

**7.5.7-1: INITIAL - CONSUMER PERCEPTIONS - LITERATURE  
SUMMARY**

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## List of Abbreviations

CI	confidence interval
DARE	Drug Abuse Resistance Education
FDA	Food and Drug Administration
FM	Factory Made Cigarettes
ITC	International Tobacco Control
ITC-4	International Tobacco Control - 4 Country
MRTPA	Modified Risk Tobacco Product Application
NCTP	non-cigarette tobacco product
NRT	nicotine replacement therapy
OR	odds ratio
PREP	potentially reduced exposure product
SD	standard deviation
SLT	smokeless tobacco
ST	smokeless tobacco
U.S.	United States
Y-K	Yukon-Kuskokwim

## **7.5.7-1. CONSUMER PERCEPTIONS LITERATURE SUMMARY**

### **7.5.7-1.1.Literature Summarizing Consumer Perceptions of the Health Risks of Smokeless Tobacco Products**

This section summarizes published scientific literature related to consumers' perceptions of the health risks of using smokeless tobacco (ST). This information addresses the following aspects of the 2012 Food and Drug Administration Draft Guidance for Modified Risk Tobacco Product Applications (MRTPAs):

- the ability of consumers to understand the modified risk claims and the significance of the information in the context of one's health;
- consumers' beliefs about the health risks of using the product relative to other tobacco products, including those within the same class of products;
- consumer beliefs about the risks of using the product relative to quitting all tobacco use;
- consumer beliefs about the health risks of using the product relative to cessation aids.

It should be noted that the majority of the available consumer perception information related to ST products is not product or even product class specific. Throughout this MRTPA, ST refers to a broad class of all United States (U.S.) ST products. Specific studies may refer to chewing tobacco, chew, snuff, moist snuff, snus, dissolvable tobacco, or ST tobacco in their perception assessments; however, in very few cases, is the perception assessment specific enough to determine with any certainty what ST product categories might be included. Nonetheless, this literature sufficiently describes consumer perceptions of moist ST products because moist ST products comprise a significant proportion of the ST products in the U.S. market and have done so for many years. The product subject of this MRTPA is a moist ST product, and therefore the available research is relevant.

Altria Client Services LLC conducted a comprehensive literature search to identify published information relevant to consumer perceptions of ST products. A description of our literature search and review process is presented in [Section 7.5.1](#) of this MRTPA. This review is limited to studies of ST products used in the United States that were published through December 2014. From this search, a total of 6,742 publications were identified, and, after a comprehensive and in depth critical review, 537 were determined to be in scope. These publications were further reviewed to assess which specific category(ies) in the MRTPA Draft Guidance each article addressed. Reports published shortly after the date of our last search were included in this review when deemed to be significant contributions to this body of research. Eighty studies of consumer perceptions of ST products are summarized.

An updated literature review was conducted to bridge the original review to February 2017, and updated findings that inform consumer perceptions of ST are presented in [Section 7.5.7-2](#).

### **7.5.7-1.2.Characteristics of Consumer Perception Studies Published in the Scientific Literature**

The most common research methods used for understanding consumers' perceptions of ST products are surveys and focus groups. Some studies reviewed in this section have the primary objective of assessing consumers' perceptions of various tobacco products. Other studies have different primary objectives but also collect some perception information to complement the study's primary findings. The number of subjects evaluated in these studies ranged from as few as 10 (Talley, 2014) to over 36,000 (Haddock, 2004). All of the focus groups included less than 100 subjects. Consumer perception studies span a wide range of participant characteristics. These include school age adolescents, college students, tobacco control professionals, military personnel, health care providers, professional athletes, and members of the general public. In addition, studies have evaluated perceptions among nontobacco consumers as well as consumers of a variety of tobacco products including moist snuff, chewing tobacco, snus, dissolvable tobacco products, Iqmik, cigars, and cigarettes.

Study methods, participant characteristics, study findings and strengths and limitations of these studies are presented in Table 7.5.7-1-1 and Table 7.5.7-1-2.

### **7.5.7-1.3.The Ability of Consumers to Understand the Modified Risk Claims and the Significance of the Information in the Context of One's Health**

Our search of the published scientific literature did not identify any studies that evaluated consumers' understanding of the specific modified risk claims (Section 6.2) that are proposed in this MRTPA.

However, as a general principle, providing factual information about the relative risks of ST products to consumers may increase the accuracy of smokers' knowledge about the products, as well as their interest in trying the products. Borland et al. (2012) investigated the effect of providing information in a fact sheet to smokers "to correct misperceptions about the relative harmfulness of nicotine replacement products (NRT) and smokeless tobacco (ST), when compared to cigarette smoking." In this study, 517 study participants from Sweden (N = 187), the UK (N = 101), Australia (N = 170) and the United States (N = 59) were interviewed for their beliefs about the relative health risks of ST vs. cigarettes before and after exposure to a fact sheet that presented relative risk information. The study findings indicated that, after exposure to the fact sheet, the percentage of study participants whose perceptions of the relative harmfulness of ST vs. cigarettes were correct more than doubled, and study participants indicated that they were more likely to try ST.

