# Oral Cancer Examinations Among Adults at High Risk: Findings from the 1998 National Health Interview Survey

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# Abstract

**Objectives:** Cigarette smoking and alcohol use are risk factors for oral and pharyngeal cancer. Recommendations for periodic oral cancer examinations highlight the importance of examining high-risk smokers and alcohol users. This investigation assessed whether cigarette smoking and alcohol use were associated with receipt of an oral cancer examination. Methods: The cross-sectional 1998 National Health Interview Survey was used. Covariates included age, sex, race/ethnicity, poverty status, and geographic region. Weighted bivariate and multivariate analyses were stratified by dentition status and limited to adults aged ≥40 years. **Results:** Regardless of dentition status, current smokers were no more likely to have received an examination than were never smokers. The associations between alcohol use and receipt of an examination were mixed, and were generally more favorable among those who had a dental visit in the last year. Dentate current and former alcohol users were more likely than abstainers to have received an examination. There was no statistically significant association between alcohol use and receipt of an oral cancer examination among edentulous adults. Conclusions: Practitioners should improve the provision rates of oral cancer examinations in accordance with published guidelines, especially among current smokers and edentulous alcohol users who have not been to the dentist in the last year. Recommendations for improvement are presented. [J Public Health Dent 2003;63(2):119-25]

Key Words: mouth neoplasms, smoking, alcohol drinking, health surveys, United States.

Oral and pharyngeal cancer (herein referred to as oral cancer) includes malignant neoplasms of the lip (1), various intraoral sites, and pharynx (2). Each year in the United States approximately 30,000 cases of oral cancer are diagnosed and 7,800 persons die from the disease (3). The survival rate for oral cancer is relatively low and depends on stage at diagnosis. Between 1992 and 1998, the 5-year survival rate for oral cancer was 67.7 percent for localized lesions, 38.1 for regional lesions, 16.9 percent for distant lesions, and 34.4 percent for unstaged (3). During the same period, only 34.5 percent of lesions were diagnosed at a localized stage. Tobacco use, heavy alcohol consumption, and poor diet are the major risk factors for oral cancer (4), and lifetime exposure to solar radiation is the major risk factor for cancer of the lips (5,6). Collectively, tobacco use, heavy alcohol consumption, and poor diet are associated with more than 90 percent of all head and neck cancers (4).

In 2000, the US Department of Health and Human Services published national health objectives for 2010 (7) that addressed a variety of health issues, including periodic oral cancer examinations. Objective 21.6 called for an increase in the proportion of oral cancers detected at the earliest stages and Objective 21.7 called for an increase in the proportion of adults who, in the past 12 months, received an examination to detect oral cancers. National health objectives for 2000 included objectives regarding a reduction in oral cancer deaths, but none regarding oral cancer examinations (8).

Notwithstanding the language contained in the national health objectives, recommendations regarding periodic oral cancer examinations vary substantially. For example, the American Cancer Society recommends an oral cancer examination every three years for persons aged 20 years or older, and annually for persons aged 40 years or older (9). The Canadian Task Force on the Periodic Health Examination, however, concludes that there is insufficient evidence to include or exclude screening for oral cancer in the general population, but suggests that "annual oral examination by a physician or dentist should be considered for persons over 60 with risk factors for oral cancer (e.g., smokers and regular drinkers)" (10). The US Task Force on Clinical Preventive Services (USTFCPS) (11) also finds insufficient evidence to recommend routine examinations among nonsymptomatic persons, and states:

Although direct evidence of a benefit is lacking, clinicians may wish to include an examination for cancerous and pre-cancerous lesions of the oral cavity in the periodic health examination of persons who chew or smoke tobacco (or did so previously), older persons who drink regularly, and anyone with suspicious symptoms or lesions detected through self-examination. All patients, especially those at increased risk, should be advised to receive a complete dental examination on a regular basis (11: p. 178).

Despite the existence of clinical recommendations, only a small proportion of adults have reported ever receiving an oral cancer examination.

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According to national data collected in 1992 (12), only 14.3 percent of adults aged 18 years or older had reported ever receiving an oral cancer examination. Of adults aged 40 years or older, African Americans were less likely than were whites, Hispanics were less likely than were non-Hispanics, and persons with low socioeconomic status were less likely than were persons with high socioeconomic status (SES) to have reported ever receiving an oral cancer examination (13).

