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ORAL CANCER

Oral cancer is cancer of the mouth and surrounding tissues. It includes the lips, inside lining of the lips and cheeks (buccal mucosa), gingiva (gums), tongue, floor of the mouth below the tongue, hard palate (roof of the mouth), and the area behind the wisdom teeth called the retromolar trigone.

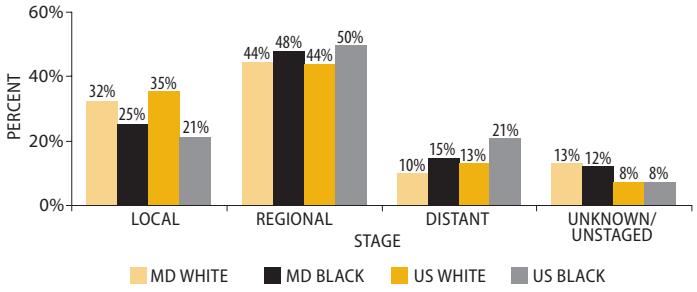
DID YOU KNOW?

Oral cancer can form in any part of the mouth or throat. Most oral cancers begin in the tongue and in the floor of the mouth.

ORAL CANCER also includes the oropharynx (base of the tongue), soft palate (roof of the mouth behind the hard palate), tonsils, and sides and back wall of the throat. The American Cancer Society estimates that approximately 35,700 new cases of oral cancer will occur in the United States in 2009, and about 7,600 individuals will die from this disease.[1] In the United States, oral cancers are more common than Hodgkin lymphoma, or cancer of the brain, liver, bone, stomach, ovary, or cervix.[1] The signs and symptoms of oral cancer are described on the Maryland Cancer Plan Web site (www.marylandcancerplan.org) on the Oral Cancer page.

Approximately 90% of all oral cancers are squamous cell carcinomas, and the remainder are salivary gland tumors and lymphomas. Oral squamous cell carcinomas generally develop after a long period of time from precancerous red-colored patches (erythroplakia) and, to a lesser extent, from white-colored patches (leukoplakia) in the mouth or on the lips. These cancers are primarily caused by tobacco use alone or in combination with heavy alcohol use.[2] If not detected early, squamous cell carcinomas can extend into nearby tissues and metastasize to regional lymph nodes in the head and neck. Treatment for oral cancer at all stages can cause disfigurement and dysfunction, but once oral cancer spreads, the course of treatment can cause severe disfigurement, pain, and dysfunction that affects speech, chewing, swallowing, and general quality of life. The most common sites for oral cancers are the tongue including the ventrolateral (side of the tongue near the back) and base of the tongue (25% of all oral cancers), tonsils

FIGURE 12.1 Oral Cancer Stage at Diagnosis by Race in Maryland and the US, 2002-2006



Source: Maryland Cancer Registry, 2002-2006.

FAST FACT Anyone can get oral cancer, but the risk is higher for users of tobacco or alcohol, males, those over age 40, and those who have a history of head or neck cancer. Frequent sun exposure is also a risk for lip cancer.

(10-15%), lips (10-15%), and salivary glands (10-15%) with the remainder in the floor of the mouth, gingiva, and other sites.[2]

Individuals 45 years of age and over comprise more than 90% of all oral cancers.[2] Nationally, oral cancers account for 2% of all cancers for both genders; men account for more of these cancers than women.[2,3] Because of changing smoking patterns, the male-to-female ratio has decreased from 6:1 in 1950 to 2.5:1 at present.[4] Further, oral cancers occur slightly more frequently in blacks or African Americans than in whites with black or African American males accounting for this disparity.[4] Fortunately, new cases of oral cancer have been decreasing for both whites and blacks or African Americans since 2000.[4] While oral cancer mortality rates are decreasing for both blacks or African Americans and whites, these rates remain disproportionately high for US blacks or African Americans. This is especially true for black or African American males, who experience approximately one and a half times the mortality rate of US white males.[4]

The five-year oral cancer survival rate has improved somewhat over the past 30 years although not as much as for most major cancers. The overall five-year relative survival rate for 1999-2006 for oral cancer was 62.7%. Black or African American men had disproportionately lower five-year relative survival rates (40.1%) compared to white men (64.4%), white women (65.6%), and black or African American women (65.8%).[4] Diagnosis of oral cancer at advanced stages is likely responsible for the low survival rate associated with oral cancers relative to other major malignancies.

Nationally, approximately 34% of oral cavity and pharynx cancer cases were diagnosed while the cancer was still confined at a localized stage (i.e., primary site) with 44% being diagnosed at a regional stage (after the cancer has spread to regional lymph nodes or directly beyond the primary site), 14% diagnosed at a distant stage (after the cancer has already metastasized), with the remaining 8% reported as unknown stage.[4] The corresponding five-year relative survival rates were 82.7% for localized, 54.3% for regional, and 31.8% for distant stage.[4]

In the United States, only 23% of blacks or African Americans with oral cancer are diagnosed at a local stage compared to 36% for whites.[4] A comparison of regional staging shows higher rates in blacks or African Americans (50%) than in whites (44%); for distant staging, blacks or African Americans (21%) have nearly a twofold difference compared with whites (13%).[4] Figure 12.1 shows a comparison of cancer stage at diagnosis by race in Maryland and nationwide; Maryland exhibits less difference by race than the US. Although clinically more visible than most other cancers, and amenable to detection through screening tools such as physical observation and palpation, most oral cancers are detected and diagnosed at regional or distant stages.

