

Oral Health

in Connecticut 2013-2018

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Office of Oral Health

Situated within Connecticut Department of Public Health, the Office of Oral Health (OOH) was established in 2005 to provide leadership and expertise in dental public health, as well as to maintain a strong and sustainable infrastructure to support essential public health activities related to oral health. The OOH became a state mandated office in 2006.

Mission

The OOH strives to promote health and reduce disease and health disparities in Connecticut through enhanced oral health and oral healthcare access. The OOH works to build the public health infrastructure for oral health within the DPH and throughout the state. The goals of the OOH include the implementation of effective, culturally appropriate oral health promotion and disease prevention programs that adopt, adapt and enhance best practices. The OOH also works to centralize the collection of oral health data in order to better detect and monitor disease, inform policy, and evaluate programs.

Activities

The OOH supports Connecticut residents through assessment, policy development, and assurance activities that include the following:

- ◆ collecting, analyzing, and reporting oral health data;
- ◆ implementing an oral health surveillance system to identify and detect disease, to inform policy, and to plan and evaluate programs;
- ◆ providing leadership in developing plans and policies through a collaborative process;
- ◆ mobilizing community partnerships to identify and implement solutions to address oral health needs;
- ◆ informing and empowering the public regarding oral health problems and solutions;
- ◆ supporting access to quality oral health services; and
- ◆ promoting laws and regulations that protect the public's well-being.

Website

<https://portal.ct.gov/dph/Oral-Health/oral-health/Office-of-Oral-Health>

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The Status of Oral Health in *Connecticut*

Oral health is key to overall health and wellbeing across the lifespan. The condition of our mouth and teeth plays an important role in everything we do: the way we speak, the foods we eat, our physical comfort, our willingness to laugh and smile, and the confidence we show in interacting with others. Most of these are hard to do if we suffer from oral diseases.

Examples of oral disorders include “chronic mouth and facial pain, oral and throat cancer, oral infection and sores, periodontal (gum) disease, tooth decay, tooth loss, and other diseases and disorders that limit an individual’s capacity in biting, chewing, smiling, speaking, and psychosocial wellbeing.”^{1,2} Oral disorders are leading causes of disease in the world, affecting approximately half of the world’s population—nearly 3.5 billion people.³

Though common across all social groups, oral diseases disproportionately affect socially disadvantaged people. In fact, differences in oral disease prevalence and access to dental care by socioeconomic status, racial grouping, and (dis)abilities are among the most glaring health disparities in the United States (US).⁴

In 2019, Connecticut was identified as one of the healthiest states in the nation, ranking fourth among all states in overall health of its residents, fifth in quality of clinical care, seventh in health policy, seventh in dentists per capita, fifth in health behaviors, and first in annual dental visits, according to America’s Health Rankings,

an annual report by the United Health Foundation.⁵

While these health rankings are encouraging, Connecticut has also been ranked third in income inequality, with the top 1% of families earning an average of 37.2 times as much as the bottom 99% of the population in 2015, according to the Economic Policy Institute.⁶ In 2019, nearly one-fifth (18.8%) of Connecticut’s households lived in areas of concentrated disadvantage.⁵

This report highlights the many steps Connecticut has taken to promote oral health equity, including providing fluoridated water to a large percentage of its citizens, offering extensive dental benefits to both children and adults on HUSKY Health insurance, ensuring there is a robust oral health safety net in place, and providing access to dental care in schools. As a result, Connecticut boasts one of the highest dental utilization rates in the country among those with Medicaid/Children’s Health Insurance Program (CHIP) coverage, also known in Connecticut as HUSKY Health. These efforts have resulted in relative equity in dental visits, dental sealants, and oral health among children and adolescents.

This report also highlights ongoing oral health inequities in Connecticut. These inequities increase with age and become more pronounced in adulthood and old age, which suggests a cumulative effect of disadvantage

associated with low socioeconomic status, racial groupings, and disabilities.

The report is structured as a series of fact sheets that offer synopses of the status of oral health in Connecticut, organized by age group and situational status across the lifespan, including very young children, children, children living in low-income households, children and youth with special needs, adolescents, adults, pregnant women, and older adults. Each fact sheet includes an overview of oral disease and prevention specific to the target group, followed by more specific information about those in Connecticut. Special care is taken to identify Connecticut's oral health disparities.

The most recent information available at this writing is used to describe the status of oral health in Connecticut. State data are compared with national and regional data, with a focus,

when possible, on how Connecticut is faring in relationship to the *Healthy People 2020* oral health objectives. *Healthy People 2020* is a national initiative that provides "science-based, 10-year national objectives for improving the health of all Americans."⁷ An at-a-glance overview of *Healthy People 2020* targets and national and state data are presented below for each of the 22 objectives pertaining to oral health (Table).⁸

Connecticut's oral health infrastructure is summarized in the final factsheet in this report. Fact sheets are written so they can be easily accessed and used as standalone documents to promote awareness of oral health. The report in its entirety contributes to attempts to monitor Connecticut's oral disease burden and inform the state's prevention and treatment efforts.

Table. *Healthy People 2020 Objectives and National and Connecticut Data*

Healthy People 2020 Objectives*		2020 Target	US	CT	Objective Met
OH-1	Dental caries experience				
	▪ Children, 3-5 years	30.0%	27.9% ¹	32.0% ¹⁷	No
	▪ Children, 6-9 years	49.0%	51.6% ¹	41.5% ¹⁷	Yes
	▪ Adolescents, 13-15 years	48.3%	49.9% ¹	--	--
OH-2	Untreated dental decay				
	▪ Children, 3-5 years	21.4%	11.9% ¹	17.3% ¹⁷	Yes
	▪ Children, 6-9 years	25.9%	15.5% ¹	15.5% ¹⁷	Yes
	▪ Children, 13-15 years	15.3%	14.1% ¹	--	--
OH-3	Untreated dental decay				
	▪ Adults, 35-44 years with dental decay	25.0%	28.2% ¹	--	--
	▪ Adults 65-74 years with coronal caries	15.4%	15.8% ¹	--	--
	▪ Adults, 75+ years with root surface caries	34.1%	29.1% ¹	--	--
OH-4	Permanent tooth loss because of dental caries or periodontal disease				
	▪ Adults, 45-64 years, with at least one lost tooth	68.6%	71.7% ¹	42.4% ¹⁸	Yes
	▪ Adults, 65-75 years, with total tooth loss	21.6%	12.5% ¹	9.4% ¹⁸	Yes
OH-5	Moderate or severe periodontitis				
	▪ Adults, 45-74 years	40.8%	37.4% ¹	--	--
OH-6	Oral and pharyngeal cancers detected at earliest stage	35.9%	29.5% ²	33.6% ¹⁹	No
OH-7	Use of the oral health care system in the past year (all ages)	49.0%	43.3% ³	76.5% ¹⁸	Yes
OH-8	Any preventative dental service for low-income children and adolescents during the past year	33.2%	38.7% ³	62.3% ²⁰	Yes
OH-9	School-based health centers with an oral health component				
	▪ Includes dental sealants	18.8%	24.4% ⁴	--	--
	▪ Includes dental care	7.0%	9.1% ⁴	29.3% ²¹	Yes
	▪ Includes topical fluoride	22.7%	33.1% ⁴	--	--
OH-10	Local health departments and health centers with an oral health program				
	▪ FQHCs with an oral health care program	73.3%	71.2% ⁵	56.3% ²²	No
	▪ Local health departments with oral health prevention or care program	28.4%	25.8% ⁶	--	--
OH-11	FQHC patients who receive oral health services at FQHCs	33.3%	21.4% ⁵	27.6% ²³	No
OH-12	Dental sealants on at least one molar tooth				
	▪ Children, 3-5 years	1.5%	4.3% ⁷	--	--
	▪ Children, 6-9 years	28.1%	38.2% ¹	38.8% ¹⁷	Yes
	▪ Children, 13-15 years	21.9%	42.4% ¹	--	--
OH-13	Population served by community water systems with optimally fluoridated water	79.6%	72.8% ⁸	89.5% ²⁴	Yes

Table. *Healthy People 2020 Objectives and National and Connecticut Data (Continued)*

Healthy People 2020 Objectives*		2020 Target	US	CT	Objective Met
OH-14	Preventative interventions in dental offices				
	▪ Adults who received information from a dentist or a dental hygienist focusing on reducing tobacco use or on smoking cessation in the past year	13.2%	11.5% ⁹	--	--
	▪ Adults who received an oral and pharyngeal cancer screening from a dentist or dental hygienist in the past year	28.6%	26.3% ⁹	--	--
	▪ Adults who were tested or referred for glycemic control from a dentist or a dental hygienist in the past year	7.3%	6.3% ⁹	--	--
OH-15	States, and the District of Columbia, that have a system for recording and referring infants and children with cleft lips and cleft palates to craniofacial anomaly rehabilitative teams				
	▪ States, and the District of Columbia, that have a system for recording cleft lips and cleft palates	39	39 ¹⁰	Yes	Yes
	▪ States, and the District of Columbia, that have a system for referral for cleft lips and cleft palates to rehabilitative teams	34	36 ¹⁰	--	--
OH-16	States, and the District of Columbia, with an oral and craniofacial health surveillance system	51	32 ¹¹	Yes	Yes
OH-17	Dental public health program directed by dental professional with public health training	25.7%	23.4% ⁶	No	No
C-6	Oropharyngeal cancer death rate per 100,000	2.3	2.5 ¹²	1.9 ¹⁹	Yes
AHS-6.3	Persons unable to obtain or delay in obtaining necessary dental care	5.0%	4.8% ³	--	--
D-8	Persons with diagnosed diabetes with at least an annual dental exam	61.2%	56.4% ¹³	70.0 ¹⁸	Yes
TU-1	Tobacco use by adults				
	▪ Cigarette smoking	12.0%	13.9% ¹³	12.2% ¹⁸	No
	▪ Use of smokeless tobacco products	0.2%	2.2% ¹⁴	--	--
	▪ Use of cigars, cigarillos, and little filtered cigars	0.3%	2.3% ¹⁴	--	--
TU-2	Tobacco use by adolescents				
	▪ Use of tobacco products in the past month	21.0%	17.0% ¹⁵	17.9% ²⁵	Yes
	▪ Use of cigarettes in the past month	16.0%	8.8% ¹⁶	3.5% ²⁵	Yes
	▪ Use of smokeless tobacco in the past month	6.9%	7.3% ¹⁵	1.6% ²⁵	Yes
	▪ Use of cigars in the past month	8.0%	8.0% ¹⁶	5.3% ²⁵	Yes

Note: *Healthy People 2020 objectives labeled OH-1 through OH-17 stand for "oral health" objectives 1 through 17; objective C-6 stands for "cancer" objective number 6; objective AHS-6.3 stands for "access to health services" objective number 6.3; objective D-8 stands for "diabetes" objective number 8; and objectives TU-1 and TU-2 stand for "tobacco use" objectives 1 and 2.

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Oral Health in *Early Childhood*

Tooth decay, also known as cavities or dental caries, is the most common of all chronic diseases in childhood. It is an infectious disease that can be passed from caregivers to children and that can affect infants from the time their teeth erupt, typically between 6 and 12 months of age.¹ Over one in five US children aged 2 to 5 years has had dental caries, and nearly one in ten has untreated tooth decay.² What is more, one in ten children with early childhood caries experiences oral pain.¹

Dental caries or cavities are caused by bacteria that metabolize sugars to create an acid which attacks the surfaces of teeth. Children are exposed to bacteria through the saliva of parents, caregivers, and playmates. The earlier they are exposed, the more likely they are to develop oral health issues.¹

Early childhood caries (ECC) is an aggressive disease that can result in rapid tooth decay, which in turn, can lead to tooth loss. Left untreated, the condition worsens and becomes more difficult to treat. ECC can affect the tooth's nerve tissue, which may require urgent care. It can also lead to other conditions, such as ear and sinus infections,¹ and can affect speaking, learning, playing, and eating, with consequences extending into adulthood. Lastly, it must be recognized that ECC is the single greatest risk factor for dental caries in permanent teeth.³

Early Childhood Preventing Oral Disease

There are several risk factors for developing ECC. Sharing utensils and using the mouth to wipe off pacifiers or bottle nipples are common ways to pass bacteria from caregivers to children. Putting kids to bed with a bottle of milk, formula, or juice causes a buildup of sugar and bacteria, primarily in the front of the mouth. Sugary snacks and drinks feed mouth

bacteria, which in turn create acid that causes tooth decay. These risks increase when snacks and drinks that contain sugar are given to young children,¹ and they are especially high when exposure to sugar is continuous, such as, for example, when a child drinks juice from a sippy cup throughout the day.

The good news is that ECC is preventable. Early dental care, routine dental hygiene, and a nutritious diet can slow down, or even reverse, the process of dental decay in young children. Oral hygiene is important from the first months of life. Babies should have their gums gently cleaned with a washcloth after meals and at bedtime. Once teeth erupt, infants need to have their teeth brushed with soft bristles twice a day. As they get older, they need to learn how to brush their own teeth.

Once babies turn 6 months old, they need fluoride in their drinking water or fluoride treatments from their dentist or pediatrician. Fluoride is a mineral that exists in most natural water sources and that can be used to prevent and control dental caries.⁴ The American Academy of Pediatric Dentistry (AAPD) "encourages optimal fluoride exposure for every child."⁵ Also, the AAPD, the American Dental Association (ADA), and the American Academy of Pediatrics (AAP) all recommend that infants see a dentist by their first birthday or within six months of



eruption of their first tooth. This creates an opportunity to not only provide early intervention but also educate parents or caregivers about their children’s oral health needs and ensure that children have access to fluoride.⁶

Early Childhood Oral Health in Connecticut

Dental Visits

While it is recommended that babies have their first dental visit by no later than 12 months of age, this recommendation is not followed by all caregivers of young children, including many of those in Connecticut. What is more, some general and pediatric dentists refuse to see children under the age of 3 years. As a result, a significantly lower percentage of Connecticut’s young children (70.3%), ages 1-5 years, than older children (92.3%) and adolescents (95.1%) had dental visits in 2017-18, according to the *National Survey of Children’s Health* (NSCH),ⁱ a study conducted by the US Census Bureau with an aim to provide national and state data on a wide range of health indicators.⁷

NSCH estimates are consistent with those from the Connecticut *Behavioral Risk Factor Surveillance Survey* (CT BRFSS),ⁱⁱ a statewide survey of households.⁸ Findings from the two studies are unequivocal: dental visits for young children in Connecticut lag behind those for older children and adolescents.ⁱⁱⁱ What is more, research suggests that a large proportion of young children in the state—nearly one-third—are not getting dental visits at



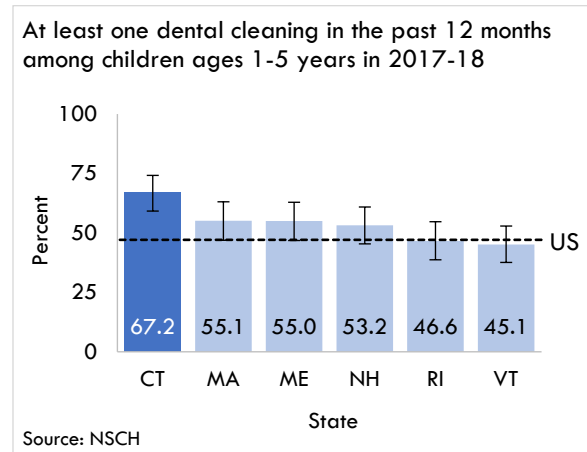
3 in 10 young children living in Connecticut did not have a dental visit in the past year

Source: NSCH

least once a year. Nonetheless, in 2017-18 Connecticut’s rate of preventative dental visits (70.3%) significantly exceeded the national rate (59.7%) among children ages 1-5 years.^{iv}

Preventative Dental Services

The NSCH is the chief source of data on young children’s utilization of the oral health system. It provides information on dental cleanings, dental sealants, fluoride treatments, and instruction on oral health care, based on parents’ or caregivers’ responses to mailed and web-based questionnaires. NSCH results from 2017 and 2018 showed that about two-thirds (67.2%) of Connecticut’s young children, ages 1-5 years, received dental cleanings in the 12-month period before the study. This estimate significantly exceeded the national rate of 47.1%. Additionally, it ranked number one in New England, and was significantly higher than the rates of two New England states: Rhode Island (46.6%) and Vermont (45.1%). That said, young children in Connecticut received dental cleanings at a lower rate than their older counterparts.



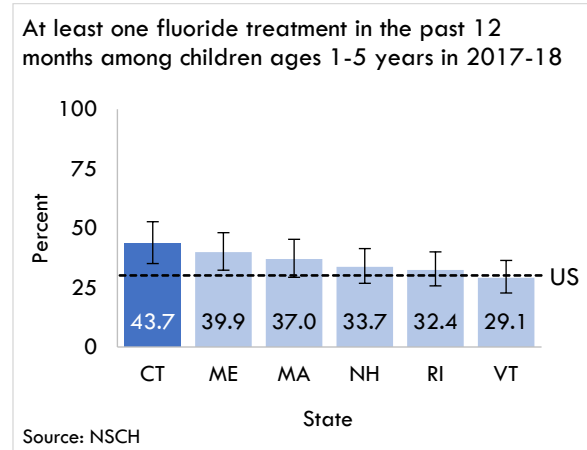
In addition to performing dental cleanings, oral health professionals use dental sealants to prevent and manage dental caries. Dental sealants are plastic coatings that dentists and other oral health professionals apply onto the chewing surfaces of

teeth. A 2016 systematic review of the scholarly literature showed that dental sealants are safe and effective in preventing dental caries.⁹ Additionally, the AAPD recommends that sealants be provided for both primary and permanent teeth.⁵ Despite the research evidence and the AAPD recommendation, only a small proportion (6.6%) of Connecticut’s young children, ages 1-5 years, received dental sealants within the past year, according to the NSCH data from 2017 and 2018. The Connecticut estimate of 6.6% was in line with the national estimate of 5.3%.^v

Another commonly used preventative dental service is topical fluoride treatment. Dentists, or other health professionals, paint fluoride varnish, fluoride gel, or fluoride foam onto the teeth in order to prevent dental caries.¹⁰ Research has shown that fluoride varnish is a safe and effective treatment.⁴ Consequently, the AAPD recommends “topical fluoride treatments every six months or as indicated by the child’s individual needs or risk status.”⁵ Additionally, the United States Preventative Services Taskforce recommends that “primary care clinicians apply fluoride varnish to the primary teeth of all infants and children starting at the age of primary tooth eruption.”³ Notably, as of 2015, fluoride varnish application by non-dental providers for children under the age of 6 years must be covered by all private and public health insurers.¹¹



In 2017-18, over four in ten (43.7%) of Connecticut’s children aged 1-5 years received topical fluoride treatment in the 12-month period preceding the NSCH questionnaires. The Connecticut rate of 43.7% significantly exceeded the US rate of 30.1%. Also, it was at the top of the list in New England in 2017-18, although the differences in rates among New England states were not statistically significant.^{vi}



The AAPD recommends that dentists provide oral hygiene instruction to their patients, in addition to performing dental cleanings and applying dental sealants and fluoride treatments.⁵ Parents’ and caregivers’ responses to the NSCH questionnaires from 2017 and 2018 suggest that fewer than half (44.8%) of Connecticut’s children aged 1-5 years received instruction on tooth brushing and oral health care from their dental providers during the 12-month period before the survey. The Connecticut rate of oral health instruction was consistent with rates in other New England states, and it was significantly higher than the national rate of 33.7%.^{vii}

Dental Caries

Healthy People 2020 goals include reducing dental caries experience and reducing untreated dental decay among children aged 3-5 years. Prevention of dental caries and its timely treatment are of vital importance because primary teeth hold space for

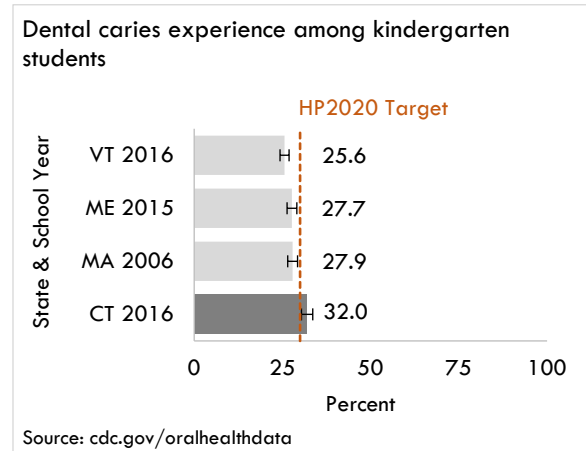
the permanent teeth to erupt in the proper position. One objective associated with these goals is to reduce the proportion of children who have experienced dental caries in their primary teeth by 10%, from 33.3% in 1999-2004 to 30% in 2020. Another objective is to reduce by 10% the proportion of children with untreated dental decay in their primary teeth, from 23.8% in 1999-2004 to 21.4% in 2020.

During the school year 2016-17, the Connecticut Department of Public Health conducted the *Basic Screening Survey* (BSS)^{viii} in a representative sample of elementary schools. This study involved oral health screenings by a team of registered dental hygienists. The results showed that almost one-third (32.0%) of kindergarteners, aged 5-6 years, had dental caries experience at some point in their lives. Additionally, 17.3% had untreated dental decay at the time of the study.¹²

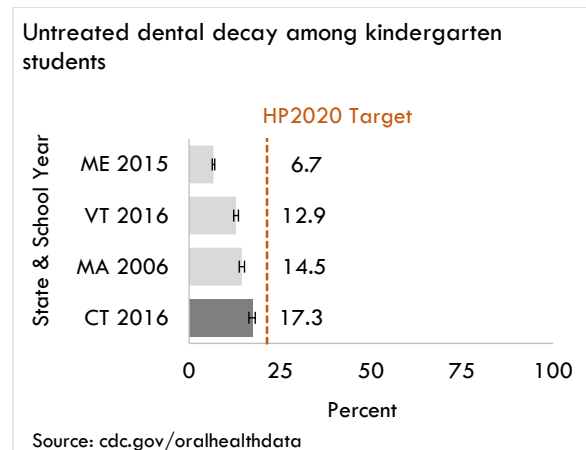
BSS estimates are not directly comparable to the national estimates that have been used to track *Healthy People 2020* objectives.^{ix} Namely, Connecticut BSS does not include data for children aged 3-4 years, who are less likely to have had dental caries experience, and it includes data for children aged 6 years, who are more likely to have had dental caries. Even so, it appears that Connecticut is slightly above the *Healthy People 2020* target for dental caries experience (32.0% vs. target of 30.0%),^x and below the *Healthy People 2020* target for untreated dental caries (17.3% vs. target of 21.4%).^{xi}

In addition to national comparisons, it is also interesting to consider how Connecticut fares in comparison with other New England states. BSS data for kindergarteners are available for Vermont, Maine, and Massachusetts. The Connecticut BSS estimate of 32.0% of kindergarteners with dental caries experience did not significantly exceed the

Massachusetts estimate of 27.9% in 2006-07, the Maine estimate of 27.7% in 2015-16, or the Vermont estimate of 25.5% in 2016-17.¹³



Similarly, the Connecticut estimate of 17.3% of kindergarteners with untreated dental decay did not significantly exceed the Massachusetts estimate of 14.5% in 2006-07 or the Vermont estimate of 12.9% in 2016-17.¹³ It did, however, exceed the Maine estimate of 6.7% in 2015-16.¹³



Lastly, it is important to note that only a very small proportion of Connecticut's kindergarten students (2.0%) were found to have an urgent need for dental care during the oral health screenings conducted by registered dental hygienists as part of Connecticut BSS.¹²

Oral Health Disparities

Healthy People 2020 aims to increase health equity and eliminate health disparities across all groups. Connecticut BSS data point to an absence of disparities in oral health outcomes among young children in the state. More specifically, there were no differences in 2016-17 by racial grouping or by household income in dental caries experience, untreated dental decay, dental visits, or preventative dental services.^{7,12}

However, Connecticut BSS data revealed disparities in obesity, a multifactorial condition caused by an interplay of genetic and environmental factors, some of which also contribute to oral disease.¹⁴ Namely,

both obesity and dental caries are exacerbated by the consumption of processed foods and sugar-sweetened beverages.

During the school year 2016-17, Black (18.4%) and Latinx (16.4%) kindergartners were twice as likely as White kindergartners (8.6%) to have obesity.^{15,xii} Additionally, schools in which most students were eligible for free or reduced-price meals (FRM)—a measure of socioeconomic status—had double the percentage of children with obesity than schools in which fewer than a quarter of students were eligible for FRM.¹²



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Early Childhood Acknowledgements

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Early Childhood End Notes

The National Survey of Children's Health (NSCH) is an ongoing mail and web-based survey that is funded and directed by the Health Resources and Services Administration (HRSA) Maternal and Child Health Bureau (MCHB) and conducted by the United States Census Bureau. The survey is designed to provide national and state-level data on the health and health care of children aged 0-17 years old in the United States. Additionally, the NSCH provides estimates for 19 Title V Maternal and Child Health Services Block Grant National Outcome and Performance Measures, as well as data for each state's Title V needs assessment.

ⁱⁱ The Connecticut Behavioral Risk Factor Surveillance System (CT BRFSS) is an ongoing telephone survey of adults from randomly selected households. Interviews are conducted by a contractor on behalf of the Connecticut Department of Public Health. BRFSS is conducted in all 50 states and it is coordinated by the Centers for Disease Control and Prevention.

ⁱⁱⁱ According to a combined 2017-18 NSCH dataset, 70.3% (95% CI: 62.5-77.1) of young children aged 1-5, living in Connecticut, had a preventative dental visit during the past 12 months. According to CT BRFSS data from 2018, 61.6% (95% CI: 54.7-68.5) of young children aged 0-4, living in Connecticut, were seen by a dental provider in the past 12 months.

^{iv} Close to one-third (29.7%, 95%CI: 22.9, 37.5) of Connecticut's young children, ages 1-5 years, as compared with over 40% (40.3%, 95%CI: 38.5, 42.2) of young children nationwide did not have a preventative dental visit in the past year, according to a combined 2017-18 NSCH dataset. In other words, the Connecticut rate of preventative dental visits of 70.3% (95% CI: 62.5, 77.1) exceeded the national rate of 59.7% (95% CI: 57.8, 61.5) among young children, ages 1-5 years.

^v According to a combined 2017-18 NSCH dataset, 6.6% (95% CI: 2.9-14.5) of young children, ages 1-5 years, living in Connecticut as compared with 5.3% (95% CI: 4.6-6.2) young children nationwide received dental sealants during the past 12 months. In New England, the lowest observed rate of dental sealants during the past 12 months was in Vermont: 4.8% (95% CI: 2.5-4.9).

^{vi} According to a combined 2017-18 NSCH dataset, the rate of fluoride treatment in Connecticut was 43.7% (95% CI: 31.5-52.7) among young children, ages 1-5 years. The national rate was 30.1% (95% CI: 28.5-31.8). In New England, the lowest observed rate of fluoride treatment among young children was in Vermont: 29.1% (95%CI: 22.7-36.4).

^{vii} According to a combined 2017-18 NSCH dataset, 44.8% (95%CI: 36.2-53.8) of children aged 1-5 years living in Connecticut as compared with 33.7% (95%CI: 32.0-35.5) of children aged 1-5 years living nationwide received instruction on oral health care from dental providers. In New England, the lowest observed rate of instruction on oral health care from dental providers was in Rhode Island: 34.1% (95% CI: 27.1-41.8).

^{viii} The Connecticut Basic Screening Survey (BSS) is a statewide study of children's oral health in a representative sample of elementary schools in Connecticut. Data are collected via oral screenings, which are conducted by registered dental hygienists.

^{ix} Data from the National Health and Nutrition Examination Survey (NHANES), a program of studies designed to assess the health and nutritional status of adults and children in the United States, have been used to estimate baseline and target values for the *Healthy People 2020* objectives pertaining to dental caries experience and untreated dental decay.

^x According to Connecticut BSS, 32.0% (95% CI: 28.2-35.9) of kindergarten children in Connecticut had dental caries experience during the school year 2016-17.

^{xi} According to Connecticut BSS, 17.3% (95% CI: 14.7-20.0) of kindergarten children in Connecticut had untreated dental decay during the school year 2016-17.

^{xii} Categories "Black" and "White" exclude Latinx children. The term "Latinx" refers to persons of Latin American descent or origin. The term was selected for use in this document because it is gender-inclusive, and therefore, consistent with the health equity framework.