### **7.5.7-1.4.Consumers' Beliefs about the Health Risks of Using the Product Relative to Other Tobacco Products, Including Those within the Same Class**

It is widely recognized within the public health community that use of smokeless tobacco poses fewer health risks compared to smoking cigarettes (Zeller, 2009). Nevertheless, one of

the most consistent findings from consumer perception research is widespread confusion and misperceptions about the relative health risks associated with ST products vs. cigarettes. O'Connor et al. (2005) analyzed data from the U.S. arm of the International Tobacco Control Policy Four-Country Survey. The survey included 2,028 adult current cigarette smokers in the United States. One of the primary objectives of the analysis was to assess smoker's perceptions about alternatives to cigarette smoking. The investigators reported that only 10.7 percent of smokers believed that ST products were less harmful than cigarettes.

In a later study, O'Connor et al. (2007) analyzed data from the same survey, including findings from all four countries: the United States, Canada, the United Kingdom, and Australia. Data from 13,322 individuals were assessed. The investigators reported that only 13 percent of smokers believed that ST was less hazardous than cigarettes. Turning their attention to findings from the United States, the investigators comment; "Why do U.S. smokers hold such beliefs, given that the product is available? In our opinion, it demonstrates a major failing of public education about the relative harms of tobacco products." They further comment, "...many smokers are likely to be deterred from trying [ST] given the lack of accurate information about relative risks..." and "Hence, smokers are systematically being prevented from making informed choices because they lack key information."

Tomar and Hatsukami (2007) analyzed data from the Monitoring the Future project collected between 1999 and 2003. This is a representative survey in the United States, and the data set included 11,093 high school seniors. The primary objective of the study was to gain insight into teenagers' perceptions of the relative risks of cigarettes vs. ST. The investigators reported that 41.3 percent of study participants perceived greater risk of harm from cigarettes while 52.7 percent perceived equal risk, and 6.1 percent perceived a greater risk from using ST.

The investigators concluded that those who believed that ST was riskier than cigarettes were more likely to be smokers and stated, "our findings suggest that young smokers may be misinformed as to the relative risks for disease associated with using these products."

Based on a survey of 411 college freshman, Smith et al. (2007) concluded, "regarding smokeless nicotine products, 89.3% of respondents incorrectly perceived dip and chew to be as harmful as or more harmful than regular cigarettes...."

The findings summarized above appear to be representative of the overall body of consumer perception research indicating widespread misperceptions among consumers about the relative health risks associated with ST products. Indeed, some studies have reported that less than 25 percent of those surveyed believe that ST poses less health risk than smoking (Berg, 2015; Borland, 2012; Choi, 2013; Kaufman, 2014; Kury, 1998; Lee, 1994; McClave-Regan, 2011; O'Connor, 2005; O'Connor, 2007; Peiper, 2010; Regan, 2012; Renner, 2013; Rinchuse, 1992; Smith, 2007; Tomar, 2007; Zhu, 2013).

Research indicates that messages designed to discourage the uptake of smokeless products by smokers (anti-smokeless messages), may reinforce smoking. In a series of online focus groups, 75 U.S. smokers were presented with various anti-smokeless message ideas (Popova, 2014a). The study objective was to evaluate counter-marketing messages in order to discourage people from using ST. While negative messages about ST tended to "evoke fear," some participants also perceived such messages as pro-smoking that may reinforce smoking.

Based on these findings, the investigators modified the messages to drop any messages that portray ST as unappealing. In their report, the researchers cautioned, "...those developing messages targeting smokers who are prior [consumers] of smokeless tobacco might consider carefully the responses to fear appeals, and these messages should be evaluated for negative reactance or the unintended consequence of reinforcing smoking rather than encouraging cessation of all tobacco products."

Similar findings were observed in a behavioral economic study, in which in-person experimental auctions were conducted with 571 smokers (Rousu, 2014). The purpose of the study was to test the effect of information and product trials on smokers' preferences. The investigators reported that anti-ST information increased demand for cigarettes when presented alone. But when anti-ST information was presented with pro-ST information, demand for cigarettes was decreased.

In a 1-year longitudinal survey of 36,012 of U.S. Air Force basic military training recruits, beliefs about risk reduction strategies were examined (Haddock, 2004). Among smokers, greater risk reduction ratings for switching to ST were associated with a greater likelihood of quitting. The investigators concluded, "[s]mokers who believed that switching to smokeless tobacco would lower the health risks associated with smoking were more likely, while smokers reporting switching to low-yield cigarettes were significant less likely, to quit during a 1-year follow-up period," and "[g]reater ratings of the risk-reduction potential of switching to smokeless tobacco were associated with a greater likelihood of quitting (odds ratio: 1.10;  $p < 0.009$ )."

### **7.5.7-1.5.Consumer Beliefs about the Risks of Using the Product Relative to Quitting All Tobacco Use**

The ALCS literature search did not find studies that specifically surveyed consumers' beliefs about the health risks of using ST products relative to quitting all tobacco use. However, many studies have evaluated consumers' beliefs about the absolute health risks of ST products. We believe it is reasonable to assume that, to the extent consumers believe use of ST causes health risks, they would believe quitting all tobacco use, including ST, would reduce or eliminate such health risks. Therefore, in order to address this question with findings from published research, this section relies on consumers' perceptions of the absolute health risks of ST products as a surrogate for beliefs about the risks of using the product relative to quitting all tobacco use.

