Program Design and Evaluation Services

Assessment of Factors Related To Smokeless Tobacco Use in Alaska

Final Report

June 2009

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Suggested Citation

Alaska Department of Health and Social Services. Assessment of Factors Related to Smokeless Tobacco Use in Alaska. Anchorage, AK: Section of Chronic Disease Prevention and Health Promotion, Division of Public Health, Alaska Department of Health and Social Services; June 2008.

Acknowledgements

This report was commissioned by the Alaska Tobacco Prevention and Control Program within the Alaska Department of Health and Social Services. The report was produced by Program Design & Evaluation Services, a public health research group housed within the Multnomah County Health Department and Oregon Public Health Division, under contract with the Alaska Tobacco Prevention and Control Program.

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Introduction and Background

Program Design and Evaluation Services (PDES) has been contracted to review and analyze the tobacco-related data from the Alaska Behavioral Risk Factor Surveillance System (BRFSS) in order to assist the Alaska Tobacco Prevention and Control Program in program planning. In addition to overall surveillance-related analyses, such as those presented in Tobacco Facts and the Tobacco BRFSS Book, PDES is conducting more in-depth examinations of factors associated with selected tobacco indicators. The current report addresses risk behaviors associated with adult smokeless tobacco (SLT) use.

Forms of Smokeless Tobacco

Smokeless tobacco is a family of tobacco products in which the nicotine is intended to be directly absorbed from tobacco in an unburned state rather than burning tobacco and inhaling the smoke as a means of nicotine delivery.

Chewing Tobacco

Chewing is one of the oldest ways of consuming tobacco leaves. Native Americans in both North and South America chewed the leaves of the plant, frequently mixed with lime or other ingredients. Modern chewing tobacco is produced in three sub-forms: twist, plug, and loose-leaf. Twist is the oldest form. One to three leaves are twisted and braided into a rope while green, and then are cured in the same manner as other tobacco. Popular brands are Mammoth Cave, Moore's Red Leaf, and Cumberland Gap. Users cut a piece off the twist and chew it, expectorating.

Plug chewing tobacco is made by pressing together cured tobacco leaves in a sweet (often molasses-based) syrup. The resulting sheet of tobacco is cut into plugs. Like twist, consumers sometimes cut, but more often bite off, a piece of the plug to chew. Major brands are Axton's, Days Work, and Cannonball.

Loose-leaf chewing tobacco was originally the excess of plug manufacturing. It is sweetened like plug tobacco, but sold loose in bags rather than a plug. Loose-leaf is one of the more popular forms of tobacco in modern times. Among those, popular brands are Red Man, Beechnut, Mail Pouch, and Southern Pride.

Iqmik

Several reports described use of a chewing tobacco variant called “Iqmik” (ickmick) or “Blackbull” that is unique to Alaska Native culture.[1-2] Iqmik is used almost exclusively in rural areas and the Gulf Coast region of Alaska. It is prepared by mixing ash from burning a woody fungus (Phellinus igniarius) from birch trees, or sometimes (less desirable) alder, willow bushes, or driftwood, with leaf tobacco. The burned ash is mixed with tobacco leaves and then pre-chewed in the mouth or mixed in a bowl with water. The mix is spit out into containers to share. Women and girls often prepare Iqmik and then share it with the family. All the

ingredients are available in local stores in areas where Iqmik is frequently used, or bartered among individuals.

Moist Snuff

Snuff is a generic term for fine-ground smokeless tobacco products. Originally the term referred only to dry snuff, a fine tan dust popular mainly in Europe. Dry snuff is intended to be *sniffed* up the nose.

Moist snuff is made from dark fire-cured tobacco that is ground, sweetened, and aged by the factory. Moist snuff is much stronger than dry snuff, and is intended to be placed between the lower or upper lip and gums. American moist snuff, also known as dipping tobacco or spit tobacco, is commonly referred to as dip. Instead of literally chewing on tobacco, a small clump or 'dip' of tobacco is placed between the lower or upper lip and gums. The dip rests on the inside lining of the mouth for approximately 30 minutes to an hour. Subtypes of moist snuff involve 'cut size', which references the length of the individual strands of tobacco. Long cuts are about 7mm long, while mid cut is about 1mm cubed. Fine cut comes in granules slightly larger than sand or coffee grounds. Fine cuts are often packaged in small coffee filter-like individual pouches. Prominent North American brands are Copenhagen, Skoal, Timber Wolf, Chisholm, Grizzly, and Kodiak.

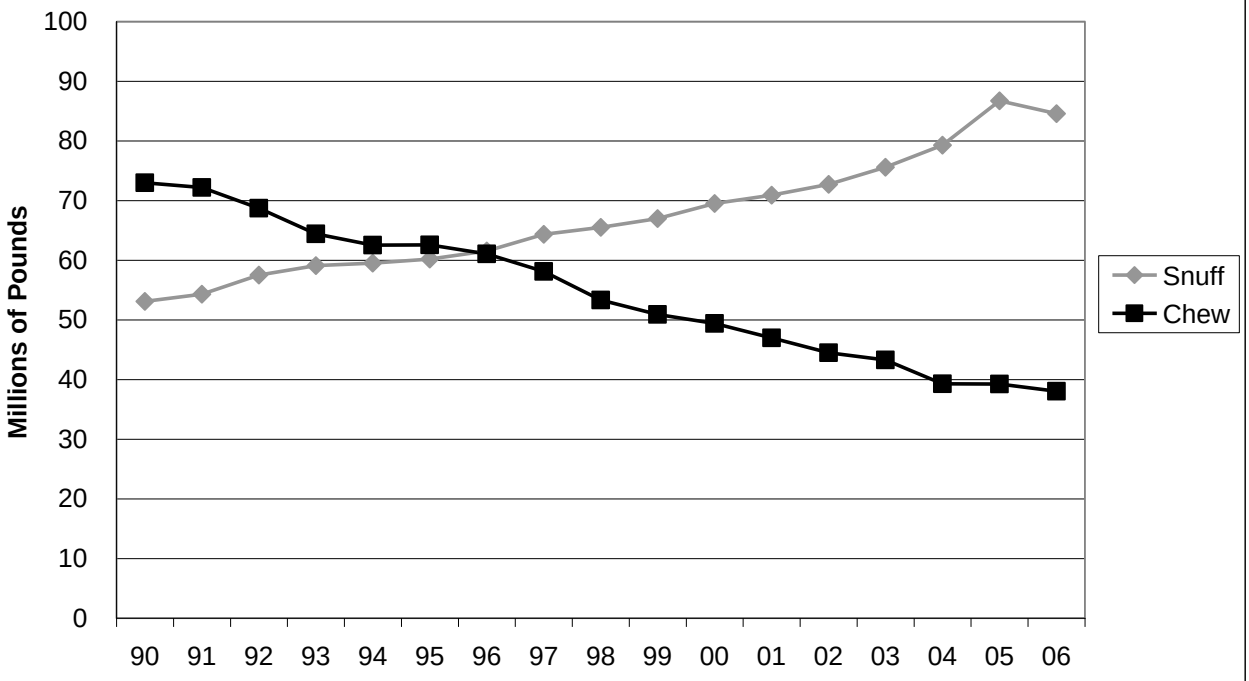
Other Forms

Snus is a moist powder tobacco product that is consumed by placing it under the upper lip for extended periods of time. It is a form of snuff that is used in a manner similar to American dipping tobacco, but typically does not result in the need for spitting. Snus is also unique in that it is steam-cured rather than fire-cured, is not fermented and contains no added sugar. The steam curing of snus rather than fire-curing or flue-curing of other smokeless tobaccos has been demonstrated to generate fewer harmful compounds than other forms of snuff. Snus is manufactured and consumed primarily in Scandinavia, but has recently been introduced in the US. Prominent brands are Swedish Match, General, Ettan, and Tre Ankare.

Adult Prevalence

Currently, approximately 2.3% of the adult population in the United States uses smokeless tobacco of some form, with men making up the vast majority of users. Historically, chewing tobacco had been the dominant form of use in the US. However, in the last decade, moist snuff has dramatically increased in use and is now the leading form used in the US.

Figure 1.
Consumption of Smokeless Tobacco Products,
United States, 1990-2006



Sources: Alcohol and Tobacco Tax and Trade Bureau, Reports EM545 and IM146

Associated Factors

Studies of US adults have shown that smokeless tobacco use is much higher among certain adult demographic groups, including men, young adults, rural residents, residents of southern or western states, Whites, American Indians/Alaska Natives, and persons with lower levels of education.[3-7]

Tax Issues

One of the best ways to prompt tobacco users to quit is by raising prices through tax increases. Numerous studies have documented the fact that smokers are more likely to reduce their tobacco use or quit smoking in response to increased prices for tobacco products. Tobacco users who want to quit can also benefit from the tax revenues if some portion is used to finance prevention and cessation programs that target communities with high rates of tobacco use.

In Alaska, a state imposed tax on smokeless tobacco products of 75% of the wholesale price has been in effect since late 1997. In that same year, state cigarette taxes were increased to $1.00. More recently, tax increases where imposed on cigarettes – + $0.60 in January of 2005 and + $0.20 in July of 2006 and 2007 – but no additional increase was imposed on smokeless tobacco products.

Harm Reduction

There is some debate among public health researchers over the use of "safer" tobacco or nicotine delivery systems, generally dividing along two lines of thought. Most researchers are currently of the "abstinence" belief, believing that no form of tobacco or nicotine use is acceptable or safe, and should be minimized among the population. A minority (primarily in Europe and Canada) believes in "harm reduction," where the belief is generally that, while it should remain a goal to reduce addiction to nicotine in the population as a whole, the reduction of harm to the health of those who choose to use nicotine should override the need to reduce overall nicotine addiction. Some researchers and policy makers suggest that using smokeless tobacco instead of cigarettes may reduce or eliminate the risk of cancers that afflict users of cigarettes.

In addition, rather obviously, using SLT eliminates any exposure to secondhand smoke (SHS), further reducing possible harm to other non-tobacco users. This is seen by public health advocates who believe in "harm reduction" as a good reason for recommending smokeless tobacco in addition to other nicotine replacement therapies rather than continued use of cancer-causing nicotine delivery systems.