Early Childhood Oral Health Trends

Table. Oral Health Trends Among Children Living in Connecticut

INDICATOR	SOURCE	2013	2014	2015	2016	2017	2018
1.0. Count of cleft lip, with or without cleft palate among newborns	CT BDR	42	31	32	40	39	43
At least one dental visit in the past year among children aged 0-4 y	CT BRFS	55.5% (48.7-62.4)	56.6% (48.1-65.2)	54.6% (48.1-61.0)	62.3% (56.3-68.4)	63.0% (55.8-70.2)	61.6% (54.7-68.5)
At least one preventative dental visit in the past year among children aged 1-5 y	NSCH**	-	-	-	65.0% (57.9-71.5)	70.3% (62.5-77.1)	72.6% (65.0-79.2)
At least one dental cleaning in the past year among children aged 1-5 y	NSCH**	-	-	-	58.1% (50.7-65.1)	67.2% (59.2-74.2)	*
Dental sealant receipt in the past year on at least one tooth among children aged 1-5 y	NSCH**	-	-	-	7.9% (3.9-15.3)	6.6% (2.9-14.5)	*
At least one fluoride treatment in the past year among children aged 1-5 y	NSCH**	-	-	-	39.9% (32.7-47.7)	43.7% (35.1-52.7)	*
Instruction on oral health care in the past year among children aged 1-5 y	NSCH**	-	-	-	45.4% (37.9-53.1)	44.8% (36.2-53.8)	*
1.1. Dental treatment need among children attending kindergarten	BSS	-	-	-	-	16.5% (13.9-19.2)	-
1.2. Urgent dental treatment need among children attending kindergarten	BSS	-	-	-	-	2.0% (1.1-2.9)	-
1.3. Dental decay experience among children attending kindergarten	BSS	-	-	-	-	32.0% (28.2-35.9)	-
1.4. Untreated dental decay among children attending kindergarten	BSS	-	-	-	-	17.3% (14.7-20.0)	-

Note. Indicators included in the 2018-2023 Connecticut Oral Health Surveillance System are marked with numeric identifiers. Each prevalence estimate is accompanied by a 95% confidence interval, enclosed in parentheses. y = year. *Not available as of this writing. **2016, 2017, and 2018 NSCH estimates are based on datasets combining two years of data: 2016 and 2017, 2017 and 2018, and 2018 and 2019, respectively.

Oral Health in *Childhood*

About half of all US children aged 6-11 years have had dental caries at some point in their lives.¹ Tooth decay, also known as cavities or dental caries, is a chronic, bacterial disease that can be passed from person to person.^{2,3} Children become exposed to bacteria that cause dental caries through contact with saliva from their caregivers or playmates.² This happens more readily when spoons, forks, and cups are shared. Acid resulting from the action of bacteria on carbohydrates leads to dental caries.⁴ Among microorganisms that can produce enough acid to decalcify tooth structure, and therefore produce dental caries, *Streptococcus mutans* is the most virulent.⁴

Over 15% of US children had untreated dental caries in 2015-16.¹ Poor oral health can affect children's physical, social, and mental wellbeing. Children with untreated dental caries may have difficulty eating, sleeping, playing, learning, or talking. They may experience pain and are more likely to develop dental caries in the future. Untreated oral disease can cause permanent damage to teeth, contribute to serious health problems, and even hinder a child's growth.²

The rate of untreated dental caries has been on a decline in the US over the past three decades.⁵ The risk of developing dental caries, however, is not the same for all children, nor is the likelihood of receiving treatment.¹ There are profound disparities between socially advantaged and disadvantaged groups in the US. Differences in factors such as socioeconomic status, racial grouping, abilities, and legal status create uneven access to healthy nutrition and oral health education, as well as preventative oral care and restorative/reparative dentistry.⁶

Childhood Preventing Oral Disease

Nutrition makes a significant difference to oral health. Risk factors for oral disease include not only the amount of sugary foods and drinks children consume, but also how often they consume them. When sugary drinks and snacks are ingested throughout the day, demineralization of tooth enamel occurs for a longer period of time. For example, when a sugary drink is consumed, it can take 30-40 minutes for saliva to return to its neutral pH balance and begin the process of remineralization. Sucking on hard candies or eating chewy sweet snacks that stay in the mouth for long periods of time exacerbates the risk of dental caries.⁷

Positive experiences and good relationships with dentists, hygienists, and dental assistants are important factors related to seeking oral health care. Dental anxiety or fear typically starts in childhood and may contribute to an avoidance of dental care during childhood, adolescence, and adulthood. While reported prevalence rates vary considerably across studies, it has been estimated that 5-20% of youth suffer from a sense of dread, stress, and worry that occur in dental settings or when thinking about going to the dentist.⁸



Ensuring that children have adequate fluoride in their drinking water, or fluoride supplements, is an important protective factor for oral health. Fluoride is a naturally occurring mineral that exists in most water sources.⁹ It protects teeth in several ways. When ingested during childhood, fluoride becomes integrated into the structure of developing teeth, which makes them more resistant to dental caries. Fluoride interferes with the process by which bacteria in the mouth produce acid that damages tooth enamel. Furthermore, it helps teeth to remineralize or repair themselves. And, while it cannot repair dental caries, fluoride inhibits, and even reverses, its progression.^{9,10}

The use of dental sealants is another important tool in preventing dental caries from early childhood through adolescence. Sealants are plastic coatings that are applied to keep bacteria and food particles from collecting on the surface of the tooth. Much of permanent tooth caries occurs in the chewing surfaces of the back teeth (molars).^{9,10} Dental sealants applied on these teeth can prevent over 80% of decay at two years after placement and about 50% of decay at four years after placement.¹¹

Children need to have a dental home—an established, ongoing relationship with a dentist who ensures their oral health care needs are met in a comprehensive and coordinated way. The dental home provides access to the dentist on a regular basis, even when children are not having problems. What is more, the dental home provides preventative oral health care and education to caregivers, reduces unmet dental needs, reduces hospital emergency department visits, and improves a child’s overall oral health.¹²

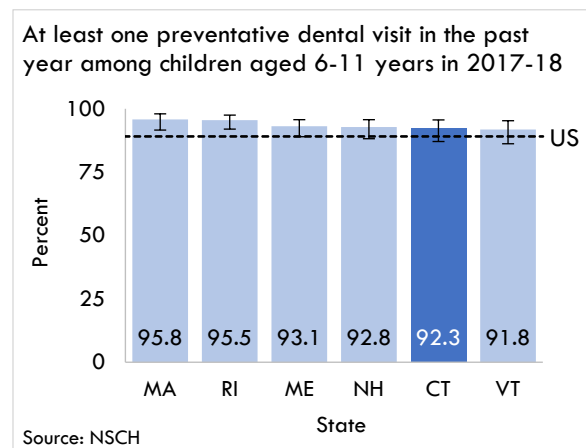
Childhood Oral Health in Connecticut

Sources of information on children’s use of the preventative dental services include two large-scale

surveys: the *National Survey of Children’s Health* (NSCH)ⁱ and the *Connecticut Behavioral Risk Factor Surveillance System* (CT BRFSS).ⁱⁱ Both studies are based on parents’ and caregivers’ responses to questions about children’s health and access to services. Another important source is the *Connecticut Basic Screening Survey* (BSS),ⁱⁱⁱ a study that involves oral health screenings by registered dental hygienists in a representative sample of elementary schools.

Dental Visits

A large majority of school-age children in Connecticut receive dental care each year. According to the CT BRFSS data from 2018, 95% of children aged 5-11 years were seen by a dental provider in the past year.¹³ CT BRFSS estimates from previous years¹⁴⁻¹⁸ were similarly high and were consistent with the 2018 NSCH estimate, according to which 92.3% of Connecticut’s children aged 6-11 years had a preventative dental visit in the year preceding questionnaire administration.¹⁹ The NSCH estimate for Connecticut (92.3%) was in keeping with the national estimate of 89.1% and with estimates from other New England states.¹⁹



Preventative Dental Services

An overwhelming majority (90%) of Connecticut’s children aged 6-11 years had at least one dental

cleaning in the past 12 months, according to the NSCH data from 2017-18.¹⁹ This rate was significantly higher than the US rate of 83.3% and was consistent with rates in other New England states.^{iv}

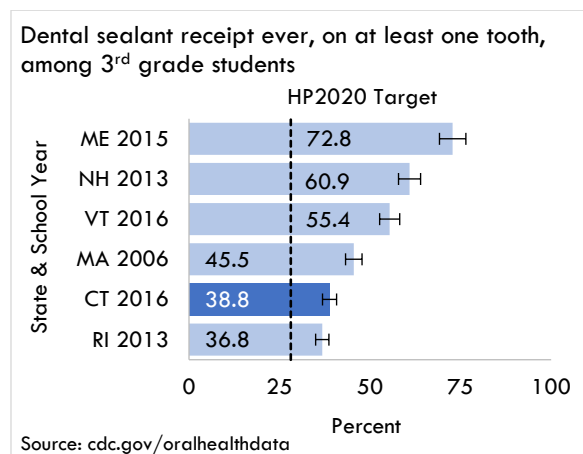


9 in 10 children had at least one dental cleaning in the past year

Source: NSCH

The use of dental sealants is another strategy in dental caries prevention. This strategy is highlighted by *Healthy People 2020*, a federal government’s initiative to build a healthier nation by setting 10-year objectives, tracking progress, and promoting action to effect positive change. One of the *Healthy People 2020* objectives is to increase the proportion of children who have received dental sealants on their permanent molars.²⁰

According to the Connecticut BSS findings, over one-third (38.8%) of 3rd grade students had dental sealants on their permanent molars in 2016-17.^v This estimate was consistent with the national estimate of 38.2% among children aged 6-9 years in 2013-16,^{vi} and it exceeded the *Healthy People 2020* target of 28.1%.²⁰ However, it was significantly lower than the estimates from four New England states: Maine in



2015-16 (72.8%), New Hampshire in 2013-14 (60.9%), Vermont in 2016-17 (55.4%), and Massachusetts in 2006-07 (45.5%).²¹

Besides performing dental cleanings and applying dental sealants, oral health professionals use topical fluoride treatment to prevent caries. Close to two-thirds (65.5%) of Connecticut’s children aged 6-11 years received fluoride treatment in the past 12 months, according to parents’ and caregivers’ responses to the NSCH questionnaires in 2017 and 2018.¹⁹ The Connecticut rate of 65.5% significantly exceeded the national rate of 56.5%^{vii} and was in keeping with rates in other New England states.

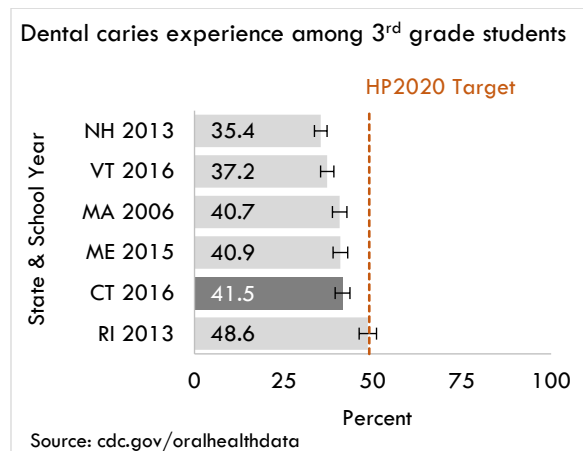
Instruction on tooth brushing and oral hygiene is yet another important tool in the fight against oral disease. The American Academy of Pediatric Dentistry recommends that dentists provide instruction on oral hygiene to their patients.²² Close to two-thirds (63.0%) of Connecticut’s children aged 6-11 years received instruction on tooth brushing or oral health care during the 12-month period prior to the NSCH survey. The Connecticut estimate of 63.0% was significantly greater than the national estimate of 52.3%,^{viii} and it was in line with estimates from other New England states.¹⁹

Dental Caries

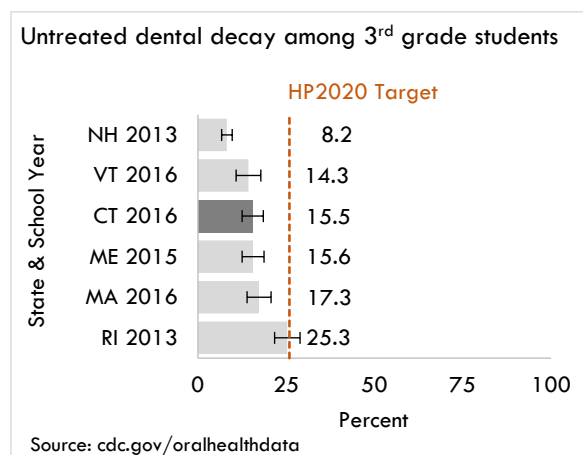
Many children in Connecticut have had dental caries at some point in their lives. Among 3rd graders, about four in ten (41.5%)^{ix} have had dental caries experience, according to the oral screenings conducted by registered dental hygienists as part of Connecticut BSS during the school year 2016-2017.²³ This estimate included untreated cavities, filled teeth, and teeth extractions because of dental caries,²³ and it was consistent with BSS estimates from other New England states.

What is more, the Connecticut estimate of 41.5% was considerably lower than the US estimate of 51.6%

among children aged 6-9 in 2013-16,²⁰ and it was lower than the *Healthy People 2020* target of 49%.



In addition to dental caries experience, it is important to consider untreated dental decay as an indicator of both oral health and access to dental care. During the school year 2016-17, over 15% of 3rd grade students in the state had untreated dental decay, according to Connecticut BSS oral screenings.^x The Connecticut estimate of 15.5% in 2016-17 was significantly higher than the New Hampshire estimate of 8.2% in 2013-14, among 3rd grades.²¹ However, it was in line with estimates from four other New England states, and it was significantly lower than the Rhode Island estimate of 25.3% in 2013-14. Also, it was lower than the *Healthy People 2020* target of 25.9% among children aged 6-9 years.²¹



The last point of interest concerns recent diagnoses of dental caries. About one in five of Connecticut's children is diagnosed with dental caries each year, according to CT BRFSS. More specifically, 23.7% of children aged 5-11 in 2016,¹⁴ 23.4% of children in 2017,¹² and 17.5% of children in 2018¹¹ had dental caries diagnosed within the past year. These estimates are based on parents' and caregivers' responses to the CT BRFSS telephone interviews.

Dental Disparities

Healthy People 2020 aims to increase health equity and eliminate health disparities across all groups. Various data sources point to a general absence of disparities in dental caries and the associated risk and protective factors among children in Connecticut. Exceptions to this finding include disparities in soda consumption and obesity by household income, caregiver education, and racial grouping. These disparities are discussed in the sections below.

Household Income

Children in households with an annual income under \$35,000 are significantly more likely than children in households with an annual income above \$74,999 to consume soda, according to the CT BRFSS data from 2013 through 2018.¹³⁻¹⁸ Additionally, children in households with a lower income are significantly more likely to have obesity, according to the CT BRFSS findings from 2016 and 2017, but not from 2018. In considering this finding, it is important to keep in mind that the BRFSS interviews are conducted in samples that are representative of all households in the state, but not specifically a subset of households with children.

Research findings on disparities in dental visits and dental caries are mixed. According to CT BRFSS, children and adolescents in households with a lower income are less likely to visit dental providers and more likely to have dental caries than children in

households with a higher income. In contrast, NSCH data do not show a disparity by household income in preventative dental visits.²⁴ Similarly, Connecticut BSS data do not show a disparity by household income in dental caries among 3rd grade children.²³ Notably, NSCH and BSS were designed to be representative of children aged 0-17 years and children in the 3rd grade, respectively, whereas CT BRFSS was designed to be representative of households, some of which do not include children.

Lastly, none of the data sources reveal disparities by household income in the receipt of dental sealants among children living in Connecticut. This is in contrast to national estimates that show a lower prevalence of dental sealants among children whose family incomes are 100-199% of the federal poverty guidelines than among children whose family incomes are higher.²⁰

Caregiver Education

Children whose parents or caregivers have a high school education, or less, are significantly more likely to consume soda than children whose caregivers have more than a high school education, according to the CT BRFSS data from 2013 through 2018.¹³⁻¹⁸ Additionally, they are significantly more likely to have obesity, according to the CT BRFSS findings from 2015 and 2016, but not from 2017 and 2018. CT BRFSS data also show a disparity in dental decay experience by caregiver education in 2016 but not in 2017 and 2018.

Racial Grouping

There are disparities by racial grouping in soda consumption, fast food consumption, and obesity, according to the CT BRFSS data from 2016 through 2018.^{13,14,16} Parents' and caregivers' responses to the CT BRFSS telephone interviews in 2018 suggest that Black and Latinx children were more likely than White children to drink soda or sugary drinks at least once daily;^{xi} Black children were more likely than White children to eat fast food at least twice weekly; and Latinx children were more likely than White children to have obesity.¹³

Research findings on disparities in dental caries are mixed. Namely, there were racial disparities in dental caries among children and adolescents in 2016 and 2017 but not in 2018, according to CT BRFSS. By contrast, BSS did not reveal racial disparities in either dental caries experience or untreated dental caries among 3rd grade children in Connecticut.²³ In considering these findings, it is important to keep in mind that the Connecticut BSS was conducted in a representative sample of 3rd grade students, whereas CT BRFSS was conducted in a representative sample of households, many of which did not include children. Lastly, it is important to emphasize that neither CT BRFSS nor Connecticut BSS reveals racial disparities in dental sealants. This is in contrast with national estimates, which show a greater prevalence of dental sealants among White children than among Black children.²⁰

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Childhood Acknowledgements

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ⁱⁱⁱ The Connecticut Basic Screening Survey (BSS) is a statewide study of children's oral health in a representative sample of elementary schools in Connecticut. Data are collected via oral screenings conducted by registered dental hygienists.

^{iv} According to a combined 2017-2018 NSCH dataset, 90.0% (95% CI: 84.6-93.7) of children, ages 6-11 years, living in Connecticut had a dental cleaning during the past 12 months, as compared to 83.3% (95% CI: 81.9-84.5) of children, ages 6-11 years, living throughout the United States.

^v According to a CT BSS, 38.8% (95% CI: 33.6-44.0) of 3rd grade students living in Connecticut received dental sealants during the school year 2016-17.

^{vi} The national estimate of the proportion of children aged 6-9 years who received dental sealants on one or more of their permanent first molar teeth is based on the National Health and Nutrition Examination Survey (NHANES), a program of studies that combine interviews and physical examinations designed to assess the health and nutritional status of adults and children in the United States.

^{vii} According to a combined 2017-2018 NSCH dataset, 65.5% (95% CI: 58.1, 72.3) of children aged 6-11 years living in Connecticut had fluoride treatment during the past 12 months, as compared to 56.5% (95% CI: 54.8, 58.1) of children aged 6-11 years living throughout the United States.

^{viii} According to a combined 2017-2018 NSCH dataset, 63.0% (95% CI: 55.6, 69.8) of children aged 6-11 years living in Connecticut received instruction on oral health care during the past 12 months, as compared to 52.3% (95% CI: 50.7, 54.0) of children aged 6-11 years living throughout the United States.

^{ix} According to Connecticut BSS data from 2016-17, 41.5% (95% CI: 37.2-45.8) of 3rd graders living in Connecticut had dental caries experience.

^x According to Connecticut BSS data from 2016-17, 15.5% (95% CI: 12.5-18.5) of 3rd grade students living in Connecticut had untreated dental decay.

^{xi} Categories "Black" and "White" exclude Latinx children. The term "Latinx" refers to persons of Latin American descent or origin. The term was selected for use in this document because it is gender-inclusive, and therefore, consistent with the health equity framework.



Childhood Oral Health Trends

Table. Oral Health Trends Among Children Living in Connecticut

INDICATOR	SOURCE	2013	2014	2015	2016	2017	2018
3.0. At least one dental visit in the past year among children aged 1-17 y	CT BRFSS	85.6% (83.3-87.9)	85.7% (82.8-88.5)	84.2% (82.0-86.4)	87.2% (85.3-89.1)	85.8% (83.4-88.1)	86.9% (84.8-89.0)
At least one dental visit in the past year among children aged 5-11 y	CT BRFSS	95.5% (93.3-97.7)	95.1% (92.5-97.8)	†	95.0% ‡	95.0% ‡	95.0% ‡
At least one preventative dental visit in the past year among children aged 6-11 y	NSCH**	-	-	-	95.2% (92.0-97.2)	92.3% (87.1-95.6)	92.3% (86.3-95.8)
At least one dental cleaning in the past year among children aged 6-11 y	NSCH**	-	-	-	93.1% (89.5-95.5)	90.0% (84.6-93.7)	*
1.10. Dental sealant receipt ever, on at least one permanent tooth, among children aged 5-17 y	CT BRFSS	43.5% (40.1-46.8)	52.9% (48.6-57.1)	52.7% (49.4-56.1)	50.0% (46.9-53.2)	50.2% (46.4-54.1)	47.2% (43.4-51.0)
Dental sealant receipt in the past year, on at least one tooth, among children aged 6-11 y	NSCH**	-	-	-	24.4% (19.7-29.9)	23.0% (17.6-29.4)	*
Dental sealant receipt ever, on at least one permanent tooth, among children aged 5-11 y	CT BRFSS	49.9% (43.8-55.9)	46.2% (39.5-52.9)	44.5% (39.5-49.4)	42.8% (38.2-47.5)	43.6% (38.0-49.2)	37.3% (31.7-42.9)
At least one fluoride treatment in the past year among children aged 6-11 y	NSCH**	-	-	-	67.6% (61.0-73.5)	65.5% (58.1-72.3)	*
Instruction on oral health care in the past year among children aged 6-11 y	NSCH**	-	-	-	69.2% (63.0-74.9)	63.0% (55.6-69.8)	*
1.5. Dental treatment need among 3 rd grade children	BSS	-	-	-	-	14.3% (11.7-16.9)	-
1.6. Urgent dental treatment need among 3 rd grade children (percentage)	BSS	-	-	-	-	2.8% (0.9-4.8)	-
1.7. Dental caries experience among 3 rd grade children (percentage)	BSS	-	-	-	-	41.5% (37.2-45.8)	-
1.8. Untreated dental decay on permanent teeth among 3 rd grade children (percentage)	BSS	-	-	-	-	4.5% (2.4-6.6)	-
1.9. Dental sealant receipt on at least one permanent first molar among 3 rd grade students (percentage)	BSS	-	-	-	-	38.8% (33.6-44.0)	-

Note. Indicators included in the 2018-2023 Connecticut Oral Health Surveillance System are marked with numeric identifiers. Each prevalence estimate is accompanied by a 95% confidence interval, enclosed in parentheses. y = year. †Estimate not reported because of a coefficient of variation in excess of 30%. ‡Confidence interval is not reported because of a coefficient of variation in excess of 20%. *Not available as of this writing. **2016, 2017, and 2018 NSCH estimates are based on datasets combining two years of data: 2016 and 2017, 2017 and 2018, and 2018 and 2019, respectively.

Oral Health of *Children and Youth*

with Special Health Care Needs (CYSHCN)

In the United States (US), about one in five children and youth under the age of 18 years has special health care needs,¹ and about two-thirds of these young people have more complex health needs.¹ The federal Maternal and Child Health Bureau defines children and youth with special health care needs (SHCN) as “those who have or are at increased risk for a chronic physical, developmental, behavioral, or emotional condition and who also require health and related services of a type or amount beyond that required by children generally.”²

Although large-scale clinical studies have not been conducted to assess the oral health of young people with SHCN, available evidence suggests that they are at greater risk of oral disease than their peers without SHCN.³ For example, some children and youth with intellectual disabilities may not have the ability to understand or carry out preventative oral health practices such as brushing and flossing, and are, for that reason, more likely to develop oral diseases.^{4,5} Other examples include children with type I diabetes, who are at risk of gum disease,⁶ children on asthma medication who may be at risk of tooth decay, gum disease, and oral thrush;⁷ and children with juvenile arthritis in arm joints, whose ability to remove plaque may be compromised.⁸

It is important to keep in mind, however, that the federal Maternal and Child Health Bureau (MCHB) definition of youth with SHCN is broad. It includes not only young people whose medical conditions or developmental disabilities put at them at risk of oral diseases, but also youth whose oral health is no worse than that of their peers without SHCN.⁹

CYSHCN Preventing Oral Disease

In the US, general recommendations for preventing oral disease include brushing twice a day with a fluoridated toothpaste, flossing once a day, and visiting a dental provider twice a year.^{5,10,11} Depending on the disability of a young person with SHCN, these recommendations might need to be modified to include electric toothbrushes and floss holders.⁵ The addition of probiotics (ie, good bacteria), antimicrobials, and remineralizing agents may be needed for some children and youth with SHCN.¹² What is more, professionally delivered interventions such as dental sealants, topical fluoride treatments, and interim therapeutic restoration using materials that release fluoride may be beneficial in some cases.⁵

Access to restorative dental care is limited for some children and youth with SHCN because of systemic constraints around financing dental services. These include low Medicaid reimbursement levels in some states; inadequate reimbursement by commercial insurance plans for complex procedures; low annual benefit maximums; and limited or nonexistent coverage for some dental procedures.⁹



Additionally, young people with SHCN face significant barriers to access when they age out of pediatric dental care and need to transition their care to a general dentist.¹¹ Nearly all pediatric dentists provide special care services; this is not the case among general dentists who treat adults.¹³ Many dentists are not adequately trained to provide care to patients with SHCN.⁹ In 2019, the Council on Dental Accreditation (CODA) passed votes requiring all US dental schools to train their students in managing treatment of patients with intellectual and developmental disabilities, as recommended by the National Council on Disability.¹⁴ However, the need to expand continuing education offerings and requirements for practicing dentists remains.¹²

CYSHCN Oral Health in Connecticut

The sole source of systematic information on the oral health of children and youth with SHCN living in Connecticut is the *National Survey of Children's Health* (NSCH). Funded and directed by the federal MCHB, the NSCH provides information about the health and health care of children and youth, ages 0-17 years, throughout the US.¹

Until 2012, the federal MCHB directed two surveys about children's health: the NSCH in 2003, 2007, and 2011-12, and the *National Survey of Children with Special Health Care Needs* (NS-CSHCN) in 2001, 2005-06, and 2009-10.¹⁵ Both surveys were conducted by the National Center for Health Statistics at the Centers for Disease Control and Prevention. More recently, the federal MCHB funded and directed a revised version of the NSCH, which combined the original NSCH and the NS-CSHCN. The revised NSCH was conducted in 2016, 2017, 2018, and 2019, and will be conducted yearly going forward, by the US Census Bureau.¹⁵ Data are collected via mailed and web-based questionnaires which are administered to parents or caregivers of children from randomly selected households

throughout the country. The revised NSCH provides information on the health and health care of young people both with and without SHCN. The "child with SHCN status" is determined by using a validated instrument that "asks whether a child currently experiences a health consequence and, if so, whether that specific health consequence is due to a medical, behavioral, or other type of health condition that has lasted, or is expected to last, 12 months or longer."¹⁶ Per this definition, one-fifth (20.0%) of young people living in Connecticut—a count of over 149,000—had SHCN in 2017-18.¹

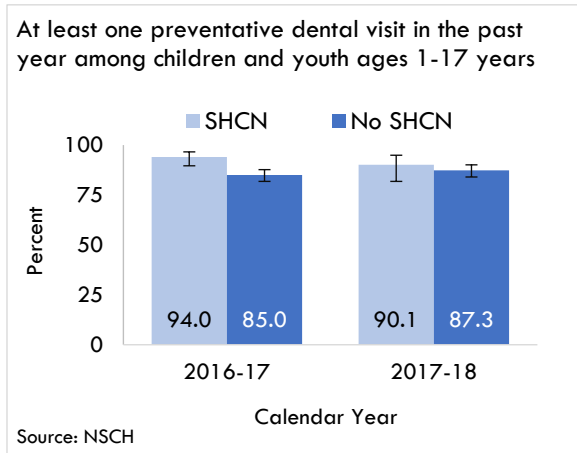
Information from the revised NSCH suggests that children and youth with SHCN receive preventative dental services at equal or higher rates than their peers without SHCN, both nationally and in Connecticut.¹ Even so, the condition of their teeth tends to be worse, especially if they have more complex health care needs.¹ Additionally, children and youth with SHCN are less likely to have health insurance coverage that adequately meets their needs.¹

A more detailed discussion of topics relevant to the oral health of children and youth with SHCN, along with regional and national comparisons, is provided in the sections that follow. This includes information on preventative dental visits, preventative dental services, condition of teeth, and health insurance coverage. Notably, reliable estimates of dental caries experience (ie, tooth decay) and untreated dental decay were not available as of this writing for Connecticut children and youth with SHCN.