In general, most consumers recognize that use of ST is associated with health risks. Overall, in most surveys, the majority of participants (i.e., >50 percent) believe that ST is associated with either general or specific health risks (Ary, 1989; Backinger, 1993; Boyle, 1989; Boyle, 1998; Brownson, 1990; Centers for Disease Control and Prevention, 1987; Chakravorty, 1997; Cohen, 1987; Colborn, 1989; Daughety, 1994; Eaves, 2009; Flanders, 1988; Gansky, 2009; Glover, 1989; Goebel, 2000; Gross, 1988; Helme, 2012; Kury, 1998; Lee, 1994; Marty, 1986a; Peiper, 2010; Renner, 2013; Riley, 1989; Schaefer, 1985; Schroeder, 1988; Walsh, 2000; Williams, 1989; Wisniewski, 1989). Similarly, most consumers appear to believe that ST products are addictive (Backinger, 1993; Boyle, 1989; Eaves, 2009; Walsh, 2000).

However, perceptions about the health risks of ST can differ significantly depending upon the study methods, number and demographics of study participants, and time period in which the study was conducted. Perceptions of health risks reported in different studies, even within similar populations, can differ from virtually all subjects perceiving no health risks, to virtually all subjects perceiving some health risks.

For example, based on focus groups of 57 Native Alaskans living in Southwest Alaska, Renner et al. (2004) reported that very few participants reported perceptions of adverse health effects from Iqmik or other tobacco products. Following a survey conducted 10 years later of 400 Native Alaskans living in Southwest Alaska, Renner et al. (2013) reported that 91.3 percent of the participants believed that no tobacco product is completely safe to use. Most participants (82.3 percent) also believed that all tobacco products are equally harmful. In addition to differences in data collection methods, the fact that the surveys were conducted 10 years apart may account for the differences in findings related to consumers' perceptions.

One of the most frequently cited differences in risk perceptions about ST is observed between study participants who use the product vs. those who either do not use the particular product, or do not use tobacco at all. In general, a larger percentage of non-consumers are likely to perceive health risks associated with ST than are consumers (Chassin, 1985; Colborn, 1989; Gansky, 2009; Gottlieb, 1993; Marty, 1986a). For example, in a survey of 901 high school students, 64.5 percent of consumers vs. 87.0 percent of non-consumers believed ST was associated with moderate to great harm (Marty, 1986a). Likewise, Brownson et al. (1990) reported that, whereas 51 percent of male ST consumers believed that ST was safer than smoking, only 15 percent of non-consumers held the same belief.

In a series of recent focus groups, Wray et al. (2012) sought to understand young adults' perceptions of emerging novel ST products. Participants generally recognized that all tobacco products were associated with health risks. However, they expressed a wide range of beliefs about the relative risks of various products ranging from all tobacco products are equally harmful, to a belief that ST products were safer than cigarettes because no smoke is inhaled into the lungs. Overall, the investigators in this study concluded that a "great deal of confusion and disagreement appeared with regard to absolute and relative risk of different tobacco products."

In summary, the published literature indicates the majority of consumers believe ST is associated with health risks. It seems reasonable to assume that consumers would believe quitting the use of ST would either reduce or eliminate such health risks.

#### **7.5.7-1.6.Consumer Beliefs about the Health Risks of Using the Product Relative to Cessation Aids**

Only a small number of studies were found in our literature search that made direct comparisons of consumers' perceptions of health risks between ST products and smoking cessation aids.

Chakravorty and Chakravorty (1997) interviewed 463 former ST consumers and 73 current ST consumers about their experiences in giving up ST. The investigators reported that ST consumers tended to have negative impressions of nicotine gum and the nicotine patch and were unlikely to have used the products.

In a study with the objective of assessing current popularity of several non-cigarette tobacco products, 10,587 adults completed a consumer mail-in survey (Regan, 2012). In particular, beliefs about the relative harm of various products vs. nicotine replacement therapy products were surveyed. Among study participants who use snus, 24.2% believed it was more harmful, 22.1% believed it was as harmful, 1.7% believed it was less harmful, and 51.9% were unsure about its harm compared to nicotine replacement therapy products. Among study participants who use dissolvable tobacco products, 20.5% believed it was more harmful, 23.6% believed it was as harmful, 1.9% believed it was less harmful, and 54% were unsure about its harm compared to nicotine replacement therapy products.

Shiffman et al. (2007) conducted a study to assess and compare smokers' interest and preferences in medicinal nicotine and ST. Among 238 smokers who were surveyed, 26 percent reported ever using ST regularly. In general, smokers expressed preference for medicinal nicotine instead of ST. Among the reasons for preferring medicinal nicotine was its relative safety, which was referred to by 13 percent.

Smith et al. (2007) evaluated harm perceptions of various nicotine containing products in college freshmen. In this study, 89.3 percent of respondents perceived dip and chew to be as harmful, or more harmful than regular cigarettes. Moreover, of 411 students surveyed, 19.6 percent perceived the nicotine patch to be as harmful, or more harmful than cigarettes. Likewise, 24.1 percent of respondents believed nicotine gum, and 52.9 percent believed the nicotine inhaler was as, or more harmful than cigarettes. Although a direct comparison of perceptions of ST vs. NRT products was not made in this study, the overall findings are consistent with, and reinforce the observation of a substantial amount of misperceptions among the American public about the relative health risks of different nicotine containing products.

