Knowledge, Attitudes and Practices of Adolescent High School Students In Brownsville, Texas to the Risk Factors for Oral Cancer

Case Report submitted in partial fulfillment of the

Residency in Dental Public Health

By

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Abstract

Annually, more than 30,000 people in the United States are diagnosed with oral cancer and more than 8,000 deaths occur as a result. Tobacco use and alcohol consumption have been identified as the major risk factors for oral and pharyngeal cancers. Habitual use of these products often develops during adolescence. This study was done to investigate the knowledge, attitudes and beliefs of the adolescent high school population at Brownsville, Texas to the risk factors for oral cancer. A self administered questionnaire was completed by 1667 (95.6% Mexican Americans) students in four of the five high schools. 60.5% had tried cigarette smoking (versus 71.3% for the US as a whole), 26.0% were current cigarette smokers (versus 34.8% for the US as a whole) and 9.8% were frequent cigarette smokers (versus 16.1% for the US as a whole). 7.7% students reported using chewing tobacco or snuff (versus 11.4% for the whole US). 69.1% had tried alcohol (versus 80.4% for the whole US), 46.1% consumed alcohol regularly (versus 51.6% for the whole US) and 31.8% were episodic heavy users (versus 32.6% for the whole US). Only 6% of the students reported having 5 or more servings of fruits and vegetables per day (versus 15.4% for the whole US). There was lack of awareness about the risk factors and signs of oral cancer among all the respondents irrespective of age, gender and ethnicity. Tobacco use was the only risk factor identified correctly by most of the study population. This study shows that the Mexican American adolescent population is not a lesser risk group for oral cancer as quoted in literature and relatively little attention has been given to educating these adolescents and youths about risk factors, protective dietary factors and early signs of oral cancer. The findings indicate the need for improved dental health educational and promotional activities directed towards this population.

TABLE OF CONTENTS

LIST OF TABLES

ACKNOWLEDGMENTS

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A. NAME OF PROJECT

Knowledge, attitudes and practices of Adolescent High School children in Brownsville to the risk factors for oral cancer.

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B. APPLICANT'S ROLE IN PROJECT

The applicant was the principal researcher in planning, implementation, analyzing, interpreting and reporting this study. Statistical assistance was given by Dennis McMahon, Statistician, Dep. Of Community Dentistry, UTHSCSA.

C. STATEMENT OF PURPOSE

- To assess the knowledge, opinions, and attitudes regarding oral cancer among the high school adolescent population at Brownsville, Texas.
- To investigate the habits and practices of the adolescent population in the high schools to the risk factors for oral cancer

D.BACKGROUND AND REVIEW OF LITERATURE

Adolescence is a time when young people-no longer children, not yet adults-experience new ideas, new relationships, and new activities. For some youth, the inherent difficulties of this transitional age, combined with high risk environments, lead to experimentation with and adoption of risky health behaviors and practices with lifelong consequences.

Youth are extremely vulnerable to multiple cancer-causing behaviors. Contemporary lifestyle, limited supportive adult contact, and easy availability of harmful activities or substances present opportunities that are detrimental to the health of the adolescent. Potentially health damaging behaviors established during adolescence can have lasting negative effects, such as cancer [1,2].

Of more than 1 million Americans who become new smokers each year, or nearly 3,000 who start smoking each day, the vast majority are recruited from the ranks of children and adolescents[4]. Most adults who smoke began experimenting with cigarettes in middle school and became regular smokers before completing high

school. About 90 percent of adult smokers started smoking before age 21 [5]. Tobacco is typically the first drug used among adolescents and the daily use of cigarettes is nine times more widespread than any other drug [6]. Furthermore studies have shown that smoking can lead to the use of alcohol and marijuana, as well as harder drugs, and is correlated with fighting, carrying weapons, attempting suicide, and engaging in high risk behaviors [6,7].

The continued onset of smoking among adolescents is the primary barrier to long-term reductions in smoking prevalence in the U.S population. Despite a consistent decline in smoking rates among adults over the past three decades, smoking rates among adolescents have remained virtually unchanged since 1980 [8]. In fact the smoking prevalence among male high school seniors actually inched upward each year between 1987 and 1991 [11]. Smoking rates among boys and girls are now at comparable levels. A disturbing trend is higher prevalence of cigarette smoking among high school seniors from the lowest socioeconomic groups; as a result, it is projected that economically disadvantaged youths will experience tobacco-related health effects more acutely in the future than other youths [10].

Alcohol has become a major public health problem concern among adolescents as well [11]. A 1989 survey conducted by the National Institute on Drug Abuse revealed that more than 5 million adolescents (defined as ages 12-17) reported drinking alcohol at least monthly [12]. Of particular concern is the fact that alcohol use among adolescent Hispanics is generally found to be similar to or higher than among non-Hispanic whites [9]. In the category of "children" (defined in the US Census as those 18 or younger) Hispanics are the largest minority population. There are many significant health issues for American Hispanic children. Among all the groups of children in America, they are least likely to have health insurance. They are the least likely to have regular care from a doctor while growing up. They are the least likely to see a doctor for routine childhood illness. They are more likely to contract vaccine-preventable disease because of low immunization rates. They are also the least likely to visit a dentist.

Tobacco use and alcohol use have been estimated to account for 33% of new cancers and cancer deaths in the United states [1]. Among Hispanic-Americans, cancer is the second leading cause of death and accounts for approximately 17% of all mortality in this population [1].Tobacco use and alcohol consumption have been identified in Healthy People 2000 as priority areas for the prevention of cancer [3]. Eight out of ten smokers start smoking before the age of 18 and unsupervised alcohol consumption starts as early as age 12 [6,7]. Tobacco use, the single most important and preventable cause of cancer mortality in the United States, is associated with cancer of the lung, lip, mouth, pharynx, larynx, and esophagus [16]. Excessive alcohol consumption also increases the risk of these cancers, particularly the risk of oral cancer when it is combined with smoking.

Annually, more than 30,000 people in the United States are diagnosed with oral cancers. Oral Cancer alone is responsible for more than 8,000 deaths each year, more than cervical cancer or malignant melanoma [17,18]. Oral cancers are more common than cancer of the brain, liver, kidney, thyroid, stomach, ovary or cervix. The number of deaths may be even higher, as oral cancer is often masked by other, more conspicuous comorbid conditions [19]. If detected early, the prognosis for survival of oral cancer is better than most cancers [20]. The percentage of people surviving five years after diagnosis corresponds to the stage of the cancer at the time of diagnosis. The five year survival rate is 75% for those with localized disease at diagnosis, compared to only 16 percent for those with metastasis[18]. Of the 13 major cancer sites, oral cancer has the fifth lowest five-year survival rate [18]. Advanced oral cancers and their sequelae cause chronic pain, loss of function, and irreparable, socially disfiguring impairment. The accompanying cosmetic changes incurred by surgery and radiation often results in great psychological trauma and social isolation.

Oral cancer is a disease with known high-risk factors, an asymptomatic phase with identifiable clinical features, an available and efficient screening modality and effective non-deforming treatment for early lesions [21,2,23]. Most oral cancer lesions are not diagnosed however until they are in an advanced stage.

Primary risk factors for oral cancers in the United States include past and present use of tobacco and alcohol products; for lip cancer, the primary risk factor is exposure to the sun [21,25,26,27]. Compared with nonsmokers, smokers have a 2 to 18 times increased risk of developing oral cancer [28]. Tobacco and alcohol use accounts for 75 percent of all oral and pharyngeal cancers and has been implicated in the formation of multiple primary cancer sites frequently found in oro-pharyngeal cancer patients [29]. Heavy drinkers who smoke more than one pack of cigarettes per day are 24 times more likely to develop oral cancer than non-alcohol and tobacco users [30].

Low intake of food containing Vitamin A, or its precursor ß-carotene, Vitamin C, fresh fruit, green leaf vegetables and other vegetables [31] is associated with increased risk for oral cancer. Dietary staples, culturally indigenous foods and beverages have been linked to the development of oral cancers [26,30,31]. Food additives, preservatives, and fats also have been linked to their development [33].

There is a higher incidence of lip cancer in outdoor workers and in rural populations than in office workers or the urban population, a relationship thought to be due to exposure to sunlight (and ultraviolet irradiation). Other studies have shown fair-skinned people to be predisposed to lip cancer in sunny climates and the fact that lip cancer involves the more exposed lower lip rather than the upper lip also supports a relationship with actinic radiation [34].

Unlike research of other cancers, few studies have been conducted on the US public regarding oral cancer knowledge, opinions, and practices. Several questions

concerning oral cancer, however, were included in two recent national surveys. The 1990 National Health Interview Survey (NHIS) Health Promotion and Disease Prevention Supplement (HPDP), included four questions about oral cancers [35]. This study found that the US adult public is not well informed about signs of oral cancers. Extensive lack of knowledge or misinformation prevailed across all groups, regardless of age, race or ethnicity.

Forty-four percent of adults did not know one sign of oral cancer and only 25 percent correctly identified one early warning sign of oral cancer. Just 13 percent knew that regular alcohol drinking increases ones' risk of oral cancer. Approximately two-thirds correctly identified tobacco as a risk factor for oral cancer. Yet, smoking was perceived as a risk factor for oral cancer by fewer people than for other health conditions.

Little published information exists on young people's knowledge and attitudes about oral cancer and cancer prevention.

Description of the Project

The Department of Health and Human Services (DHHS) has designated South Texas as a "medically and dentally underserved" area. Such designation means many residents of that particular area lack access to basic health care needs. A recent report by the Texas Hispanic Information Initiative for Good Health [36] stated that residents of south Texas have important barriers to health care, such as urban isolation, rural distances, poor public health and low use of cancer screening services. One such area in South Texas is Brownsville, with a population greater than 115,000. Brownsville lies at the mouth of Rio Grande River on the Gulf of Mexico. Its twin border city in Mexico is Matamoros and it is the most southerly city in the US, with a highly mobile youthful population. Nearly 40 percent of the population lives below the federal poverty level. Historically, there has been distinct need of oral health services in Brownsville school children. Unfortunately, program administrators have little evidence to justify current spending on oral health education activities. There are also many areas that need further studies to assess how significant is the use of alcohol and tobacco and other risk factors for oral cancer among the adolescent school population and what is the current level of knowledge among the high-schoolers to the risk factors for oral cancer. In preparing for this project, the author heard anecdotal reports from dentists and health educators of the low oral cancer risk in Brownsville.

After a thorough review of the literature we can conclude that relatively little data is present on the current use of tobacco and alcohol among the high school children in South Texas. There is no baseline data on the attitudes and practices regarding these risk factors among the high school population in Brownsville and data from this study will benefit ongoing and future health education programs (carried out by the

Brownsville Community Health Center) aimed specifically at the high schoolers. To date there appears to be no documentation in the scientific literature of studies on the aforementioned needs and services in the Brownsville community. While there are dental health services available through Brownsville Community Health Center, the only specific programs targeting high school children are taught in health classes.

Considering pressures of limited resources for health programs, policy makers are doubting that health education programs would have any impact on future improvements in oral health status. Unfortunately, program administrators have little evidence to justify current or future spending on oral health education activities.

Under the assumptions that oral health education conveys improved knowledge that raises awareness and is transformed into appropriate behavior which in turn may contribute to better oral health status, this study gathers baseline data on knowledge, attitudes and practices among the high school children in Brownsville to oral cancer. Investigation may also assist in securing and directing funds to support the specific oral health needs of these and other LRVG and South Texas school children.

Study Design

This residency project concentrated on the awareness of oral cancer and the prevalence of tobacco and alcohol use among the high school population. This study resulted from the observations made by Ms. Joan Dentler, Director for Campus Care Centers (which is part of the Brownsville Community Health Center and runs health clinics in the high schools). As a result of her observations, a pilot study was done in December when health records of about 500 children attending the health clinics was reviewed for the high risk behaviors.