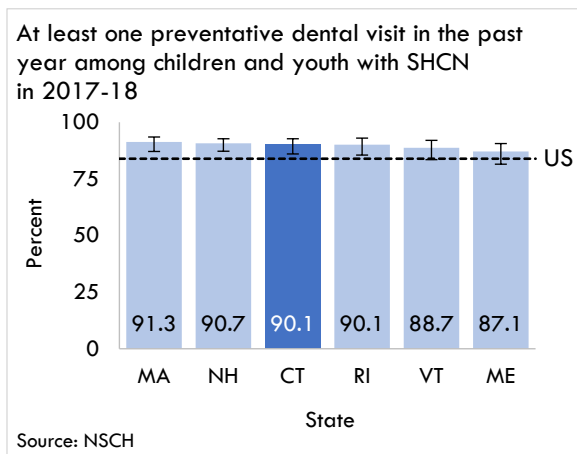
Preventative Dental Visits

Young people with SHCN, ages 1-17 years, visited dental providers for preventative care as much as, or more than, their peers without SHCN. In 2016-17, the rate of preventative dental visits was significantly higher among young people with SHCN (94.0%) than among their peers without SHCN (85.0%). In

2017-18, the difference between the two groups was not statistically significant.ⁱⁱ



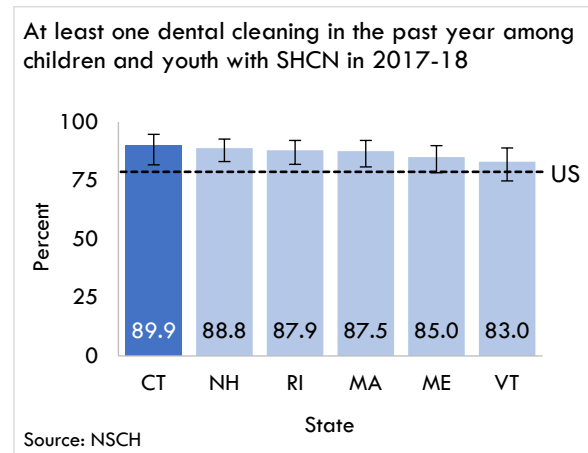
In 2017-18, the Connecticut estimate of nine in ten (90.1%) children and youth with SHCN having preventative dental visits at least once a year was in keeping with estimates from other New England states and with the national estimate of 83.9%.ⁱⁱⁱ



Preventative Dental Services

Nationally, a significantly higher proportion of children and youth with SHCN (78.0%) as compared to those without SHCN (71.1%) received at least one dental cleaning during the past 12 months, according to the NSCH data from in 2017-18. The same was true in the New England region.^{iv} Within New England states, the observed rate of dental cleanings was higher by at least five percentage

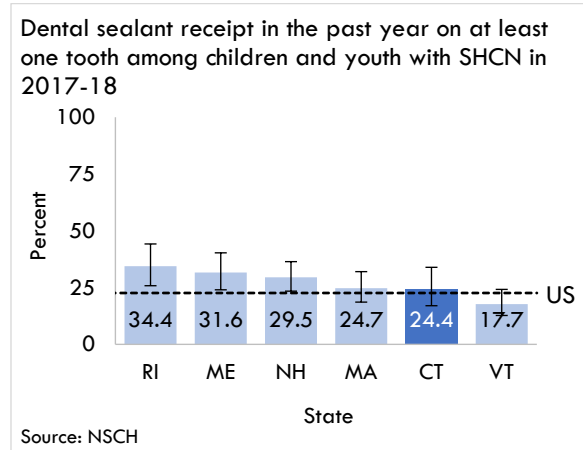
points among children and youth with SHCN than among their peers without SHCN. This difference, however, was not statistically significant in any New England state except Rhode Island. It is noteworthy that the Connecticut estimate of dental cleanings among young people with SHCN (89.9%) was significantly higher than the US estimate (78.7%)^y and was at the top of the list in New England in both 2017-18 and 2016-17. Even so, the observed differences among New England states were small.



In addition to performing dental cleanings, oral health professionals use dental sealants to prevent dental caries (tooth decay). Dental sealants are plastic coatings that are applied onto the chewing surfaces of back teeth. Research has shown that they are safe and effective in preventing dental caries,¹⁷ and they have been recommended by the American Academy of Pediatric Dentistry (AAPD) for both primary and permanent teeth.¹⁸

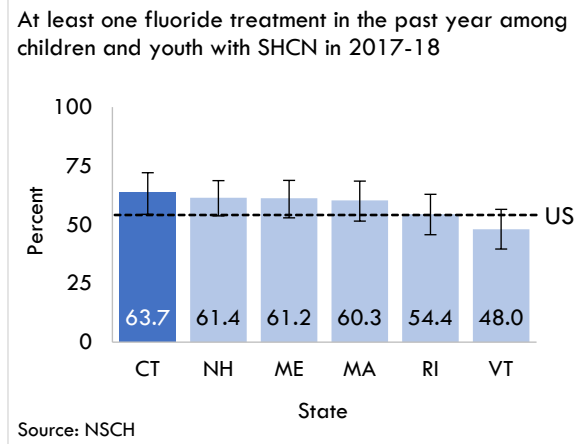
Nationwide, as well as in New England, the rate of dental sealant receipt was significantly higher among children and youth with SHCN than among those without SHCN, per parents' or caregivers' responses to the NSCH questionnaires in 2017-18.^{vi} This was also true in Maine, New Hampshire, and Rhode Island. By contrast, observed differences between the two groups of children were not meaningful in Connecticut, Massachusetts, or Vermont.

It is also interesting that the observed rate of dental sealant receipt among Connecticut’s children and youth with SHCN (24.4%) was in line with the national estimate (22.6%)^{vii} and was among the lowest in New England in 2017-18 and 2016-17. Admittedly, however, the observed differences among New England states were small and the precision of estimates was low.



Another preventative oral health intervention is fluoride treatment. Professionally-applied topical fluoride treatment has been shown to be effective in the prevention of dental caries¹⁹ and is recommended by the AAPD.¹⁸ In the US and in the New England region, the rate of fluoride treatment receipt was significantly higher among children and youth with SHCN than among their peers without SHCN, according to parents’ and caregivers’ reports in 2017-18.^{viii}

Within individual New England states, the difference between the two groups of young people was not meaningful.^{ix} Notably, the Connecticut rate of fluoride treatment among children and youth with SHCN (63.7%) was at the top of the list in New England in 2017-18 and in 2016-17. However, the observed differences among New England states were relatively small and the precision of estimates was low.



Instruction on tooth brushing and oral hygiene is yet another commonly employed preventative oral health intervention. Nationwide, a significantly greater proportion of children and youth with SHCN, as compared to those without SHCN, received instruction on oral health care during the past 12 months, according to the NSCH data from 2017-18.

In New England as a whole, the observed difference between the two groups was not meaningful. Similarly, in Connecticut, young people with and without SHCN received instruction on oral health care at a similar rate: 53.0% vs. 53.9%, respectively.

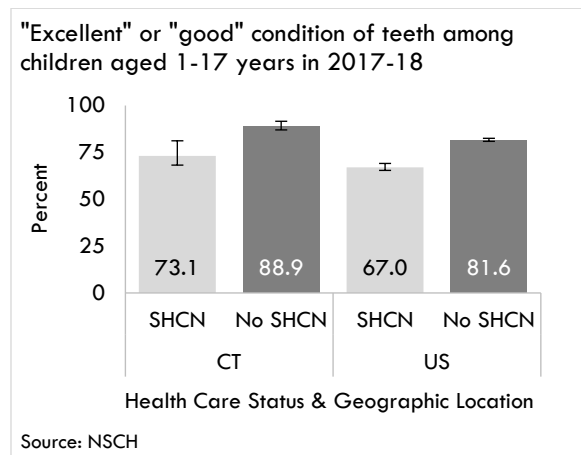
Condition of Teeth

Despite equal or greater utilization of preventative dental services by young people with SHCN, their teeth tend to be in worse condition than the teeth of their counterparts without SHCN. Nationwide, under seven in ten (67.0%) children and youth with SHCN, as compared to over eight in ten (81.6%) children and youth without SHCN, had “excellent” or “very good” condition of teeth, as rated by parents or caregivers in 2017-18.

The difference in the condition of teeth between those with and without SHCN is largely due to the condition of teeth of those with more complex health needs. Nationally, six in ten (62.1%) young people with more complex health needs, as

compared to eight in ten (79.5%) young people with less complex health needs and eight in ten (81.6%) young people without SHCN had an “excellent” or “very good” condition of teeth.^x

A similar pattern was observed in New England, as well as in Connecticut. More specifically, among children and youth living in Connecticut, almost three-quarters (73.1%) of those with SHCN as compared to nine in ten (88.9%) of those without SHCN had “excellent” or “very good” condition of teeth, as rated by parents or caregivers in 2017-18.^{xi}



Insurance

According to the NSCH data from 2017-18, children and youth with SHCN living in Connecticut were as likely to have health insurance coverage as those without SHCN: 93.1% vs 97.9%, respectively. Even so, the rate of adequate health insurance coverage was relatively low in Connecticut.

In 2017-18, fewer than three-quarters (72.4%) of children and youth had health insurance coverage that was “usually” or “always” adequate to meet their needs.^{xii} Furthermore, the rate of adequate health insurance coverage was significantly lower among children and youth with SHCN than among their peers without SHCN: 58.1% vs 72.0%, respectively.^{xiii}

A similar pattern was evident at the national level. Although children and youth with SHCN were more

likely to have insurance coverage than their peers without SHCN, they were significantly less likely to have coverage that adequately met their needs.²⁰ Accordingly, US children and youth with SHCN were significantly more likely to have unmet dental care needs than children and youth without SHCN, based on the NSCH data from 2017-18.^{xiv}

Notably, the NSCH inquires about health insurance coverage in general but not about dental benefits. Because health insurance usually does not include dental coverage, most families need separate dental insurance for dental care. Therefore, parents and guardians’ responses to the NSCH questions about health insurance may not pertain to coverage for dental care.



Special Smiles

To increase access to dental care among people with intellectual and developmental disabilities, the Special Olympics Healthy Athletes program holds Special Smiles events at Connecticut state competitions for Special Olympics athletes. The primary purpose of Special Smiles is to offer free dental screenings and instructions on correct brushing and flossing techniques to athletes with intellectual and developmental disabilities. Additionally, these events serve to raise dental professionals' awareness of the oral health concerns of people with SHCN.

In Connecticut, the Special Olympics Healthy Athletes program partners with the University of Connecticut School of Dental Medicine and the Tunxis Community College Dental Hygiene Program to conduct oral screenings and to educate athletes during Special Smiles events. Typically, three events

are held per year. Screenings are conducted by clinical volunteers, with assistance from dental hygiene students and oversight by clinical faculty and the Special Olympics Healthy Athletes program Clinical Director. At each event, about 20%-25% of competition participants receive oral screenings.

Data collected during Special Smiles oral screenings in the period between 2007 and 2018 have shown that many Special Olympics athletes are unaware of the condition of their teeth and mouth. Namely, the results of 3,174 oral screenings showed that 25.0% of Connecticut-based Special Olympics athletes had missing teeth, 21.4% had gingival signs, 18.1% had untreated tooth decay, 10% had mouth pain, and 9.8% required urgent dental referrals. To facilitate access to dental care, Special Smiles staff and volunteers provided not only oral health instruction but also a list of dental professionals in the region who care for people with SHCN.^{xv}



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CYSHCN End Notes

ⁱ In addition to national and state data on child health, the NSCH provides estimates for 19 Title V Maternal and Child Health Services Block Grant National Outcome and Performance Measures, as well as data for each state's Title V needs assessment.

ⁱⁱ According to a 2016-17 combined NSCH dataset, the rates of preventative dental visits were 94.0 (95% confidence interval: 89.6-96.6) and 85.0% (95% confidence interval: 81.8-87.7) for children with and without SHCN, respectively. According to a combined 2017-18 NSCH dataset, the rates of preventative dental visits were 90.1% (95% confidence interval: 81.8-94.9) and 87.3% (95% confidence interval: 84.0-90.1) for children with and without SHCN, respectively.

ⁱⁱⁱ According to a combined 2017-18 NSCH dataset, 90.1% (95% confidence interval: 81.8-94.9) of Connecticut children with SHCN had a preventative dental visit in the past 12 months, as compared with 83.9% (95% confidence interval: 82.1-85.6) US children with SHCN.

^{iv} According to a combined 2017-18 NSCH dataset, 78.7% (95% confidence interval: 76.8-80.2) of US children *with* SHCN as compared to 71.1% (95% confidence interval: 70.1-72.1) of US children *without* SHCN received a dental cleaning during the past 12 months. In New England, 87.9% (95% confidence interval: 84.4-90.6) of children *with* SHCN as compared to 80.1% (95% confidence interval: 77.8-82.2) children *without* SHCN received at least one dental cleaning during the past 12 months.

^v According to a combined 2017-18 NSCH dataset, 89.9% (95% confidence interval: 81.7-94.7) of Connecticut children with SHCN as compared to 78.7% (95% confidence interval: 76.8-80.4) of US children with SHCN received at least one dental cleaning during the past 12 months.

^{vi} According to a combined 2017-18 NSCH dataset, 22.6% (95% confidence interval: 21.0-24.4) of US children *with* SHCN as compared to 16.4% (95% confidence interval: 15.6-17.2) of US children *without* SHCN received dental sealants in the past 12 months. In New England, 26.2% (95% confidence interval: 22.4-30.3) of children *with* SHCN, as compared to 19.1% (95% confidence interval: 17.1-21.3) of children *without* SHCN received dental sealants in the past 12 months.

^{vii} According to a combined 2017-18 NSCH dataset, 24.4% (95% confidence interval: 17.0-33.9) Connecticut children with SHCN as compared with 22.6% (95% confidence interval: 21.0-24.4) US children with SHCN received dental sealants within the past 12 months.

^{viii} According to a combined 2017-18 NSCH dataset, 54.1% (95% confidence interval: 52.1-56.1) of children *with* SHCN living throughout the US, as compared to 44.4% (95% confidence interval: 43.3-45.4) of children *without* SHCN living throughout the US, received fluoride treatment in the past 12 months. In New England as a whole, 60.5% (95% confidence interval: 55.7-65.0) of children *with* SHCN as compared to 52.3% (95% confidence interval: 49.6-54.9) of children *with* SHCN received fluoride treatment in the past 12 months.

^{ix} According to a combined 2017-18 NSCH dataset, 63.7% (95% confidence interval: 54.5-72.1) of Connecticut children *with* SHCN as compared with 55.1% (95% confidence interval: 50.3-59.8) of Connecticut children *without* SHCN received fluoride treatment in the past 12 months.

^x According to a combined 2017-18 NSCH dataset, 62.1% (95% confidence interval: 59.5-64.7) of US children with more complex SHCN as compared to 79.5% (95% confidence interval: 76.7-82.1) of US children with less complex SHCN and 81.6% (95% confidence interval: 80.7-82.5) of US children without SHCN had an "excellent" or "very good" condition of teeth, as rated by parents or caregivers.

^{xi} According to a combined 2017-18 NSCH dataset, 73.1% (95% confidence interval: 63.1-81.2) of Connecticut children *with* SHCN, as compared to 88.9% (95% confidence interval: 85.5-91.6) of Connecticut children *without* SHCN had an "excellent" or "very good" condition of teeth, as rated by parents or caregivers.

^{xii} According to a combined 2017-18 NSCH dataset, 72.4% (95% confidence interval: 68.5-76.0) of Connecticut children had health insurance coverage that was usually/always adequate to meet their needs. This compared with 73.8% (95% confidence interval: 73.0-74.5) of US children.

^{xiii} According to a combined 2017-18 NSCH dataset, 58.1% (95% confidence interval: 48.9-66.7) of children *with* SHCN as compared with 72.0% (95% confidence interval: 67.6-76.0) of children *without* SHCN had adequate health insurance coverage. The estimates for the two groups were as follows in 2016-17: 66.2% (95% confidence interval: 59.0-72.7) vs. 71.3 (95% confidence interval: 67.3-74.9), respectively.

^{xiv} According to a combined 2017-18 NSCH dataset, 3.5% (95% confidence interval: 2.6-4.7) of US children *with* SHCN, as compared to 1.3% (95% confidence interval: 1.1-1.7) of US children *without* SHCN, had unmet dental care needs during the past 12 months. A comparison of children living in Connecticut is not available because of a small number of children with unmet dental care needs.

^{xv} Caitlin Daikus, MPH, CHES, Director, Health & Wellness at Special Olympics Connecticut, personal communication, July 1, 2020.

CYSHCN Oral Health Trends

Table. Oral Health Trends Among Children and Youth with SHCN Living in Connecticut

INDICATOR	SOURCE	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
At least one preventative dental visit in the past year among children and youth with SHCN, ages 1-17 y	NSCH	-	-	-	94.0% (89.6-96.6)	90.1% (81.8-94.9)	89.8% (82.2-94.3)
At least one dental cleaning in the past year among children and youth with SHCN, ages 1-17 y	NSCH	-	-	-	91.7% (86.9-94.8)	89.9% (81.7-94.7)	*
Dental sealant receipt in the past year on at least one tooth among children and youth with SHCN, ages 1-17 y	NSCH	-	-	-	28.8% (21.7-37.1)	24.4% (17.0-33.9)	*
At least one fluoride treatment in the past year among children and youth with SHCN, ages 1-17 y	NSCH	-	-	-	70.0% (62.7-76.4)	63.7% (54.4-72.1)	*
Instruction on oral health care in the past year among children and youth with SHCN, ages 1-17 y	NSCH	-	-	-	59.2% (50.9-66.9)	50.7% (48.7-52.7)	*
"Excellent or very good" condition of teeth among children and youth with SHCN, ages 1-17 y	NSCH	-	-	-	76.0% (68.0-82.5)	73.1% (63.1-81.2)	*

Note. Indicators included in the 2018-2023 Connecticut Oral Health Surveillance System are marked with numeric identifiers. 2016, 2017, and 2018 NSCH estimates are based on datasets combining two years of data: 2016 and 2017, 2017 and 2018, and 2018 and 2019, respectively. Each prevalence estimate is accompanied by a 95% confidence interval, enclosed in parentheses. y = year. SHCN = special health care needs. †Estimate not reported because of a coefficient of variation in excess of 30%. ‡Confidence interval is not reported because of a coefficient of variation in excess of 20%. *Not available as of this writing.

Oral Health of *Children and Youth*

Living on Low Income

There are clear oral health disparities among children and youth based on family income. In fact, differences in oral health are among the most glaring health disparities in the United States (US).¹ Not only do children living in poverty have twice the incidence of dental caries compared to their wealthier peers,² but they are also far more likely to have dental caries that goes untreated.³

According to the National Health and Nutrition Examination Survey data from 2015-16, almost a quarter (24%) of US children living below the federal poverty line had untreated dental caries, as compared with about 11% of children with family incomes of at least twice the federal poverty level.⁴ This is particularly concerning given that untreated dental caries leads to more complex and costly dental care needs, compounding the effect of poverty on oral health over time.¹

The likelihood of seeing a dentist generally increases with income. In other words, children and youth living in poverty are less likely to visit dental providers than their more affluent peers. In 2017, eight in ten (81.9%) young people living below the federal poverty line, as compared with nine in ten (91.4%) youth with a family income of at least four times the federal poverty line, had a dental visit, according to data from the National Health Interview Survey.⁵

Living on Low Income Preventing Oral Disease

Lack of access to dental care is one of the greatest risk factors for oral disease among young people living on low income. Whether or not children and youth have the opportunity to receive dental care is

based on numerous factors, including insurance coverage, public policy, availability of dentists, dentist enrollment in Medicaid (a health insurance plan for those living on low income), parents' ability to take time off work for dental appointments, access to transportation, and out-of-pocket expenses associated with dental care. The interplay of these factors sometimes creates a situation in which those children and youth most in need of dental care are the least likely to receive it.¹

The oral health of youth and children living on low-income is also influenced by food insecurity caused by lack of access to nutritional foods. Food insecurity includes food shortage, hunger, and irregular meals. Those on low income are more likely to live in food deserts where fast food restaurants and convenience stores are overrepresented and grocery stores with fresh food and reasonable prices are underrepresented. This creates a food environment that promotes dental caries.⁶ Excess consumption of carbohydrates, such as sweets, fruit juices, sugar sweetened beverages, crackers, chips, and to some degree pasta and bread, is associated with food insecurity. These foods are also considered cariogenic (caries-causing).⁷ Among 2.7 million households with children living in the US in 2018, 7.1% experienced food insecurity, meaning they were unable to provide adequate and nutritional food to their children at least sometime during the year.⁸ Fluoridated drinking water, along with the use of fluoride mouthwash and fluoride toothpaste, can help reduce tooth decay.^{7,9} School based dental sealant and dental care programs can also improve oral health for young people living on low income.¹⁰

Living on Low Income Oral Health in Connecticut

Access to Health Care

To provide access to health care for children whose families have limited income or resources, states and the federal government fund two public health coverage programs: Medicaid and the Children’s Health Insurance Program (CHIP). In Connecticut, Medicaid and CHIP are administered under the umbrella of the HUSKY Health program. HUSKY Health offers health care coverage for over 350,000 children and youth¹¹—or about 40% of all young people in the state. Benefits are comprehensive and include dental care in addition to preventative care, primary care, specialist visits, hospital care, and other services.¹²

Notably, the proportion of young people enrolled in HUSKY Health has grown in recent years, from 37.2% in 2013 to 43.7% in 2018 (Table 1), thus reflecting an increasing gap between the rich and the poor.¹³

Roughly 95% of children enrolled in HUSKY Health are covered by HUSKY A,¹⁴ a Medicaid plan that provides free health insurance to children and youth whose family incomes are up to 201% of the federal

poverty level (as well as pregnant women and parents and caretaker relatives who meet the income guidelines).¹⁵ In addition to providing health coverage for children and youth living on low income, HUSKY A covers most children in foster care and children in subsidized adoptions.¹⁴

HUSKY B is a CHIP plan that provides low-cost health insurance to children up to age 19 whose families earn too much to qualify for HUSKY A.^{12,15} HUSKY B comprises two levels, called bands, which are based on family income. HUSKY B Band 1 has no premium, whereas HUSKY B Band 2 has a \$30/month premium for one child and a \$50/month premium for two or more children.¹⁴ Additionally, families are responsible for \$5 or \$10 copayments for non-preventative doctor visits and prescription drugs.¹⁶ HUSKY B benefits are less comprehensive than those offered by HUSKY A and do not include Early Periodic Screening, Diagnosis & Treatment (EPSDT), which allows for the receipt of medically necessary services even if they are not covered benefits.¹² However, because HUSKY B is administered with HUSKY A, nearly all EPSDT standards are applied to HUSKY B dental coverage.¹

Table 1. *Young People’s Enrollment in Medicaid and the Rate of Uninsured in Connecticut Between 2013 and 2018*

Year	2013	2014	2015	2016	2017	2018
Count of children, ages 1-19 years, enrolled in Medicaid ⁱⁱ	318,436	333,007	351,425	341,592	347,497	351,513
Estimated count of Connecticut population aged 1-19 years ¹⁷	855,654	844,925	832,988	821,296	812,588	803,833
Percent of Connecticut’s children, ages 1-19 years, enrolled in Medicaid	37.2%	39.4%	42.2%	41.6%	42.8%	43.7%
Estimated percent of Connecticut’s children aged 0-18 years without health insurance coverage (with 95% confidence intervals in parentheses) ¹⁸	3.4% (3.2-3.6)	3.5% (3.3-3.7)	3.5% (3.3-3.7)	3.5% (3.3-3.7)	3.6% (3.4-3.8)	3.2% (3.0-3.4)

Note. Counts of children, ages 1-19 years, enrolled in Medicaid were provided by Connecticut Dental Health Partnership based on computations by the Connecticut Department of Social Services for each federal fiscal year. Estimated counts of Connecticut population aged 1-19 years were computed by a Connecticut Department of Public Health epidemiologist based on 2010 US Census. Rates of uninsured children are 5-year estimates for 2009-2013, 2010-2014, 2011-2015, 2012-2016, 2013-2017, and 2014-2018, computed by Connecticut Data Collaborative based on the US Census Bureau’s American Community Survey, table B27001.

Notwithstanding Connecticut's success in providing health care coverage to a large number of young people with limited income or resources, it is important to acknowledge that not everyone in the state has health insurance. Over 25,000 children and youth in Connecticut—about 3.2%ⁱⁱⁱ of all young people under 18 years old—were uninsured in the period between 2014 and 2018.¹⁸ Most recently, in 2018, an estimated 2.6% of Connecticut's children under 19 did not have health insurance coverage, according to the American Community Survey.¹⁹ This estimate was in line with estimates from three other New England states—New Hampshire (2.6%), Rhode Island (2.2%), and Vermont (2.0%)—yet significantly lower than the national estimate of 5.2% and the Maine estimate of 5.5%. However, it was significantly higher than the lowest rate in the US: the Massachusetts estimate of 1.2% children and youth without health insurance coverage in 2018.¹⁹

As concerns oral health, sources of information on the use of preventative dental services among children and youth residing in Connecticut include the following: 1) Medicaid EPSDT benefit data reports, which are publicly available on the Centers for Medicare & Medicaid Services website; 2) the *Connecticut Behavioral Risk Factor Surveillance System* (CT BRFSS),^{iv} a large scale annual survey of households that involves telephone interviews asking parents and caregivers to report on children's health and access to services; and 3) the *National Survey of Children's Health* (NSCH),^v a large scale survey of households with children that involves the completion of mailed and web-based surveys about young people's health by parents and caregivers.

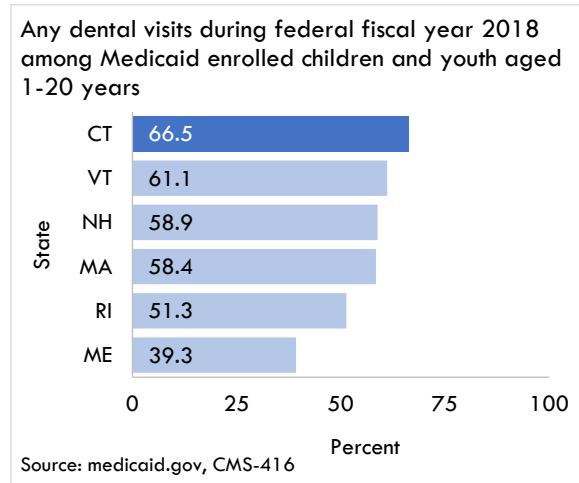
Dental Visits

Connecticut is doing well in ensuring children and youth are able to receive dental care regardless of household income. In fact, there were no significant differences in the rate of dental visits in the past year

by household income,^{vi} according to CT BRFSS data from 2018,²⁰ nor were there significant differences in the rate of preventative dental visits by household income, according to the NSCH surveys from 2016-2018.²¹ There were large differences, however, between young people in the general population and those on Medicaid. According to parents' or caregivers' responses to the CT BRFSS telephone interviews conducted in 2018, an estimated 86.7% of Connecticut children and youth under 18, across income categories, visited a dentist in the past 12 months. In contrast, only about 65.9%^{vii} of Connecticut's children under 19 who were enrolled in Medicaid received dental services during the federal fiscal year 2018, according to administrative EPSDT data.²² This discrepancy may, in part, be a function of the fact that the Medicaid numbers include 18-year-old youth, who have a lower rate of dental service receipt than their younger counterparts. That said, even children aged 6-14, who had the highest rate of dental service receipt among all children enrolled in Medicaid in 2018, had a lower rate of utilization than youth in the general population, as reported by parents or caregivers during CT BRFSS interviews. One explanation for this difference may be overreporting in CT BRFSS (in other words, adults erroneously reporting that children had seen dental providers because of social pressures, lapses in memory, or respondent fatigue).

Inadequate access to health care services among those enrolled in Medicaid might provide another explanation. That said, it must be emphasized that Connecticut is doing well with respect to dental service receipt among children and youth on Medicaid in comparison with other states in New England. In fact, Connecticut ranked first in the region on the proportion of Medicaid enrolled young people under 20 who received any dental service during the federal fiscal year 2018. What is more, Connecticut was considerably higher than the

second-ranking state in New England, Vermont, on the rate of dental services receipt among Medicaid enrolled children (66.5% v 61.1%, respectively).



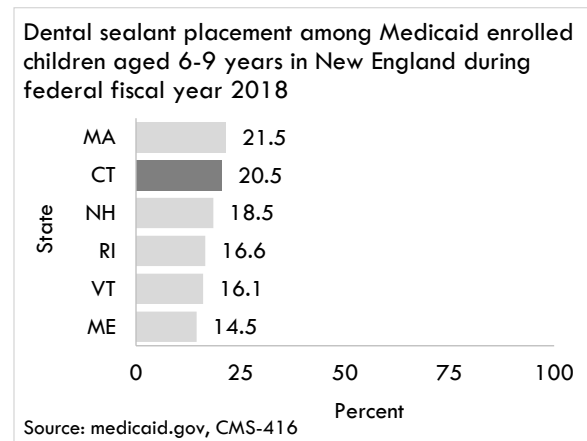
Preventative Dental Services

Young people living on low income were significantly less likely than their more affluent peers to receive dental sealants on their permanent teeth, according to the CT BRFSS interviews conducted in 2018.²⁰ Over half (51.9%) of children and youth in households with an annual income of \$75,000 and above, as compared to over one-third (36.2%) of children and youth in households with an annual income of less than \$35,000, received dental sealants on their permanent teeth at some point in their lives.^{viii} This difference was not, however, found in the previous five years.²³⁻²⁷ Also noteworthy was an absence of a difference in the receipt of dental sealants by caregiver education.^{ix} In other words, young people were equally likely to receive dental sealants across caregiver education categories.