### **7.5.7-1.7. Summary and Conclusions**

This literature review addresses the following aspects of the FDA Draft Guidance for MRTPAs:

- Consumer beliefs about the risks of using the product relative to quitting all tobacco use.
- Consumers' beliefs about the health risks of using the product relative to other tobacco products, including those within the same class of products.
- Consumer beliefs about the health risks of using the product relative to cessation aids.
- The ability of consumers to understand the modified risk claims and the significance of the information in the context of one's health.

Most consumers believe ST is associated with health risks. It is reasonable to assume that consumers would believe quitting the use of all tobacco products, including ST, would reduce or eliminate ST related health risks.

There is widespread confusion and misperceptions among consumers about the relative health risks of ST vs. cigarettes. Research suggests the majority of consumers believe that ST is as harmful as, or more harmful than smoking.

Research indicates that messages designed to discourage smokers from taking up ST can be viewed by consumers as pro-smoking messages and may increase demand for cigarettes when presented alone. However, when anti-ST information is presented with pro-ST information, demand for cigarettes may be decreased.

Research indicates that, if smokers believe that switching to ST will lower their health risks, they are more likely to quit smoking.

**Table 7.5.7-1-1: Beliefs About the Health Risks of Using the Product Relative to Other Tobacco Products, Including Those within the Same Class, and Relative to Quitting All Tobacco Use**

Author and Date	Report Title	Study Methods and Participant Characteristics	Beliefs About the Health Risks of Using the Product Relative to Other Tobacco Products, Including Those within the Same Class, and Relative to Quitting All Tobacco Use	Comments
(Berg, 2015)	Perceived Harm of Tobacco Products and Individual Schemas of a Smoker in Relation to Change in Tobacco Product Use Over One Year Among Young Adults	Survey, ST, 4,840 college students, average age (SD) = 20.34 (2.78) years.	Perceived harm of ST vs. cigarettes: <ul style="list-style-type: none"> <li>• Less = 13.1%</li> <li>• Equal = 70.9%</li> <li>• More = 16.1%</li> </ul>	Limitations = low response rate and sample overrepresented by females and subjects from southeast.
(Berg, 2014)	Perceived harm, addictiveness, and social acceptability of tobacco products and marijuana among young adults: marijuana, hookah, and electronic cigarettes win	Survey, ST, 2,002 college students, average age (SD) 21.02 (2.02) years.	Perceived harm on a scale of 1-7: <ul style="list-style-type: none"> <li>• Cigarettes = 6.47</li> <li>• Smokeless = 6.07</li> </ul> <p>“...those [products] perceived to be the most addictive were cigarettes (6.42); smokeless tobacco (5.63); and cigar products (5.63).”</p>	Limitations = low response rate and sample overrepresented by females and subjects from southeast.
(Biener, 2014)	Public education about the relative harm of tobacco products: an intervention for tobacco control professionals	Survey, ST, 52 tobacco-control professionals.	“...31% did not know that cigarettes are more harmful than smokeless tobacco...%”	Limitation = presentation material may have been overly technical for subjects.
(Burris, 2014)	Brief, instructional smokeless tobacco use among cigarette smokers who do not intend to quit: a pilot randomized clinical trial	Survey, Camel snus, 57 adults, mean age (SD) = 41.5 (12.1) years.	“...participants in the Snus to Cope and Snus to Reduce groups perceived low-nitrosamine SLT as having either less (67.4%) or equal (32.6%) risk compared with conventional cigarettes; no one rated this PREP (potentially reduced exposure product) as having more risk than conventional cigarettes.”	Limitations = small sample size and differences in some characteristics across groups could have confounded results.
(Kasza, 2014)	Cigarette smokers’ use of unconventional tobacco products and associations with quitting activity: findings from the ITC-4 U.S. cohort	Survey, ST, 6,110 adult smokers in the U.S., ages 18 years and over.	“For each family of unconventional tobacco products, those who used a given product were significantly more likely to report that they believe the product is less harmful than conventional cigarettes compared with their counterparts who did not use the given product (data not shown).”	Limitations = low response and high lost to follow-up rates, low use-rate of unconventional products.
(Kaufman, 2014)	Judgments, awareness, and the use of snus among adults in the United States	Survey, snus, 2,067 adults, ages in years, 18-25=14.1%; 26-30=8.8%; 31-45=24.7%; 46-55=17.4%; ≥56+=34.9%.	“Compared with nonsmokers, smokers were more likely to perceive snus as not harmful or not addictive (8.9% vs. 6.5%) and to perceive snus as not harmful and not addictive (9.4% vs. 4.5%, $\chi^2$ [2 df] = 9.8, p = .008). Smokers were also more likely than nonsmokers to perceive snus as less harmful or less addictive than cigarettes (16.2% vs. 11.2%) and to perceive snus as less harmful and less addictive than cigarettes (8.6% vs. 5.8%, $\chi^2$ [2 df] = 7.1, p = .028).”	Limitations = data are self-reported and cross-sectional data limits causal, time order inferences.

