9. ORAL HEALTH

Number	Objective
1	Caries experience
2	Untreated dental decay
3	Root caries
4	No tooth loss
5	Complete tooth loss
6	Gingivitis
7	Periodontal disease
8	Stage I oropharyngeal cancer lesions
9	Dental sealants
10	Water fluoridation
11	Topical fluorides
12	Screening/counseling for 2-year-olds
13	Screening, referral, treatment for first-time school program children
14	Adult use of oral health care system
15	School-based health centers with oral health component
16	Community health centers with direct oral health service component
17	Exams and services for those in long-term care facilities
18	Referral for cleft lip/palate
19	State-based surveillance system
20	State and local dental programs
21	Screening for oropharyngeal cancer

Oral Health

Goal

Improve the health and quality of life for individuals and communities by preventing and controlling oral, dental, and craniofacial diseases, conditions, and injuries and improving access to oral health care for all Americans.

Terminology

(A listing of all acronyms used in this publication appears on page 27 of the Introduction.)

Dental caries: An infectious disease that results in cavitation of the tooth surface if not controlled. The decay can either have been treated (filled) or it can be untreated (unfilled). The sum of the filled and unfilled dental decay, along with any missing teeth due to decay, constitutes the dental caries experience of an individual.

> **Coronal caries:** Dental decay that occurs on the enamel surface (or the crown), not on the root structure.
>
> **Root caries:** Dental decay that occurs on the root portion or cemental surfaces of the tooth and may be covered by gum tissue.

Dentate: A person with one or more teeth.

Edentulism/Edentulous: A condition in which a person has lost all of his or her natural teeth.

Etiology: Cause of disease or condition.

Fluoride dentifrice: Toothpaste with fluoride.

Gingivitis: An infection of the gums that can cause swelling and bleeding gums.

Lesion (soft tissue): An oropharyngeal pathology or trauma that reflects an abnormality of the tissues or the oral cavity or pharynx; a soft tissue lesion may be noncancerous or cancerous.

Microbial infection: Infection caused by bacteria, viruses, or other microbes.

Oral Candidiasis: Yeast infection that occurs in the oral cavity (mouth).

Periodontal disease: A syndrome of conditions caused by bacterial infection and resulting in inflammation and destruction of the supporting structures of the teeth. A broad term encompassing several diseases of the gums and tissues supporting the teeth.

Sealant: A plastic coating applied to the chewing surface of teeth, primarily to protect the surface molars from collecting food, bacteria, or debris that would promote dental decay development.

Xerostomia: A condition in which the mouth feels dry or is lacking in sufficient salivary flow.

Overview

Note: Once the *Surgeon General's Report on Oral Health* becomes available in early 1999, this chapter will be modified to reflect the most current oral health science, data, and other information.

Americans cannot be truly healthy unless they are free from the burden of oral, dental, and craniofacial diseases and conditions. Millions of Americans suffer from diseases and conditions of the oral cavity that result in needless pain and suffering, difficulty speaking, chewing, and/or swallowing, increased costs of care, loss of self-esteem, decreased economic productivity through lost work and school days, and, in extreme cases, death.[1] Oral diseases and conditions, including dental caries (also known as cavities), periodontal disease (a broad term encompassing several diseases of the gums, jaw bones, and tissues supporting the teeth), and tooth loss afflict more persons than any other single disease in the United States. Further, oropharyngeal cancer, which affects primarily adults older than 55 (mean age of onset 62), results in significant morbidity and disfigurement associated with treatment, substantial cost, and more than 8,000 deaths annually.[2] Minorities experience worse outcomes than whites. At 31 percent, the 5-year cancer survival rate for African Americans is 22 percent lower than for whites.

Oral diseases remain unnecessary obstacles to better health. While significant improvements have been made in preventing and controlling dental caries and periodontal disease during the past two decades, millions of Americans have been left behind. Almost all Americans have been affected by oral diseases; however, poor and low-income persons, members of racial and ethnic minority groups, and persons with little education are particularly at risk.[3]

Access to primary and preventive dental care for most Americans has been improving, as has their oral health status. However, access to primary and preventive dental care can be difficult, especially for those who cannot afford it. Regrettably, Americans for whom the burden of oral disease is greatest often have the most difficulty gaining access to the dental care system. Access to needed services is critical to eliminate the disparities in oral diseases that exist between the poor and the middle class and between the population as a whole and members of racial and ethnic minority groups. Access to dental care for poor elderly Americans is particularly difficult. Medicare reimburses only for limited dental services (for example, medically necessary dental care and surgery on the jaw not involving the teeth).

Oral diseases have a significant impact on general health. Over one million Americans each year are diagnosed with cancer. Cancer treatments such as chemotherapy can cause problems in the mouth. Head and neck radiotherapy can damage the salivary glands, resulting in decreased or loss of salivary flow. Uncontrolled diabetes mellitus can increase a person's risk of periodontal disease. Recent research has even suggested that the bacteria in the mouth may contribute to increased risk for heart attacks and may be associated with prematurely born babies in some women. The presence of oral disease can jeopardize any organ transplantation. Treatment associated with dental and oral diseases can result in infective endocarditis (a heart infection with a 50 percent mortality rate); infections of artificial knee, hip, and shoulder joints; and complications associated with organ and bone marrow transplantation.[4-6] Oral complications associated with HIV infection also can have a significant impact on overall health, resulting in loss of appetite, painful mouth sores, hospitalization, and potentially life-threatening fungal infections. A dentist in an outpatient setting can manage most of these complications among people with HIV/AIDS. However, because many people with AIDS cannot afford dental care, access is often compromised.

Cost, fear, and a person's belief that he or she does not need to see a dentist are the principal barriers to needed dental care. Currently, over 49 percent of the Nation's dental bill ($47.9 billion in 1996) was paid directly by consumers. Dental insurance reimbursement coverage accounts for 48 percent of

dental reimbursement. However, over 150 million Americans have no dental insurance coverage or the coverage they have is extremely limited.[7] Public programs pay for less than 3 percent of all dental services, and eligibility for these programs is highly variable. Most States provide only limited dental services for adults or none at all. In many States, benefits available to children covered by Medicaid do not even include basic dental services. The 30 percent decrease in per capita payments for dental services under Medicaid between 1975 and 1990 stands in stark contrast to all other medical expenditure categories under Medicaid, none of which declined during this period.