Rates of dental sealant receipt in the past year were comparable for Connecticut’s children and youth on Medicaid and the general population of young people in the state. Of all children in Connecticut aged 6-9 who were enrolled in Medicaid during the federal fiscal year 2018, 20.5% received dental sealants.²² This is comparable to an estimated rate

of 23.0%^x among the general population of children aged 6-11, whose parents or caregivers completed the NSCH questionnaires in 2017-18.²¹

It is also important to note that Connecticut fares well in regional comparisons of Medicaid data. Connecticut ranked second in New England on the proportion of Medicaid enrolled children aged 6-9 years who received dental sealants during the federal fiscal year 2018 (20.5%), closely following the top-ranking state, Massachusetts (21.5%).



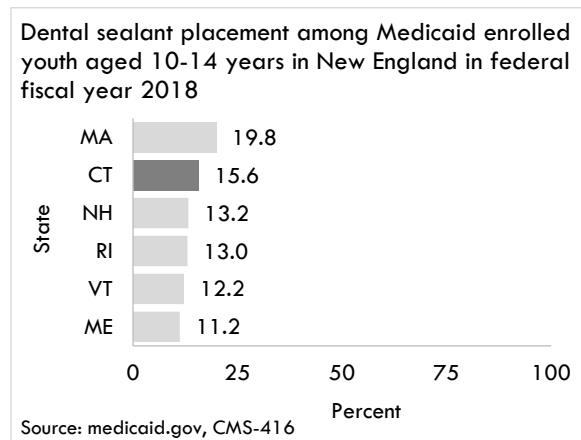
Available data suggest that older children on Medicaid received dental sealants at a lower rate than their peers in the general population. Among Medicaid enrolled youth, ages 10-14 years, 15.6% received dental sealants during the federal fiscal year 2018, according to the administrative EPSDT data.²² By contrast, an estimated 21.0%^{xi} of adolescents, ages 12-17 years, in the general population received dental sealants during 2017-18, according to parents’ and caregivers’ responses to the NSCH questionnaires in 2017-18.²¹

There are several possible explanations for this difference. First, NSCH participants might be overreporting dental sealant receipt. Second, different age ranges are being compared (ie, 10-14 years among youth enrolled in Medicaid v 12-17 among youth in the general population). Third, those who did not receive dental sealants during any

given year, according to administrative records, might have received them in the prior years.

At any rate, given that second molars erupt at about 12-13 years of age, the rate of dental sealant placement among older children should equal that of younger children. At present, there is a gap. Of children and youth on Medicaid who received any dental services during the federal fiscal year 2018, 27.0% among children aged 6-9 received dental sealants as compared with 21.2% among children aged 10-14.²²

Nonetheless, Connecticut is doing relatively well in comparison with other states in the region. During the federal fiscal year 2018, Connecticut ranked second in New England on the rate of dental sealant receipt among Medicaid enrolled youth aged 10-14. Connecticut rate of 15.6%, however, was lower by four percentage points than the top-ranking rate of 19.8%, in Massachusetts.



Dental Caries

Young people living on low income were more likely than their wealthier counterparts to have dental

decay, according to parents' and caregivers' responses to the CT BRFSS interviews. In 2018, there was a statistically significant difference in the rate of dental decay in the past 12 months among children living in households with an income of \$75,000 and above (10.9%) than among children living in households with an income of less than \$35,000 (20.7%).^{20,xii} This difference was also evident in data from 2016 and 2017.^{24,25}

The observed difference in the rate of dental decay by caregiver education was not statistically significant in 2018 or 2017 but was significant in 2016. Namely, 15.1% of young people whose caregivers had more than a high school education were told that they had dental decay as compared with 26.7% of young people whose caregivers had a high school education or less, according to the CT BRFSS interviews conducted in 2016.^{25,xiii}

Dental Disparities

As the income gap widens in Connecticut, more and more children are living in low-income households and becoming eligible for Medicaid services. Access to dental care for children and youth on Medicaid has improved dramatically in Connecticut over the past decade, with 46.7% of Connecticut's dentists accepting Medicaid in 2016, as compared with the national average of 39%. In fact, Connecticut has one of the highest dental care utilization rates for Medicaid enrolled children in the country.¹⁰ Even so, it is important to keep in mind that Connecticut's children and youth living in households with an annual income of under \$35,000 were significantly less likely to have sealants than their more affluent peers.²⁰ These same children and youth were also at higher risk for dental decay.²⁰

Living on Low Income References

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Living on Low Income End Notes

ⁱ Marty Milković, Director, Connecticut Dental Health Partnership, personal communication, June 24, 2020.

ⁱⁱ Counts of children enrolled in HUSKY Health (ie, eligible for EPSDT for 90 continuous days, CMS-416 Form line 1b) were provided by Connecticut Dental Health Partnership based on the Connecticut Department of Social Services computations.

ⁱⁱⁱ According to Connecticut Data Collaborative, 3.2% \pm 0.2% of Connecticut's children under 18 years of age did not have health insurance in the period between 2014 and 2018. This 5-year estimate is based on the US Census Bureau's American Community Survey (table B27001).

^{iv} Connecticut Behavioral Risk Factor Surveillance System (CT BRFSS) is an ongoing telephone survey of adults from randomly selected households in Connecticut. Interviews are conducted by a contractor on behalf of the Connecticut Department of Public Health. BRFSS is conducted in all 50 states and it is coordinated by the Centers for Disease Control and Prevention.

^v The National Survey of Children's Health (NSCH) is an ongoing mail and web-based survey that is funded and directed by the Health Resources and Services Administration (HRSA) Maternal and Child Health Bureau (MCHB) and conducted by the United States Census Bureau. The survey is designed to provide national and state-level data on the health and health care of children aged 0-17 years old in the United States. Additionally, the NSCH provides estimates for 19 Title V Maternal and Child Health Services Block Grant National Outcome and Performance Measures, as well as data for each state's Title V needs assessment.

^{vi} According to the CT BRFSS data from 2018, 89.3% (95% CI: 86.7-91.9) of children aged 0-17 years living in households with an annual income of \$75,000 or above visited a dentist in the past year. Among children aged 0-17 years living in households with an annual income of less than \$35,000, 82.0% (95% CI: 76.4-87.6) visited a dentist in the past year.

^{vii} The proportion of children and youth on Medicaid who received dental services during federal fiscal year 2018 was computed based on the publicly available Form CMS-416, lines 1b and 12a.

^{viii} According to the CT BRFSS interviews conducted in 2018, 51.9% (95% CI: 46.9-56.9) of children in households with an annual income of \$75,000 or more as compared with 36.2% (95% CI: 27.7-44.8) of children in households with an annual income of less than \$35,000 ever received dental sealants on their permanent teeth.

^{ix} According to the CT BRFSS interviews conducted in 2018, 49.2% (95% CI: 44.9-53.5) of children whose caregiver had more than a high school education, as compared with 40.0% (95% CI: 32.3-47.7) of children whose caregiver had a high school education or less, ever received dental sealants on their permanent teeth.

^x According to an NSCH dataset combining data from 2017 and 2018, 23.0% (95% CI: 17.6-29.4) of children aged 6-11 years received dental sealants during the past 12 months.

^{xi} According to an NSCH dataset combining data from 2017 and 2018, 21.0% (95% CI: 16.5-26.4%) of children aged 12-17 years received dental sealants during the past 12 months.

^{xii} According to the CT BRFSS data from 2018, 10.9% (95% CI: 7.8-14.1) of children and youth living in households with an annual income of \$75,000 or more, as compared with 20.7% (95% CI: 14.4-26.9) of children and youth living in households with an annual income under \$35,000, were told that they had dental decay in the past 12 months.

^{xiii} According to the CT BRFSS data from 2016, 15.1% (95% CI: 12.8-17.3) of children and youth whose caregivers had more than a high school education, as compared with 26.7% (95% CI: 21.1-32.4) of children and youth whose caregivers had a high school education or less, were told that they had dental decay in the past 12 months.



Oral Health in *Adolescence*

Adolescents are at high risk for developing dental caries, commonly known as tooth decay or cavities. This is, in part, because of an increase in tooth surfaces, and in part, because adolescence is a time when youth gain more independence relative to what they eat, how they take care of their teeth, and whether they seek or avoid dental care.¹ According to the *National Health and Nutrition Examination Survey* (NHANES), over half of adolescents in the United States (US) have experienced dental caries in permanent teeth, and one in seven has at least one untreated cavity.²

Adolescents are more likely than prepubescent children or adults to develop gingivitis.¹ Gingivitis is a mild form of gum disease that results in redness and swelling of the gums. Left untreated, gingivitis can progress to periodontitis, a more serious disease that can lead to tooth loss. The most common cause of gingivitis is inadequate tooth brushing and flossing.³ In puberty, sex hormones can also increase the risk of gingivitis.¹

Third molars, also known as wisdom teeth, tend to emerge during adolescence. These teeth can be blocked from breaking through the gum (impacted teeth), or they can erupt into a non-functional position (malposition of teeth), which can lead to



pain and which necessitates an evaluation of whether they are functional teeth that should remain in the mouth or whether they need to be removed.

Misalignment of the teeth (malocclusion) is also common as permanent teeth come in, as is agenesis—teeth missing due to genetics. Both malocclusion and agenesis may require orthodontic evaluation and care.¹

Much like younger children, adolescents need to have a dental home—an established, ongoing relationship with a dentist who ensures their oral health care needs are met in a comprehensive and coordinated way. The dental home provides access to the dentist on a regular basis, even when a young person is not having problems. What is more, the dental home provides preventative oral health care and education to caregivers; reduces unmet dental needs; decreases hospital emergency department visits; and improves a young person's overall oral health.⁴

Adolescence Preventing Oral Disease

There are a number of modifiable risk factors that make oral disease more likely during adolescence. Young people are more likely to injure their teeth playing sports or engaging in physical activities (eg, skateboarding). They are also more likely to have eating disorders, consume soda and sports drinks, use drugs, and/or neglect their oral hygiene. It is not uncommon for adolescents to get infections from piercings of the tongue, cheek, or lip, or to create dental problems by applying jewelry directly to the surface of their teeth.⁵ Tobacco use is also a significant risk factor among US adolescents, as it increases the likelihood of dental problems.⁶

Adolescents need to receive oral health care education in ways that motivate them to care for their teeth. This includes brushing twice a day, using dental floss, and getting dental cleanings every six months. Adolescents can also benefit from fluoride and should continue to drink optimally-fluoridated water,ⁱ use toothpaste with fluoride, and receive professionally-applied fluoride treatments.^{1,7} Adolescents with malocclusion need orthodontic care to correctly position their teeth.¹

Adolescence Oral Health in Connecticut

Dental Visits

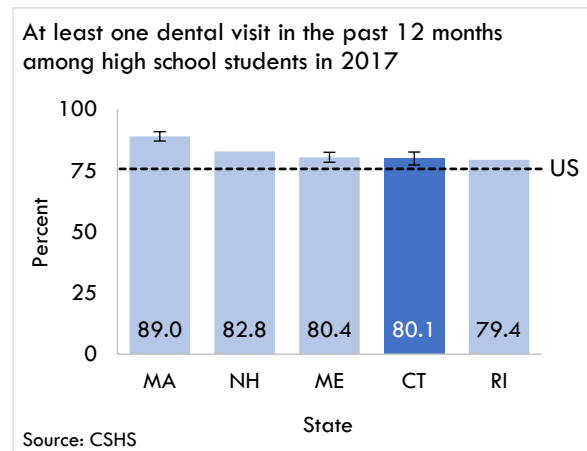
Most Connecticut adolescents have dental visits at least once a year. An estimated 95% of those aged 12-17 years saw a dental provider in the past year, according to the data collected in 2018 as part of the Connecticut *Behavioral Risk Surveillance System* (CT BRFSS).⁸ CT BRFSS estimates are based on telephone interviews with adults from a random sample of households.ⁱⁱ Interviews are conducted every year, and estimates of dental visits among adolescents from 2013 through 2017 are similarly high as the 2018 estimate of 95%.^{8-10,iii}

Additionally, CT BRFSS estimates are consistent with those from the *National Survey of Children's Health* (NSCH), a study that surveys parents or caregivers, using web-based and mailed questionnaires.^{iv} According to the NSCH data from 2017 and 2018, 95.1% of adolescents in Connecticut had a preventative dental visit in the 12-month period preceding the survey. This was significantly higher than the national rate of 86.3%,^v and it was consistent with rates from other New England states.¹¹

Data from the *Connecticut School Health Survey* (CSHS) also suggest a high rate of oral health care utilization among young people in Connecticut. Unlike CT BRFSS and NSCH estimates, which are

based on parents' and caregivers' answers, CSHS estimates are based on the responses of high school students in grades 9-12.^{vi} CSHS data from 2017 suggest that 80.1% of high school students had at least one dental visit in the past year.¹² This estimate was comparable with the national estimate of 75.5%¹³ in 2017 and with estimates from three New England states: New Hampshire,¹⁴ Maine,¹⁵ and Rhode Island.¹⁶ It was significantly lower, however, than the Massachusetts estimate of 89.0%.¹⁷

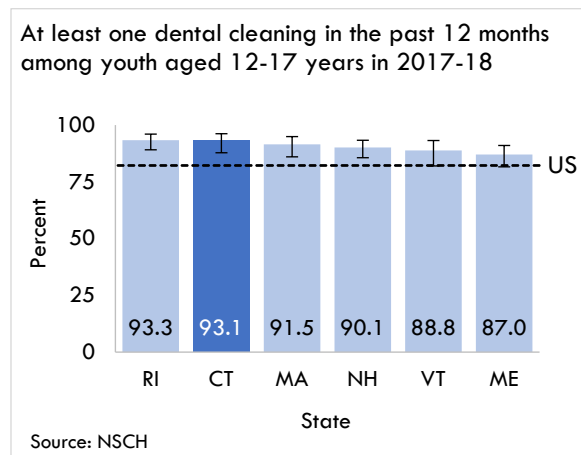
Notably, the 2017 CSHS estimate of oral health care utilization among adolescents in Connecticut was considerably lower than the CT BRFSS estimate from the same year (80.1% vs 90%, respectively). Possible explanations for this discrepancy include different age ranges in the two studies (ie, CT BRFSS includes younger children) and a difference in how survey questions are worded (ie, CT BRFSS asks about seeing a dental provider, whereas CSHS asks about seeing a dentist). It is also possible that dental visits were simply overreported by parents or caregivers participating in CT BRFSS and/or underreported by adolescents.



Preventative Dental Services

Chief sources of information on preventative dental services in adolescence include NSCH data on dental cleanings, fluoride treatments, and oral health care

instruction, as well as CT BRFSS data on dental sealants. According to the NSCH data from 2017 and 2018, a large majority (95.1%) of adolescents had at least one preventative dental visit in the 12-month period prior to the survey, and a majority (93.1%) received at least one dental cleaning.¹¹ The Connecticut estimate of dental cleanings (93.1%) among adolescents was consistent with those from other New England states, and it exceeded the national estimate of 82.2%.^{vii}

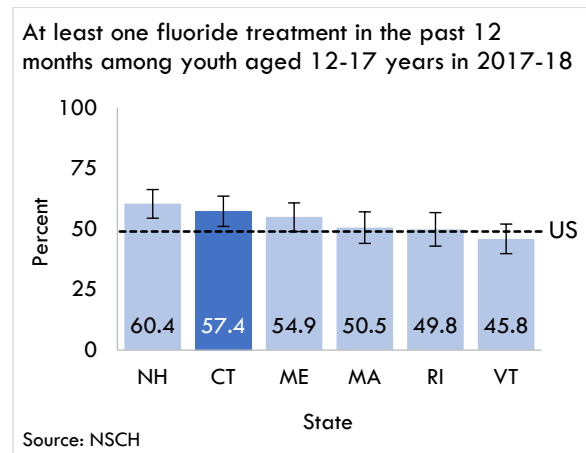


Another preventative dental service commonly used in Connecticut is the application of dental sealants. Sealants are plastic coatings painted onto the surface of the teeth to prevent dental caries. One *Healthy People 2020* objective aims to increase the proportion of adolescents who have received dental sealants on their permanent molars (back teeth).¹⁸ Connecticut does not have a system for tracking dental sealants, dental caries, and other oral health indicators among middle school and high school students, unlike for kindergarteners and 3rd grade students.

The only publicly available source of systematic information on dental sealants among adolescents in Connecticut comes from parents' and caregivers' responses to the CT BRFSS interviews. According to this source, over half (58%) of adolescents, ages 12-17 years in 2018, received dental sealants on their

permanent teeth at some point in their lives.⁸ Although CT BRFSS summary tables present data on a broader age range (ie, 12-17 years) than the one used to track the *Healthy People 2020* oral health objectives among adolescents (ie, 13-15 years), the available data suggest that Connecticut has surpassed the national target of 21.9% of adolescents with dental sealants.

Aside from dental sealants, dental professionals use fluoride treatments to prevent dental caries^{19,20} and to treat incipient carious lesions.²¹ In Connecticut, over half of adolescents aged 12-17 years (57.4%) received fluoride treatments during the past 12 months, according to the NSCH data from 2017 and 2018.¹¹ This was significantly higher than the national rate of 48.9%, and it was in line with the rates in other New England states.^{viii} Favorable national and regional comparisons notwithstanding, it must be underscored that over four in ten of Connecticut's adolescents went without a fluoride treatment in the past 12 months, according to the NSCH data from 2017-18.



Oral hygiene instruction is yet another strategy that dental professionals use to prevent disease and promote oral health among children and adolescents. In Connecticut, about half (50.9%) of adolescents, ages 12-17 years, received instruction on tooth brushing and oral health care during the

past 12 months, according to parents' and caregivers' responses to the NSCH questionnaires from 2017 and 2018.¹¹ This was significantly higher than the national rate of 42.1%, and it was consistent with the rates in other New England states.^{ix}

Dental Caries

Healthy People 2020 objectives include a target of no more than 48.3% of adolescents having a dental decay experience in their permanent teeth, and no more than 15.3% having untreated dental caries. As mentioned previously, Connecticut has not conducted an open-mouth survey in middle schools and high schools to track dental sealants, dental caries, and other oral health indicators among adolescents. The only available sources on dental caries and other oral health problems are parents' or caregivers' responses to CT BRFSS interviews and NSCH questionnaires. Neither of these studies asks about lifetime dental caries in permanent teeth. Instead, both inquire about oral health in the past 12 months—CT BRFSS about recent dental decay diagnoses and NSCH about frequent or chronic difficulty with toothaches, bleeding gums, and decayed teeth or cavities.

According to the CT BRFSS data from 2018, about one in seven (14.9%) Connecticut adolescents, ages 12-17, was told that they had dental decay in the past 12 months.⁸

Furthermore, NSCH data from 2017 and 2018 suggest that 8.3% of adolescents, ages 12-17, had frequent or chronic oral health problems, including dental caries. This was lower than the national estimate of 12.9%,^x and it was in line with estimates from other New England states.

Use of Tobacco

Connecticut's adolescents are exceeding the *Healthy People 2020* goal of reducing current tobacco use from 26% to 21% among those in grades 9 through 12. In 2017, 17.9%^{xi} of Connecticut's high school

students reported current tobacco use as defined by the use of cigarettes, "cigars, cigarillos, or little cigars," "chewing tobacco, snuff, or dip," "tobacco in a pipe," hookahs, e-cigarettes, and any other tobacco on one or more of the past 30 days.²²

It is important to note that while cigarette smoking has been on a decline among high school students in Connecticut,²³ use of e-cigarettes has been on the rise. One in seven (14.7%) adolescents smoked e-cigarettes in 2017, as compared to one in thirteen adolescents (7.2%) who did so in 2015, according to the *Connecticut Youth Tobacco Survey*.^{22,24}

Oral Health Disparities

Healthy People 2020 aims to increase health equity and eliminate health disparities across all groups. Available data point to a general absence of disparities in dental caries and the associated risk and protective factors among adolescents in Connecticut. An exception to this is the differential use of the oral health system by racial grouping. According to the CSHS data, a higher percentage of White high school students (84.9%) as opposed to Black (72.4%) and Latinx (73.1%) students reported that they saw a dentist "for a check-up, exam, teeth cleaning, or other dental work, during the 12 months before the survey."^{12,xii} Nevertheless, it is important to keep in mind that there is a relative paucity of oral health information about adolescents in Connecticut. In other words, it is possible that any existing disparities have not been documented.



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Adolescence Acknowledgements

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Adolescence End Notes

ⁱ The United States Public Health Service (PHS) recommends an optimal fluoride concentration in drinking water of 0.7 milligrams/liter. Optimally-fluoridated water has been shown to be safe and effective in reducing dental caries. The United States Environmental Protection Agency (EPA) standard of a maximum concentration of fluoride in drinking water is 4.0 milligrams/liter. The EPA standard was set to protect against skeletal fluorosis, a disease that can cause pain or damage to bones and joints. In Connecticut, public water systems serving of 20,000 people are required, per state statute, to adjust fluoride levels in drinking water in accordance with PHS guidelines for optimal fluoride concentration in drinking water.

ⁱⁱ The Connecticut Behavioral Risk Factor Surveillance System (CT BRFSS) is an ongoing telephone survey of adults from randomly selected households in Connecticut. Interviews are conducted by a contractor on behalf of the Connecticut Department of Public Health. BRFSS is conducted in all 50 states and it is coordinated by the Centers for Disease Control and Prevention.

ⁱⁱⁱ According to CT BRFSS data from 2018, 95% of adolescents, ages 12-17, saw a dental provider in the past year. The coefficient of variation for this estimate was greater than 20%. In 2017, the estimate was 90.0%; in 2016, it was 95.3% (95% confidence interval: 93.4-97.1).

^{iv} The National Survey of Children's Health (NSCH) is an ongoing mail and web-based survey that is funded and directed by the Health Resources and Services Administration (HRSA) Maternal and Child Health Bureau (MCHB) and conducted by the United States Census Bureau. The survey is designed to provide national and state-level data on the health and health care of children aged 0-17 years old in the United States. Additionally, the NSCH provides estimates for 19 Title V Maternal and Child Health Services Block Grant National Outcome and Performance Measures, as well as data for each state's Title V needs assessment.

^v According to a combined 2017-18 NSCH dataset, 95.1% (95% confidence interval: 90.2-97.6) of Connecticut adolescents, ages 12-17 years, had a preventative dental visit during the past 12 months, as compared with 86.3% (95% CI: 85.1-87.4) of US adolescents.

^{vi} The Connecticut School Health Survey (CSHS) is nationally known as the Youth Risk Behavior Survey (YRBS). The CSHS is administered every other year. CSHS participants are students in grades 9-12, from randomly chosen classrooms within selected schools. The survey contains questions about behaviors that contribute to, or detract from, health and wellbeing.

^{vii} According to a combined 2017-18 NSCH dataset, 93.1% (95% confidence interval: 87.8-96.2) of Connecticut adolescents aged 12-17 received a dental cleaning during the 12 months before the survey as compared with 82.2% (95% confidence interval: 80.9-83.4) of US adolescents aged 12-17.

^{viii} According to a combined 2017-18 NSCH dataset, the rate of fluoride treatment receipt in Connecticut was 57.4% (95% confidence interval: 51.0-63.5) among adolescents aged 12-17, as compared with the national rate of 48.9% (95% confidence interval: 47.4- 50.4) in the same age group.

^{ix} According to a combined 2017-18 NSCH dataset, the rate of oral health care instruction in Connecticut was 50.9% (95% confidence interval: 44.5-57.2) among adolescents aged 12-17 years, as compared with the national rate of 42.1% (95% confidence interval: 40.6-43.5) in the same age group.

^x According to a combined 2017-18 NSCH dataset, 8.3% (95% CI: 5.8-11.8) of Connecticut adolescents, ages 12-17, had frequent or chronic difficulties with toothaches, decayed teeth, or bleeding gums, as compared with 12.9% (95% confidence interval: 11.8-14.1) of adolescents nationally.

^{xi} Between 2005 and 2019, the Connecticut School Health Survey (CSHS) comprised two components: the Youth Tobacco Component (YTC) for grades 6 to 12 and the Youth Behavior Component (YBC) for grades 9 to 12. According to YTC data from 2017, 17.9% (95% confidence interval: 14.1-21.6) of Connecticut high school students used some form of tobacco on one or more of the past 30 days. The 2015 estimate was 14.3% (95% confidence interval: 11.3-17.3) and the 2013 estimate was 18.7% (95% confidence interval: 16.2-21.2)

^{xii} According to the Connecticut School Health Survey (CSHS) data from 2017, 84.9% (95% confidence interval: 82.3-82.1) White high school students, as compared with 73.1% (95% confidence interval: 68.9-77.0) Latinx and 72.4% (95% confidence interval: 65.5-78.5) Black students saw a dentist during the 12 months before the survey. Notably, categories "Black" and "White" include only those adolescents who did not identify as Latinx. The term "Latinx" refers to persons of Latin American descent or origin. The term was selected for use in this document because it is gender-inclusive, and therefore, consistent with the health equity framework.

Adolescence Oral Health Trends

Table. Oral Health Trends Among Adolescents Living in Connecticut

INDICATOR	SOURCE	2013	2014	2015	2016	2017	2018
3.1. At least one dental visit in the past year among high school students in grades 9-12	CSHS	79.7% (76.7-82.4)	-	80.8% (78.0-83.3)	-	80.1% (77.3-82.6)	-
At least one dental visit in the past year among adolescents aged 12-17 y	CT BRFSS	93.0% (90.2-95.8)	97.0% (95.5-98.6)	†	95.3% (93.4-97.1)	90.0% ‡	95.0% ‡
At least one preventative dental visit in the past year among adolescents aged 12-17 y	NSCH**	-	-	-	94.2% (89.4-96.9)	95.1% (90.2-97.6)	93.4% (89.4-96.0)
At least one dental cleaning in the past year among adolescents aged 12-17 y	NSCH**	-	-	-	91.8% (87.1-94.9)	93.1% (87.8-96.2)	*
Dental sealant receipt in the past year, on at least one tooth, among adolescents aged 12-17 y	NSCH**	-	-	-	23.6% (19.2-28.7)	21.0% (16.5-26.4)	*
Dental sealants receipt ever, on at least one permanent tooth, among adolescents aged 12-17 y	CT BRFSS	62.2% (56.9-67.5)	62.1% (56.3-67.9)	63.8% (59.1-68.4)	58.0% (53.7-62.2)	58.5% (53.4-63.5)	58.0% (53.2-62.9)
At least one fluoride treatment in the past year among adolescents aged 12-17 y	NSCH**	-	-	-	63.5% (57.9-68.7)	57.4% (51.0-63.5)	*
Instruction on oral health care in the past year among adolescents aged 12-17 y	NSCH**	-	-	-	48.3% (42.7-54.1)	50.9% (44.5-57.2)	*
Dental decay in the past year among adolescents aged 12-17 y	CT BRFSS	-	-	-	14.7% (11.7-17.7)	13.1% (10.0-16.3)	14.9% (11.4-18.4)
Frequent or chronic oral health problems in the past year among adolescents aged 12-17 y	NSCH**	-	-	-	7.8% (5.4-11.2)	8.3% (5.8-11.8)	*
Current tobacco use among high school students in grades 9-12	YTC	18.7% (16.2-21.2)	-	14.3% (11.3-17.3)	-	17.9% (14.1-21.6)	-
Current cigarette smoking among high school students in grades 9-12	YTC	8.9% (7.1-10.6)	-	5.6% (3.5-7.8)	-	3.5% (2.4-4.7)	-
Current cigarette smoking among high school students in grades 9-12	CSHS	13.5% (11.1-16.3)	-	10.3% (8.6-12.3)	-	7.9% (6.4-9.7)	-
Current e-cigarette smoking among high school students in grades 9-12	YTC	5.3% (3.7-6.8)	-	7.2% (4.7-9.7)	-	14.7% (11.0-18.4)	-

Note. Indicators included in the 2018-2023 Connecticut Oral Health Surveillance System are marked with numeric identifiers. Each prevalence estimate is accompanied by a 95% confidence interval, enclosed in parentheses. y = year. †Estimate not reported because of a coefficient of variation in excess of 30%. ‡Confidence interval is not reported because of a coefficient of variation in excess of 20%. *Not available as of this writing. **2016, 2017, and 2018 NSCH estimates are based on datasets combining two years of data: 2016 and 2017, 2017 and 2018, and 2018 and 2019, respectively.