**Table 7.5.7-1-1: Beliefs About the Health Risks of Using the Product Relative to Other Tobacco Products, Including Those within the Same Class, and Relative to Quitting All Tobacco Use (Continued)**

Author and Date	Report Title	Study Methods and Participant Characteristics	Beliefs About the Health Risks of Using the Product Relative to Other Tobacco Products, Including Those within the Same Class, and Relative to Quitting All Tobacco Use	Comments
(Luryi, 2014)	Public awareness of head and neck cancers: a cross-sectional survey	Survey, chewing or "spitting" tobacco, 2,126 randomly selected adults, mean age 42.0 years (range, 18-92 years).	"Smoking and chewing or spitting tobacco were identified by 54.5% and 32.7% of respondents as risk factors for mouth and throat cancer, respectively."	Limitations = internet survey selects specific pool of subjects, may not be representative for general population
(Pepper, 2015)	How risky is it to use e-cigarettes? Smokers' beliefs about their health risks from using novel and traditional tobacco products	Survey, ST, 6,607 adult smokers, mean age (SD) 44.2 (15.2) years.	"Participants viewed using NCTPs [non-cigarette tobacco products] other than e-cigarettes as more likely to cause oral cancer than smoking cigarettes but less likely to cause lung cancer."	Limitation = cross-sectional design limits causal, time order inferences.
(Popova, 2014b)	A qualitative study of smokers' responses to messages discouraging dual tobacco product use	Focus groups, novel ST products, 75 U.S. smokers, age in years: 18-29=21%; 30-44=28%; 45-59=31%; 60+=20%.	"The idea that smokeless tobacco is harmful was new for some non-users, while past smokeless tobacco users were generally aware of the hazards of smokeless tobacco products."  "Some participants' comments indicated that messages emphasizing snus's lack of appeal may reinforce smoking when viewed by smokers. Past negative experiences with novel smokeless tobacco products referenced in counter-marketing advertisements might be perceived as a pro-smoking message."	Limitation = relying on internet for focus groups may bias responses due to technology related issues.
(Popova, 2014a)	Scaring the snus out of smokers: testing effects of fear, threat, and efficacy on smokers' acceptance of novel smokeless tobacco products	Survey, snus, 1,836 smokers, 18-29=15.5%; 30-44=24.2%; 45-59=41.0%; 60+=19.2%.	"In an online study with a nationally representative sample of U.S. smokers it was found that smokers perceive novel smokeless tobacco as dangerous and harmful to health..."	Limitation = online sample may limit generalizability.
(Richardson, 2014)	Prevalence, harm perceptions, and reasons for using noncombustible tobacco products among current and former smokers	Survey, ST, 1,487 current and former smokers, ages 18-49 years.	"...38.4% of the respondents who had tried snus said that it was "less harmful" than cigarettes as compared with only 12.3% of those who were only aware of but had not tried the product (P< .01)."	Limitations = cross-sectional design limits causal, time order inferences.
(Rousu, 2014)	The impact of product information and trials on demand for smokeless tobacco and cigarettes: Evidence from experimental auctions	Experimental auctions; Camel snus and Ariva; 571 adult current smokers; not currently using NRT; ages <30 years (37%), 30-50 years (40%), >50 years (23%).	"Anti-ST information increased demand for cigarettes when presented alone, but when presented with pro-ST information it decreased demand for cigarettes."	Limitation = minority and low income participants over represented, may limit generalizability.

**Table 7.5.7-1-1: Beliefs About the Health Risks of Using the Product Relative to Other Tobacco Products, Including Those within the Same Class, and Relative to Quitting All Tobacco Use (Continued)**

Author and Date	Report Title	Study Methods and Participant Characteristics	Beliefs About the Health Risks of Using the Product Relative to Other Tobacco Products, Including Those within the Same Class, and Relative to Quitting All Tobacco Use	Comments
(Talley, 2014)	Smokeless Tobacco Use Among Rural Women in NE Alabama	Interviews, ST, 10 women, ages 32-87 years.	“Health risks became apparent to the participants who had had significant health problems and had been told that these problems were related to their smokeless tobacco use. They stated they were not aware of health risks prior to diagnosis.”	Limitation = small sample size.
(Choi, 2013)	Awareness, perceptions and use of snus among young adults from the upper Midwest region of the USA	Survey, snus, 2,607 young adults.	“17.3% agreed snus is less harmful than cigarettes...”	Limitation = attrition over time may have biased findings.
(Renner, 2013)	Tobacco use among southwestern Alaska Native people	Survey, Iqmik, 400 of Alaska native adult tobacco consumers and non-consumers, mean age 38.9 years	“The majority (91.3%) of the participants believed that no tobacco product is completely safe to use. Most (82.3%) believed that all tobacco products are equally harmful. When asked which tobacco product is safest to use during pregnancy, 85.8% indicated that no tobacco product is safe and all are equally dangerous; 8.0% indicated they did not know.”	Limitations = unique population and product may limit generalizability.
(Van Zyl, 2013)	Exploring attitudes regarding smokeless tobacco products for risk reduction	Focus groups, ST, 77 participants.	“ST was associated with a number of diseases such as cancer (throat and mouth), and dental and gum disease; users were also concerned about stomach cancer.”  “There was a general lack of knowledge regarding the lesser risks associated with ST use, which is consistent with recent American and Swedish surveys... When this information was provided, focus group participants were surprised and much more open to considering the use of ST instead of cigarettes.”	Limitation = focus group design limits quantitative prevalence estimates.
(Zhu, 2013)	The use and perception of electronic cigarettes and snus among the U.S. population	Survey, snus, N = 10,041 adults, ages 18-65+.	10.8% of participants believed that snus was safer than cigarettes	Limitation = participants may take multiple surveys potentially inflating some findings.
(Borland, 2012)	Effects of a Fact Sheet on beliefs about the harmfulness of alternative nicotine delivery systems compared with cigarettes	Survey, ST, 59 U.S. adults, mean age (SD) 47.2 (9.7) years.	6.8% perceived ST a lot less harmful than smoking.	Limitations = small convenience samples and short period between pretest and post-test.

