2007

Oral Health in Connecticut

Connecticut Department of Public Health

CONNECTICUT DEPARTMENT OF
PUBLIC HEALTH

CONNECTICUT DEPARTMENT OF PUBLIC HEALTH
Keeping Connecticut Healthy

ORAL HEALTH IN CONNECTICUT

2007

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Letter From the Commissioner

Dear Colleague:

The Connecticut Department of Public Health strives to promote health and reduce disease and health disparities in Connecticut through enhanced oral health and oral healthcare access. To help achieve this goal, I am pleased to present the *Oral Health in Connecticut* report.

Oral Health in Connecticut is the premier effort by the Department to document the current oral health status of residents and provide an overview of the current knowledge about the state of oral health issues in Connecticut. Data from various sources were used to define the impact of oral disease on residents. The report is intended to provide baseline data on oral health of Connecticut residents to promote appropriate interventions and policies, and facilitate monitoring of oral disease trends and improvements made in the oral health of Connecticut residents.

I invite you to partner with the Department of Public Health to address this important health issue. Together we can work to improve the overall health of Connecticut residents through improving oral health.

Sincerely,

J. Robert Galvin, M.D., M.P.H.
Commissioner

Mission Statement:
Office of Oral Public Health

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

Key Findings

Connecticut is in an excellent position to make long lasting and profound improvements in the oral health of its residents.

Oral Health Status

- Young children, particularly those in HUSKY A, Head Start, and children with special healthcare needs, may be disproportionately affected by dental disease due to limited access to dental services.
- Late detection of oral cancer due to limited oral cancer screening adversely affects long-term survival particularly for racial and ethnic minorities.
- Risk factors for poor overall health are similar to risk factors for poor oral health demonstrating the need to integrate oral health into general health programs.
- Pregnant women with oral disease may have a higher risk of poor birth outcomes.
- Cleft lip/palate ranks fourth among all birth defects.
- Oral disease trends in children, adults and special populations are not adequately collected, measured or reported.
- Ethnic minorities are disproportionately affected by oral disease in Connecticut.

Risk and Benefits

- Preventive measures such as community water fluoridation, fluoride supplements, dental sealants, and routine dental visits are effective measures in the prevention of oral disease.
- Children in HUSKY A have poor utilizations rates for routine dental services.
- Many physicians may not be aware of the fluoride supplement prescription protocols for infants and children.
- Use of non dental providers in promoting oral health as a part of general health promotes early detection and treatment of oral diseases.

Workforce and Access

- The number of actively practicing dentists is declining in the state and will further reduce access to oral health services for Connecticut residents.
- Safety net dental sites are limited in number and in their capacity to provide services to those who need them.
- The distribution of the dental workforce in Connecticut is uneven resulting in a shortage of providers in many towns.
- While the University of Connecticut, School of Dental Medicine has a pipeline project to train more culturally competent and ethnically diverse students, retaining those students to practice in Connecticut, especially in underserved areas of the state, remains a significant challenge.
- The extent of access to dental services for the medically compromised elderly, the homebound, and nursing home patients is unknown but thought to be extremely limited.
- Reimbursement rates for dental services to private providers are a major barrier to access to care for Medicaid clients.

Figures, Maps, and Tables

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Section I. Introduction

Oral Health in Connecticut is the result of the efforts of a comprehensive and diverse group of stakeholders interested in improving the overall health of Connecticut residents through the enhancement of oral health. These efforts began in 2004 with a statewide conference, "Building and Embracing a Vision of Oral Health in Connecticut". The purpose of the conference was to build a vision for improving oral health in Connecticut through a unified strategy that maximizes the use of limited resources, encourages an integrated system of care, avoids duplication and fragmentation, prioritizes service needs, and fosters culturally appropriate interventions.

Dental and non-dental providers and consumers from all over Connecticut participated in the conference along with experts from the federal government and other states. The result was the development of a Coalition for Oral Health Planning. This group used the information gained from the conference and from the resource, "Healthy People 2010: Oral Health Objectives for the Nation," along with input from consumers, medical and dental professionals, social services providers, government and non-profit agencies, and legislators, to develop the Connecticut Oral Health Improvement Plan for 2007-2012.

Additionally, a series of community focus groups were conducted around the state to gather comments on the proposed goals and objectives for the plan.

Connecticut is in an excellent position to make long lasting and profound improvements in the oral health of its residents. Recent initiatives concerning oral health in the state include the:

- allocation of $2,500,000 in state bond funds to enhance and/or expand dental safety net facilities;
- collaboration between the State Departments of Public Health and Social Services in the development of a Dental Loan Repayment Program;
- allocation of a five-year Robert Wood Johnson Pipeline Grant to the University of Connecticut School of Dental Medicine to increase underrepresented minority enrollees;
- identification of Dental Health Professional Shortage Areas within the state;
- establishment of the Connecticut Oral Health Initiative, a statewide dental advocacy group;
- establishment of a primary focus on oral health by the Connecticut Health Foundation;
- establishment of eight Oral Health Collaboratives to initiate and implement action plans to improve oral health in the towns and regions they serve;
- revision of the State Dental Practice Act to allow dental hygienists to practice independently in community based settings, get reimbursed directly for services, and administer local anesthesia;
- revision of the State Dental Practice Act to allow dental assistants to take x-rays;
- revision of the State Dental Practice Act to require that dentists receive continuing education.

Oral Health in Connecticut is a companion document to the Connecticut Oral Health Improvement Plan for 2007-2012. It is an overview of the current knowledge about the state of oral health issues in Connecticut and is intended to provide the most up-to-date data on oral health. The information contained in this document may facilitate the future monitoring of trends and improvements in Connecticut's oral health.

Section II. State Demographics

Connecticut is New England's second smallest and southernmost state. Its 5,009 square miles are bordered by the states of New York to the west, Massachusetts to the north, and Rhode Island to the east, and by Long Island Sound to the south. In the 2000 Census, Connecticut ranked twenty-ninth in population with 3.4 million people. Rankings for income, educational attainment, and healthcare expenditures, however, are more distinctive. In 2002, Connecticut ranked third nationally in median household income ($56,803 in 2003 inflation-adjusted dollars), fourth in percent of population with a bachelor's degree or more (34.6%), and fourth in personal healthcare expenditures per capita ($4,656 in 1998).[1]

Other demographic data that play a role in oral healthcare in Connecticut include:

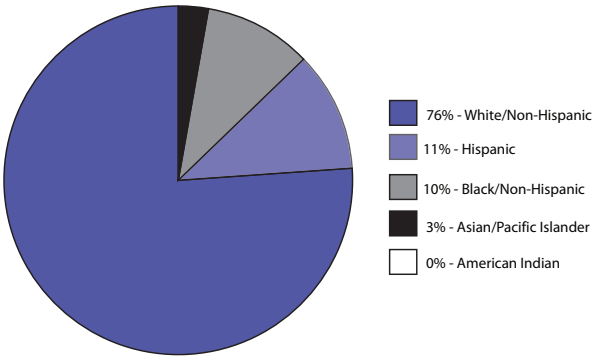
- Twenty-four percent of state residents are Hispanic, Black, or other minority group.
- Women of childbearing age (15-44 years) compose about twenty-one percent of the population.
- Twenty-one percent of the population consists of children under the age of 15 years.
- Ten percent of the population is uninsured.

A. Population Growth and Diversity

During the 1990's, Connecticut's population grew a modest 3.6 percent. As a result of changes beginning in this decade and continuing to today, Connecticut has a population that is older, more educated, and more racially and ethnically diverse. The median age rose from 34.4 years in 1990 to 37.4 years in 2000. Connecticut now ranks seventh in median age nationwide and this population-aging trend is expected to continue into the foreseeable future.[2]

Connecticut's growing racial and ethnic diversity is also reflected in the 2004 population estimates (Figure 1). Currently about 24% of Connecticut residents belong to a racial or ethnic minority, and projections indicate that by the year 2025, this percentage will rise to 31%.[3] All racial categories of the non-white population have increased, as have the Hispanic or Latino population. Asians and Pacific Islanders experienced the largest relative increase (124%) from 1990 to 2004. The largest increase in the absolute number of residents was for those of Hispanic origin (212,677 in 1990 to 371,818 in 2004).[4,5] Hispanics have overtaken non-Hispanic blacks as the state's largest minority group (Table 1).

Figure 1. Connecticut Population by Race/Ethnicity, NCHS 2004



B. Socioeconomic Status

Connecticut residents are generally well educated, have high median incomes, spend more than average on personal healthcare, and are more likely to have health insurance. However, 10% of Connecticut residents are uninsured, compared to 15% nationally.[6] Eighty-eight percent of persons 25 and older are high school graduates and 35 percent have undergraduate degrees, the fourth highest percentage nationally.[7] Although Connecticut is viewed as one of the wealthiest states in the nation, income levels are not evenly distributed across the state. Fairfield County, which borders on New York, boasts affluent towns with median household incomes in the $100,000 - $200,000 range according to the 2000 Census. On the other end of the spectrum is the city of Hartford with a median household income of $28,000.[8]

In Connecticut, 8.1% of the population

Table 1: Connecticut Racial/Ethnic Demographic Data for 1990[4] and 2004[5]

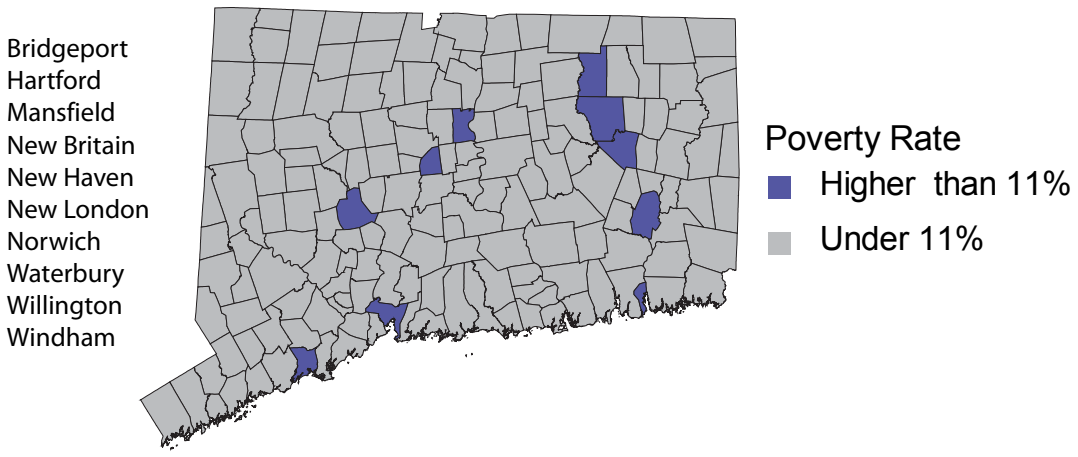
	White Non-Hispanic	Black Non-Hispanic	American Indian/ Alaska Native	Asian/Pacific Islander	Hispanic
1990	2,753,210	267,005	6,329	49,689	212,677
2004	2,677,202	333,713	9,474	111,397	371,818
% Change 1990 to 2004	-2.76%	24.98%	49.69%	124.19%	74.83%

lives below the federal poverty level compared to 12.7% of the nation's population, according to 2003 estimates from the U.S. Census Bureau's American Community Survey. Of children under the age of eighteen in Connecticut, 10.8% live below the poverty level compared to 17.3% nationally.[7] However, the picture changes when poverty rates are viewed by town. While 38 out of 169 towns have child poverty rates of less than 2%, the city of Hartford's 41.3% rate is second highest in the nation among cities with populations exceeding 100,000.[9] The cities of New Haven, Bridgeport, and Waterbury rank 29th, 72nd, and 84th with rates of 32.6%, 25.1%, and 23.9%, respectively. According to the U.S. Census, half of those persons living in poverty in Connecticut were concentrated in the ten cities or towns with the highest poverty rates and only about 20% of the state's overall population. Map 1 identifies the areas of the state with the highes concentrations of persons in poverty, a population group that has significant healthcare needs.