SYNOPSIS OF THE PILOT STUDY

Total number of individuals : 485 (ranged in age from 12 - 20; mean age of 15). The sample was evenly distributed with regards to gender with 46.4% (n=224) males and 53.6% (n=259) females. As expected the majority of the sample i.e. 86% (n=415) were of Hispanic origin.

Alcohol consumption: 41.2% (n=195) respondents answered that they have used alcohol and 15.0% (n=71) said that they regularly consume alcohol.

Cigarette smoking: 13.6% (n=65) were regular tobacco users and 38.4% (n=183) replied that they had tried tobacco/smoking

Drug use: 22.6% (n=107) had used illegal drugs and 5.0%(n=24) regularly consumed drugs and a majority mentioned marijuana.

Sexual activity: 31.7% (N=151) mentioned that they have had sex. Of all those who were sexually active, about half replied they did not use condoms or anything else to prevent pregnancy'.

After a series of meetings with the Director of Health Services, Brownsville Independent School District and the principals of the different high schools, the planning process of the project was initiated and a research protocol was developed in January 1997. This protocol included identification of study population, sample size, questionnaires, and methods of analysis.

After two reviews and corrections, by March 1997 the protocol was approved by the University of Texas Health Science Center Institutional Review Board for data collection (Appendix D). Data collection was completed between April 10 and May 15, 1997. By early August 1997 complete data review, entry, cleaning and analysis was finished.

Materials and Methods

The sample population was chosen from the public school system, which represented a cross section of different socio-economic groups in Brownsville. Private and parochial schools enroll only 4% of the total 9-12 grade population and were not considered for the study. We employed a two stage cluster sample design to produce a simple convenience representative sample of students in grades 9-12. The first-stage sampling frame consisted of all public schools containing any of grades 9-12. Four out of the five high schools agreed to participate in the study. The four high schools in this survey were School #1 Lopez, #2 Porter, #3 Hanna and #4 Rivera. The following table describes the student makeup of each of the four high schools.

Characteristics	**Lopez**	**Porter**	**Hanna**	**Rivera**
Number of Students	1510	2360	2731	1840
Economically Disadvantaged	1349(89.33)	1660(70.33)	1814(66.42)	1652(89.78)
Male : Female	52.3:47.6	51.4:48.5	50.9:48.9	53.5:46.3
Hispanic : Non Hispanic ratio	98.9: 1.2	98.5:1.3	93.1:6.0	98.4:1.5

Table 1: Demographics of the four schools in Brownsville

At the second sampling stage in each of the four schools, intact classes on a selected required subject or a selected period (e.g., second period) were randomly selected. All students in the selected classes were eligible to participate in the survey. The procedure was slightly modified to comply with the administrative arrangements in one of the schools. In this way the respondents in each school were considered to be representative of that school and all the respondents representative of the Brownsville ISD High School population

The National Health Interview Survey on Teenage Attitudes and Practices and Youth Risk Behavior Surveillance System Questionnaire was used in designing the study questionnaire. A structured questionnaire consisting of 39 items was developed, including two open ended and 37 precoded items (Appendix A).

Pre coded questions relating to the following topics were included:

- Risk Factors specific to oral cancer
- Early signs and risk sites for oral cancer
- Tobacco and Alcohol Use
- Dietary and nutritional practices
- Social dimensions of self-esteem

The questions were designed and selected to be appropriate, self explanatory, and easy to answer with little or no assistance.

Survey procedures were designed to protect the student's privacy by allowing for anonymous and voluntary participation. Teachers administered the survey which took approximately 15 minutes to complete. Students recorded their responses in the classroom during a regular class period. Students were told the questionnaire was designed to find out how much they knew about cancer and their answers would be used to develop health education programs for high schools students in Brownsville. Students recorded their responses directly on the questionnaire. Parental consent procedures were followed before survey administration (Appendix C). A passive consent procedure was used to obtain parental consent by advising parents of the study and requesting those who do not want their adolescent to participate to so advise, by completing and returning the form. A positive consent was taken from all students who wished to participate in the survey (Appendix B)

Data Analysis

Data was entered into a IBM PC using the spreadsheet program Microsoft Excel (Version 7.0a). A random ten percent of all data were verified for coding accuracy and the error rate was found to be minimal. Statistical analyses was carried out using SPSS (Statistical Package for Social Science) Version 6.1.4. This statistical analyses included both descriptive and analytical tests. Descriptive statistics was used to compute frequency of response for all demographic items and all questions about beliefs, knowledge, and practices to risk factors of oral cancer. Data was further analyzed by the Chi Square Statistics to assess if the variables correlate with the binary response variable. Those variables which correlated were then considered for entry into the Logistic Models. Individual predictors of tobacco-use, alcohol use and fruits/vegetables servings consumed were examined and odds ratios and 95% confidence intervals from the logistic regression were presented. for each of the independent variables which entered the model.

Results

The sampling frame consisted of 2600 children to whom consent forms and questionnaires were distributed. A total of 1754 questionnaires were returned (Response rate 67.46%). 137 questionnaires were incomplete, unanswered and were not considered for data analysis. Thus results computed below are from the 1667 completed questionnaires.

95.1% of the sample population were Hispanics. The sample was evenly distributed with regards to gender with 51.3% (n=856) males and 48.7% (n=811) females. The overwhelming majority of Hispanics in Brownsville are Mexican Americans and in this report these terms may be used interchangeably.

Characteristics	Number	Percent
Sex		
Female	811	48.7
Male	856	51.3
Grade		
9th Grade	690	41.4
10th Grade	421	25.3
11th Grade	328	19.7
12th Grade	213	12.8
Age		
14 years	100	6.0
15 years	379	22.7
16 years	517	31.0
17 years	379	22.7
18 years or older	287	17.2
Race or ethnicity		
White	41	2.5
Black	4	0.2
Hispanic	1585	95.1
Asian or Pacific Islander	4	0.2
Native American	6	0.4
Other	12	0.7
School		
Lopez	524	31.4
Porter	376	22.6
Hanna	416	25.0
Rivera	351	21.1

Table 2: Demographics of the Brownsville Oral Cancer Risk Behavior Survey

Univariate Analysis

Cigarette Use

Overall, 60.5% of the students had ever tried smoking (Appendix A: Table 13,15). Male students (68.3%) were significantly more likely than female students (52.8%) to have ever tried cigarette smoking. White students (75.6%) were significantly more likely than the Hispanic (60.7%) students to have ever tried cigarette smoking.

More than one fourth (26.0%) of the student population had smoked cigarettes on 1 or more of the 30 days preceding the survey (i.e., current cigarette use). Male students (36.2%) were significantly more likely than female students (16.4%) to report current cigarette use. White students (51.2%) were again significantly more likely than the Hispanic (25.5%) students to report this.

9.8% of the students had smoked cigarettes on 20 or more of the 30 days preceding the survey (ie., frequent cigarette use). Again, Male students (13.6%) were significantly more likely than female students (6.4%) to report frequent cigarette use. White students and students of other non-Hispanic ethic origin were significantly more likely than the Hispanic students to do so.

Smokeless Tobacco Use

Overall prevalence of smokeless tobacco use was 7.7% (Appendix A: Table 14,16). Prevalence of current smokeless tobacco use was significantly higher among male students (13.9%) than among female students (1.6%). Of those who used smokeless tobacco, 42 % used more than half a can/pouch of chewing tobacco or snuff every day. White students and students of other non-Hispanic ethic origin were significantly more likely than the Hispanic students to use smokeless tobacco.

Alcohol Use

69.1% of the students had at least one drink of alcohol during their lifetime (Appendix A: Table 14,16). Male students (55.2%) were significantly more likely than female students (42.8%) to have done this. Overall, 12th graders (58.6%) were significantly more likely than 9th graders (44.5%) to have had at least one drink of alcohol ever. White students were significantly more likely than the Hispanic and students of other ethnic origin to do so.

Overall almost half (46.1%) of all students had at least one drink of alcohol during the 30 days preceding the survey (i.e., current alcohol use). Again male students (54.4%) were significantly more likely than female students (38.4%) to be regular

users of alcohol. White students were significantly more likely than the Hispanic and students of other ethnic origin to do so.

31.8 % of the students had at least five or more drinks of alcohol on at least one occasion during the 30 days preceding the survey (i.e., episodic heavy drinking). Overall male students (43.9%) were significantly more likely than female students (20.0%) to report episodic heavy drinking.

Dietary Behaviors

Only 6.8% of students had eaten five or more servings of fruits and vegetables during the day preceding the survey (Table 3 and Appendix A: Table 17). However 29.1% of the students reported having three or more servings of fruits and vegetables during the day preceding the survey. Male students were more likely than female students to have three or more servings of fruits and vegetable servings per day.

Category	3 or more daily servings of fruits & vegetables		5 or more daily servings of fruits & vegetables	
	N	%	N	%
Sex				
Female	191	26.5	46	6.4
Male	231	31.7	53	7.3
Grade				
9th Grade	165	27.7	40	6.7
10th Grade	103	28.9	30	8.4
11th Grade	99	33.4	20	6.8
12th Grade	49	26.2	8	4.3
Age				
14 years	26	30.6	6	7.1
15 years	88	25.7	24	7.0
16 years	118	26.7	31	7.0
17 years	107	32.6	23	7.0
18 years or older	81	32.7	13	5.2
Race or ethnicity				
White	8	21.1	2	5.3
Other	9	37.5	4	16.7
Hispanic	403	29.3	93	6.8
School				
Lopez	132	29.2	33	7.3
Porter	98	29.3	30	9.0
Hanna	95	26.5	20	5.6
Rivera	97	31.9	16	5.3

Table 3: Dietary Behavior by gender, grade, age, ethnicity and school

Perceptions On Oral Cancer

Respondents did not know about risk factors for mouth or lip cancer (Table 4). More than half of the respondents (54.8%) had not heard about oral cancer. Tobacco use was the only risk factor which was correctly identified by most of the respondents. 52.7% did not think alcohol to be a risk factor. Only 10.6% correctly responded that sunlight can be a risk factor for lip cancer.

Extensive misinformation prevailed across all group, regardless of gender, age or ethnicity (Appendix A: Table 18,19,20). About a quarter of the study population incorrectly mentioned drinking coffee as a risk factor for oral cancer; 41.5% thought poor oral hygiene was a risk factor for oral cancer.

Knowledge on the risk factors	N	% and C.I at 95%
Drinking alcohol	789	47.3(44.9-49.7)
Spicy food	132	7.9(6.6-9.2)
Sugary Food	160	9.6(8.2-11.0)
Environmental pollution	301	18.1(16.2-19.9)
Cigarettes	1399	83.9(82.22-85.7)
Antibiotics	219	13.1(11.5-14.8)
Removal of Teeth	226	13.6(11.9-15.2)
Sunlight	176	10.6(9.1-12.0)
Poor Oral Hygiene	691	41.5(39.1-43.8)
Drinking Coffee	393	23.6(21.5-25.6)
Use of Mouthwash	89	5.3(4.3-6.4)
Chewing Tobacco	1446	86.7(85.1-88.4)

Table 4: Perceptions of the Risk Factors For Oral Cancer

This survey also found that the high school children are not well informed about early signs or risk sites for oral cancer (Table 5,6). Almost 80% of the students mentioned gums as a common risk site for oral cancer; which in fact is one of the least common sites. The same holds true for roof of the mouth. About 20% of the respondents even mentioned teeth as a risk site for cancer. The most common type of precancerous lesions in US occurs along the tongue or under the tongue. About 50% of the respondents did not mention tongue (or under the tongue) as a risk site for oral cancer.