The unfortunate reality is that people who cannot afford routine dental care and who are not covered by either public programs or private dental insurance do not receive basic dental services. Many local health departments provide dental services to children and to some adults; many other local health departments do not have a dental component. Another source of care is Community and Migrant Health Centers (CMHCs), found where demonstrated need has been documented. Only about one-half of existing CMHCs provide basic dental care services (according to the Bureau of Primary Health Care, Health Resources and Services Administration, Public Health Service, Rockville, MD, February 1993). More important, CMHCs do not have the resources to meet this need alone.

The U.S. dental care delivery system is the best in the world. Among many children, their parents, and even their grandparents, oral health is very good. Some Americans have the best teeth and oral health in the world. But if many of our children do have sealants, orthodontics, and mouthguards and are caries free, should not all U.S. children be just as healthy? For those who are unable to afford dental care, who have limited or no dental insurance, and who are often at highest risk of dental and oral diseases, there needs to be improved access to primary preventive and early intervention services and the removal of barriers to the dental care system.

Disparities in Health

Dental caries is the most common infectious disease of U.S. children. Fifty-two percent of children aged 6 to 8 of elementary school age have been affected by dental caries. By the time they graduate from high school, the proportion increases to 84 percent.[8] Unless arrested in its earliest stages, dental caries become irreversible. Unless stopped by dental treatment or reversed, the carious infection will continue to destroy the tooth, resulting in pain and acute infection of surrounding tissues.

During the past 30 years, the prevalence of dental caries has declined dramatically among schoolchildren. Community water fluoridation, increased use of toothpastes and rinses containing fluorides, increased availability of fluoride in foods and drinks prepared with fluoridated water, and changes in diet have contributed to this decline.[9] However, 80 percent of dental caries found in children is concentrated in 25 percent of the child population. Higher disease levels generally are found among members of racial and ethnic minority groups, children from low-income families, and children whose parents have less than a high school education.

While the overall oral health of adults is improving, dental caries, gingivitis, and periodontal disease continue to affect many adult Americans. In 1988-91, a national survey found that 94 percent of dentate adults had experienced coronal dental caries; j25 percent had experienced root caries. Gingivitis and periodontal disease are infections of the gums that support the teeth and affect nearly half of all employed Americans between 18 and 64 years of age. Periodontal disease can lead to tooth loss among adults. In addition, it, as well as overzealous brushing, grinding, and other factors, can lead to the loss of enamel or cementum from the tooth, exposing the roots of the teeth. Root surfaces are not covered by enamel and are quite susceptible to dental caries.

Data from the mid-1980s indicated that more than 99 percent of the elderly had evidence of dental decay or past evidence of disease in the form of missing or filled teeth.[10] More than 56 percent of Americans older than 65 years with teeth had at least one decayed or filled root surface, indicating a previous history of disease. As the baby boomers age, this generation will lose fewer teeth and keep more of their teeth than ever before.

In 1998, it is estimated that 27,000 new cases of oropharyngeal cancer will be diagnosed, and approximately 8,000 deaths will occur from the disease. The 5-year survival rate for this cancer is 52 percent and it is more common than leukemia, Hodgkin's disease, and cancers of the brain, cervix, ovary, liver, pancreas, bone, thyroid gland, testes, or stomach. Oropharyngeal cancer is the 10th most common cancer found among U.S. men and the 14th most common among U.S. women.[11]

Impact of Oral Health Problems

Poor oral health and untreated oral diseases and conditions can have a significant impact on quality of life. Oral and facial pain affects a substantial proportion of the general population.[12-18] Studies to determine the number of persons experiencing oral pain have found that, at any given time, between 29 and 50 percent of those surveyed reported some dental and oral pain.

Dental disease also has an impact on economic productivity and the ability of American children to learn. In 1989, more than 164 million hours were missed from work (an average of 1.48 hours per employed U.S. adult), and nearly 52 million hours of school were lost (1.17 hours missed per child) because of dental treatment and problems.[19]

Millions of Americans are at high risk for oral health problems because of underlying medical or handicapping conditions, ranging from very rare genetic diseases to more common chronic diseases such as arthritis and diabetes. These conditions not only affect the person’s quality of life (that is, their ability to eat, speak, taste, and swallow), but also cause pain and discomfort.[20]

Expenditures, Costs, and Sources of Payment

In 1996, an estimated $47.9 billion was spent on dental services, representing about 5 percent of all expenditures for personal health care in the United States. By 2000, an estimated $60 billion will be spent on dental services.[21,22]

In 1996, an average of approximately $300 was spent for dental services for those Americans with a dental expense;[23] about 96 percent of these expenditures for dental services were paid by private sources, either out-of-pocket by dental consumers (48 percent) or through private health insurance (47 percent). Less than 4 percent of dental expenditures come from public sources, principally Medicaid. The primary source of payment for dental services is out-of-pocket. In 1996, the mean annual out-of-pocket expense for dental services was approximately 48 percent. On average, Americans paid almost $50 more out-of-pocket annually for dental services than for ambulatory physician services. The need for individual payment of cost of dental services can have a significant impact on the poor (those Americans below the Federal poverty level [FPL]).

Approximately 40 percent of Americans (95 million in 1989) have some form of dental insurance, although it often is with limited coverage and high copayments.[24] Most persons who have dental insurance are between 25 and 54 years of age or are the dependents of employed adults with dental insurance. Since dental insurance coverage is usually employment based, persons who do not work or who work part-time are less likely to be insured.

