V. RISK AND PROTECTIVE FACTORS AFFECTING ORAL DISEASES

The most common oral diseases and conditions can be prevented. Safe and effective measures are available to reduce the incidence of oral disease, reduce disparities, and increase quality of life.

a. Community Water Fluoridation

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 [CDC 1999]. It is an ideal public health method because it is effective, eminently safe, inexpensive, requires no behavior change by individuals, and does not depend on 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 [USDHHS 2000a].

Recognizing the importance of community water fluoridation, *Healthy People 2010* Objective 21-9 is to "Increase the proportion of the U.S. population served by community water systems with optimally fluoridated water to 75 percent." In the United States during 2002, approximately 170 million persons (67 percent of the population served by public water systems) received optimally fluoridated water [CDC 2004].

Not only does community water fluoridation effectively prevent dental caries, it is one of very few public health prevention measures that offers significant cost savings to almost all communities [Griffin et al. 2001]. It has been estimated that about every $1 invested in community water fluoridation saves approximately $38 in averted costs. The cost per person of instituting and maintaining a water fluoridation program in a community decreases with increasing population size.

b. Topical Fluorides and Fluoride Supplements

Because frequent exposure to small amounts of fluoride each day will best reduce the risk of dental caries in all age groups, all people should drink water with an optimal fluoride concentration and brush their teeth twice daily with fluoride toothpaste [CDC 2001]. For communities that do not receive fluoridated water and persons at high risk of dental caries, additional fluoride measures might be needed. Community measures include fluoride mouth rinse or tablet programs, which typically are conducted in schools. Individual measures include professionally applied topical fluoride gels or varnish for persons at high risk of caries.

c. Dental Sealants

Since the early 1970s, the incidence of childhood dental caries on smooth tooth surfaces (those without pits and fissures) has declined markedly 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.

Pit-and-fissure dental sealants—plastic coatings bonded to susceptible tooth surfaces—have been approved for use for many years and have been recommended by professional health associations and public health agencies. First permanent molars erupt into the mouth at about age 6 years. 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 applied routinely to susceptible tooth surfaces in conjunction with the appropriate use of fluoride, most tooth decay in children could be prevented [USDHHS 2000b].

Second permanent molars erupt into the mouth at about age 12 to 13 years. Pit-and-fissure surfaces of these teeth are as susceptible to dental caries as the first permanent molars of younger children. Therefore, young teenagers need to receive dental sealants shortly after the eruption of their second permanent molars.

The *Healthy People 2010* target for dental sealants on molars is 50 percent for 8-year-olds and 14-year-olds. The most recent estimates of the proportion of children aged 8 years with dental sealants on one or more molars are presented in Table VII. Within each age group, African Americans and Mexican Americans are less likely than non-Hispanic whites to have sealants. The prevalence of sealants also varies by the education level of the head of household.

Table VII. Percentage of Children in United States and <STATE> with Dental Sealants on Molar Teeth, by Age and Selected Characteristics

Children, Selected Ages, 1999–2000 (unless otherwise indicated)	Dental Sealants on Molars			
	21-8a. Aged 8 years		21-8b. Aged 14 years	
	United States, (8-year-olds)* (%)	<STATE>, 3rd graders [d] (%)	% United States* (%)	<STATE> [d] (%)
***Healthy People 2010* Target**	50		50	
TOTAL	28		14	
Race or ethnicity				
American Indian or Alaska Native	63 [a]		46 [a]	
Asian or Pacific Islander	DSU		DSU	
Asian	DNC		DNC	
Native Hawaiian or other Pacific Islander	20 [b]		---	
Black or African American	11 [c]		5 [c]	
White	26 [c]		19 [c]	
Hispanic or Latino	DSU		DSU	
Mexican American	10 [c]		DSU	
Not Hispanic or Latino	25 [c]		DNA	
Black or African American, not Hispanic or Latino	23		14	
White, not Hispanic or Latino	35		16	
Sex				
Female	31		12	
Male	25		17	
Education Level (head of household)				
Less than high school	17 [c]		4 [c]	
High school graduate	12 [c]		6 [c]	
At least some college	35 [c]		28 [c]	
Disability Status				
Persons with disabilities	DNA		DNA	
Persons without disabilities	DNA		DNA	
Select Populations				
3rd grade students	26 [c]		NA	

Table VII Sources:
Healthy People 2010, Progress Review, 2000. U.S. Department of Health and Human Services.
Available at www.cdc.gov/nchs/ppt/hpdata2010/focusareas/fa21.xls.
<These data will be updated in 2006.>

--- = Data not available
DNA = Data not analyzed
DNC = Data not collected
DSU = Data are statistically unreliable or do not meet criteria for confidentiality
NA = Not applicable

*National data are from NHANES 1999–2000 unless otherwise indicated.
[a] Data are for IHS service areas, 1999.
[b] Data are for Hawaii, 1999.
[c] Data are from NHANES III, 1988–1994.
[d] <State Data Source(s)>

d. Preventive Visits

Maintaining good oral health takes repeated efforts on the part of the individual, caregivers, and health care 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 that is being tracked, as shown in Table VIII, is the percentage of adults who had their teeth cleaned in the past year. Having one's teeth cleaned by a dentist or dental hygienist is indicative of preventive behaviors.