To date, only two national studies (12,14) have described the association between cigarette smoking and receipt of an oral cancer examination. Both of these studies showed that current cigarette smokers were less likely to have received an oral cancer examination than were former or never smokers. Although these two studies provided useful information, neither controlled for the potential confounding effect of alcohol use.

This investigation used national survey data to determine whether being at higher risk for oral cancer, due to cigarette smoking or alcohol use, was associated with receipt of an oral cancer examination during one's lifetime. This investigation is unique because it used national data to test the association between cigarette smoking or alcohol use and receipt of an oral cancer examination in a multivariate analysis. Findings from this investigation may be used to develop initiatives that address national health objectives for 2010.

# Methods

The National Health Interview Survey (NHIS) collects data regarding the health, illness, and disability status of children and adults in the United States via a face-to-face interview. We used the public-access version of the 1998 National Health Interview Survey (1998 NHIS) for this investigation (15). The 1998 NHIS used a complex, multistage probability sampling design. Its cross-sectional data were representative of the US civilian, noninstitutionalized household population. The survey sampled 38,209 households, which yielded 38,773 families and 98,785 persons. We used the Sample Adult Core Questionnaire and the Sample Adult Prevention Module, and the overall response rate for these two questionnaire components was 72.6 percent. Detailed descriptions of survey methodology are available elsewhere (16).

Study Variables. The dichotomous oral cancer examination variable was derived from a questionnaire item that asked, "Have you ever had a test for oral cancer in which the doctor or dentist pulls on your tongue, sometimes with a gauze wrapped around it, and feels under your tongue and inside the cheeks?" The tobacco use variable was derived from two questionnaire items that asked, "Have you smoked at least 100 cigarettes in your ENTIRE LIFE?" and "Do you NOW smoke cigarettes everyday, some days, or not at all?" Responses to these questions were combined to produce a cigarette smoking status variable that included three levels (current, former, or never smoker) according to established coding criteria (16). The alcohol use variable was derived from two questionnaire items that asked, "In your EN-TIRE LIFE, have you had at least 12 drinks of any type of alcoholic beverage?" and "In the PAST YEAR, how often did you drink any type of alcoholic beverage?" Responses to these questions were combined to produce an alcohol status variable that included three levels (current user, former user, and lifetime abstainer) according to established coding criteria (16). The number of drinks imbibed in the last year variable was derived from two questionnaire items that asked, "In the PAST YEAR, how often did you drink any type of alcoholic beverage?" and "In the PAST YEAR, on those days that you drank alcoholic beverages, on the average, how many drinks did you have?" Responses to these questions were combined and the distributions were grouped to produce a variable that included four levels.

Covariates included age, sex, race/ethnicity (non-Hispanic white, non-Hispanic black, non-Hispanic other, or Hispanic), poverty status (below 100% of the federal poverty level (FPL), 100%–199% FPL, or  $\geq$ 200% FPL), geographic region (Northeast, Midwest, South, or West), presence of a dental visit in the last year, and dentition status (dentate or edentulous).

Analysis. We used the SUDAAN statistical software program (17) to produce bivariate (unadjusted) and multivariate (adjusted) parameter estimates for this investigation. SUDAAN was used because it accounted for the complex, multistage sampling design of the 1998 NHIS when it calculated standard errors and confidence intervals. Full sample weights were used to ensure that estimates were representative of the civilian, noninstitutionalized US population.

The original survey sample of adults aged 40 years or older included 19,001 persons. To ensure that the unadjusted and adjusted analyses included similar sample sizes, we excluded from analysis persons with an unknown oral cancer examination history (n=970), unknown cigarette smoking status (n=176), unknown alcohol use status (n=352), unknown dentition status (n=91), as well as "non-Hispanic other" persons and those with unknown race/ethnicity (n=513). Overall, excluded sample persons were less likely to have received an oral cancer examination than were those who were retained (crude odds ratio=0.7; P<.01). The final sample included 17,408 sample persons, representing 101.3 million adults in the US population.

## Results

In 1998 approximately 22 percent of US adults aged 40 years or older were current smokers, and 32 percent were former smokers (Table 1). Current smokers were more likely than former or never smokers to be younger (aged 40–64 years), male, non-Hispanic black, below 100 percent FPL, residing in the South, and edentulous.

Nearly 60 percent of US adults were current alcohol users and approximately 21 percent were former alcohol users (Table 1). Current alcohol users were more likely than former or never users to be younger, male, non-Hispanic white, at or above 200 percent FPL, residing in the Northeast, and dentate. Among current alcohol users, 60.9 percent had imbibed 1–5 drinks during the last year, 21.5 percent had imbibed 6–10 drinks, and 17.6 percent had imbibed 11 drinks or more. Current cigarette smokers and alcohol users were similar in terms of age and sex.