In fiscal year 1994-96, more than $800 million was spent to provide dental services to an average of 6.3 million Medicaid recipients; an average of 18 percent of Medicaid eligibles received dental services. Expenditures for these services represented less than 1 percent of the total Medicaid budget. Expenditures for dental services actually decreased since 1975 by 29.7 percent and are the only health service expenditures that have decreased since that time. Medicaid payments for dental services were primarily for children receiving benefits through the Aid to Families with Dependent Children (AFDC) Program (48.6 percent). In most States, Medicaid dental services for adults are extremely limited or are not covered at all.

With Medicare, payment for dental services is limited. Medically necessary dental care and surgery on the jaw, not involving the teeth, is one example of a covered service; another is HMOs that provide dental services as an enticement for senior citizens to join.

Disparities in Oral Health Care

Health Status

- African Americans have a much poorer 5-year survival for oropharyngeal cancer than whites (31 percent vs. 55 percent).

- The level of untreated dental caries among members of racial and ethnic minority groups is greater than the national average.

- Almost 9 percent of poor adults have lost all their teeth, compared with 5 percent of the adult population; 46 percent of the poor elderly had lost all their teeth.

Access

- Poor children and members of racial and ethnic minority groups have less private dental insurance than the average for all children.

- Poor children have 37 percent fewer dental visits than nonpoor children.

- Smaller proportions of members of racial and ethnic minority groups and poor adults have dental insurance than the national average.

- Smaller proportions of members of racial and ethnic minority groups and poor adults had a dental visit in the preceding year.

- Only 15 percent of the elderly have any private dental insurance, and Medicare does not reimburse for routine dental services.

- More than 22 percent of elderly African Americans and 26 percent of poor elderly had at least one dental visit in the preceding year, about one-half of the national average for all elderly.

Preventive Services

- Smaller proportions of minority and poor children have dental sealants.

Progress Toward Year 2000 Objectives

Most of the 17 oral health objectives for Healthy People 2000 (10/17) have moved toward the targets, 2 have moved away from targets, 1 has had a mixed trend, and 4 have no data beyond the baseline. As highlighted in the midcourse review in May 1995, a decrease in the percentage of 5-year-old children who reported having seen a dentist in the past year coincided with an increase (from 28 percent to 31 percent) in the percentage of 6- to 8-year-olds who had untreated dental decay. Among 15-year-olds over the same period, an increase in the percentage reporting a past year dental visit coincided with a decrease in the percentage of children with untreated decay.

13.1	Reduce dental caries (cavities).	Moving toward target
13.2	Reduce untreated dental caries.	Trend mixed
13.3	Never lost a permanent tooth.	Moving toward target
13.4	Lost all of their natural teeth.	Moving toward target
13.5	Reduce the prevalence of gingivitis.	Moving away from target
13.6	Destructive periodontal diseases.	Moving toward target
13.7	Oropharyngeal cancer.	Moving toward target
13.8	Increase protective sealants.	Moving toward target
13.9	Water system fluoridation.	Moving toward target
13.10	Topical or systemic fluorides.	No data beyond baseline
13.11	Prevent baby bottle tooth decay.	No data beyond baseline
13.12	Screening, referral, and followup.	Moving away from target
13.13	Oral examinations and services.	No data beyond baseline
13.14	Use of the oral health care system.	Moving toward target
13.15	Recording and referring cleft lips.	Moving toward target
13.16	Requirement for mouth protection.	No data beyond baseline
13.17	Reduce smokeless tobacco use.	Moving toward target

Draft 2010 Objectives

1. **(Former 13.1) Reduce dental caries (cavities) in primary and permanent teeth (mixed dentition) so that the proportion of children who have had one or more cavities (filled or unfilled) is no more than 15 percent among children aged 2-4, 40 percent among children aged 6-8, and 55 percent among adolescents aged 15.** (Baseline: in the 1988-94 time period, 18 percent of children aged 2-4, 52 percent of children aged 6-8, and 61 percent of adolescents aged 15 had experienced dental caries)

Select Populations	**1988-94**
Aged 2-4 primary teeth	
African American, non-Hispanic	24%
American Indian/Alaska Native	Not available
Asian/Pacific Islander	Not available
Hispanic	Not available
Mexican American	34%
White, non-Hispanic	15%
<100% of Federal poverty level	29%
100-199% of Federal poverty level	21%
≥200% of Federal poverty level	10%
Aged 6-8 primary/permanent teeth	
African American, non-Hispanic	50%
American Indian/Alaska Native	Not available
Asian/Pacific Islander	Not available
Hispanic	Not available
Mexican American	65%
White, non-Hispanic	51%
<100% of Federal poverty level	62%
100-199% of Federal poverty level	60%
≥200% of Federal poverty level	42%
Aged 15 Permanent Teeth	
African American, non-Hispanic	70%
American Indian/Alaska Native	Not available
Asian/Pacific Islander	Not available
Hispanic	Not available
Mexican American	64%
White, non-Hispanic	60%
<100% of Federal poverty level	77%
100-199% of Federal poverty level	69%
≥200% of Federal poverty level	51%

Target Setting Method: Better than the best.

Data Source: National Health and Nutrition Examination Survey (NHANES), 1988-94, CDC, NCHS.

2. (Former 13.2) Reduce untreated cavities in the primary and permanent teeth (mixed dentition) so that the proportion of children with decayed teeth not filled is no more than 12 percent among children aged 2-4, 22 percent among children aged 6-8, and 15 percent among adolescents aged 15. (Baseline: from 1988 to 1994, 16 percent of children aged 2-4; 29 percent of children aged 6-8; 20 percent of adolescents aged 15 had one or more decayed teeth)

Select Populations	1988-94
Aged 2-4, primary teeth	
African American, non-Hispanic	22%
American Indian/Alaska Native	Not available
Asian/Pacific Islander	Not available
Hispanic	Not available
Mexican American	30%
White, non-Hispanic	11%
<100% of Federal poverty level	26%
100-199% of Federal poverty level	20%
≥200% of Federal poverty level	7%
Aged 6-8, Primary/permanent teeth	
African American, non-Hispanic	36%
American Indian/Alaska Native	Not available
Asian/Pacific Islander	Not available
Hispanic	Not available
Mexican American	47%
White, non-Hispanic	26%
<100% of Federal poverty level	47%
100-199% of Federal poverty level	32%
≥200% of Federal poverty level	16%
Aged 15, Permanent teeth	
African American, non-Hispanic	29%
American Indian/Alaska Native	Not available
Asian/Pacific Islander	Not available
Hispanic	Not available
Mexican American	36%
White, non-Hispanic	19%
<100% Federal Poverty Level	20%
100-199% of Federal poverty level	28%
≥200% of Federal poverty level	16%

Target Setting Method: 25 percent improvement.