Table VIII. Percentage of Adults Aged 18 Years or Older Who Had Their Teeth Cleaned Within the Past Year, 2002

	Median % United States (%)	<STATE>[a] Status (%)
Total	69	
Age		
18 – 24 years	70	
25 – 34 years	66	
35 – 44 years	69	
45 – 54 years	71	
55 – 64 years	73	
65 + years	72	
Race		
White	72	
Black	62	
Hispanic	65	
Other	64	
Multiracial	56	
Sex		
Male	67	
Female	72	
Education Level		
Less than high school	47	
High school or G.E.D.	65	
Some post high school	72	
College graduate	79	
Income		
Less than $15,000	49	
$15,000 – 24,999	56	
$25,000 – 34,999	65	
$35,000 – 49,999	72	
$50,000+	81	

Table VIII Sources:
Division of Adult and Community Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, *Behavioral Risk Factor Surveillance System Online Prevalence Data*, 1995–2004.
Available at www.cdc.gov/brfss.

[a] <State Data Source(s)>

e. Screening for Oral Cancer

Oral cancer detection is accomplished by a thorough examination of the head and neck; an examination of the mouth including the tongue, the entire oral and pharyngeal mucosal tissues, and the lips; and palpation of the lymph nodes. Although the sensitivity and specificity of the oral cancer examination have not been established in clinical studies, most experts consider early detection and treatment of precancerous lesions and diagnosis of oral cancer at localized stages to be the major approaches for secondary prevention of these cancers [Silverman 1998; Johnson 1999; CDC 1998]. If suspicious tissues are detected during an examination, definitive diagnostic tests, such as biopsies, are needed to make a firm diagnosis.

Oral cancer is more common after the age of 60 years. Known risk factors include use of tobacco products and alcohol. The risk of oral cancer is increased 6 to 28 times in current smokers. Alcohol consumption is an independent risk factor and, when combined with the use of tobacco products, accounts for most cases of oral cancer in the United States and elsewhere [USDHHS 2004a]. Individuals should also be advised to avoid other potential carcinogens, such as exposure to sunlight (a risk factor for lip cancer) without protection (use of lip sunscreen and hats is recommended).

Recognizing the need for dental and medical providers to examine adults for oral and pharyngeal cancer, *Healthy People 2010* Objective 21-7 is to increase the proportion of adults who, in the past 12 months, report having had an examination to detect oral and pharyngeal cancers. Nationally, relatively few adults aged 40 years and older (13%) reported receiving an examination for oral and pharyngeal cancer, although the proportion varied by race/ethnicity (TABLE IX).

Table IX. Proportion[a] of Adults in the United States and <STATE> Who Were Examined for Oral and Pharyngeal Cancer in the Preceding 12 Months

Adults Aged 40 Years and Older	Oral and Pharyngeal Cancer Examination in Past 12 Months	
	United States (1998) (%)	<STATE>[c] (%)
***Healthy People 2010* Target**	20	20
TOTAL	13	
Race or ethnicity		
American Indian or Alaska Native	DSU[b]	
Asian or Pacific Islander	12[b]	
Asian	12[b]	
Native Hawaiian and other Pacific Islander	DSU[b]	
Black or African American only	7[b]	
White only	14[b]	
2 or more races	DNC	
American Indian or Alaska Native; White	DNC	
Black or African American; White	DNC	
Hispanic or Latino	6	
Not Hispanic or Latino	14	
Black or African American, not Hispanic or Latino	6[b]	
White, not Hispanic or Latino	15[b]	
Sex		
Female	14	
Male	12[b]	
Education Level		
Less than high school	5	
High school graduate	10	
At least some college	19	

Table IX Sources:
H*ealthy People 2010, Progress Review, 2000.* U.S. Department of Health and Human Services.
Available at www.cdc.gov/nchs/ppt/hpdata2010/focusareas/fa21.xls.
<These data will be updated in 2006.>