Research Questions

This report attempts to address three specific questions regarding smokeless tobacco use in Alaska:

1. What are the current combinations of smokeless, and smoked, tobacco products being used? Have the combination proportions changed over time? Of particular interest is whether or not SLT use has increased among former smokers.

2. What risk factors, as measured in the BRFSS, are related to smokeless tobacco use in Alaska?

3. Do risk factor associations vary by demographic factors of age, gender and race?

Methods

A summary of the data sources, sample, and analysis strategy for this report is provided below.

Population: Adults in Alaska.

Data source: The majority of analyses use the 2004-2007 Behavioral Risk Factor Surveillance System (BRFSS) statewide representative sample data set. Analyses to address long-term trends in prevalence additionally use the BRFSS data sets for years 1991-2002 (questions regarding smokeless tobacco use are not available in 2003). Over 17,000 respondents are available for 2004 -2007.

Measures:

Current smokeless tobacco use-related items in the BRFSS

These include:

- Current use of smokeless tobacco
- Smokeless tobacco types used

These variables are binary coded (i.e., "*any use*" vs. "*no use")* using Alaska Tobacco Prevention and Control Program (TPCP) conventions and guidelines. Smokeless tobacco usage will be examined as a single product type and in combination with smoked tobacco.

Other Factors and Health Risk Behaviors in the BRFSS

These include the following domains:

- Demographics (age, gender, race/ethnicity, socio-economic status (SES), region, and time period)
- General physical and mental health status
- Health care access (insurance)
- Chronic conditions (asthma, hypertension, diabetes)
- Cigarette use status
- Secondhand smoke rules and attitudes

These variables are also binary coded (i.e., "*exhibits the behavior or attribute*" vs. "*not*") based on CDC, Healthy Alaska 2010, or Alaska Chronic Disease Prevention and Health Promotion conventions and guidelines. The risk factor domains, and items within domains, will be examined alone and in combination.

Priority Populations

Alaska Natives and people of low socio-economic status (SES) are two groups with a disproportionately high prevalence of smokeless tobacco use. Alaska Natives comprise roughly 14% of the adult population in Alaska. We drew upon the previous Alaska TPCP studies, *Smoking Behavior and Beliefs Among Non-Native Alaskans of Low Socio-Economic Status: Implications for Program Planning* and *What State Surveys Tell Us About Tobacco Use Among Alaska Natives: Implications for Program Planning* to define Alaska Native and low SES priority groups.

Alaska Native

The term Alaska Native is used to refer to the original inhabitants of the land that is now the state of Alaska. For this study, Alaska Native includes all survey respondents who reported "Alaska Native/American Indian" as their primary or only race group. Although some Alaska Natives such as the Tlingit and Haida share cultural background with Pacific Coast Native Americans, many Alaska Natives are culturally much closer to other sub-arctic region

peoples such as Canadian First Nations. Alaska Natives are also different than "lower 48" Native Americans in their relationship with tobacco. Tobacco was not historically or traditionally used by Alaska Native people, but was widely adopted after introduction by Russian traders in the 1700s.

Low socio-economic status (SES)

The Low SES priority group is defined more specifically as those who are at or below 185% of poverty level and/or have less than a high school education.

Poverty level (as calculated by income and household size) and less education were identified as key indicators of low SES that were available using BRFSS. The state of Alaska guidelines for Medicaid eligibility – household incomes at or below the 185% poverty guideline - were adopted as the poverty measure. Of the response categories available for education, *less than high school* was chosen as a conservative estimate of low education. Those with missing information on income were categorized as low or higher SES based on information about their education only. Those missing information about income, household size and education represented only a handful of cases in the 2004-2007 Alaska BRFSS dataset and were not used in the analysis. We also examined the SES component factors of income, education, poverty level and employment status in addition to the summary measure.

Geographic Classification

Regions were defined using borough designation, developed for the Alaska BRFSS dataset by Charles Utermohle using a mapping of telephone prefixes to borough. Although the BRFSS survey data do not provide enough representation for reporting by most of the individual boroughs, combining boroughs provided a useful geographic factor for analyses. Boroughs were grouped with reference to geographic proximity, Alaska Native ethnicity and relative similarity of tobacco prevalence, based on combined 2004-2007 BRFSS data.

Region was also modified by tribal health organization region designation. This variable was developed upon the request of staff at the Alaska Native Medical Center as a means of summarizing data into meaningful geographic groups. While the individual tribal health organizations are generally too small to represent with survey data from the BRFSS, these aggregated units help meet the need of providing information at a useful level of geography. In some cases, boroughs are large and extended, and tribal health care is provided by organizations in another borough, and the regions used in this report reflect that difference between tribal health provision and borough. For this reason, about 14% of respondents from the Yukon-Koyukuk Borough are categorized with the Yukon-Kuskokwim region, and about 14% of those from the Denali Borough are grouped with the Gulf Coast boroughs for this report. Regional groups for the associations analyses are as follows:

1) Anchorage
2) Mat-Su
3) Gulf Coast – Kenai/Kodiak/Valdez Cordova (Prince William Sound)
4) Bristol Bay/Aleutians/Pribilofs – also includes Dillingham and Lake & Peninsula boroughs
5) Yukon-Kuskokwim – Bethel/Wade Hampton/Yukon-Koyukuk (lower part)
6) Southeast – Yakutat/Skagway/Juneau/Sitka/Haines/Wrangell-Petersburg/Ketchikan

7) Interior – Yukon-Koyukuk/Southeast Fairbanks/Denali
8) Fairbanks North Star
9) Norton Sound/Arctic – Nome /Northwest Arctic/North Slope

Analytic Strategy

Preliminarily, we examined the prevalence of smokeless tobacco use in Alaska since 1991 for trend. We then addressed the research questions in three general sets of analyses:

Assessments of tobacco use combinations

First, we constructed a *dual tobacco use* combination variable that included categories of no current tobacco use, smoker only, smokeless only, and use of both products. We then examined the proportion of respondents in each category and tested for changes over time in those proportions using a multinomial logic regression model. We also tested for changes in proportions of specific form of SLT (chew, snuff, Iqmik, or a combination) in a similar fashion.

To examine use of SLT as a potential 'harm reduction" strategy among cigarette smokers, we repeated the above analysis with current and former smoker sub samples.

Assessment of health risk factor associations with smokeless tobacco use

We examined the bivariate associations between smokeless tobacco use and the other health risk-related variables. The associations are examined for the smokeless tobacco use variable with each of the individual variables in the risk factor domains listed above. Measures that showed no reliable association with any smokeless tobacco use were noted and dropped from further analysis. All the bivariate associations and their standard errors are tabled in the body of the report.

As the final step in the examination of risk factors, we built multiple regression models using the factors found to be significant in the prior step as elements in the models. The purpose of these models was to identify common and unique areas of association between health risk factors and smokeless tobacco use. We present tables of adjusted odds ratio estimates and their standard errors in the body of the report.

Strategy to assess associations by demographic factors of age, gender and race

At this stage of the analysis we had a set of measures uniquely predictive in the total population. Note that demographic factors were used earlier as a risk factor domain and prior analysis has shown that those factors will be highly associated with smokeless tobacco use; that is, that males, younger adults, Alaska Natives, and those residing in certain regions, have higher levels of tobacco use. In this step we examined the other health risk associations within these demographic subgroups to help explain the demographic associations.

Analysis program and statistical specifications

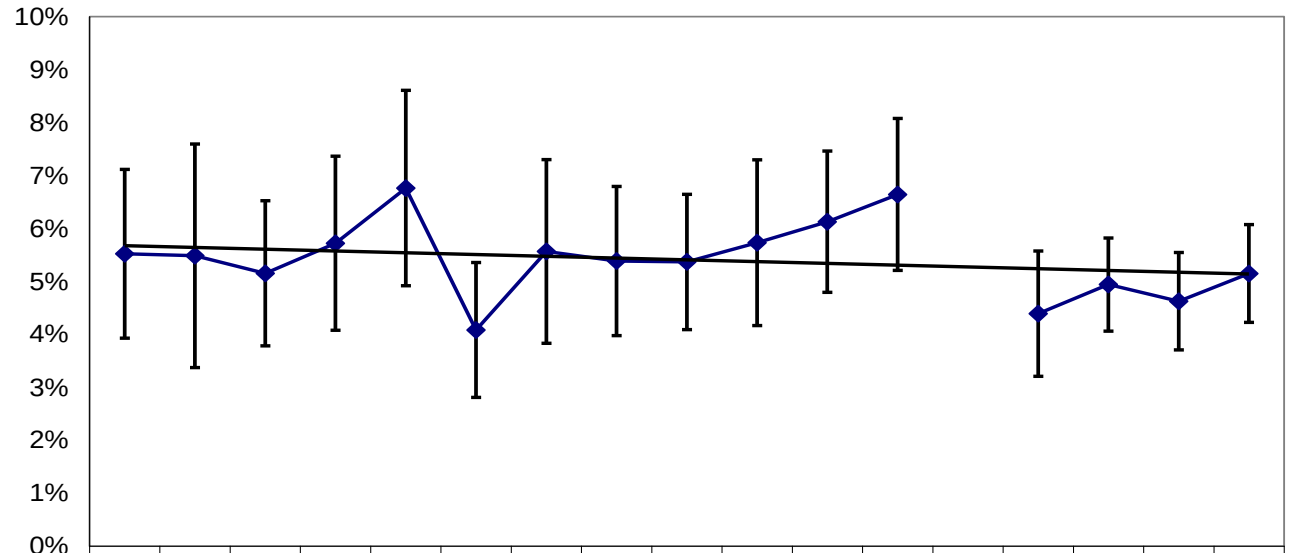
We used SAS Version 9.2 to conduct analyses, and took into account the complex survey sampling design and weighting methodology employed by the BRFSS. Simple and multiple

logistic regressions were used to conduct regression analyses. Statistical significance was tested at the 5% level and confidence intervals calculated at 95%.

Results

Part I: Trends in Smokeless Tobacco Use

Figure 2.
Smokeless Tobacco Use, Alaska, 1991-2007



	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003*	2004	2005	2006	2007
SLT Use	5.5%	5.5%	5.2%	5.7%	6.8%	4.1%	5.6%	5.4%	5.4%	5.7%	6.1%	6.6%		4.4%	4.9%	4.6%	5.1%

Source: Alaska BRFSS
*Smokeless Tobacco questions were not asked on the 2003 Alaska BRFSS.