Risk Factors and Primary Prevention

Several risk factors increase the chance of developing oral cancer, including the following.

Tobacco and alcohol use

THE PRIMARY RISK FACTORS for oral cancer are past and present use of tobacco products including cigarettes, cigars, pipe and spit tobacco, and alcohol.[5,6,7] Tobacco and alcohol use account for 75% of all oral cancers. Compared to nonsmokers, smokers have up to an 18-fold risk of developing oral cancer. Heavy alcohol drinkers (men who drink more than four standard drinks per day or more than fourteen per week and women who drink more than three per day or more than seven per week)[8] who smoke more than one pack of cigarettes a day are at an even higher risk for oral cancer than those who use neither tobacco nor alcohol. It is believed that alcohol acts as a facilitator for the penetration of tobacco carcinogens into the soft tissues of the mouth. In addition, evidence suggests that marijuana use may also increase the risk for oral cancer.[9]

Because of confounding factors from concurrent tobacco and alcohol use and different patterns of spit tobacco use, the role of spit tobacco in oral cancer development is less clear than that of other forms of tobacco use.[10,11] However, various national and international agencies and advisory committees have concluded that the many forms of spit tobacco, including snuff and chewing tobacco, do play a role in oral cancer development, especially in younger age groups who more frequently use this form of tobacco.[12] Other types of tobacco use and behaviors specific to Southeast Asia and India but increasing in the US (such as paan, bidis, and betel or areca nut use) have been found to give rise to submucous fibrosis, a precancerous condition consisting of generalized fibrosis of the oral soft tissues.[13,14,15]

Sun exposure

UNPROTECTED EXPOSURE to UV radiation is the primary risk factor for lip cancer.[16]

Viruses

EXPOSURE TO VIRUSES such as human papillomavirus (HPV), herpes simplex type 1, and Epstein-Barr Virus (EBV) are risk factors.[17,18] Viruses are capable of producing cancer-causing genes called oncogenes. Many oncogenes have been found in oral cancers and are thought to develop through an array of genetic mutations and alterations. Various herpes virus types have been discovered in oral cancers including Kaposi's sarcoma, a rare cancer found in AIDS patients that is often first detected in the oral cavity.[19,20] In addition to these viruses acting as etiologic agents in oral cancer development, fungal infections caused by strains of Candida albicans may cause oral cancer through the development of carcinogenic nitrosamines in the oral soft tissues.[21]

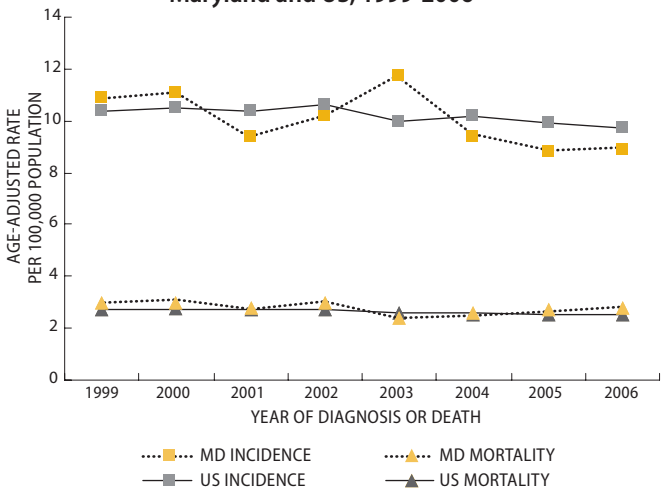
HPV has been isolated in oropharyngeal precancerous and squamous cell carcinoma lesions and is known to act as a co-factor in cancer development in both cervical and oral cancers.[22,23] Targets for HPV-associated oral cancer include the tonsils and base of the tongue; cancer at these sites appears to be more prevalent in younger, non-smoking individuals, who have a different risk profile than groups traditionally at risk for oral cancer. The risk factors for HPV infection preceding oral and cervical cancer development include having multiple sex partners, having a partner who has had numerous partners, and having a weakened immune system.[24]

Approximately 25% of all head and neck cancers (primarily cancers of the base of the tongue and tonsil) are caused by HPV.[22] A recent study showed that 34% of head and neck cancers were HPV positive in white patients whereas only 4% of head and neck cancers were HPV positive in black or African American patients. This may contribute to poor treatment outcomes in the black or African American population because HPV-positive tumors are more sensitive to treatment than HPV-negative tumors.[25] More information on HPV and oral cancer is posted on the Maryland Cancer Plan Web site (www.marylandcancerplan.org) on the Oral Cancer page.