Evaluation by age, gender, ethnicity showed no differences and the whole group of respondents indicated a pervasive lack of knowledge on the risk sites and early signs for oral cancer

Risk Site for Oral Cancer	N	% and C.I
Tongue	794	47.6(45.2-50.0)
Teeth	345	20.7(18.7-22.6)
Gums	1305	78.3(76.3-80.3)
Cheek	642	38.5(36.2-40.9)
Roof of the mouth	870	52.2(49.8-54.6)
Under the tongue	913	54.8(52.4-57.2)

Table 5: Perceptions of the Risk sites for Oral Cancer

Nearly two thirds of the population thought a white or red patch in the mouth was not an early sign for oral cancer. The fact that 60% of the population identified bleeding gums as an early sign of oral cancer suggests the lack of awareness and misconceptions regarding the disease. About 55% of the respondents reported a non healing ulcer in the mouth as not an early risk sign for oral cancer.

Early Signs for Oral Cancer	N	% and C.I
Bleeding gums	1032	61.9(59.6-64.2)
Ulcer in the mouth which does not heal	758	45.5(43.1-47.9)
White patch	670	40.2(37.8-42.5)
Red patch in the mouth	567	34.0(31.7-36.3)
Bad breath in the mouth	535	32.1(29.9-34.3)
Lump/swelling in the mouth	945	56.7(54.3-591)
Difficulty in chewing	778	46.7(44.3-49.1)
Difficulty in swallowing	656	39.4(37.0-41.7)

Table 6: Perceptions of the Early signs of Oral Cancer

Multivariate Analysis

Multiple logistic regression models were built to examine and determine the combination of independent variables which could best predict the following dependent variables:

- Current Smoking Status
- Use of Smokeless Tobacco
- Frequent Alcohol Use
- Consumption of 3/ more servings of fruits & vegetables per day.

(Hosmer and Lemeshow [37]statistics was used to assess the goodness -of-fit for these models). Composite values were constructed for self-esteem and knowledge about the risk factors for oral cancer(explained on page 40 above Table 21 -Appendix A) [**Note**: Logistic regression is used for ease of interpretation as are odds ratios. Logistic regression for each of the dependent variable produced a symmetric cumulative distribution function or curve for the independent variables in the model. In case of the model predicting use of ST however this did not hold true despite due to the small percentages involved (only 7.7% currently used ST).

Current Smoking Status

On logistic modeling for current smoking behavior (Table 7), it was found that current alcohol use stood out as an important predictor. A current alcohol drinker was 15.6 times more likely to be currently using cigarettes than a non alcohol user. In this model, it was also found that male students were 2.38 times as likely to be current smokers than females, and a student using smokeless tobacco was 2.39 times more likely to be a current smoker than those who did not use smokeless tobacco. Thus the model shows that alcohol consumption and smokeless tobacco use in male students are quite strong predictors in determining the current smoking status of a high school individual. (Detailed Analysis-Appendix A: Table 21)

Variable	Parameter Estimate	Stan. Error	Odds Ratio
→Age	0.2356	0.0921	1.2657
→Sex	0.8675	0.1562	**2.381**
→Class	-0.3442	0.0985	0.7088
→Ethnic	-0.5326	0.3614	0.5871
→Smokeless Tobacco	0.8745	0.2692	**2.3976**
→Current Alcohol	2.7522	0.1847	**15.6774**
→3/more servings	-0.4392	0.1698	0.6445
→Knowledge	-0.4715	0.2514	0.6241

Table 7: Logistic Modeling for Current Smoking Behavior

Use of Smokeless Tobacco

Hispanic male students were 13.6 times more likely to be using smokeless tobacco than the females (Table 8). The model also suggested a low self esteem as a predictor for use of smokeless tobacco use. Individuals with low self esteem about life were 3.62 times more likely to use smokeless tobacco. A frequent alcohol user with low knowledge about the risk factors foe oral cancer was 3.35 times more likely to use smokeless tobacco. (Detailed Analysis-Appendix A: Table 22,23)

Variable	Parameter Estimate	Standard Error	Odds Ratio
→Ethnicity*sex			
• Non Hispanic Males vs. Females	0.2399	0.7934	1.271122
• Hispanic Males vs. Females	2.6107	0.431861	**13.60857**
→Ever smoked in life	-0.5613	0.3264	0.570467
→Current smoker	0.952	0.2829	**2.590886**
→Self esteem composite	1.2891	0.4234	**3.629519**
→Frequent Alcohol *Knowledge Composite			
• Not an alcohol drinker (low vs. high)	-0.4021	0.390625	0.668914
• Frequent Alcohol drinker (low vs.high)	1.2102	0.121171	**3.354155**

Table 8: Logistic Modeling for Current Use of Smokeless Tobacco

Frequent Alcohol Use

A current cigarette smoker was 8.89 times more likely to be frequently using alcohol than someone who is not a smoker (Table 9). Likewise the odds ratio for a smokeless tobacco user to frequently use alcohol was 2.29 and for someone with a low self esteem was 3.41 than for someone who is not. Further this model tells us that the odds ratio for age is 1.03 for females and 1.35 for males. This means that for males at each increment of 1 year the odds ratio goes up by a factor of 1.35 times and for females 1.03 times. At a particular age group the odds ratio for a male and female is not quite the same. For example a 16 year old male was 1.86 times more likely than a 16 year old female and a 17 year old male was 2.42 times as likely than a 17 year old female to be a frequent alcohol user. (Detailed Analysis-Appendix A: Table 25)

Variable	Parameter Est.	Stan. Error	Odds Ratio
→Sex			
• Female	0.0359	0.0865	1.036552
• Male	0.3024	0.075031	1.353102
→Age * Sex			
• 14 years (male vs. female)	0.0882	0.290046	1.092207
• 15 years (male vs. female)	0.3547	0.195545	1.425753
• 16 years (male vs. female)	0.6212	0.136104	1.86116
• 17 years (male vs. female)	0.8877	0.158067	**2.429535**
• 18+ years (male vs. female)	1.1542	0.240044	**3.171485**
→Current Smoker	2.186	0.1375	**8.8999**
→Smokeless Tobacco user	0.8324	0.2418	**2.2987**
→Self Esteem composite	1.2273	0.3581	**3.4122**

Table 9: Logistic Modeling for Frequent Use of Alcohol

Consumption of 3/ more daily servings of fruits & vegetables

Males were more likely to have 3 or more daily servings of fruits & vegetables than females (Table 10). An individual who was a current smoker, had a low self esteem and has a poor recognition of the risk factors for cancer was less likely to have three or more daily servings of fruits & vegetables. (Detailed Analysis-Append. A:Table 24)

Variable	Parameter Estimate	Standard Error	Odds Ratio
→Age	0.0761	0.0514	1.079
→Sex	0.3513	0.1228	1.429
→Current Smoker	-0.3059	0.1433	0.7365
→Knowledge composite	-0.3865	0.2152	0.6794
→Self esteem composite	-0.6701	0.4212	0.5117

Table 10: Logistic Modeling for consumption of 3 or more servings of fruits and vegetables

Discussion

There are some limitations to this study that must be considered before conclusions can be drawn. This study was limited to a school-based sample and the findings may not generalize to adolescents who are not in school. The ability of students to complete the questionnaire varied. The number of questions left blank increased towards the end of the questionnaire. Some of the students may have found the questions too difficult or lost interest. It must be borne in mind that the beliefs expressed by the participants in part may reflect their own personal general health and well being, current media hype and existing economic conditions. A few individuals had a tendency to tick multiple answers or report ambiguous responses to certain questions. The sample had a preponderance of Hispanic subjects (95%) reflecting the Brownsville high school students' community. These considerations necessitate a degree of caution in drawing general conclusions from the data. However it is representative of the Brownsville high school population and has implications for Mexican American population generally.

Results of this study suggests that the high school students are ill-informed about risk factors for and signs of oral cancer. Except in the case of tobacco use, a high percentage of students did not recognize the risk factors, risk sites or early signs for oral cancer. Across all groups, there was a higher level of knowledge about tobacco use as a risk factor. For decades it has been known that the use of tobacco products and excessive alcohol is detrimental to health. The use of tobacco products, especially cigarettes, is harmful and a major contributing factor to mortality vis-à-vis heart disease, emphysema, lung cancer and low birth-weight babies.

A variety of educational and informational campaigns have urged people who use tobacco products to stop. Rarely do available educational materials also include information on the use of tobacco products as risk factor for oral cancer. Similarly there have been major educational efforts regarding alcohol use as a risk factor for cirrhosis of the liver, liver cancer and fetal alcohol syndrome. But these educational messages seldom identify alcohol use as a risk factor for oral cancers. This study found that most high schoolers know that tobacco is detrimental to health. This suggests that some educational messages have successfully imparted correct information. The respondents were reasonably knowledgeable about the link between tobacco products and oral cancer. However the survey demonstrates that because of the general lack of education on the relation of alcohol to oral cancers, there is a corresponding lack of knowledge .

One objective in the Healthy People 2000 initiative is to reduce mortality from oral cancers[3]. As with most other cancers, when oral cancer is detected early, the prognosis is greatly improved. Without accurate and appropriate information people can neither make nor be expected to make informed, intelligent decisions about their own health [38]. Preventable diseases, such as oral cancer, impair quality of life and

impose financial burdens on society. Many people do not practice preventive behaviors - not by informed choice, but because they have never been taught about them, do not have skills to seek such information or do not have access to the information. Individuals need to know the risk factors for and signs and symptoms of oral cancers, as well as how to obtain a thorough oral examination [39]. According to the 1995-96 Texas Oral Cancer Risk Behavior Survey[40], 33% of Texan adults reported at least one risk behavior for oral cancer (tobacco use and risky alcohol behaviors). Public awareness and education efforts should be increased with emphasis on the oral cancer risks associated with tobacco and alcohol use. Although oral cancer typically strikes older adults, interventions targeting younger persons are more likely to be successful and discourage long-term tobacco and alcohol exposure.

The Youth Risk Behavior Surveillance system monitors health risk behaviors among youth and young adults across the nation. The following table (Table 11) compares the use of cigarettes, alcohol and smokeless tobacco among high school students in Brownsville, Texas and nationally as shown in the Youth Risk Behavior Survey[41] conducted by the CDC in 1995. The results show that the health risk behaviors (tobacco and alcohol use) of the high school children in Brownsville approach and are comparable to national risk behaviors.

Risk Behaviors	**Brownsville Survey**	**National Survey**
Ever smoked cigarette	60.5%	71.3%
Current Cigarette smoker	26.0%	34.8%
Frequent Cigarette smoker	9.8%	16.1%
Smokeless tobacco	7.7%	11.4%
Ever tried Alcohol	69.1%	80.4%
Current Alcohol	46.1%	51.6%
Episodic Heavy Alcohol	31.8%	32.6%

Table 11: Comparison between the Brownsville and National Survey

Scientific evidence suggests that as many as one third of the 500,000 cancer deaths that occur in the United States each year is related to dietary factors. Another third is attributable to smoking. For Americans who never used or have successfully quit using tobacco, modifying dietary & physical activity habits becomes the most relevant route for reducing cancer risk.. Consuming more fruits & vegetables (particularly green and dark yellow vegetables) is associated with lower risk of oro-pharyngeal and gastrointestinal cancers. According to the American Cancer Society and the USDA an individual should have atleast 5 daily servings of fruits and vegetables.

The 1995 Youth Risk Behavior Survey (YRBS) national sample found that 28% of high school students ate five or more servings of fruits and vegetables the day preceding the survey. Among the states and localities participating in the 1995 YRBS, the percentage of students who consumed at least five servings of fruits and vegetables was 23.1% in Texas, 22.3% in Dallas and 27.1% in Houston. However the present survey found that only 6.8% of high school students in Brownsville had eaten

five or more daily servings of fruits and vegetables. This is an alarming statistic and needs immediate attention.

This study found that Male Hispanic students when compared to Female Hispanic students were more likely to adopt and practice risky health behaviors (Table 12). The 1995 Youth Risk Behavior Study found that the use of smokeless tobacco was highest (25.1%) among the white male students. There is widespread erroneous belief that the use of smokeless tobacco is very low to none among the Mexican American population. 12.8% of the male Hispanic students in the present study were currently using smokeless tobacco. This shows that the male Hispanic population is also at a higher risk for use of smokeless tobacco. Relatively little attention has been given to educating them about the harmful effects of chewing tobacco and snuff.