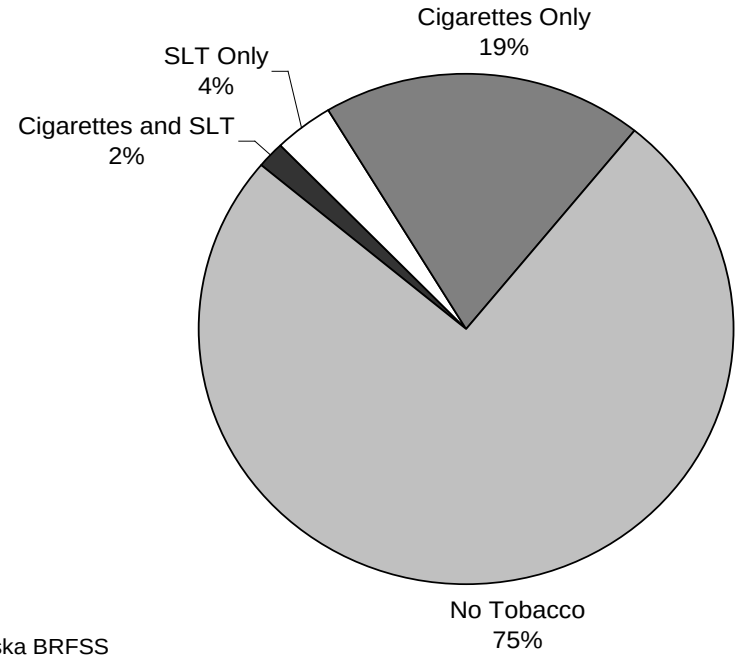
Long term prevalence trend

The figure above plots the prevalence of smokeless tobacco use in Alaska since 1991. Prevalence has remained fairly constant at around 5% through the period. Although individual year estimates appear to vary, the variation is within the margin of error for the BRFSS survey. A straight, flat trend line fits the data ($p>0.40$) with no individual years deviating significantly from that line.

What are the combinations of smokeless, and smoked, tobacco products being used?

Using the most recent BRFSS data (2007), we estimate that approximately 5% of Alaskan adults use smokeless tobacco – with approximately 3% using it exclusively and 2% using in combination with cigarettes. This compares to approximately 19% of adults who report smoking cigarettes only, and 76% who report no tobacco use at all. As illustrated in the figure below, SLT users make up a relatively small portion of the general population but a nontrivial portion (18%) of the tobacco using sub-population.

Figure 3.
Use of Single and Multiple Tobacco Products
Among Alaskan Adults, 2007

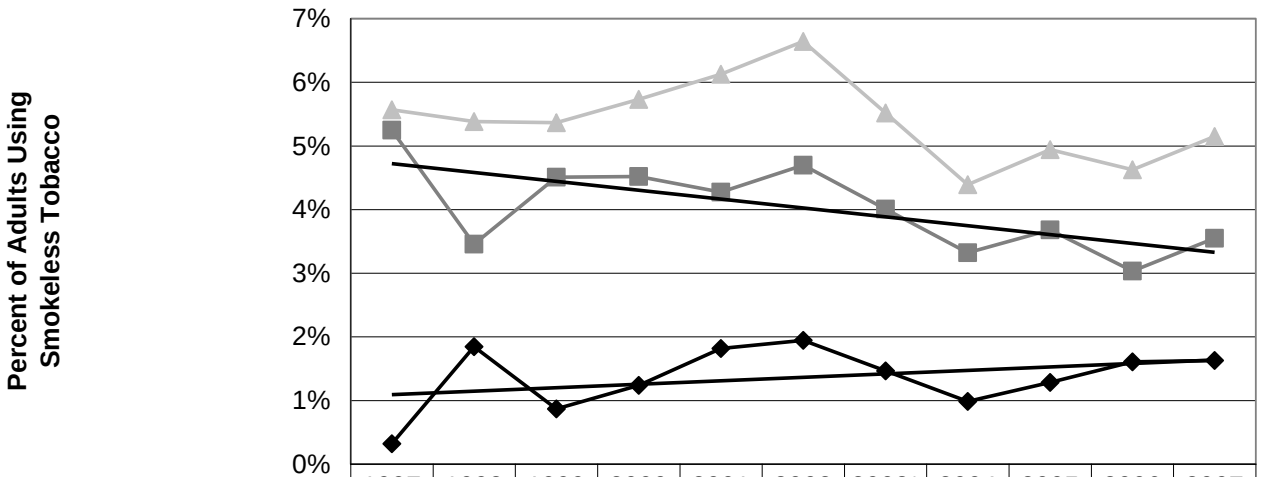


Source: Alaska BRFSS

Have the SLT use combination proportions changed over time?

While the overall proportion of SLT users in the general population has remained relatively constant over the last 10 years, we examined patterns of exclusive and dual use of SLT to see if they had changed over time. The figure below plots those trends since 1997. Exclusive SLT use has fallen, from constituting the majority of the SLT users in 1997 (92%) to about two-thirds of the users currently (68%). During that same interval, dual use has increased 5 fold, from 0.3% to 1.6%. Considering that cigarette use in general has fallen during this period, this suggests that current smokers are taking up SLT use rather than switching to SLT.

Figure 4.
Trends in Exclusive and Dual Use Smokeless Tobacco, Alaska, 1997-2007

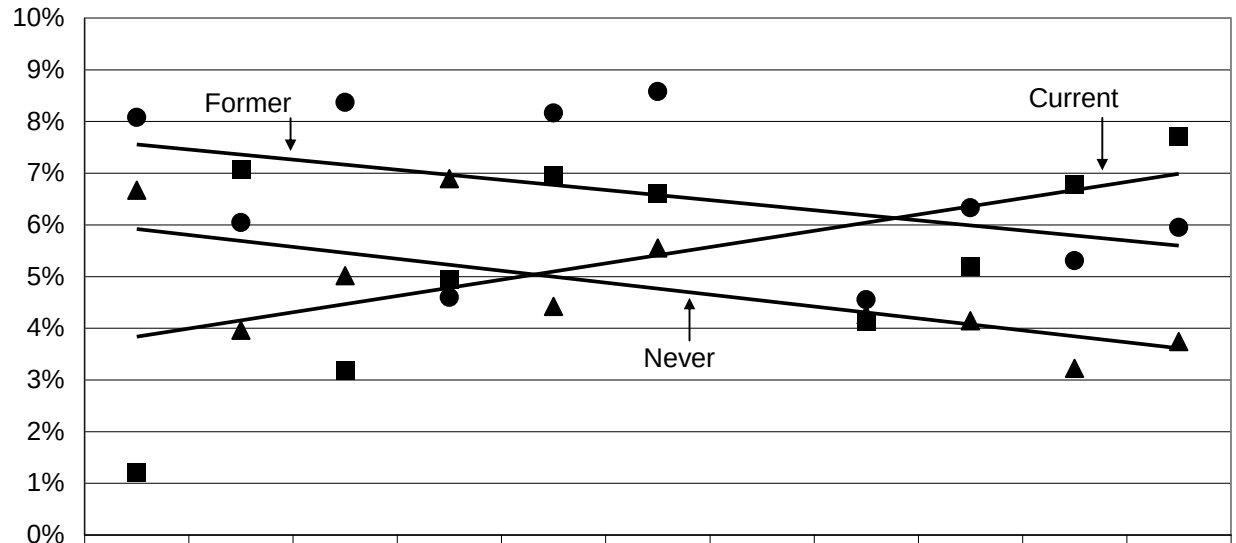


	1997	1998	1999	2000	2001	2002	2003*	2004	2005	2006	2007
SLT Only	5.2%	3.5%	4.5%	4.5%	4.3%	4.7%	4.0%	3.3%	3.7%	3.0%	3.5%
Cigarettes and SLT	0.3%	1.8%	0.9%	1.2%	1.8%	1.9%	1.5%	1.0%	1.3%	1.6%	1.6%
All Smokeless	5.6%	5.4%	5.4%	5.7%	6.1%	6.6%	5.5%	4.4%	4.9%	4.6%	5.1%

* Estimate
Source: Alaska BRFSS

To further examine use of SLT as a potential 'harm reduction" strategy among cigarette smokers, we examined time trends in SLT use among current smoker (dual users) and former/never (exclusive users) smoker sub samples. We are particularly interested in whether or not SLT use has increased among former smokers. Such increases would indicate a switching to SLT (in the case of former smokers) or augmenting tobacco use with SLT (in the case of current smokers), perhaps in reaction to restrictions on smoking. The figure below again indicates that current smokers have greatly increased their use of SLT, from a mere 1.2% in 1997 to 7.7% in 2007. During the same period, the SLT prevalence among former and never smokers has significantly decreased.

Figure 5.
Smokeless Tobacco Use by Smoking Status, Alaska, 1997-2007



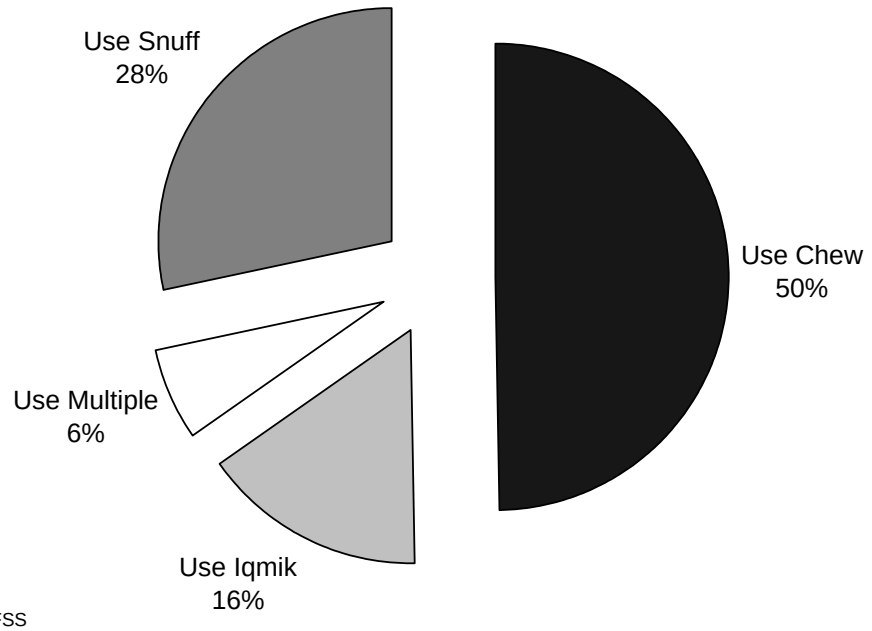
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
■ Current	1.2%	7.1%	3.2%	4.9%	6.9%	6.6%		4.1%	5.2%	6.8%	7.7%
● Former	8.1%	6.0%	8.4%	4.6%	8.2%	8.6%		4.6%	6.3%	5.3%	6.0%
▲ Never	6.7%	4.0%	5.0%	6.9%	4.4%	5.6%		4.3%	4.1%	3.2%	3.7%

Source: Alaska BRFSS

Forms of smokeless tobacco used

Currently, half of smokeless tobacco users use chewing tobacco only, while one quarter use snuff. Iqmik is used exclusively by 16% of all SLT users. Only 6% of all SLT users use multiple forms of SLT.