Overall, 20.1 percent of adults aged 40 years or older reported having received an oral cancer examination during their lifetime. Among adults who had a dental visit in the last year, 26.2 percent reported ever having received an examination. Former smok-

	Smoking Status			Alcohol Use Status		
Characteristics	Current % (SE)	Former % (SE)	Never % (SE)	Current % (SE)	Former % (SE)	Never % (SE)
Overall	21.6 (0.4)	32.1 (0.4)	46.3 (0.5)	58.1 (0.5)	20.8 (0.4)	21.1 (0.4)
Age						
40–64 years	26.1 (0.5)	28.2 (0.5)	45.7 (0.5)	64.6 (0.6)	18.0 (0.4)	17.4 (0.5)
65 years or older	10.9 (0.5)	41.3 (0.7)	47.8 (0.8)	42.4 (0.7)	27.5 (0.7)	30.1 (0.7)
Sex						
Men	23.8 (0.6)	40.7 (0.7)	35.5 (0.7)	65.2 (0.7)	22.5 (0.6)	12.3 (0.5)
Women	19.7 (0.5)	24.5 (0.6)	55.8 (0.6)	51.9 (0.6)	19.3 (0.4)	28.8 (0.6)
Race/ethnicity						
Non-Hispanic white	21.1 (0.4)	33.9 (0.5)	45.0 (0.5)	60.3 (0.6)	20.5 (0.4)	19.2 (0.5)
Non-Hispanic black	27.5 (1.2)	22.5 (1.1)	50.0 (1.2)	45.8 (1.6)	25.8 (1.0)	28.4 (1.2)
Hispanic	19.1 (1.2)	24.4 (1.2)	56.5 (1.4)	49.4 (1.3)	18.1 (0.9)	32.5 (1.3)
Poverty status						
≥200% federal poverty level	20.2 (0.5)	34.2 (0.6)	45.6 (0.6)	67.4 (0.6)	17.9 (0.5)	14.7 (0.5)
100%–199% federal poverty level	24.6 (1.0)	28.6 (1.0)	46.8 (1.1)	40.7 (1.1)	27.8 (1.1)	31.5 (1.2)
>100% federal poverty level	32.4 (0.5)	20.9 (0.6)	46.7 (0.6)	35.0 (1.3)	28.2 (1.3)	36.8 (1.4)
Unknown	20.3 (0.8)	31.8 (0.9)	47.9 (1.0)	51.1 (1.0)	22.1 (0.8)	26.8 (0.9)
Geographic region					. ,	. ,
Northeast	20.2 (0.7)	34.6 (0.8)	45.2 (0.9)	65.1 (1.0)	20.2 (0.8)	14.7 (0.6)
Midwest	21.3 (0.8)	31.5 (0.9)	47.2 (1.0)	61.7 (1.0)	20.2 (0.8)	18.1 (0.8)
West	19.5 (0.9)	34.5 (1.0)	46.0 (1.0)	62.1 (1.1)	20.4 (0.8)	17.5 (0.8)
South	23.6 (0.6)	29.8 (0.7)	46.6 (0.8)	49.6 (1.0)	21.8 (0.7)	28.6 (0.9)
Dentition status	. /			. /		. ,
Dentate	20.6 (0.4)	30.8 (0.5)	48.6 (0.5)	61.7 (0.5)	18.7 (0.4)	19.6 (0.4)
Edentulous	27.8 (1.1)	39.6 (1.1)	32.6 (1.1)	35.8 (1.1)	33.6 (1.1)	30.6 (1.1)

 

 TABLE 1

 Weighted Prevalence of Smoking and Alcohol Use Among Adults Aged 40 Years or Older, by Selected Characteristics, United States, 1998 (N=17,408)

Source: NCHS/CDC, 1998 National Health Interview Survey.

Note: This table presents row percentages only. Persons with unknown oral cancer examination history, smoking status, alcohol use status, and dentition status, as well as persons of non-Hispanic other or unknown race/ethnicity have been excluded from this analysis.

ers and current alcohol users were the groups most likely to report ever having received an examination among adults who visited a dentist in the last year (Figure 1). Among adults who had not visited a dentist in the last year, only 9.2 percent reported ever having received an examination. Similarly, among adults who had not visited the dentist in the last year, former smokers and current alcohol users were the groups most likely to report having received an examination (Figure 1).