Risk Behaviors	**Male Hispanic (n=795)**	**Female Hispanic(n=783)**
Ever smoked cigarette	68.2	53.1* [p<.001]
Regular Cigarette smoker	16.6	7.3 * [p<.001]
Current Cigarette smoker	35.2	15.8* [p<.001]
Frequent Cigarette smoker	12.5	5.7* [p<.001]
Smokeless tobacco	12.8	0.9* [p<.001]
Ever tried Alcohol	54.4	42.3 * [p<.001]
Current Alcohol	53.9	38.0* [p<.001]
Episodic Heavy Alcohol	43.2	19.6* [p<.001]

Table12: Comparison between Health Risk Behaviors (Hispanic Students)

On comparing the present prevalence of the risk habits of the school students to the Healthy People 2000 goals[3], we find that a great challenge lies ahead in accomplishing these goals in the next three years. Comprehensive educational interventions are needed if the healthy People 2000 objectives for oral cancer are to be achieved in Brownsville and will take a well-funded, organized and scientifically based educational program to accomplish this with individuals, families and groups.

Healthy People 2000: Reduce the initiation of cigarette smoking by children and youth so that no more than 15 percent have become regular cigarette smokers by age 20.
Brownsville survey : 26.0% of the high school children reported current regular cigarette smoking
Healthy People 2000: Reduce smokeless tobacco use by males aged 12 through 24 to a prevalence of no more than 4 percent
Brownsville survey : 7.7% of the students were current users of smokeless tobacco
Healthy People 2000: 50% of the population should be eating 5/more servings of fruits/vegetables.
Brownsville survey : 6.8% of students reported having 5 or more daily servings of fruits and vegetables
Healthy People 2000: Reduce the proportion of high school seniors engaging in recent occasions of heavy drinking of alcoholic beverages to no more than 28% of high school seniors
Brownsville Survey : 31.8% of the high-schoolers had engaged in recent occasions of heavy drinking of alcoholic beverages.

Conclusion

Mexican Americans are the second largest ethnic group in the southwest, yet almost half of these Mexican Americans were born in Mexico[48]. Mexican Americans tend to be poorer, less educated, and medically underserved compared with non-Hispanic whites. Despite these socioeconomic risks, Mexican American rates of infant mortality are equivalent to non-Hispanic whites and half that of Blacks, and the overall mortality rate among Mexican Americans is lower than that of non-Hispanic Whites [14]. This is a paradox of profound importance. An explanation of the paradox of Hispanic health has been proposed. Called the acculturation hypothesis, it explains the paradox in terms of cultural orientation linked to ethnicity [42]. Mexican American ethnicity is a marker of a Mexican cultural orientation that is defined by behavioral norms that account for their health status. Mexican Americans as a group smoke less[43], drink less[44], and eat a better diet[45] than do non-Hispanic Whites. This constellation of behaviors provides evidence for the group-level variable, cultural orientation, which directly influences the behavior of an entire group

The characteristic change in behavioral norms associated with US acculturation is a group-level phenomenon that gradually occurs over several generations. Changes in behavioral norms are determined at the group level and therefore appear to be cultural adaptations to the socio-economically disadvantaged community environments, Mexican Americans share with one another [46]. Increased consumption of tobacco, alcohol and non-nutritious foods are behavioral norms naturally selected in communities with greater availability and consumption of these products. In fact, the over-concentration of mini-markets and convenience stores, which are the primary outlet for these products, has been documented in the socio-economically disadvantaged communities where Mexican Americans reside[47].

Hispanic youth may conform to the mainstream and media potrayed adolescent culture by adopting risky behaviors such as smoking to gain acceptance from peers, which in turn increases self-esteem. Other contributing factors that may place Hispanics at higher risks to initiate smoking are family disintegration, low social self-concept, poor relationship with parents, deviant behavior, poor self esteem. depression, sensation seeking, and peer and adult substance abuse by older siblings and parents [43,49,50]. Preventive programs need to encourage more parental involvement in youth activities. Programs encouraging the value of family and other traditional Hispanic values should be greatly expanded.

Tobacco use has been identified as a major public health problem and the most preventable cause of premature death in the United States. Because tobacco in all forms is a known major cause of cancer and other disease, abstinence from tobacco offer major means for cancer prevention. However, the behaviors related to these substances often begin in adolescence, making youth an important population for primary prevention interventions. The Institute of Medicine (IOM), National

Academy of Sciences is the premiere health policy body in the US and advisor to the Congress. The IOM states that in the long run, tobacco use can be most efficiently reduced through a youth-centered policy [16].

Although efforts have been made to reduce the smoking prevalence in the general population, few efforts have been made to prevent initiation of cigarette smoking among ethnically diverse groups such as Hispanic youth. Hispanic youth smoke at a rate comparable to that for other ethnic or racial groups and the same holds true for alcohol use.

Increasingly, the tobacco industry is targeting Hispanic youth with suggestive advertisements sponsoring entertainment, cultural, and sports events that draw large minority audiences [51]. Although African-American males are at the highest risk to oral cancer, the marketing of various tobacco and alcohol products to Hispanic youth has grown in intensity. Teenagers seem to be responsive to advertisements and promotional activities, such as the sponsorship of sporting events and public entertainment, point-of-sale displays, and distribution of specialty items (including T-shirts, caps, sunglasses, key chains, and sporting goods). Cigarette advertisements use images of glamorous people and cartoon characters to portray the attractiveness of smoking and to relate it to independence, healthfulness, adventure seeking, and youthful activities, thereby implying that smoking can close the gap between an ideal and actual self-image. It is a deceptive image but seductive to youth !

Recent increases in the use of smokeless tobacco among adolescents are the result of a carefully crafted marketing strategy by tobacco companies. The sponsorship of touring sports and cultural events, use of sport figures promoting the use of ST and the distribution of free samples at various sporting events have been very effective at introducing youth to a risk for nicotine addiction and an increased risk for oral, pharyngeal and other cancers. In South Texas rodeos have become a major venue for Smokeless tobacco promotion.

This survey indicated that adolescent high schoolers in Brownsville engaged in relatively high levels of risk behaviors and their knowledge base was limited. Many of them hold misconceptions about oral cancer risk factors, signs, and sites that can have an impact on preventive behaviors. There is a great need for more information about oral cancer and cancer prevention in the schools. More than 50% of the students in this study wanted more information about oral cancer. Relatively few oral cancer educational materials for the public have been produced. This observation is particularly noteworthy especially for dental professionals, when compared with the plethora of materials that have been developed on tooth brushing, flossing and the need for dental visits. Studies are lacking that determine what educational materials are available and that assess their content in terms of accuracy, comprehensiveness, reading level, and cultural acceptability.

A review of health education textbooks for kindergarten through 12th grade students found that the oral cancer coverage was uneven, misleading, sometimes incorrect, but most often omitted altogether [52]. A lack of and incorrect content in health education textbooks may contribute to the public's overall lack of knowledge about oral cancers. There is a great need for cancer prevention in the school curriculum. The content should include knowledge about cancer risk factor, particularly in the area of diet, where specific dietary advice is required (according to the USDA pyramid).

Many of the behaviors recommended to reduce cancer risks require healthy decisions to be made early, reinforced and reaffirmed repeatedly throughout life. Students rely on a wide variety of sources for health information and schools (though major) represents only one part of the students educational experiences. Collaboration with other agencies and influences on the students social environment are required to promote healthy choices in such complex social behaviors as smoking, drinking and eating habits.

We conclude that oral cancer prevention programs targeting the adolescent high school population should emphasize the providing of factual information about cancer, its risk factors and screening. The programs should also counter the deceptive emotional appeals and peer pressures generated in advertising alcohol & tobacco.

Major Conclusions:

- **A large number of students were current users of tobacco (26% currently smoked cigarette and 8% smokeless tobacco) and involved in episodic heavy alcohol consumption (32%) and can be considered to be at risk for oral cancer.**

- **Relatively little is known about the risk factors and signs of oral cancer among the student population**

- **Though the Mexican - American population is quoted in the scientific literature as not a lesser risk group for oral cancer, significant percentage of the adolescents engaged in high risk behaviors.**

- **There is great need for carefully planned and scientifically evaluated health education and promotion programs on oral cancer for this community**

Suggested Changes if Study is Repeated

The sample in this study was obtained from the four public high schools in Brownsville. The extent to which similar and troubling findings would be found in other populations in South Texas is unknown. A need exists to replicate the findings reported here with geographically, ethnically, and socio-economically diverse samples.

Future studies should include clinical oral examinations and the use of 'bogus pipeline' techniques to validate the findings of this study. A need also exists for longitudinal studies to examine how the social contexts of tobacco, alcohol use and associated problem behaviors change, as youth move from adolescence to young adulthood, and how these patterns may differ for males and females.

An interesting study would be to follow trends in incidence of oral carcinoma with trends in cigarette, tobacco and alcohol advertising. Unfortunately, a confounder might be mobility of the population, but if trends were examined as a function of advertising spent in a large enough demographic area or specific demographic segments of the population, the trends may be able to be examined and compared.

Future studies in this area will definitely want to look at the role of acculturation, generational differences in predicting alcohol, tobacco, and other substance abuse. In prediction studies, researchers must attend not only to current tobacco and alcohol status but also changes in that status as potential predictors of other mal-adaptive behaviors. Further research is needed that investigates the origins of adolescents health concerns and when they emerge and wane.

Implications and Significance of the Study

1. The data from this study provides baseline data on tobacco and alcohol habits among the high-schoolers in Brownsville, Texas with particular relevance to Mexican Americans. This information may be used in program development of services, as well as information for future investigations, projects or surveys which might be conducted by AHEC, UTHSCSA, Texas Department of Health, or other agencies.

2. This study may be used for working hypotheses for future studies and interventions in the area.

3. Findings from this study will provide direction/assistance to the Campus Care Health Center, Brownsville Independent School District and Dental and Executive Directors of Brownsville Community Health Center in obtaining much needed funds for oral cancer and other oral health promotion and disease prevention in their region.

4. Indirectly this study may contribute ideas to:

- Improve student participation in the Brownsville Campus Care Centers' preventive programs.

- Identify resources needed for establishing, maintaining, and expanding programs and personnel

- Establish oral health education programs for parents and children attending community health centers in Brownsville, Lower Rio Grande Valley, South Texas and the US more generally.