Oral Health in *Adulthood*

Most people living in the United States (US) will experience dental caries by the time they have reached adulthood. Commonly known as cavities or tooth decay, dental caries is a bacterial disease that destroys tooth enamel and causes holes in the surface of teeth.^{1,2} Left untreated, dental caries can lead to severe toothaches, damaged or broken teeth, and/or tooth loss.¹ Untreated decay can also lead to dental abscess, a chronic infection below the gums or in the bone, which can be life threatening.^{1,3}

Nine in ten (89.9%) US adults aged 20-64 have had at least one cavity in their lifetime, and a quarter (26.1%) have untreated tooth decay.⁴ What is more, four in ten (41%) US adults experience frequent oral pain, according to a 2015 survey conducted by the American Dental Association (ADA).⁵

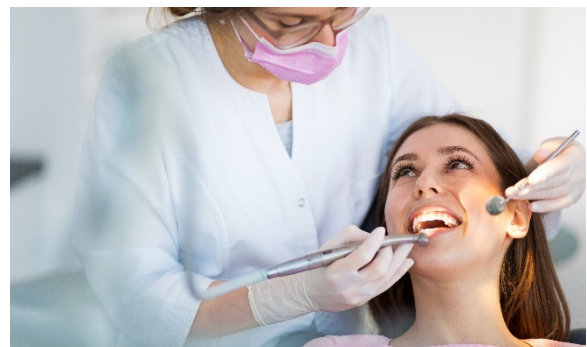
Oral pain is most often caused by dental caries and periodontitis, a form of periodontal disease that is commonly known as gum disease. Periodontitis is a serious infection of the gums that can, without treatment, damage the bone that supports teeth and cause tooth loss.⁶ Additionally, periodontitis is linked with several chronic diseases, including diabetes, heart disease, dementia, Alzheimer's, gastrointestinal and colorectal cancer, as well as respiratory infection and adverse pregnancy outcomes.^{7,8} About four in ten (42.2%) US adults aged 30 or older show signs of periodontitis, according to clinical examinations conducted by registered dental hygienists in 2009-2014.⁹

A quarter (25%) of all adults living in the US avoid smiling and almost a quarter (23%) feel embarrassed about the condition of their mouth and teeth, according to the ADA survey from 2015.⁵ These numbers are considerably higher among those living on low income, with over a third (37%) reporting that

they avoid smiling, and over a third (35%) reporting that they feel embarrassed about their mouth and teeth. Young adults also experience embarrassment about their teeth at higher rates than the general population of US adults. In addition, over a third (35%) of young adults in the US have difficulty biting and chewing.⁵ These facts are particularly concerning, given that an overwhelming majority of US adults value oral health (97%) and believe that regular dental visits are important (95%).⁵

Adulthood Preventing Oral Disease

Most adults in the US have grown up with fluoridated water, fluoridated toothpaste, and professional fluoride treatments, all of which are important for preventing dental caries, periodontitis, and tooth loss. Many were also provided with dental sealants as children, further decreasing the likelihood they would enter adulthood with dental caries. These protective factors do not, however, eliminate the importance of routine dental care across the lifespan. This includes regular oral exams and teeth cleaning, as well as reparative and restorative procedures, periodontal services, orthodontic care, or prosthodontic care as needed. As an aside, periodontal care focuses the treatment of oral inflammation and includes services such as scaling and root planing and root surface



debridement; orthodontic care centers on the position of teeth and jaws, and involves the use of appliances such as braces and removable retainers; and prosthodontic care revolves around missing teeth, and includes services such as tooth reconstruction, bridges and implants, and dentures.

Adults are at greater risk of periodontal disease, bone loss, dental decay, and tooth loss as they become older.^{4,9-11} Tobacco use is a risk factor for oral disease among one in seven (15%) of US adults.⁴ Smoking and/or the use of smokeless tobacco can lead to periodontitis, oral and pharyngeal cancers, tooth discoloration, dental caries, and tooth loss. The need for dental care tends to be greater for some racial groupings, as well as those living on low income.⁴ Adults living on low income are also less likely to have access to nutritional foods, relying on a diet of cariogenic (caries-causing) starches and sugary foods. An estimated one in nine adults living in the US suffers from food insecurity.¹²

Affordability constitutes a barrier to accessing dental care for many adults in the US. In fact, a third of adults in the US have no form of dental insurance,¹³ and many cannot afford out-of-pocket costs for dental care, whether or not they have dental insurance. Additionally, many commercial dental insurance plans do not cover scaling and root planing, which is one of the most effective ways to treat gum disease before it becomes severe.

Furthermore, Medicare, the national health insurance program for older adults and certain younger adults with disabilities, does not cover routine dental care, and almost two-thirds of Medicare beneficiaries do not have dental coverage.¹⁴ Medicaid, a health insurance program for low-income adults, children, pregnant women, elderly adults, and people with disabilities, covers dental care in some states but not others. In states such as Connecticut in which Medicaid covers dental

care, there are limits for adult coverage.¹⁵ Dental anxiety or fear may present a barrier for some adults. It has been estimated that roughly 15% of adults suffer from dental fear or anxiety significant enough to interfere with seeking dental care. While fear and anxiety are not the same, these terms have been used interchangeably across studies to indicate a sense of dread, stress, and worry that occur when people are in dental settings or when they think about going to the dentist.¹⁶

Adulthood Oral Health in Connecticut

Overall, adults in Connecticut fare well in national comparisons of oral health services and outcomes. However, oral health disparities exist among adults in Connecticut based on health and ability status, socioeconomic status, and racial grouping.

The sources of systematic information on oral health among adults in Connecticut include the Behavioral Risk Factor Surveillance System (BRFSS) and the Connecticut Tumor Registry. BRFSS is a telephone survey of adults from randomly selected households.¹⁷ Established in 1984 within 15 states, BRFSS has expanded over time and is now conducted in all 50 states, the District of Columbia, and three US territories, with the purpose of collecting information about health conditions, risk behaviors, and use of preventative services.

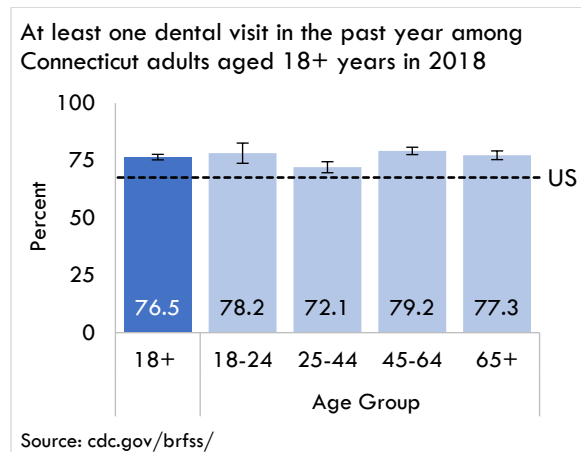
As concerns oral health, the Connecticut BRFSS (CT BRFSS) survey includes questions about dental visits, tooth loss, and periodontal disease (gum disease) among adults aged 18 years or older.¹⁸ It does not, however, include questions about dental caries experience or untreated dental decay.

The second source of information on oral health in the state is the Connecticut Tumor Registry (CTR). Located within the Department of Public Health, CTR is a statewide, population-based resource for tracking cancer in Connecticut.¹⁹ By law, licensed

medical providers, hospitals, and pathology laboratories in Connecticut are required to report cancer cases to CTR.¹⁹ CTR, in turn, maintains and analyzes data on cancer for the purpose of tracking how widespread it is in Connecticut.²⁰ As concerns oral health, CTR epidemiologists computed for this report annual counts and rates of new diagnoses of oral and pharyngeal cancers; annual counts and rates of death; and, the proportion of cancer cases diagnosed at the earliest stage. Additionally, the CTR 2019 report on the burden of cancer provides important information about oral and pharyngeal cancers among Connecticut residents.²⁰

Dental Visits

The percentage of adults in Connecticut who have dental visits each year is higher than the national average of 67.6%.ⁱ It also exceeds the *Healthy People 2020* target of 49%.²¹ Roughly three-quarters of Connecticut adults had an annual dental visit, according to the CT BRFSS interviews conducted between 2013 and 2018.²²⁻²⁴ Most recently, in 2018, three-quarters (76.5%)ⁱⁱ of adults reported that they visited a dentist or a dental clinic within the past year.²⁴



It is interesting to note that younger adults were significantly less likely than older adults to have dental visits. Namely, 72.1% of adults aged 25-44 as

compared to 79.2% of adults aged 45-64 and 77.3% of adults aged 65 years or older reported in 2018 that they had a dental visit within the past year.^{25,iii}

Periodontal Disease

One of the *Healthy People 2020* objectives is to reduce the occurrence of moderate to severe periodontal disease from 47.5%^{iv} in 2009-10 to 40.8% by 2020, among US adults aged 45-74 years.²¹ While information about the severity of periodontal disease among Connecticut adults is not available, data that are available suggest that Connecticut might be meeting the 2020 target.²²⁻²⁴

According to the CT BRFSS interviews conducted in 2018, one in six (16.3%) Connecticut adults aged 45-74 reported being told that they had “periodontal disease (gum disease)” at some point in their lives.²⁴ Additionally, close to a quarter (23.3%) of adults reported in 2018 that they received “treatment for gum disease such as scaling and root planing, or deep cleaning.”^{24,v} Each of these estimates (ie, 16.3% and 23.3%) is well below the 2020 target of 40.8%.

With that said, it is important to keep in mind two considerations. First, *Healthy People 2020* uses the National Health and Nutrition Examination Survey (NHANES) data to track the prevalence of periodontal disease nationwide. NHANES estimates are based on full mouth examinations, which are conducted by dental hygienists.²¹ By contrast,



Connecticut estimates are based on adults' recollections, as reported during CT BRFSS interviews. Consequently, CT BRFSS estimates exclude those who have not visited oral health professionals and who, therefore, could not have received a diagnosis of, or treatment for, periodontal disease. Additionally, CT BRFSS participants may not report on their health status truthfully or may not remember fully, or correctly, what they were told by their dental providers. All this is to say that CT BRFSS estimates are not directly comparable to NHANES estimates. Second, questions about periodontal disease included on the CT BRFSS survey are "state-added questions." Because they are not part of the national BRFSS survey, a comparison between state and national BRFSS data is not possible. Even so, available data suggest that Connecticut is most likely meeting the *Healthy People 2020* target.

The last point of interest concerns the relationship between periodontal disease and age. In Connecticut, as well as nationally,⁹ the rate of periodontal disease increases with age. According to the CT BRFSS data, one in ten (9.9%) adults aged 35-54 as compared to almost one-fifth (18.3%) of adults aged 55 years or older reported ever being told that they had "periodontal disease (gum disease)."²⁴ Similarly, one in seven (13.8%) adults aged 35-54 as compared to over one-quarter (26.6%) of adults

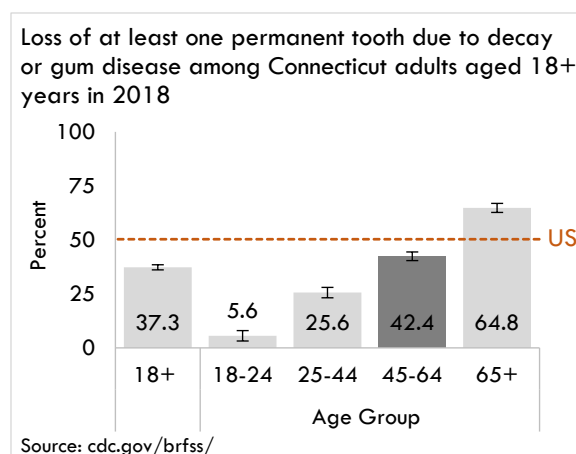
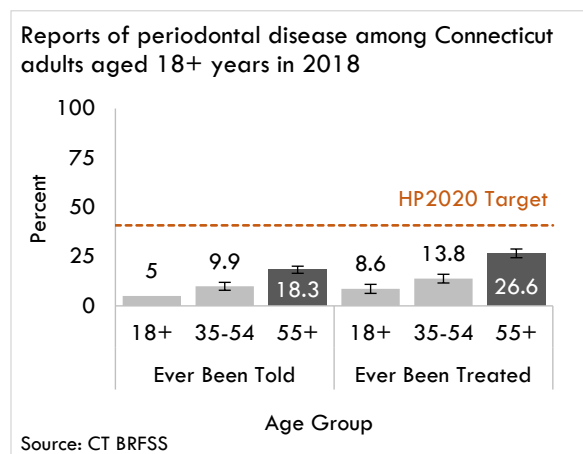
aged 55 years and over reported that they ever had "treatment for gum disease."²⁴

Loss of Permanent Teeth

The *Healthy People 2020* target for reducing the proportion of adults who had at least one permanent tooth extracted because of dental caries or periodontal disease is 66.8%,^{vi} among adults aged 45-64.²¹ Connecticut data suggest that this objective is being met.^{24,25,vii}

According to the CT BRFSS interviews in 2018,²⁵ about four in ten (42.4%) Connecticut adults aged 45-64 had at least one permanent tooth removed "because of tooth decay or gum disease."^{viii} This was lower than the national BRFSS estimate of 50.3%,²¹ which, in turn, was lower than the national NHANES estimate (71.7%) based on data collected between 2013 and 2016.²¹ The difference between national BRFSS and NHANES estimates is likely a function of data collection methods (ie, interviews vs clinical examinations by dental hygienists) and/or time periods for data collection (ie, 2018 vs 2013-2016).

As expected, the risk of permanent tooth loss increases with age. In 2018, a quarter (25.6%) of adults aged 25-44, as compared to 42.4% of adults aged 45-64 and 64.8% of adults aged 65 years or older reported that they had at least one tooth removed "because of tooth decay or gum disease."²⁵



Oral and Pharyngeal Cancers

Oral and pharyngeal cancers are much more likely to occur in men than in women, and are among the most common cancers among men in Connecticut.²⁰ In the period between 2013 and 2017, there were an average of 545 new cases of oral and pharyngeal cancers annually in Connecticut, with an age-adjusted incidence rate—that is, the rate of new cases—of 11.9 per 100,000 Connecticut residents. The average annual number of deaths due to oral and pharyngeal cancers was 87, with an age-adjusted mortality rate of 1.9 per 100,000 people.^{ix}

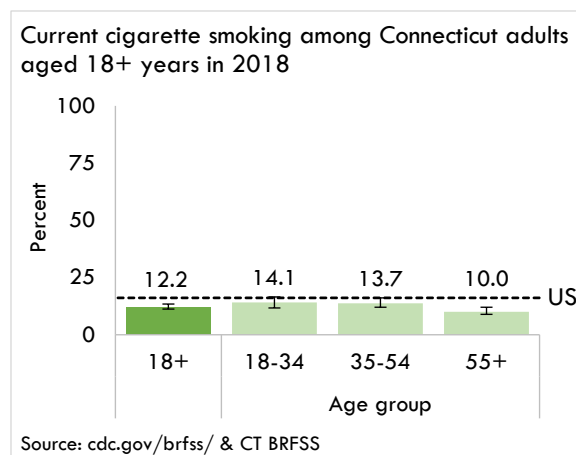
One *Healthy People 2020* objective is to increase the proportion of oral and pharyngeal cancers detected at the earliest (localized) stage,²¹ in hopes of improving treatment outcomes. In Connecticut, 33.6% of oral and pharyngeal cancer cases were diagnosed at the local stage in the period between 2013 and 2017.^x This proportion exceeds the *Healthy People 2020* baseline of 32.6% in 2007, as well as the nationwide estimate of 29.5% in 2016.²¹ However, it falls short of the 2020 target of 35.9%.²¹

Tobacco Use

Tobacco use is an important risk factor for oral disease, as well as many other health conditions. Accordingly, *Healthy People 2020* aims to decrease cigarette smoking to no more than 12% of adults.²¹ In Connecticut, about one in eight (12.2%)¹⁴ adults reported in 2018 that they smoked cigarettes “every day” or “some days,” as compared to the US median of 16.1%.²⁰ This finding suggests that Connecticut is on track to meet the 2020 target for cigarette smoking.

The proportion of current cigarette smokers was significantly greater among men (13.6%) than among women (10.8%).^{24,xi} Additionally, it was greater among those in the youngest age bracket than among those in the oldest age bracket. More specifically, 14.1% of adults aged 18-34, as compared

with 10.0% of adults aged 55 years or older, reported in 2018 that they smoked cigarettes every day or some days.^{24,xii}



While cigarette smoking appears to be decreasing,^{xiii} e-cigarette use is on the rise, with close to one-fifth (19.6%) of Connecticut adults aged 18 years and older reporting in 2018 that they ever used e-cigarettes or other electronic vaping products.^{xiv} As might be expected, the proportion of those who ever tried e-cigarettes, as reported in 2018, was greater among adults aged 18-34 (38.1%) than among adults aged 35-54 (18.9%) or adults aged 55 years and older (8.4%).²⁴

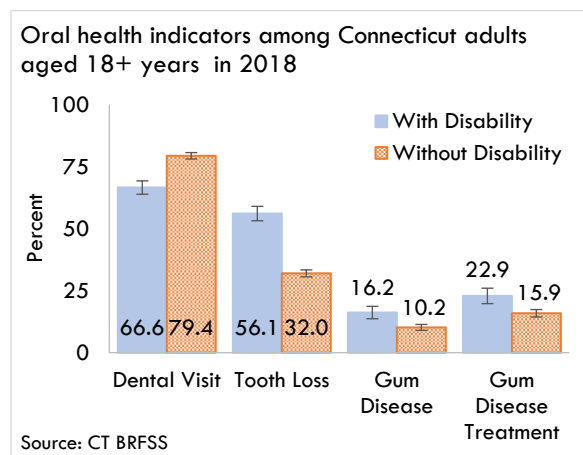
Oral Health Disparities

Healthy People 2020 aims to increase health equity and eliminate health disparities across all groups. Connecticut data point to disparities among adults on a number of indicators of oral health based on health and ability status, socioeconomic status,^{xv} and racial grouping.

Health and Ability Status

In 2018, close to a quarter (23.2%)^{xv} of Connecticut adults aged 18 years or older had a disability.²⁴ Adults with disabilities were more likely than those without disabilities to be uninsured and to skip doctor visits due to cost.²⁴ They were also more likely to feel worried about having enough money to buy

nutritious meals or to pay for housing.²⁴ Not surprisingly, there were disparities by health and ability status on most indicators of oral health collected as part of CT BRFSS.²²⁻²⁴ Adults with disabilities reported a significantly lower rate of annual dental visits than those without disabilities (66.6% vs 79.4%).²⁴ At the same time, they were significantly more likely to report tooth loss (56.1% vs 32.0%), periodontal disease (16.2% vs 10.2%), or treatment for periodontal disease (22.9% vs 15.9%).



Socioeconomic Status

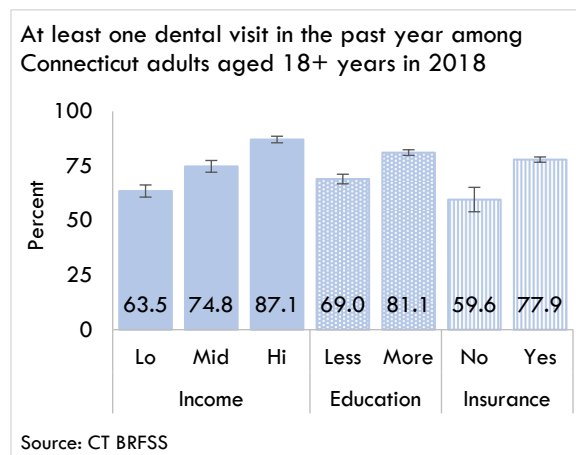
Two key measures of socioeconomic status (SES) include income and education. Being related to income, health insurance serves as a supplementary measure of SES. Between 2014 and 2018, the median household income in Connecticut was \$76,106, according to the American Community Survey.²⁶ In 2016, over a quarter (28.8%) of Connecticut adults lived in households with an annual income below \$35,000; a quarter (26.3%) lived in households with an income between \$35,000 and \$74,999; and four in ten (44.9%) lived in households with an income above \$75,000, according to CT BRFSS interviews.²³

In terms of educational attainment, six in ten (61.1%) had more than a high school diploma, and close to four in ten (38.9%) had a high school diploma or less.²³ Lastly, a large majority (90.9%) of adults aged

18-64 had insurance coverage in 2018, but only about three-quarters (74%) had dental coverage.²⁴

CT BRFSS data show that Connecticut adults in the lowest income bracket (ie, < \$35,000) were less likely to receive preventative healthcare, and were more likely to report poor mental and physical health than those with higher incomes.²³ These adults were also more likely to smoke cigarettes, and were at greater risk for disabilities, diabetes, heart disease, and obesity.²³

In terms of oral health, there were large differences in dental visits by household income. Put simply, those with a higher household income were more likely to report having an annual dental visit than those with a lower income. According to the CT BRFSS interviews in 2018, close to nine in ten (87.1%) of those in the highest income bracket, as compared to three-quarters (74.8%) of those in the middle income bracket, and fewer than two-thirds (63.5%) of those in the lowest income bracket reported visiting a dentist or dental clinic in the past year.²⁴



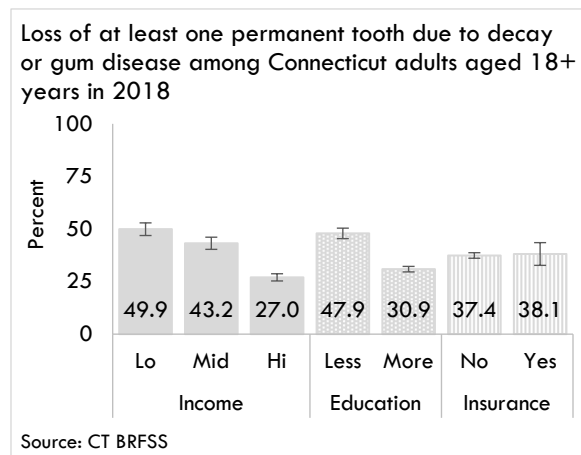
There were also differences in dental visits by educational attainment. Namely, a higher level of education was associated with greater utilization of the oral health care system. In 2018, a significantly higher percentage of those with more than a high school education (81.1%) than those with a high

school education or less (69.0%) reported that they had a dental visit within the past year.²⁴

And, as might be expected, health insurance coverage was linked with dental visits. In 2018, almost eight in ten (77.9%) of those who had health insurance coverage as opposed to six in ten (59.6%) of those who did not reported that they visited a dentist or a dental clinic within the past year.²⁴

In addition to disparities in annual dental visits, there were disparities in the loss of permanent teeth. Namely, over one quarter (27.0%) of those in the highest income bracket as compared to four in ten (43.2%) of those in the middle-income bracket and half (49.9%) of those in the lowest income bracket reported in 2018 that they lost at least one permanent tooth because of dental caries or periodontal disease.²⁴

Moreover, close to half (47.9%) of adults with a high school degree or less, as compared to three in ten (30.9%) of those with more than a high school degree, reported tooth loss because of oral diseases. Interestingly, however, there were no differences in tooth loss by health insurance coverage.²⁴



In contrast to the finding of an unequivocal difference by SES in the prevalence of tooth loss, CT BRFSS findings are mixed on SES differences in self-

reported periodontal disease. There were statistically significant differences by household income in 2018 but not in 2016. Differences by education and insurance status were not significant or could not be assessed.^{23,24}

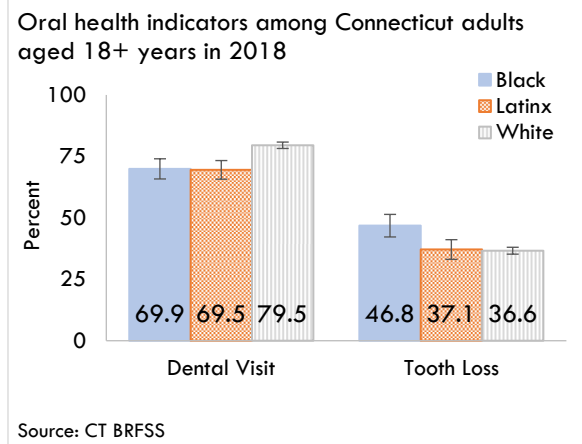
Lastly, there are differences in cigarette smoking by SES. Most recently, in 2018, adults in the lowest income bracket were significantly more likely to report that they smoked cigarettes (21.2%), either every day or on some days, than adults in the middle-income bracket (12.2%) and adults in the highest income bracket (7.4%).²⁰ Current cigarette smoking was also more likely among adults with a high school education or less (19.0%) than among adults with more than a high school education (8.0%), and also among those without (19.7%) than among those with (11.6%) health insurance coverage.²⁴

Racial Grouping

In addition to disparities by SES, there were disparities by racial grouping in oral health indicators. In 2016, one in ten (9.6%) adults living in Connecticut were Black; one in seven (14.2%) were Latinx,^{xvi} and seven in ten (69.9%) were White, according to CT BRFSS.^{23,xvii} White adults were more likely than Black or Latinx adults to have annual dental visits.^{22,23,25} Most recently, in 2018, eight in ten (79.5%) White adults as compared to seven in ten (69.9%) Black adults and seven in ten (69.5%) Latinx adults reported that they visited a dentist or a dental clinic within the past year.²⁴

Furthermore, there were differences by racial grouping in tooth loss.^{22,23,25} In 2018, Black adults were more likely to report that they had any teeth removed due to tooth decay or gum disease than White and Latinx adults: 46.8% vs 36.6% vs 37.1%, respectively.²⁵ However, adults across racial groupings were equally likely to self-report a diagnosis of periodontal disease. Finally, there were

differences by racial grouping in the use of tobacco products and in new cases of oral and pharyngeal cancers. In the period between 2013 and 2018, the proportion of current cigarette smokers was significantly greater among Black (17.4%) or Latinx Americans (17.0%) than among White Americans (12.6%) living in Connecticut.²⁵ By contrast, roughly three-quarters of those who reported in 2013-18 that they used chewing tobacco, snuff, or snus, either every day or on some days, self-identified as White.¹⁸ In accordance with the later finding is a significantly higher rate of new cases of oral and pharyngeal cancers among White men (17.9/100,000) than among Latinx men (14.0/100,000).²⁰



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Adulthood End Notes

ⁱ According to the Behavioral Risk Factor Surveillance System (BRFSS) telephone interviews conducted in 2018, the crude prevalence of dental visits in the past year in the United States (median) was 67.6%. By contrast, almost one-third of US adults (32.4%) did not visit the dentist or dental clinic in the past year.

ⁱⁱ According to the CT BRFSS 2018 summary tables, 76.5% (95% confidence interval: 75.4-77.7) of Connecticut adults aged 18 and older visited a dentist or dental clinic for any reason in the previous year.

ⁱⁱⁱ According to the Centers for Disease Control and Prevention (CDC) BRFSS web enabled analysis tool, 72.1% (95% confidence interval: 69.7-74.6) Connecticut adults aged 25 to 44 years, as compared to 79.2% (95% confidence interval: 77.6-80.8) Connecticut adults aged 45 to 64 years and 77.3% (95% confidence interval: 75.4-79.2) adults aged 65 years or older visited a dentist or a dental clinic within the past year. Among adults aged 18 to 24 years, living in Connecticut, 78.2% (95% confidence interval: 73.9-82.6) visited a dentist or a dental clinic within the past year.

^{iv} *Healthy People 2020* uses data from the National Health and Nutrition Examination Survey (NHANES) to track progress on the objective to reduce the proportion of US adults aged 45 to 74 years with moderate or severe periodontitis. In 2009-10, the US prevalence of adults aged 45 to 74 with moderate or severe periodontitis was 47.5% (95% confidence interval: 42.4-52.6). In 2013-14, the most recent period for which data were available, the prevalence was 37.4% (95% confidence interval: 31.9-43.0).

^v According to the CT BRFSS 2018 summary tables, 18.3% (95% confidence interval: 16.5-20.2) of Connecticut adults aged 55 years or older reported in 2018 that they were ever told that they had periodontal disease, and 26.6% (95% confidence interval: 24.4-28.8) reported that they ever had treatment for gum disease such as scaling and root planning, or deep cleaning. According to computations provided by the Connecticut Department of Public Health—the state agency that is responsible for CT BRFSS—16.3% (95% confidence interval: 14.6-18.1) of Connecticut adults aged 45 to 74 years in 2018 reported ever being told that they had periodontal disease and 23.3% (95% confidence interval: 21.3-25.3) of Connecticut adults aged 45 to 74 years in 2018 reported they had ever had treatment for periodontal disease.

^{vi} *Healthy People 2020* uses data from the National Health and Nutrition Examination Survey (NHANES) to track progress on the objective to reduce the proportion of US adults aged 45 to 64 years who have ever had a permanent tooth extracted because of dental caries or periodontal disease. The baseline for this objective was 76.5% (95% confidence interval: 74.2-78.6) of US adults aged 45 to 64 years in 1999-2004. The target for the year 2020 is 68.8%. According to the most recent estimates from 2013-2016, 71.7% (95% confidence interval: 68.7-74.6) of US adults aged 45 to 64 years ever had a permanent tooth extracted because of dental caries or periodontal disease.

^{vii} According to CT BRFSS 2018 summary tables, 37.3% (95% confidence interval: 36.1-38.6) of Connecticut adults aged 18 years or older reported that they were missing any teeth due to tooth decay or gum disease. The national median in 2018 was 41.3% among adults aged 18 years or older, according to the Centers for Disease Control and Prevention (CDC) BRFSS Prevalence & Trends Data. For the subgroup of people aged 45-64 years, the estimate was 42.4% (95% confidence interval: 40.4-44.3) in Connecticut and 50.3% (95% confidence interval: 49.8-50.8) nationally, according to the CDC's BRFSS web-enabled analysis tool.