Having some of the wealthiest as well as some of the poorest cities in the nation has earned the state the title of the "Two Connecticuts".

Map 1. Connecticut Poverty Rates by Town, 2000 Census

Ten Towns with the Highest Poverty Rates *



* These ten towns account for 20% of the population but 50% of persons in poverty.

Section III. Oral Health Status

The "Two Connecticuts" demographic profile referred to in the previous section is evident in the oral health status of the state's residents. Those who are affluent, well educated, and non-minority are more likely to have fewer obstacles to good oral health. The most vulnerable populations, including the elderly, poor, uninsured, racial and ethnic minorities, disabled, and those challenged by transportation barriers, face significant oral health problems in, including tooth decay and periodontal (gum) disease. These preventable oral diseases can also act as a focus of infection which can influence the outcomes of serious health problems such as cardiovascular disease, diabetes, and pre-term low birth weight. As a result, oral diseases place a significant burden on the healthcare system in Connecticut and on the public in terms of pain, suffering, poor self-esteem, cost of treatment, and lost productivity in school and at work.

Oral diseases can also affect individuals across their lifespan. Nationally, 1 in 6 children (17%), aged 2 to 4 years are affected by tooth decay. Over 50% of eight year olds and 78% of seventeen year olds in this country are affected by tooth decay. The heaviest burden of tooth decay falls on children from low-income families and on racial/ethnic minorities, with up to 80% of their decay being untreated. Children are not the only ones affected. Ninety six percent of adults and 99% of seniors age 65+ have experienced dental decay. Two in five seniors (44%) have lost their teeth due to decay and periodontal disease. Annually, more that 30,000 Americans are diagnosed with oral and pharyngeal cancer and approximately 8,000 die each year.[10]

A. Dental Caries in Connecticut

Dental caries is a progressive, cumulative, infectious oral disease process. Bacteria (plaque), if not removed daily from teeth, produce acid that breaks down the tooth structure and causes cavitations (cavities) in the teeth. This oral disease process can lead to nerve destruction in the tooth, tooth loss, abscess, and systemic infection. Figure 2 shows primary (baby teeth) dentition with brown and black decayed tooth structure. Figure 3 shows facial swelling on the cheek and under the eye of a child as a result of a carious infection.

Figure 2. Dental Caries in the Primary Dentition

Figure 3. Facial Swelling Due to Dental Caries

The prevalence of dental caries in children and adults in Connecticut is not well known. In 1997, a small open mouth survey of second graders found 57% had caries experience and 40% of those had active, untreated cavities.[11] These data, however, were not representative of second grade children statewide and so could not be generalized to this population.

Utilization of dental services sometimes can be used as surrogate data for caries prevalence. According to data on dental utilization from HUSKY (Healthcare for Uninsured Kids and Youth) A, 13% of preschool children aged 3 to 5 had a "treatment visit" in 2004. For school-aged children 6 to 14 years old, 24% had a dental "treatment visit" within the past year.[12] It is likely that most of these treatment needs were due to dental caries, thus providing a perspective on the extent of tooth decay in a subset of Connecticut's children.

However, such dental utilization data paints a narrow picture of the oral health status or caries experience in Connecticut and may not be generalizable to the population of all children in the state. The HUSKY B program included only about 16,579 children as of 2006, while the Medicaid Managed Care Program HUSKY A covers a more sizable number of children (204,394).[12] It is also notable that only a fraction

of those children eligible under these programs receive oral healthcare.

Further information on dental caries in preschool children comes from Connecticut's Head Start programs. Head Start programs are mandated by federal statute to provide healthcare assessments, including oral health, for the children participating in their programs and to assist parents in obtaining services to address their healthcare needs. In Connecticut, the Head Start programs collect information yearly on children aged 2 to 5 regarding their health and dental insurance status. The programs also collect information on the number of children who receive dental examinations and preventative services, as well as on the number of children who are in need of dental treatment as compared to those who actually receive treatment.

A 2005 report of health services for Head Start programs in Connecticut showed that 1,310 or 16 percent of Head Start children needed dental care, likely for the treatment of dental caries. In this same group of children, 767 or 9% were reported having asthma. Of the children in need of dental care, 904 (69%) received dental services. The Head Start programs also collected information regarding the childrens' medical or dental homes. The concept of a child having a medical or dental home suggests that there is a continuous, accessible source of healthcare for the individual. Most Head Start children had a medical home (99%), while only (79%) had a dental home.[13]

Regarding school-age children, the majority of school districts in Connecticut do not provide dental services (81%). The State Department of Education, however, annually surveys school nurses on dental health problems of students. In the 2004-2005 school year, 21 percent of elementary students were referred to dental providers by the school nurse for immediate oral health needs.[14] Specifics on the type of dental disease were not collected, although caries is the most prominent chronic childhood disease.

School-based and school-linked dental clinics provide oral health services to school-aged children. Data on services provided and the oral health status of school children in these programs are not uniformly or centrally collected, so the degree of caries experience in these settings is not known.

The extent of dental caries in adults has also not been identified. However, the Connecticut Behavioral Risk Factor Surveillance System (CTBRFSS), an ongoing telephone survey of adult residents 18 years of age and older, provides data on health behaviors, risk factors, and health conditions. Data on caries experience, periodontal disease, and gingivitis are not collected currently. Data on tooth loss from dental caries and/or periodontal disease, dental visits, access to dental services, and annual dental cleanings are collected through the CTBRFSS.

The limitations of data collected in this way include the underreporting of oral health conditions, the reliance on self-reports and people's perceptions of their personal oral health status, and the exclusion of residents without telephones. In addition, children at the elementary school and pre-school age are not the focus of this telephone survey.

Dental caries experience remains one of the primary indicators of oral health. The presence of this ongoing active infectious disease process and its relationship to the overall health of Connecticut residents needs further study. The lack of information on dental caries in children and adults, including socioeconomic variables such as income, race, and ethnicity, continues to hinder the ability to target scarce oral health resources and control the spread of the disease process.

B. Periodontal Disease in Connecticut

Periodontal disease, the progressive destruction of the supporting structures of the teeth, is caused by a chronic bacterial infection of the gums. According to the Surgeon General's report on oral health in America, periodontal

disease progresses as one ages, is more prevalent in men than women, and, across every age group, disproportionately affects those who are poor or who are racial/ethnic minorities.[10] The infectious oral disease of the periodontia (gums, ligaments, and bone) is linked to a number of chronic and acute health disorders as well as to tooth loss.

Tooth Loss and Periodontal Disease

Despite an overall trend toward a reduction in tooth loss in the U.S. population, not all demographic groups have benefited equally. Women tend to have more tooth loss than men of the same age group. African Americans are more likely than whites to have tooth loss. The percentage of African Americans who have lost one or more permanent teeth is more than three times greater than the rate for whites. Among all predisposing and enabling factors, low educational level has been found to have the strongest and most consistent association with tooth loss.[15]

In comparison to all states, Connecticut adults rank first in the nation in keeping their natural teeth according to the CTBRFSS. In a survey of Connecticut adults aged 18 and older, 3.5% reported that all of their natural teeth had been removed. Among adults aged 65 and older, only 12.4% reported the removal of all their natural teeth in comparison to the national average of 21.2%. Women (4.3%) were more likely than men (2.7%) to have total tooth loss, and whites (3.7%) were more likely than African Americans (2.4%) and Hispanics (3.0%) to have total tooth loss. For those who did not suffer total tooth loss, 14.2% of African Americans and 6% of Hispanics reported 6 or more teeth missing, as compared to 10% of whites.[16] Also, Connecticut adults with higher income and education levels are less likely to have had all of their teeth removed (Figures 4 and 5). In Connecticut, adult smokers sho have been told by a healthcare provider that they have high blood pressure or diabetes are more likely to have had one or more teeth removed (Figure 6).

Loss of permanent teeth is most likely the result of a progressive oral disease, such as periodontal disease and dental caries. Injury to the mouth and teeth as well as orthodontic care can also result in tooth loss.

Systemic Health and Periodontal Disease

Periodontal disease has been associated

Figure 4. Percent of CT Adults Who Have Had All of Their Permanent Teeth Removed by Level of Education, BRFSS 2004

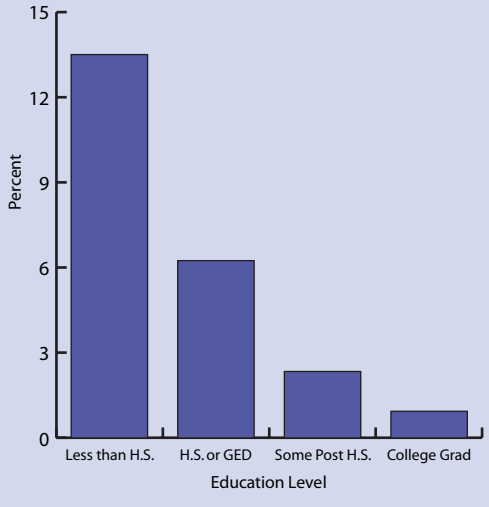
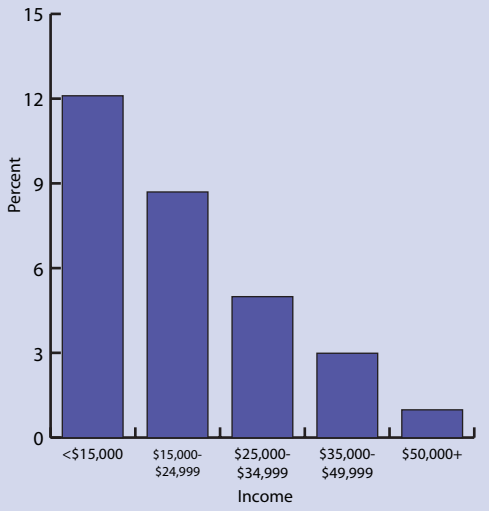