GLOSSARY

(1) TERMS

- **LRVG : Lower Rio Grande Valley.**
- **YRBS: Youth Risk Behavior Surveillance System**
- **CDC : Center for Disease Control**
- **IOM : Institute of Medicine**
- **UTHSCSA : University of Texas Health Science Center at San Antonio**

(2) STUDY VARIABLES

- **Ever smoked cigarette :Ever had tried cigarette smoking as little as 1 or 2 puffs**
- **Regular Cigarette smoker : Ever had been a regular user, smoking atleast 1 cigarette a day for 30 days**
- **Current Cigarette smoker : Current user, smoking cigarette on 1/more of the 30 days preceding the survey**
- **Frequent Cigarette smoker : Frequent user smoking cigarettes on 20 or more of the 30 days preceding the survey**
- **Smokeless tobacco : Used Chewing tobacco or snuff n 1/more of the 30 days preceding the survey**
- **Ever tried Alcohol : Alcohol use ever in life**
- **Current Alcohol : Consumed at least 1 drink during the 30 days preceding the survey**
- **Episodic Heavy Alcohol: Consumed 5 or more drinks of alcohol on atleast 1 occasion during the 30 days preceding the survey**
- **3/more servings: Daily consumption of three or more servings of fruits and vegetables**
- **Knowledge composite (Recognition of the risk factors for oral cancer - Low vs.High)**
- **Esteem : Social dimensions of self-esteem (Poor vs. High)**
- **Ethnicity*Sex: Interaction term between different ethnic groups and gender**
- **Frequent Alcohol* Knowledge Composite : Interaction term between Frequent Use of Alcohol and Identification of risk factors for oral cancer**
- **Age*Sex : Interaction term between ages 14,15,16,17 and 18 with gender.**

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APPENDIX A: LIST OF TABLES

Table 13: Percentage of High School Students who used cigarettes by gender, grade, age, ethnicity, and school

Category	Cigarette use ever[1]		Regular Cigarette use[2]		Current Cigarette use[3]		Frequent Cigarette use[4]	
	N	%	N	%	N	%	N	%
Sex								
Female	427	52.8*	63	7.9*	131	16.4*	51	6.4*
Male	582	68.3	151	17.9	304	36.2	114	13.6
Grade								
9th Grade	413	60.3	90	13.3	200	29.5	63	9.3
10th Grade	255	60.9	48	11.6	107	25.8	39	9.4
11th Grade	203	61.9	48	14.8	69	21.6	33	10.3
12th Grade	131	61.5	23	11.0	54	25.7	27	12.9
Age								
14 years	56	56.0	9	9.1	17	17.3	7	7.1
15 years	220	58.4	43	11.5	98	26.1	23	6.1
16 years	326	63.5	67	13.2	140	27.6	53	10.4
17 years	228	60.3	55	14.7	94	25.5	41	11.1
18 years or older	177	61.7	39	13.8	84	29.8	40	14.2
Race or ethnicity								
White	31	75.6	17	41.5	21	51.2	12	29.3
Other Non-Hispanic	15	57.7*	10	38.5	17	50.0	8	34.6
Hispanic	958	60.7	187	12.0*	397	25.5*	142	9.1*
School								
Lopez	335	64.1	60	11.6	128	24.9	45	8.7
Porter	214	57.1	48	12.9	103	27.7	33	8.9
Hanna	244	58.9	56	13.7	108	26.4	47	11.5
Rivera	216	62.1	50	14.6	96	28.2	40	11.7

Table 13: Tobacco Use by gender, grade, age, ethnicity and school.

[1] Ever had tried cigarette smoking as little as 1 or 2 puffs
[2] Ever had been a regular user, smoking atleast 1 cigarette a day for 30 days
[3] Current user, smoking cigarette on 1/more of the 30 days preceding the survey
[4] Frequent user smoking cigarettes on 20 or more of the 30 days preceding the survey
* $p<.001$; ** $p<.01$

Table 14: Percentage of High School Students who used smokeless tobacco and alcohol by gender, grade, age, ethnicity, and school

Category	Current Smokeless Use		Alcohol use[1]		Regular Alcohol use[2]		Frequent Alcohol use[2]	
	N	%	N	%	N	%	N	%
Sex								
Female	13	1.6*	343	42.8*	308	38.4*	160	20.0*
Male	115	13.9	464	55.2	461	54.4	370	43.9*
Grade								
9th Grade	54	8.0	301	44.5	336	49.0	217	31.8
10th Grade	38	9.3	210	50.5	183	44.2	134	32.5
11th Grade	22	6.9	165	50.8	134	41.5	98	30.3
12th Grade	10	4.8	123	58.6	109	51.7	76	36.0
Age								
14 years	6	6.3	41	41.8	45	45.0	20	20.0
15 years	23	6.1	169	45.1	171	45.4	100	26.5
16 years	48	9.6	248	49.0	240	47.1	167	32.9
17 years	24	6.5	193	51.3	160	42.9	131	35.3
18 years or older	26	9.5	155	55.0	150	52.8	109	38.5
Race or ethnicity								
White	13	31.7	31	75.6	27	65.9	21	51.2
Other Non Hispanic	9	34.6	14	53.8	13	50.0	12	46.2
Hispanic	106	6.9*	758	48.5**	722	46.0	492	31.5**
School								
Lopez	38	7.5	249	48.0	235	45.4	167	32.4
Porter	33	8.9	189	50.9	174	46.4	123	32.9
Hanna	27	6.7	201	49.5	187	45.6	127	31.1
Rivera	30	8.9	168	48.7	173	50.0	113	32.8

Table 14: Smokeless Tobacco and Alcohol Use by gender, age, grade, ethnicity and school.

[!] Used Chewing tobacco or snuff n 1/more of the 30 days preceding the survey

[1] Alcohol use ever

[2] Consumed at least 1 drink during the 30 days preceding the survey

[3] Consumed 5 or more drinks of alcohol on atleast 1 occasion during the 30 days preceding the survey

* $p<.001$; ** $p<.01$

Table 15: Percentage of High School boys and girls who used cigarettes by grade, age, ethnicity, and school

	Cigarette use ever[1]				Regular Cigarette use[2]				Current Cigarette use[3]				Frequent Cigarette use[4]			
	Male		**Female**		**Male**		**Female**		**Male**		**Female**		**Male**		**Female**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Grad																
9th	248	66.3	165	53.1	65	17.6	25	8.1	147	39.9	53	17.1	48	13.0	15	4.8
10th	135	70.7	120	52.6	33	17.5	15	6.7	65	34.6	42	18.6	22	11.7	17	7.5
11th	119	68.4	84	54.5	34	19.7	14	9.3	52	30.6	17	11.3	25	14.7	8	5.3
12th	76	71.0	55	51.9	15	14.2	8	7.7	36	33.6	18	17.5	17	15.9	10	9.7
Age																
14	30	62.5	26	50.0	6	12.8	3	5.8	8	17.4	9	17.3	3	6.5	4	7.7
15	122	67.4	98	50.0	29	16.1	14	7.2	71	39.4	27	13.8	18	10.0	5	2.6
16	172	69.1	154	58.3	47	19.1	20	7.7	88	35.8	52	19.8	34	13.8	19	7.3
17	150	68.2	78	49.4	41	18.7	14	9.1	75	35.0	19	12.3	32	15.0	9	5.8
18	107	70.4	70	51.9	28	18.7	11	8.3	61	40.4	23	17.6	27	17.9	13	9.9
Ethnicity																
White	24	82.8	7	58.3	14	48.3	3	25.0	16	55.2	5	41.7	8	27.6	4	33.3
Other*	11	68.8	4	40.0	6	37.5	4	40.0	9	56.3	4	40.0	6	37.5	3	30.0
Hispanic	542	68.2	416	53.1	131	16.6	56	7.3	275	35.2	122	15.8	98	12.5	44	5.7
School																
Lopez	211	73.0	124	53.0	47	16.3	13	5.7	101	35.4	27	11.7	35	12.3	10	4.3
Porter	119	63.0	95	51.1	33	17.6	15	8.2	70	37.4	33	17.8	26	13.9	7	3.8
Hanna	135	68.2	109	50.5	38	19.5	18	8.4	75	38.5	33	15.4	29	14.9	18	8.4
Rivera	117	66.5	99	57.6	33	19.0	17	10.1	58	33.7	38	22.5	24	14.0	16	9.5

Table 15: Tobacco use among male and female students by grade, age, ethnicity and school.

[1] Ever had tried cigarette smoking as little as 1 or 2 puffs
[2] Ever had been a regular user, smoking atleast 1 cigarette a day for 30 days
[3] Current user, smoking cigarette on 1/more of the 30 days preceding the survey
[4] Frequent user smoking cigarettes on 20 or more of the 30 days preceding the survey
* other non-white, non-Hispanic
* $p<.001$; ** $p<.01$

Table 16: Percentage of High School boys and girls who used smokeless tobacco and alcohol by grade, age, ethnicity, and school

Categ	Current Smokeless Use[!]				Alcohol use[1]				Regular Alcohol use[2]				Frequent Alcohol use[2]			
	Male		Female		Male		Female		Male		Female		Male		Female	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Grad																
9th	47	13.0	7	2.3	183	49.7	118	38.2	209	55.9	127	40.7	151	40.8	66	21.2
10th	35	18.6	3	1.4	109	57.7	101	44.5	102	54.0	81	36.0	89	47.3	45	20.1
11th	21	12.5	1	0.7	98	57.3	67	43.5	85	49.7	49	32.2	75	43.9	23	15.1
12th	10	9.5	0	0	69	65.1	54	51.9	60	56.1	49	47.1	51	47.7	25	24.0
Age																
14	5	11.4	1	2.0	22	47.8	19	36.5	22	45.8	23	44.2	12	25.0	8	1.4
15	19	10.6	4	2.0	92	51.7	77	39.1	98	54.7	73	36.9	64	35.8	36	18.2
16	45	18.6	3	1.2	127	52.0	121	46.2	133	53.6	107	40.8	104	42.6	63	24.0
17	22	10.2	2	1.3	130	59.1	63	40.4	109	50.0	51	32.9	105	48.4	26	16.9
18	24	16.4	2	1.6	93	61.6	62	47.3	97	63.8	53	40.2	83	54.6	26	19.8
Ethnicity																
White	11	37.9	2	16.7	22	75.9	9	75.0	19	65.5	8	66.7	17	58.6	4	33.3
Other*	5	31.3	4	40.0	9	56.3	5	50.0	9	56.3	4	40.0	8	50.0	4	40.0
Hispanic	99	12.8	7	0.9	429	54.6	329	42.3	426	53.9	296	38.0	340	43.2	152	19.6
School																
Lopez	37	13.1	1	0.4	163	57.0	86	36.9	156	54.4	79	34.2	125	43.6	42	18.3
Porter	31	16.7	2	1.1	103	54.8	86	47.0	101	53.4	73	39.2	86	46.0	37	19.8
Hanna	26	13.5	1	0.5	110	57.0	91	42.7	107	54.6	80	37.4	86	44.3	41	19.2
Rivera	21	12.5	9	5.3	88	50.9	80	46.5	97	55.4	76	44.4	73	42.0	40	23.4

Table 16: Smokeless Tobacco & Alcohol use among male & female students by grade, ethnicity & school

[!] Used Chewing tobacco or snuff n 1/more of the 30 days preceding the survey
[1] Alcohol use ever
[2] Consumed at least 1 drink during the 30 days preceding the survey
[3] Consumed 5 or more drinks of alcohol on atleast 1 occasion during the 30 days preceding the survey
* other non-white, non-Hispanic
* $p<.001$; ** $p<.01$

Table 17: Frequency of selected nutritional practices among Hispanic High School Students

Table 17 presents the frequency of reported consumption of food (% who ate specific food on previous day)

Nutritional Practices	Hispanic	
	Female(n=786)	Male (n=799)
Oranges	18.4	24.7 **
Orange Juice	36.1	33.7
Fruit Drinks	16.9	21.2
Grapefruit	8.5	8.9
Cantaloupe	4.3	4.1
Banana	25.7	30.7
Apple/applesauce	23.4	21.7
Tomatoes	40.3	39.2
Salsa	21.4	22.8
Peppers	9.5	11.9
Carrots	16.9	19.4
Green Salads	29.9	26.4
Broccoli	9.4	9.4
Potatoes	30.7	34.2
Pinto Beans	19.6	18.8
Guacamole	14.8	14.3
Bread or roll	52.7	48.6
Yogurt	7.3	9.3
Cheese	43.9	46.3
Tortillas	58.4	66.5
Cold Cereal	26.2	27.0
Pasta	11.8	11.5
Fideo	10.9	13.4
Rice	33.2	41.1 *
Lard or meat	18.6	18.9
Margarine	8.1	9.1
Butter	18.2	16.6
Vegetable oil	84.0	75.6 *
Olive oil	9.2	11.3
Red Meat 2-3 times	70.48	72.46
Fish	6.0	7.6
Chicken	37.3	40.7
Turkey	2.8	4.6
Beef	39.7	44.6
Pork	5.3	7.6
Mixed Meat Dishes	8.1	12.3 **
Sausage OR bacon	9.4	11.8
Eggs	21.6	26.3
Pork skin	.8	2.4
more than one glass of milk	34.6	46.8 *
whole	34.7	39.2
low fat	25.7	27.2
non fat	5.0	4.4

Percentages may not equal 100% because they are rounded data

* $p<.001$; ** $p<.01$

Table 18: Knowledge and Perceptions on Oral Cancer by Gender

	Female		Male	
	N	%	N	%
Risk Factors For Oral Cancer				
Heard about Oral Cancer	343	42.2	411	48.6
Drinking alcoholΦ	411	50.7	378	44.2**
Spicy food	49	6.0	83	9.7**
Sugary food	59	7.3	101	11.8**
Environmental pollution	125	15.4	176	20.6**
CigarettesΦ	688	84.8	711	83.1
Antibiotics	105	12.9	114	13.3
Removal of teeth	117	14.4	109	12.7
SunlightΦ	78	9.6	98	11.4
Poor oral hygiene	362	44.6	329	38.4**
Drinking Coffee	179	22.1	214	25.0
Use of mouthwash	37	4.6	52	6.1
Chewing tobaccoΦ	717	88.4	729	85.2
Risk Sites For Oral Cancer				
TongueΦ	391	48.2	403	47.1
Teeth	158	19.5	187	21.8
Gums	646	79.7	659	77.0
CheekΦ	309	38.1	333	38.9
Roof of the mouth	449	55.4	421	49.2
Under the tongueΦ	468	57.7	445	52.0
Early Signs For Oral Cancer				
Bleeding gums	503	62	529	61.8
Ulcer in the mouthΦ	389	48.0	369	43.1
White patchΦ	333	41.1	337	39.4
Red patchΦ	281	34.6	286	33.4
Bad breath	260	32.1	275	32.1
Lump or swelling	483	59.6	462	54.0
Difficulty in chewing	384	47.3	394	46.0
Difficulty in swallowing	329	40.6	327	38.2

Table 18: Knowledge and Perceptions of oral cancer by gender.