^{viii} In asking about permanent teeth removed because of tooth decay or gum disease, CT BRFSS survey directs participants not to include in the count teeth lost for injury or orthodontics.

^{ix} Counts and age-adjusted incidence and mortality rates for oral and pharyngeal cancers for the period between 2013 and 2017 were computed by a Connecticut Tumor Registry epidemiologist.

^x Age-adjusted incidence rate for oral and pharyngeal cancers, the proportion of cases diagnosed at the local stage (derived SEER Summary Stage 2000), and age-adjusted mortality rate for oral and pharyngeal cancers were computed for this report by the Connecticut Tumor Registry.

^{xi} According to CT BRFSS 2018 summary tables, 13.6% (95% confidence interval: 12.1-15.1) men as compares with 10.8% (95% confidence interval: 9.6-12.0) women reported that they had ever smoked 100 cigarettes in their life, and that they smoked cigarettes at the time of their CT BRFSS interview, either every day or on some days.

^{xii} According to CT BRFSS 2018 summary tables, 14.1% (95% confidence interval: 11.7-16.5) of Connecticut adults aged 18 to 34 years old as compared to 10.0% (95% confidence interval: 8.9-11.1) of Connecticut adults aged 55 years and older reported that they had ever smoked 100 cigarettes in their life, and that they smoked cigarettes at the time of their CT BRFSS interview, either every day or on some days.

^{xiii} According to CT BRFSS reports and summary tables, the proportion of Connecticut adults aged 18 years or older who were current cigarette smokers decreased from 15.5% (95% confidence interval: 14.3-16.7) in 2013 to 12.2% (95% confidence interval: 11.2-13.1) in 2018.

^{xiv} According to estimates computed by a CT DPH epidemiologist, the proportion of Connecticut adults who used cigarettes; chewing tobacco, snuff, or snus; or e-cigarettes every day has remained constant between 2013 and 2018. That said, the BRFSS question about the consumption of e-cigarettes has changed from "During the past 30 days, on how many days did you use electronic cigarettes or E-cigarettes?" in 2013-2015 to "Do you now use e-cigarettes or other electronic vaping products every day, some days, or not at all?" in 2016-2018. This change in wording may have an impact on the estimates of the proportion of those who use tobacco products daily.

^{xv} According to CT BRFSS 2018 summary tables, disability is defined as being blind or deaf; having serious difficulty in walking or climbing stairs; having difficulty in dressing or bathing; being limited in any activities because of physical, mental, or emotional problems; or requiring the use of special equipment such as a cane, a wheelchair, a special bed, or a special telephone due to a health problem.

^{xvi} The term "Latinx" refers to persons of Latin American descent or origin. The term was selected for use in this document because it is gender-inclusive, and therefore, consistent with the health equity framework.

^{xvii} Categories "Black" and "White" include only those adults who did not identify as Latinx.

Adulthood Oral Health Trends

Table. Trends in Oral Health Among Adults Living in Connecticut

INDICATOR	SOURCE	2013	2014	2015	2016	2017	2018
4.0. At least one dental visit in the past year among adults aged 18+ y	CT BRFSS	-	74.9% (73.5-76.3)	-	77.8% (76.7-79.0)	-	76.5% (75.4-77.7)
4.1. At least one dental visit in the past year among adults aged 18+ y with diabetes	CT BRFSS	-	68.0% (63.7-72.4)	-	67.5% (64.0-70.9)	-	70.0% (66.4-73.5)
2.0. No permanent tooth loss due to dental caries or periodontal disease among adults aged 18-64 y	CT BRFSS	-	63.9% (62.1-65.7)	-	68.3% (66.8-69.8)	-	70.3% (68.9-71.8)
Any permanent teeth extracted due to dental caries or periodontal disease among adults aged 18+ y	CT BRFSS	-	43.2% (41.6-44.7)	-	39.2% (37.9-40.5)	-	37.3% (36.1-38.6)
Any permanent teeth extracted due to dental caries or periodontal disease among adults aged 55+ y	CT BRFSS	-	64.3% (62.4-66.2)	-	61.3% (59.8-62.8)	-	57.9% (56.2-59.5)
2.1. Periodontal disease among adults aged 45-74 y	CT BRFSS	-	-	-	19.3% (17.5-21.2)	-	16.3% (14.6-18.1)
Periodontal disease among adults aged 18+ y	CT BRFSS	-	-	-	13.1% (11.9-14.4)	-	11.7% (10.6-12.8)
2.2. Treatment for periodontal disease among adults aged 45-74 years	CT BRFSS	-	-	-	25.2% (23.0-27.3)	-	23.3% (21.3-25.3)
Treatment for periodontal disease among adults aged 18+ y	CT BRFSS	-	-	-	18.5% (17.0-20.1)	-	17.4% (16.1-18.8)
2.11. Age-adjusted incidence of oral and pharyngeal cancers per 100,000 population	CTR	11.5	11.8	12.2	12.0	11.9	*
Count of new cases of oral and pharyngeal cancers	CTR	506	543	566	553	556	*
2.12. Age-adjusted mortality from oral and pharyngeal cancers per 100,000 population	CTR	2.0	1.6	2.1	1.6	2.1	*
Count of deaths from oral and pharyngeal cancers	CTR	90	73	95	78	99	*
6.3. Current tobacco use, [§] every day or some days, among adults aged 18+ y	CT BRFSS	16.7% (15.5-18.0)	16.4% (15.2-17.7)	14.6% (13.6-15.6)	14.4% (13.4-15.5)	13.7% (12.7-14.7)	13.3% (12.3-14.2)
Current cigarette smoking, every day or some days, among adults aged 18+ y	CT BRFSS	15.5% (14.3-16.7)	15.4% (14.2-16.6)	13.5% (12.5-14.4)	13.3% (12.4-14.3)	12.7% (11.7-13.7)	12.2% (11.2-13.1)

Note. Indicators included in the 2018-2023 Connecticut Oral Health Surveillance System are marked with numeric identifiers. Each prevalence estimate is accompanied by a 95% confidence interval, enclosed in parentheses. y = year. [§]Tobacco use includes cigarette smoking and the use of smokeless tobacco, snuff, or snus; it does not include the use of cigars, e-cigarettes, or other forms of tobacco. *Not available as of this writing.

Oral Health During *Pregnancy*

Oral health is important for the overall health of pregnant women and their unborn children.¹ In fact, good oral health makes it less likely for mothers to pass cariogenic (cavity causing) bacteria onto their babies,^{2,3} which reduces the possibility that children will develop dental caries (tooth decay) as they grow. In other words, establishing good oral hygiene before and during pregnancy is key, as it tends to be reflected in the future oral health of children.

Dental care is particularly important during pregnancy because hormonal and physiological changes during this time may lead to periodontal disease (gum disease),^{1,4} and also tooth erosion, tooth mobility, and dental caries.⁵ While it is not clear whether periodontal disease causes pregnancy complications, it is associated with premature birth, low birth weight, and preeclampsia.¹⁻³

It has been shown that routine dental care (eg, teeth cleaning, local anesthesia, restorative and reparative care) is both important and safe for pregnant women and their unborn children. In 2012, a group of experts developed a National Consensus Statement aimed at encouraging and improving oral health among pregnant women and outlining standards of dental care during pregnancy.⁶ The statement includes guidelines for best practices for a wide audience of stakeholders, including policy



makers, health professionals, dentists, and patients.⁶ Likewise, in 2013 the Connecticut State Dental Association (CSDA) published a resource for Connecticut dentists, offering considerations for the dental treatment of pregnant women.⁷ The CSDA resource states that “healthy women with uncomplicated pregnancies can safely receive oral health services throughout pregnancy,” and also that “consultation with an obstetric provider is prudent prior to providing dental treatment when a co-morbid condition exists.”⁷ For its part, the American College of Obstetricians and Gynecologists (ACOG) published an opinion in 2013 (reaffirmed in 2017), encouraging prenatal health professionals to routinely counsel women about the “safety and importance of oral health care during pregnancy.”⁵

Pregnancy Preventing Oral Disease

Along with physiological changes during pregnancy, changes in diet and oral hygiene can lead to an increase in tooth decay and periodontal disease. Some women may consume more sugary foods due to cravings. Gastric reflux and frequent vomiting may also increase oral acidity, causing erosion of the tooth surface and deteriorating oral health in pregnant women.

Changes in diet and lifestyle can help reduce these risks. For example, avoiding certain foods and rinsing with water to neutralize the mouth after vomiting can reduce oral acidity. Pregnant women can also be encouraged to use soft bristled toothbrushes, avoid brushing their teeth immediately after vomiting, and use fluoride mouthwash to protect sensitive or eroding teeth.³

One of the greatest risks of oral disease among pregnant women is the lack of adequate dental care. Some women may not seek dental services during pregnancy because they lack awareness of the importance of oral health, or because they have concerns about the safety of dental procedures.¹⁸ Available evidence suggests that prenatal health professionals are not always counseling women about dental care during pregnancy, despite ACOG recommendations.⁵ In fact, a recent study in a convenience sample of Midwestern prenatal health professionals showed that, as of 2018, fewer than one in ten consistently included a dental screening as part of prenatal care.⁹

Some women may not seek dental services during pregnancy because of financial constraints or a lack of health insurance coverage. Research has shown that women living on low income are far less likely to receive dental care during pregnancy than those with higher incomes and/or who have private insurance.¹⁰ What is more, utilization of dental services is relatively low¹¹ among women who have Medicaid coverage. As a point of clarification, Medicaid is a joint federal and state program that provides health coverage to qualified pregnant women and children, families living on low income, older adults, and people with disabilities.¹² It is the single largest payer of pregnancy-related services in the US, one responsible for financing close to half (43%) of all births in 2016.¹³ Per federal law, state Medicaid programs are required to cover pregnancy-related services.¹³ Whether this includes oral healthcare varies by state.¹⁰ In Connecticut, HUSKY Health, which includes both Medicaid and the Children's Health Insurance Program, provides oral health coverage to all beneficiaries.¹¹ Even so, there are a number of challenges related to accessing oral health care with Medicaid coverage in Connecticut as well as nationwide. These include a lack of dentists who accept Medicaid, a lack of access

to transportation, and difficulties with navigating Medicaid benefits.

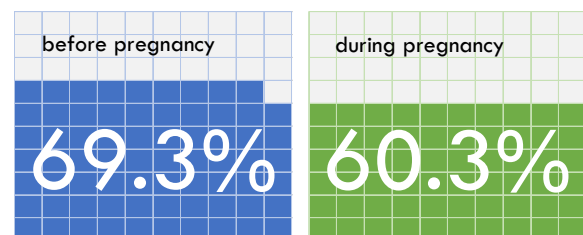
Pregnancy Oral Health in Connecticut

The Pregnancy Risk Assessment Monitoring System (PRAMS) is a primary source of data on maternal attitudes and experiences during, before, and shortly after pregnancy, both in Connecticut and nationwide. PRAMS is used to gather state-specific information by mail or telephone from a sample of women who recently gave birth.¹⁴ Connecticut PRAMS includes self-reported data about teeth cleanings; insurance coverage for dental care during pregnancy; need for and receipt of dental treatment; and potential barriers to accessing dental services during pregnancy.

Dental Cleanings

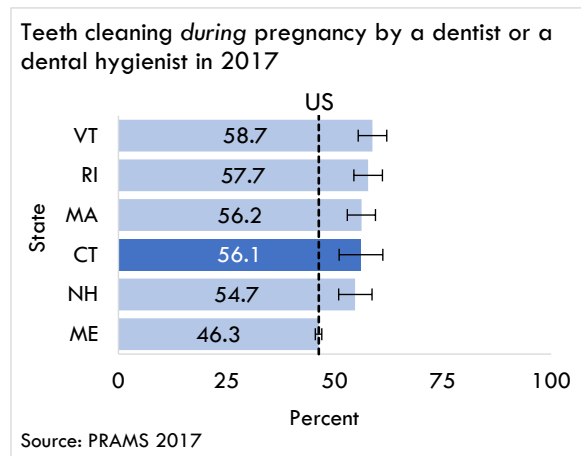
According to Connecticut PRAMS data for the period between 2013 and 2018, about seven in ten women had a dental cleaning prior to pregnancy, and approximately six in ten had a dental cleaning during pregnancy. More specifically, 69.3% of postpartum women reported that their teeth were cleaned by a dentist or a dental hygienist in the 12-month period prior to their most recent pregnancy, and 60.3% reported that their teeth were cleaned during their most recent pregnancy, according to the PRAMS data collected in Connecticut in 2018. That the proportion of women who reported a dental cleaning before pregnancy was significantly higher than the one during pregnancy suggests that

Postpartum Women's Reports of Dental Cleanings



Source: CT PRAMS 2018

there are barriers in Connecticut to dental care utilization during pregnancy. In 2017, the most recent year for which comparative PRAMS data were available, 56.1% of postpartum women in Connecticut reported that they had a dental cleaning during their most recent pregnancy. This estimate was consistent with those from four other New England states, and it was significantly higher than the Maine estimate of 46.3%, as well as the national estimate of 46.3%.ⁱ What is more, it exceeded the *Healthy People 2020* target of 49% of US residents having an annual dental visit.¹⁵ All this suggests that Connecticut is doing well in regional and national comparisons.



Nevertheless, the finding that only about six in ten (56.1% in 2017 and 60.3% in 2018) women in Connecticut had a dental cleaning during pregnancy indicates that about four in ten did not.



4 in 10 women report not having dental cleanings during pregnancy

Source: CT PRAMS 2018

Considering that most women (84.4%) had insurance coverage for dental care during pregnancy, it appears that factors in addition to financial constraints played a role in limiting women’s access to dental services during pregnancy.

Restorative Dental Care

In 2018, around one in six (16.1%) postpartum women in Connecticut reported via the PRAMS survey that they needed to see a dentist for a problem during pregnancy, and one in seven (14.0%) went to a dentist about a problem. In other words, out of those who needed to see a dentist for a problem during pregnancy, about eight in ten (79.4%) went to a dentist, whereas about two in ten (20.6%) did not.

Access to Dental Care During Pregnancy

Chief barriers to accessing dental care during pregnancy included women’s concerns about the safety of dental services (11.7%); lack of affordability (9.2%); lack of dental providers who accepted pregnant patients (3.8%); and lack of dental providers who accepted Medicaid (3.6%), according to PRAMS data collected in 2018.ⁱⁱ It is interesting to note that the concerns about the safety of dental care during pregnancy were more likely among women under 25 than among women 35 years or older; women with a high school education or less than women with more than a high school education; women with Medicaid prior to pregnancy than women with private insurance prior to pregnancy; and women living on a lower income than women living on a higher income, as shown in Table 2 on page 6/61.

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Pregnancy Acknowledgements

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Connecticut Department of Public Health, Office of Oral Health epidemiologist, Lisa Budris, MS, MPH, conducted analyses of Connecticut PRAMS data for this report.

Pregnancy End Notes

ⁱ According to PRAMS data from 2017, 56.1% (95% confidence interval: 52.8-59.3) of postpartum women in Connecticut as compared to 46.3% (95% confidence interval: 45.5-47.0) of postpartum women throughout the United States reported that they had their teeth cleaned by a dentist or a dental hygienist during their most recent pregnancy. The estimates from other New England states are as follows: 58.7% (55.2-62.2) Vermont, 57.7% (54.4-61.0) Rhode Island, 56.2% (52.9-59.5) Massachusetts, 54.7% (49.6-59.7) New Hampshire, and 46.3% (42.5-50.2) Maine.

Pregnancy Oral Health Trends

Table 1. Oral Health Trends Among Pregnant Women Living in Connecticut

INDICATOR	SOURCE	2013	2014	2015	2016	2017	2018
4.2. Teeth cleaning in the 12 months prior to pregnancy among women who had a recent live birth	PRAMS	71.8% (68.2-75.4)	70.2% (67.0-73.3)	66.9% (63.3-70.6)	71.7% (68.3-75.2)	66.4% (62.5-70.2)	69.3% (65.5-73.0)
4.3. Teeth cleaning during pregnancy among women who had a recent live birth	PRAMS	64.2% (60.4-68.1)	61.3% (57.9-64.7)	63.8% (60.1-67.5)	58.8% (55.6-62.1)	56.1% (52.8-59.4)	60.3% (57.0-63.6)
Insurance covered dental care during pregnancy among women who had a recent live birth	PRAMS	84.9% (82.2-87.5)	83.0% (80.5-85.5)	83.2% (80.4-86.1)	84.0% (81.5-86.4)	85.7% (83.5-87.8)	84.4% (81.9-87.0)
4.4. Need to see a dentist for a problem during pregnancy among women who had a recent live birth	PRAMS	17.7% (14.7-20.8)	16.4% (13.8-19.0)	13.7% (10.9-16.4)	17.7% (15.2-20.3)	16.8% (14.3-19.3)	16.1% (13.7-18.5)
4.5. Dental treatment service during pregnancy among women who had a recent live birth	PRAMS	15.8% (12.9-18.7)	13.2% (10.9-15.5)	12.4% (9.7-15.0)	14.2% (11.8-16.5)	15.4% (13.0-17.8)	14.0% (11.7-16.4)
Barriers to going to dentist about a problem during pregnancy: couldn't find provider that took pregnant patients	PRAMS	†	†	†	3.1% (1.9-4.2)	5.1% (3.8-6.4)	3.8% (2.4-5.2)
Barriers to going to dentist about a problem during pregnancy: couldn't find a provider that took Medicaid	PRAMS	†	†	†	3.6% (2.3-4.8)	4.3% (3.1-5.5)	3.6% (2.2-5.0)
Barriers to going to dentist about a problem during pregnancy: didn't think it was safe to go during pregnancy	PRAMS	†	†	†	14.2% (12.1-16.3)	12.7% (10.9-14.5)	11.7% (9.9-13.6)
Barriers to going to dentist about a problem during pregnancy: couldn't afford to go	PRAMS	†	†	†	9.3% (7.5-11.2)	9.1% (7.5-10.8)	9.2% (7.1-11.2)

Note. Indicators included in the 2018-2023 Connecticut Oral Health Surveillance System are marked with numeric identifiers. Each prevalence estimate is accompanied by a 95% confidence interval, enclosed in parentheses. y = year. †In 2013-2015, questions about barriers to going to dentist about a problem during pregnancy were asked only of those respondents who went to a dentist or a dental clinic about a problem. In 2016-2018, questions about barriers to going to dentist about a problem during pregnancy were asked of all respondents. Hence, estimates from 2013-2015 are not comparable to the estimates from 2016-2018 and are not reported in Table 1 (above).

Pregnancy Concerns About Safety

Table 2. Women Who “Did Not Think It Was Safe to Go to a Dentist During Pregnancy” by Demographic Characteristics

	n	Percent	95% CI
Maternal Age			
< 20	33	23.8	(15.2-32.4)
20-24	120	18.5	(14.8-22.3)
25-29	191	13.8	(11.5-16.1)
30-34	214	10.2	(8.5-11.9)
35+	152	11.5	(9.2-13.8)
Maternal Education			
< 12 y	149	28.2	(23.6-32.9)
12 y	174	18.5	(15.3-21.7)
12+ y	386	9.6	(8.4-10.8)
Health Insurance Prior to Pregnancy			
Private	254	7.5	(6.4-8.7)
Medicaid/HUSKY	353	20.6	(18.1-23.1)
Uninsured	46	25.5	(18.8-32.2)
Federal Poverty Level			
Poor	318	23.7	(20.8-26.7)
Near Poor	123	13.9	(11.0-16.9)
Not Poor	156	5.5	(4.4-6.6)

Source: PRAMS data collected between, and inclusive of, 2016 and 2018.

Oral Health in Older Adults

Although oral disease is largely preventable, many older adults in the United States (US) experience difficulties with their mouth and teeth.¹ More than nine in ten (96%) older adults, ages 65 years and over, have had dental caries during their lifetime.² Dental caries or cavities are caused by acid that results from the action of bacteria, most notably *Streptococcus mutans*, on carbohydrates; the acid destroys tooth enamel, which is accompanied or followed by a disintegration of the organic substance of the tooth.³ Close to one in six older adults has untreated tooth decay (15.9%),² and six in ten (59.8%) have some form of periodontitis, an infection of the soft tissue surrounding the teeth.⁴

Oral disease does not resolve by itself if it is left untreated. Instead, it can lead to other health complications, and can progress to tooth loss.⁵ In the US, over two-thirds (68.9%) of older adults have lost at least one permanent tooth because of oral disease,⁶ and about one in six (17.3%) has a complete loss of natural teeth,² also known as edentulism.

Although older adults are much more likely than younger adults to be edentulous—that is, to lose all their natural teeth—age in itself is not a risk factor for tooth loss.^{2,7} In the US, the percentage of older adults with edentulism has significantly decreased over the past few decades. In 1999-2004, close to one-third (31.2%) of adults aged 75 years or older had a complete loss of natural teeth.² In 2011-2016, this percentage dropped to under one-quarter (22.5%),² most likely because of a greater exposure to fluorides over the past 60 years,⁸ and therefore, better control of the two major causes of tooth loss: dental caries and periodontitis.⁷ That older adults nowadays have more natural teeth than older adults in the past shows that tooth loss is not an inevitable

consequence of aging. Rather, oral disease can be prevented and successfully treated throughout the life course.

Even so, it is important to acknowledge that risks for dental caries and periodontitis, and therefore tooth loss, increase with age. This is in part because of declines in general health and decrease in saliva production, in part because of aging-related difficulties with brushing and flossing, and in part because of difficulties with accessing dental care.

There is ample evidence that oral health both reflects and contributes to overall health.^{5,7,9} Periodontal disease, for example, is linked to a number of chronic health conditions, including cardiovascular diseases, diabetes, rheumatoid arthritis, osteoporosis, upper respiratory infection, and Alzheimer's disease.³

Loss of teeth, to give another example, is greater among persons reporting poor general health than among those with better general health.⁷ And, complete tooth loss (edentulism), to give yet another example, is linked with multiple systemic disorders including coronary artery plaque formation, diabetes, rheumatoid arthritis, and certain cancers.¹¹ Older adults are more likely than younger adults to have chronic health conditions that adversely affect



oral health. Medicationsⁱ used to treat these conditions can reduce saliva production and induce dry mouth.⁵ Saliva serves a protective role in oral health because it removes food particles and keeps oral tissues moist, thus inhibiting the growth of bacteria.⁷ By contrast, an insufficient amount of saliva exacerbates periodontitis and dental caries, in addition to causing difficulty swallowing and tasting.

Together, problems with the mouth and teeth diminish the enjoyment of food and limit food choices. People who are missing teeth or using dentures (false teeth) may suffer from poor nutrition as they tend to prefer softer foods that are easier to chew than nutritionally-dense foods like fresh fruits and vegetables.¹² In turn, poor nutrition affects overall functioning of the body, thereby perpetuating the cycle of ill health in general and oral disease in particular.

Older Adults Preventing Oral Disease

Tooth brushing and regular use of dental care are key for maintaining oral health.⁷ Older adults with age-related cognitive declines or limited use of hands and arms may have difficulties with tooth brushing, a practice that has been shown to be effective in staving off oral disease.¹³ Additionally, research has shown that older adults in long term care facilities have poorer oral health than older adults in general, partly because of a need for



assistance with oral hygiene,^{7,14} and partly because of poor or nonexistent dental benefits coverage¹⁵ and because of state- and facility-level policies that do not do enough to promote oral health care delivery and accountability.¹⁶

Regardless of their living situation, older adults, much like younger adults and children, benefit from regular dental visits and education about oral health during routine wellness checks. These can include reviewing medications that reduce saliva, providing guidance for routine oral hygiene, consultation on maintaining a low-sugar diet, suggesting fluoridated products, and encouraging twice yearly cleaning and dental exams.⁵ Effective professional interventions for controlling periodontitis include scaling and root planing, along with medication and other supplementary therapies.¹⁷

Tooth loss is far more likely among older adults living on low income. Routine dental care is not covered for older adults on Medicare, which increases the likelihood that dental visits will be postponed due to out-of-pocket expense. In the US, only about half of older adults on Medicare visit a dentist annually.¹⁰ Additionally, fewer than a third (29.2%) of older adults have dental insurance coverage.¹⁵ This leaves many older adults vulnerable to untreated oral disease, which worsens and becomes more complicated over time.¹⁰

Older Adults in Connecticut

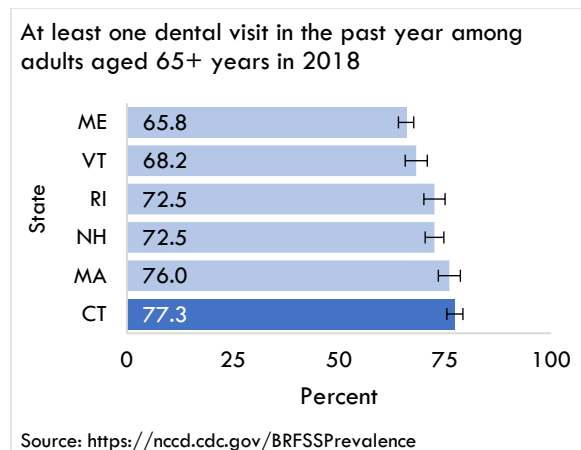
Connecticut is meeting *Healthy People 2020* goals in relationship to dental visits and tooth loss among its general population of adults age 65 and older. Disparities exist, however, based on health and ability status, income, and racial grouping. As is the case nationally, Connecticut's older adults who have disabilities and who live on low income, as well as older adults of color, are less likely to visit dental providers, and more likely to experience tooth loss.

The sole source of systematic information on oral health of older adults in Connecticut is the Behavioral Risk Factor Surveillance System (BRFSS).ⁱⁱ The BRFSS is a telephone survey of adults, aged 18 years or older, from randomly selected households,¹⁸ designed to collect information on health conditions, health-related risk behaviors, and use of preventative services. As concerns oral health, the national BRFSS survey asks about dental visits and tooth loss.¹⁹ The Connecticut survey (CT BRFSS) additionally inquires about periodontal disease.^{20,21} Both nationally and in Connecticut, questions about oral health are asked biennially.

Dental Visits

In the period between 2013 and 2018, utilization of the oral health care system was higher among older adults in Connecticut than among older adults throughout the US, and it exceeded the *Health People 2020* goal of at least 49% across all age groups.²²

In 2018, eight in ten (77.3%) of Connecticut’s adults aged 65 year and over reported that they visited a dentist or a dental clinic in the 12 months prior to the CT BRFSS interviews.¹⁹ In regional comparisons, Connecticut was significantly higher than four New England states (Maine, Vermont, Rhode Island, and New Hampshire) on annual dental visits among older adults.¹⁹

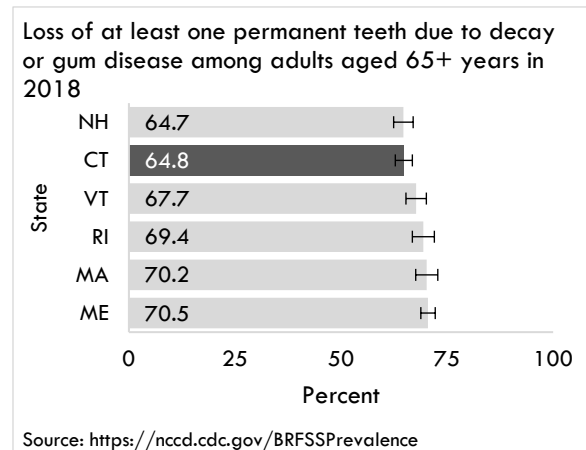


Periodontal Disease

Close to one-fifth (18.3%) of Connecticut’s adults aged 55 years and over reported in 2018 that they were ever told they had “periodontal disease (gum diseases),” and over a quarter (26.6%) reported that they “ever had treatment for gum disease such as scaling and root planing, or deep cleaning.”²¹ Together, these estimates offer a general idea of the share of Connecticut’s older adults who might have periodontal diseases. In considering these estimates, it is important to keep in mind that they are based on self-report. As such, they exclude Connecticut’s adults who have not had dental visits, and they exclude those who might not have remembered or understood their diagnosis, as well as those who might have been reluctant to report honestly on their oral health status.