Figure 5. Percent of CT Adults Who Have Had All of Their Permanent Teeth Removed by Income, BRFSS 2004



with diabetes, cardiovascular disease, and preterm low birth weight.[10, 17]

Diabetes

In Connecticut, 6% of the adult population has been diagnosed with diabetes. A greater number remain at risk for diabetes or are undiagnosed. Periodontal disease can cause a release of bacteria in the blood stream (bacteremia) leading to an increase in blood sugar. This could make diabetes more difficult to control and increase the risk for diabetic complications.[17] Conversely, diabetes, if left uncontrolled, may result in periodontal disease, significant bone loss around the teeth, and tooth loss. Seventy percent of diabetics in Connecticut reported tooth loss in the 2004 CTBRFSS.[16]

Cardiovascular Disease

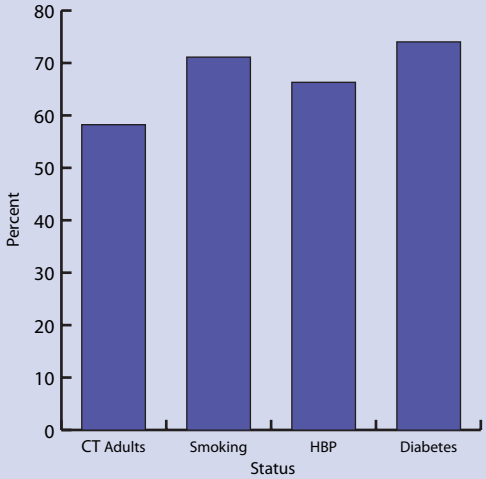
Cardiovascular disease (CVD) is the number one cause of morbidity and mortality in Connecticut, accounting for 42 % of annual deaths and 23% of hospitalizations. Known risk factors for CVD only account for about two-thirds of the incidence of all cases. Systemic periodontal infection has been linked to an increased risk of heart disease.[18] Research is still needed to determine if a true cause and effect relationship exists.

Pre-term birth and low-birth weight infants

Pre-term birth and low-birth weight are considered the leading perinatal problems in the United States. Pre-term births (before 37 weeks gestation) account for 6% to 9% of all births.[19] Pre-term and low birth-weight babies may face serious health issues and are at higher risk of long-term disabilities. Despite widespread use of drugs to arrest pre-term labor, there has been no decrease in the incidence of low birth-weight or preterm infants in the last 30 years. It is estimated that over 25% of pre-term, low birth-weight infants occur without any known risk factors.[20]

In 2003, there were 42,826 live births in Connecticut. Of these, 3,229 (7.6%) were low-birth-weight and 3,951 (9.3%) were pre-term.[21] The average total cost (in 2004) to care for a low-birth weight baby was $48,125. This average cost has increased from $31,092 in 2000 and represents an annual expenditure of over $132 million in Connecticut.[22] This number does not include the healthcare costs beyond the initial hospitalization or for treatment of disabilities with lifelong implications.[20]

Figure 6. Percent of CT Adults Who Had One or More of Their Permanent Teeth Removed by Smoking Status, High Blood Pressure, and Diabetes; BRFSS, 2004



Recent research has demonstrated maternal periodontal disease increases the relative risk for preterm or spontaneous preterm births,[23,24] and that pregnant women with periodontal disease are 7 times more likely to give birth to low-birth weight infants.[25]

Of additional concern is the presence of periodontal disease in a pregnant woman with preeclampsia. Preeclampsia is a disorder that occurs only during pregnancy and the postpartum period and may affect both the mother and the unborn baby. Affecting at least 5-8% of all pregnancies in the state, it is a rapidly progressive condition characterized by high blood pressure and the presence of protein in the urine.[26]

A 2002 study's results suggest that mothers with preeclampsia may be at greater risk for preterm delivery if periodontal disease is present

early in pregnancy or has progressed during pregnancy.[27] Other studies have shown that mothers with preeclampsia who were treated for periodontal disease during pregnancy were less likely to give birth prematurely to low-birth-weight babies.[28]

While these studies suggest that there is a link between the presence of periodontal disease during pregnancy and low-birth-weights or preterm birth outcomes, to date there has not been conclusive evidence that it is a direct causal effect. A study of pregnant women published in 2006 found that while periodontal disease treatment was effective at reducing this oral disease, it did not significantly affect the rate of pre-term birth or low birth weights.[29] Further study is needed to determine a definitive cause, but, if the connection can be made, periodontal disease is a potentially modifying factor that can be treated and managed to improve overall health and reduce healthcare costs.

C. Cancer of the Oral Cavity and Pharynx in Connecticut

Cancer of the oral cavity and pharynx includes cancers that develop in any part of the oral cavity including the lip, tongue, salivary glands, floor of the mouth, nasopharynx and hypopharynx. In 2003, 388 residents in Connecticut were diagnosed with cancer of the oral cavity and pharynx. Seventy-nine deaths resulted from these cancers. The tongue (Figure 7) was the most frequent site of oral cancers for cases reported in 2003 among Connecticut residents. Similar to national statistics, cancer of the oral cavity and pharynx is diagnosed in Connecticut more frequently among males than females and among blacks than whites.[30] Based on national rates from 2000-2002, 1 in 99 men and women will be diagnosed with cancer of the oral cavity and pharynx during their lifetime.[31]

Figure 7. Cancer of the Tongue

Table 2. Age Adjusted Incidence* of Cancer of the Oral Cavity and Pharynx by Gender/Race 1999-2003

	Other SEER Registries		CT	
	N	Rate	N	Rate
Male				
All Races	8020	15.7	1236	15.0
White	6398	15.7	1122	14.9
Black	863	18.4	93	17.4
Female				
All Races	3959	6.5	640	6.2
White	3137	6.5	578	6.1
Black	386	6.3	47	6.7

* Incidence rates are per 100,000 persons and age adjusted to the 2000 U.S. standard population.

Connecticut has a similar incidence (number of new cases) of oral and pharyngeal cancer when compared to the United States. The Connecticut Tumor Registry is part of the National Cancer Institute's (NCI's) SEER (Surveillance, Epidemiology and End Results) Registries. The registries use consistent standards for ascertainment and follow up of cases. Therefore, the age adjusted incidence rates for Connecticut for 1999 – 2003 have been compared with the other registries.[32]

Table 2 demonstrates that, overall, the rate of new oral cancers is higher for males than females and higher for blacks than whites. The Connecticut incidence rate (new cases of cancer) for white males was lower than that observed in the other registries; however, this difference was not statistically significant.

The oral cancer incidence rates for 1999 –2003 were examined by county in Connecticut. The lowest rates for both males and females were found in Tolland County. The highest rate for males was found in New London County,

while the highest rate for females was found in Fairfield County. None of the differences in oral cancer incidence rates among counties were statistically significant, and the small number of cases by county makes it difficult to interpret these rates.

Both the incidence and mortality rates for cancer of the oral cavity and pharynx have decreased over time. Nationally, for both males and females of all races, the incidence for oral and pharyngeal cancers decreased 1.2% between 1981 and 2003, while the mortality rate decreased 2.5% between 1991 and 2003.[31]

Oral and pharyngeal mortality rates for 1998-2002 are found in Table 3 for the United States and Connecticut. The mortality rates in CT are generally similar to that found in the other SEER registries and the entire U.S.[32] The mortality rate for black males in CT was higher than that observed in the other SEER registries, but the difference was not statistically significant.

The relative survival rate estimates the effect of cancer by comparing the survival of cancer patients to that of the general population. The five-year survival rate is related to the site of the cancer.

Figure 8 contains the five-year survival rates of various cancer sites for Connecticut residents. The five-year survival rate for cancer of the oral cavity and pharynx is lower than that seen for all the other cancers except for lung cancer. The five-year survival rate is also lower than that seen for all invasive cancers.

In Connecticut, males have a higher incidence of cancer of the oral cavity and pharynx and also a poorer survival rate than females (Figure 9). This is true for both whites and blacks. When comparing the survival of Connecticut residents to residents in the other registries, white males and females and black

Table 3. Age Adjusted Mortality* of Cancer of the Oral Cavity and Pharynx by Gender and Race 1998-2002

	Other SEER Registries		CT	
	N	Rate	N	Rate
Male				
All Races	1848	3.9	298	3.8
White	1373	3.6	258	3.5
Black	238	5.6	37	7.8
Female				
All Races	1000	1.6	147	1.3
White	793	1.6	137	1.3
Black	110	1.9	9	1.4

* Mortality rates are per 100,000 persons and age adjusted to the 2000 U.S. standard population.

Figure 8. Five Year Relative Survival Rates for CT SEER Registry for Various Cancer Sites by Race, 1995-2001

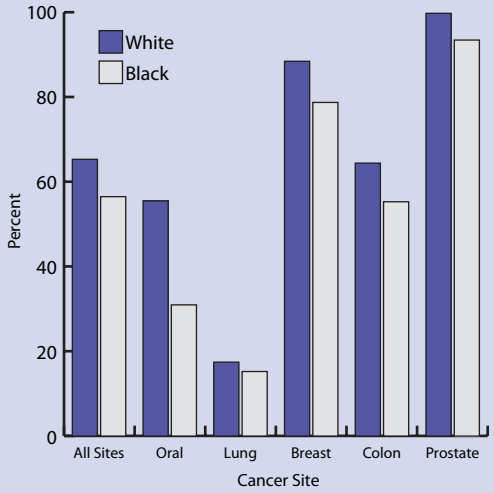
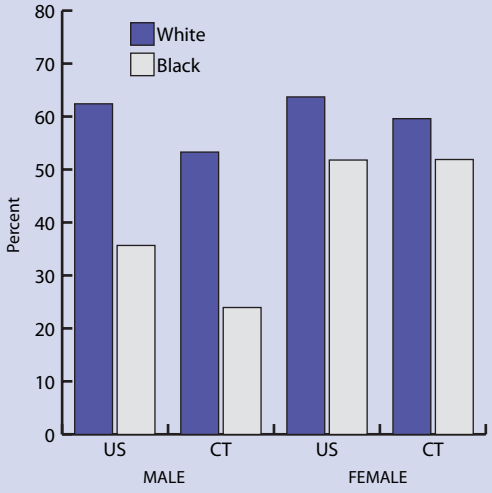


Figure 9. Five Year Relative Survival Rates for Oral/Pharyngeal Cancer by Race/Gender, CT and Other SEER Registries, 1995-2001



males in Connecticut had lower relative survival rates than the corresponding demographic groups in the other registries combined. The relative survival rate for black females in Connecticut was similar to the rates in the other registries (Figure 9).

In general, cancer survival is enhanced by early diagnosis. Whites in Connecticut are more likely to be diagnosed in the early stage of cancer of the oral cavity and pharynx than blacks. Figure 10 shows the stage of diagnosis for cancer of the oral cavity and pharynx for Connecticut males and females compared with the other registries. This indicates that a similar percentage of blacks were diagnosed in the localized stage in both Connecticut and among other registries while a higher percentage of whites in the other registries were diagnosed in the localized stage compared to Connecticut. This suggests that early identification of cancer of the oral cavity and pharynx may increase the survival of those with these conditions in Connecticut.

