear this perception entirely reflects reality for dental care in Texas. In 2014, 48% of Texas dentists participated in Medicaid, exceeding the national average of 42%.[151] Texas is also one of two states with a "reverse gap" in use of dental services, wherein children enrolled in Medicaid and CHIP make dental visits at higher rates than children enrolled in private insurance.[152]

As of 2016, Texas' Medicaid program reimburses for child dental services at about 72.1% the rate of private insurance, compared to the national average of 61.8%.[153] Optimizing reimbursement rates for dentists has been a balancing act for Texas lawmakers. Texas enacted major Medicaid reforms increasing fee-for-service reimbursement rates for pediatric dental procedures by 33.8% between 2003 and 2013, placing Texas among states with the highest such rates in the nation.[154]

These reforms led to increases in preventive dental care utilization and reductions in unmet dental need among Medicaid eligible children, a promising finding given downstream cost savings of several million dollars per year to the state when children receive preventive dental care.[155] [156] However, immediate budgetary pressures and concerns about costly waste, fraud, and abuse by some Medicaid dental providers may move lawmakers to consider reducing reimbursement rates to more closely align with other states' and national averages.

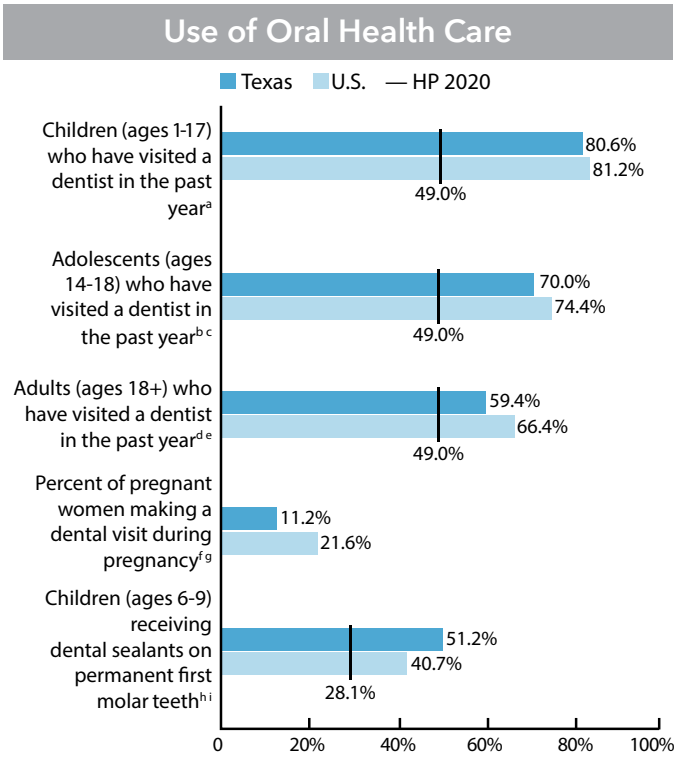
Oral Health Care Utilization

Preventive and Routine Care. People who visit the dentist throughout life report better overall oral health status, lower rates of tooth decay and tooth loss, and fewer cavities in adulthood.[157] Texas' children are accessing and using dental care on par with national averages and well in excess of Healthy People 2020 targets. Among all Texas children ages 1-17, 80.6% have made a dental visit in the past year, as well as 70.0% of adolescents ages 14-18. Adults in the state have a lower rate of past year dental visits than children and teens, with 59.4% making a past year dental visit. While this rate exceeds the Healthy People 2020 target of 49.0%, it falls short of the national average of 66.4% (Figure 6).

Women are at high risk for developing periodontal disease while pregnant due to hormonal changes, making dental visits during pregnancy an essential component of prenatal care. However, on this measure Texas lags; just 11.2% of pregnant women made a dental visit, about half the national average rate (Figure 6).

Since the 1980s, the number of people making an annual dental visit has steadily increased for nearly all populations. However, rates of receiving regular dental care vary by race and ethnicity, geography, education, and household income.[158] [159] [160] Past-year dental visit rates have historically been higher among Texans than the national rate for all race and ethnic groups, though visit rates for Whites are approximately 20% higher than Blacks and 25% higher than Hispanics. College-educated Texans historically visit the dentist at about 25% higher rates than high school graduates and about 50% higher rates than those with less than a high school education.[161]

Figure 6



Sources:

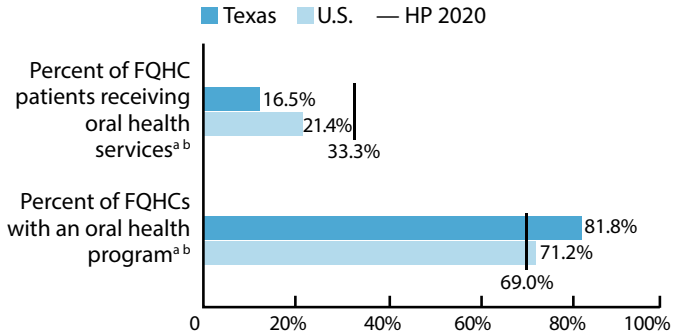
[a] National Survey of Children's Health, 2016
[b] Youth Risk Behavior Surveillance System, 2015
[c] Texas Youth Risk Behavior Surveillance System, 2017
[d] Texas Behavioral Risk Factor Surveillance System, 2016
[e] Behavioral Risk Factor Surveillance System, 2016
[f] Texas Pregnancy Risk Assessment Monitoring System, 2015
[g] Pregnancy Risk Assessment Monitoring System, 2011
[h] National Health and Nutrition Examination Survey, 2013-2014
[i] Texas Basic Screening Survey, 2012-2013

Texas' oral health safety net is comprised of 73 federally qualified health centers (FQHCs), three FQHC look-alikes, 60 non-FQHC community health centers, three schools of dentistry, 64 state and local health departments, 70 public and non-profit hospitals, and 90 school-based health centers.[162] Despite an apparent breadth of options, the oral health safety net is diffuse, under-resourced, and strains to meet demand. Even when care is deeply discounted, some patients still remain burdened by out-of-pocket costs and other accessibility issues impeding their ability to connect with care they need.

About four in five FQHCs in Texas have an oral health program, a higher rate than the national average, though oral health services are delivered to just 16.5% of FQHC patients in those settings, a lower than average rate compared to the nation (Figure 7).