Figure 2 lists the prevalence of ever having received an oral cancer examination among adults aged 40 years or older, stratified by presence of dental visit and the number of alcohol drinks imbibed in the last year. Among those with a dental visit in the last year, there appeared to be a substantial difference in prevalence of an examination beFIGURE 1 Prevalence of Having Received Oral Cancer Examination During Lifetime Among US Adults, by Presence of Dental Visit in Last Year and Smoking and Alcohol Use Status



SOURCE: CDC, NCHS, 1998 National Health Interview Survey NOTE: Analysis restricted to those ages 40 years or older.

# FIGURE 2 Prevalence of Having Received Oral Cancer Examination During Lifetime Among US Adults, by Presence of Dental Visit and Number of Drinks Imbibed in Last Year



SOURCE: CDC, NCHS, 1998 National Health Interview Survey NOTE: Analysis restricted to those ages 40 years or older.

#### **TABLE 2**

Unadjusted and Adjusted\* Odds Ratios for Having Ever Received Oral Cancer Examination During Lifetime Among Adults Aged 40 Years or Older, by Presence of Dental Visit in Last Year, United States, 1998 (n=17,408)

Unadjusted Odds Ratio (95% CI)	Adjusted* Odds Ratio (95% CI)	
0.91 (0.79, 1.03)	0.90 (0.78, 1.04)	
1.25 (1.12, 1.41)	1.19 (1.06, 1.34)	
1.00	1.00	
1.62 (1.35, 1.94)	1.39 (1.15, 1.69)	
1.68 (1.42, 1.98)	1.44 (1.20, 1.71)	
1.81 (1.60, 2.04)	1.56 (1.38, 1.76)	
1.00	1.00	
0.80 (0.60, 1.06)	0.78 (0.58, 1.05)	
1.25 (1.00, 1.57)	1.19 (0.94, 1.50)	
1.00	1.00	
1.32 (0.91, 1.93)	1.34 (0.90, 1.99)	
1.36 (0.97, 1.89)	1.29 (0.92, 1.82)	
1.56 (1.22, 2.01)	1.48 (1.14, 1.91)	
1.00	1.00	
	Unadjusted Odds Ratio (95% CI) 0.91 (0.79, 1.03) 1.25 (1.12, 1.41) 1.00 1.62 (1.35, 1.94) 1.68 (1.42, 1.98) 1.81 (1.60, 2.04) 1.00 0.80 (0.60, 1.06) 1.25 (1.00, 1.57) 1.00 1.32 (0.91, 1.93) 1.36 (0.97, 1.89) 1.56 (1.22, 2.01) 1.00	

Source: CDC/NCHS, 1998 National Health Interview Survey.

Note: Persons with unknown oral cancer examination history, smoking status, alcohol use status, and dentition status, as well as persons of non-Hispanic other or unknown race/ethnicity have been excluded from this analysis.

Alcohol use based on number of alcoholic drinks in last year: heavy=11 or more, moderate=6–10, light=1-5, abstainers=0.

\*Controlling for age, sex, race/ethnicity, poverty status, and geographic region.

Boldface=statistically significant association at the  $P \le .05$  level.

CI=confidence interval.

tween those who had a drink in the last year and those who did not. However, there appeared to be little difference in prevalence of an examination across the various categories of drinkers. The statistical significance of these unadjusted associations was confirmed (Table 2). Similarly, among those without a dental visit in the last year, there appeared to be a difference in prevalence between drinkers and abstainers, but little difference in prevalence across the various categories of drinkers. The statistical significance of these unadjusted associations also was confirmed (Table 2).

Table 3 presents the unadjusted and adjusted odds ratios for having ever received an oral cancer examination, by presence of a dental visit in the last year. Among adults aged 40 years or older who had a dental visit in the last year and controlling for relevant covariates, current smokers were significantly less likely to report ever having received an oral cancer examination than were never smokers, and current and former alcohol users were significantly more likely to report an examination than were lifetime abstainers. Among adults who had not visited a dentist in the last year and controlling for relevant covariates, current smokers were again significantly less likely to report ever having received an examination than were never smokers, and current alcohol users were significantly more likely to report ever having received an examination than were lifetime abstainers.