Although there is only scant evidence supporting a role for screening, there is some support that routine annual oral examination may lead to a shift in the proportion of patients diagnosed with early-stage disease. This would be especially true for those at high risk due to socioeconomic status, and tobacco and alcohol use.

The American Cancer Society recommends that primary care physicians and dentists examine the mouth and throat as part of a routine cancer-related check-up.[33]

D. Cleft Lip and Cleft Palate in Connecticut

When the lip or the palate fails to fuse or join during gestation, a cleft in the lip and/or palate results. According to the March of Dimes, approximately 1 in 1,000 babies are born each year with a cleft lip or palate. This is more frequent than metabolic disorders (1 in 3,500) and spina bifida (1 in 5,000), and less frequent than heart defects (1 in 125).[34] Unlike these disorders, cleft lip/palate is not generally life threatening. Cleft lip and/or palate is more likely to occur in boys than girls, in multiple births than in single births, and in Asian populations. It is least likely in African Americans.

In Connecticut, the rate of cleft lip and/or cleft palate is approximately 1 in 2,200, based on defects reported on birth records for 2000-2004. This ranks cleft lip/palate 4th among birth defects in Connecticut. Between 2000 and 2004, the number of cleft birth defects ranged from 15 to 24 per year (Figure 11). Connecticut cleft lip/palate rates were consistently lower than comparable annual U.S. rates by 25% to 50% for 2000-2003. Consistent with the national data, more cleft birth defects occurred in boys (62%) than girls (38%). Cleft defect rates did not differ significantly by race/ethnicity in Connecticut. The causes of clefts are not clear. Environmental factors (for example, certain drugs), genetic factors, and maternal illness may be linked with clefts.

While these data on the oral health status of residents is the most current to date, much information is still lacking. Oral disease trends in children, adults, and special needs populations are not adequately collected, measured or reported in Connecticut.

Figure 10. Stage of Diagnosis for Cancer of the Oral Cavity and Pharynx by Race, CT and Other SEER Registries, 1998-2002

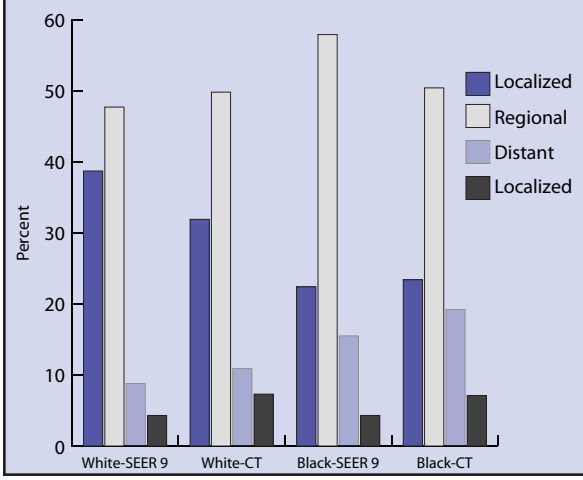
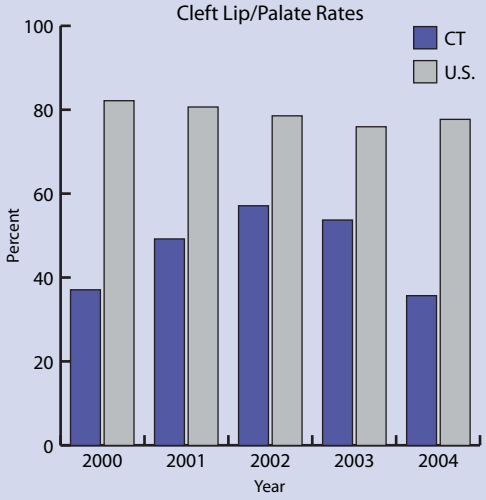


Figure 11. 2000-2004 Congenital Abnormalities: Cleft Lip/Palate Rates



Section IV. Risk and Protective Factors

A number of factors, both beneficial and detrimental, that influence oral health status. Tobacco, with or without alcohol use, is a major contributor to oral diseases, particularly oral cancer. Poor oral hygiene, poor nutrition, and inadequate dental care-seeking behaviors negatively impact oral health. There are also a number of known protective factors which can be significant in combating oral diseases, including regular dental visits, fluoridation, dental sealants, and good oral hygiene practices.

A. Tobacco and Alcohol Use in Connecticut

Tobacco use accounts for between 80-90% of oral cancers, and all forms of the substance have been implicated, including cigarettes, cigars, pipes, and chewing tobacco. Pipe smokers are prone to cancer of the lip. The chewing of smokeless (SML) or spit tobacco, which contains 28 known cancer-causing agents (carcinogens)[35], is responsible for a fourfold increase in the risk for oral cancers.[36, 37]

The use of tobacco and alcohol in combination produces a much greater risk for oral cancer than either substance alone. One pack of cigarettes a day increases the risk for oral cancer 4.5 times; 6-9 alcoholic drinks a day increases the risk 15 times; but tobacco and alcohol combined increases the risk for oral cancer up to 100 times. This amplification of risk may due to the actions of alcohol as a solvent, which might facilitate the effects of tobacco by making it easier for carcinogenic agents to penetrate the oral tissues.[38]

There are a number of other oral health problems strongly associated with the use of tobacco, particularly the smokeless variety. Leukoplakia, a lesion of the soft tissue of the mouth consisting of a white patch that cannot be scraped off, is common, as is bad breath,

Figure 12. Effects of Tobacco on the Dentition

tooth discoloration, tooth abrasion (wearing away of tooth enamel), tooth sensitivity, and periodontal (gum) destruction. The incidence of tooth decay is also increased, as sugar is usually added to smokeless tobaccos to improve the taste (Figure 12).

When compared to national statistics, in 2005 Connecticut residents were less likely to report cigarette smoking. For the past 10 years, the adult smoking rate has generally been lower in Connecticut as compared to the U.S. average (Figure 13).

In Connecticut, 16.5% of adults smoke cigarettes, which represents about 440,000 residents. The rate of cigarette smoking has dropped significantly since 2000, when the rate was 19.9%. Of those who currently smoke, 12.4% smoke daily.

The highest smoking rates in Connecticut are found among 25 to 34 year old adults, low-income persons (<$50,000 per year), those with less education, the unemployed, and the uninsured. In Connecticut, although it appears that white adults are less likely than black and Hispanic adults to smoke, the differences between races are not statistically significant (16%, 22%, and 18% respectively) (Figure 14).

Current use of smokeless tobacco among adults in Connecticut is negligible; in 2003, 1.6% of men and almost no women (0.8%) reported using smokeless tobacco. Overall, nearly 1 in 10 Connecticut adults have used smokeless tobacco at some point during their lifetime.

In 2005, a total of 37,300 public middle and high school students in Connecticut were current cigarette smokers. Overall, 5.9% of middle school students and 17% of high school students smoked cigarettes. The highest rate was found among students in grade 12 (27.7%) (Figure 15). Cigarette smoking increased 30-fold from 0.9% in grade 6 to 27.7% in grade 12.

By race/ethnicity in middle school, Hispanic students are more likely than white and black students to smoke; however, the differences were not significant. In high school, however, white students are significantly more likely than black and Hispanic students to smoke cigarettes (Figure 16).

In 2000, frequent smokeless tobacco use among Connecticut middle and high school students was the lowest in the nation (0.4% and 0.5%, respectively). In 2005, rates of smokeless tobacco use by middle and high school students remained lower than rates for students nationally.

Several groups in Connecticut are considered to be particularly at risk for negative oral effects of smoking. The populations include adults with low income (<$25,000 per year), those in fair or poor health, the uninsured, those who were unable to see a physician or dentist in the past year due to cost, those without a regular physician or dentist, the unemployed, the

Figure 13. Current Cigarette Smoking Rates Among Adults in CT and the United States by Year, BRFSS 2005

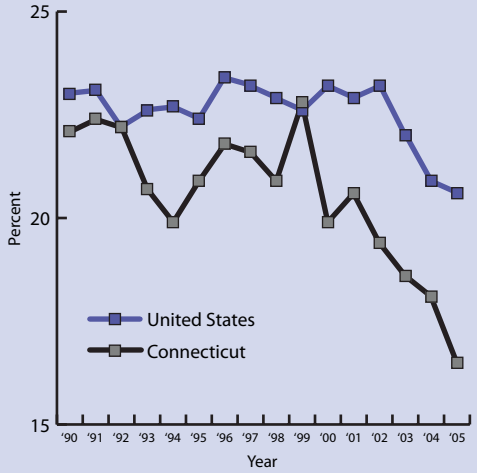


Figure 14. Current Cigarette Smoking Rates Among Adults in CT by Race/Ethnicity, BRFSS 2005

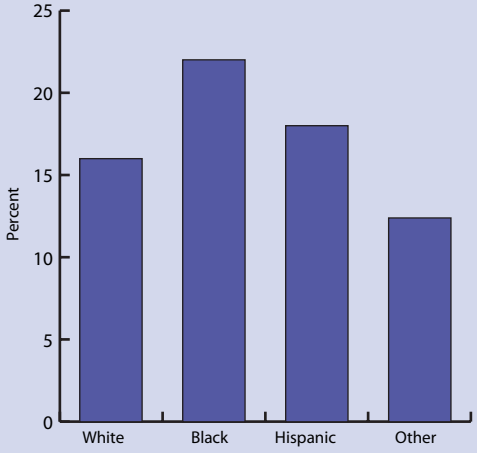


Figure 15. Current Cigarette Smoking Rates Among Students in CT by Grade, CSHS 2005

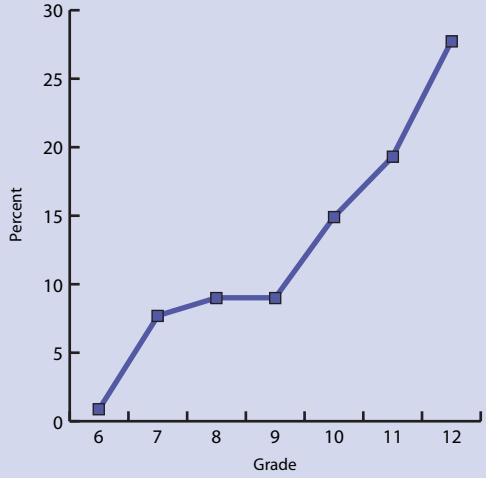
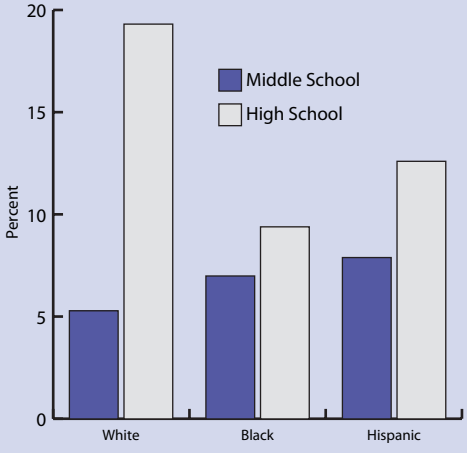


Figure 16. Current Cigarette Smoking Rates Among Students in CT by Race/Ethnicity and School Type, CSHS 2005



disabled, and those reporting 14 or more days of poor mental health in the past month (Figure 17). These situations may create circumstances conducive to smoking or may present barriers to smoking cessation. Adults in each of these groups had significantly higher rates of current smoking than their counterparts who were not included in the group.