Figure 7

Oral Health Care in Federally Qualified Health Centers



Sources:
[a] Uniform Data System, 2015
[b] Uniform Data System, 2016 (Texas)

A core function of Texas' dental care system – especially in the safety net – is administering long-acting preventive care like sealants. Sealants are plastic coatings applied to molars, creating a barrier on the tooth's pits and fissures to prevent caries from forming. Sealants are extremely effective at preventing tooth decay, reducing pain and suffering, decreasing expensive hospital dental treatments, and saving taxpayer dollars by averting the cost of restorative care.[163] [164] A 2012 analysis estimated the state of Texas would save $29 million by providing sealants to every child in the state.[165] Currently, 51.0% of Texas children age 6-9 have sealants on their permanent first molars, better than the national rate of 40.7% (Figure 6).

The American Academy of Pediatric Dentistry has published new guidelines recommending silver diamine fluoride for arresting and managing existing caries in children.[166] Silver diamine fluoride treatment has shown encouraging results in trials of populations who often receive care in safety net settings, including children, older adults, people with intellectual and developmental disabilities, and others who may have functional limitations preventing them from tolerating dental intervention or maintaining oral hygiene without assistance.[167] [168] As of September 2017, silver diamine fluoride was not a covered benefit under Texas Medicaid.[169] The use of silver diamine fluoride is relatively new, but may proliferate in safety-net settings and state Medicaid programs as new evidence emerges.

Emergency Care. Oral health problems contribute heavily to avoidable use of expensive emergency care. Approximately one person every 15 seconds visits a hospital emergency department for a dental condition, a rate cumulating in 2.18 million total dental emergency visits nationwide in 2012.[170] Some oral health-related emergency department use results when people who cannot or do not use oral health care regularly have minor, treatable issues that worsen into serious, acute, or even life-threatening conditions.[171] [172] Not all oral health-related emergency care is for severe issues; many people choose emergency departments as their usual source of care because it is more convenient, or because it is the only care setting where they cannot be turned away.[173]

Approximately one person every 15 seconds visits a hospital emergency department for a dental condition.

In Texas, 7.2% of teens age 14-18 say they have visited the emergency room for dental problems.[174] Comparable data are not available for adults or young children. For people of all ages, most dental visits to emergency departments are for preventable, non-traumatic problems requiring pain management or infection treatment. An estimated 80% of these visits could be handled effectively in a community setting.[175] Odds of dental emergency visits being non-traumatic have increased 16% from 2009-2015, with uninsured patients as much as two times more likely to make a non-traumatic dental visit to the emergency room.[176]

Can Texas' Oral Health Workforce Meet Demand?

Oral Health Workforce Capacity

Current Size & Distribution. Workforce size and geographic distribution influence whether the state's oral health system has sufficient capacity to meet existing demand. The oral health workforce in Texas currently consists of over 300,000 licensed health care professionals, providing services ranging from routine prevention to intervention for oral health emergencies. Dentists, oral surgeons, and orthodontists perform preventive, diagnostic, and treatment services specifically on the mouth and face, with dental hygienists and dental assistants in support.[177] Often, front-line providers such as primary care physicians, nurse practitioners, physician assistants, and emergency physicians serve as essential members of the oral health workforce, detecting and treating oral health problems in patients who do not receive regular dental care.

No state has added more dentists since 2013 than Texas, over 100 more than California, the state with the second-largest number of new dentists.[178] However, the dental workforce is disproportionately concentrated in urban areas: while 15% of Texas' population resides in rural areas, just 7% of dentists practice outside of the state's urban centers.[179] [180] Many of Texas' rural counties lack a population center large enough to support a dental health care facility, leaving these areas short of providers. More than 4 million Texans live in dental health professional shortage areas (DHPSAs); that is, areas where there is less than one practicing dentist for every 5,000 residents (or 4,000 residents in higher need areas).[181]

Lower-income working adults and families who reside in rural areas comprise most of the dentally underserved population.[182] Dental problems are more common among people living at or near the poverty level, who have lower rates of dental insurance coverage and rely more on public programs to pay for care.[183] These trends suggest Texans bearing the highest burden of oral disease are living in areas least equipped to serve them.

Workforce Trends. The disproportionate concentration of health care providers in cities is largely attributable to recent demographic and economic transitions. More than one-third of dentists in the state are now over age 55, and 41% of the dentist workforce will be at or past retirement age within a decade.[184] As dentists retire and leave the workforce, it will be important to monitor whether the number and distribution of new dentists in the state is adequate to sustain capacity vacated by those who leave. Currently, Texas' urban areas have a net migration rate 25 times larger and growth rate three times larger than the state's rural areas, potentially impacting which areas of the state deliver the most promising opportunities for dental practice.[185]

Federal and state programs have been established to incentivize early-career dental professionals to practice in underserved areas of Texas while relieving student debt pressure. The National Health Service Corps (NHSC) offers a $50,000 initial award in exchange for two years of practice in a federally designated health professional shortage area (HPSA) for physicians, or DHPSA for dentists, while the Texas Higher Education Coordinating Board offered $10,000 in loan repayment for a 12-month commitment to practice pediatric or general dentistry in a DHPSA, and up to $160,000 in loan repayment over four years for physicians practicing in a HPSA.[186] Participating dentists and physicians were required to accept Medicaid and could not turn away patients based on ability to pay. Due to budgetary constraints, state funding for the Texas Dental Loan Repayment Program was not appropriated in the 85th legislative session.[187] [188]

While loan repayment assistance programs do ease debt, it is unclear how strongly they influence new dentists' decision to practice in underserved areas. Studies show dentists say loan repayment is minimally important compared to other factors in their choice of practice location, suggesting practitioners in underserved areas might have chosen those areas with or without the program.[189] Furthermore, critics of loan repayment programs have pointed out the potential for misuse and abuse by dentists seeking opportunities to advance their portfolio for specialty practice rather than providing underserved patients with the full spectrum of care.

In Central Texas, a private foundation has partnered with the state to fund loan repayments, an example of a local initiative to address oral health workforce gaps. Through December 31, 2017, The St. David's Foundation awarded nearly $1.5 million in loan repayments through the Texas Higher Education Coordinating Board for physicians, physician assistants, dentists, and nurse practitioners who practice in safety net settings in the foundation's five-county greater Austin service area.[190] [191] Foundation funding for the program has been renewed for 2018, but no state funds have been appropriated for the current biennium. While the St. David's Foundation program has shown promise with the foundation's limited resources, philanthropic engagement at the regional level does not release the state from its responsibility and stake in growing the workforce in all under-resourced communities. Private-public collaborations modeled after the St. David's Foundation program may be better sustained and replicated with state investment.