Table 2 presents the unadjusted and adjusted odds ratios for having ever received an oral cancer examination, by presence of a dental visit in the last year, with number of drinks imbibed in the last year as a measure of alcohol use. Among adults aged 40 years or older who had a dental visit in the last year and controlling for relevant covariates, current smokers were no more likely to report having received an oral cancer examination than were never smokers, and adults who imbibed 1-5, 6-11, and 11 or more drinks in the last year were each significantly more likely to have reported an examination than were those who did not have a drink in the last year. Note, however, that there was no statistically significant difference in the odds ratios for receipt of an oral cancer examination across drinking status categories. Among adults who had not vis-

#### TABLE 3

Unadjusted and Adjusted\* Odds Ratios for Having Ever Received Oral Cancer Examination during Lifetime among Adults Aged 40 Years or Older, by Presence of Dental Visit in Last Year, United States, 1998 (*n*=17,408)

Dental Visit in Last Year Smoking/Alcohol Use Status	Unadjusted Odds Ratio (95% CI)	Adjusted* Odds Ratio (95% CI)	
Yes ( <i>n</i> =10,773)			
Smoking status			
Current	0.91 (0.79, 1.03)	0.86 (0.75, 0.99)	
Former	1.25 (1.12, 1.41)	1.14 (1.01, 1.28)	
Never	1.00	1.00	
Alcohol use status			
Current	2.21 (1.91, 2.56)	1.85 (1.59, 2.16)	
Former	1.58 (1.32, 1.90)	1.45 (1.20, 1.75)	
Never	1.00	1.00	
No ( <i>n</i> =6,581)			
Smoking status			
Current	0.80 (0.60, 1.06)	0.78 (0.58, 1.05)	
Former	1.25 (1.00, 1.57)	1.19 (0.91, 1.46)	
Never	1.00	1.00	
Alcohol use status			
Current	1.58 (1.20, 2.06)	1.51 (1.13, 2.01)	
Former	1.17 (0.85, 1.61)	1.13 (0.82, 1.56)	
Never	1.00	1.00	

Source: CDC/NCHS, 1998 National Health Interview Survey.

Note: Persons with unknown oral cancer examination history, smoking status, alcohol use status, and dentition status, as well as persons of non-Hispanic other or unknown race/ethnicity have been excluded from this analysis.

\*Controlling for age, sex, race/ethnicity, poverty status, and geographic region.

Boldface=statistically significant association at the  $P \le .05$  level.

CI=confidence interval.

ited a dentist in the last year and controlling for relevant covariates, current smokers were significantly less likely to have received an oral cancer examination than were never smokers, and only adults who had imbibed 1–5 drinks in the previous year were significantly more likely to report having received an examination than were those who had not imbibed alcohol beverages in the last year.

# Discussion

This investigation revealed a number of important associations. Regardless of dentition status in the last year, current smokers were no more likely to have received an oral cancer examination than were never smokers. Among persons who had a dental visit in the last year, current and former alcohol users were more likely to have received an examination than were abstainers. In addition, persons who were heavy, moderate, or light drinkers in the last year were more likely to have received an examination than were abstainers; however, there was no dose-response relation across the different levels of drinking. Among persons who did not have a dental visit in the last year, only current drinkers were more likely to have received an examination than were abstainers. In addition, only light drinkers were more likely to have received an oral cancer examination than were abstainers, and again, there was little evidence of a dose-response relation.

There were three possible explanations for this these findings. The first explanation is that high-risk individuals may not visit a health care practitioner, and thus do not receive an oral cancer examination. There is evidence that smokers are less likely to visit a dentist than are nonsmokers (18); however, it is unlikely that the utilization rates for these high-risk adults are zero, across their lifetimes. National data (19,20) suggest that, on average, adults visit a physician from 3 to 10 times per person per year, and visit a dentist from 1 to 3 times per person per year

The second explanation is that highrisk individuals who have visited a health care practitioner may have received an oral cancer examination, but did not recall it. A recent qualitative investigation showed dentists were hesitant to mention that an oral cancer examination was provided to their patients unless the practitioners found a suspicious lesion (21). In addition, the public's poor knowledge of the risk factors and signs and symptoms of oral cancer (22-26) might have led them to believe an examination was unnecessary (27).

The third explanation is that highrisk individuals may have visited a health care practitioner, but did not receive an oral cancer examination during the visit. There is little evidence to suggest that health care practitioners were providing oral cancer examinations at higher rates than was revealed in the 1998 NHIS or other national surveys. In general, physicians, dentists, and dental hygienists show inconsistent knowledge of the risk factors and signs of oral cancer (21,28-31), and this inconsistent knowledge may translate into patchy or inconsistent oral cancer examination practices (32). Although each of these explanations was feasible, additional research will be necessary to identify which explanation is most likely and which would be amenable to interventions and health promotion efforts.

