

## Oral Cancer Risk Perception among Participants in an Oral Cancer Screening Program

Jennifer L. Hay,<sup>1</sup> Jamie S. Ostroff, Gustavo D. Cruz, Racquel Z. LeGeros, Herbert Kenigsberg, and D. Mercedes Franklin

Department of Psychiatry and Behavioral Sciences, Memorial Sloan-Kettering Cancer Center, New York, New York 10021 [J. L. H., J. S. O.]; New York University College of Dentistry, New York, New York 10010 [G. D. C., R. Z. L.]; and New York City Health and Hospitals Corporation, Office of Oral Health, Programs and Policy for New York City, New York, New York 10007 [H. K., D. M. F.]

### Abstract

**Oral cancer screening provides an opportunity for early detection and for education to high-risk tobacco and alcohol users. To plan interventions that would motivate oral cancer screening and risk reduction, we surveyed oral cancer risk perception and risk behaviors among participants in a free oral-cancer screening. Participants (N = 803) were racially diverse; 43% had a history of smoking and 9%, a history of alcohol abuse. Current smokers and those with higher lifetime tobacco exposure perceived themselves to be at higher risk for cancer than nonsmokers or those with less lifetime tobacco exposure (all *ps*, <0.01). Alcohol use was unrelated to oral cancer risk perception (*p* > 0.05). Compared with women, men (*p* = 0.01) felt more at risk; compared with other racial groups, Asians (*p* < 0.05) felt less at risk. Demographic differences were explained by differences in risk behaviors. Current smoking status (beta, 0.196; *p* < 0.001) and level of tobacco exposure (beta, 0.100; *p* < 0.05) were the only significant independent predictors of heightened risk perception ( $R^2 = 0.09$ ). Those with alcohol abuse histories, and older smokers, may need increased education. These findings support the need for health education materials that incorporate the oral cancer risk perception of high-risk individuals.**

### Introduction

Approximately 30,000 individuals developed cancers of the oral cavity, larynx, and pharynx last year in the United States (1). Public awareness about the risk factors and methods of early detection of oral cancer are quite low (2, 3). Tobacco and alcohol users over age 40 are at highest risk for this disease (4) but often do not appreciate their own heightened risk status (5, 6), and do not take advantage of community head and neck

cancer screenings when they are offered (7–9). Although the efficacy of oral cancer screening has not been evaluated in a randomized clinical trial, the high concentration of these cancers in tobacco and alcohol users over age 40 argues for the utility of targeted screening (10). An awareness of personal risk or susceptibility to illness is a central factor in most major theories of health behavior change (11–13), but there are only a few studies examining oral cancer risk perception among higher risk individuals (9, 14, 15). Studies examining the covariates of oral cancer risk perception will provide the basis for the development of tailored interventions aimed toward increasing oral cancer risk perception, screening, and risk reduction among tobacco and alcohol users.

In this study, we assessed oral cancer risk behavior history, risk perception, and demographic and behavioral risk covariates of risk perception among oral cancer screening participants. We hope to use this information to determine whether screening is a feasible context for risk reduction counseling and to guide the content and tailoring of oral cancer prevention messages.

### Materials and Methods

A consortium led by the New York University College of Dentistry (NYUCD) conducted a 3-day, no-cost, oral cancer screening during June of 1999 at several sites in the New York/New Jersey area. Advertising included print and radio media, and signs posted in NYUCD and nearby hospitals. Five screening participants of 808 refused to participate in the survey. Prior Institutional Review Board approval from New York University was obtained.

The 5-min survey (16) was administered by trained interviewers and included 21 items assessing sociodemographic characteristics, oral cancer knowledge, past (history) and current risk behaviors, and readiness to quit smoking (17). Alcohol abuse history was assessed with the CAGE (Cutting down, Annoyance by criticism, Guilty feeling, and Eye-openers) questionnaire (18). Oral cancer risk perception was assessed by asking all of the participants their risk for developing oral cancer compared with others of their age and sex using a five-point Likert scale (9, 19, 20). Smokers were asked their perception of risk for developing oral cancer compared with other smokers of their age and sex, and nonsmokers of their age and sex, using separate scales identical to that described above (19–21).

### Results

**Sociodemographics and Risk Behaviors.** Participants (N = 803) were racially diverse, with 38% self-identifying as African American, 37% as Caucasian, 18% as Hispanic, and 7% as Asian or other, and older, with 66% over age 40. Over one-half (63%) were women, and nearly one-half (44%) reported completion of a college degree.

These oral cancer screening participants reported substan-

Received 6/22/01; revised 11/14/01; accepted 11/21/01.