Figure 6.
Types of Smokeless Tobacco Used, Alaska, 2007

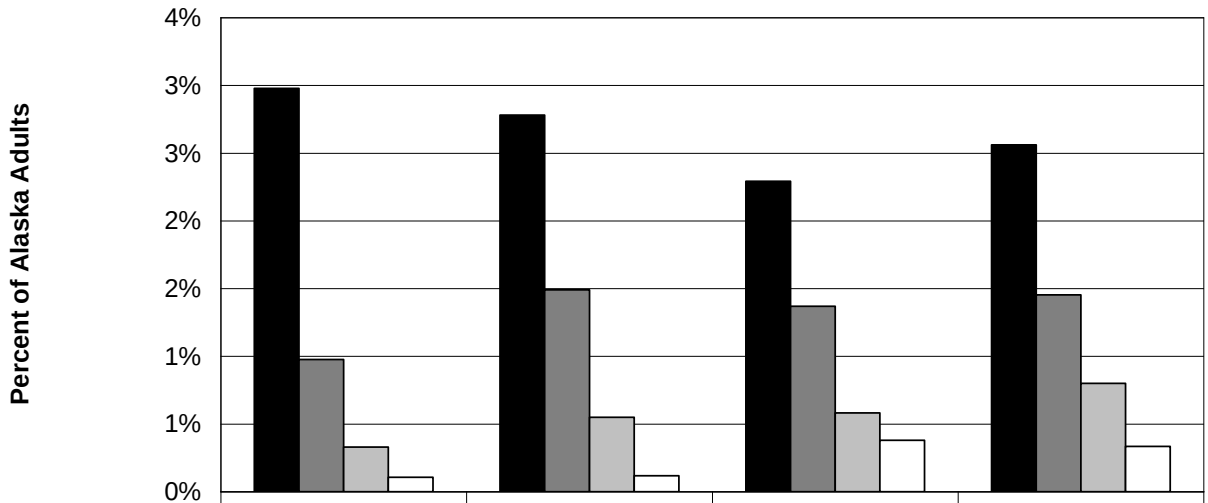


Source: Alaska BRFSS

Changes in forms of SLT used

Figure 7 shows percentages of Alaskan adults that report using various forms of SLT between 2004 and 2007. The use of chewing tobacco has remained fairly constant near 3%. Snuff also remains stable at 1-1.5%. There are small offsetting changes in these two SLT forms, but neither trend is statistically significant. The use of Iqmik however does have a small but statistically significant increase between 2004 and 2007 (chisq (1) =7.75, p=0.005, OR=1.28[1.07-1.54]).

Figure 7.
Types of Smokeless Tobacco Used, Alaska, 2004-2007



	2004	2005	2006	2007
Use Chew	3.0%	2.8%	2.3%	2.6%
Use Snuff	1.0%	1.5%	1.4%	1.5%
Use Iqmik	0.3%	0.5%	0.6%	0.8%
Use Multiple	0.1%	0.1%	0.4%	0.3%

Source: Alaska BRFSS

Part 1: Trends in Smokeless Tobacco Use In Alaska

Summary of Key Findings:

- Overall, smokeless tobacco use prevalence has remained constant at about 5% since 1991, and appears little affected by the state taxes imposed in 1997.
- Smokeless tobacco users currently make up about 20% of the tobacco users in Alaska.
- Dual use of cigarettes and SLT has increased six fold in smokers over the last decade. Exclusive use of SLT has declined 2-3 percentage points.
- Over half of all SLT users report using chewing tobacco and one quarter report using moist snuff. 16% of SLT users report exclusive use of Iqmik. While moist snuff use is increasing elsewhere in the US, these patterns have remained fairly constant in Alaska.

Recommendations:

- Work to increase taxes on SLT. While the current price based tax structure is leading most other states, SLT is still a relatively inexpensive way to consume nicotine compared to cigarettes in Alaska.
- SLT users make up nearly 20% of the tobacco using population. Programmatic efforts to reduce the burden of tobacco in Alaska should address the use of SLT.
- Chewing tobacco remains the preferred form of SLT in Alaska. Focus programmatic efforts toward this form of SLT, but be prepared for a potential increase in moist snuff use.
- The observed stability in moist snuff use may be due to ambiguity in the terms used for SLT in the BRFSS survey. We suggest making question wording clearer as to distinctions between moist snuff and chewing tobacco.

Part II: Associations with Smokeless Tobacco Use

This section focuses on the associations between current smokeless tobacco use and measures of factors available in the AK BRFSS that are likely to influence that behavior. Independent characteristics considered include: a) smoking status; b) demographic factors such as gender, age, race, SES, employment, presence of children in the home, and region; c) the presence of smoking bans at home or at work; d) attitudes about secondhand smoke; and e) general and specific chronic health conditions.

For these analyses, we collapse survey responses over the years 2004 – 2007 in order to maintain reasonable cell sizes within subgroups. The overall prevalence of SLT did not vary significantly over this time period, and averages to 4.77% (+/- 0.25%). Deviations from that value indicate an excess of SLT users in persons with that attribute.

In the tables below, we present prevalence of SLT in subgroups as Row Percents for Use SLT = 'Yes' rows. Also included in the tables are the standard errors of those prevalences, the un-weighted frequencies (number of surveys used), and the Percent of Total population and its standard error.

Percent of the total population (PTP) is an important statistic because it indexes the absolute number of SLT users contained in that subgroup and can be compared directly across subgroups. Larger values indicate more persons. It is the product of the SLT prevalence and the percent of persons in the risk group relative to the total population. The maximum value will be 4.77%, which is the percentage of all the SLT users in the population.

We also include the test for associations between the factors and SLT based on the Rao-Scott Chi-Square. Probability (Pr) values less than 0.05 indicate an association. We use the term 'related' and 'not related' below as shorthand for statistical significance at $p<0.05$.

Gender

Gender is highly related to SLT use. Males are by far the largest group of SLT users (4.22% PTP). The prevalence of use among males is 8.1%, while among females it is near 1%.

Smokeless Tobacco Use by Gender, Alaska, 2004-2007

Gender	Use SLT	Frequency	Percent of Total	Std Err of Percent	Row Percent	Std Err of Row Percent
Female	No	9035	47.79	0.58	98.86	0.12
	Yes	160	0.55	0.06	1.13	0.12
Male	No	6976	47.43	0.59	91.81	0.46
	Yes	694	4.22	0.24	8.18	0.46

Rao-Scott Chi-Square	342.15
DF	1
Pr > ChiSq	<.0001

Smoking Status

Smoking status is related to SLT use in Alaska, with current and former smokers exhibiting a higher proportion of SLT use. The largest number of SLT users is contained in the never smoker group (1.98% of AK population compared to 1.37 and 1.46% PTP in other groups).

Smokeless Tobacco Use by Smoking Status, Alaska, 2004-2007

Smoking Status	Use SLT	Frequency	Percent of Total	Std Err of Percent	Row Percent	Std Err of Row Percent
Current	No	3771	21.91	0.49	94.07	0.62
	Yes	211	1.37	0.14	5.92	0.62
Former	No	4468	24.98	0.49	94.47	0.46
	Yes	281	1.46	0.12	5.52	0.46
Never	No	7668	48.32	0.59	96.15	0.32
	Yes	357	1.92	0.16	3.84	0.32

Rao-Scott Chi-Square	14.06
DF	2
Pr > ChiSq	0.0009

Race

Race is highly related to SLT use in Alaska. Alaskan Natives have the highest prevalence rate at 11.1%. However, Whites have the largest number of SLT users (2.97% PTP). An amalgamation of the other race groups has both the lowest prevalence and the lowest number of SLT user.

Smokeless Tobacco Use by Race, Alaska, 2004-2007

Race	Use SLT	Frequency	Percent of Total	Std Err of Percent	Row Percent	Std Err of Row Percent
White	No	11706	71.45	0.52	96.00	0.27
	Yes	445	2.97	0.20	3.99	0.27
Native	No	2800	12.86	0.35	88.89	0.90
	Yes	374	1.60	0.13	11.10	0.90
Other	No	1505	10.90	0.39	98.19	0.49
	Yes	35	0.20	0.05	1.80	0.49

Rao-Scott Chi-Square	112.75
DF	2
Pr > ChiSq	<.0001

Age

Age is related to SLT use; those under 45 have a higher prevalence of use (6.6%) than those over 45 (2.6%). The under 45 group also contains the majority of the SLT users (3.54 PTP).