Diet

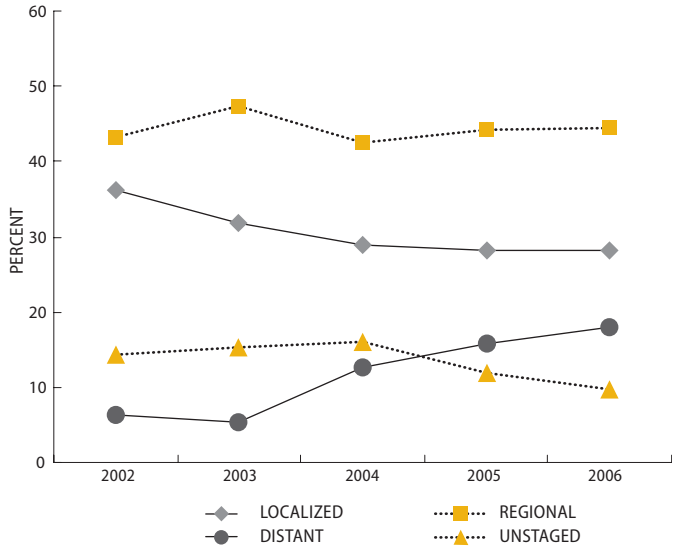
POOR DIETARY INTAKE OF ESSENTIAL NUTRIENTS from fruits and vegetables may also be a risk factor for oral cancer.[26] A diet consisting of daily intake of fruits, vegetables, and dietary fibers may protect against early oral cancers and precancerous lesions, especially among smokers. In addition, the role of antioxidants—including vitamins A, C, and E,

FIGURE 12.2 Oral Cancer Incidence and Mortality Rates by Year of Diagnosis or Death, Maryland and US, 1999-2006



Rates are age-adjusted to 2000 US standard population.
Sources: Maryland Cancer Registry, 1999-2006.
NCI SEER*Stat (US SEER 13 rates).
NCHS Compressed Mortality File in CDC WONDER .

FIGURE 12.3 Oral Cancer by Stage at Diagnosis Maryland, 2002-2006



Source: Maryland Cancer Registry, 2002-2006.

FAST FACT A diet consisting of daily intake of fruits, vegetables, and dietary fibers may protect against early oral cancers and precancerous lesions, especially among smokers.

dietary selenium, folate, and certain carotenoid and retinoid compounds—is being studied. If such a link is definitively established, dietary nutrients could play a major role in helping prevent oral cancer development.[27,28]

Burden of Oral Cancer in Maryland

Incidence Rates

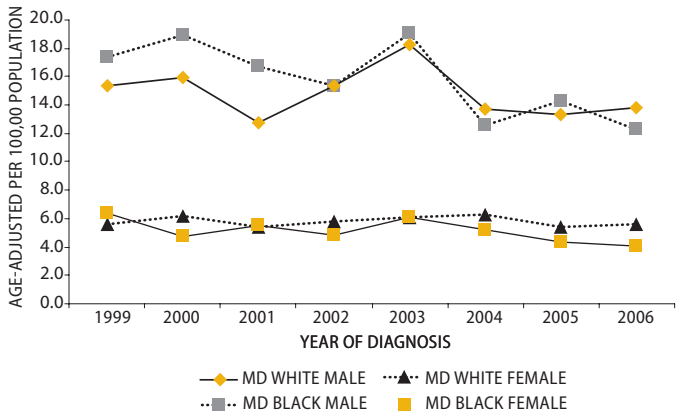
IN 2006, 520 newly diagnosed cases of oral cavity and pharynx cancer were reported in Maryland. The annual age-adjusted incidence rate for oral cancers in Maryland is 8.9 per 100,000, which is less than the national rate of 10.2 (Figure 12.2). In 2006, 28.1% of oral cancers were diagnosed at the localized (early) stage, and more than 44% were diagnosed at a regional stage (Figure 12.3). Because oral cancer has a far better prognosis when found early at the local stage, diagnosis at a regional stage contributes to a lower survival rate.

From 1999 to 2006, Maryland males had a higher oral cancer incidence rate than females. Incidence rates for black or African American men and women continue to decline faster than for whites (Figure 12.4).

Mortality Rates

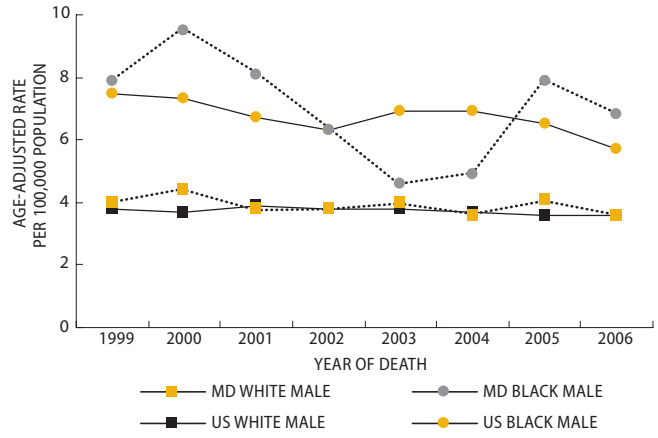
THE ORAL CANCER MORTALITY RATE in Maryland has significantly decreased over the past ten years. According to the CDC, Maryland ranked 20th among all states between 2002-2006, compared to 8th in the time period from 1997-2001.[4] An overall decline in the oral cancer mortality rate for black or African American males since 1999 has contributed to this improved oral cancer mortality (Figure 12.5).