**Table 7.5.7-1-1: Beliefs About the Health Risks of Using the Product Relative to Other Tobacco Products, Including Those within the Same Class, and Relative to Quitting All Tobacco Use (Continued)**

Author and Date	Report Title	Study Methods and Participant Characteristics	Beliefs About the Health Risks of Using the Product Relative to Other Tobacco Products, Including Those within the Same Class, and Relative to Quitting All Tobacco Use	Comments
(Choi, 2012)	Young adults' favorable perceptions of snus, dissolvable tobacco products, and electronic cigarettes: findings from a focus group study	Focus groups, snus and dissolvable tobacco products, 66 adults, ages 18-26 years.	<p>"Participants were not in agreement on whether snus, dissolvable tobacco products, and e-cigarettes were less harmful than cigarettes."</p> <p>"Some participants were concerned that snus and dissolvable tobacco products were even more harmful than cigarettes because they come into direct contact with the mouth..."</p> <p>"Some participants perceived that these products were less harmful than cigarettes because they were smokeless."</p>	Limitations = small group size in some focus groups, dissolvables were not available in the area where research was conducted.
(Helme, 2012)	Health, masculinity and smokeless tobacco use among college-aged men	Focus groups, ST, 50 male, undergraduate, ST consumers, ages 18-22 years.	<p>"None of the males included in this study were unaware of the health risks surrounding smokeless tobacco use. In fact, all were able to describe many of the long-term detrimental consequences surrounding SLT. However, many felt that since they were not smoking cigarettes or inhaling other forms of tobacco smoke their individual use was of much less risk and therefore not something they found troubling on a day-to-day basis."</p> <p>"Some participants admitted their knowledge regarding the addictive properties of nicotine, but did not see themselves as being addicted to the product or likely to become addicted to the product:"</p>	Limitations = limited sample size, derived mostly from tobacco growing states, may limit generalizability.
(Loukas, 2012)	Who uses snus? A study of Texas adolescents	Survey, snus, 8,472 6th-12th grade students.	"...snus consumers, particularly male snus users perceived less danger associated with using snus and other tobacco products than non-snus users."	Limitation = sample limited to Texas students, cross-sectional design limits causal, time order inferences.
(Regan, 2012)	Smokeless and flavored tobacco products in the U.S.: 2009 Styles survey results	Survey, snus, and dissolvable tobacco products, 10,587 adults, ages 18-65+ years.	<p>Harm beliefs vs. cigarettes:</p> <p>Snus Dissolvables</p> <p>More harmful: 8.3% 6.6%</p> <p>As harmful: 49.9% 39.2%</p> <p>Less harmful: 4.5% 3.8%</p> <p>Unsure: 37.3% 50.3%</p>	Limitation = low response rate may cause non-responder bias.

**Table 7.5.7-1-1: Beliefs About the Health Risks of Using the Product Relative to Other Tobacco Products, Including Those within the Same Class, and Relative to Quitting All Tobacco Use (Continued)**

Author and Date	Report Title	Study Methods and Participant Characteristics	Beliefs About the Health Risks of Using the Product Relative to Other Tobacco Products, Including Those within the Same Class, and Relative to Quitting All Tobacco Use	Comments
(Sami, 2012)	Smokers' perceptions of smokeless tobacco and harm reduction	Focus groups, ST, 37 daily smokers, ages 18-50+.	"Contrary to our hypothesis that additional health information would be useful for encouraging smokers to try quitting, smokers in our study did not perceive such information as being motivational. Furthermore, smokers did not consider additional health information on the comparative risks of alternative tobacco products when making decisions about switching to SLT."	Limitation = convenience sample from Orange County, California, may limit generalizability.
(Wray, 2012)	Young adults' perceptions about established and emerging tobacco products: results from eight focus groups	Focus groups, ST, N = 67 university or community college students, mean age 21.74 years.	"Every group felt that all tobacco products are dangerous. However, some participants reported varying levels of risk for different products, while other participants maintained that all products were equally dangerous. Some felt that smokeless products are equally dangerous because "cancer is cancer," whether it occurs in the lungs or in the mouth. Alternatively, some felt that smokeless products were safer because smoke is not inhaled into the lungs."	Limitation = unique study population may limit generalizability.
(Borland, 2011)	Trends in beliefs about the harmfulness and use of stop-smoking medications and smokeless tobacco products among cigarettes smokers: Findings from the ITC four-country survey	Survey; ST; 21,207 current smokers, aged 18-24 (15.1%), 25-39 (33.4%), 40-54 (32.8%), ≥55 (18.6%). Canada, US, UK, and Australia	"In Canada and the US where SLT is legally available, only around one in six smokers believed that some SLT products could be less harmful than cigarettes."	Limitation = only cigarette smokers were recruited.
(Kiesges, 2011)	Impact of differing definitions of dual tobacco use: implications for studying dual use and a call for operational definitions	Secondary analysis of clinical trial data, ST, 36,013 Air Force recruits	"Interestingly, while dual users were 2.6 times more likely to report harm reduction by switching to ST relative to cigarette smokers, they were less likely to report a harm-reduction benefit to ST relative to ST users (OR = 0.41, CI = 0.29-0.58)."	Limitation = unique survey population may limit generalizability.
(McClave-Regan, 2011)	Smokers who are also using smokeless tobacco products in the US: a national assessment of characteristics, behaviours and beliefs of 'dual consumers'	Survey, ST, 10,108 consumers, ages 18-55+.	"The majority (63.6%) of 'dual users' also believed smokeless tobacco is as harmful as cigarettes and less often reported smokeless tobacco was less harmful than cigarettes compared to smokeless tobacco users (OR 0.21, 95% CI 0.08 to 0.54). One-quarter (22.7%) of 'dual users' did not know whether smokeless tobacco was as harmful as or less harmful than cigarettes."	Limitation = low response rate and small number of dual users limits statistical power.