Data Source: National Health and Nutrition Examination Survey (NHANES), CDC, NCHS.

3. **Reduce the prevalence of untreated root caries in adults, aged 65-74, with six or more teeth from 19 percent to 13 percent.** (Baseline: from 1988 to 1994, 19 percent of persons aged 65-74 had decay on the roots of their teeth. All estimates now control for 6+ teeth. As a new objective it will be difficult to reduce root caries rate while population is aging, exposing more roots to decay, and putting more people at risk.)

Select Populations	1988-94
African American, non-Hispanic	39%
American Indian/Alaska Native	Not available
Asian/Pacific Islander	Not available
Hispanic	Not available
Mexican American	32%
White, non-Hispanic	16%
<100% of Federal poverty level	36%
100-199% of Federal poverty level	33%
>200% of Federal poverty level	12%

Target Setting Method: 32 percent improvement.

Data Source: National Health and Nutrition Examination Survey (NHANES), CDC, NCHS.

4. **(Former 13.3) Increase to at least 37 percent the proportion of dentate people aged 35-44 who have never lost a permanent tooth due to dental caries or periodontal disease.** (Baseline: from 1988 to 1994, 31 percent of persons aged 35-44 had never lost a permanent tooth; from 1985-86 to 1988-94, 31 percent of persons had not lost a tooth each time period)

Select Populations	1988-94
African American, non-Hispanic	12%
American Indian/Alaska Native	Not available
Asian/Pacific Islander	Not available
Hispanic	Not available
Mexican American	30%
White, non-Hispanic	34%
<100% of Federal poverty level	17%
100-199% of Federal poverty level	18%
$\geq$200% of Federal poverty level	36%

Note: Never lost a permanent tooth is defined as having 28 natural teeth exclusive of third molars, and teeth lost due to orthodontics or trauma.

Target Setting Method: 20 percent improvement.

Data Source: National Health and Nutrition Examination Survey (NHANES), CDC, NCHS.

5. (Former 13.4) Reduce to no more than 20 percent the proportion of people aged 65 and older who have lost all of their natural teeth. (Baseline: from 1988-94, 33 percent of persons aged 65 and older lost all of their teeth)

Select Populations	1988-94
African American, non-Hispanic	36%
American Indian/Alaska Native	Not available
Asian/Pacific Islander	Not available
Hispanic	Not available
Mexican American	23%
White, non-Hispanic	33%
<100% of Federal poverty level	47%
100-199% of Federal poverty level	45%
≥200% of Federal poverty level	23%

Target Setting Method: 40 percent improvement.

Data Source: National Health and Nutrition Examination Survey (NHANES), CDC, NCHS.

6. (Former 13.5) Reduce the prevalence of gingivitis among people aged 35-44 to no more than 30 percent. (Baseline: from 1988-94, 48 percent of persons aged 35-44 had gingivitis)

Select Populations	1988-94
African American, non-Hispanic	51%
American Indian/Alaska Native	Not available
Asian/Pacific Islander	Not available
Hispanic	Not available
Mexican American	61%
White, non-Hispanic	47%
<100% of Federal poverty level	66%
100-199% of Federal poverty level	55%
≥200% of Federal poverty level	45%

Target Setting Method: 37 percent of baseline.

Data Source: National Health and Nutrition Examination Survey (NHANES), CDC, NCHS.

7. (Developmental/Former 13.6) Reduce the prevalence of destructive periodontal disease to __ percent among people aged 35-44.

Potential Data Source: National Health and Nutrition Examination Survey (NHANES), CDC, NCHS.

8. Increase from to at least 50 percent the proportion of oropharyngeal cancer lesions detected at stage I. (Baseline: for the 1981-86 time period, 38 percent of oropharyngeal cancer lesions diagnosed were stage I-localized)

Target Setting Method: 30 percent improvement.

Data Sources: State cancer registries and Surveillance, Epidemiology, and End Results (SEER), NIH, NCI.

Dental caries (tooth decay) is perhaps the most prevalent infectious disease known. In its early stages dental caries can be reversed. Once cavitation of the tooth surface occurs it is irreversible and cumulative. Early childhood caries (ECC), frequently referred to as baby bottle tooth decay, can be a devastating condition often requiring thousands of dollars and a hospital visit for treatment. The pain, psychological trauma, health risks, and costs associated with restoration of these grossly carious teeth for children affected by ECC can be substantial, often requiring general anesthesia during treatment. Prenatal care for pregnant mothers and increased control of oral infections of other caregivers, dietary counseling, and intervention by dental and other professionals provide the best available means of preventing this serious oral disease.

Children whose parents or caregivers have less than a high school education or whose parents and caregivers are Hispanic, American Indians, or Alaska Natives appear to be at markedly increased risk for developing ECC. The cause of disease for this type of dental caries remains under investigation. Prenatal care of mothers and nutrition of the infant as well as comorbidities and healthy behaviors have been hypothesized as potential causative factors.

Children aged 6 through 8 are at an important stage of dental development. They have the majority of their primary teeth, and the permanent first molars and incisors are erupting into the mouth during these ages. The importance of optimal oral health for these children cannot be overemphasized; it is critical not only to their current functioning oral health, but also for long-term health. The presence of carious primary teeth is the single best predictor that children will develop decay in their permanent teeth (indicating that they are at high risk). The pivotal time to intervene for high-risk children is age 6 through 8, so that parents can take steps to improve personal health practices and use of professional care. The period between when the first permanent molars erupt and before vulnerable pits and fissures are infected is also a critical time for children to be assessed with regard to appropriateness of dental sealant application for permanent teeth.