This investigation had several limitations. The 1998 NHIS did not validate the report of an oral cancer examination with chart audits or independent observation. Given that sample persons might have received an oral cancer examination without their knowledge, the outcome variable in this investigation possibly may have underestimated the "true" prevalence of lifetime oral cancer examinations. It is unlikely, however, that the underestimation was systematically associated with smoking status or alcohol use status.

Another limitation was that the definition of alcohol use in the 1998 NHIS was somewhat generous. Current alcohol users were defined as those who had had at least 12 drinks during their lifetime and had at least one drink in the last year. Former alcohol users were those who had had at least 12 drinks during their lifetime, but who had not had an alcoholic beverage in the last year. Such a generous definition might have led to misclassification. The reader should note that it was not possible to assess the magnitude of misclassification, if it existed. Another limitation was the finding that sample persons who were excluded from the analysis were different from those who were retained, in that excluded persons were significantly less likely to have received an examination. Given this difference, the results of the investigation likely overestimated the true prevalence of receipt of an oral cancer examination. Finally, this investigation did not assess the relation between other forms of tobacco use (cigars, pipes, and spit tobacco) and receipt of an oral cancer examination, because the prevalence of these behaviors was relatively low and did not allow for the calculation of reliable estimates.

Notwithstanding the limitations, this investigation also exhibited a number of important strengths. The investigation determined the association between risk factors for oral cancer and receipt of an oral cancer examination, while controlling for relevant demographic and SES variables. The investigation used national data to determine the association between alcohol use and receipt of an oral cancer examination. By stratifying the data by dental visit history, we were able to describe the association between cigarette smoking, alcohol use, and receipt of an oral cancer examination for persons who had different oral health care utilization patterns, and we were able to remove the influence of dental visits from the analysis. This stratification was important, because dentists are more likely to perform an oral cancer examination than are other health care providers (14).

One of the reasons knowledge of oral cancer risk factors among health care professionals is inconsistent may be an inadequate professional education. A recent study of US medical schools revealed that only 43 percent of schools advocated intraoral palpation, only 29 percent required inspection of all oral structures, and 7 percent did not require inspection of the mouth (33). A recent study of Texas dental students showed that only about one-fourth had conducted a biopsy, and just over one-half had observed the procedure or read a biopsy report (34). Although 84 percent of these students reported being comfortable with the curricula regarding the provision of a thorough oral cancer examination, only 14 percent had received tobacco cessation training and one-fourth had received instruction in the prescribing of nicotine replacement therapy.

Possible ways to address the low rates of oral cancer screening include an improved education for health care practitioners. Medical and dental school curricula need to include oral cancer examination procedures, biopsy procedures, counseling for tobacco and alcohol cessation, and prescription of nicotine replacement therapy, and must reinforce the translation of knowledge into practice. Medical and dental schools also might incorporate case-based scenarios into their curricula, since students may not encounter many oral cancer cases during their professional education.

For practicing health care professionals, continuing education programs could provide valuable information (21). Compared to physicians, dentists may be less likely to ask patients about their smoking and alcohol history, but may be more likely to transfer that information into an oral examination when the information is solicited (35). Training to emphasize the need for recording smoking and alcohol status, and translating that information into an oral cancer examination could improve the situation. For example, standardized patient records might include space dedicated to the recording of tobacco and alcohol status and/or the results of an oral cancer examination (35,36).

For the public, health education should be incorporated into public awareness campaigns that include a focus on the risk factors and oral cancer. An increased knowledge base may prompt the public to request an oral cancer examination when one is not otherwise offered.

The most effective way to reduce oral cancer incidence is to affect preventable risk factors, such as tobacco use, heavy alcohol consumption, diet, and exposure to solar radiation (37,38). Diagnostic tests such as exfoliative cytology and vital staining also may show promise for detecting the disease in the future (39,40). Evidence relating the sensitivity of an oral cancer examination to early detection and lower incidence rates is still under question (41-47); however, until a more sensitive detection measure is discovered, the periodic oral cancer examination represents the only tool available to health care practitioners. The results of this investigation indicate that few adults report receipt of an oral cancer exam, and as a result may be at increased risk of death from oral cancer.

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