Workforce Diversity

Cultivating cultural and linguistic diversity in the health workforce has emerged as a strategy to reduce health disparities observed among people of color and limited English proficient populations. Racial and ethnic diversity in the health professions is associated with higher patient satisfaction among patients of color, improved patient-provider communication, and indirectly, promotes responsiveness to social circumstances and cultural beliefs that influence patients' health.[192] [193] [194] Despite shifting racial and ethnic demographics, the oral health workforce – especially doctors and dentists – remains overwhelmingly White. The number of Black dentists in the U.S. would have to increase four times, Hispanic dentists five times, and American Indian/Alaska Native dentists nearly eight times to reach parity with their respective shares of the U.S. population.[195] [196] Currently, there are not enough Hispanics in the nation's pipeline of new dentists to bring their proportion level with the Hispanic population, especially in regions of the country experiencing rapid Hispanic population growth.[197] Because Texas is among the states with the largest and fastest growing Hispanic populations, preventing excessive discordance between the state's share of Hispanic dentists and population overall could be a challenge in years to come.[198]

Research shows clinicians of color disproportionately bear the responsibility of care for underserved populations. Black, Hispanic, and American Indian/Alaska Native dentists and physicians are more likely than White dentists and physicians to practice in underserved communities, treat more patients of color, and more patients with lower incomes or who are covered by public insurance.[199] [200] They also bear significantly higher than average levels of student debt.[201] Some loan repayment programs, like NHSC, intentionally recruit physicians and dentists from diverse socioeconomic, racial, and ethnic backgrounds in an effort to increase workforce diversity and representativeness in underserved communities. The proportion of African Americans and Hispanics in its clinician cohort is four to five times higher than the national rate.[202] [203] NHSC has also steadily augmented the health workforce in underserved areas, with nearly 90% remaining in underserved communities at least one year beyond their commitment period and 55% remaining after ten years.[204] While loan repayment incentives and other social and cultural factors may increase the likelihood clinicians will elect to anchor their practice in underserved communities long-term, oral health professionals of color ought not bear an outsized responsibility for lower-compensated safety-net care.[205] Rather, different incentives are needed to fairly and equitably align oral health needs with Texas' highly skilled and growing workforce.

Resolving Workforce Shortages

Telehealth. Telemedicine and teledentistry have the potential to bridge gaps in rural oral health care access by allowing dental consultation to occur remotely via videoconference between providers and patients. In Texas, Medicaid has reimbursed telemedicine services for the past two decades, and use of telemedicine among Medicaid providers and patients continues to increase.[206] Teledentistry services are not included in Texas law authorizing telemedicine, and no laws have been passed encouraging or requiring teledentistry benefits in Medicaid and/or commercial plans (as states like Arkansas, Tennessee, California, and Washington have done).[207] Evaluations of teledentistry programs consistently show encouraging results; patients tend to rate their experience positively, outcomes improve, and most efforts have resulted in at least some cost savings to health systems.[208] Telehealth services can be part of a broad strategy to address shortages of oral health care in the most depopulated and under-resourced areas of the state, especially as a screening and diagnostic tool.[209] However, access barriers to conventional oral health interventions may remain.[210]

Assuming steady dental care utilization patterns, Texas will experience a shortage of nearly 500 fewer dentists than needed to meet statewide demand by 2025, but will have a surplus of over 3,300 dental hygienists by the same year.

Scope of Practice. Assuming steady dental care utilization patterns, Texas will experience a shortage of nearly 500 fewer dentists than needed to meet statewide demand by 2025, but will have a surplus of over 3,300 dental hygienists by the same year.[211] [212] Though the overall supply of dentists in Texas is projected to continue rising, consideration should be given to the value of conducting a comprehensive assessment of the state's dental workforce capacity to meet needs especially in different geographic settings.[213] In the recent past there has been a growing demand both at the community level and the Texas legislature to consider the state's mid-level providers workforce a potential sourse of capacity to address localized provider shortages.[214] Laws expanding scope of practice for existing mid-level providers or establishing new mid-level provider categories with expanded functions have been passed in Minnesota and Maine, and discussed in approximately a dozen other states.[215]

Opponents of expanding scope of practice have raised safety concerns about delegating dental procedures to providers with less extensive training, while proponents cite estimates that dental hygienists can safely perform approximately 50-80% of routine dental services delivered in community clinics and safety-net dental clinics.[216] [217] Advocates have also raised concerns that positioning mid-level providers to fill workforce shortages in higher-need communities could result in an inequitable standard of care, with poor consumers more likely to be treated by those with less education or experience.[218]

Overall, there is a need for more research to examine whether scope of practice expansions produce comparable outcomes to conventional dental care. The current literature contains results from promising pilot initiatives, but there are currently limited studies directly comparing these delivery models to conventional oral health care provided by a dentist, and no rigorous longitudinal studies showing long-term effectiveness at this time.

Moving forward, it will be important for all stakeholders to collaborate on identifying and addressing systemic gaps, and to strengthen the dental infrastructure to ensure efficient, quality-focused dental care for every Texan.

Key Findings & Discussion

This report's key findings reflect high-level themes observed consistently within regions and throughout the state. While these key findings begin to tell a high-level story on oral health in Texas, they are not intended to be exhaustive or conclusive. Rather, they serve as examples of the type of inquiry the data support, and provide a starting point for conversations around tailored, evidence-informed solutions.

1 While Texas is lagging in several oral health priorities, it has also shown capacity to lead.

Data and literature presented in this report confirm Texas has many opportunities to improve oral health across the state. Children in Texas experience tooth decay and dental problems at elevated rates: two-thirds (66.8%) of third graders in the state have had dental caries, compared to just over half (51.7%) of third graders nationally.[219] [220] Among third graders who have had caries, one quarter of those in Texas (26.2%) have not received treatment, compared to 16.2% nationally.[221] [222] Rates of adult oral health problems in Texas more closely resemble national averages, but still reflect a great burden of chronic or severe oral health deterioration with age. More than half (54.1%) of Texas adults age 45-64 have had tooth loss due to dental caries or periodontal disease, and 13.1% of Texas adults age 65 and older are edentulous, with none of their natural teeth remaining.[223] Only 11.2% of Texas women – half the national average – make recommended dental visits during pregnancy, a time of increased susceptibility to oral disease.[224]

Gaps in health insurance coverage and the high relative share of dental costs borne out of pocket provide ample reason for concern about Texans' ability to obtain and afford oral health care they need. Nearly 17% of Texans have no health insurance, the highest rate of any state in the nation.[225] While the exact dental uninsured rate in Texas is not publicly tracked, the U.S. dental uninsured rate is estimated to be about three times higher than the overall uninsured rate.[226] In addition, 40% of the nation's dental costs are borne out of pocket by consumers, compared to 11% of overall health care costs paid out of pocket.[227] Yet, over one-third of Texas' population lived in a low-income household[228] in 2016, and food insecurity affected 9.6% of Texans.[229] Families who have difficulty affording basic needs are unlikely to have disposable resources to spend on oral health care, especially services not covered by insurance.