FIGURE 12.4 Oral Cancer Incidence by Race and Gender, Maryland, 1999-2006



Rates are age-adjusted to 2000 US Standard population.
Source: Maryland Cancer Registry, 1999-2006.

FIGURE 12.5 Oral Cancer Mortality Rates Among Males by Race, Maryland and US, 1999-2006



Rates are age-adjusted to 2000 US standard population.
Source: NCHS Compressed Mortality File in CDC WONDER.

In 2006, there were 158 deaths from oral cancer in Maryland. Mortality rates for oral cancer show an overall slight downward trend (Figure 12.2). When compared by race and gender, males consistently have higher mortality rates than females. Historically, black or African American males have a higher mortality rate than white males although the gap between white and black or African American males has decreased.[29]

Disparities

Maryland blacks or African Americans bear a disproportionate share of the oral cancer burden including higher incidence and mortality and later stage at diagnosis when compared to white men (Figures 12.1, 12.4, 12.5).

IN ADDITION TO DIFFERENCES in risk factors and tumor types, this disparity in oral cancer burden is likely related to the inequity in access to healthcare, specifically oral healthcare, which exists between blacks or African Americans and whites.[30] While access to oral healthcare in Maryland is not this chapter's focus, access clearly looms as a significant impediment to receiving routine oral cancer examinations to facilitate early diagnosis.

In addition, new research[31] suggests that lower levels of HPV infection in blacks or African Americans compared to whites may contribute to poorer outcomes in blacks or African Americans because HPV-positive patients with oral cancer respond better to treatment.

Oral Cancer Examination

Incorporating routine oral cancer examinations (and other screening methods for oral cancer) into the daily practice of healthcare practitioners can increase the likelihood of earlier detection of oral

FAST FACT When comparing by race and gender, males consistently have higher mortality rates than females. Historically, black or African American males have a higher mortality rate than white males although the gap between white and black or African American males has decreased.

cancer. However, there is no evidence that such early detection can decrease oral cancer mortality.[32]

NEVERTHELESS, ROUTINE EXAMINATIONS for early detection of oral cancer should still be recommended because:

- Oral cancer is a serious yet treatable disease in its early stages.
- Treatment in the early stages of oral cancer is generally better tolerated compared with later treatment of symptomatic patients.
- Screening examinations are inexpensive and safe.[33]

THE ORAL CANCER EXAMINATION can be performed easily and takes no more than two minutes.[34] Although dentists and dental hygienists are the ideal health practitioners to perform this examination, other providers (i.e., nurse practitioners, physician assistants, and physicians) can and should provide oral cancer examinations as part of routine physical examinations. Because individuals at high risk for oral cancer are more likely to visit these providers than to visit a dentist or dental hygienist, non-dental healthcare providers may be critically important to screening efforts.

First, a careful health history must be completed, assessing risk factors such as past and present tobacco and alcohol use, diet and lifestyle, prior cancer history, sun exposure experience and behaviors, surgeries, medications, and sexual practices (to discern possible HPV exposure).[35] A detailed description of the oral cancer examination may be found at the Maryland Cancer Plan Web site (www.marylandcancerplan.org) on the Oral Cancer page.

Two technologies that may aid identification and diagnosis of oral cancer are toluidine blue stain and the chemoluminescent light. These two agents are useful to identify lesions that may require biopsy, but are not ordinarily used for population-based screening.[35]

Screening Recommendations of Professional Groups

Prominent professional and governmental groups have developed guidelines for oral cancer screening, but there is a lack of consensus. There is no clear direction or guidance for healthcare professionals and the public.

A SUMMARY OF THESE RECOMMENDATIONS can be found on the Maryland Cancer Plan Web site (www.marylandcancerplan.org) on the Oral Cancer page. The appropriate clinical trials to assess the effectiveness of early detection in finding oral cancer at a local stage and/or reducing oral cancer mortality have not been performed. However, in the absence of such research-based evidence for oral cancer screening, there is anecdotal data to support the need for oral cancer screening by all healthcare professionals.

Despite a lack of consensus among groups that issue screening guidelines, the Oral Cancer Committee believes that oral cancer screening is and should be an important and necessary part of each dental and medical examination. Early detection of oral cancer and pre-oral cancer conditions at a local stage enables less invasive treatment options. Quality of life for the patient (and family) is markedly improved compared to treatment for oral cancer at a later stage. In addition, treatment costs for oral cancer may be reduced when oral cancer is detected and treated early.