The above figures shows the correct responses for risk factors, early signs and sites identified by the respondents. Φ denotes the risk factors, early signs and common sites for oral cancer in US Population.
* $p<.001$; ** $p<.01$

Table 19: Knowledge and Perceptions on Oral Cancer by Class

	9th Grade		10th Grade		11th Grade		12th Grade	
	n	%	n	%	n	%	n	%
Risk Factors For Oral Cancer								
Oral Cancer	273	39.9	215	51.8	156	48.0	104	49.8
AlcoholΦ	330	47.8	200	47.5	148	45.1	103	48.4
Spicy food	58	8.4	32	7.6	21	6.4	19	8.9
Sugary food	67	9.7	39	9.3	26	7.9	26	12.2
Pollution	129	18.7	80	19.0	49	14.9	40	18.8
CigarettesΦ	556	80.6	361	85.7	276	84.1	193	90.6
Antibiotics	96	13.9	60	14.3	36	11.0	26	12.2
Removal of teeth	112	16.2	54	12.8	28	8.5	29	13.6
SunlightΦ	94	13.6	41	9.7	22	6.7	15	7.0
Poor hygiene	245	35.5	188	44.7	138	42.1	111	52.1
Coffee	176	25.5	100	23.8	63	19.2	52	24.4
Mouthwash	44	6.4	20	4.8	15	4.6	9	4.2
Chewin tobaccoΦ	582	84.3	371	88.1	292	89.0	189	88.7
Risk Sites For Oral Cancer								
TongueΦ	319	46.2	224	53.2	137	41.8	102	47.9
Teeth	142	20.6	96	22.8	59	18.0	46	21.6
Gums	486	70.4	344	81.7	275	83.8	188	88.3
CheekΦ	225	32.2	171	40.6	139	42.4	99	46.5
Roof of the mouth	340	49.3	242	57.5	163	49.7	116	54.5
Under tongueΦ	365	52.9	243	57.7	173	52.7	120	56.3
Early Signs For Oral Cancer								
Bleeding gums	413	59.9	265	62.9	211	64.3	133	62.4
Ulcer in mouthΦ	259	37.5	207	49.2	164	50.0	118	55.4
White patchΦ	254	36.8	178	42.3	132	40.2	99	46.5
Red patchΦ	222	32.2	157	37.3	103	31.4	79	37.1
Bad breath	218	31.6	149	35.4	99	30.2	60	28.2
Lump swelling	342	49.6	270	64.1	186	56.7	137	64.3
Diff. chewing	314	45.5	205	48.7	154	47.0	96	45.1
Diff. swallowing	263	38.1	185	43.9	117	35.7	84	39.4

Table 19: Knowledge and Perceptions of oral cancer by class

The above figures show the correct responses for risk factors, signs and sites identified by the respondents.
Φ denotes the risk factors, early signs and common sites for oral cancer in US Population.
* $p<.001$; ** $p<.01$

Table 20: Knowledge and Perceptions on Oral Cancer by Age

	14		15		16		17		18&over	
	n	%	n	%	n	%	n	%	n	%
Risk Factors For Oral Cancer										
Oral Cancer	28	28.3	182	48.1	232	45.4	177	47.2	134	47.7
AlcoholΦ	60	60	175	46.2	247	47.8	185	48.8	121	42.2
Spicy food	6	6.0	33	8.7	32	6.2	36	9.5	24	8.4
Sugar food	12	12.0	35	9.2	52	10.1	30	7.9	30	10.5
Pollution	10	10	74	19.5	93	18	69	18.2	54	18.8
CigarettesΦ	87	87.0	315	83.1	429	83.0	323	85.2	242	84.3
Antibiotics	15	15.0	58	15.3	62	12.0	45	11.9	38	13.2
Removal of teeth	8.2	8.0	69	18.2	62	12.0	36	9.5	5	17.4
SunlightΦ	9	9.0	39	10.3	56	10.8	41	10.8	30	10.5
Poor hygiene	46	46	148	39.1	223	43.1	150	39.6	123	42.9
Coffee	29	29.0	92	24.3	130	25.1	71	18.7	70	24.4
Mouthwash	6	6.0	24	6.3	27	5.2	17	4.5	14	4.9
Chewin tobaccoΦ	91	91	333	87.9	444	85.9	329	86.8	247	86.1
Risk Sites For Oral Cancer										
TongueΦ	47	47.0	185	48.8	252	48.7	173	45.6	137	47.7
Teeth	20	20	82	21.6	109	21.1	76	20.1	58	20.2
Gums	75	75	284	74.9	414	80.1	294	77.6	237	82.6
CheekΦ	38	38	147	38.8	201	38.9	135	35.6	121	42.2
Roof mouth	53	53	200	52.8	284	54.9	191	50.4	142	49.5
Under tongueΦ	57	57	209	55.1	296	57.3	196	51.7	154	53.7
Early Signs For Oral Cancer										
Bleeding gum	65	65.0	226	59.6	322	62.3	247	65.2	171	59.6
Ulcer in mouthΦ	37	37.0	160	42.2	247	47.8	176	46.4	138	48.1
White patchΦ	36	36	148	39.1	224	43.3	143	37.7	119	41.5
Red patchΦ	31	31.0	126	33.2	184	35.6	124	32.7	192	35.5
Bad breath	39	39.0	106	28.0	180	34.8	114	30.1	96	33.4
Lump/ swell	60	60.0	218	57.5	291	56.3	215	56.7	160	55.7
Diff chewing	46	46.0	183	48.3	247	47.8	176	46.4	126	43.9
Diff swallow	39	39	157	41.4	214	41.4	129	34.0	117	40.8

Table 20: Knowledge and Perceptions of oral cancer by age

The above figures show the correct the correct responses for risk factors, early signs and sites identified by the respondents. Φ denotes the risk factors, early signs and common sites for oral cancer in US Population.
* p<.001 ; ** p<.01

Self esteem composite

The items were taken from Rosenbergs' Self Esteem Inventory Scale

I like school (Score = 0) I hate school (Score = 1)
I get along with my family (Score = 0) I never get along with my family (Score = 1)
Most of the time I feel happy (Score = 0) Most of the time I feel sad (Score = 1)
In general my life is good (Score = 0) In general my life is bad (Score = 1)

The score were totaled and a combined score of 2 or more was defined as low self esteem

Knowledge Composite

Heard about oral cancer (Score = 0)
Have Not heard about oral cancer (Score = 1)
Cigarettes are a risk factor for oral cancer (Score = 0)
Cigarettes are not a risk factor for oral cancer (Score = 1)
Smokeless tobacco is a risk factor for oral cancer (Score = 0)
Smokeless tobacco is not a risk factor for oral cancer (Score = 1)
Alcohol is a risk factor for oral cancer (Score = 0)
Alcohol is not a risk factor for oral cancer (Score = 1)
Sunlight is a risk factor for oral cancer (Score = 0)
Sunlight is not a risk factor for oral cancer (Score = 1)

The scores were totaled and a combined score of 2 or more was defined as low knowledge on oral cancer.

Table 21: Detailed Logistics Analysis For Current Smoking Behavior

Variable	Parameter Estimate	Standard Error	Wald Chi square	Prob Chi square	Odds Ratio	95% LCL O.R.	95% UCL O.R.
Age	0.2356	0.0921	6.5459	0.0105	1.26566	1.056629	1.516062
Sex	0.8675	0.1562	30.8395	0.0001	2.38095	1.753034	3.233781
Class	-0.3442	0.0985	12.2222	0.0005	0.70878	0.584347	0.859727
Ethnic	-0.5326	0.3614	2.1723	0.1405	0.58707	0.289111	1.192133
Smokeless Tobacco	0.8745	0.2692	10.5561	0.0012	2.39767	1.41463	4.063855
Current Alcohol user	2.7522	0.1847	222.1418	0.0001	15.6774	10.91555	22.51568
3+ daily serv of fruits/veg	-0.4392	0.1698	6.6946	0.0097	0.64455	0.462084	0.899072
Knowledge Composite	-0.4715	0.2514	3.5159	0.0608	0.62406	0.381271	1.021471

Hosmer and Lemeshow G.O.F. Test (p-value= 0.6378, df=8, H-L Stat= 6.0839)

Current alcohol drinker has odds ratio of 15+ of being a smoker. Actual relative risk for bivariate case is 8.75 due to high proportion of smokers.

Table 22 : Detailed Logistics Analysis For Current Smokeless Tobacco Use

Variable	Parameter Estimate	Standard Error	Wald Chi-square	Prob Chi-square	Odds Ratio	95% LCL O.R.	95% UCL O.R.
Sex	0.2399	0.7934	0.0914	0.7624			
Ethnicity	-2.0746	0.9775	4.5084	0.0337			
Smoke	-0.5613	0.3264	2.9575	0.0855	0.570467	0.30088	1.081603
Current smoke	0.952	0.2829	11.3220	0.0008	2.590886	1.488124	4.510843
Frequent alcohol	2.5188	0.8545	8.6895	0.0032			
knowledge comp	-0.4021	0.625	0.4138	0.5200			
Esteem composi	1.2891	0.4234	9.2672	0.0023	3.629519	1.582864	8.322511
eth*sex	2.3708	0.9007	6.9345	0.0085			
eth*freq alcohol	-1.9845	0.8784	5.1036	0.0239			
freq*know comp	1.6123	0.7103	5.1524	0.0232			

Hosmer and Lemeshow G.O.F. Test (p-value= 0.8444, df=8, H-L Stat= 4.1389)

The other odds ratios and confidence intervals have to be computed below by a different formula due to the interaction terms.

	odds ratio for sex by ethnicity:						
				LCL	UCL	LCL	UCL
Ethnicity	log odds	SE	O.R.	log(O.R.)	log(O.R.)	O.R.	O.R.
Non Hispanic	0.2399	0.7934	1.271122	-1.31516	1.794964	0.26843	6.019258
Hispanic	2.6107	0.431861	13.60857	1.764252	3.457148	5.837205	31.72636

The odds ratio for the variable sex is not significant for non-Hispanics due to large standard error caused by small sample size for non-Hispanic. For Hispanics the odds ratio is 13.61 that is the odds ratio is 13.61 for Hispanic males vs. Hispanic females for smokeless use.

	odds ratio for knowledge composite by frequent alcohol use						
				LCL	UCL	LCL	UCL
FREQ.	logodds	se	O.R.	log(O.R.)	log(O.R.)	O.R.	O.R.
None	-0.4021	0.390625	0.668914	-1.16773	0.363525	0.311074	1.438391
Freq. alcoholic	1.2102	0.121171	3.354155	0.972705	1.447695	2.645089	4.253301

For frequent alcohol=0 (i.e., non frequent drinkers) the odds ratio for knowledge composite low is .669 and not significant. When looking at confidence Interval for frequent drinkers the odds ratio for Knowledge composite is 3.354and significant.

	odds ratio for ethnic.d by freq. alcohol and by sex							
					LCL	UCL	LCL	UCL
freq. alcoh	SEX	log odds	se	O.R.	log(O.R.)	log(O.R.)	O.R.	O.R.
None	Female	-2.0746	0.955506	0.125607	-3.94739	-0.20181	0.019305	0.817252
None	Male	0.2962	0.679667	1.344739	-1.03595	1.628347	0.35489	5.095444
Yes	Female	-4.0591	0.714253	0.017265	-5.45904	-2.65916	0.004258	0.070007
Yes	Male	-1.6883	0.208473	0.184833	-2.09691	-1.27969	0.122836	0.278123
	different odds ratios for the variable ethnic according to the levels of freq. alcoho and sex.							