The cumulative experience of dental caries is so much higher among adolescents than among young children because caries prevalence increases with age. By the time adolescents finish high school, 84 percent have experienced dental decay. Effective personal preventive measures (e.g., brushing, flossing, appropriate dental prophylaxis) need to be applied throughout adolescence, as children become more independent with their oral hygiene and dietary habits. Tailored dental visits provide an opportunity to assess and to place sealants on vulnerable permanent teeth (including second permanent molars at around age 12) erupting during this life stage.

Regular access to preventive care should lead to a lower prevalence of untreated caries. Community water fluoridation, school-based or professionally applied topical fluorides, dental sealants, and appropriate use of fluoridated toothpaste decrease the likelihood that children and adolescents will develop caries. Many young children, particularly those in high-risk groups, do not receive adequate fluoride exposure or adhesive sealants, regular professional care, or oral hygiene instruction, and some do not even own a toothbrush and fluoride toothpaste. Efforts are needed to encourage all primary care providers to conduct a dental examination and provide children or their parents with oral health counseling or referral for care.

Financial, cultural, psychological, social, and geographic barriers contribute to inadequate access to preventive dental care. Surveys have shown that, in the absence of routine dental care, certain populations experience higher rates of untreated caries. For example, the prevalence of untreated decay is higher among the children of migrant workers than the total population, in part because of lack of access; migrant workers' use of dental services is well below the national average. For children from low-income families, the cost of dental care presents a significant barrier to obtaining necessary services and, in some communities, finding a convenient, accessible dentist.

Dental caries is a unique microbial infection. Once beyond its earliest stages, it is irreversible and frequently progressive. Even when primary preventive efforts are not available or are unsuccessful, early diagnosis and prompt treatment of caries can halt tooth destruction and prevent tooth loss.

As gums recede in adults, the root surface of the tooth becomes susceptible to dental caries. Root lesions or root caries are difficult to detect because they are found as small, discrete lesions on a single root surface rather than circumscribing a root. As the population ages, with one in every five persons estimated to be 65 years or older by the year 2010, root caries may become a significant dental problem for adults and particularly seniors.

Teeth can be kept for life with optimal personal and professional preventive practices. As teeth are lost a person’s oral function, or the ability to chew and speak, decreases. There also can be a loss or a withdrawal from social functioning. Widespread exposure to fluorides, dental sealants, and improved personal oral care habits have combined to reduce the prevalence of the two leading causes of tooth loss: dental caries and periodontal disease (this term actually encompasses several diseases of the tooth-supporting tissues). Tooth loss also occurs as a result of trauma and oropharyngeal cancer treatment. In addition, certain orthodontic and prosthetic services will sometimes require the removal of teeth.

Despite a general reduction in tooth loss, 25 percent of American Indians and Alaska Natives aged 35 through 44 have fewer than 20 natural teeth; among those aged 55 and older, nearly 75 percent have fewer than 20 natural teeth. Overall, among adults in other racial and ethnic groups, the rate of tooth loss does not differ significantly from the national average.

Despite a steady decline in the rate of complete tooth loss over the past several decades, 30 percent of people aged 65 through 74 had lost all of their natural teeth in 1986; among all people aged 65 and older, 36 percent had lost all of their natural teeth. The rate of complete tooth loss among African Americans and Hispanics aged 65 through 74 is close to the national average, although low-income adults aged 65 and older experience a higher prevalence (46 percent in 1986).

Among older people, loss of natural teeth can contribute to psychological, social, and physical impairment. Even when missing teeth are replaced with well-constructed dentures, there may be limitations in speech, chewing ability, and quality of life. Most tooth loss is the result of dental caries and periodontal disease. Therefore, the level of edentulism (complete tooth loss) reflects not only the prevalence of caries and periodontal disease, but also the availability and use of appropriate professional services and community preventive services. Tooth loss can be prevented through education, early diagnosis, and regular dental care. Children and adults (and the health care professionals who serve them) must recognize the signs and symptoms of oral diseases and know the oral health care practices necessary to prevent them.

Gingivitis is characterized by localized inflammation, swelling, and bleeding gum tissue. It is frequently reversible with proper daily oral hygiene and serves as a measure of one’s self-care. Most young adults have some degree of gingivitis. Prevalence of gingivitis is high among Hispanics, American Indians, and

adults with low incomes. Gingivitis is likely to remain a substantial problem and may even increase as tooth loss due to dental caries declines, and as a result of some systemic medications.

Prevention of gingivitis can usually be accomplished through appropriate oral hygiene (for example, daily brushing and flossing) and by checking medications. Such practices minimize gingival swelling and bleeding. A combination of efforts is needed to achieve this objective. Both the public and private sectors should implement educational initiatives aimed at increasing public awareness of the causes and effects of gingivitis and the importance of patient compliance with effective oral hygiene practices.
Destructive periodontal disease is defined as one or more sites with 4 mm or greater loss of tooth attachment (receding gums). Loss of attachment can lead to loss of the tooth. Among adults, destructive periodontal disease is a leading cause of bleeding, pain, infection, physical dysfunction, tooth mobility, and tooth loss. The disease also has been associated with increased risk for heart disease, stroke, and low birthweight. **Note:** The number of periodontal pockets probed will increase from 2 to 3 in future assessments. The addition of the distolingual site may increase the prevalence of the condition.

The prevalence and severity of destructive periodontal disease are also measured by loss of tooth attachment and gingival pocket depth and increase with age and vary by socioeconomic status. The prevalence of periodontal disease is higher than the national average among American Indians and Alaska Natives, adults with less than a high school education, and migrant workers. Unless preventive measures are taken, the problem of destructive periodontal disease will grow as the aging population retains teeth later in life. This objective is intended to encourage prevention and more effective intervention across the entire adult age spectrum. Because the prevalence of periodontal disease increases with age, a single indicator of progress is not appropriate for all ages.