The costs of publication of this article were defrayed in part by the payment of page charges. This article must therefore be hereby marked *advertisement* in accordance with 18 U.S.C. Section 1734 solely to indicate this fact.

<sup>1</sup> To whom requests for reprints should be addressed, at Department of Psychiatry and Behavioral Sciences, Memorial Sloan-Kettering Cancer Center, 1275 York Avenue, New York, NY 10021.

Table 1 Risk behaviors among participants in an oral cancer screening program (total N = 803)

Smoking History	
Never smoked	439 (55%)
Smoked at least 100 cigarettes in lifetime	347 (43%)
Missing	17 (2%)
Current Tobacco Use	
Yes	230 (29%)
No	573 (71%)
Type of current use (n = 230, current smokers)	
Currently smoke cigarettes	216 (27%)
Currently smoke cigars	11 (1.4%)
Currently smoke pipe	1 (.1%)
Currently use smokeless tobacco/chew	2 (.2%)
Current smoking rate (n = 230)	
<1/2 pack a day	102 (44%)
1/2 up to 1 pack a day	84 (37%)
>1 pack a day	37 (16%)
Missing	7 (3%)
Smoking Duration (n = 230)	
[mean (SD); median; min-max]	19 yrs (13); 17; 0.5-67.0
Quit attempts of current smokers (n = 230)	
Never tried to quit before	46 (20%)
Have tried to quit before	141 (61%)
Missing	43 (19%)
Intentions to quit among current smokers (n = 230)	
Precontemplation (not thinking about quitting)	50 (22%)
Contemplation (planning quit attempt in next 6 mo)	35 (15%)
Preparation (planning to quit in the next 30 days)	21 (9%)
Action (taking current action to quit)	48 (21%)
Missing	76 (33%)
Length of Cessation (n = 117, past smokers)	
Quit in the past 6 mo	7 (6%)
Quit >6 mo ago	103 (88%)
Missing	7 (6%)
Number of reported drinks/week	
≤7/wk	560 (70%)
>7/wk, ≤14/wk	22 (2%)
≥14/wk	29 (4%)
Missing	192 (24%)
Alcohol abuse/dependence history (CAGE questionnaire) <sup>a</sup>	
Yes	73 (9%)
No	730 (91%)

<sup>a</sup> Ref. 18.

tial risk behavior histories and current use (Table 1). Whereas the rate of ever smoking (43%) is somewhat lower than the United States prevalence rate (45%;  $p < 0.05$ ; Ref. 22), the rate of current use (29%) is higher than United States prevalence rate (22.6%;  $p < 0.01$ ; Ref. 23). Sixteen percent of current smokers reported that they smoke more than a pack a day, which is slightly less than that of the United States population of smokers (18.6%;  $p < 0.05$ ; Ref. 23) and which may be explained by the relatively older age of the screening participants. Most smokers stated that they were receptive to quitting. Nine percent had a probable alcohol-abuse or -dependence history, which is lower than that in a community sample assessed with the same criteria (13%;  $p < 0.05$ ; Ref. 24), as indicated by their endorsement of at least two questions from the CAGE questionnaire (18). Four percent reported current high-risk alcohol consumption of 14 or more drinks per week, which was comparable with that of the United States population (3.6%;  $p > 0.05$ ; Ref. 23). Nearly one-half of the sample (43%) reported that they abstained from alcohol use altogether, which

was lower than the percentage as reported by the general population (45.8%;  $p < 0.01$ ; Ref. 23). Overall, 46% of the sample reported at least one behavioral risk factor for oral cancer (history of smoking or alcohol abuse, or currently drinking 14 or more drinks/week), and the presence and extent of tobacco and alcohol use were highly intercorrelated.<sup>2</sup>