Tobacco and alcohol are significant risk factors for poor oral health. Opportunities for initiatives such as the integration of tobacco use prevention strategies in dental offices, the introduction of dental safety nets, and the inclusion of state and local oral health promotional activities are important to the overall health and wellness of Connecticut residents.

B. Community Water Fluoridation in Connecticut

Community water fluoridation is the process of adjusting the natural fluoride concentration of a community's water supply to a level that is best for the prevention of dental caries. In the United States, community water fluoridation has been the basis for the primary prevention of dental caries for 60 years and has been recognized as one of 10 great achievements in public health of the 20th century. It is an ideal public health method because it is effective, safe, and inexpensive; it requires no individual behavioral changes; and it does not depend on the access or availability of professional services. Water fluoridation is equally effective in preventing dental caries among different socioeconomic, racial, and ethnic groups. Fluoridation helps to lower the cost of dental care and helps residents retain their teeth throughout life.[15]

Fluoride is present in small but widely varying amounts in practically all soils, water supplies, plants, and animals, and thus is a normal constituent of all diets. All public water supplies in this country contain at least trace amounts of natural fluoride.

Strong evidence now exists that water fluoridation aids in the remineralization of the tooth, thus actually reversing the decay process after it already has begun. In addition, fluoride may also make teeth more resistant to bacterial acids and inhibit the growth of certain kinds of bacteria that produce these acids. However, excessive fluoride consumption can cause mottled enamel or fluorosis (i.e. whitish or brownish spots on teeth). Dental fluorosis results from the ingestion of high levels of fluoride during tooth development in children less than 8 years old. Some people who drink water that contains fluoride in excess of the 4.0 milligrams per liter (mg/l) maximum contaminant level over many years may develop skeletal fluorosis that can cause pain and tenderness in the bones.

Public water systems in Connecticut serving 20,000 or more people are required by regulation to add fluoride to the water, maintaining an optimal fluoride content between 0.8 mg/l and 1.2 mg/l. For Connecticut, the most benefit to oral health is achieved when waters are fluoridated to 1.0 mg/l.

In Connecticut, there are 33 public water systems that adjust their fluoride levels and some of these water systems sell their fluoridated water to other public water systems in the state. Connecticut is fortunate to have an additional 30 public water systems that are considered naturally fluoridated (0.8 –1.2 mg/l).

In 2004, 88% of the population of Connecticut, or 2,381,133 persons, received fluoridated water (Map 2). However, the 12% of the population that does not have community water fluoridation is scattered across more than 75 towns in Connecticut. These small communities are often served primarily by private well systems. The level of fluoride in these wells is not generally known. Homeowners must test their well water for fluoride levels. They are often unaware of the optimal levels of fluoride needed for oral health and do not usually know when it may be appropriate to ask their dentist or physician about fluoride supplements for their

Figure 17. Current Cigarette Smoking Rates Among Vulnerable Adult Populations in CT, BRFSS 2003

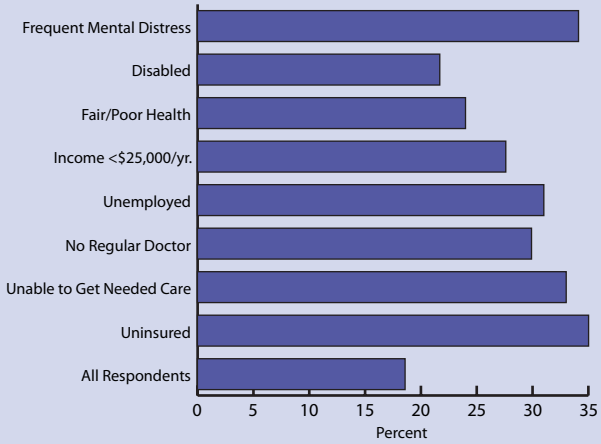
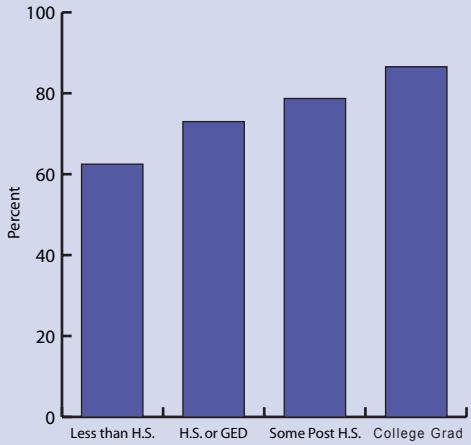
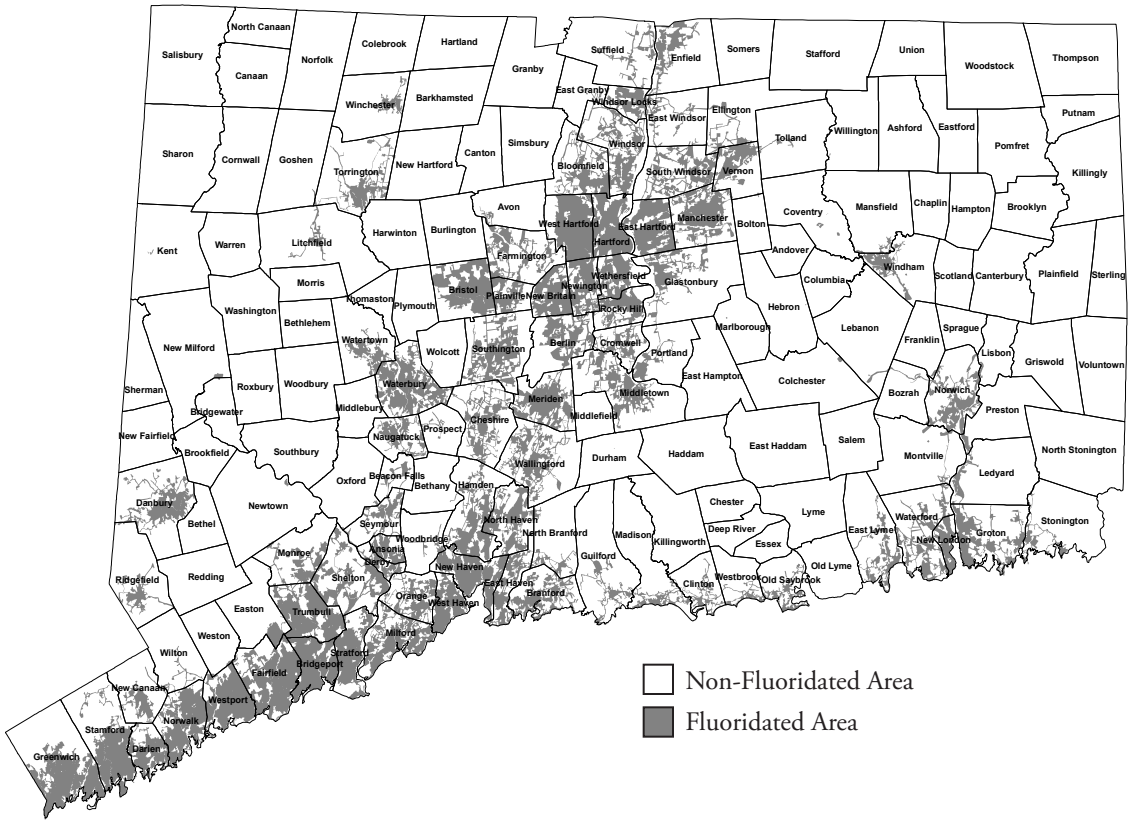


Figure 18. Percent of CT Adults Who Have Visited a Dental Clinic or Dentist within the Past Year by Education, BRFSS 2004



Map 2. Fluoridated Public Drinking Water



children. Furthermore, these communities are often the same ones that have limited access to private dental providers and/or dental safety net providers. Many physicians may not be aware of the fluoride supplement prescription protocols for infants and children. Childhood caries is the most common infectious disease in children that can be prevented. Pediatricians who routinely inquire about fluoride consumption and prescribe fluoride supplementation as needed can greatly reduce the occurrence of this common chronic infection in children.

C. Preventive Dental Visits in Connecticut

Maintaining good oral health requires consistent effort on the part of the individual, caregivers, and healthcare providers. Daily oral hygiene routines and healthy lifestyle behaviors play an important role in preventing oral diseases. Regular preventive dental care can reduce the development of disease and facilitate early diagnosis and treatment. One measure of preventive care is the percentage of adults who had a dental visit or teeth cleaning in the past year. Having one's teeth cleaned by a dentist or dental hygienist is indicative of good preventive behaviors.[15]

According to the Connecticut Behavioral Risk Factor Surveillance System, Connecticut ranks first in the nation in visits to a dental clinic or dentist. Of all adults aged 18 and older, 80.6% reported having visited a dental clinic or dentist within the past year, as compared to 70.2% nationally. Seventy-eight percent had a visit to a dentist or hygienist for teeth cleaning within the past year.

In Connecticut, the likelihood of having visited a dental clinic or dentist within the past year is associated with both income and education (Figures 18 and 19).

Those with higher education and higher income are more likely to have visited a dental clinic or dentist within the past year. Hispanics and African Americans are less likely to have visited a dental clinic or dentist within the past year (Figure 20).

Overall, 10 percent of Connecticut adults reported that cost prevented them from visiting the dentist in the past year. This percentage was higher for minorities, those with less than a high school education, and those with lower income (Figure 21). Twenty four percent of Hispanics reported cost as a barrier compared to 16 percent of African Americans and 7 percent of whites (Figure 22).

Very little is known about the dental visits of those who are disabled, homebound, or living in nursing homes. Because these groups are usually medically compromised, have complex medical conditions, and are not ambulatory, their access to routine dental care and preventive dental services is limited. Furthermore, dental providers who are knowledgeable and willing to provide services to these adult populations are scarce.

Utilization of dental services by children who receive dental benefits through public dental insurance (Medicaid/HUSKY Program) has been monitored since 1998. Less than half of children aged 3 to 19 enrolled in HUSKY A received any dental care in a one-year period (Table 4).[39] Only one in five children had treatment for oral disease. Very few children (5% or fewer each year since 2000) under 3 years of age received dental care and even fewer (less than 3% a year) had preventive care.[40]

Table 4. Children Continuously Enrolled in HUSKY A for 2004 with Dental Care Services

Number of continuously enrolled children 3-19	98,652 (100%)
Had any dental care	69,419 (47%)
Had preventive care	58,684 (40%)
Had treatment	30,676 (21%)

There has been little change in the percentage of children in HUSKY A receiving dental services between 1998 and 2004. However, Figure 23 hides the fact that the absolute number of children enrolled in HUSKY A has increased over this period of time.