Smokeless Tobacco Use by Age Group, Alaska, 2004-2007						
Age Group	Use SLT	Frequency	Percent of Total	Std Err of Percent	Row Percent	Std Err of Row Percent
18-24	No	1205	13.20	0.51	93.28	0.95
	Yes	90	0.95	0.13	6.71	0.95
25-34	No	2689	16.49	0.42	92.78	0.70
	Yes	219	1.28	0.12	7.22	0.70
35-44	No	3257	20.04	0.45	93.85	0.51
	Yes	270	1.31	0.11	6.14	0.51
45-54	No	4131	22.38	0.47	96.62	0.50
	Yes	157	0.78	0.11	3.37	0.50
55-64	No	2729	13.81	0.36	97.68	0.37
	Yes	77	0.32	0.05	2.31	0.37
65-99	No	2000	9.26	0.29	98.71	0.27
	Yes	41	0.12	0.02	1.28	0.27
		Rao-Scott Chi-Square		78.48		
		DF		5		
		Pr > ChiSq		<.0001		

Age (18 – 44 vs. 45+)

Smokeless Tobacco Use by Age Group, Alaska, 2004-2007						
Age Group	Use SLT	Frequency	Percent of Total	Std Err of Percent	Row Percent	Std Err of Row Percent
45+	No	8860	45.46	0.57	97.30	0.28
	Yes	275	1.23	0.13	2.63	0.28
18-44	No	7151	49.75	0.58	93.34	0.40
	Yes	579	3.54	0.21	6.65	0.40
		Rao-Scott Chi-Square		61.27		
		DF		1		
		Pr > ChiSq		<.0001		

Region (based on Health Regions)

Region is related to SLT use. Very high prevalence is seen in the Y-K region (26.2%), and lower prevalence is seen in the Anchorage area. Anchorage also contains the largest number of SLT users (1.05PTP), although the Y-K region has a substantial number (0.94 PTP). Bristol Bay/Aleutian/Pribilof and Norton Sound/Arctic regions also have elevated SLT prevalence rates (8.6% and 6.6%).

Smokeless Tobacco Use by Region, Alaska, 2004-2007

Region	Use SLT	Frequency	Percent of Total	Std Err of Percent	Row Percent	Std Err of Row Percent
Anchorage	No	2662	39.39	0.51	97.38	0.42
	Yes	55	1.05	0.17	2.61	0.42
Mat-Su	No	802	11.97	0.44	95.12	1.00
	Yes	29	0.61	0.12	4.87	1.00
Gulf - Kenai/Kodiak/PW Sound	No	3381	11.17	0.13	94.62	0.54
	Yes	150	0.63	0.06	5.37	0.54
Bristol Bay/Aleut/Prib	No	603	1.62	0.07	91.39	1.48
	Yes	45	0.15	0.02	8.60	1.48
Y- K	No	781	2.65	0.11	73.70	1.73
	Yes	255	0.94	0.06	26.29	1.73
Southeast	No	3164	10.54	0.11	95.94	0.45
	Yes	117	0.44	0.05	4.05	0.45
Interior	No	684	2.40	0.14	95.37	1.07
	Yes	30	0.11	0.02	4.62	1.07
Fairbanks North Star	No	2996	12.40	0.14	95.44	0.46
	Yes	119	0.59	0.06	4.55	0.46
Norton Sound/Arctic	No	937	3.05	0.10	93.38	1.10
	Yes	54	0.21	0.03	6.61	1.10

Rao-Scott Chi-Square	392.79
DF	8
Pr > ChiSq	<.0001

Has Children

Having a child in the home is related to SLT use. Those with children at home have a higher prevalence of SLT (6.1%) as well as the largest number of users (2.85 PTP).

Smokeless Tobacco Use by Children in Household, Alaska, 2004-2007

Children in Household	Use SLT	Frequency	Percent of Total	Std Err of Percent	Row Percent	Std Err of Row Percent
No	No	9258	51.87	0.59	96.45	0.29
	Yes	357	1.90	0.15	3.54	0.29
Yes	No	6714	43.36	0.58	93.82	0.42
	Yes	494	2.85	0.19	6.17	0.42

Rao-Scott Chi-Square	27.46
DF	1
Pr > ChiSq	<.0001

Married

Marital Status is NOT related to SLT use in Alaska. The majority of SLT users are married (3.21 PTP).

Smokeless Tobacco Use by Marital Status, Alaska, 2004-2007

Marital Status	Use SLT	Frequency	Percent of Total	Std Err of Percent	Row Percent	Std Err of Row Percent
Single	No	6387	32.22	0.55	95.34	0.37
	Yes	342	1.57	0.12	4.65	0.37
Married	No	9518	62.98	0.57	95.14	0.32
	Yes	510	3.21	0.22	4.85	0.32

Rao-Scott Chi-Square	0.16
DF	1
Pr > ChiSq	0.6820

Socio-Economic Status

Socio-economic status, as defined jointly by low education and poverty status, is related to SLT use. The prevalence of SLT use is 6.4% in the low SES group. However, the group composed of those not of low SES status contain the larger number of SLT users (2.95 PTP).

Smokeless Tobacco Use by Socio-Economic Status, Alaska, 2004-2007

Socio-economic Status	Use SLT	Frequency	Percent of Total	Std Err of Percent	Row Percent	Std Err of Row Percent
Not Low	No	11560	68.68	0.56	95.87	0.28
	Yes	498	2.95	0.20	4.12	0.28
Low	No	4416	26.52	0.54	93.53	0.52
	Yes	356	1.83	0.15	6.46	0.52

Rao-Scott Chi-Square	17.78
DF	1
Pr > ChiSq	<.0001

Educational Attainment

When examined separately from SES status, education is independently related to SLT use. The prevalence of SLT decreases linearly with educational attainment, with 8.6% of those with less than a High School education using SLT and 2.7% of those with college or greater education using SLT. The group with only a high school education contains the largest number of SLT users (2.03% PTP).

Smokeless Tobacco Use by Education, Alaska, 2004-2007

Education	Use SLT	Frequency	Percent of Total	Std Err of Percent	Row Percent	Std Err of Row Percent
< than HS	No	1225	7.24	0.33	91.34	1.23
	Yes	121	0.68	0.10	8.65	1.23
HS	No	4775	28.15	0.53	93.25	0.49
	Yes	396	2.03	0.15	6.74	0.49
> than HS	No	4764	29.13	0.53	96.00	0.46
	Yes	206	1.21	0.14	3.99	0.46
College+	No	5196	30.67	0.53	97.29	0.34
	Yes	130	0.85	0.11	2.70	0.34

Rao-Scott Chi-Square	57.55
DF	3
Pr > ChiSq	<.0001

Income Category

We also examined income range as a possible factor related to SLT use. It was NOT related using the groupings below, although those making $25k a year or less do have an elevated prevalence (5.7%). The largest number of SLT users is found in those making over $50K per year.

Smokeless Tobacco Use by Income, Alaska, 2004-2007

Income	Use SLT	Frequency	Percent of Total	Std Err of Percent	Row Percent	Std Err of Row Percent
<$25K	No	3087	18.64	0.49	94.21	0.62
	Yes	220	1.14	0.12	5.78	0.62
$25-$49k	No	3890	24.65	0.53	94.87	0.53
	Yes	205	1.33	0.14	5.12	0.53
$50k+	No	7242	51.90	0.61	95.74	0.36
	Yes	320	2.30	0.20	4.25	0.36
		Rao-Scott Chi-Square		5.31		
		DF		2		
		Pr > ChiSq		0.0701		

Poverty Status

Poverty status is related to SLT use. Those below the Alaska poverty threshold (defined as 185% of the Federal Poverty Level), have a higher prevalence than others (7.7%). The largest numbers of SLT users are above a 200% cutoff (2.60PTP).

Smokeless Tobacco Use by Poverty Status, Alaska, 2004-2007

Poverty Status	Use SLT	Frequency	Percent of Total	Std Err of Percent	Row Percent	Std Err of Row Percent
Poor (Below Alaska Poverty Threshold)	No	1490	9.07	0.37	92.23	0.82
	Yes	160	0.76	0.08	7.76	0.82
Near Poor (100-199% Alaska Poverty Threshold)	No	2589	15.13	0.43	94.63	0.72
	Yes	153	0.85	0.11	5.36	0.72
Middle/High Status (200%+ Alaska Poverty Threshold)	No	10138	59.81	0.58	95.83	0.31
	Yes	432	2.60	0.19	4.16	0.31
Missing	No	1794	11.20	0.38	95.29	0.63
	Yes	109	0.55	0.07	4.70	0.63
		Rao-Scott Chi-Square		20.27		
		DF		3		
		Pr > ChiSq		0.0001		

Employment Status

Employment status is related to SLT use. The highest SLT use prevalence is among those not employed (8.6%), and the lowest is among those not in the work force. Still, the largest number of SLT users is in the employed group (3.72 PTP).

Smokeless Tobacco Use by Employment Status, Alaska, 2004-2007

Employment Status	Use SLT	Frequency	Percent of Total	Std Err of Percent	Row Percent	Std Err of Row Percent
Employed	No	10749	65.13	0.56	94.59	0.33
	Yes	627	3.72	0.23	5.40	0.33
Not Employed	No	1008	6.17	0.31	91.37	1.23
	Yes	116	0.58	0.08	8.62	1.23
Not In Work Force	No	4177	23.96	0.49	98.28	0.24
	Yes	100	0.41	0.06	1.71	0.24

Rao-Scott Chi-Square	69.02
DF	2
Pr > ChiSq	<.0001

Health Insurance

Failure to have a health plan is related to SLT use. Those reporting no health plan use SLT at a rate of 6.1%. The group with a health plan contains the most SLT users (3.67 PTP).

Smokeless Tobacco Use by Health Plan Status, Alaska, 2004-2007

Health Plan Status	Use SLT	Frequency	Percent of Total	Std Err of Percent	Row Percent	Std Err of Row Percent
Has a Plan	No	13304	79.16	0.49	95.56	0.27
	Yes	641	3.67	0.22	4.43	0.27
No Plan	No	2605	16.10	0.45	93.87	0.64
	Yes	199	1.05	0.11	6.12	0.64

Rao-Scott Chi-Square	6.85
DF	1
Pr > ChiSq	0.0089

Health

None of the health status indicators included in the AK BRFSS- general, physical, or mental - were related to SLT use, with the majority of SLT users found among those reporting good health (3.98 – 4.37 PTP).