There were significant demographic differences in oral cancer risk behaviors. Men were more likely than women to report a history of smoking [55.2% versus 37.8%;  $\chi^2(1) = 22.33$ ;  $p < 0.001$ ], and to report current tobacco consumption [36.5% versus 24.3%;  $\chi^2(1) = 13.62$ ;  $p < 0.001$ ]; men and women smokers reported comparable lifetime use [15.3. versus 13.4 packs/day  $\times$  years;  $t(228) = 0.79$ ;  $p > 0.05$ ]. Smoking history, but not current usage, differed by racial group [Caucasian 55%, Hispanics 39%, African Americans 38%, Asians 27%;  $\chi^2(3) = 24.41$ ;  $p < 0.001$ ], and Caucasian participants also reported more extensive lifetime use of tobacco (packs/day  $\times$  years) than did other racial groups [ $F(3763) = 6.80$ ;  $p < 0.001$ ; as assessed through post-hoc LSD<sup>3</sup> tests]. Men were more likely than women to report an alcohol abuse history [17.7% versus 4.1%;  $\chi^2(1) = 41.45$ ;  $p < 0.001$ ] and to report more frequent current drinking {4 versus 2 drinks/week [ $t(608) = 4.96$ ;  $p < 0.001$ ]}.<sup>4</sup> Alcohol abuse history did not differ by racial group ( $ps > 0.05$ ), but Caucasian participants reported heavier current alcohol use than all of the other participants [ $F(3,579) = 5.13$ ;  $p = 0.001$ ; as assessed through post-hoc LSD]. Older participants were more likely to have a smoking history [mean age never smokers, 46 years; mean age ever smokers, 52 years;  $t(771) = -4.42$ ;  $p < 0.001$ ]; and older smokers, not surprisingly, reported more extensive lifetime use of tobacco than did younger smokers [ $r(227) = 0.38$ ;  $p < 0.001$ ].<sup>5</sup>

**Oral Cancer Risk Perception.** On average, most participants did not feel at high risk for developing oral cancer, with most (77%) reporting their risk for oral cancer was less than, or equal to, that of others of their age and sex; and 31 and 19% of current smokers perceived their oral cancer risk as less than that of other smokers and other nonsmokers, respectively (Table 2).

**Factors Related to Participants' Risk Perception.** Among all participants, men felt more at risk than women [ $t(751) = 2.54$ ;  $p = 0.01$ ], and Asians felt least at risk compared with all other racial groups [African Americans, Hispanics, Caucasians;  $F(3717) = 2.56$ ;  $p = 0.05$ ; as assessed through post-hoc LSD]. Age was not significantly related to oral cancer risk perception [ $r(755) = -0.056$ ;  $p > 0.05$ ], nor was level of education [ $F(3,743) = 1.15$ ;  $p > 0.05$ ]. Those with self-reported histories of tobacco use or alcohol abuse had higher risk perception than those who did not report these histories [ $t(740) = -5.44$ ;  $p < 0.001$  versus  $t(753) = -2.65$ ;  $p < 0.01$ ]. Current smokers [ $t(753) = -7.83$ ;  $p < 0.001$ ] and those with more extensive lifetime use of tobacco [packs/day  $\times$  years;  $r(755) = 0.222$ ;  $p < 0.001$ ] had higher risk perception than did nonsmokers and lighter smokers. However, those who drank 14 or more drinks per week did not have higher risk perception than those who did not drink this amount [ $t(753) = -0.55$ ;  $p > 0.05$ ].

<sup>2</sup> Those with a history of tobacco use were more likely to have a comorbid history of alcohol abuse than were never smokers [15 versus 5%;  $\chi^2(1) = 21.58$ ;  $p < 0.001$ ]; smokers of one pack or more per day reported heavier drinking than smokers of less than a pack per day [17 versus 5% drink 14 or more drinks/wk;  $\chi^2(1) = 9.39$ ;  $p < 0.01$ ].

<sup>3</sup> The abbreviation used is: LSD, least-significant difference.

<sup>4</sup> This analysis included all alcohol abstainers.

<sup>5</sup> There were no differences by education on history of smoking or alcohol abuse, current smoking status, or packs  $\times$  years.

Table 2 Oral cancer risk perceptions among oral cancer screening participants

Questions	Subsample assessed	Much less than others n (%)	Slightly less than others n (%)	About the same as others n (%)	Slightly more than others n (%)	Much more than others n (%)	Total n (%)
"Compared to other people my age and sex my chances of having oral cancer in the future are . . . ."	Nonsmokers	193 (36)	93 (17)	186 (35)	49 (9)	16 (3)	537 (100)
"Compared to other people my age and sex my chances of having oral cancer in the future are . . . ."	Smokers	37 (17)	22 (10)	88 (41)	51 (23)	20 (9)	218 (100)
"Compared to other smokers my age and sex, my chances of having oral cancer in the future are . . . ."	Smokers	40 (18)	30 (13)	101 (45)	34 (15)	19 (9)	224 (100)
"Compared to nonsmokers my age and sex, my chances of having oral cancer in the future are . . . ."	Smokers	26 (12)	17 (7)	38 (17)	75 (33)	70 (31)	226 (100)

Once we controlled for risk behaviors in a multiple regression equation, gender and racial group were no longer significant covariates of oral cancer risk perception ( $p < 0.05$ ).<sup>6</sup> Current smoking status (yes *versus* no; beta = 0.196,  $p < 0.001$ ) and lifetime tobacco exposure (*i.e.*, packs/day  $\times$  years; beta = 0.100,  $p = 0.023$ ) remained the only significant independent predictors ( $p < 0.05$ ) of heightened risk perception in a multiple regression equation where all significant predictors (gender, race (Asian *versus* other), history of smoking (yes *versus* no), history of alcohol abuse (yes *versus* no), current smoking status (yes *versus* no), and lifetime tobacco exposure were considered simultaneously ( $R^2$  total = 0.09). Thus, the demographic differences in risk perception among men and Asians are explained by the differences in risk behaviors among these groups.