Table 23: Detailed Logistics Analysis For Smokeless Tobacco Use (Hispanics)

			Wald chi	Prob chi		LCL	UCL
	logodds	se	Square	square	O.R.	O.R.	O.R.
sex	2.6143	0.4323	36.5635	0.0001	13.65765	5.85322	31.86818
smoke	-0.5752	0.3367	2.9175	0.0876	0.562592	0.290796	1.088425
cur.smoke	0.9664	0.2977	10.5405	0.0012	2.628465	1.466543	4.710961
frequent alc	0.527	0.2888	3.3310	0.0680			
knowledge	-0.3934	0.6265	0.3943	0.5300			
self esteem	1.3425	0.4553	8.6952	0.0032	3.828603	1.568488	9.345435
freq alc.*knowled	1.6177	0.7176	5.0817	0.0242			

Hosmer and Lemeshow G.O.F. Test (p-value=0.6807, df=7, H-L Stat= 4.8302)

For this model and the full model for smokeless tobacco, smoke acts as a correction factor for current smoke. The implication is that if someone tried smoking (smoke) but is not a current smoker (i.e. he quit) he is less likely to use smokeless tobacco than someone who has never tried smoking.

	Odds ratio for frequent at different levels of knowledge						
Knowledge	Log odds	S.E	Odds Ratio	LCL log (OR)	UCL log (OR)	LCL O.R	UCL O.R
0	0.527	0.2888	1.693843	-O.3905	1.093048	O.961705	2.98335
1	2.1447	0.68989	8.53947	0.792506	3.496894	2.208924	33.01277

	Odds ratio for knowledge at different levels of frequent alcohol						
Frequent Alcohol	Log odds	S.E	Odds Ratio	LCL log (OR)	UCL log (OR)	LCL O.R	UCL O.R
0	-0.3934	0.6265	0.674759	-1.62134	0.83454	0.19763	2.30375
1	1.2243	0.36165	3.401784	0.51546	1.93313	1.67441	6.91116

Freq alc* knowledge is not shown due to complexity of interpretation

Table 24: Detailed Logistics For Daily Consumption of Fruit &Vegetable (3/more servings)

Variable	Parameter Estimate	Standard Error	Wald chi square	Prob Chi-square	Odds Ratio	95% LCL O.R.	95% UCL O.R.
Age	0.0761	0.0514	2.1856	0.1393	1.0790	0.975657	1.193445
Sex	0.3513	0.1228	8.1815	0.0042	1.4209	1.116961	1.807578
Current Smoke	-0.3059	0.1433	4.5585	0.0328	0.7365	0.556122	0.975279
Knowledge comp	-0.3865	0.2152	3.2265	0.0725	0.6794	0.445619	1.035922
self esteem comp	-0.6701	0.4212	2.5334	0.1115	0.5117	0.224102	1.168186

Hosmer and Lemeshow G.O.F. Test (p-value = 0.6577, df=8, H-L Stat = 5.9062)

Only the variable sex is significant in that the confidence interval (1.117,1.808) does not contain 1. It seems that males are more likely to eat 3 or more servings fruit & vegetables than females. Knowledge comp. and age are both close to being significant.

Table 25: Detailed Logistics Analysis For Frequent Alcohol Use

Variable	Parameter Estimate	Standard Error	Wald statitics	Prob Chi square	Odds Ratio	95% LCL O.R.	95% UCL O.R.
Age	0.0359	0.0865	0.1742	0.6780	1.0366		
Sex	-3.6429	1.8644	3.8179	0.0507	0.491		
Current Smoke	2.186	0.1375	252.889	0.0001	8.8999	6.797127	11.65226
Smokeless tobacc	0.8324	0.2418	11.8489	0.0006	2.2987	1.431141	3.69259
Esteem composit	1.2273	0.3581	11.7437	0.0006	3.4122	1.691176	6.883836
(Age by sex)	0.2665	0.1144	5.4237	0.0199	1.3054		

Hosmer and Lemeshow G.O.F. Test (p-value=0.7480, df=7, H-L Stat = 4.2718)

Computations for odds ratios for age (at different levels of sex) and for sex (at different levels of age) are done below.

odds ratios for the variable sex at different ages							
NOTE: 3=AGE 14; 4=AGE 15;...etc.							
				LCL	UCL	LCL	UCL
age	log(O.R.)	SE	OR	log(O.R.)	log(O.R.)	O.R.	O.R.
14	0.0882	0.290046	1.092207	-0.48029	0.65669	0.618604	1.928398
15	0.3547	0.195545	1.425753	-0.02857	0.737969	0.971835	2.091683
16	0.6212	0.136104	1.86116	0.354437	0.887963	1.425377	2.430176
17	0.8877	0.158067	2.429535	0.577888	1.197512	1.782271	3.311865
18	1.1542	0.240044	3.171485	0.683715	1.624685	1.981224	5.076821

This tells us that the odds ratio for sex (male compared to female reference category) increases with age.

odds ratio for the variable age at different levels of sex							
				LCL	UCL	LCL	UCL
sex	log(O.R.)	SE	OR	log(O.R.)	log(O.R.)	O.R.	O.R.
Female	0.0359	0.0865	1.036552	-0.13364	0.20544	0.874905	1.228065
Male	0.3024	0.075031	1.353102	0.15534	0.44946	1.168055	1.567466

This tells us that the odds ratio for age is 1.037 for females and 1.353 for males. this means that for males (e.g.) for each increment of 1 year the odds ratio goes up by a factor of 1.353. odds ratio for females increases by factor of 1.037 a year.

APPENDIX B: QUESTIONNAIRE

Oral Cancer Behavior Survey

DO NOT write your name on this survey. This survey is anonymous and no attempt will be made to identify you personally. Hence we are not asking your name or any other form of personal identification. No one will know what you write. Answer the questions based on what you really do.

Please fill in pencil the box below the questions, your correct or best answer to each question.
Fill in only one box for each question
For example:

❑1
■2
❑3

(The correct or best answer is number 2).
If you wish to change an answer, erase and remark it. Some questions require you to enter a number in a box. If more than one answer is required this will be shown by the statement "fill in all boxes which apply" after the question.

1. How old are you?
   - ❑1 12 years old or younger
   - ❑2 13 years old
   - ❑3 14 years old
   - ❑4 15 years old
   - ❑5 16 years old
   - ❑6 17 years old
   - ❑7 18 years old or older

2. What is your sex?
   - ❑1 Female
   - ❑2 Male

3. In what grade are you in?
   - ❑1 9th grade
   - ❑2 10th grade
   - ❑3 11th grade
   - ❑4 12th grade
   - ❑5 Ungraded or other

4. How do you describe yourself?
   - ❑1 White-not Hispanic
   - ❑2 Black-not Hispanic
   - ❑3 Hispanic
   - ❑4 Asian or Pacific Islander
   - ❑5 Native American or Alaskan Native
   - ❑6 Other

11. During the past 30 days, on the days you smoked, how many cigarettes did you smoke per day?
    - ❑1 I did not smoke cigarettes during the past 30 days.
    - ❑2 Less than 1 cigarette per day
    - ❑3 1 cigarette per day
    - ❑4 2 to 5 cigarettes per day
    - ❑5 6 to 10 cigarettes per day
    - ❑6 11 to 20 cigarettes per day
    - ❑7 More than 20 cigarettes per day

12. During the past 6 months, did you try to quit smoking cigarettes?
    - ❑1 I did not smoke cigarettes during the past 6 months.
    - ❑2 Yes
    - ❑3 No

13. During the past 30 days, did you use chewing tobacco, such as Redman, Levi Garrett, or Beechnut, or snuff, such as Skoal, Skoal Bandits, or Copenhagen?
    - ❑1 No, I did not use chewing tobacco or snuff during the past 30 days.
    - ❑2 Yes, chewing tobacco only
    - ❑3 Yes, snuff only
    - ❑4 Yes, both chewing tobacco and snuff

14. During the past 30 days, on the days you chewed tobacco, how many cans/ pouches did you use per day?
    - ❑1 less than half a can/ pouch a day
    - ❑2 half to one can/pouch a day
    - ❑3 more than one can/pouch a day

The next four questions ask about drinking alcohol. This includes drinking beer, malt liquor, wine, wine coolers, and liquor such as rum, tequilla, gin, vodka, or whiskey. For these questions, drinking alcohol does not include drinking a few sips of wine for religious purposes.

15. How old were you when you had your first drink of alcohol other than a few sips?
    - ❑1 I have never had a drink of alcohol other than a few sips.
    - ❑2 Less than 9 years old
    - ❑3 9 or 10 years old
    - ❑4 11 or 12 years old
    - ❑5 13 or 14 years old
    - ❑6 15 or 16 years old
    - ❑7 17 or more years old

21. Did you eat any vegetables yesterday?
- ❑1 Yes
- ❑2 No
- ❑3 Don't know/Not sure

22. If yes, please fill in all boxes which apply to you.
- ❑1 Tomatoes
- ❑2 Salsa
- ❑3 Peppers
- ❑4 Carrots
- ❑5 Green salads
- ❑6 Broccoli
- ❑7 Potatoes
- ❑8 Pinto beans
- ❑9 Guacamole
- ❑10 Other _____

23. How many servings of fruits and vegetables did you eat yesterday?

❑1 servings (write the number of servings)

24. Yesterday, did you eat (Please fill in all boxes which apply to you)
- ❑1 Bread or roll
- ❑2 Yogurt
- ❑3 Cheese
- ❑4 Tortillas
- ❑5 Cold cereal
- ❑6 Pasta
- ❑7 Fideo
- ❑8 Rice

25. When anyone in your household cooks, what type of fat or oils is used?
- ❑1 Lard, or meat fat (beef, chicken, pork fat etc.)
- ❑2 Butter
- ❑3 Margarine
- ❑4 Vegetable oil
- ❑5 Olive oil

26. How often do you eat red meat, such as beef, pork or lamb?
- ❑1 Every day or at least five times per week
- ❑2 Two or three times a week
- ❑3 Once a week or less
- ❑4 Once a month or almost never, or
- ❑5 Don't eat meat

32. I can talk about my problems with (Fill in all the boxes that apply)

- ❑1 No one
- ❑2 Parents
- ❑3 Friends
- ❑4 Brother/Sister
- ❑5 Teachers
- ❑6 Other

33. Most of the time I feel

- ❑1 Very happy
- ❑2 Happy
- ❑3 Okay
- ❑4 Sad
- ❑5 Very sad

34. In general, my life is

- ❑1 Great
- ❑2 Pretty good
- ❑3 Okay
- ❑4 Not very good
- ❑5 Bad

35. Have you heard about oral (mouth) cancer?

- ❑1 Yes
- ❑2 No

36. The following list of factors may or may not cause mouth cancer. Please indicate those you believe may commonly cause mouth cancer (fill in all the boxes that apply).