DNC = Data not collected
DSU = Data are statistically unreliable or do not meet criteria for confidentiality
[a] Age adjusted to the year 2000 standard population.
[b]Persons reported only one race or reported more than one race and identified one race as best representing their race.
[c] <State data source>

f. Tobacco Control

Tobacco use has a devastating effect on the health and well-being of the public. More than 400,000 Americans die each year as a direct result of cigarette smoking, making it the nation's leading preventable cause of premature mortality, and smoking causes over $150 billion in annual health-related economic losses [CDC 2002]. The effects of tobacco use on the public's oral health are also alarming. The use of any form of tobacco — including cigarettes, cigars, pipes, and smokeless tobacco — has been established as a major cause of oral and pharyngeal cancer [USDHHS 2004a]. The evidence is sufficient to consider smoking a causal factor for adult periodontitis [USDHHS 2004a]; one-half of the cases of periodontal disease in this country may be attributable to cigarette smoking [Tomar & Asma 2000]. Tobacco use substantially worsens the prognosis of periodontal therapy and dental implants, impairs oral wound healing, and increases the risk of a wide range of oral soft tissue changes [Christen et al. 1991; AAP 1999].

Comprehensive tobacco control would have a large impact on oral health status. The goal of comprehensive tobacco control programs is to reduce disease, disability, and death related to tobacco use by

- Preventing the initiation of tobacco use among young people.
- Promoting quitting among young people and adults.
- Eliminating nonsmokers' exposure to secondhand tobacco smoke.
- Identifying and eliminating the disparities related to tobacco use and its effects among different population groups.

National and state data on Behavioral Risk Factor Surveillance System (BRFSS):
http://apps.nccd.cdc.gov/brfss/page.asp?cat=TU&yr=2004&state=US#TU

National data on National Youth Tobacco Survey:
http://www.cdc.gov/tobacco/research_data/youth/mmwr_5412_intro.htm

National and state data on Youth Risk Behavioral Surveillance System:
http://apps.nccd.cdc.gov/yrbss/ and
http://apps.nccd.cdc.gov/yrbss/CategoryQuestions.asp?Cat=2&desc=Tobacco%20Use

Other national sources include the National Health Interview Survey (NHIS):
http://www.cdc.gov/nchs/nhis.htm,
and the National Health and Nutrition Examination Survey (NHANES):
http://www.cdc.gov/nchs/nhanes.htm.

The dental office provides an excellent venue for providing tobacco intervention services. More than one-half of adult smokers see a dentist each year [Tomar et al. 1996]. Dental patients are particularly receptive to health messages at periodic check-up visits, and oral effects of tobacco use provide visible evidence and a strong motivation for tobacco users to quit. Because dentists and dental hygienists can be effective in treating tobacco use and dependence, the identification, documentation, and treatment of every tobacco user they see needs to become a routine practice in every dental office and clinic [Fiore et al. 2000]. However, national data from the early 1990s indicated that just 24 percent of smokers who had seen a dentist in the past year reported that their dentist advised them to quit, and only 18 percent of smokeless tobacco users reported that their dentist *ever* advised them to quit.

Cigarette smoking among adults 18 years older is described in Table X. Data from the Youth Risk Behavior Surveillance System on students who smoked or used other tobacco products are shown in Table XI.

Table X. Cigarette Smoking Among Adults Aged 18 Years and Older

Healthy People 2010* Target: *12%	**United States[a] (%)**	**<STATE> Status[b] (%)**
Total	24	
Race or Ethnicity		
American Indian or Alaska Native	35	
Asian or Pacific Islander	13	
Asian	13	
Native Hawaiian and other Pacific Islander	17	
Black or African American	25	
White	25	
Hispanic or Latino	19	
Not Hispanic or Latino	25	
Black or African American	25	
White	25	
Sex		
Female	22	
Male	26	

Table X Sources:
H*ealthy People 2010*, 2nd Ed. U.S. Department of Health and Human Services, November 2000.
<These data will be updated in 2006.>

[a] Age-adjusted to the Year 2000 standard population.
[b] <State Data Source(s)>

Table XI. Percentage of Students in High School (Aged 12–21 years) who Smoked Cigarettes or who Used Chewing Tobacco or Snuff One or More of the Past 30 Days

	Cigarettes United States (%)	Cigarettes <STATE> (%)	Chew United States (%)	Chew <STATE> [a] (%)
Total	22		7	
Race				
White	25		8	
Black	15		3	
Hispanic	18		5	
Other	18		10	
Sex				
Female	22		2	
Male	22		11	

Table XI Sources:
Division of Adolescent and School Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Youth Risk Behavior Surveillance System Online, Available at http://apps.nccd.cdc.gov/yrbss/SelQuestyear.asp?cat=2&desc=Tobacco%20Use&loc=XX.

[a]<State Data Source(s)>

g. Oral Health Education

Oral health education for the community is a process that informs, motivates, and helps people to adopt and maintain beneficial health practices and lifestyles; advocates environmental changes as needed to facilitate this goal; and conducts professional training and research to the same end [Kressin & DeSouza 2003]. Although health information or knowledge alone does not necessarily lead to desirable health behaviors, knowledge may help empower people and communities to take action to protect their health.