Despite the state's oral health challenges, this report also provides evidence that Texas has achieved examples of success worth sustaining. For example, most of Texas' children and adolescents are obtaining oral health care regularly and children in Texas' Medicaid and CHIP programs are receiving dental care at some of the highest rates in the country. Eighty-one percent of children ages 1-17 have made a dental visit in the past year, as well as 70.0% of adolescents age 14-18.[230] [231] Approximately 69.2% of children enrolled in Texas' Medicaid and CHIP programs visit the dentist annually, well in excess of the U.S. average of 50.4% for this population.[149] Several urban and suburban regions serve as proof points of what can be achieved when threats to good oral health are minimized. Regions containing Austin, Round Rock/Hill Country, Dallas, Plano/Sherman, Houston, San Antonio, and the Brazos Valley have fewer than 10% of adults in poor dental health (defined as having had six or more teeth extracted due to dental caries or periodontal disease). Common threads between these regions include low smoking rates and oral cancer incidence, a greater supply of oral health professionals per capita, and higher rates of health insurance coverage. Notably, some of these regions achieve the state's best dental outcomes despite high proportions of low-income and food insecure residents, suggesting there may be protective factors or effective safety net initiatives in those regions to explore or potentially replicate elsewhere.

2 Texas' oral health burden is most concentrated in its rural and border regions.

Texas' oral health burden is stratified across distinct urban/rural and border/non-border divides, a pattern observed consistently across demographic, risk behaviors, chronic disease, clinical care, and oral health outcome measures. Rural regions are home to an older population with high rates of partial or complete tooth loss, prevalent chronic disease and health risk behaviors, and greater incidence of oral cancer. The border regions, while home to a younger population, have high rates of uninsured people living at or near the poverty level, with tremendous need for oral health services in under-resourced safety net care settings. Rural and border regions experience common oral health care access barriers, including profound provider shortages and low rates of adults who currently use regular dental care. In the border regions, adult health uninsured rates range from 29.5 to 41.6%.[232]

The rural region containing Abilene has an estimated 27.6% of adults in poor dental health. This rate is nearly four times higher than the top performing urban regions (each with rates of 7.2-7.9%), and still approximately double the rate in other rural regions with similar age structures.[233] The rural regions containing Abilene and Wichita Falls also have some of the state's highest oral cancer incidence rates.

Chronic disease prevalence and rates of health risk behaviors are excessive in rural regions. The rural region containing Abilene has nearly three times the estimated rate of diabetes as the Dallas region (22.1% vs. 8.2%), and twice the rate of smoking as the San Antonio region (20.9% vs. 11.5%).[234] Border regions are not consistently represented among those with the highest rates of smoking, cardiovascular disease, or excessive drinking. Because estimates are not age-adjusted, differences in underlying age structure of the state's rural/urban and border/non-border populations may at least partially explain differences. In general, rural counties in Texas tend to have older median ages, and border counties tend to have younger median ages.

All seven rural regions fall below the state average (59.4%) for the estimated percent of adults making a dental visit in the past year.[235] There appears to be strong overlap between regions with the lowest rates of adults with past-year dental visits and the supply of oral health providers in the region. While the urban, non-border regions containing Houston, Dallas, Austin, Fort Worth, and San Antonio all have at least one dentist for every 3,000 residents, four rural and all three border regions have no more than one dentist for every 4,000 residents. The Plano/Sherman region, which has the highest dental supply in the state, has quadruple the rate of dentists per capita as the Laredo region (2,084 to 1 in the Plano/Sherman region versus 9,012 to 1 in the Laredo region).[236] Similar trends are observed for dental hygienists, dental assistants, and primary care physicians.

A key distinction between rural and border regions appears to be use of the public health care safety net. In all seven rural regions, a relatively low proportion of the population (20% or below) is enrolled in Medicaid coverage. In contrast, the top three regions with the highest proportion of residents enrolled in Medicaid are all border regions, with between 20-29% of the population enrolled.[237] Annual Medicaid costs per enrollee (both dental and non-dental) are among the state's highest in border regions, and among the lowest in rural regions.[238] While it is unclear what underlying health needs may explain these differences, it does suggest a trend worthy of further analysis: border regions with younger populations have higher costs per enrollee in Medicaid, whereas in rural regions with older populations, costs per enrollee are low. This finding somewhat corroborates previous research that has uncovered pockets of abnormally high Medicare spending in parts of the Rio Grande Valley, patterns which were potentially explained by high post-acute care costs and poor care coordination.[239]

3 Focusing narrowly on health care neglects other opportunities to improve oral health.

Data and literature presented in this report suggest access to health care is necessary, but not sufficient, to achieve good oral health outcomes. Perhaps nowhere is this finding more clearly illustrated than by comparing Texas' strong position on child access to oral health care alongside its poor performance in oral health outcomes for Texas children.

This report finds evidence of several conditions promoting good access to care for Texas children. Approximately 90.0% of Texas children have health insurance, and for those with private plans, pediatric dental care is a required essential health benefit under the ACA.[240] Texas' Medicaid and CHIP programs, which today cover nearly half of Texas' children, have included dental benefits since 2006. Reimbursements for child dental services in Medicaid increased 33.8% from 2003-2013, boosting the number of participating providers.[241] Higher reimbursements in Texas were found to increase the number of children receiving preventive care and decreased unmet dental need.[242] Today, eight out of ten Texas children age 0-17 have made a dental visit in the past year, and about 25% more Texas children receive sealants than the national average, decreasing the likelihood of dental caries.