Smokeless Tobacco Use by Self-Reported General Health, Alaska, 2004-2007

Poor Health	Use SLT	Frequency	Percent of Total	Std Err of Percent	Row Percent	Std Err of Row Percent
No	No	13679	83.17	0.42	95.10	0.27
	Yes	752	4.27	0.23	4.89	0.27
Yes	No	2273	12.04	0.35	95.98	0.64
	Yes	98	0.50	0.08	4.01	0.64

Rao-Scott Chi-Square	1.37
DF	1
Pr > ChiSq	0.2406

Smokeless Tobacco Use by Mentally Unhealthy Days, Alaska, 2004-2007

Mentally Unhealthy Days	Use SLT	Frequency	Percent of Total	Std Err of Percent	Row Percent	Std Err of Row Percent
Not Frequent	No	14140	86.52	0.40	95.18	0.27
	Yes	739	4.37	0.24	4.81	0.27
Frequent	No	1520	8.74	0.33	96.11	0.74
	Yes	72	0.35	0.06	3.88	0.74

Rao-Scott Chi-Square	1.15
DF	1
Pr > ChiSq	0.2817

Smokeless Tobacco Use by Physically Unhealthy Days, Alaska, 2004-2007

Physically Unhealthy Days	Use SLT	Frequency	Percent of Total	Std Err of Percent	Row Percent	Std Err of Row Percent
Not Frequent	No	12604	78.93	0.47	95.19	0.27
	Yes	671	3.98	0.22	4.80	0.27
Frequent	No	2791	16.37	0.43	95.91	0.73
	Yes	119	0.69	0.12	4.08	0.73

Rao-Scott Chi-Square	0.74
DF	1
Pr > ChiSq	0.3867

Restrictions on Smoking

Workplace smoking bans were the only smoking bans related to SLT use, with a prevalence of 9.1% among those working but not having a workplace ban. Most SLT users have home and car smoking bans (4.07 and 2.92 PTP).

Smokeless Tobacco Use by Home Smoking Ban, Alaska, 2004-2007

Home Smoking Ban	Use SLT	Frequency	Percent of Total	Std Err of Percent	Row Percent	Std Err of Row Percent
No	No	1657	15.27	0.54	95.41	0.67
	Yes	84	0.73	0.10	4.58	0.67
Yes	No	7851	79.91	0.60	95.14	0.36
	Yes	415	4.07	0.30	4.85	0.36

Rao-Scott Chi-Square	0.12
Pr > ChiSq	0.7265

Smokeless Tobacco Use by Car Smoking Ban, Alaska, 2004-2007

Car Smoking Ban	Use SLT	Frequency	Percent of Total	Std Err of Percent	Row Percent	Std Err of Row Percent
No	No	1460	26.34	0.87	94.26	0.85
	Yes	96	1.60	0.24	5.73	0.85
Yes	No	3614	69.12	0.91	95.94	0.47
	Yes	160	2.92	0.34	4.05	0.47

Rao-Scott Chi-Square	3.35
Pr > ChiSq	0.0670

Smokeless Tobacco Use by Work Smoking Ban, Alaska, 2004-2007

Work Smoking Ban	Use SLT	Frequency	Percent of Total	Std Err of Percent	Row Percent	Std Err of Row Percent
N/A	No	3020	29.13	0.67	96.53	0.49
	Yes	121	1.04	0.15	3.46	0.49
No	No	1993	19.97	0.59	90.83	0.94
	Yes	192	2.01	0.21	9.16	0.94
Yes	No	4507	46.09	0.74	96.40	0.40
	Yes	186	1.71	0.19	3.59	0.40

Rao-Scott Chi-Square	52.67
Pr > ChiSq	<.0001

Secondhand Tobacco Smoke Knowledge and Attitudes

The AK BRFSS asks a series of questions related to the knowledge and attitudes of the health effects of secondhand smoke (SHS). None of the knowledge of secondhand smoke's relationship to disease items included in the AK BRFSS were related to SLT use.

Smokeless Tobacco Use by SHS Causes Lung Cancer, Alaska, 2004-2007

SHS Causes Lung Cancer	SLT Use	Frequency	Percent of Total	Std Err of Percent	Row Percent	Std Err of Row Percent
No	No	1026	20.20	0.80	96.01	0.75
	Yes	50	0.83	0.16	3.98	0.75
Yes	No	3696	75.11	0.87	95.14	0.51
	Yes	197	3.83	0.41	4.86	0.51
		Rao-Scott Chi-Square		0.83		
		Pr > ChiSq		0.3612		

Smokeless Tobacco Use by SHS Causes Heart Disease, Alaska, 2004-2007

SHS Causes Heart Disease	SLT Use	Frequency	Percent of Total	Std Err of Percent	Row Percent	Std Err of Row Percent
No	No	1663	33.17	0.97	95.17	0.88
	Yes	82	1.68	0.31	4.82	0.88
Yes	No	3059	62.09	1.00	95.32	0.48
	Yes	167	3.04	0.31	4.67	0.48
		Rao-Scott Chi-Square		0.02		
		Pr > ChiSq		0.8858		

Smokeless Tobacco Use by SHS Causes Respiratory Problems, Alaska, 2004-2007

SHS Causes Respiratory Problems	SLT Use	Frequency	Percent of Total	Std Err of Percent	Row Percent	Std Err of Row Percent
No	No	510	9.62	0.55	94.94	1.15
	Yes	31	0.51	0.11	5.05	1.15
Yes	No	4213	85.65	0.68	95.31	0.47
	Yes	217	4.20	0.42	4.68	0.47
		Rao-Scott Chi-Square		0.09		
		DF		1		
		Pr > ChiSq		0.7608		

SHS Knowledge and Attitudes (continued)

Smokeless Tobacco Use by SHS Causes Colon Cancer, Alaska, 2004-2007

SHS Causes Colon Cancer	SLT Use	Frequency	Percent of Total	Std Err of Percent	Row Percent	Std Err of Row Percent
No	No	3795	76.55	0.91	95.49	0.50
	Yes	184	3.60	0.40	4.50	0.50
Yes	No	929	18.72	0.85	94.41	0.87
	Yes	64	1.10	0.17	5.58	0.87

Rao-Scott Chi-Square	1.23
Pr > ChiSq	0.2657

Smokeless Tobacco Use by SHS Causes Sudden Infant Death Syndrome (SIDS), Alaska, 2004-2007

SHS Causes SIDS	SLT Use	Frequency	Percent of Total	Std Err of Percent	Row Percent	Std Err of Row Percent
No	No	3136	62.84	1.01	95.23	0.58
	Yes	161	3.14	0.38	4.76	0.58
Yes	No	1587	32.44	0.98	95.37	0.63
	Yes	87	1.57	0.21	4.62	0.63

Rao-Scott Chi-Square	0.02
Pr > ChiSq	0.8647

Attitudes related to the harm of secondhand smoke exposures were somewhat related to SLT use. Persons who thought secondhand smoke was harmful and those that thought others needed to be protected from SHS used SLT less than those who did not have those attitudes. (We note that the SHS protection item was not asked in 2005.)

Smokeless Tobacco Use by the Need for Protection from SHS, Alaska, 2004-2007

Need Protection From SHS	SLT Use	Frequency	Percent of Total	Std Err of Percent	Row Percent	Std Err of Row Percent
No	No	2838	43.04	0.90	94.01	0.69
	Yes	183	2.73	0.32	5.98	0.69
Yes	No	3633	52.28	0.91	96.44	0.39
	Yes	151	1.92	0.21	3.55	0.39
		Rao-Scott Chi-Square		10.77		
		Pr > ChiSq		0.0010		

Smokeless Tobacco Use by SHS Harm, Alaska, 2004-2007

SHS is Harmful	SLT Use	Frequency	Percent of Total	Std Err of Percent	Row Percent	Std Err of Row Percent
No	No	2326	34.80	0.85	94.48	0.66
	Yes	142	2.03	0.24	5.51	0.66
Yes	No	4172	60.44	0.88	95.68	0.48
	Yes	194	2.72	0.30	4.31	0.48
		Rao-Scott Chi-Square		2.26		
		Pr > ChiSq		0.1321		

Chronic Conditions

Among those chronic conditions reported in the BRFSS, persons with Asthma use SLT less than those without asthma. Those with diabetes or high blood pressure also tended to use SLT less, but not significantly so. Those without these chronic conditions make up the majority of SLT users (3.8 – 4.5 PTP). (We note that the asthma item was not asked in 2007.)

Smokeless Tobacco Use by Asthma, Alaska, 2004-2006

Asthma	SLT Use	Frequency	Percent of Total	Std Err of Percent	Row Percent	Std Err of Row Percent
Yes	No	815	11.35	0.55	97.99	0.48
	Yes	27	0.23	0.05	2.01	0.48
No	No	6306	83.89	0.64	94.88	0.41
	Yes	340	4.52	0.37	5.11	0.41
		Rao-Scott Chi-Square		14.56		
		Pr > ChiSq		0.0001		

Smokeless Tobacco Use by Diabetes, Alaska, 2004-2007

Diabetes	SLT Use	Frequency	Percent of Total	Std Err of Percent	Row Percent	Std Err of Row Percent
Yes	No	567	5.48	0.32	95.76	1.44
	Yes	15	0.24	0.08	4.23	1.44
No	No	8974	89.70	0.44	95.15	0.33
	Yes	485	4.56	0.31	4.84	0.33
		Rao-Scott Chi-Square		0.15		
		Pr > ChiSq		0.6982		

Smokeless Tobacco Use by High Blood Pressure, Alaska, 2004-2007

High Blood Pressure	SLT Use	Frequency	Percent of Total	Std Err of Percent	Row Percent	Std Err of Row Percent
Yes	No	704	23.15	1.14	96.55	0.82
	Yes	33	0.82	0.19	3.44	0.82
No	No	2080	72.17	1.21	94.94	0.70
	Yes	112	3.84	0.53	5.05	0.70
		Rao-Scott Chi-Square		1.97		
		Pr > ChiSq		0.1604		

Overall Model of SLT Use

All of the variables above that were measured in years 2004 -2007 and were found to exhibit a significant bi-variate association with SLT use were placed in a multivariate logistic regression model. The results of that model are displayed in the Table below.

Respondent gender (male), age (18-44), race/ethnicity (Other), region (relative to Anchorage), education (HS or less), and employment status (employed) remained independently associated with SLT use in Alaska. Controlling for these factors, smoking status, Alaska Native race, having children, SES, and having a health plan are no longer significantly related to SLT use.