Figure 19. Percent of CT Adults Who Have Visited a Dental Clinic or Dentist within the Past Year by Income, BRFSS 2004

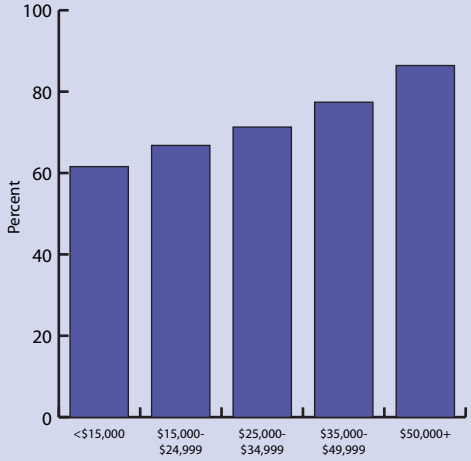


Figure 20. Percent of CT Adults Who Have Visited a Dental Clinic or Dentist within the Past Year by Race/Ethnicity, BRFSS 2004

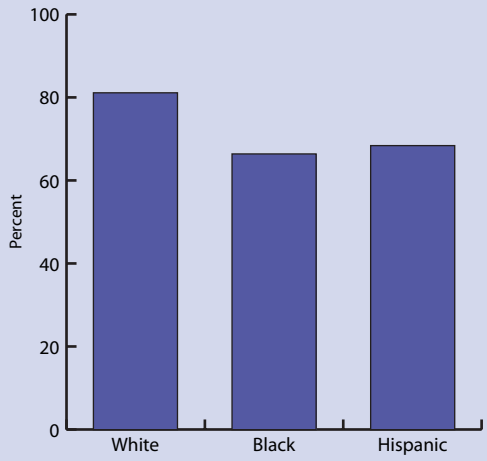


Figure 21. Percent of CT Adults Who Reported Cost Prevented a Dental Visit within the Past Year by Income, BRFSS 2004

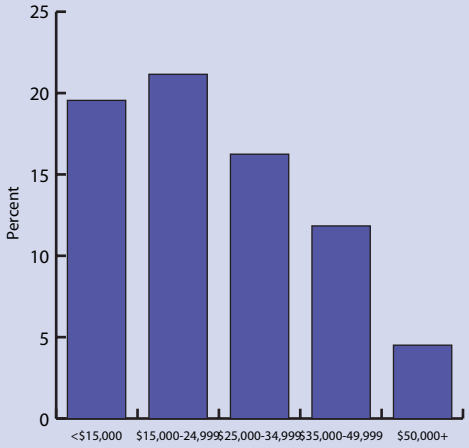


Figure 22. Percent of CT Adults Who Reported Cost Prevented a Dental Visit within the Past Year by Race/Ethnicity, BRFSS 2004

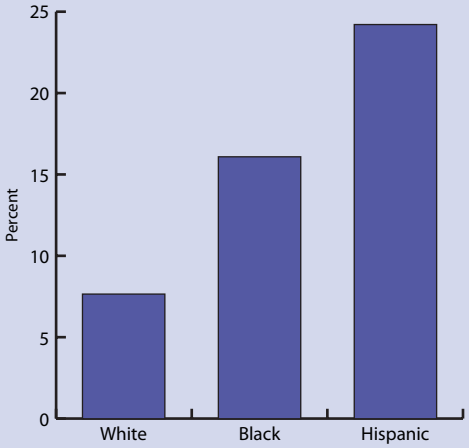
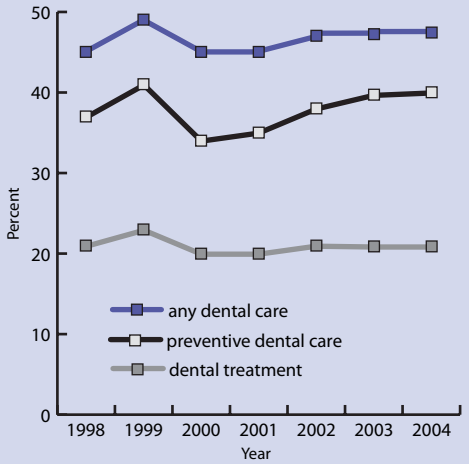
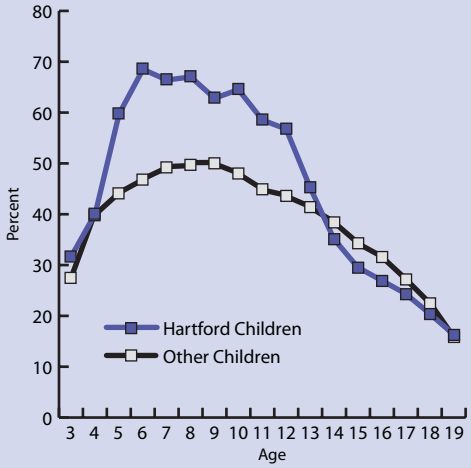


Figure 23. Trends in Dental Care for Connecticut Children in HUSKY A from 1998-2004



Source: CT Voices for Children Analysis of CT Department of Social Services Data

Figure 24. Preventive Dental Care for Children Age 3-19 in HUSKY A, 2005



Source: CT Voices for Children Analysis of CT Department of Social Services Data

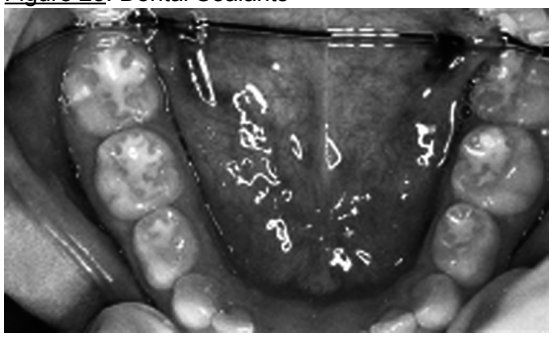
Preventive dental care utilization rates typically vary greatly, depending on sociodemographic and enrollment factors. The effect of these factors on utilization is evidenced by the significantly higher preventive care and treatment rates for children living in Hartford as compared to the rates for other Connecticut children (Figure 24). The rate increase for Hartford children begins upon school entry and persists through middle school age. This difference in utilization of dental services is related to the increased access to care afforded by public school-based dental clinics in Hartford's elementary and middle schools.

Routine dental visits are effective means of early disease detection, of providing preventive education, of initiating interventions, and of reducing the overall cost of care and morbidities associated with dental disease. Connecticut residents who are poor, who are ethnic minorities, and who have less education are less likely to receive routine dental care.

D. Dental Sealants in Connecticut

Since the early 1970s, the incidence of childhood dental caries on smooth tooth surfaces (those without pits and fissures) has markedly declined because of widespread exposure to fluorides. Most decay among school age children now occurs on tooth surfaces with pits and fissures, particularly the molar teeth.

Figure 25. Dental Sealants



The use of pit-and-fissure dental sealants (Figure 25) — plastic coatings bonded to susceptible tooth surfaces — has been approved for many years and has been recommended by professional health associations and public health agencies. The first permanent molars erupt into the mouth at about six years of age. Placing sealants on these teeth shortly after their eruption protects them from the development of caries in areas of the teeth where food and bacteria are retained. If sealants were routinely applied to susceptible tooth surfaces, in conjunction with the appropriate use of fluoride, most tooth decay in children could be prevented.[15]

Second permanent molars erupt into the mouth at about age 12 to 13 years. Pit-and-

Figure 26. Percent of CT Adults Reporting Children in Household Age 6-15 with Dental Sealants by Race/Ethnicity, BRFSS 2004

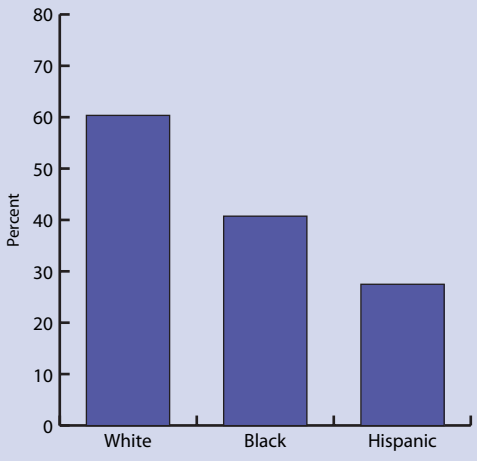
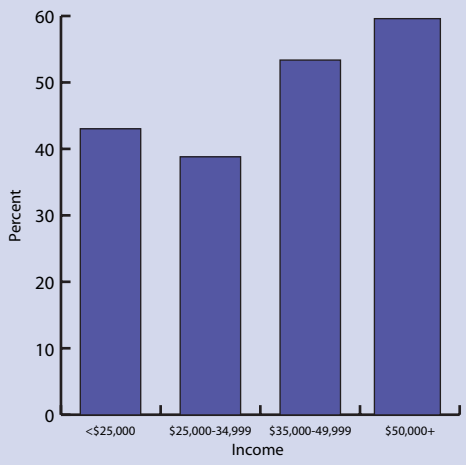


Figure 27. Percent of CT Adults Reporting Children in Household Age 6-15 with Dental Sealants by Income, BRFSS 2004



fissure surfaces of these teeth are as susceptible to dental caries as the first permanent molars of younger children. Therefore, young teenagers may benefit from the placement of dental sealants shortly after the eruption of their second permanent molars. The Healthy People 2010 target for dental sealants on molars is 50% for children aged 8 to 14 years.

The prevalence of sealants also varies by the education level of the head of household. A question on the 2004 CTBRFSS asked respondents if any children in the household between the ages of 6 and 15 had dental sealants placed on their teeth; approximately 54% reported the presence of sealants. This percentage was higher for households in which the respondents were white with higher incomes, who had higher education levels, and who had healthcare coverage (Figures 26 and 27).

For children continuously enrolled in Husky A, the prevalence of dental sealants was much less common than the rates reported by parents in the CT Behavioral Risk Factor Surveillance System (BRFSS). For children aged 6 to 15 in HUSKY A, 10% had at least one sealant placed. Almost seven (6.9) % of six-year olds and only 4.8% of 15 year-olds had at least one dental sealant placed.[40]

While the data on risk and protective factors presented here are the most current available, there is still much to learn regarding strategies to improve the oral health of Connecticut residents. For example, oral hygiene practices in day care settings and nursing homes, physician and dentist fluoride prescription practices for high risk children, WIC and Head Start parent education on oral disease prevention, and fluoridation levels in well water are some areas in need of further study. In addition, programs to better integrate oral health care into general health care should be explored.