Many of the conditions that currently promote widespread children's access to care in Texas have been in place for a decade or more. However, child oral health outcomes in Texas continue to lag: 7.5% of Texas parents say their child's oral health is fair or poor (compared to 5.5% nationally), and 14.9% say their child has had dental problems like toothaches and bleeding gums.[243] And while Texas ranks 1st in the nation for the percent of Medicaid-enrolled children making dental visits, Texas ranks 39th out of 41 ranked states for the percentage of third graders who have experienced dental caries.[244] [245]

This phenomenon was also observed regionally. Despite performing at or above the state average on several measures of oral health care access, such as oral health care provider supply and past-year dental visit rates, the Beaumont/Galveston region in Southeast Texas ranks among the worst in the state for oral cancer mortality, rates of poor adult dental health, and edentulism among older adults. Put another way, oral health outcomes in the Beaumont/Galveston region are no better than regions with measurably greater access limitations.

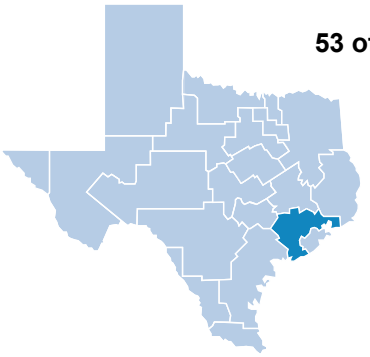
Other factors appear to be undermining the protective effects of access to oral health care for Texans, and this report identifies several potential contributors. The percent of Texans served by fluoridated drinking water has decreased from 79.0% in 2014 to 68.8% in 2018.[246] [247] Food insecurity, which affects a greater proportion of Texas' rural population than urban, is a source of risk for untreated dental caries and dental pain among children. And, in the Beaumont/Galveston example above, the region's smoking, cardiovascular disease, and obesity rates rank among some of the highest in the state.

Summary

The wealth of data and supporting literature presented in this report aims to empower public health leaders to better understand oral health strengths and challenges across Texas. The report's three key findings reflect themes that emerged from state, regional, and local analyses, while also providing examples of how data can stimulate inquiry, inform decision-makers, and help establish oral health priorities.

The report confirms oral health problems are widespread among Texans of all ages and backgrounds. These problems contribute to a largely preventable burden of disease, cost taxpayers millions of dollars in avoidable health care spending, and cause untold pain and suffering. Already a pervasive and expensive issue, oral health is poised to grow into an increasingly complex and urgent challenge for the state. Texas has one of the nation's youngest populations, but life expectancies remain high, the state's chronic disease burden is on the rise, and the population is forecast to continue to grow and age.[248] These trends suggest more Texans will begin to live more years of their life affected by oral health issues, which already burden Texas children from an early age and usually do not resolve themselves over time without access to appropriate and timely care.

Texas public health leaders should consider opportunities within and beyond the context of clinical care to improve oral health. As evidence from this report shows, focusing narrowly on one or two elements is insufficient; a thorough approach must address risk factors, co-occurring diseases, insurance coverage, care, and health-related social determinant needs.

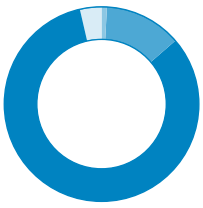


Southeast - Houston

9 counties: Austin, Calhoun, Chambers, Colorado, Fort Bend, Harris, Matagorda, Waller, Wharton