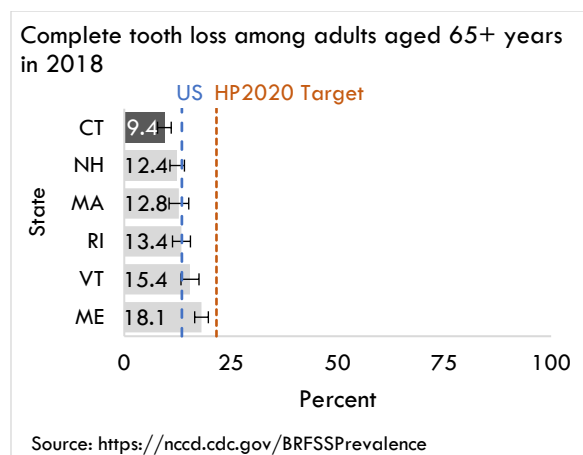
Loss of Permanent Teeth

Regarding tooth loss, Connecticut’s older adults fare better than their peers across the US. According to the CT BRFSS interviews in 2018, almost two-thirds (64.8%) of Connecticut’s adults aged 65 and over lost at least one permanent tooth in their lifetime “because of tooth decay or gum disease.”¹⁹ Furthermore, about one-fifth (19.0%) of older adults in Connecticut experienced significant tooth loss (6 or more teeth);⁶ and about one-tenth (9.4%) experienced a complete loss of permanent teeth



because of oral diseases.¹⁹ Although these findings suggest a widespread prevalence of dental caries and periodontitis—the main causes of tooth loss—among Connecticut’s residents, they also point to areas of strength in regional comparisons. Namely, in 2018 Connecticut was significantly lower than Maine, Massachusetts, and Rhode Island on the proportion of older adults who had any permanent teeth removed.¹⁹

What is more, in 2018 Connecticut was the lowest in New England on edentulism (a complete loss of natural teeth), with an estimate of 9.4% of edentulous adults aged 65 years and over.¹⁹ This estimate was also lower than the US median of 13.5%¹⁹ and the Healthy People 2020 target of 21.6%.²²



Oral Health Disparities

Notwithstanding successes in regional and national comparisons, and an enviable rate of oral health care system utilization among older adults, Connecticut faces challenges in ensuring oral health equity for its residents. Especially important to consider are disparities in dental visits and tooth loss by health and ability status, income, and racial grouping, which have also been documented in the US as a whole.^{15,23}



Health and Ability Status

Connecticut’s older adults who have difficulty doing errands on their own “because of a physical, mental, or emotional condition” were significantly less likely to have dental visits than their peers without such difficulty. In 2018, six in ten (59.5%) older adults who had difficulty doing errands alone as compared to almost eight in ten (78.9%) older adults without such difficulty reported that they visited a dentist or a dental clinic within the past year. A similar pattern was evident among older adults who had difficulty dressing or bathing themselves and older adults who had difficulty walking or climbing stairs: they were significantly less likely than their peers without such difficulties to use the oral health care system.ⁱⁱⁱ

Disparities by health and ability status were also evident in edentulism (ie, complete tooth loss). One-fifth (20.1%) of adults aged 65 years and over who reported “fair” or “poor” health in 2012-2016 had edentulism, as compared to under one in ten (8.7%) older adults who reported “good” or “better” health.^{iv} Similarly, the prevalence of edentulism was greater among older adults who had difficulty doing errands alone, who had difficulty dressing or bathing, and who had difficulty walking or climbing stairs than among their peers without such difficulties, as reported during the CT BRFSS telephone interviews in 2018.^v

Income

In Connecticut, older adults living on an income below \$50,000 per year were less likely to use the oral health care system than their peers in higher income brackets. In 2012-2016, seven in ten (72.6%) older adults, aged 65 years and over, with an annual income between \$35,000 and \$49,999 reported that they visited a dental provider within the past year.^{vi} This compares with almost nine in ten (87.7%) of those with an annual income of \$75,000 or above.

Income disparity was also reflected in edentulism. In the period between 2012 and 2016, a small proportion (3.1%) of Connecticut's older adults living on an annual income of \$75,000 or more reported a complete loss of natural teeth. By contrast, the estimate of edentulism was 14.2% among older adults living on less than \$35,000 per year, and 17.0% among those living on less than \$25,000 per year.^{vii}

Racial Grouping

In Connecticut, older adults who self-identify as White are more likely to use the oral health care system than older adults of color. Eight in ten (79.5%) White older adults reported in 2018 that they visited a dentist or a dental clinic within the past year. This compares to seven in ten (69.2%) Black/African American older adults, seven in ten (69.3%) Hispanic/Latinx older adults, and seven in ten (70.8%) older adults in other racial groupings.^{viii}

Racial disparity was also evident in edentulism. In the period between 2012 and 2016, one in ten (9.9%) White older adults in Connecticut reported a complete loss of permanent teeth because of oral disease. This compares to almost two in ten (17.6%) Black/African American older adults and two in ten (20.2%) Hispanic/Latinx older adults.^{ix}



9 in 10 older adults with a high income had at least one dental visit in the past year



8 in 10 White older adults had at least one dental visit in the past year



7 in 10 older adults with a low income and 7 in 10 older adults of color had at least one dental visit in the past year



6 in 10 older adults with a disability had at least one dental visit in the past year

Source: BRFS

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Older Adults Acknowledgements

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Older Adults End Notes

ⁱ According to Coll, Lindsay, Meng, and colleagues, examples of medications that can contribute to dry mouth include antihistamines (diphenhydramine, chlorpheniramine), decongestants (pseudoephedrine), antidepressants (citalopram, sertraline, paroxetine), antipsychotics (haloperidol), diuretics (hydrochlorothiazide, furosemide), muscle relaxants (cyclobenzaprine, orphenadrine), benzodiazepine (alprazolam, lorazepam), bladder relaxants (oxybutynin, mirabegron), analgesics (tramadol, codeine), nonsteroidal anti-inflammatory drugs (ibuprofen, naproxen), etc.

ⁱⁱ In addition to BRFSS, the Basic Screening Survey for older adults (BSSOA) contains oral health information on adults in Connecticut. The State of Connecticut Department of Public Health (CT DPH) conducted its first BSSOA in 2012, and is planning to conduct a second one in 2021, in order to assess the oral health status of adults in long-term care facilities and adults attending federally subsidized congregate meal sites. BSSOA involves open-mouth screenings by registered dental hygienists, using a nationally standardized tool developed by the Association of State and Territorial Dental Directors in conjunction with the Centers for Disease Control and Prevention. Although BSSOA has the potential to provide invaluable information on the health status of vulnerable older adults in Connecticut, its findings from 2012 were excluded from the 2013-2019 Burden of Oral Disease in Connecticut document for two reasons. First, in 2012 the intention was to conduct oral health screenings in a probability sample of 20 long-term care facilities and in federally subsidized congregate meal sites in the same communities as the long-term care facilities. However, 12 out of 20 long-term care facilities did not grant permission to the CT DPH Office of Oral Health to conduct surveys and screenings on their premises. Hence, the 2012 CT BSSOA findings may not be representative of the long-term care population in the state. Second, age is missing for one-sixth of long-term care residents who participated in the 2012 BSSOA. Because long-term care facilities include residents in their thirties and forties, and because the primary purpose of the present document is to provide information on older adults in Connecticut, age is a key variable. Given that age is missing for a large proportion of participants, it is impossible to determine whether findings from the 2012 BSSOA pertain mostly to older adults or to adults in general.

ⁱⁱⁱ According to the BRFSS web enabled analysis tool, older adults, ages 65 years and over, living in Connecticut reported in 2018 that they visited a dentist or a dental clinic within the past year at following rates: 59.5% (95% confidence interval: 50.4-68.5) of those who had difficulty doing errands alone because of a physical, mental, or emotional condition as compared to 78.9% (95% confidence interval: 77.0-80.9) of those without such difficulty; 61.0% (95% confidence interval: 48.7-73.3) of older adults who had difficulty dressing or bathing as compared to 78.2% (95% confidence interval: 76.2-80.1) of their peers without such difficulty; 63.4% (95% confidence interval: 58.6-68.3) of older adults who had serious difficulty walking or climbing stairs as compared to 81.8% (95% confidence interval: 79.8-83.7) of older adults without such difficulty.

^{iv} According to the BRFSS web enabled analysis tool, among older adults, ages 65 years and over, in Connecticut, 20.1% (95% confidence interval: 17.4-22.8) who reported "fair" or "poor" health in 2012-2016 as compares to 8.7% (95% confidence interval: 7.8-9.6) of those who reported "good" or "better" health had edentulism.

^v According to the BRFSS web enabled analysis tool, older adults, ages 65 years and over, living in Connecticut reported in 2018 that they had a complete loss of permanent teeth at following rates: 20.1% (95% confidence interval: 11.7-28.5) of those who had difficulty doing errands alone because of a physical, mental, or emotional condition as compared to 7.9% (95% confidence interval: 6.5-9.3) of those without such difficulty; 16.4% (95% confidence interval: 12.3-20.6) of those who had serious difficulty walking or climbing stairs as compares to 6.6% (95% confidence interval: 5.2-8.0) of those who did.

^{vi} According to the BRFSS web enabled analysis tool, among older adults, ages 65 years and over, in Connecticut, 72.6% (95% confidence interval: 70.2-75.0) of those with an annual income between \$35,000 and \$49,999 as compared to 87.7% (95% confidence interval: 86.7-88.6) of those with an annual income above \$75,000 had a dental visit within the past year.

^{vii} According to the BRFSS web enabled analysis tool, among older adults, ages 65 years and over, in Connecticut, 3.1% (95% confidence interval: 2.0-4.2) of those with an annual income of \$75,000 or above reported edentulism in 2012-2016 as compares with 14.2% (95% confidence interval: 10.7-17.7) of those with an annual income below \$35,000 and 17.0% (19% confidence interval: 13.1-20.9) of those with an annual income below \$25,000.

^{viii} Categories "Black" and "White" include only those children who did not identify as Latinx.

^{ix} According to the BRFSS web enabled analysis tool, among older adults, ages 65 years and over, in Connecticut, 9.9% (95% confidence interval: 9.0-10.9) of those who self-identified as "White," 17.6% (95% confidence interval: 12.9-22.4) of those who self-identified as "Black or African American," and 20.2% (95% confidence interval: 13.2-27.2) of those who self-identified as "Hispanic, Latino/a, or Spanish origin," and 15.4% (95% confidence interval: 9.4-21.5) of older adults of other racial/ethnic backgrounds reported in 2012-2016 a complete loss of natural teeth.

Older Adults Oral Health Trends

Table. Trends in Oral Health Among Older Adults Living in Connecticut

INDICATOR	SOURCE	2013	2014	2015	2016	2017	2018
At least one dental visit in the past year among adults aged 65+ y	BRFSS	-	75.1% (72.7-77.5)	-	75.5% (73.7-77.3)	-	77.3% (75.4-79.2)
Periodontal disease among adults aged 55+ y	CT BRFSS	-	-	-	19.4% (17.7-21.1)	-	18.3% (16.5-20.2)
Treatment for periodontal disease among adults aged 55+ y	CT BRFSS	-	-	-	23.9% (22.1-25.8)	-	26.6% (24.4-28.8)
Any permanent teeth extracted among adults aged 65+ y	BRFSS	-	71.0% (68.6-73.3)	-	68.7% (66.9-70.5)	-	64.8% (62.8-66.8)
2.3. Six or more permanent teeth lost among adults aged 65+ y	BRFSS	-	21.1% (18.7-23.4)	-	20.9% (19.2-22.6)	-	19.0% (17.2-20.7)
2.4. All permanent teeth lost among adults aged 65+ y	BRFSS	-	10.5% (8.9-12.2)	-	9.6% (8.3-10.9)	-	9.4% (7.8-11.0)

Note. Indicators included in the 2018-2023 Connecticut Oral Health Surveillance System are marked with numeric identifiers. Each prevalence estimate is accompanied by a 95% confidence interval, enclosed in parentheses. y = year.



Connecticut's Oral Health Infrastructure

Oral Health Workforce

Dental Professionals

The oral health workforce in Connecticut consists of dentists, dental hygienists, and dental assistants. Additionally, there are two emerging practice models in Connecticut—expanded function dental assistants and dental therapists.

Dentists

Dentists specialize in evaluating, diagnosing, and treating “diseases and/or conditions of the oral cavity, maxillofacial area and/or the adjacent and associated structures and their impact on the human body.”¹ As part of clinical practice, dentists perform a wide range of activities, including, for example, removing tooth decay, filling cavities, reading radiographs (often referred to as x-rays), treating periodontal diseases, extracting teeth, and assessing for oral cancer.²

Becoming a general dentist typically requires a bachelor's degree and four years of dental school. The degree awarded upon graduation from dental school is either a Doctor of Dental Medicine (DDM) or a Doctor of Dental Surgery (DDS).³ Dentists who have one or the other receive the same education.¹ Following the receipt of either dental degree, some dentists undergo additional training in a specialty area such as orthodontics or endodontics. Per the American Dental Association (ADA), there are nine recognized dentistry specialties.³

To practice clinical dentistry in the United States (US), dentists must be licensed in a state, or states, in which they wish to practice. In Connecticut, obtaining a dentist license entails graduation from a dental school accredited or recognized by the ADA, or a foreign dental school; successful completion of the National Board of Dental Examiners

examinations; and successful completion of Regional Board Examination approved by the Connecticut State Dental Commission and the Connecticut Department of Health (CT DPH).⁴ Dentists who choose not to practice clinically have several options for work in non-traditional practice settings. These include academia, consulting, dental products industry, insurance, research, and public health.³

Dental Hygienists

Dental hygienists specialize in “preventing oral disease and identifying and treating oral disease while it is still manageable.”⁵ Their scope of practice includes plaque and calculus (commonly known as tartar) removal from tooth surfaces, dental sealant placement, fluoride treatments, and oral health education.^{5,6}

Becoming a dental hygienist requires successful completion of an approved dental hygiene program, which takes two years for an associate's degree and four years for a bachelor's degree. Dental hygienists must obtain a license if they wish to practice in the US. In Connecticut, requirements for a dental hygiene license include graduation from an ADA-accredited dental hygiene program; successful completion of the National Board Examinations; and successful completion of clinical performance examinations approved by CT DPH.⁷

Licensed dental hygienists in Connecticut do not practice independently. Rather, they work under the general supervision of a licensed dentist, which means “with the knowledge of said licensed dentist, whether or not the dentist is on the premises when such procedures are being performed,” (CGS §Sec. 20-126). Licensed dental hygienists who work in public health settings such as schools and Head Start programs make an exception to this rule. They can practice without the supervision of a dentist if they

have a referral protocol in place and if they have at least two years of clinical practice experience. Besides clinical practice, dental hygienists may obtain a Master's degree in dental hygiene, and may pursue alternative careers in non-traditional practice settings such as academia, research, and government.⁶

Dental Assistants

Dental assistants perform tasks such as assisting dentists during treatment procedures, asking about patients' medical history, helping patients feel comfortable during dental treatment, providing patients with instructions for oral care following surgery, taking impressions of teeth for study models, and serving as infection control officers.⁸ They are required by CT DPH to pass the Dental Assisting National Board's (DANB) Infection Control examination.⁹ Additionally, they have the option to become certified, which involves graduating from a dental assisting or dental hygiene program, or obtaining a high school degree and a minimum of 3,500 hours of approved work experience, and passing the DANB's General Chairside Assisting examination and Radiation Health and Safety examination, in addition to the Infection Control examination.¹⁰

Unlike dentists and dental hygienists, dental assistants are neither licensed nor certified by CT DPH. They practice under direct supervision of a licensed dentist, "with such dentist remaining on-site in the dental office or treatment facility while such procedures are being performed by the dental assistant and [...] prior to the patient's departure from the dental office, such dentist reviews and approves the treatment performed by the dental assistant,"(CGS §Sec. 20-112a(a)(1)).

Emerging Practice Models

Besides the well-established members of the dental team (ie, dentists, dental hygienists, and dental

assistants), there are two emerging practice models in Connecticut: expanded function dental assistants (EFDA) and dental therapists (DT). The EFDA model, which was legislated in 2016, allows dentists to delegate more procedures to dental assistants or dental hygienists who obtain EFDA certification. Pursuant to the CGS §Sec. 20-122a (c)(2), the expanded duties include "(A) the placing, finishing, and adjustment of temporary restorations and long-term individual fillings, capping materials and cement bases; (B) oral health education for patients; (C) dental sealants; and (D) coronal polishing, provided the procedure is not represented or billed as prophylaxis." Earning an EFDA status entails completing an EFDA educational program at an institution of higher education and passing DANB's Certified Dental Assistant or Certified Orthodontic Assistant examinations, and DANB's examinations concerning certified preventive functions and certified restorative functions.

The dental therapist (DT) model was legislated in Connecticut in 2019, allowing dental hygienists to become dental therapists after at least 18 months of additional training. Dental therapists are midlevel providers, similar to physician assistants in medicine, who deliver "preventative and routine restorative care such as filling cavities, placing temporary crowns, and extracting badly diseased or loose teeth."¹¹ The scope of their practice is between that of a dental hygienist and a dentist.¹² Dental therapists in Connecticut can only practice in public health settings and under the supervision of dentists. The Connecticut law for dental therapists went into effect on January 1, 2020. At the time of this writing, statutes have not been updated in accordance with this law.

Educational Institutions

The University of Connecticut School of Dental Medicine is the only dental school in Connecticut,

and it includes departments of general dentistry, orthodontics, prosthodontics, pediatric dentistry, oral and maxillofacial surgery, behavioral sciences and community health, endodontology, periodontology, oral and maxillofacial diagnostic sciences, and biomedical engineering.

Connecticut schools that provide training for dental hygiene include the University of Bridgeport Fones School of Dental Hygiene, the Tunxis Community College Dental Hygiene Program, the University of New Haven School of Health Sciences, and the Goodwin University Dental Hygiene Degree Program. Among those who held an active dental hygienist license in Connecticut in 2018, about one-third reported that they graduated from the University of Bridgeport; almost a quarter reported that they graduated from Tunxis Community College; and close to 10% reported they graduated from the University of New Haven.¹³

Workforce Size

In 2019, Connecticut ranked seventh in the US in dentist density, with a ratio of 72.6 dentists per 100,000 population.¹⁴ Massachusetts ranked number one in the nation with 83.4 dentists per 100,000 population.¹⁴ Within New England, Massachusetts and Connecticut were followed by New Hampshire with 63.5, Vermont with 59.9, Maine with 54.8, and Rhode Island with 53.6 dentists per 100,000 population.¹⁴

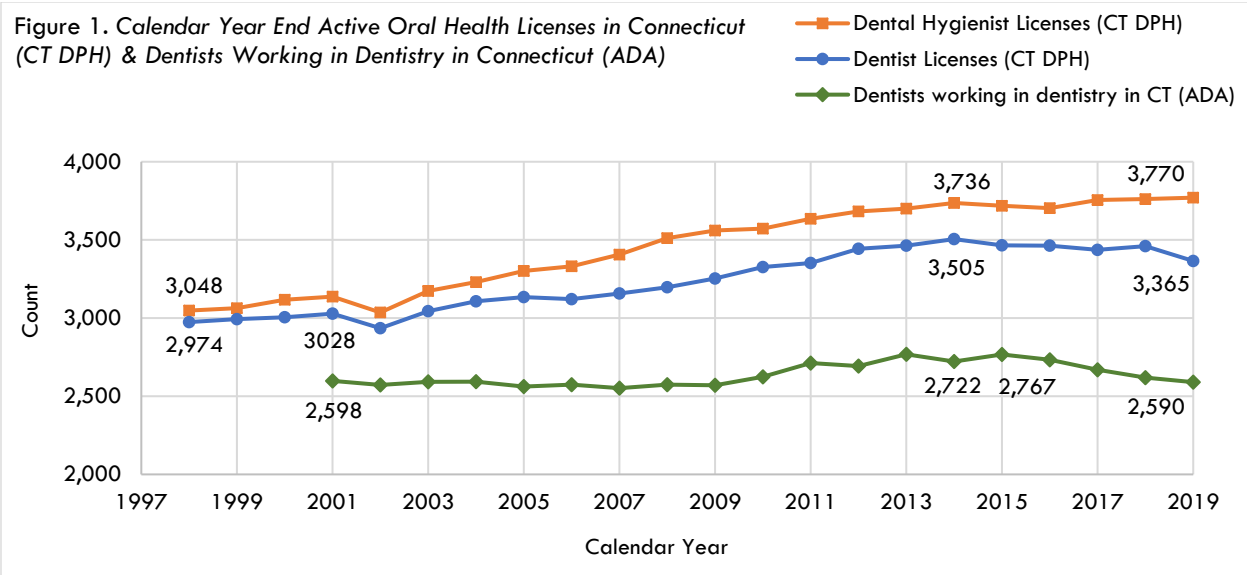
Figure 1 shows the number of dentist and dental hygienist licenses in Connecticut, at the end of each calendar year between 1998 and 2019.¹⁵ The number of dentist licenses increased between 1998 and 2014, starting with 2,974 licenses in 1998, and ending with 3,505 licenses in 2014. This increase was followed by a decrease to 3,365 licenses in 2019. The number of dental hygienist licenses increased over the past two

decades, from 3,048 licenses in 1998 to 3,770 licenses in 2019.¹⁵

It is worth noting that the number of dental hygienist licenses exceeded the number of dentist licenses each year. Moreover, the gap between the two sets of professional licenses increased over time, from 74 more dental hygienist than dentist licenses in 1998 to 405 more dental hygienist licenses in 2019 (Figure 1).¹⁵

Not all dentists licensed in Connecticut practice in the state. Some hold a professional license in Connecticut but practice in another state; maintain a professional license but are retired; work in occupations unrelated to dentistry; or work in non-clinical dentistry occupations. Dentists may also hold more than one specialization or may practice general dentistry along with a specialization. Among those with an active Connecticut dental license in 2017, 68% practiced general dentistry and 5.2% practiced pediatric dentistry. In addition, dentists reported holding the following specializations in 2017: endodontics (3.3%), oral and maxillofacial pathology, radiology and/or surgery (5.4%), orthodontics and dentofacial orthopedics (6.3%), periodontics (4%), and prosthodontics (2.5%).ⁱ

As Figure 1 shows, the number of dentists actually working in dentistry in Connecticut was considerably lower than the number of dentist licenses each year between 2001 and 2019.^{14,15} It is interesting that the gap between the count of Connecticut dentist licenses and the count of dentists working in dentistry in Connecticut increased over time. It is also noteworthy that the number of practicing dentists has declined in recent years, from 2,767 in 2015 to 2,590 in 2019. Dentist density also decreased during this period, from 75.7 per 100,000 in 2015 to 72.7 per 100,000 in 2019.¹⁴



Predicted Shortage of Dentists

The Health Resources and Service Administration (HRSA) is predicting a shortage of dentists in all 50 states and the District of Columbia. This includes a predicted shortage of 232 dentists in Connecticut by the year 2025 (Table 1).¹⁶ In contrast, the supply of dental hygienists is expected to outpace the demand in most states.

Expanding the role of dental hygienists and integrating dental therapists into dental care delivery is likely to mitigate the shortage of dentists.¹⁶ There is also some evidence that the number of pediatric dentists will continue to grow to meet or exceed need.¹⁷

Table 1. Projected Supply of and Need for Dentists in 2025¹⁶

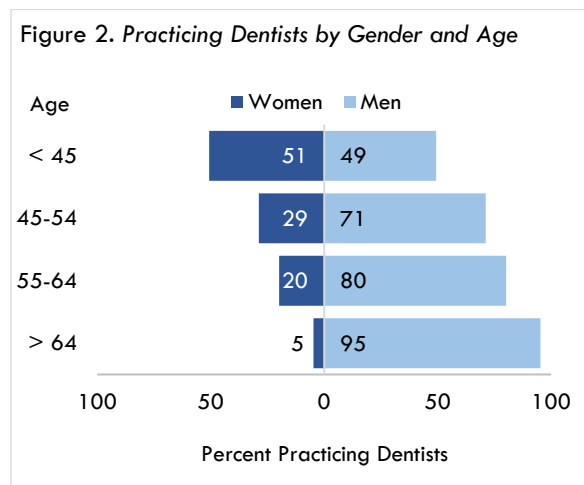
New England State	Projected Supply of Dentists in 2025	Projected Need for Dentists in 2025	Difference/ Projected Shortage
Connecticut	2,497	2,643	(232)
Maine	614	645	(75)
Massachusetts	4,628	4,894	(338)
New Hampshire	913	938	(29)
Rhode Island	558	603	(78)
Vermont	328	353	(26)

Workforce Demographics

Among professionally active dentistsⁱⁱ in Connecticut, the average age was 50 years in 2016, with close to one-fifth (17.4%) aged 21-34, one-third (32.4%) aged 35-49, one-third (32.7%) aged 50-64, and

close to one-fifth (17.6%) aged 65 years or above.¹⁸ Concerning a gender breakdown, about seven in ten professionally active dentists were men (69.1%) and three in ten (30.9%) were women in 2016.¹⁸ Survey responses from those practicing clinical dentistry in

Connecticut in the spring of 2018ⁱⁱⁱ suggest that the gender gap in dentistry has been closing over the generations.¹³ As Figure 2 shows, the youngest age group (“< 45” years old) in 2018 evidenced gender parity. By contrast, there were considerably more men than women in the three older age groups.¹³

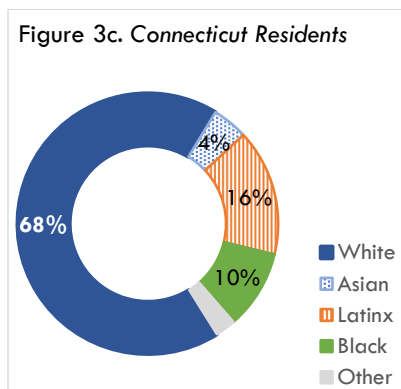
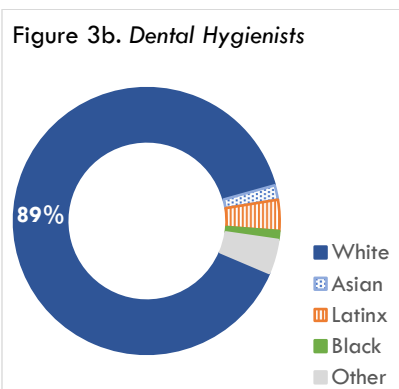
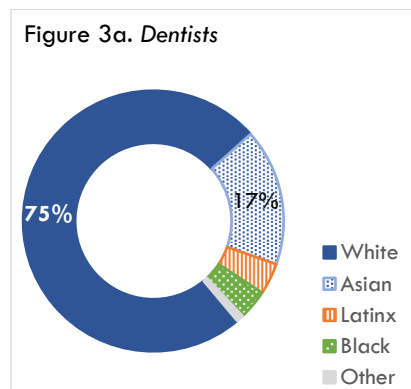


The average age of registered dental hygienists practicing clinical dental hygiene in Connecticut was 48 years in the spring of 2018.^{iv} An overwhelming majority of practicing dental hygienists (97.3%) were women, just over one percent were men (1.4%), and just over one percent selected the “prefer not to answer” response choice (1.3%) or omitted a response (< %).¹³

Regarding race/ethnicity, among professionally active dentists in Connecticut in 2016, about three-quarters (74.5%) self-identified as White. This was followed by Asian American (17.0%), Latinx (3.9%), African American or Black (3.7%), and dentists of other racial groupings (0.9%), as Figure 3a shows.¹⁸

Among dental hygienists who practiced clinical dental hygiene in Connecticut in 2018, an overwhelming majority (89.3%) self-identified as White.^v This was followed by Latinx (3.8%), Asian American (1.8%), Black (1.1%), and respondents of other racial/ethnic backgrounds (4.1%), as Figure 3b shows.¹³

Notably, racial groupings among clinical practitioners in the state differed from those of Connecticut’s residents (Figure 3c).¹⁹ Namely, White and Asian Americans were over-represented among dentists, and White Americans were overrepresented among dental hygienists. By contrast, Black and Latinx Americans were underrepresented among both dentists and dental hygienists. More specifically, Black Americans made up roughly 10% of Connecticut’s residents¹⁹ but only about 4% of dentists¹⁸ and 1% of dental hygienists.¹³ The gap was even larger for Latinx Americans who made up roughly 16% of Connecticut’s residents¹⁹ but only 4% of dentists¹⁸ and 4% of dental hygienists.¹³



Access to Oral Health Care

Dental Insurance

Many Connecticut residents are able to obtain dental insurance through health insurance exchanges, employers, unions, and individual plans. Nine in ten (92.5%) Connecticut adults of any age had some type of health insurance (whether private, Medicare, or Medicaid) in 2018.²⁰ Among adults aged 18-64, close to two-thirds (64.1%) had private health insurance; 11.8% had Medicaid coverage; and 5.6% had Medicare coverage, according to CT BRFSS survey responses from 2018.²⁰

Health insurance does not necessarily include dental coverage, however, leaving 26% of Connecticut's adults in 2018 without dental insurance.²⁰ What is more, dental premiums and benefits vary widely across private insurance plans, with many requiring additional out of pocket costs for comprehensive oral health care.