**Table 7.5.7-1-1: Beliefs About the Health Risks of Using the Product Relative to Other Tobacco Products, Including Those within the Same Class, and Relative to Quitting All Tobacco Use (Continued)**

Author and Date	Report Title	Study Methods and Participant Characteristics	Beliefs About the Health Risks of Using the Product Relative to Other Tobacco Products, Including Those within the Same Class, and Relative to Quitting All Tobacco Use	Comments
(Carpenter, 2010)	A pilot randomized study of smokeless tobacco use among smokers not interested in quitting: changes in smoking behavior and readiness to quit	Clinical study; Ariva and Stonewall; N = 31 smokers uninterested in quitting; mean ages (SD) potentially reduced exposure product 42.2 (14.1) years, control 37.6 (15.1) years.	At visit 1, the control group was asked how risky is the ST product compared to cigarettes? <ul style="list-style-type: none"> <li>• Less risky = 92%</li> <li>• Equal risky = 8%</li> <li>• More risky = 0%</li> </ul>	Limitations = small sample size, no placebo control, short test period.
(McClellan, 2010)	Smokeless tobacco use among military flight personnel: a survey of 543 aviators	Survey; ST; 543 aviators; mean age (SD) 28.6 (4.81) years for current consumers, 30.2 (6.10) years for former consumers, 28.9 (5.65) years for nonconsumers.	May lead to adverse cardiovascular effects Current consumers: <ul style="list-style-type: none"> <li>• Very aware = 44</li> <li>• Somewhat or not aware = 27</li> </ul> Non-consumers: <ul style="list-style-type: none"> <li>• Very aware = 229</li> <li>• Somewhat or not aware = 77</li> </ul> May lead to cancer of the head and neck region Current consumers: <ul style="list-style-type: none"> <li>• Very aware = 59</li> <li>• Somewhat or not aware = 12</li> </ul> Non-consumers; <ul style="list-style-type: none"> <li>• Very aware = 269</li> <li>• Somewhat or not aware = 37</li> </ul>	Limitation = unique sample population may limit generalizability.
(Peiper, 2010)	University faculty perceptions of the health risks related to cigarettes and smokeless tobacco	Survey, ST, 1,610 full-time faculty at two universities, ages in years, 20-29=2%; 30-39=23%; 40-49=25%; 50-59=31%; ≥ 60=19%.	“...ST was also considered as high risk by the majority of faculty (69–87%), and at least half perceived cigarettes and ST to be equally harmful across all domains.”	Limitation = unique sample limits generalizability.
(Walsh, 2010)	Smokeless tobacco cessation cluster randomized trial with rural high school males: Intervention interaction with baseline smoking	Intervention trial, ST, 3,072 high school students (at follow-up).	Perception of risk associated with ST use in Intervention Group: <ul style="list-style-type: none"> <li>• No/slight risk = 12%</li> <li>• Moderate risk = 31%</li> <li>• Great risk = 57%</li> </ul>	Limitation = tobacco use status not confirmed by biomarkers at follow-up.
(Eaves, 2009)	Prevalence of spit tobacco use and health effects awareness in baseball coaches	Survey; “spit tobacco”; 509 baseball coaches, ages 20-29 (8.6%), 30-39 (25.5%), 40-49 (27.9%), 50-59 (28.5%), 60+ (8.6%).	No harmful effects with use: <ul style="list-style-type: none"> <li>• True = 3.3%</li> <li>• False = 95.1%</li> </ul> No one can be addicted: <ul style="list-style-type: none"> <li>• True = 2.9%</li> <li>• False = 96.1%</li> </ul> Causes oral cancer: <ul style="list-style-type: none"> <li>• True = 96.7%</li> <li>• False = 3.1%</li> </ul>	Limitations = low response rate, survey structure prevents quantification of response vs. nonresponse bias.