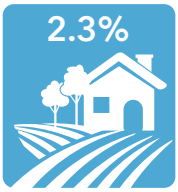
Population 5,352,934

County Populations

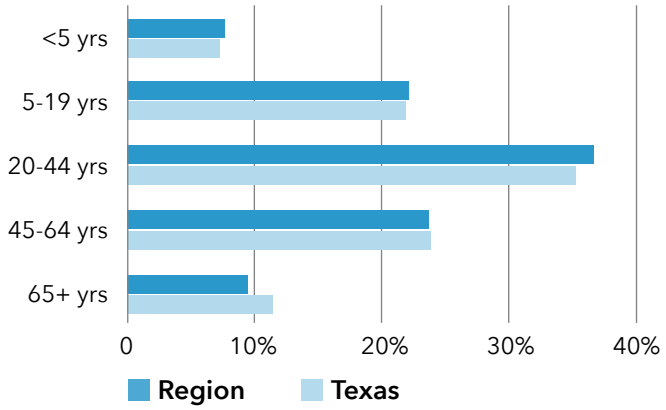


Harris
Ft. Bend
Waller
Others

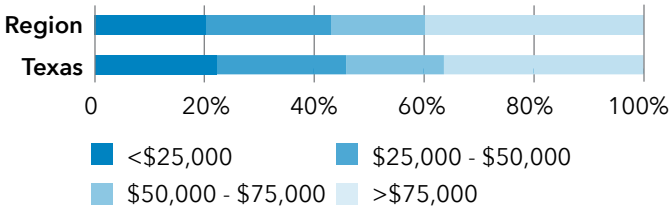
Rural Population



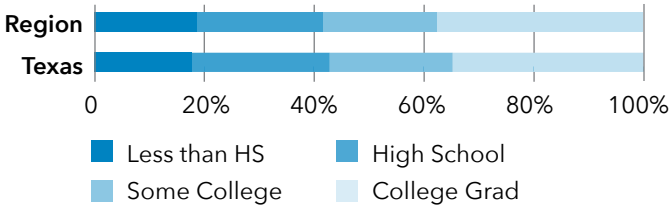
Age



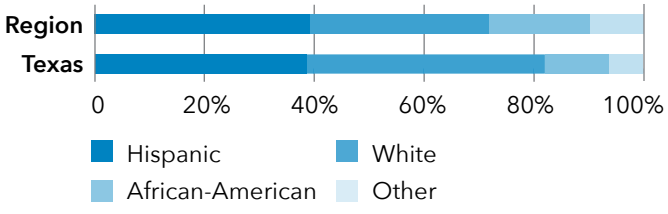
Income



Education



Race and Ethnicity

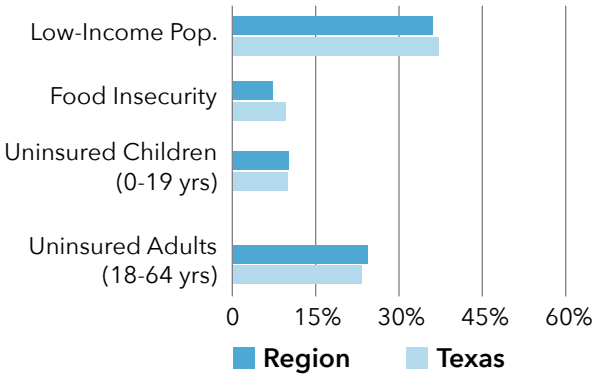


Key Points

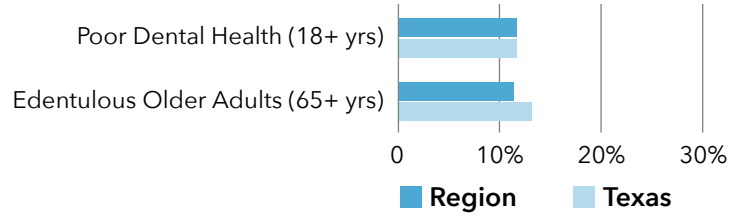
- This region's oral health outcomes are similar to the rest of the state, but not as good as other regions containing the state's major cities (Dallas, San Antonio, Austin).
- Past-year dental visit rates among adults are on par with the state average. Provider supply is more abundant in this region, but appears driven by higher numbers of providers per capita in Fort Bend and Harris, the region's two most populous counties. On the other hand, Chambers and Waller counties have more limited provider supply.
- There is substantial county-level variation on social and economic measures, with approximately a two-fold difference between the counties with highest and lowest rates of low-income and uninsured residents.

Southeast - Houston

Socioeconomic Factors



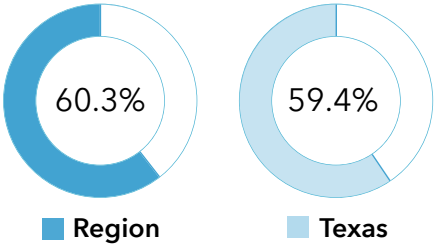
Oral Health Outcomes



	Region	Texas
Oral Clefts rate per 10,000 live births	12.7	15.8
Oral Cancer Incidence rate per 100,000 Pop.	10.9	10.8
Oral Cancer Mortality rate per 100,00 Pop.	3.5	2.6

Clinical Care

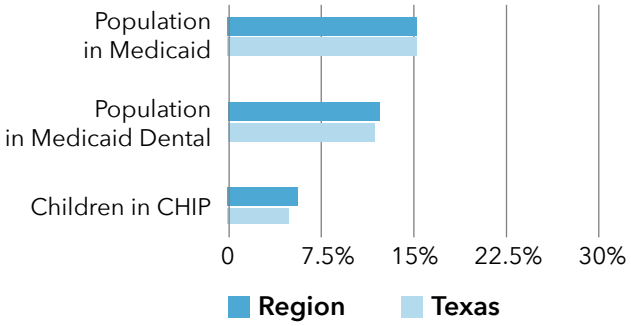
Past-Year Dental Visits (18+ years)



Population to Provider Ratio	Region	Texas
General Dentist	2468: 1	2970: 1
Pediatric Dentist	10172: 1	9411: 1
Specialized Dentist	12318: 1	14291: 1
Dental Hygienist	2513: 1	2220: 1
Dental Assistant	785: 1	805: 1
Primary Care Physician	1206: 1	1362: 1
Nurse Practitioner	1722: 1	1961: 1
FQHCs per 100,000 pop.	1.4	1.5

Medicaid and CHIP

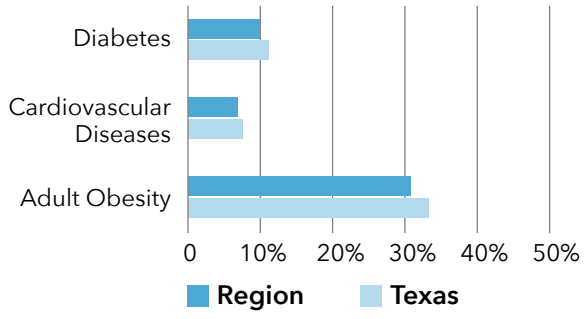
Enrollment (% of total population)



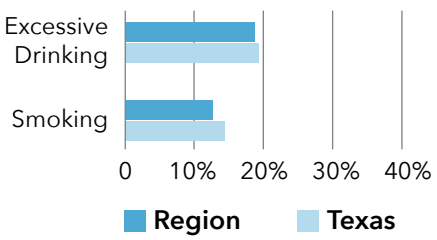
Annual Expenses Per Enrollee	Region	Texas
Medicaid Non-Dental	$4,832	$5,224
Medicaid Dental	$418	$419
CHIP Non-Dental	$1,587	$1,527
CHIP Dental	$286	$285

Risk Factors

Chronic Conditions

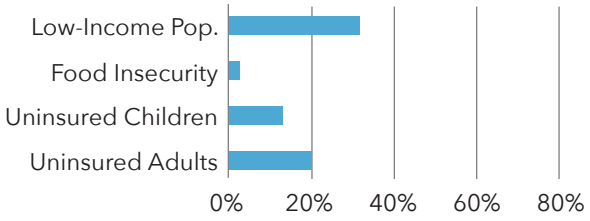


Behaviors



Austin County Population 29,107

Socioeconomic Factors



Oral Health Outcomes

Oral Clefts Rate per 10,000 Live Births	0.0
Oral Cancer Incidence Rate per 100,000 pop.	11.3
Oral Cancer Mortality Rate per 100,000 pop.	3.5

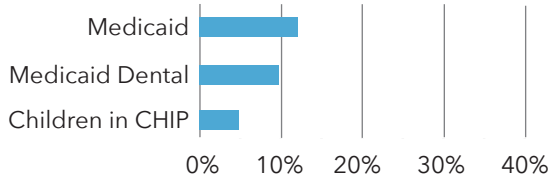
Clinical Care

Pop. to Provider Ratio

General Dentist	3080:1
Pediatric Dentist	7026:1
Specialized Dentist	33876:1
Dental Hygienist	2606:1
Dental Assistant	584:1
Primary Care Physician	3764:1
Nurse Practitioner	8469:1
FQHCs per 100,000 pop.	0

Medicaid & CHIP

Enrollment (% of total population)

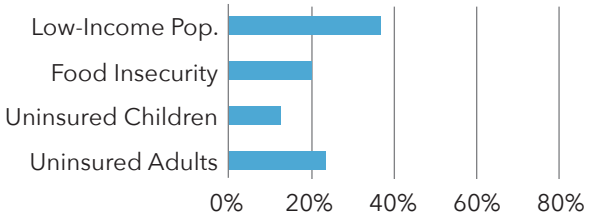


Annual Expenses per Enrollee

Medicaid Non- Dental	$4,974
Medicaid Dental	$417
CHIP Non- Dental	$1,595
CHIP Dental	$284