Outcome: SLT Use (2004-2007)			
Effect	**Odds Ratio**	**95% Wald Confidence Limits**	
YEAR	1.068	0.949	1.203
SMOKING: Current vs Never	0.895	0.623	1.286
SMOKING: Former vs Never	1.376	0.997	1.899
GENDER: Male vs Female *	8.012	6.129	10.475
RACE: Alaska Native vs White	1.502	0.900	2.507
RACE: Other Race vs White *	0.388	0.213	0.709
AGE: 18-44 vs 45+ *	2.279	1.621	3.206
REGION: Bristol Bay/Aleut/Prib vs Anchorage *	2.545	1.352	4.791
REGION: Fairbanks North Star vs Anchorage *	1.619	1.093	2.397
REGION: Gulf-Kenai/Kodiak/PWS vs Anchorage *	1.993	1.336	2.972
REGION: Interior vs Anchorage *	1.989	1.071	3.695
REGION: Mat-Su vs Anchorage *	1.851	1.077	3.182
REGION: Norton Sound/Arctic vs Anchorage	1.737	0.905	3.334
REGION: Southeast vs Anchorage	1.488	0.969	2.285
REGION: Y-K vs Anchorage *	7.747	4.340	13.829
PARENT: Has Children	1.173	0.886	1.554
SES: Low vs High	1.070	0.760	1.506
EDUCATION: <HS vs College+ *	1.966	1.101	3.511
EDUCATION: >HS vs College+	1.394	0.926	2.099
EDUCATION: HS vs College+ *	1.636	1.136	2.357
EMPLOYMENT: Not Employed vs Employed	0.791	0.509	1.230
EMPLOYMENT: Not in Workforce vs Employed *	0.439	0.305	0.632
INSURANCE: Has a Health Plan vs Not	0.909	0.654	1.264

* = Significant at .05

Part II: Associations with Smokeless Tobacco Use

Summary of Key Findings:

- Males make up the vast majority of SLT users, with an 8 to 1 ratio in the general Alaskan adult population.
- Younger age (<45), living in non-urban areas, and not having attained education beyond high school define independent subpopulations for SLT use.
- Persons of Alaska Native race use SLT at higher rates, however this is mitigated somewhat by the other demographic factors. The use of Iqmik by Natives in the Y-K region accounts for a large amount of the Native use.
- Being of low income, uninsured, and having children were observed to be associated with SLT use, but those factors did not appear to be related once demographic factors such as age were controlled for.
- General health status, being married, knowledge and attitudes toward secondhand smoke, personal smoking bans in the home or car, and most chronic conditions were not found to be related to SLT use.

Recommendations:

- As is seen elsewhere in the US, males, those under the age of 45, those living in non-urban areas, and those with less education use SLT at higher rates. Programmatic efforts should focus on these demographic subgroups.
- Alaska Native race is associated with higher SLT use, although this was explained somewhat by other demographic factors such as region and education. Still the use of SLT needs to continue to be programmatically addressed in both Alaska Native men and women, and in urban as well as rural areas.
- SLT use was associated with the lack of a smoking ban in the workplace. This finding needs further exploration. It may be due in part to either the types of workplaces without bans or the workplace norm about tobacco use. In either case, programmatic efforts to achieve total workplace smoking bans should continue to be initiated.
- Most SLT users rate themselves as currently in good health. It is unknown from BRFFS data if SLT users consider SLT harmful to their health. The perceived health consequences of SLT use should be assessed in the Alaskan population and corrected by a programmatic campaign if necessary.

Part III: Models of SLT Associations by Subpopulations

In this section we re-examine the overall model of SLT use in sub-groups of persons known to have vastly different rates of SLT use. Data are from the Alaska 2004-2007 BRFSS combined.

Gender

Males are much more likely to use SLT than females, on the order of 8 to 1 in the general population. In order to examine whether the factors related to SLT use are different between males and females, we ran separate multivariate logistic models. Table III A displays a model of SLT use for male and female subgroups.

The gender models reveal important differences in the factors related to SLT use for men and women. First, Native women are much more likely to use SLT than White women (OR=30.0), while Native men are not more likely to use SLT than White men (OR=1.1, ns). It would appear that this gender difference accounts for the race difference seen in the overall population. Further investigation revealed that SLT use was rare among White or other race women (<1%) but higher in Native women (8%) due partly to the use of Iqmik (4%).

Another large difference between gender models is seen in the relationship of SLT use to region. While the Y-K region exhibits the highest SLT use relative to Anchorage in both sexes, the odds ratio is much higher for women (OR=12.1 vs. 4.8). In fact, Y-K is the only region with significantly higher SLT for women, while for men all regions are higher than Anchorage.

The role of educational attainment was also different between the sexes, with high school or less education being related to SLT use for women but not for men. Conversely, employment status was related to SLT use for men, but not for women.

The age factor is about equal for the two genders (OR=2.0 and 2.3), with younger persons in both groups using SLT more, as is seen in the overall population. As in the overall model, year, parenthood, SES, and health plan status were not independently associated with SLT use after controlling for the other risk factors.

Finally, the role of smoking status differs between genders in that male former smokers, and to some extent current smokers, are more likely to use SLT than never smokers (OR=1.6 and 1.2) whereas female former and current smokers are much less likely to use SLT than those women who do not have smoking experience (OR= 0.15 and 0.45).

Table III A: SLT Use By Gender	Female				Male			
YEAR	1.06	0.80	1.14		1.07	0.94	1.22	
SMOKING: Current vs Never	0.15	0.07	0.34	*	1.21	0.83	1.77	
SMOKING: Former vs Never	0.46	0.25	0.82	*	1.67	1.16	2.40	*
RACE: Native vs White	30.05	7.45	121.21	*	1.15	0.63	2.11	
RACE: Other Race vs White	0.92	0.18	4.83		0.39	0.21	0.71	*
AGE: 18-44 vs 45+	2.08	1.05	4.12	*	2.39	1.64	3.49	*
REGION: Bristol Bay/Aleut/Prib vs Anchorage	2.90	0.50	16.65		2.58	1.31	5.07	*
REGION: Fairbanks North Star vs Anchorage	1.38	0.28	6.78		1.66	1.11	2.49	*
REGION: Gulf - Kenai/Kodiak/PWS vs Anchorage	1.70	0.37	7.72		2.06	1.36	3.12	*
REGION: Interior vs Anchorage	0.70	0.09	5.26		2.22	1.16	4.24	*
REGION: Mat-Su vs Anchorage	0.00	0.00	0.00		2.02	1.17	3.51	*
REGION: Norton Sound/Arctic vs Anchorage	0.63	0.11	3.47		2.00	1.00	4.00	*
REGION: Southeast vs Anchorage	0.16	0.02	1.06		1.62	1.04	2.52	*
REGION: Y-K vs Anchorage	12.65	2.89	55.30	*	4.88	2.61	9.12	*
PARENT: Has Children	1.35	0.64	2.84		1.12	0.83	1.50	
SES: Low vs High	1.18	0.55	2.56		1.13	0.78	1.63	
EDUCATION: <HS vs College+	5.09	1.21	21.52	*	1.55	0.83	2.91	
EDUCATION: >HS vs College+	1.86	0.53	6.57		1.32	0.86	2.04	
EDUCATION: HS vs College+	4.50	1.24	16.30	*	1.41	0.97	2.05	
EMPLOYMENT: Not Employed vs Employed	2.19	0.96	5.01		0.69	0.44	1.09	
EMPLOYMENT: Not in Workforce vs Employed	0.92	0.44	1.89		0.40	0.26	0.62	*
INSURANCE: Has a Health Plan vs Not	2.04	0.96	4.33		0.81	0.57	1.14	

* = Significant at .05

Race

Race is also an important observed factor in the overall Alaskan population, with Alaska Natives overall using SLT more (11%) than Whites (4%) or other races (< 2%). Sample size limitations prohibit examination of the 'other' race subgroup. Table III B displays the results separate logistic models of SLT use in Alaska Natives and Whites.

One glaring difference in the two models is the gender factor. As mentioned above, use is rare in the female White subpopulation (< 1%) while it is more common in Alaska Native women (8%). Male rates in the two populations are 7% (Whites) and 14% (Alaska Natives). We note that this odds ratio represents about a 7 percentage point gender difference in both races and is inflated due to the extremely low female white prevalence (0.05%).

As in the gender models, smoking status plays a reciprocal role in the race subgroups. White current and former smokers use SLT more than those never smoking (OR= 1.8 and 2.1), with Alaska Natives showing the opposite effect (0.2 and 0.5).

Unlike the White subpopulation, age does not play a role in predicting SLT use in Alaska Natives, nor does employment status or residence in any region except Y-K. Parenthood status emerges as a predictive factor for Alaska Natives (OR=2.4), but not for Whites (0.9, ns).

Education drops out as an independent predictor for both race and SES, and health plan status remains non-independently predictive as in the general population model.

Table III B: SLT Use By Race	White				Native			
Effect	Odds Ratio	Lower CL	Upper CL	Sig	Odds Ratio	Lower CL	Upper CL	Sig
SYEAR	1.04	0.91	1.19		1.11	0.89	1.38	
SMOKING: Current vs Never	1.82	1.21	2.75	*	0.22	0.14	0.36	*
SMOKING: Former vs Never	2.12	1.47	3.05	*	0.58	0.35	0.98	*
GENDER: Male vs Female *	134.73	44.50	407.89	*	2.75	1.70	4.44	*
AGE: 18-44 vs 45+ *	3.18	2.29	4.40	*	1.13	0.60	2.12	
REGION: Bristol Bay/Aleut/Prib vs Anchorage *	2.63	1.28	5.41	*	1.93	0.53	6.97	
REGION: Fairbanks North Star vs Anchorage *	1.69	1.12	2.54	*	0.79	0.21	2.92	
REGION: Gulf - Kenai/Kodiak/PW Sound vs Anchorage *	2.08	1.39	3.12	*	1.39	0.43	4.54	
REGION: Interior vs Anchorage *	2.18	1.01	4.68	*	1.46	0.43	4.92	
REGION: Mat-Su vs Anchorage *	1.74	0.98	3.10		1.60	0.32	8.06	
REGION: Norton Sound/Arctic vs Anchorage	2.56	0.99	6.62		1.04	0.32	3.37	
REGION: Southeast vs Anchorage	1.85	1.22	2.81	*	0.46	0.13	1.63	
REGION: Y-K vs Anchorage *	0.94	0.34	2.64		5.57	1.91	16.21	*
PARENT: Has Children	0.91	0.67	1.24		2.41	1.42	4.08	*
SES: Low vs High	1.09	0.67	1.77		0.97	0.59	1.60	
EDUCATION: <HS vs College+ *	1.81	0.79	4.15		1.77	0.67	4.70	
EDUCATION: >HS vs College+	1.17	0.76	1.79		1.90	0.62	5.80	
EDUCATION: HS vs College+ *	1.32	0.85	2.03		1.85	0.81	4.21	
EMPLOYMENT: Not Employed vs Employed	0.54	0.21	1.43		1.19	0.73	1.93	
EMPLOYMENT: Not in Workforce vs Employed *	0.34	0.20	0.60	*	0.69	0.39	1.20	
INSURANCE: Has a Health Plan vs Not	0.75	0.48	1.18		1.29	0.82	2.03	

* = Significant at .05

Age

Persons 18 – 44 use SLT at a higher rate (6.6%) than those over 45 (2.6%). In addition, 75% of the SLT users are under 45 years of age. Age therefore represents an important sub-grouping with regards to SLT use. Table III C displays the result of separate multivariate logistic regressions for older (45+) and younger (18-44) persons in Alaska. We note that age as we split it here is not related to gender, but is related to race, with slightly more younger people among Alaska Natives and other race than in Whites (60/40 vs. 50/50).