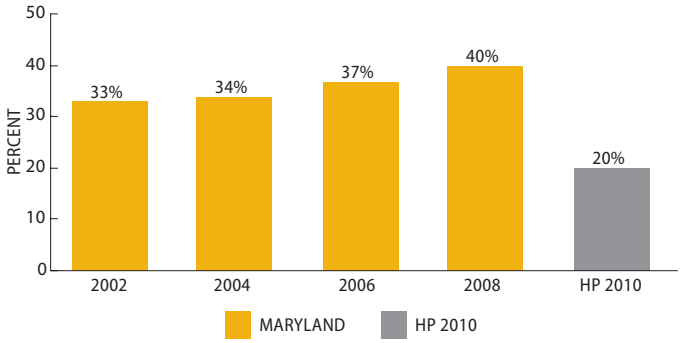
Oral Cancer Examination Rates

Progress has been made in oral cancer screening rates in Maryland.

THE 2008 MARYLAND CANCER SURVEY found that 40% of Marylanders ages 40 or over reported that they had received an oral cancer examination in the past year (compared to 33.9% in 2002). Fifty percent of adults ages 40 and over reported that they received an oral cancer examination at least once in their lifetime (compared to 42.8% in 2002). Only 23% of black or African American Marylanders ages 40 or over reported having an

FAST FACT According to the 2008 Maryland Cancer Survey, 40% of Marylanders ages 40 or over have received an oral cancer exam in the past year, and 50% of adults ages 40 and over have received an oral cancer exam at least once in their lifetime.

FIGURE 12.6 Percentage of Maryland Adults* Having an Oral Cancer Exam in Past 12 Months Compared to Healthy People (HP) 2010 Target 2002-2008



* Adults age 40 years and older.
Sources: Maryland Cancer Survey, 2002, 2004, 2006, and 2008.
Healthy People 2010, US Department of Health and Human Services, 2000.

oral cancer examination in the past year. Nevertheless, these oral cancer exam rates surpass the goal of the Healthy People 2010 target of 20% (Figure 12.6).[36] Despite this progress, there is considerable room for improvement in the proportion of Marylanders who receive oral cancer examinations: while 73% of Marylanders ages 40 and over reported that they had a dental visit in past year, only 40% reported that they had had an oral cancer exam.

In sum, despite the significant improvement in oral cancer exam rates, a trend toward earlier diagnosis of patients with oral cancer has yet to be seen.

Barriers to Oral Cancer Examination

In addition to the lack of consensus for oral cancer screening guidelines, the low examination rates described here result from a number of significant financial, educational, and behavioral barriers.

THESE OBSTACLES include lack of access to dental care services as well as a lack of oral cancer knowledge that likely affects behaviors of both the public and healthcare practitioners.

Lack of access to, and use of, oral health services for high-risk populations

ORAL CANCER EARLY DETECTION AND DIAGNOSIS SERVICES

FOR THOSE AT HIGHEST RISK for oral cancer, access to the healthcare system is limited both in the US and in Maryland. Access is critical in order to receive timely and appropriate oral cancer examinations. It is well established that those populations with the highest oral cancer mortality rates experience the poorest access to the overall healthcare system.[30] Populations at high risk for oral cancer with restricted access to the healthcare system include individuals with minority status, low income, low education, no health insurance, and who are 65 years of age or older. Unfortunately for these populations, access to dental care services is even more limited.

Medicare Part A covers costly hospital-based surgical procedures for oral and pharyngeal cancer but does not cover inexpensive and routine dental procedures (including oral cancer examinations). Medicare Part B covers outpatient doctor visits but not dental visits. As in most states, Medicaid dental coverage in Maryland for adults 64 years and younger is very limited and unavailable to patients over 65. As a result of the lack of coverage for dental visits, populations at risk for oral cancer are more likely to visit a healthcare provider other than a dentist, and the frequency of visits to primary care providers is far greater than it is to dental practices.[37] Studies show that primary healthcare providers diagnosed more oral cancers than dentists and that the majority of these malignancies were detected at a late stage in their development.[38]

ORAL CANCER TREATMENT AND REFERRAL SERVICES

GENERALLY, PRIVATE OR PUBLIC medical insurance packages provide access to oral cancer treatment services. However, these services are usually unavailable for uninsured adults not yet eligible for Medicare. Further, once a lesion is detected

or suspected of being malignant through oral cancer examination, many patients experience difficulties in obtaining more extensive and definitive diagnostic services such as biopsy. Referral systems for these services are often small and random, if present at all, leading to additional continuity problems for patients who will eventually need treatment for oral cancer.

Lack of Oral Cancer Literacy

INADEQUATE PUBLIC KNOWLEDGE AND PREVENTIVE BEHAVIORS

STUDIES CONDUCTED in the US and Maryland show that the public is not well informed about oral cancer and its prevention. Only 23% of the Maryland public could identify an early oral cancer symptom.[39] While most respondents correctly identified tobacco use as an oral cancer risk factor, only 13% knew that alcohol was also a major risk factor for this disease. Similar low responses were given for other oral cancer risk behaviors.