- ❑1 Drinking alcohol
- ❑2 Spicy food
- ❑3 Sugary food
- ❑4 Environmental pollution
- ❑5 Cigarettes
- ❑6 Antibiotics
- ❑7 Removal of teeth
- ❑8 Sunlight
- ❑9 Poor oral hygiene
- ❑10 Drinking Coffee
- ❑11 Use of mouthwash
- ❑12 Chewing tobacco

APPENDIX C: RESPONDENTS CONSENT FORM

Subject Consent to Take Part in a study of
"Knowledge, Attitudes and Practices of Adolescent High School Children in Brownsville to the Risk Factors for Oral Cancer"

The Brownsville Independent School District,
Campus Care Centers
Department of Community Dentistry, University of Texas Health Science Center at San Antonio

We are inviting you to take part in the Oral Cancer Survey. We want to find out the knowledge, attitudes and practices of high school children in Brownsville Independent School District to the risk factors for oral cancer.

Questions like these are being asked to students your age in all high schools in Brownsville. The information you give will be used to develop better health education programs in schools.Everything we learn about you in the study will be confidential. This survey is anonymous and no attempt will be made to identify you personally. Hence we are not asking your name or any other form of personal identification. If we publish the results of the study in a scientific journal or book, we will not identify you in any way.

This is a short paper and pencil questionnaire, therefore the only burden will be the time taken to answer the questions. The Questionnaire will take you approximately fifteen minutes to complete. This study does not involve medical treatment of any kind, and your alternative to participating is simply to decline participation.

Your decision to take part in the study is voluntary. You are free to choose not to take part in the study or to stop taking part at any time. If you choose not to take part in the study or to stop at any time, it will not affect your future medical care or your status as a student at the University of Texas Health Science Center at San Antonio, Brownsville Independent School District or the Campus Care Centers.

If you have any questions please call the research study coordinators, Ms. Joan Dentler, Campus Care Centers, Brownsville (210-541-5039) or Dr. Kishore Shetty, Department of Community Dentistry, UTHSCSA. (210-567 3200).We will give you a copy of this form to keep. The University of Texas Health Science Center committee that reviews research on human sublects (Institutional Review Board) will answer any questions about your rights as a research subject (210-567-2351).

Your signature indicates that you have decided to take part in this research study and that you have read and understand the information given above and explained to you.

.....	.....
Signature of the Volunteer	Date/Time
.....	.....
Signature of the Witness	Date/Time
.....	.....
Signature of the Principal Investigator	Date/Time

APPENDIX D: PARENTAL CONSENT FORM

The University of Texas
Health Science Center at San Antonio
7703 Floyd Curl Drive
San Antonio, Texas 78284-7917

Dental School
Department of Community Dentistry

(210) 567-3200
Fax # (210) 567-4587

Oral Cancer Risk Behaviour Survey

Dear Parents:

The Brownsville Independent School District, Campus Care Centers and the Department of Community Dentistry, University of Texas Health Science Center at San Antonio invite your child to take part in a study.

We want to find out the knowledge, attitudes and practices of a high school children in Brownsville Independent School District to the risk factors for oral cancer. All the students will be asked to fill out a questionnaire only after their positive written consent . There are no risks or discomforts that are foreseen as a result of participation in this study.

This study does not involve medical treatment of any kind. Participation is voluntary and there is no cost to you. This will in no way affect any services available to you or your teenager from Brownsville ISD, Campus Care Centers or the University of Texas Health Science Center. The survey is anonymous and no attemt will be made to identify the respondents. If you have any questions please call the research study coordinators, Ms. Joan Dentler, Campus Care Centers, Brownsville (210-541-5039) or Dr. Kishore Shetty, Department of Community Dentistry, UTHSCSA. (210-567 3200)

If you **do not** wish your child to take part in this study, please complete and sign the statement below to be handed back to the school teacher.

I.....(Parents' Name) **DO NOT WISH** .....(Child'sName)
.....(Grade).....(Teacher's Name) **TO PARTICIPATE IN THIS STUDY.**

Ms. Ana M. Milan
Director
School Health Services
1124 East Madison Street
Brownsville, Texas 78520

Joan G. Dentler
Director
Campus Care Centers
1124 E.Madison
Brownsville, Tx 78520

Dr John Brown
Professor and Chairman
Department of Community Dentistry
University of Texas Health Science Center
San Antonio 78284-7917

Dr. Kishore Shetty
Resident - Dental Public Health
Department of Community Dentistry
University of Texas Health Center
San Antonio 78284-7917

APPENDIX E: IRB APPROVAL AND CONSENT

The University of Texas
Health Science Center at San Antonio
7703 Floyd Curl Drive
San Antonio, Texas 78284-7830

Institutional Review Board
(Multiple Assurance #1403)

(210) 567-2351
FAX: (210) 567-2360

April 7, 1997
(Revised May 9, 1997 to include regulation for children)

Kishore Shetty, D.D.S.
Dept. of Community Dentistry
UTHSCSA

Dear Dr. Shetty:

Re: IRB Protocol #967-1901-235 **Knowledge, Attitudes and Practice of Adolescent High School Children in Brownsville to the Risk Factors for Oral Cancer (Brownsville Independent School District)**

This protocol was approved as submitted on April 7, 1997, under DHHS Regulation **46.110(9)** for **EXPEDITED** review: Research on individual or group behavior or characteristic of individuals, such as studies of perception, cognition, game theory, or test development, where investigator does not manipulate subjects' behavior and the research will not involve stress to subjects.

*Approval of this study to include children may be given under DHHS regulation **46.404**: Research not involving more than minimal risk.*

This approval will be endorsed by the full Board and recorded in the minutes at the next convened IRB meeting on April 15, 1997.

RESPONSIBILITIES OF PRINCIPAL INVESTIGATOR:

(1) report **immediately** to the IRB all deaths of subjects, regardless of cause;

(2) report **immediately** to the IRB any severe adverse reaction or serious problem, whether anticipated or unanticipated;

(3) report any significant findings that become known in the course of the research that might affect the willingness of subjects to continue to take part;

(4) insure that only formally designated investigators (as approved by the IRB) enroll subjects;

(5) submit for review and approval by the IRB all modifications to the protocol or consent form(s) prior to the implementation of the change;

(6) submit a **Progress Report** for continuing review by the IRB. Federal regulations require IRB review of on-going projects no less than once a year (a Progress Report will be sent to you in 10 months); and

(7) notify the IRB when the study has been completed and prepare a final report.

NEXT IRB REVIEW: FEBRUARY 1998

Wayne P. Pierson, Ph.D., Director, IRB

The next ten questions are about tobacco use.

5. Have you ever tried cigarette smoking, even one or two puffs?
   - ❑1 Yes
   - ❑2 No

6. Do you think you will try cigarette smoking during the next 12 months?
   - ❑1 I have already tried cigarette smoking.
   - ❑2 Yes, I think I will try cigarette smoking during the next 12 months.
   - ❑3 No, I think I will not try cigarette smoking during the next 12 months.

7. How old were you when you smoked a whole cigarette for the first time?
   - ❑1 I have never smoked a whole cigarette.
   - ❑2 Less than 9 years old
   - ❑3 9 or 10 years old
   - ❑4 11 or 12 years old
   - ❑5 13 or 14 years old
   - ❑6 15 or 16 years old
   - ❑7 17 or more years old

8. Have you ever smoked cigarettes regularly, that is, at least one cigarette every day for 30 days?
   - ❑1 Yes
   - ❑2 No

9. How old were you when you first started smoking cigarettes regularly? (at least one cigarette every day for 30 days)
   - ❑1 I have never smoked cigarettes regularly.
   - ❑2 Less than 9 years old
   - ❑3 9 or 10 years old
   - ❑4 11 or 12 years old
   - ❑5 13 or 14 years old
   - ❑6 15 or 16 years old
   - ❑7 17 or more years old

10. During the past 30 days, on how many days did you smoke cigarettes?
    - ❑1 0 days
    - ❑2 1 or 2 days
    - ❑3 3 to 5 days
    - ❑4 6 to 9 days
    - ❑5 10 to 19 days
    - ❑6 20 to 29 days
    - ❑7 All 30 days

16. During your life, on how many days have you had at least one drink of alcohol?

- ❑1 0 days
- ❑2 1 or 2 days
- ❑3 3 to 9 days
- ❑4 10 to 19 days
- ❑5 20 to 29 days
- ❑6 40 to 99 days
- ❑7 100 or more days

17. During the past 30 days, on how many days did you have at least one drink of alcohol?

- ❑1 0 days
- ❑2 1 or 2 days
- ❑3 3 to 5 days
- ❑4 6 to 9 days
- ❑5 10 to 19 days
- ❑6 20 to 29 days
- ❑7 All 30 days

18. During the past 30 days, on how many days did you have 5 or more drinks of alcohol in a row, that is, within a couple of hours?

- ❑1 0 days
- ❑2 1 day
- ❑3 2 days
- ❑4 3 to 5 days
- ❑5 6 to 9 days
- ❑6 10 to 19 days
- ❑7 20 or more days

Now, I'd like to ask you about the food you ate yesterday.

19. Did you eat any fresh fruit yesterday?

- ❑1 Yes
- ❑2 No
- ❑3 Don't know/Not sure

20. If yes, please fill in all the boxes which apply to you.

- ❑1 Oranges
- ❑2 Orange juice
- ❑3 Fruit drinks
- ❑4 Grapefruit
- ❑5 Cantaloupe
- ❑6 Banana
- ❑7 Apple/applesauce
- ❑8 Other _____

27. Yesterday, did you eat
- ❑1 Fish
- ❑2 Chicken
- ❑3 Turkey
- ❑4 Beef
- ❑5 Pork
- ❑6 Mixed Meat dishes
- ❑7 Sausage or bacon
- ❑8 Eggs
- ❑9 Fried pork skin

28. How much milk did you drink yesterday?
- ❑1 You didn't drink milk
- ❑2 Less than one glass, example on cereal or in coffee
- ❑3 One to two glasses, or
- ❑4 3 or more glasses
- ❑5 Don't know/Not sure

29. Did you drink or use whole mile (regular), lowfat milk, or nonfat (skim) milk yesterday?
- ❑1 Whole (regular)
- ❑2 Lowfat (0.5 to 2% lowfat)
- ❑3 Nonfat (skim)
- ❑4 Don't know/Not sure

Now I would like to ask a few questions about your school and personal life.

30. The way I feel about school is:
- ❑1 I like it
- ❑2 It's good most of the time
- ❑3 It's OK
- ❑4 I usually don't like it
- ❑5 I hate it

31. I get along with my family
- ❑1 Great, all the time
- ❑2 Okay, most of the time
- ❑3 Okay
- ❑4 We usually don't get along
- ❑5 We never get along

37. Where in the mouth do you think one can get cancer? (Mark all that apply)

- ❑1 Tongue
- ❑2 Teeth
- ❑3 Gums
- ❑4 Cheek
- ❑5 Roof of the mouth
- ❑6 Under the tongue

38. Which of the following are <u>early signs</u> of mouth cancer? (Mark all that apply)

- ❑1 Bleeding gums
- ❑2 Ulcer in the mouth which does not heal
- ❑3 White patch in the mouth
- ❑4 Red patch in the mouth
- ❑5 Bad breath
- ❑6 Lump or swelling in the mouth
- ❑7 Difficulty in chewing
- ❑8 Difficulty in swallowing

39. Finally, What name (English or Spanish) would you give to a health education program in your high school or community for cancer prevention

_____

Thank you for all your time and help. Please feel free to comment on any aspect of this survey or any other questions that you may have

_____