Calhoun County Population 21,805

Socioeconomic Factors



Oral Health Outcomes

Oral Clefts Rate per 10,000 Live Births	---
Oral Cancer Incidence Rate per 100,000 pop.	16.6
Oral Cancer Mortality Rate per 100,000 pop.	2.4

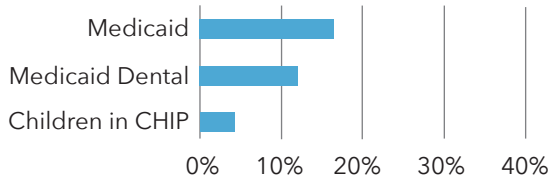
Clinical Care

Pop. to Provider Ratio

General Dentist	4814:1
Pediatric Dentist	-
Specialized Dentist	-
Dental Hygienist	4012:1
Dental Assistant	1504:1
Primary Care Physician	1852:1
Nurse Practitioner	3439:1
FQHCs per 100,000 pop.	18.3

Medicaid & CHIP

Enrollment (% of total population)

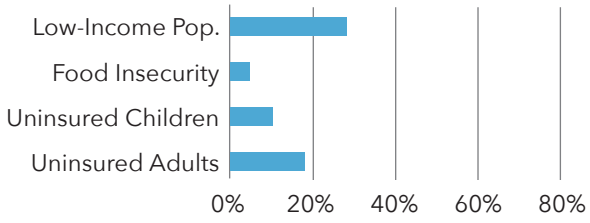


Annual Expenses per Enrollee

Medicaid Non- Dental	$6,348
Medicaid Dental	$416
CHIP Non- Dental	$1,591
CHIP Dental	$284

Chambers County Population 38,072

Socioeconomic Factors



Oral Health Outcomes

Oral Clefts Rate per 10,000 Live Births	---
Oral Cancer Incidence Rate per 100,000 pop.	13
Oral Cancer Mortality Rate per 100,000 pop.	3

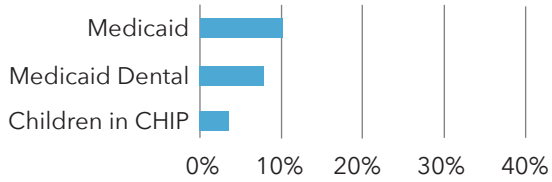
Clinical Care

Pop. to Provider Ratio

General Dentist	10878:1
Pediatric Dentist	-
Specialized Dentist	-
Dental Hygienist	7252:1
Dental Assistant	1088:1
Primary Care Physician	3956:1
Nurse Practitioner	3626:1
FQHCs per 100,000 pop.	5.3

Medicaid & CHIP

Enrollment (% of total population)

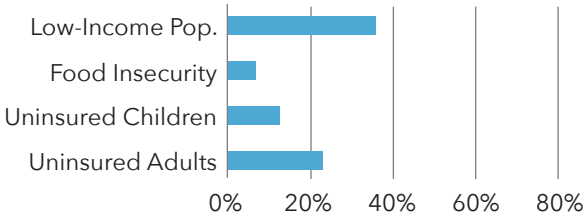


Annual Expenses per Enrollee

Medicaid Non- Dental	$5,246
Medicaid Dental	$418
CHIP Non- Dental	$1,586
CHIP Dental	$286

Colorado County Population 20,792

Socioeconomic Factors



Oral Health Outcomes

Oral Clefts Rate per 10,000 Live Births	---
Oral Cancer Incidence Rate per 100,000 pop.	14.1
Oral Cancer Mortality Rate per 100,000 pop.	4.1

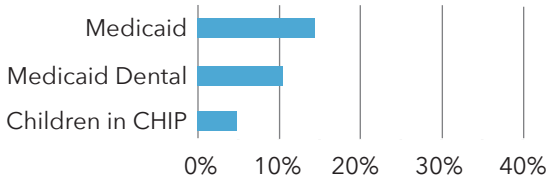
Clinical Care

Pop. to Provider Ratio

General Dentist	5538:1
Pediatric Dentist	-
Specialized Dentist	-
Dental Hygienist	3692:1
Dental Assistant	1007:1
Primary Care Physician	1166:1
Nurse Practitioner	4430:1
FQHCs per 100,000 pop.	0

Medicaid & CHIP

Enrollment (% of total population)

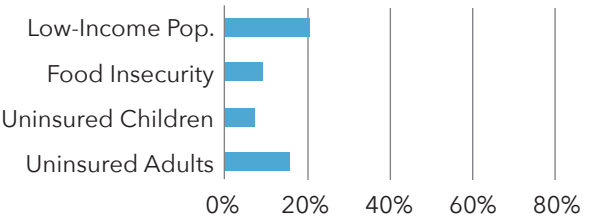


Annual Expenses per Enrollee

Medicaid Non- Dental	$5,400
Medicaid Dental	$419
CHIP Non- Dental	$1,306
CHIP Dental	$283

Fort Bend County Population 683,756

Socioeconomic Factors



Oral Health Outcomes

Oral Clefts Rate per 10,000 Live Births	6.9
Oral Cancer Incidence Rate per 100,000 pop.	10
Oral Cancer Mortality Rate per 100,000 pop.	2

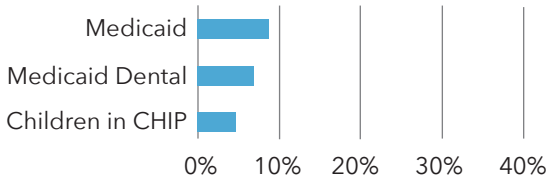
Clinical Care

Pop. to Provider Ratio

General Dentist	2742:1
Pediatric Dentist	5621:1
Specialized Dentist	9481:1
Dental Hygienist	2023:1
Dental Assistant	802:1
Primary Care Physician	1613:1
Nurse Practitioner	2281:1
FQHCs per 100,000 pop.	0.4

Medicaid & CHIP

Enrollment (% of total population)