## Discussion

This study is the first to examine the relationship between oral cancer risk behaviors, demographics, and oral cancer risk perception among a large, diverse sample of oral cancer screening volunteers. Consistent with other small-sample surveys (9, 14, 15), tobacco users are aware of their heightened oral cancer risk. The findings demonstrate the feasibility of reaching high-risk individuals for oral cancer screening and risk reduction counseling, because almost one-half (46%) of participants in this screening reported at least one behavioral risk factor for oral cancer.

Despite their high-risk profile, screening attendees felt relatively invulnerable to developing oral cancer. Relatively low perceptions of risk were comparable with those found in hospital-based screening (9), and probably reflect normative optimistic biases (19, 20). However, tobacco users, but not heavy alcohol users, were relatively accurate in their heightened oral cancer risk perception. This suggests that individuals with heavy alcohol use histories may be less likely to present themselves for oral cancer screening than smokers, and less likely to pursue alcohol-dependence treatment to reduce their risk of oral cancer.

Significant gender and racial differences in oral cancer risk perception were explained by variations in tobacco use among demographic groups, but older participants were no more likely to feel at risk than were younger participants, despite their more extensive risk histories. This finding may signal an important

opportunity for educating older individuals about their at-risk status (1) and the benefits of quitting, and for delivering tailored risk communication that would encourage oral cancer screening and risk reduction. These findings support the need for health education materials that incorporate oral cancer risk perception of high-risk individuals, which should be offered in places frequented by high-risk individuals, including smoking cessation clinics, alcohol drug rehabilitation centers, and food shelters. Currently, there are few oral cancer educational resources (25).

The major limitation of this study involves the absence of a comparison group of nonscreeners that would have allowed examination of risk perception as a motivator for screening participation, and the extent to which these screeners' risk perceptions differed from that of the general population. Another limitation of the study involved the substantial percentage (24%) of missing data for current alcohol consumption. This may highlight participants' reluctance to accurately report their level of alcohol consumption in medical settings. Study strengths include the assessment of a large, very diverse participant population, which allowed us to disentangle relationships between demographics and risk behaviors and perception.

In conclusion, the results of this study suggest that risk reduction counseling in the oral cancer screening session may be a feasible way to reach those who are most at risk.

## References

1. American Cancer Society. Cancer Facts and Figures, 2001.
2. Warnakulasuriya, K. A. A. S., Harris, C. K., Scarrott, D. M, Watt, R., Gelbier, S., Peters, T. J., and Johnson, N. W. An alarming lack of public awareness towards oral cancer. *Br. Dental J.*, 187: 319–322, 1999.
3. Horowitz, A. M., and Nourjah, P. A. Factors associated with having oral cancer examinations among U. S. adults 40 years of age or older. *J. Public Health Dent.*, 56: 331–335, 1996.
4. Smart, C. R. Screening for cancer of the aerodigestive tract. *Cancer (Phila)*, 71: 1061–1065, 1993.
5. Lowry, R. J., and Craven, M. A. Smokers and drinkers awareness of oral cancer: a qualitative study using focus groups. *Br. Dent. J.*, 18: 668–670, 1999.
6. Horowitz, A. M., Moon, H. S., Goodman, H. S., and Yellowitz, J. A. Maryland adults' knowledge of oral cancer and having oral cancer examinations. *J. Public Health Dent.*, 58: 281–287, 1998.
7. Clayman, G. L., Chamberlain, R. M., Lee, J. J., Lippman, S. M., and Hong, W. K. Screening at a health fair to identify subjects for an oral leukoplakia chemoprevention trial. *Journal of Cancer Education*, 10: 88–90, 1995.
8. Jullien, J. A., Zakrzewska, J. M., Downer, M. C., and Speight, P. M. Attendance and compliance at an oral cancer screening programme in a general medical practice. *Eur. J. Cancer B Oral Oncol.*, 31: 202–206, 1995.
9. Ostroff, J. O., Hay, J. L., Schantz, S. P., and Maher, M. M. A survey of smoking status and cancer risk perceptions among participants attending a hos-

<sup>6</sup> Because gender and ethnic group (Asian *versus* other) were not related [ $\chi^2(1) = 5.17$ ;  $p > 0.05$ ], it was not necessary to do separate regressions with each demographic variable.