One measure of the success of strategies to detect oral and pharyngeal cancers is the proportion of lesions detected at the earliest stage of diagnosis. Over time, a higher proportion of oropharyngeal cancer lesions should be diagnosed at stage I, which would indicate that strategies geared to increase appropriate screening with comprehensive oropharyngeal cancer examinations have been successful. Other outcome measures indicating success of strategies to reduce oropharyngeal cancer include the reduction in oropharyngeal cancer incidence and mortality rates and an increase in 5-year survival.

Oral Health Services and Systems

9. (Former 13.8) Increase to at least 70 percent the proportion of children aged 8 and 14 who have received protective sealants in permanent molar teeth. (Baseline: from 1988 to 1994, 23 percent of 8-year-old and 24 percent of 14-year-old children received sealants in permanent molar teeth)

Select Populations	1988-94
Aged 8	
African American, non-Hispanic	11%
American Indian/Alaska Native	Not available
Asian/Pacific Islander	Not available
Hispanic	Not available
Mexican American	10%
White, non-Hispanic	26%
<100% of Federal poverty level	3%
100-199% of Federal poverty level	18%
≥200% of Federal poverty level	35%
Aged 14	
African American, non-Hispanic	5%
American Indian/Alaska Native	Not available
Asian/Pacific Islander	Not available
Hispanic	Not available
Mexican American	10%
White, non-Hispanic	28%
<100% of Federal poverty level	12%
100-199% of Federal poverty level	11%
≥200% of Federal poverty level	39%

Target Setting Method: Better than the best.

Data Source: National Health and Nutrition Examination Survey (NHANES), CDC, NCHS.

10. (Former 13.9) Increase to at least 85 percent the proportion of the population served by community water systems with optimally fluoridated water. (Baseline: in 1992, 62 percent of persons served by community water systems received optimally fluoridated water)

Target Setting Method: 37 percent improvement.

Data Sources: Fluoridation Census, CDC.

11. (Developmental) Increase use of topical fluorides to at least __ percent of people *not* receiving optimally fluoridated public water.

12. (Developmental) Increase to __ percent the proportion of 2-year-olds who receive caries screening by a qualified health professional (e.g., dentist, dental hygienist, pediatrician, nurse, etc.) for the existence of any observable decay and counseling regarding the need to either increase sources of fluoride or decrease potentially excessive sources of fluoride, e.g., unsupervised tooth brushing.

13. (Developmental) Increase to at least __ percent the proportion of all children entering school programs for the first time who have received an oral health screening. Of those screened and needing referral, __ percent will have received a referral for necessary diagnostic, preventive, and treatment services. Of those being referred for treatment, __ percent will have begun treatment within 90 days.

14. (Former 13.14) Increase to at least 70 percent the proportion of adults aged 18 and older using the oral health care system each year. (Baseline: in 1993, 61 percent of adults visited the dentist during the previous year)

Select Populations	**1993**
Dentate	65%
Edentulous	19%
African American	48%
American Indian/Alaska Native	Not available
Asian/Pacific Islander	Not available
Hispanic	47%
White	64%
Below poverty threshold	43%
At or above poverty threshold	64%

Target Setting Method: Better than the best.

Data Source: National Health Interview Survey (NHIS), CDC, NCHS.

Since the early 1970s, childhood dental caries on smooth tooth surfaces has declined markedly. Fluoridation and the use of other fluorides have been successful in decreasing the prevalence of childhood dental caries. However, in 1986-87, approximately 90 percent of the decay in children's teeth occurred in pits and fissures, and almost two-thirds was found on the chewing surfaces alone. Pit-and-fissure sealants--plastic coatings that are applied to susceptible tooth surfaces--have been approved for use for many years and have been recommended by professional associations and public health agencies. If sealants were applied routinely to susceptible tooth surfaces, most incremental tooth decay among children could be prevented. Appropriate use of fluorides and sealant acts as surrogates for immunization against dental caries. Reaching the 70 percent target will be a challenge and for dental sealant placement will be accomplished only with a concerted national effort.

Community water fluoridation is the single most effective and efficient means of preventing dental caries in children and adults, regardless of education or income level. Widespread exposure to fluorides through drinking water and dental products appears to be the primary reason for the declining prevalence of dental caries in the school-age population. Children in nonfluoridated communities frequently benefit from ingesting fluoride in commercial products that were prepared in fluoridated communities. This is often referred to as the diffusion effect of fluoridation. Consequently, caries have declined in both fluoridated and nonfluoridated communities. As with the sealant objective, this objective remains challenging and a concerted national effort, with adequate resources, will be necessary to reach the target.

A substantial proportion of the population receives drinking water from nonfluoridated individual water sources or community water systems. Examples of fluoride treatments include professionally applied topical fluoride, fluoride dentifrice, and fluoride mouth rinses, all of which can prevent initial decay and promote the repair of early-stage caries. Studies are under way to determine the optimal level of aggregate fluoride exposure necessary to prevent tooth decay.

The 5-year survival rate for oropharyngeal cancer is 52 percent. Those who are treated for this cancer frequently face significant functional problems, disfigurement that decreases quality of life, and an increased risk of developing new oropharyngeal cancers, as well as other types of cancer. Comprehensive oropharyngeal cancer examinations greatly increase the probability of early detection and successful treatment outcomes. They are the best strategy to narrow the gap in survival between African Americans and whites, since early detection and prompt treatment are imperative. Yet, African Americans are less likely than whites to have dental visits.

The age of 2 is a critical time in a young child's life. Children at high risk of caries have some primary teeth risk; it may be difficult for the untrained parent to assess the earliest signs of tooth decay such as demineralization. Children can be at risk of dental fluorosis by ingesting too much fluoride if they are swallowing toothpaste during unsupervised brushing. There already is wide agreement among pediatricians and general dentists that age 2 is a very appropriate time for a child's first visit for professional assessment. Focusing on this single age is not to discourage earlier assessment if it is possible. Emphasis on ages 1 to 2 as a critical time would warrant generation of a public health safety net strategy to proactively seek and assist children whose parents have not ensured that they receive the needed assessment and counseling.