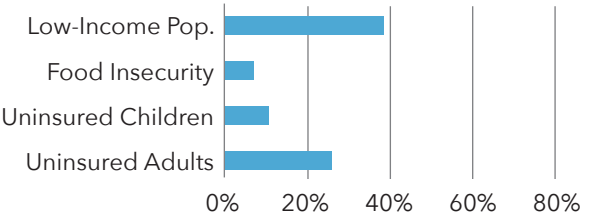


Annual Expenses per Enrollee

Medicaid Non- Dental	$5,029
Medicaid Dental	$421
CHIP Non- Dental	$1,590
CHIP Dental	$287

Harris County Population 4,434,257

Socioeconomic Factors



Oral Health Outcomes

Oral Clefts Rate per 10,000 Live Births	9.1
Oral Cancer Incidence Rate per 100,000 pop.	10.9
Oral Cancer Mortality Rate per 100,000 pop.	2.6

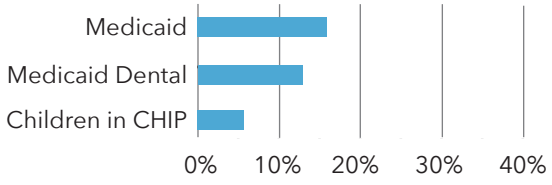
Clinical Care

Pop. to Provider Ratio

General Dentist	2363:1
Pediatric Dentist	11160:1
Specialized Dentist	12356:1
Dental Hygienist	2606:1
Dental Assistant	783:1
Primary Care Physician	1124:1
Nurse Practitioner	1599:1
FQHCs per 100,000 pop.	1.3

Medicaid & CHIP

Enrollment (% of total population)

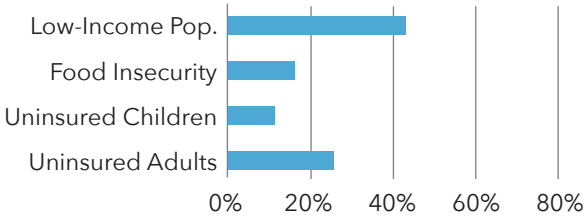


Annual Expenses per Enrollee

Medicaid Non- Dental	$4,798
Medicaid Dental	$418
CHIP Non- Dental	$1,588
CHIP Dental	$285

Matagorda County Population 36,719

Socioeconomic Factors



Oral Health Outcomes

Oral Clefts Rate per 10,000 Live Births	---
Oral Cancer Incidence Rate per 100,000 pop.	16.9
Oral Cancer Mortality Rate per 100,000 pop.	1.7

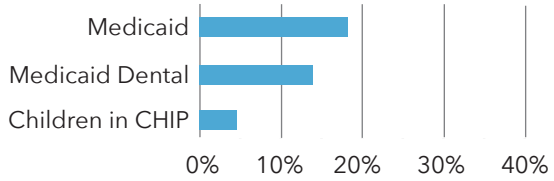
Clinical Care

Pop. to Provider Ratio

General Dentist	4860:1
Pediatric Dentist	-
Specialized Dentist	-
Dental Hygienist	1851:1
Dental Assistant	793:1
Primary Care Physician	1851:1
Nurse Practitioner	2991:1
FQHCs per 100,000 pop.	10.9

Medicaid & CHIP

Enrollment (% of total population)

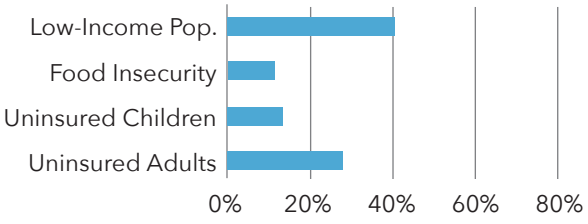


Annual Expenses per Enrollee

Medicaid Non- Dental	$5,110
Medicaid Dental	$419
CHIP Non- Dental	$1,588
CHIP Dental	$286

Waller County Population 47,049

Socioeconomic Factors



Oral Health Outcomes

Oral Clefts Rate per 10,000 Live Births	---
Oral Cancer Incidence Rate per 100,000 pop.	9.1
Oral Cancer Mortality Rate per 100,000 pop.	3

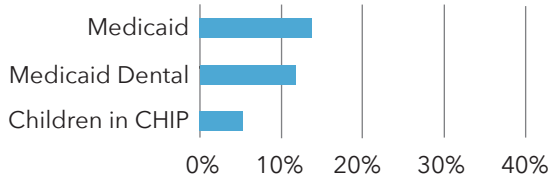
Clinical Care

Pop. to Provider Ratio

General Dentist	10619:1
Pediatric Dentist	-
Specialized Dentist	-
Dental Hygienist	6637:1
Dental Assistant	1002:1
Primary Care Physician	17698:1
Nurse Practitioner	10619:1
FQHCs per 100,000 pop.	4.3

Medicaid & CHIP

Enrollment (% of total population)

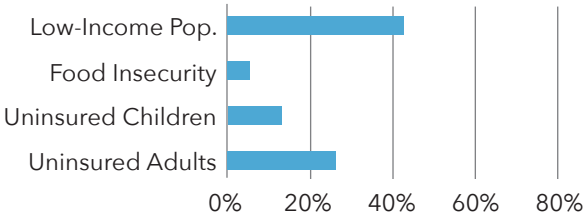


Annual Expenses per Enrollee

Medicaid Non- Dental	$4,647
Medicaid Dental	$421
CHIP Non- Dental	$1,585
CHIP Dental	$286

Wharton County Population 41,377

Socioeconomic Factors



Oral Health Outcomes

Oral Clefts Rate per 10,000 Live Births	---
Oral Cancer Incidence Rate per 100,000 pop.	10.8
Oral Cancer Mortality Rate per 100,000 pop.	2.8

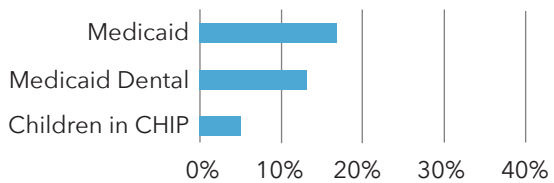
Clinical Care

Pop. to Provider Ratio

General Dentist	2669:1
Pediatric Dentist	-
Specialized Dentist	21351:1
Dental Hygienist	1294:1
Dental Assistant	445:1
Primary Care Physician	1941:1
Nurse Practitioner	5338:1
FQHCs per 100,000 pop.	0

Medicaid & CHIP

Enrollment (% of total population)



Annual Expenses per Enrollee

Medicaid Non- Dental	$5,044
Medicaid Dental	$420
CHIP Non- Dental	$1,581
CHIP Dental	$288