Section V. Workforce and Access

A. Dentists

The U.S. Bureau of the Census has estimated that the population of Connecticut was 3,405,584 in the year 2000. The number of professionally active dentists in the state of Connecticut for that year was 2,591. Most (74%) were general practitioners, 10% were women, 28% were specialists, and only 3% pediatric dentists. The mean age was 52 years.[41]

According to data from the 2000 U.S. Census, the ratio of practicing dentists to the overall population in the state was 1:1,514.[42] More recent data from a report to the Connecticut Health Foundation suggests that the ratio may be even better, 1:1,314, the second highest nationally.[41] However, Connecticut's dentists are not adequately distributed to serve the needs of the population. Windam County's dentist to population ratio in 2000 (1:2,728) was more than double that of Fairfield County, which had the best dentist to population ratio (1:1,277) (Table 5). Approximately 12% of towns (more than 60,000 residents) in Connecticut have no professionally active dentists and almost 45% of towns in Connecticut have five or fewer dentists[41] (Map 3).

The dentists in Connecticut are also not reflective of the state's racial and ethnic diversity. Twenty-two percent of the state's residents are Hispanic or Black and this rate is projected to increase to 31% by 2025. Only about 8% of dentists in Connecticut are Black or Hispanic.[41] Of the eight counties in Connecticut, only Fairfield, Hartford, and New Haven Counties have minority dentists (Black or Hispanic) (Table 6). Hartford County has the largest minority population as well as the largest number of minority dentists. However, other counties with significant minority populations, such as New London which has nearly 27,000 Black or Hispanic residents, do not have any racially and ethnically concordant oral healthcare providers.

Table 5. Profile of CT Dentists, 2000 US Census

State	Population	# Dentists	Ratio*
Connecticut	3,405,565	2,249	1,514
County	Population	# Dentists	Ratio*
Fairfield	882,567	691	1,277
Hartford	857,183	667	1,285
Litchfield	182,193	115	1,584
Middlesex	155,071	89	1,742
New Haven	824,008	439	1,877
New London	259,088	113	2,293
Tolland	136,364	95	1,435
Windham	109,091	40	2,728

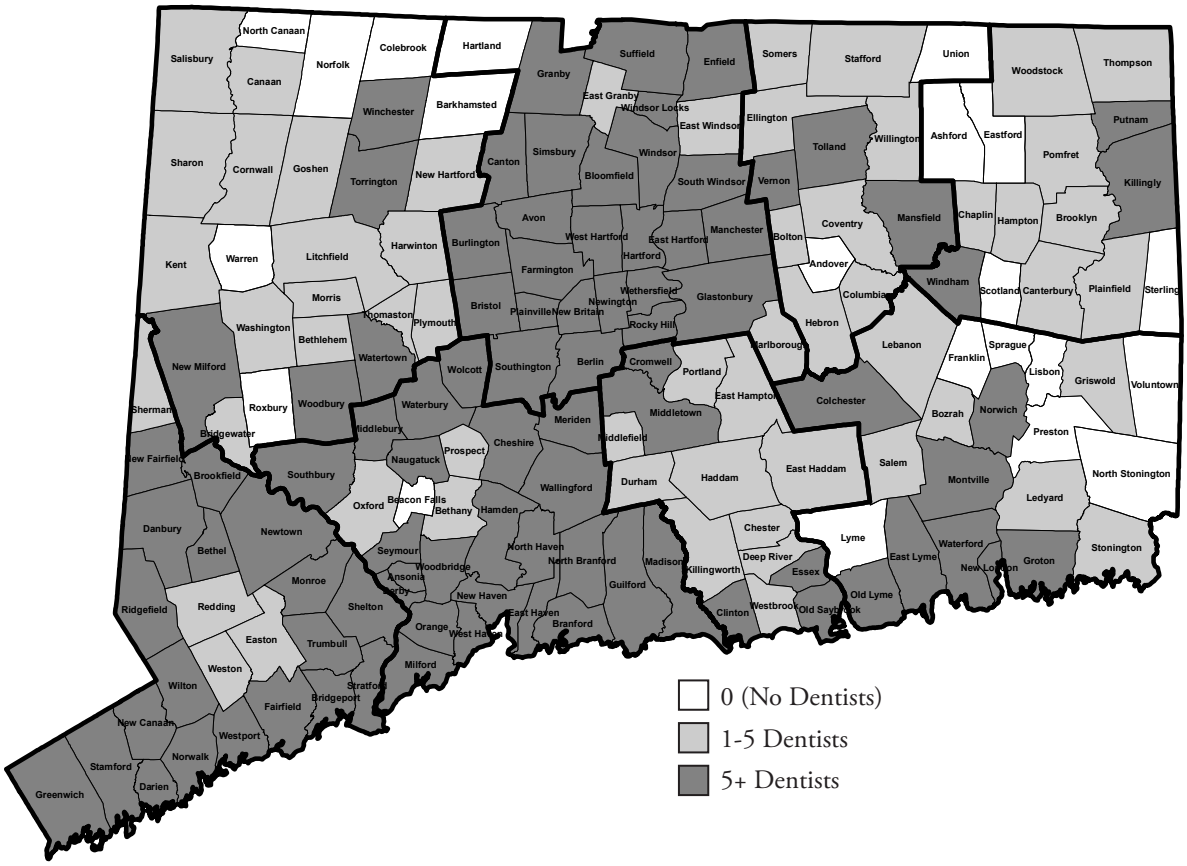
*Dentist to population ratio = Population / # Dentists

Approximately 15 percent of dentists in 2005 accepted Medicaid, and 595 dentists had at least one paid claim during that period. While all counties in the state have a dentist who accepts Medicaid, poor reimbursement, administrative red tape, and missed appointments by Medicaid patients are disincentives for dental practitioners to participate in Medicaid.

The Connecticut population is projected to increase in the next 15 years. In contrast, the number of professionally active dentists has stopped growing and, since 1991, has started to decline. The demand for dental services is strong, and this has caused significant increases in private dental fees. This situation is expected to continue as the dental workforce declines. Additionally, the number of Connecticut dentists expected to retire from practice may exceed the number of new dentists expected to enter practice, during the period from 2001 to 2015.[41]

It is estimated that by 2015 there will be a net loss of approximately 15 percent of the dental workforce. Because of continued decreases in numbers of dentists and increases in fees, access to dental care is likely to become more difficult for the entire population, but particularly for the working poor, ethnic and racial minorities, the elderly, children, and those with public dental insurance.[41]

Map 3. Number of Dentists per Town



B. Dental Hygienists and Dental Assistants

In 2000, the U.S. Census reported 2,060 licensed, practicing dental hygienists in the state.[42] The national average for dental hygienists in private practices is one hygienist part time per every full time dentist, and the number of hygienists in Connecticut nearly equals the number of dentists.[41] The number of dental assistants in the state was 3,098.[42] This number is below the national average of 1.5 assistants per dentist. HRSA ranked the state 18th in dental assistants in 2000.[41] Table 8 shows the number of dental hygienists and assistants by county.

In Connecticut, fewer than 500 dental auxiliaries (hygienists, assistants) are Black or Hispanic.[42] These minority dental auxiliaries are slightly better distributed among the counties than dentists; however, certain areas such as New London have neither a minority dentist nor a minority dental auxiliary (Tables 6 and 8).

C. Dental Safety Net

The dental safety net system, consisting of dental clinics owned and operated by public and voluntary sector organizations, provides services to the poor and other populations who have difficulty obtaining care. Most dental safety net services are delivered in community dental clinics, such as Federally Qualified Health Centers (FQHCs) and look-a-like community health centers (CHCs).[39] In 2004, there were 20 dental clinics associated with community health centers located in 17 towns. All patients are accepted, regardless of the ability to pay. In turn, some community health centers receive significant public subsidies which are not available to non-federally qualified health centers.[41]

Table 6. Profile of CT Minority Dentists, 2000 US Census

State	Black Population	# Black Dentists	Ratio*	Hispanic Population	# Hispanic Dentists	Ratio**
Connecticut	309,807	103	3,008	320,323	78	4,107
County	Black Population	# Black Dentists	Ratio*	Hispanic Population	# Hispanic Dentists	Ratio**
Fairfield	88,326	34	2,599	104,835	14	7,488
Hartford	99,936	59	1,694	98,963	44	2,249
Litchfield	1,998	0	1,998	3,894	0	3,894
Middlesex	6,856	0	6,856	4,649	0	4,649
New Haven	9,3239	10	9,324	8,3131	20	4,157
New London	13,703	0	13,703	13,236	0	13,236
Tolland	3,708	0	3,708	3,873	0	3,873
Windham	2,041	0	2,041	7,737	0	7,737

*Black dentist to black population ratio **Hispanic dentist to Hispanic population ratio

Table 7. Profile of CT Dental Personnel, 2000 US Census

State	Population	# Dentists	# Hygienists	# Assistants
Connecticut	3,405,565	2,249	2,060	3,098
County	Population	# Dentists	# Hygienists	# Assistants
Fairfield	882,567	691	542	663
Hartford	857,183	667	666	890
Litchfield	182,193	115	100	149
Middlesex	155,071	89	105	213
New Haven	824,008	439	388	828
New London	259,088	113	164	215
Tolland	136,364	95	45	70
Windham	109,091	40	50	70

Table 8. Profile of CT Minority Dental Auxiliary Personnel, 2000 US Census

State	# Hygienists	# Black Hygienists	# Hispanic Hygienists	# Assistants	# Black Assistants	# Hispanic Assistants
Connecticut	2,060	30	31	3,098	129	288
County	# Hygienists	# Black Hygienists	# Hispanic Hygienists	# Assistants	# Black Assistants	# Hispanic Assistants
Fairfield	542	10	4	663	40	145
Hartford	666	0	4	890	30	70
Litchfield	100	0	15	149	0	20
Middlesex	105	0	0	213	14	19
New Haven	388	20	8	828	45	34
New London	164	0	0	215	0	0
Tolland	45	0	0	70	0	0
Windham	50	0	0	70	0	0

In 2004, the Connecticut community health center safety net system included 111 full time equivalent dentists, 133 allied health personnel, and 221 chairs. Community health centers annually provide about 2,000 patient visits per dentist and treat 600 patients per dentist per year.[39]

Another important part of the safety net system is dental clinics associated with public schools. School-based dental services across the state are offered to school-age youth through a variety of different venues. Dental services are offered within existing school-based health centers, as stand-alone school-based dental clinics, or through mobile vans and portable dental equipment that provide periodic visits to multiple schools. These safety net dental systems are administered by community health centers, hospitals, local health departments, or public school systems.

A total of 17 dental clinics were located in existing school-based health centers as of October, 2005 (Table 9). This form of service was available in only 9 of the 169 towns in Connecticut. There were a total of 13 schools in four Connecticut towns which offered oral health services through stand-alone school-based dental clinics. The city of Hartford offered dental services through 11 stand-alone school-based dental sites. Stand-alone school-based dental clinics were also located in the towns of Stamford and East Hartford.