Regarding smoking status, we did find that younger former smokers where more likely to use SLT (OR=1.8) while older former smokers were not (OR=0.8, ns).

Gender was highly related to SLT use in both age groups, although slightly higher in older (OR=9.7) than younger (OR=7.5) persons. Alaska Native race was related in the older (OR=3.2) but not the younger (OR=1.02) age group. Both age groups of other races used SLT far less than Whites.

The Y-K region was the only region related to SLT use in the older group, while in the younger age group all regions exhibit higher SLT use than Anchorage. The SLT prevalence in Anchorage among those 18-44 is 3.6%.

Educational status is related to SLT in both groups, although statistical significance is achieved for slightly different education levels; less than high school for the older (OR=2.8) and high school for the younger (OR=1.7), compared to those who have completed college. The usage rate in younger college graduates is 4.1%.

Employment status is related in both age groups, and parenthood, SES and health plan status are not related in either group.

Table III C : SLT Use by Age	Age 45-99				Age 18-44			
Effect	Odds Ratio	Lower CL	Upper CL	Sig	Odds Ratio	Lower CL	Upper CL	Sig
SYEAR	1.06	0.85	1.34		1.08	0.94	1.23	
SMOKING: Current vs Never	0.60	0.32	1.13		1.07	0.71	1.63	
SMOKING: Former vs Never	0.83	0.51	1.35		1.83	1.29	2.59	*
GENDER: Male vs Female *	9.73	5.90	16.03	*	7.53	5.46	10.38	*
RACE: Native vs White	3.27	1.19	8.99	*	1.02	0.65	1.60	
RACE: Other Race vs White *	0.19	0.09	0.41	*	0.42	0.22	0.81	*
REGION: Bristol Bay/Aleut/Prib vs Anchorage *	1.34	0.37	4.83		3.39	1.75	6.57	*
REGION: Fairbanks North Star vs Anchorage *	1.24	0.55	2.83		1.72	1.11	2.64	*
REGION: Gulf - Kenai/Kodiak/PW Sound vs Anchorage *	1.89	0.88	4.04		2.07	1.31	3.27	*
REGION: Interior vs Anchorage *	1.93	0.63	5.97		1.86	0.94	3.70	

REGION: Mat-Su vs Anchorage *	1.57	0.57	4.29		1.98	1.06	3.72	*
REGION: Norton Sound/Arctic vs Anchorage	1.15	0.33	4.03		2.10	1.04	4.22	*
REGION: Southeast vs Anchorage	1.48	0.65	3.35		1.49	0.92	2.40	
REGION: Y-K vs Anchorage *	5.61	1.79	17.61	*	9.49	5.40	16.67	*
PARENT: Has Children	1.51	0.97	2.36		1.02	0.75	1.40	
SES: Low vs High	0.73	0.41	1.31		1.17	0.79	1.74	
EDUCATION: <HS vs College+ *	2.83	1.34	5.94	*	1.65	0.77	3.52	
EDUCATION: >HS vs College+	1.78	0.88	3.57		1.22	0.75	1.96	
EDUCATION: HS vs College+ *	1.41	0.84	2.37		1.70	1.06	2.72	*
EMPLOYMENT: Not Employed vs Employed	1.15	0.62	2.15		0.77	0.46	1.31	
EMPLOYMENT: Not in Workforce vs Employed *	0.56	0.33	0.97	*	0.40	0.25	0.65	*
INSURANCE: Has a Health Plan vs Not	1.43	0.84	2.44		0.75	0.51	1.11	

* = Significant at .05

Part III: Associations with Smokeless Tobacco Use within Subpopulations

Summary of Key Findings:

- Multivariate association models reveal important differences in the factors related to SLT within sub-populations.
- SLT use among Alaskan women is largely restricted to Alaska Native never-smokers, for whom younger age, living in the Y-K region, and education are also predictive of use.
- Younger men, employed and living outside of an urban area (Anchorage) show an increased rate of SLT use. Men who are former smokers are also at increased risk.
- Alaska Native men of both older and younger age use SLT at high rates.

Recommendations:

- Develop intervention materials that are sensitive to the unique characteristics of sub-populations of SLT users.
- Alaska Native race is associated with higher SLT use, although this was explained somewhat by other demographic factors such as region and education. Still the use of SLT needs to continue to be a high priority programmatically in both older and younger Native men and women, and in urban as well as rural areas.

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APPENDICES

Appendix A: Subgroup Sample Sizes in 2004-2007 Combined BRFSS

	Gender					
	Female			Male		
	RACE			RACE		
	White SLT N	Native SLT N	Other SLT N	White SLT N	Native SLT N	Other SLT N
AGE						
45+	3716	779	331	3245	630	377
18-44	2895	953	472	2242	769	346
COLLAPSED TRIBAL HEALTH ORG REGIONS						
Anchorage	1180	125	232	939	64	159
Mat-Su	412	30	30	308	21	27
Gulf - Kenai/Kodiak/PW Sound	1616	186	133	1303	141	139
Bristol Bay/Aleut/Prib	120	169	26	132	163	30
Y-K	117	389	13	115	357	25
Southeast	1388	267	136	1142	205	122
Interior	251	106	16	212	98	26
Fairbanks North Star	1395	109	189	1174	73	165
Norton Sound/Arctic	132	351	28	162	277	30
ALL	6611	1732	803	5487	1399	723

Appendix B: Prevalence of SLT and Iqmik in Alaskan Sub-Populations, 2004-2007

All Forms of Smokeless Tobacco	Gender					
	Female			Male		
	RACE			RACE		
	White	Native	Other	White	Native	Other
	SLT	SLT	SLT	SLT	SLT	SLT
	Percent Using	Percent Using	Percent Using	Percent Using	Percent Using	Percent Using
AGE						
45+	0.1	4.3	0.1	3.9	13.2	0.8
18-44	0.0	10.0	0.1	11.2	15.2	5.5
COLLAPSED TRIBAL HEALTH ORG REGIONS						
Anchorage	0.0	2.6	0.0	5.2	9.1	0.8
Mat-Su	0.0	0.0	0.0	9.2	15.2	11.9
Gulf - Kenai/Kodiak/PW Sound	0.2	2.6	0.0	10.3	11.7	3.8
Bristol Bay/Aleut/Prib	0.0	5.1	0.0	12.1	14.4	9.3
Y-K	0.0	33.8	11.4	4.9	30.7	19.5
Southeast	0.1	0.0	0.0	8.7	4.8	3.3
Interior	0.0	1.6	0.0	9.4	9.9	0.0
Fairbanks North Star	0.0	3.2	0.2	9.3	5.8	4.6
Norton Sound/Arctic	0.0	2.1	0.0	12.2	11.2	6.3
All	0.1	7.6	0.1	7.7	14.4	3.5

IQMIK	Gender					
	Female			Male		
	RACE			RACE		
	White	Native	Other	White	Native	Other
	Iqmik	Iqmik	Iqmik	Iqmik	Iqmik	Iqmik
	Percent Using	Percent Using	Percent Using	Percent Using	Percent Using	Percent Using
AGE						
45+	0.0	2.5	0.0	0.0	2.9	0.2
18-44	0.0	5.5	0.1	0.0	3.9	0.2
COLLAPSED TRIBAL HEALTH ORG REGIONS						
Anchorage	0.0	0.0	0.0	0.0	0.0	0.0
Mat-Su	0.0	0.0	0.0	0.0	0.0	0.0
Gulf - Kenai/Kodiak/PW Sound	0.0	0.3	0.0	0.0	2.8	0.0
Bristol Bay/Aleut/Prib	0.0	0.4	0.0	0.0	0.0	0.0
Y-K	0.0	24.1	8.3	0.0	14.7	13.6
Southeast	0.0	0.0	0.0	0.0	0.0	0.0
Interior	0.0	0.0	0.0	0.0	0.0	0.0
Fairbanks North Star	0.0	0.0	0.0	0.0	0.0	0.0
Norton Sound/Arctic	0.0	0.3	0.0	0.0	0.5	0.0
All	0.0	4.2	0.0	0.0	3.5	0.2

Appendix C: Specific Wording for Alaska BRFSS SLT current use Item

C.2 Do you currently use any smokeless tobacco products such as chewing tobacco, snuff, Iq'mik, or Blackbull? Probe for which.	1 Yes, chewing tobacco 2 Yes, snuff 3 Yes, Iq'mik or Blackbull 4 Yes, more than one 5 Yes, other (specify)_____ 6 No, None **skip to next sct** 7 DK/NS **skip to next sct** 9 refused **skip to next sct**

***Include prompt: By smokeless tobacco use we also mean iq'mik (also known as blackbull). Iq'mik is a form of smokeless tobacco that is chewed. It is made by mixing fire-cured tobacco leaves and "punk ash", which is the ash generated by burning a fungus that grows on birch trees.**