Inadequate health knowledge is compounded by the public's poor health-conscious practices, as evidenced by minimal use of dental healthcare services among individuals at high risk for oral cancer when controlling for socioeconomic, demographic, and health-related characteristics. Poor use of dental healthcare services occurs among high-risk adults who are long-term smokers and low consumers of fruits and vegetables.[40]

Long-term adult cigarette smokers are less likely than never smokers to have visited the dentist in the previous year. Among long-term cigarette smokers, the likelihood of a yearly dental examination decreases with increasing smoking duration and number of cigarettes smoked per day. Beyond not receiving oral cancer examinations by dental practitioners, these individuals are also not receiving healthy lifestyle and diet counseling by the healthcare practitioners most likely to make connections between risk factors and oral cancer.[40]

In addition to helping the Maryland public gain greater knowledge and understanding about oral cancer, it is vital that the public become functionally literate in how to obtain appropriate health services.

DID YOU KNOW? According to a Maryland study, only 25% of the public can identify an early oral cancer symptom. Only 13% know that alcohol is a major risk factor for the disease.

INADEQUATE TRAINING IN ORAL CANCER PREVENTION AND SCREENING DETECTION PRACTICES

A PILOT STUDY conducted in Maryland found that dentists were not as knowledgeable about oral cancer prevention as they thought and that most physicians did not believe that their oral cancer knowledge was current.[41] The oral cancer knowledge base of these practitioner groups was found to play a significant role in their related examination behaviors. While the vast majority of dentists were providing oral cancer examinations, a high proportion of these examinations likely were not performed properly. Among physicians, those who did not believe their oral cancer knowledge to be current were less likely to provide routine oral cancer examinations.[41]

More representative, broad-based studies of Maryland dentists and dental hygienists corroborated the findings of the earlier pilot study. However, these studies also found that healthcare providers did not feel adequately trained to palpate neck lymph nodes as part of their oral cancer examination and that they were not examining high-risk edentulous patients.[42,43] Non-dental health providers such as family physicians and family nurse practitioners were also found to have low oral cancer knowledge.[44,45]

Further, to increase patient comprehension and encourage patients to play a more active role in their own healthcare and maintenance, healthcare providers must receive training to improve their communications skills.

Ideal Model for Oral Cancer Control

An Oral Cancer Prevention, Early Detection, and Treatment Model has been developed to decrease oral cancer incidence and mortality by increasing oral cancer literacy among specific groups: the public, healthcare providers, and policymakers.

SUCH KNOWLEDGE includes an understanding and awareness of oral cancer risk assessment and reduction, risk factors and behaviors, signs and symptoms, and the rudiments and frequency

of adequate and timely oral cancer examinations.

Improving oral cancer literacy will promote more routine, timely, and comprehensive oral cancer examinations that are requested by an informed public and adequately provided by informed dental and non-dental healthcare practitioners. In addition, informing and engaging policymakers will impact oral cancer prevention through legal, educational, scientific, fiscal, and curricular change. The public needs to be specifically targeted for these messages through appropriate channels. Dental and non-dental provider education must be enhanced through wider availability of oral cancer continuing education courses and curricular change. These public and healthcare provider strategies should increase the number of appropriate oral cancer examinations and related referral, follow-up, and treatment modalities.

The increase in appropriate oral cancer examination, referral, follow-up, and related treatment efforts, coupled with policy change, should lead to reduced oral cancer morbidity and mortality in Maryland and a significantly smaller disparity in these rates between blacks or African Americans and whites. Further, policymakers at all levels, including legislative, governmental, professional associations, and education (K-12 and higher education), must be an integral part of a comprehensive oral cancer prevention program. A diagram of the Ideal Model is posted on the Maryland Cancer Plan Web site (www.maryland-cancerplan.org) on the Oral Cancer page.

Current Efforts in Maryland

Oral cancer prevention and early detection efforts in Maryland are largely facilitated by the Department of Health and Mental Hygiene's (DHMH) Office of Oral Health (OOH) and Cigarette Restitution Fund Program (CRFP).

BOTH THE OOH AND CRFP ORAL CANCER PROGRAMS provide grant funds to local health departments for the provision of oral cancer screening and education to the general public and healthcare providers. The focus of oral cancer prevention and early detection activities within DHMH can be attributed to several significant developments in the past 20 years.

In the early 1990s, a small partnership among diverse organizations developed in an attempt to reduce the high rates of oral cancer morbidity and mortality in Maryland and to reduce the disparity in oral cancer rates between whites and blacks or African Americans.[38] This partnership encompassed educational, networking, and advocacy activities throughout the state in order to enhance awareness, knowledge, and understanding of oral cancer. These activities led to two important outcomes that advanced oral cancer awareness in Maryland: 1) inclusion of two oral cancer prevention objectives in the Maryland Health Improvement Plan and 2) inclusion of oral cancer as one of seven targeted cancers in the Cigarette Restitution Fund (CRF) program.