School based health centers are located in elementary, middle, and high schools. Data from the school-based health centers' annual report for 2003 shows approximately 120,000 visits per year. However, dental visits accounted for only three percent (3,600) of all visits.

A third source of dental services to the school age population is the use of mobile dental vans and portable dental units. By using these modalities to deliver dental services, large numbers of schools can be visited over a wide geographic area. The Smiles-To-Go Mobile Van based in the city of New Haven, the Molar Express based in Hartford, and the Generations Mobile Van based in Windham County together visit more than 40 schools per year.

While access to dental services is improved through the use of mobile vans and portable dental equipment, the degree to which dental services are offered within these modalities is variable. Some offer only screening programs, others offer only preventive services, and some offer comprehensive care. In addition, these modalities do not provide statewide coverage or adequate coverage for those areas of the state with few or no dentists.

Table 9. Number of School Based Health Centers (SBHC) with Dental Clinics

Town	SBHC Dental Clinics	Stand-Alone Dental Clinics	Other*	Total
Bridgeport	7	0	2	9
East Hartford	1	1	0	2
Groton	1	0	0	1
Hamden	1	0	0	1
Hartford	3	11	0	14
New Britain	1	0	0	1
New Haven	1	0	0	1
Stamford	1	1	0	2
Stratford	1	0	12	13
TOTAL	17	13	14	44

*Number of additional schools that have access to SBHC dental clinic services

Map 4 shows the coverage by town of the CHC and SBHC safety net sites. Although the towns with the largest populations have the most access to safety nets, a significant segment of Connecticut is without dental coverage from safety nets or private dentists.

The University of Connecticut School of Dental Medicine (UCSDM) provides another source for safety net services, and has been working to improve access to oral healthcare and to reduce disparities in oral health among disadvantaged populations in Connecticut. UCSDM is the single largest provider of treatment to Medicaid patients in the state, providing care to 7% of all Medicaid children receiving treatment. UCSDM also provides screening and fluoride services to all the Hartford and East Hartford Head Start sites and participates in many community outreach programs that provide dental services, including Camp Courant, the Special Olympics, South Park Inn, and Migrant Farm Workers Clinics.

In 2003, UCSDM received a grant from the Robert Wood Johnson Foundation for a program termed "Pipeline, Profession, and Practice: Community-Based Dental Education." This is a five-year project designed to help increase access to dental care for underserved populations. Grant funds were provided to a total of 15 U.S. dental schools with the goals of developing community-based clinical education programs that provide oral healthcare to the most vulnerable populations, and increasing the recruitment and retention of low-income, underrepresented minority dental students. With the help of this funding, UCSDM has partnered with the Community Health Centers throughout Connecticut to develop rotations and placement for General Practice Dental Residents, dental students, and clinical instructors in underserved areas of the state. Additionally, years three and four of the UCSDM curricula were revised to include courses in geriatric and special needs dentistry, public healthcare policy, culture and dental care, and community health center-based practice management.

D. Access for Underserved Populations

Connecticut participates in two federal programs that support improved access for underserved populations in the state: the Health Professional Shortage Area (HPSA) Designation Program and the State Loan Repayment Program.

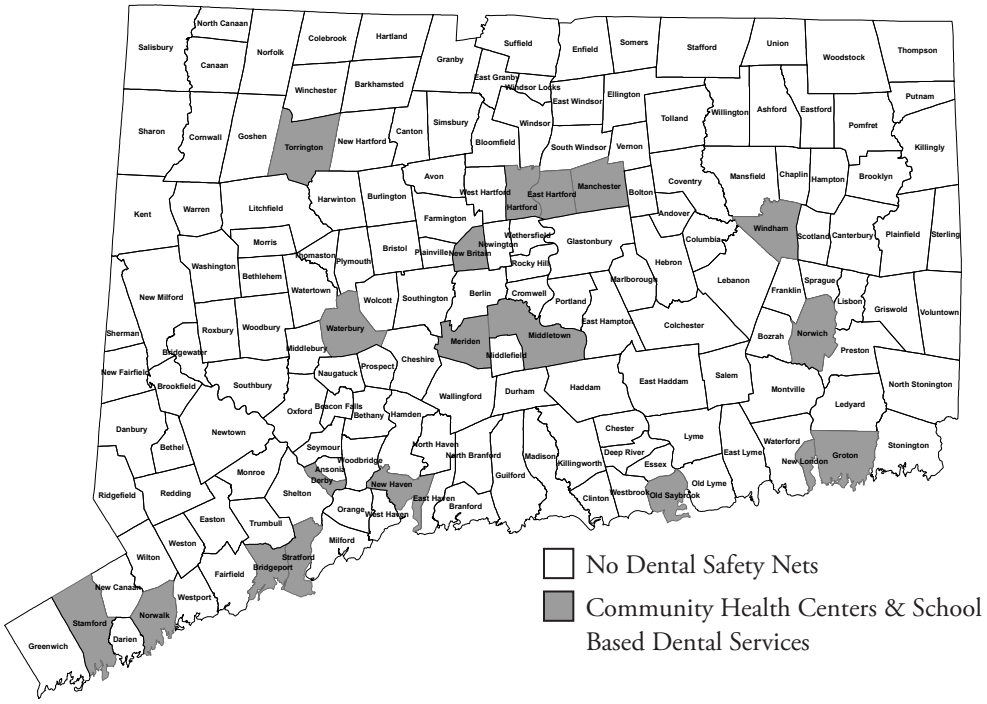
The federal HPSA Designation Program was designed to focus resources (federal and otherwise) to meet identified local needs for certain healthcare providers. An underserved geographical area of the state is designated by the U.S. Department of Health and Human Services as a Dental HPSA when the following criteria are met:

1. The area is a rational area for the delivery of dental services.
2. One of the following conditions prevails in the area: (a) The area has a population to full-time-equivalent dentist ratio of at least 5,000:1, or (b) The area has a population to full-time-equivalent dentist ratio of less than 5,000:1 but greater than 4,000:1 and has unusually high needs for dental services or insufficient capacity of existing dental providers.
3. Dental professionals in contiguous areas are overutilized, excessively distant, or inaccessible to the population of the area under consideration.[43]

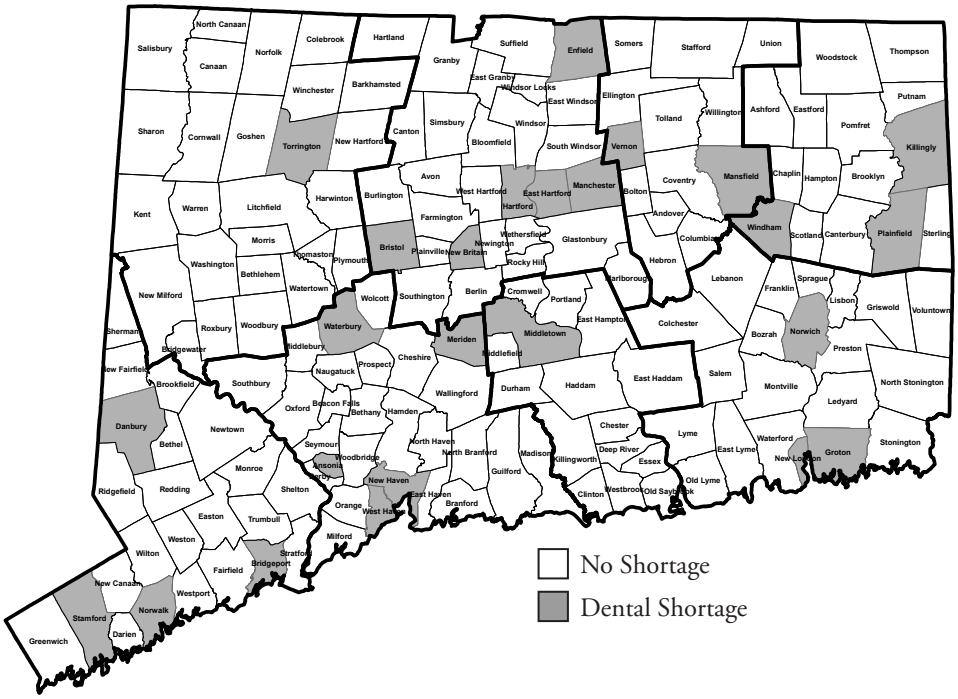
HPSA designations are valid for a period of three years, and are designated according to three categories: dental, primary care, or mental health. Within these categories, sub-categories are defined according to geographic area, population group, or facilities. Some automatic designations are made for community health centers.

HPSAs are instrumental in supporting community health centers and other qualified primary healthcare organizations in recruitment efforts for dental practitioners (dentists and dental hygienists). All eight of Connecticut's counties have at least one dental HPSA designation. Fairfield, Hartford, and New

Map 4. Oral Health Safety Net Dental Services



Map 5. Dental Health Professional Shortage Areas

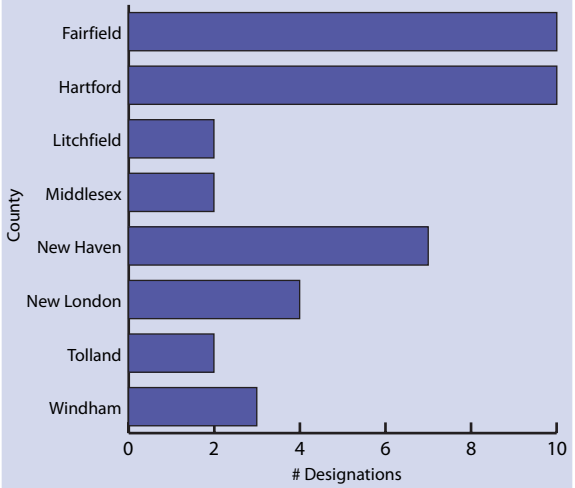


Haven counties have the majority of areas designated underserved in terms of dental practitioners (Figure 28 and Map 5).

The State Loan Repayment Program is a state and federal partnership that assists Connecticut in addressing the health professional shortages that cause disparities in access to healthcare. Dental practitioners, dentists and dental hygienists may work for community health centers and other eligible primary care sites in the state for up to two years in exchange for repayment of educational loans. Since 1998, the Dental Repayment program has placed 19 dentists and 4 dental hygienists in community health centers throughout Connecticut.

The private dental practitioner workforce is declining in Connecticut and the population is growing. The distribution of the dental workforce is uneven, resulting in a shortage of providers in many of Connecticut's towns. Although safety net dental sites are available, they are limited in number and do not have the capacity to serve all those in need. Non-dental providers (physicians, nurses, and nutritionists) have been targeted for training in basic oral health prevention methods,

Figure 28. CT Dental Health Professional Shortage Area Designations, March 2006



and the expansion of duties for dental hygienists and dental assistants is also currently being explored. Besides loan repayment programs, additional incentives for private practitioners may be needed to encourage them to serve the indigent and establish practices in underserved areas of the state.

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