Despite dramatic success in the reduction of caries in children over the past 20 years, many young children still suffer from oral diseases. A visit to a dental professional at the time of school entry provides an opportunity to educate parents about effective techniques for preventing oral disease. It is inevitable that some children will not receive the full benefit of primary prevention. For them, secondary preventive services, including early diagnosis and prompt treatment, can eliminate pain, infection, and progressive oral diseases.

Unfortunately, early and regular dental care among children remains far from universal. In 1986 only 25 percent of children aged 2 had ever visited a dentist; by ages 5 and 7, the proportions increased to 75 percent and 89 percent, respectively. Achievement of this objective could be linked to other health-related requirements for children entering school. Special efforts should be made to reach developmentally disabled children, as well as children with other disabling conditions.

Oral health care is an essential, but often neglected, component of total health care. Regular dental visits are an opportunity for early diagnosis, prevention, and treatment, as well as for oral hygiene education. Adults who do not receive regular professional care can develop oral diseases that eventually require complex restorative treatment and may lead to tooth loss. Edentulous persons (those without teeth) who do not receive regular dental care may develop soft tissue lesions, due to medications, systemic conditions, and exposure to tobacco, as well as prosthetic appliances that are not maintained properly. Persons with and without teeth are at increased risk of oral and pharyngeal cancer as well as autoimmune disorders and other chronic disabling conditions as they grow older. Those without teeth, however, often are unaware that they are still at risk of oral diseases. Consequently, they may have long intervals between professional examinations.

Access to Dental Care

15. (Developmental) Increase to __ percent the proportion of school-based health centers (prekindergarten through 12th grade) with an oral health component.

Potential Data Source: School Health Policies and Programs Study (SHPPS); questions could be modified.

16. **(Developmental) Increase to __ percent the proportion of local health departments and community-based health centers, including Community Migrant Health Centers, that have a direct oral health education and service component.**

    Potential Data Source: American Association of Community Dental Programs and the Health Resources Services Administration.

17. **(Developmental/Former 13.13) Increase to __ percent the proportion of long-term care facilities that provide oral examinations and initiate necessary prevention, education, and oral health treatment services no later than 30 days after entry into these facilities.**

    Potential Data Source: National Nursing Home Survey.

18. **(Former 13.15) Ensure that all States have a viable system for recording and referring infants and children with cleft lips, cleft palates, and other craniofacial anomalies to craniofacial anomaly teams.** (Baseline: In 1993, 23 States had systems for recording and referring infants and children with cleft lips, palates, and other craniofacial anomalies)

    Target Setting Method: Retain year 2000 target.

    Data Source: Survey of State dental directors, 1993, Illinois State Health Department.

Schools, in addition to providing education concerning oral health, increasingly are being used as a mechanism to increase access to and utilization of preventive health services. Through a system of oral health case management, triage, education, and prevention, children's oral health needs are assessed and referred to the private sector or community clinics where appropriate treatment can be rendered. Dental preventive services such as fluoride mouth rinse and dental sealants are being provided to those children in greatest need in some school-based and school-linked programs. Although baseline data will not be available until 2000 or 2001, the hope is that this objective will encourage and track in school settings the growth of dental preventive services and a system for oral health case management for children.

Access to care for both children and adults continues to be a problem for many, particularly those in low-income groups. To eliminate disparities in the provision of health care, more opportunities for dental services are needed in areas where need is demonstrated. Currently, approximately one-half of community-based health centers, placed in communities where the need has been demonstrated, have a dental component. These are ideal places to extend dental care to groups that traditionally have very limited access.

Residents of institutions face several barriers to obtaining needed dental services. Often residents have multiple chronic diseases, take medications that affect their oral health, or have diseases or disabilities that make brushing their teeth and flossing difficult or impossible. A decline in physical and oral health, use of one or more of the many medications that cause dry mouth (xerostomia), and inadequate access to dental care increase the risks of oral diseases such as yeast infections (candidiasis), root caries, coronal caries (caries not on the root surface), gingivitis, oral mucosal pathologies, and periodontal diseases.

The Surgeon General has recommended that all residents of long-term care facilities receive a dental examination within 30 days of admission. Similarly, the Department of Veterans Affairs recommends that "comprehensive intra-oral and extra-oral examination should be performed as soon as possible, but not longer than 30 days after admission" and that subsequent oral examinations "should be accomplished every 6 months at a minimum." Medicaid and Medicare standards call for all residents of nursing homes and

skilled nursing facilities to receive comprehensive health assessments that include a dental examination. For newly admitted residents, 1990 Medicare and Medicaid guidelines require an assessment to be performed within 4 days of admission.

Cleft lip and palate are reported in 760 to 930 per 100,000 live births and isolated cleft palate is reported in 470 to 570 per 100,000 live births. Several national and regional studies have found, however, that the incidence of both is underreported. In Illinois, for example, birth certificate data from 1986 to 1988 show underreporting of 35 percent. Improper case ascertainment and undiscovered cases are the primary reasons for underreporting. Physicians and nurses in hospital nurseries are usually the first to examine newborns and are responsible for noting congenital anomalies and describing them on the medical record. Therefore, hospital personnel must clearly understand the definitions of congenital defects and abnormalities of the lips and palate, properly examine newborns, and correctly record any malformations. Proper case ascertainment is important because newborns with cleft lip or palate should be referred immediately to an interdisciplinary team for intervention to minimize the physical and psychosocial trauma that can be associated with eating, drinking, speech, and hearing disorders. Although surgical repair of the lips can be performed soon after birth, repair of the palate should often be delayed several years to allow facial growth and arch development. Prompt professional attention to cleft lip and palate can help prevent these conditions from affecting sound child development. Therefore, children need to be enrolled in a system that provides for continuity of care. The potential of folic acid to reduce the incidence of cleft lip and palate is under study. Surveillance of cleft lip and palate cases to determine the potential of folic acid to reduce their incidence is important.