Another major outcome of this partnership was the funding of a DHMH oral-cancer-specific program by the Maryland General Assembly in 2000. This program resulted in the current statewide oral cancer prevention initiative led by OOH. This legislation requires OOH to prevent and detect oral cancer in the state, with a specific emphasis on targeting the needs of high-risk, underserved populations. The major components of this initiative include:

- Oral cancer education for the public.
- Education and training for dental and non-dental healthcare providers.
- Screening and referral, if needed.
- Conducting an evaluation of the program.

SINCE 2002, when funds were made available for the initiative, 15,254 people have been screened for oral cancer, 1,889 people have been referred to smoking cessation services, and 3,671 healthcare providers have received oral cancer prevention and early detection education through OOH grants to local health departments throughout Maryland.

Additional OOH efforts resulting from the initiative include the development and distribution of a toolkit to assist local jurisdictions in promoting and facilitating oral cancer prevention activities, the creation of educational materials for low-literacy populations, and the annual observance of Oral Cancer Awareness Week in Maryland.

During this same time period, the Maryland General Assembly created the Cigarette Restitution Fund Program (2000), providing funds for

cancer prevention, education, screening, and treatment for the seven targeted cancers. Some local jurisdictions have opted to provide oral cancer screening and/or education to residents. To date, 5,535 people have been screened for oral cancer, and 6,596 health professionals have received oral cancer prevention and early detection education through CRFP grants. Garrett County continues to use CRFP funding to provide oral cancer activities, and the Baltimore City program initiated an oral-cancer-screening program in fiscal year 2011. The CRFP develops and maintains the Oral Cancer Minimal Elements for Screening, Diagnosis, Treatment, Follow-Up, and Care Coordination to provide guidance for public health programs that screen for oral cancer. In addition, CRFP cancer research funds provided to Johns Hopkins University and the University of Maryland have been used to conduct oral cancer research.

As a result of these cumulative efforts, thousands of Maryland residents have been screened for oral cancer and considerably more have received oral cancer prevention messages and information. Others have been referred to smoking cessation programs. Finally, more than 10,000 healthcare practitioners have received education and training regarding oral cancer prevention and examinations. Plans to evaluate the success of these programs are scheduled for the future and include upcoming surveys of both the public and healthcare providers.

Scientific Advances in Oral Cancer

With improved understanding of oral cancer biology and the availability of state-of-the-art molecular technologies, a number of molecular markers have been tested for their potential use as biomarkers to enhance prediction of oral cancer risk or early oral cancer diagnosis for patients with oral lesions. In a large study, investigators found certain biomarkers can predict oral cancer risk years before clinical diagnosis of oral cancer in patients with oral precancerous lesions.[46]

SALIVA HAS BEEN EXPLORED as a diagnostic medium for oral cancer detection with promising results.[47] Many of the salivary biomarkers will need to be validated in large clinical trials before they can be recommended for routine clinical use.

Because of logistical concerns and lack of funding, evidence-based clinical trials for oral cancer prevention modalities that demonstrate a definitive impact on morbidity and mortality rates have yet to be conducted. In the absence of such research, oral cancer prevention guidelines and protocols will continue to lack consensus and fail to guide the public, healthcare practitioners, policymakers, and healthcare delivery systems.

More evidence-based information is needed to evaluate and compare the practice patterns of primary care and dental providers, and to assess the effectiveness of existing oral cancer prevention programs. Currently, funding to expand ongoing oral cancer research and the development of more sensitive and specific oral cancer screening tools is limited. Additional resources are needed for this and for research that aids our understanding of the etiologic pathways from potential viral, environmental, behavioral, and familial sources.

GOAL 1

Reduce oral cancer incidence and mortality.

TARGETS (2015)

INCIDENCE **6.5 per 100,000**
(2006 Baseline: 8.9 per 100,000)
Source: Maryland Cancer Registry.

MORTALITY **2.1 per 100,000**
(2006 Baseline: 2.8 per 100,000)
Source: CDC WONDER.

OBJECTIVE 1

By 2015, increase the proportion of adults 40 years and older who have had an oral cancer exam in the past year to 48% (2008 Baseline: 40%).
Source: Maryland Cancer Survey.

STRATEGIES

1. **INCREASE ORAL CANCER SCREENINGS** among adults by providing access to both primary care providers and oral health providers for low-income and underserved adult populations in Maryland by supporting community health centers, mobile screening services, seeking new funding sources (public and/or private), and advocating for policy changes and funding at the local, state, and federal levels.
2. **ESTABLISH A SUBCOMMITTEE** for the purpose of investigating policies aimed at incorporating oral cancer exams into routine medical and dental exams and assessing the availability and consistency of oral cancer continuing education.
3. **DEVELOP A STATEWIDE EDUCATIONAL CAMPAIGN** designed to increase the demand for oral cancer screening by encouraging individuals to ask healthcare providers for an annual oral cancer exam as part of routine health exams.