HUSKY Health—Connecticut's Medicaid and Children's Health Insurance Program (CHIP)—covers over 800,000 people, or roughly 22% of the state's population. Four in ten of Connecticut's children are covered by HUSKY Health.²¹ HUSKY Health is funded through a cost-sharing agreement between the state and federal government; the federal government covers 59% of Medicaid costs and 88% of CHIP costs. Unlike most state Medicaid and CHIP capitated managed care systems, HUSKY Health is a self-insured, managed fee-for-service program. Connecticut Dental Health Partnership (CTDHP) manages HUSKY Health dental health care services, ensuring maximum access and provision of dental health care.²²

HUSKY Health plans A, B, C, and D cover medical, dental, and mental health care for financially eligible children and their caregivers, older adults, single adults, and those with disabilities. HUSKY Health dental coverage for children is extensive, and

includes evaluation, x-rays, cavity risk assessments, dental cleanings, dental sealants on permanent teeth, fluoride treatments, and fillings.²²

Connecticut is one of 17 states across the nation, and among three New England states (Connecticut, Massachusetts, and Rhode Island) that offer extensive dental benefits for adults on Medicaid.²³ The annual adult benefit maximum for adults on HUSKY Health as of 2018 was \$1,000; however, additional services are covered beyond this limit when there is medical necessity. Benefits for adults cover dental exams, cleanings, x-rays, extractions, fillings, dentures, root canals, crowns and oral surgery.²²

HUSKY Health provides eligible children and adolescents (20 years of age or under) with Early and Periodic Screening, Diagnostics and Treatment (EPSDT). There were 366,645 children and adolescents who were eligible for EPSDT for at least 90 continuous days in Connecticut during 2018.²⁴

Nearly half (46.7%) of dentists in Connecticut accepted HUSKY Health insurance for dental services for children and adolescents in 2016, compared to an average of 39% of dentists who participated in Medicaid or CHIP nationwide.²⁵ Additionally, Connecticut has been ranked among the top states in dental care use rates among Medicaid-enrolled children.²⁵ Compared to a national average of 50.4%, two-thirds (67.3%) of Connecticut children covered by HUSKY Health visited a dentist in 2016. This was the third highest rate of dental care use rate in the nation in 2016, after Texas at 69.2% and Hawaii at 67.9%.²⁶

Dental Health Professional Shortage Areas

A Health Professional Shortage Area (HPSA) is a designation given to areas in the US in which there are shortages of medical, dental, or mental health care professionals. These shortages may be based on 1) geographic areas (ie, a shortage of providers

for the entire population within a defined geographic area), 2) population groups (ie, a shortage of providers for a specific population groups within a defined geographic area such as migrant farmworkers and people in low-income households), or 3) facilities (eg, correctional facilities, community health centers, etc).^{27,28}

HPSA designations are assigned by the Human Resources and Services Administration (HRSA), based on needs assessments conducted by state Primary Care Offices.²⁷ Areas in which Federally Qualified Health Centers (FQHCs) and FQHC look-a-likes are located are automatically designated as HPSAs without having to apply for a designation.²⁷

As of October 2020, there were 37 designated dental HPSAs in Connecticut, 18 of which were based on facilities^{vi} and 19 on low-income population groups.²⁹ Collectively, these dental HPSAs were home to 394,804 Connecticut residents as of March 2020, and per HRSA calculations, they needed 100 additional dentists to achieve a population-to-dentist ratio that would result in their removal from the designation.²⁸ Notably, CTDHP argues that the assumptions for HRSA’s calculation are not valid in Connecticut.^{vii}

Dentists and dental hygienists who commit to working in an FQHC for a period of time are eligible for a student loan repayment program. The Connecticut State Loan Repayment Program is a federal-state partnership that helps decrease health

care disparities caused by health professional shortages.³⁰

Dental Safety Net

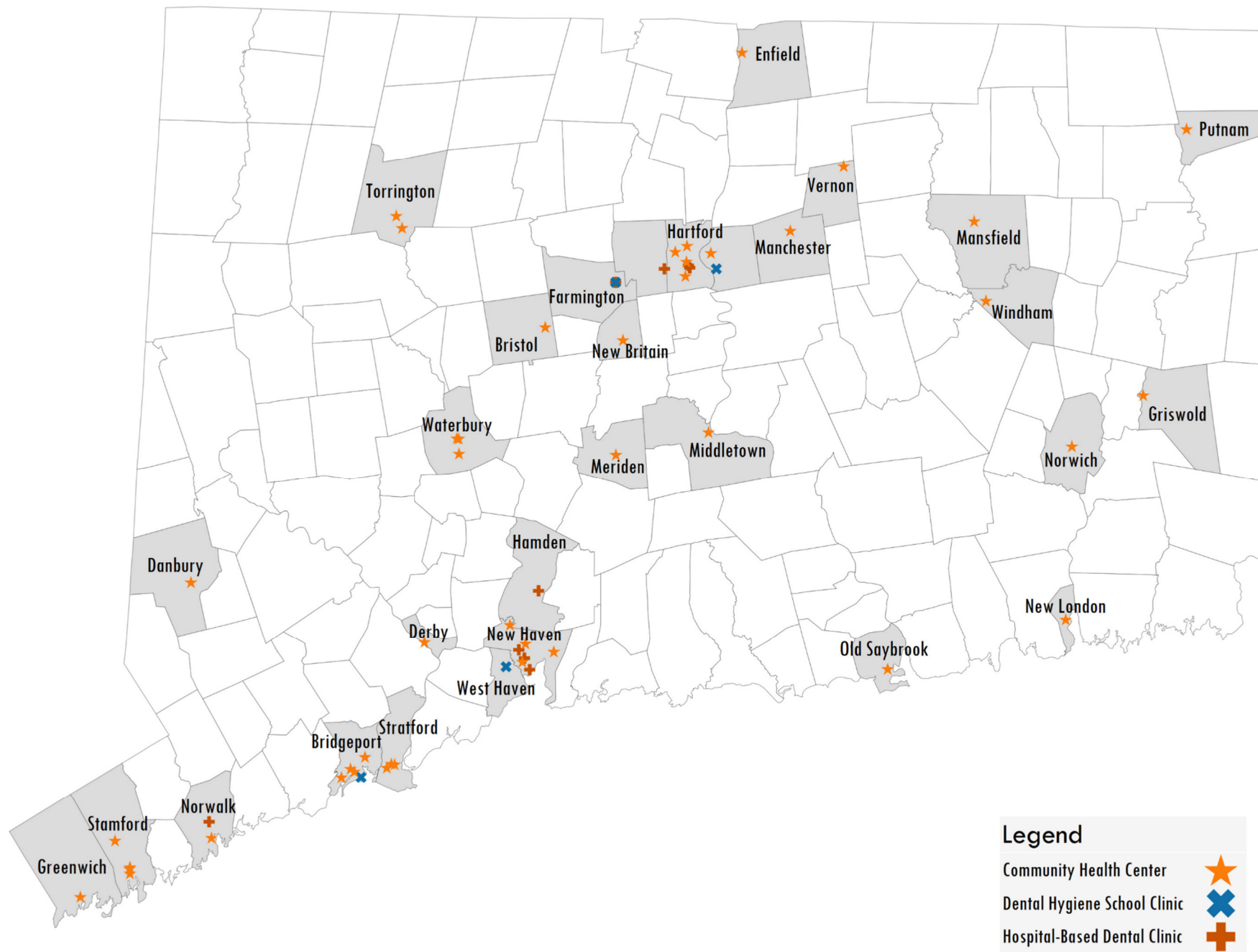
Public and nonprofit organizations have established dental clinics to meet the needs of the underserved, that is, those who cannot access private-sector dentists. These clinics are collectively known as a dental safety net. Connecticut’s dental safety net includes dental services offered in FQHCs (also known as Community Health Centers), dental hygiene schools, hospital-based dental clinics, and public schools.³¹

Community Health Centers (CHCs) provide services to anyone seeking healthcare, regardless of health insurance coverage or ability to pay. As of October 2020, there were 42 CHC sites with dental services in Connecticut, including in the count one site that was closed for renovation (Figure 3). A complete listing of sites, along with addresses and phone numbers, is provided in Table 5 (page 16), courtesy of CTDHP. Services provided within CHC sites range from dental hygiene to the full spectrum of dental care for several target populations, including a center’s own medical patients, school children, pregnant women, adults, older adults, people with special health care needs, and the general population. Table 3 shows that roughly 27% of all CHC patients—a count of 109,879—received at least one oral health service in 2018.^{32,33} A similar proportion of patients received dental care from CHCs in prior years.

Table 3. Connecticut Residents Receiving Oral Health Services at CHCs^{32,33} in the Period Between 2013 and 2018

Year	2013	2014	2015	2016	2017	2018
Count of CHCs	14	14	16	17	17	17
Count of patients receiving any services at CHCs	342,656	347,598	351,367	376,477	392,732	398,699
Count of patients receiving at least one oral health service at CHCs	90,017	94,290	96,541	103,530	107,144	109,879
Percent of patients who received at least one oral health service at CHCs	26.30%	27.10%	27.50%	27.50%	27.30%	27.60%

Figure 3. Connecticut's Dental Safety Net



In addition to CHC sites, nine hospital based dental clinics and four clinics within dental hygiene schools contributed to Connecticut's dental care safety net in 2020 (Figure 3).³⁴ Addresses and phone numbers for these clinics are listed in Table 5 (page 16).

As a result of this network of services, 99% of publicly insured children in Connecticut live in geographical areas where there is at least one Medicaid dentist per 2,000 publicly insured children, and they are able to access dental care within 15 minutes of their homes.³⁵

Dental Services in Schools

School Based Health Centers

School Based Health Centers (SBHC) are medical clinics located within, or on the grounds of, elementary, middle, and high schools in 27 communities in Connecticut.³⁶ The first SBHC opened in Connecticut in 1981, and the first SBHC funded by CT DPH opened in 1985.³⁷

Although SBHCs aim to reach children whose families have little or no health insurance coverage, their services are available to all students enrolled in schools with an SBHC on site, regardless of insurance status or family income.³⁶ As of 2018, CT DPH funded 92 SBHCs, 27 of which provided dental services (Figure 4). During the school year 2018-2019, a total of 3,814 students received dental care services at SBHCs, at an average of 2.5 visits per student (for a total of 9,557 dental visits).^{viii}

School-Based or School-Linked Dental Programs

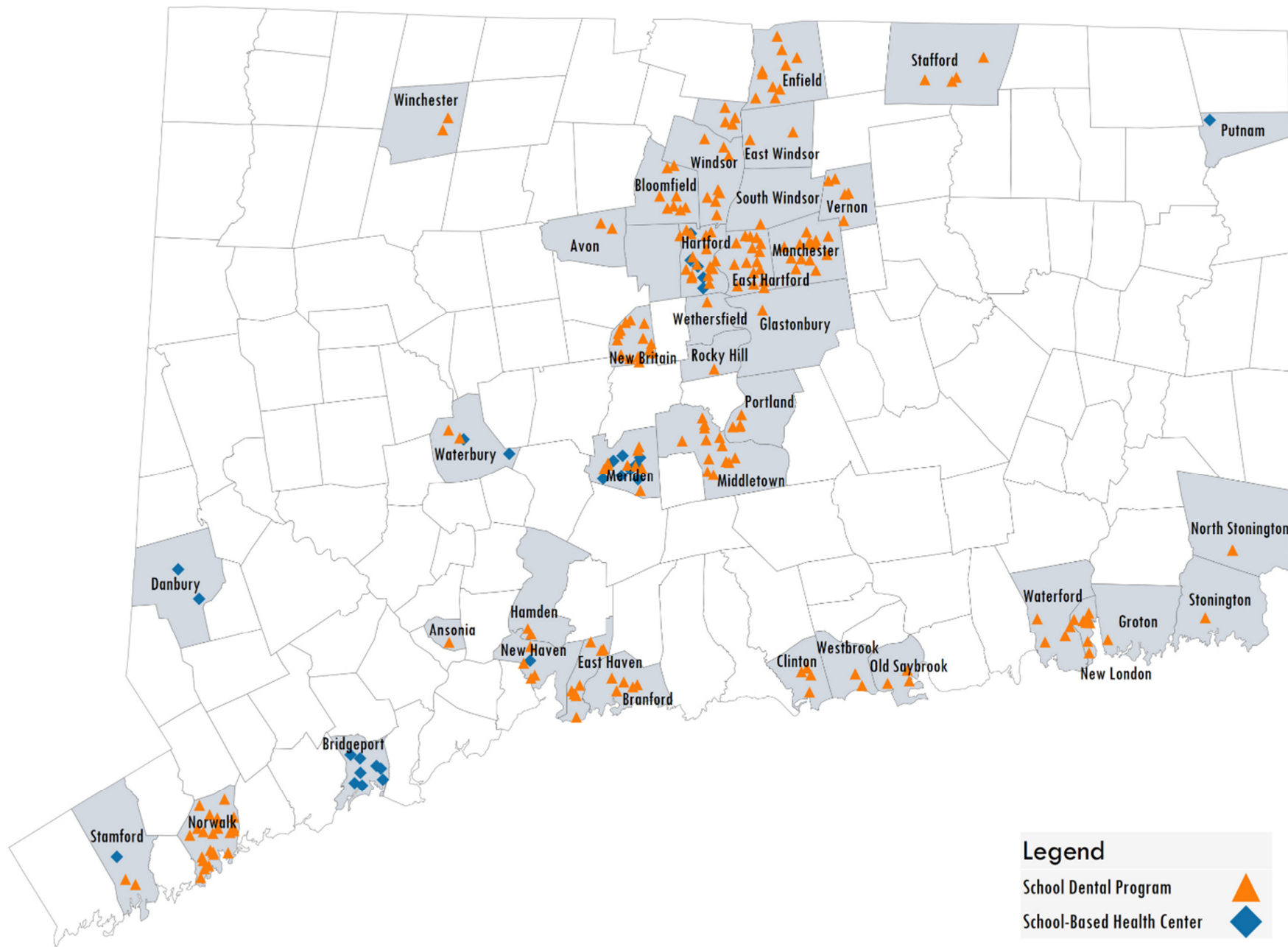
In addition to SBHCs, FQHCs, boards of education, and local health departments provide dental services in schools and preschools throughout the state (Figure 4). These school-based or school-linked programs offer preventative dental care, which includes check-ups, cleanings, fluoride varnish, sealants, and referrals to dentists. Some such

programs additionally offer restorative dental care (eg, fillings).

With monies from the Centers for Disease Control and Prevention (CDC) and the Human Resources and Services Administration (HRSA) Workforce Development Grant, the CT DPH Office of Oral Health (OOH) has funded school-based or school-linked dental programs to conduct oral health screenings and provide dental sealants to students in schools with at least 50% eligibility for free or reduced-price meals and also schools in dental HPSAs. During the school years 2015-16, 2016-17 and 2017-18, six programs received OOH funding: The Hartford Board of Education, Community Health Centers, The City of Stamford, First Choice, United Community & Family Services, and New Haven Public Schools. Collectively, these programs served each year roughly 17,000 students in grades K-12.³⁸ What is more, each year, these programs provided oral health screenings to over 5,000 students in grades 2, 6, and 7—that is, students who may be eligible to receive dental sealants—and they provided dental sealants to roughly 40% of these students.³⁸

Most recently, during the school year 2019-2020, the OOH funded four agencies to provide dental sealants in elementary and middle schools with at least 50% eligibility for free or reduced-price meals. These agencies include The Hartford Board of Education, Community Health Center Inc., First Choice Health Center, and New Haven Public Schools. Going forward, the OOH will continue to fund dental sealant programs as part of a Cooperative Agreement with the CDC.

Figure 4. Dental Services in Schools in Connecticut



Community Water Fluoridation

In addition to professionally-delivered services, strategies employed by individuals and communities are important for the prevention of oral disease. Self-administered strategies include the use of fluoride toothpastes and fluoride mouth rinses, as recommended by dental professionals.

Community-based strategies are deployed at the level of communities. School-based dental sealant programs are one example of a community-based strategy. Another example is community water fluoridation—or the addition of fluoride to drinking water—in order to prevent dental caries (tooth decay).

Fluoride is a naturally-occurring mineral that promotes remineralization of tooth enamel, which helps with preventing dental caries.³⁹ What makes community water fluoridation especially valuable is the delivery of fluoride to all community members—regardless of socioeconomic status, health insurance coverage, or ability—in a cost-saving and cost-effective way.⁴⁰ A recent economic evaluation found that individuals in communities that fluoridated water save an average of about \$32 per person in 2013 in averted dental care costs.⁴¹ Moreover, economic evaluations found that savings for communities ranged from \$1.12 to \$135 for each \$1 invested.⁴²

In the US, community water fluoridation has been the chief strategy for the primary prevention of dental caries for over 60 years.⁴³ It has been recognized by the CDC as one of the ten great public health achievements in the 20th century,⁴⁴ and has been endorsed by a large number of professional health organizations, including the

World Health Organization, the American Dental Association, and the American Academy of Pediatrics.^{44–55}

Studies conducted in the United States in the late 1930s and early 1940 found a reduction of about 50% in the prevalence of dental caries in communities that had about 1.0 milligram per liter (mg/L) of naturally-occurring fluoride as compared to communities with less than 0.1 mg/L of fluoride in their drinking water.³⁹ Since then, studies from many different countries have been consistent in the finding that community water fluoridation is effective in decreasing dental caries prevalence and severity.^{56,57}

Most water contains some fluoride, but typically not enough for dental caries prevention. Concentrations of fluoride in water range from less than 0.1 mg/L to over 9.0 mg/L.^{39,43} Community water systems can adjust the concentration of fluoride in their water to a level that is optimal for dental caries prevention, but that does not cause dental fluorosis (mottled enamel).⁵⁸ The current US Public Health Service (PHS) recommendation for the level of fluoride in drinking water is 0.7 mg/L.⁵⁹ This recommendation was established in 2015, and it is a decrease from the previous recommendation that was established in 1962, prior to a widespread availability of other sources of fluoride such as soft drinks, processed foods, and fluoride toothpastes.^{39,40,58}

In 2018, around three-quarters of Connecticut's residents received drinking water from public water systems, and roughly 90% of those received optimally fluoridated water, as shown in Table 4.⁶⁰ The percentage of Connecticut's residents receiving optimally fluoridated drinking water was similarly high in the previous years (Table 4).

Table 4. Connecticut Residents Receiving Optimally Fluoridated Water and Fluoridated Water Systems in Connecticut in the Period Between 2013 and 2018

Year	2013	2014	2015	2016	2017	2018
Count of residents ³²	3,593,222	3,593,222	3,593,222	3,593,222	3,593,222	3,594,478
Count of residents on public water systems ⁶⁰	2,602,539	2,690,930	2,690,930	2,690,930	2,693,622	2,698,656
Percent of residents on public water systems	72.4%	74.9%	74.9%	74.9%	75.0%	75.1%
Count of residents on public water systems receiving optimally fluoridated water ⁶⁰	2,350,920	2,409,333	2,409,333	2,409,333	2,415,008	2,416,428
Percent of residents on public water systems receiving optimally fluoridated water	90.3%	89.5%	89.5%	89.5%	89.7%	89.5%
Count of adjusted water systems ⁶⁰	32	32	31	31	31	31
Count of natural water systems ⁶⁰	27	27	27	27	27	27
Count of consecutive water systems ⁶⁰	33	33	34	34	34	36
Total count of fluoridated water systems ⁶⁰	92	92	92	92	92	94



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End Notes

ⁱ CT DPH licensing statistics as of February 2017.

ⁱⁱ Professionally active dentists in the American Dental Association (ADA) report from 2016 were defined as those who were "listed in the ADA Masterfile as licensed, not retired, living in the 50 states or District of Columbia, and having a primary occupation of private practice (full- or part-time), dental school/faculty staff member, armed forces, other federal services (ie, Veterans' Affairs, Public Health Service), state or local government employee, hospital staff dentist, graduate student/intern/resident, or other health/dental organization staff member."

ⁱⁱⁱ In the spring of 2018, the Connecticut Department of Public Health, Office of Oral Health administered an anonymous survey to dentists with an active license in Connecticut. A total of 1,201 licensed dentists completed the questionnaire, with a response rate of roughly 37%. Of those who held an active license in Connecticut, 924 reported that they practiced clinical dentistry in the state.

^{iv} In the spring of 2018, the Connecticut Department of Public Health, Office of Oral Health administered an anonymous survey to dental hygienists with an active license in Connecticut. A total of 1,728 licensed dental hygienists completed the questionnaire, with a response rate of roughly 48%. Of those who held an active license in Connecticut, 1,316 reported that they practiced clinical dental hygiene in the state.

^v Race/ethnicity breakdown was computed for those respondents who answered the question about their race/ethnicity. Close to 10% of respondents did not answer this question.

^{vi} As of this writing in the spring of 2020, there were 17 community health centers in Connecticut and one Indian Health Service health center.

^{vii} Marty Milkovic, Director, Connecticut Dental Health Partnership, personal communication, June 24, 2020.

^{viii} CT DPH SBHC statistics computed by CT DPH epidemiologists for the purpose of this report.

Resources for Accessing Dental Safety Net in Connecticut

A calendar of free or discounted dental services is maintained by the Connecticut State Dental Association (CSDA) and is available at www.csda.com/for-the-public/charitable-dental-outreach-calendar. Additionally, a calendar of Connecticut Mission of Mercy free dental clinic events is available at <http://cfdo.org/ctmom-patients.html>. Lastly, a list of organizations providing free or discounted dental services, organized by the town, is provided in Table 5, courtesy of Connecticut Dental Health Partnership (CTDHP).

HUSKY Health members may call CTDHP at 855-CT-DENTAL (855-283-3682), Monday through Friday, 8AM to 5PM, for help with finding a dentist.

Table 5. *Organizations Providing Free or Discounted Dental Services in Connecticut*

Name	Organization	Address	Town	Telephone	Notes
Bridgeport Community Health Center (Optimus)	Community Health Center	982 East Main St	Bridgeport	203-696-3270	
Park City Primary Care Center, Inc. (Optimus)	Community Health Center	64 Black Rock Ave	Bridgeport	203-579-5223	
Southwest Community Health Center	Community Health Center	46 Albion St	Bridgeport	203-330-6000	
Southwest Community Health Center	Community Health Center	968 Fairfield Ave	Bridgeport	203-330-6000	
The Fones School of Dental Hygiene	Dental Hygiene School Clinic	60 Lafayette St	Bridgeport	203-576-4137	Dental hygiene services only
Bristol Burlington Health District	Community Health Center	240 Stafford Ave	Bristol	860-584-7682	Dental hygiene services only for children and seniors
Greater Danbury Community Center (Connecticut Institute for Communities, CIFIC)	Community Health Center	70 Main St	Danbury	203-743-0100 203-456-1408	Formerly Danbury Hospital Dental Clinic
Cornell Scott Hill Health Center	Community Health Center	121 Wakelee Ave	Ansonia	203-503-3000	
East Hartford Community Health Care Dental Clinic (First Choice Health Center)	Community Health Center	94 Connecticut Blvd	East Hartford	860-528-1359	
Goodwin College of Dental Hygiene	Dental Hygiene School Clinic	403 Main Street	East Hartford	860-218-1800	Dental hygiene services only
Community Health Center of Enfield	Community Health Center	5 North Main St	Enfield	860-253-9024	Mobile dental services only
School of Dental Medicine, UConn Health Center	Hospital Based Dental Clinics	263 Farmington Ave	Farmington	860-679-2464	For dental emergencies, call 860-679-2325
Tunxis Dental Hygiene Program	Dental Hygiene School Clinic	263 Farmington Ave	Farmington	860-773-1681	Dental hygiene services conducted at UConn Dental Clinic
Family Centers Health Care at Wilbur	Community Health Center	111 Wilbur Peck Court	Greenwich	203-717-1760	Located at lower level
Yale Hamden Dental Center	Hospital Based Dental Clinics	2560 Dixwell Ave	Hamden	203-230-3431	Adults

Table 5. Organizations Providing Free or Discounted Dental Services in Connecticut (Continued)

Name	Organization	Address	Town	Telephone	Notes
Charter Oak Health Center	Community Health Center	21 Grand St	Hartford	860-550-7500	
Community Health Services	Community Health Center	500 Albany Ave	Hartford	860-249-9625	
Hartford Gay and Lesbian Health Collective (HGLHC)	Community Health Center	1841 Broad St	Hartford	860-278-4163	Limited to established patients through Ryan White funding
Wheeler Health and Wellness Center	Community Health Center	43 Woodland St	Hartford	860-793-3500	
Connecticut Children's Medical Center (CCMC)	Hospital Based Dental Clinics	282 Washington St	Hartford	860-545-9030	Patients with physical disabilities only; must have referral
Hartford Hospital	Hospital Based Dental Clinics	79 Retreat Ave	Hartford	860-972-2700	The Brownstone Building, across from the Helen & Harry Grey Cancer Center
UCFS (United Community and Family Services)	Community Health Center	70 Main St	Jewett City	860-376-7040	
Manchester Community Health Care Dental Clinic (First Choice Health Center)	Community Health Center	150 North Main St	Manchester	860-646-4678	
Mericare (Community Health Center of Meriden)	Community Health Center	165 Miller St	Meriden	203-639-3500	Must be a medical patient to receive dental services
Community Health Center of Middletown	Community Health Center	675 Main St	Middletown	860-347-6971	Must be a medical patient to receive dental services
Community Health Center of New Britain	Community Health Center	1 Washington Square	New Britain	860-224-3642	Must be a medical patient to receive dental services
Cornell Scott Hill Health Center	Community Health Center	428 Columbus Ave	New Haven	203-503-3040	
Cornell Scott Hill Health Center	Community Health Center	226 Dixwell Ave	New Haven	203-503-3421	
Cornell Scott Hill Health Center	Community Health Center	122 Wilmont St	New Haven	203-503-3000	
Fair Haven Community Health Center	Community Health Center	50 Grand Ave	New Haven	203-777-7411	
Oral Maxillofacial Surgery Center at Yale New Haven Hospital St. Raphael's Campus Medical Group	Hospital Based Dental Clinics	1450 Chapel St	New Haven	203-789-3156	Oral surgery only
Yale Pediatric Dentistry Center	Hospital Based Dental Clinics	1 Long Wharf Dr	New Haven	203-688-3000	Suite 403
Yale Adult Dental Center	Hospital Based Dental Clinics	789 Howard Ave	New Haven	203-688-2464	Dana II Bldg, 2nd Floor
Community Health Center of New London	Community Health Center	1 Shaws Cove	New London	860-447-8304	Must be a medical patient to receive dental services
Norwalk Smiles (Community Health Center of Norwalk)	Community Health Center	49 Day St	Norwalk	203-854-9292	Must be a medical patient to receive dental services
Norwalk Hospital	Hospital Based Dental Clinics	34 Maple St	Norwalk	203-852-2146	

Table 5. Organizations Providing Free or Discounted Dental Services in Connecticut (Continued)

Name	Organization	Address	Town	Telephone	Notes
United Community and Family Services	Community Health Center	47 Town St	Norwich	860-892-7042	
Community Health Center of Old Saybrook	Community Health Center	263 Main St	Old Saybrook	860-388-4433	
Generations Family Health Center	Community Health Center	202 Pomfret St	Putnam	860-963-7917	
Dental Center of Stamford (Franklin Street Community Health Center)	Community Health Center	141 Franklin St	Stamford	203-969-0802	
Stamford Health Department	Community Health Center	888 Washington Blvd	Stamford	203-977-4846	Limited to children enrolled at a school site with dental services.
Stamford Ambulatory Care Clinics (Optimus)	Community Health Center	1351 Washington Blvd	Stamford	203-621-3900	
West Hill High School	Community Health Center	125 Roxbury Rd	Stamford	203-977-4937	Limited to children enrolled in any Stamford school.
UCONN Storrs	Community Health Center	One Royce Circle	Storrs	860-487-9330	Suite 108
Stratford Community Health Center (Optimus)	Community Health Center	727 Honeyspot Rd	Stratford	203-380-5283	
Stratford Health Department	Community Health Center	468 Birdseye St	Stratford	203-385-4090	
Stratford Health Department Mobile Dental Clinic	Community Health Center	719 Birdseye St	Stratford	203-385-4090	
Community Health & Wellness Center of Greater Torrington	Community Health Center	469 Migeon Ave	Torrington	860-489-0931	Adults
Maria Seymour Brooker Memorial, Inc.	Community Health Center	157 Litchfield St	Torrington	860-489-1328	Children & pregnant women
First Choice Health Centers	Community Health Center	3 Prospect St	Vernon		Under renovation, dental services coming soon
Staywell South End Health Center	Community Health Center	1302 South Main St	Waterbury	203-597-9044	
Staywell Health Center	Community Health Center	80 Phoenix Ave	Waterbury	203-756-8021	
Community Health Center of Waterbury	Community Health Center	51 North Elm St	Waterbury	203-574-4000	Accepting new patients
UConn Health Partners	Hospital Based Dental Clinics	65 Kane St	West Hartford	860-523-3770	Pediatric dental services only
University of New Haven	Dental Hygiene School Clinic	419 Boston Post Rd	West Haven	203-931-6028	Dental hygiene services only; does not accept Husky Health Insurance
Generations Family Health Center	Community Health Center	40 Mansfield Ave	Willimantic	860-450-7471	