A recent study showed that children with no health insurance were 6 times more likely than insured children (24 percent vs. 4 percent) not to have a usual source of care. Uninsured children were 4 times as likely to have been unable to get dental care as insured children (17 percent vs. 4 percent).

Surveillance

19. (Developmental) Establish an oral health surveillance system in at least __ States.

Potential Data Source: Association of State and Territorial Dental Directors.

20. (Developmental) Ensure that all State health agencies and all local health agencies serving jurisdictions of 250,000 or more persons have an identifiable dental public health program in place that is directed by a dental professional.

Potential Data Source: Association of State and Territorial Dental Directors and the Association of Community Dental Programs.

The development of a surveillance system within States to assess their oral health needs may be crucial to the existence of many State-based oral health programs. Dental personnel must be present in State and local health departments to implement these programs. Presently only 31 States have a full-time dental director. Of 243 local health departments surveyed in 1995, approximately 165 had a dental program. Identification of those at highest risks for oral diseases and conditions with appropriate targeting of resources to intervene in these groups is essential for State and local dental programs. An oral health surveillance system would help to accomplish this goal. A surveillance system also should be linked to public health action. For example, a minimal oral health surveillance system for a State should be able to measure the following:

- Percentage of population on public water systems receiving fluoridated water

- Percentage of third graders with dental sealants (should be available if all States measure the Maternal and Child Health performance measure on sealants)

- Percentage of oropharyngeal cancer lesions detected at stage I

- Percentage of adult population age __ visiting the dentist within the past year (available on Behavioral Risk Factor Surveillance System)

- Percentage of Early and Periodic Screening, Diagnosis, and Treatment enrollees receiving preventive dental services

- Percentage of children born with cleft lips or with cleft palates, and with both cleft lips and palates.

21. Increase to 50 percent the number of adults aged 18 years and older who, in the last year, report having had an oropharyngeal cancer examination. (Baseline: in 1992, 7 percent of adults aged 18 and older reported having had an oropharyngeal cancer examination)

Select Populations	**1992**
African American, non-Hispanic male	3%
African American, non-Hispanic female	2%
American Indian/Alaska Native	Not available
Asian/Pacific Islander	Not available
Hispanic male	3%
Hispanic female	2%
White, non-Hispanic male	7%
White, non-Hispanic female	8%
Adults 18-74	7%
Male	6%
Female	7%
Below Federal poverty level	3%
At or above Federal poverty level	7%

Target Setting Method: 614 percent of baseline.

Data Source: Cancer Supplement, National Health Interview Survey (NHIS), CDC, NCHS.

Related Objectives From Other Focus Areas

Nutrition

1 Healthy weight
2 Obesity in adults
13 Meals and snacks at school
14 Nutrition education, elementary schools
15 Nutrition education, middle/junior high schools
16 Nutrition education, senior high schools
18 Nutrition assessment and planning
19 Nutrition counseling

Tobacco Use

1 Adult tobacco use
3 Adolescent tobacco use
5 Adolescent never smokers
6 Smoking cessation
10 Advice to quit smoking
11 Treatment of nicotine addiction
12 Providers advising smoking cessation
13 Physician inquiries about secondhand smoke
14 Tobacco-free schools
17 Enforcement of minors' access laws
20 Adolescent perception of harm of tobacco use
21 Tobacco use prevention education
24 State tobacco control programs
25 Preemptive tobacco control laws

Educational and Community-Based Programs

2 School health education
3 Undergraduate health risk behavior information
4 School nurse-to-student ratio
7 Patient satisfaction with health care provider communication
9 Community disease prevention and health promotion activities
10 Community health promotion initiatives
11 Culturally appropriate community health promotion programs
12 Elderly participation in community health promotion

Environmental Health

4 Waterborne disease
5 Water-related adverse health effects
25 Monitoring of exposure to other chemicals

Injury/Violence Prevention

7 Injury prevention and safety education
15 Safety belts and child restraints
16 Primary enforcement laws for safety belt use
17 Use of motorcycle helmets
25 Bicycle helmet laws
26 Bicycle helmet use, high school students
27 Bicycle helmet use
31 Head, face, eye, and mouth protection in school sports
32 Injury prevention counseling

Occupational Safety and Health

4 Overexertion or repetitive motion
8 Noise-induced permanent threshold shift
12 Latex allergy
15 Hepatitis B infections
16 Hepatitis B vaccinations

Access to Quality Health Services

A.1 Uninsured children and adults
A.2 Insurance coverage
A.4 Reporting on service delivery
A.5 Training to address health disparities
B.1 Source of ongoing primary care
B.2 Failure to obtain all needed health care
B.3 Lack of primary care visits
B.4 Access to primary care providers in underserved areas
B.5 Racial/ethnic minority representation in the health professions
B.6 Preventable hospitalization rates for chronic illness
D.1 Functional assessments
D.3 Access to the continuum of services

Maternal, Infant, and Child Health

11 Quality of prenatal care
17 Low birthweight
31 Newborn screening
37 Primary care services for babies 18 months and younger
38 Screening for vision, hearing, speech, and language impairments

Medical Product Safety

6 Provider review of medications taken by patients

Public Health Infrastructure

2 Training in essential public health services
3 Continuing education and training by public health agencies
6 Access to public health information and surveillance data
7 Tracking Healthy People 2010 objectives for select populations
8 Data collection for Healthy People 2010 objectives
9 Use of geocoding in health data systems
10 Performance standards for essential public health services
14 Model statutes related to essential public health services
15 Data on public health expenditures
16 Collaboration and cooperation in prevention research efforts
17 Summary measures of population health and the public health infrastructure

Health Communication

1 Public access to health information
3 Evaluation of communication programs
4 Satisfaction with health information

Cancer

6 Oropharyngeal cancer deaths
12 Oral, skin, and digital rectal examinations
14 Physician counseling of high-risk patients
15 Statewide cancer registries
16 Cancer survival rates

Diabetes

1 Type 2 diabetes
2 Diabetes prevalence
3 Diagnosis of diabetes

Immunization and Infectious Diseases

15 Occupational needle-stick exposures

Substance Abuse

9 Alcohol consumption

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