OBJECTIVE 2

By 2015, increase the proportion of oral cancer detected at a local stage to greater than 28% (2006 Baseline: 28%).
Source: Maryland Cancer Registry

1. **INCREASE THE PROPORTION** of primary care providers who perform oral cancer screening by working with professional organizations to teach and encourage physicians, dentists, nurse practitioners, nurse-midwives, and physicians' assistants to conduct oral cancer screening as part of a routine physical exam.
2. **DEVELOP AN ORAL CANCER EDUCATION/EARLY DETECTION PROGRAM** to target healthcare providers at Federally Qualified Health Centers, local health departments, other community health centers, and Veterans' Administration hospitals to ensure oral cancer screening is conducted during routine visits.
3. **PROVIDE HEALTHCARE PROVIDERS** with referral mechanisms for oral cancer by identifying local and state referral resources.

OBJECTIVE 3

By 2015, increase oral cancer literacy in the public and among healthcare providers to meet the following targets:

- **Increase the proportion of adults 40 years and older who have heard of an exam for oral cancer to 35% (2003 Baseline: 27%)**
  Source: Survey of Maryland Adults' Knowledge of Oral Cancer.
- **Increase the percentage of all healthcare providers who report adequate training for conducting oral cancer exams.**
  (Survey currently underway to access healthcare provider oral cancer literacy.)

STRATEGIES

1. **INCREASE THE ORAL CANCER KNOWLEDGE** of the public about oral cancer risk factors (such as tobacco use, alcohol use, and HPV infection) by developing targeted and culturally relevant oral cancer messages in plain language about high-risk activities.
2. **INCREASE THE NUMBER OF HEALTHCARE PROVIDERS** who are educated about oral cancer prevention (including tobacco, alcohol, and HPV risk-reduction strategies) and early detection through the education of health professionals including current practitioners and students in dentistry, medicine, nursing, and allied health fields.
3. **CREATE A JOINT COMMITTEE** of professional associations to encourage the development of a collaborative relationship among medicine, nursing, and dentistry in providing effective oral health education, including oral cancer prevention education and patient care.
4. **ENCOURAGE AND SUPPORT** professional organizations to include oral cancer prevention and early detection as a topic at educational seminars and meetings.

GOALS • OBJECTIVES • STRATEGIES

5 **PROMOTE THE INCLUSION** of oral health and oral cancer education materials in the health education curricula for grades K-12 in Maryland by working with local boards of education and other parent and teacher groups.

OBJECTIVE 4

By 2015, decrease the prevalence of oral cancer risk factors among adults 18 years and older in Maryland.

See specific objectives and strategies in the following chapters: Nutrition, Physical Activity, and Healthy Weight; Tobacco Use Prevention/Cessation and Lung Cancer; and Cervical Cancer (HPV).

STRATEGIES

1 **ENCOURAGE, INCREASE, AND REVIEW** research to determine effects of current and emerging risk factors.

GOAL 2

Reduce disparities in the incidence and mortality of oral cancer

OBJECTIVE 1

By 2015, increase the proportion of black or African American adults with oral cancer detected at a local stage to greater than 25% (2006 baseline: 25%).
Source: Maryland Cancer Registry.

STRATEGIES

1 **INCREASE THE NUMBER OF PRIMARY CARE** medical and dental providers in minority communities who perform routine oral cancer exams by determining and reducing barriers that prevent oral cancer screening.

2 **DEVELOP AND IMPLEMENT** an oral cancer education program to target healthcare providers at Federally Qualified Health Centers, local health departments, other community health centers, and Veterans' Administration hospitals to reduce the number of late stage of oral cancer diagnoses.

3 **DEVELOP, TEST, AND IMPLEMENT** an oral cancer education program to target black or African American adults about prevention and early detection of oral cancers.

OBJECTIVE 2

By 2015, increase the percentage of black or African American adults who have been screened in the past year for oral cancer to 25.8% (2008 Baseline: 23%).
Source: Maryland Cancer Survey.

STRATEGIES

1 **ADVOCATE AT THE STATE LEVEL** for increased funding for oral cancer in order to increase grant opportunities for community oral cancer programs targeted at underserved and minority communities.

2 **UTILIZE MOBILE DENTAL AND/OR MEDICAL SERVICES** to conduct oral cancer exams in minority and underserved communities.

3 **DEVELOP APPROPRIATE MATERIALS** and a distribution network in order to increase community-based and culturally relevant oral cancer programs and messages that target minority and underserved communities.

OBJECTIVE 3

By 2015, increase the number of healthcare providers who provide oral cancer exams and risk reduction counseling to minority and underserved populations.

STRATEGIES

1 **INCREASE THE HEALTH LITERACY** and cultural awareness of healthcare providers to improve their communication techniques with patients regarding oral cancer by providing continuing education.

2 **DEVELOP A METHOD** to measure the number of healthcare providers in underserved communities who conduct oral cancer exams and include this measure on future oral cancer surveys of healthcare providers.

3 **ENCOURAGE HEALTHCARE PROVIDERS** to engage in oral cancer volunteerism by providing continuing education credits or other potential incentives for participating in community oral cancer screenings.

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