- pital-based head and neck screening program. *Psychology and Health*, 14: 979–990, 2000.
10. Mashberg, A., and Samit, A. Early diagnosis of asymptomatic oral and oropharyngeal squamous cancers. *CA Cancer J. Clin.*, 45: 328–351, 1995.
  11. Ajzen, I., and Fishbein, M. *Understanding attitudes and predicting behavior*. Englewood Cliffs, NJ: Prentice Hall, 1980.
  12. Janz, N. K., and Becker, M. H. The Health Belief Model: a decade later. *Health Educ. Quart.*, 11: 1–48, 1984.
  13. Rogers, R. W., and Mewborne, C. R. Fear appeals and attitude change: effect of a threat's noxiousness, probability and occurrence and the efficacy of coping responses. *J. Pers. Soc. Psychol.*, 34: 54–61, 1976.
  14. Severson, H. H., Eakin, E. G., Lichtenstein, E., and Stevens, V. J. The inside scoop on the stuff called snuff: an interview study of 94 adult male smokeless tobacco users. *J. Subst. Abuse*, 2: 77–85, 1990.
  15. Tan, B. S., Ng, K. H., and Esa, R. Health beliefs in oral cancer: Malaysian estate Indian scenario. *Patient Education Counseling*, 42: 205–211, 2001.
  16. Cruz, G. D., LeGeros, R. Z., Ostroff, J. S., Hay, J. L., Kenigsberg, H., and Franklin, D. M. Oral cancer knowledge, risk factors and characteristics of participants in a large oral cancer screening program in New York City. *Am. J. Public Health*, in press, 2002.
  17. Prochaska, J. O., DiClemente, C. C., and Norcross, J. C. In search of how people change: applications of addictive behaviors. *Am. Psychol.*, 47: 1102–1114, 1983.
  18. Ewing, J. A. Detecting alcoholism: the CAGE questionnaire. *JAMA*, 252: 1905–1907, 1984.
  19. Weinstein, N. D. Unrealistic optimism about future live events. *J. Pers. Soc. Psychol.*, 39: 806–820, 1980.
  20. Weinstein, N. D. Unrealistic optimism about susceptibility to health problems. *J. Behav. Med.*, 5: 441–460, 1982.
  21. Weinstein, N. D. Accuracy of smokers' risk perceptions. *Ann. Behav. Med.*, 20: 135–140, 1998.
  22. Centers for Disease Control. Tobacco use—United States, 1900–1999. *Morb. Mortal. Wkly. Rep.*, 48: 986–993, 1999.
  23. Centers for Disease Control and Prevention. Behavioral Risk Factor Surveillance System Summary Prevalence Report. Atlanta, GA: Centers for Disease Control and Prevention, 1999.
  24. Crowe, R. R., Kramer, J. R., Hesselbrock, V., Manos, G., and Bucholz, K. K. The utility of the 'brief MAST' and the 'CAGE' in identifying alcohol problems. *Arch. Fam. Med.*, 6: 477–483, 1997.
  25. Chung, V., Horowitz, A. M., Canto, M. T., and Siriphant, P. Oral cancer educational materials for the general public: 1998. *J. Public Health Dent.*, 60: 49–52, 2000.

# Cancer Epidemiology, Biomarkers & Prevention

AACR American Association  
for Cancer Research

## Oral Cancer Risk Perception among Participants in an Oral Cancer Screening Program

Jennifer L. Hay, Jamie S. Ostroff, Gustavo D. Cruz, et al.

*Cancer Epidemiol Biomarkers Prev* 2002;11:155-158.

**Updated version** Access the most recent version of this article at:  
<http://cebp.aacrjournals.org/content/11/2/155>

**E-mail alerts** [Sign up to receive free email-alerts](#) related to this article or journal.

**Reprints and  
Subscriptions** To order reprints of this article or to subscribe to the journal, contact the AACR Publications  
Department at [pubs@aacr.org](mailto:pubs@aacr.org).

**Permissions** To request permission to re-use all or part of this article, use this link  
<http://cebp.aacrjournals.org/content/11/2/155>.  
Click on "Request Permissions" which will take you to the Copyright Clearance Center's (CCC)  
Rightslink site.