**Table 7.5.7-1-1: Beliefs About the Health Risks of Using the Product Relative to Other Tobacco Products, Including Those within the Same Class, and Relative to Quitting All Tobacco Use (Continued)**

Author and Date	Report Title	Study Methods and Participant Characteristics	Beliefs About the Health Risks of Using the Product Relative to Other Tobacco Products, Including Those within the Same Class, and Relative to Quitting All Tobacco Use	Comments
(Gansky, 2009)	Patterns and correlates of spit tobacco use among high school males in rural California	Survey, ST, 4,731 male high school students.	Perception of risk associated with ST use: <ul style="list-style-type: none"> <li>• No risk = 4.1%</li> <li>• Slight risk = 6.7%</li> <li>• Moderate risk = 30.4%</li> <li>• Great risk = 56.9%</li> <li>• Missing = 1.8%</li> </ul>	Limitation = low response rate.
(O'Connor, 2007)	Smokers' beliefs about the relative safety of other tobacco products: findings from the ITC collaboration	Survey, ST, 13,322 current smokers, ages 18 and over.	"About one-quarter of smokers believed that pipes, cigars, or roll-your-own cigarettes were safer than FM [factory-made] cigarettes, whereas only about 13% responded correctly that smokeless tobacco was less hazardous than cigarettes."	Limitation = study design resulted in some subjects answering questions multiple times.
(Smith, 2007)	Harm perception of nicotine products in college freshmen	Survey, ST, 411 college freshmen, mean age 18.7 years.	"Regarding smokeless nicotine products, 89.3% of respondents incorrectly perceived dip and chew to be as harmful as or more harmful than regular cigarettes..."	Limitations = cross-sectional design limits causal, time order inferences.
(Tomar, 2007)	Perceived risk of harm from cigarettes or smokeless tobacco among U.S. high school seniors	Survey, ST, 11,093 high school seniors.	"Overall, 52.7% perceived equal risk of harm from using either product, 41.3% perceived greater risk from cigarettes, and 6.1% perceived a greater risk from using ST."  "Overall, 74.0% of high school seniors perceived great risk of harm from smoking and 44.9% perceived great risk of harm from using smokeless tobacco."	Limitation = questions about risk were phrased differently for ST vs. cigarettes.
(O'Connor, 2005)	Smoker awareness of and beliefs about supposedly less-harmful tobacco products	Survey, ST, 2,028 adult current cigarette smokers in the U.S., ages 18 and over.	"In contrast, 82% of cigarette smokers were aware of SLT products, but only 10.7% of these believed that SLTs were less harmful than ordinary cigarettes."	No limitations noted.
(Haddock, 2004)	Modified tobacco use and lifestyle change in risk-reducing beliefs about smoking	One-year longitudinal survey, ST, 36,012 young adults entering the U.S. Air Force, mean age 20.1 years.	Switching from cigarette smoking to ST use was endorsed by the fewest participants as providing significant health risk reduction compared with switching to low tar cigarettes or cigars.	Limitation = unique sample population, may limit generalizability.
(Renner, 2004)	Focus groups of Y-K Delta Alaska Natives: attitudes toward tobacco use and tobacco dependence interventions	Focus groups, Iqmik, 57 Alaska natives (35 adults, 22 adolescents), mean age adult group 31 years (range, 18-63 years), mean age adolescent group 15 years (range, 11-18 years).	"There is a lack of knowledge and generally a low level of concern about the health effects for the Iqmik user or for others."  "From the focus groups of pregnant women, we learned that Iqmik is perceived as less harmful (even harmless by some) than commercial ST or cigarettes..."	Limitations = unique population and product may limit generalizability.

**Table 7.5.7-1-1: Beliefs About the Health Risks of Using the Product Relative to Other Tobacco Products, Including Those within the Same Class, and Relative to Quitting All Tobacco Use (Continued)**

Author and Date	Report Title	Study Methods and Participant Characteristics	Beliefs About the Health Risks of Using the Product Relative to Other Tobacco Products, Including Those within the Same Class, and Relative to Quitting All Tobacco Use	Comments
(Prokhorov, 2002)	Spit tobacco prevention and cessation counseling: statewide survey of health-care professionals and educators	Survey, ST, 4,089 clinicians and educators.	<p>“Although knowledge of the health effects of ST was fairly high among all subgroups, more than 10% of dentists and dental hygienists failed to report that ST use causes gum disease.”</p> <p>“More than 10% of DARE [Drug Abuse Resistance Education] officers and agricultural science teachers believed that ST use is a safe alternative to smoking.”</p>	Limitation = unique sample may limit generalizability.
(Goebel, 2000)	Correlates of youth smokeless tobacco use	Survey, ST, 1,834 total (638 in 5th grade, 634 in 8th, and 562 in 11th).	<p>ST is harmful to health:</p> <ul style="list-style-type: none"> <li>• Consumers = 74.4%</li> <li>• Non-consumers = 91.2%</li> </ul> <p>ST is safer than cigarettes</p> <ul style="list-style-type: none"> <li>• Consumers = 42.2%</li> <li>• Non-consumers = 15.5%</li> </ul>	Limitation = study limited to Appalachian population.
(Walsh, 2000)	Spit (smokeless) tobacco use by high school baseball athletes in California	Survey, ST, 1,226 high school student baseball athletes.	<p>ST would give me mouth cancer:</p> <ul style="list-style-type: none"> <li>• Slightly/very unlikely = 12%</li> <li>• Slightly/very likely = 88%</li> </ul> <p>I would become addicted to ST:</p> <ul style="list-style-type: none"> <li>• Slightly/very unlikely = 23%</li> <li>• Slightly/very likely = 77%</li> </ul>	Limitation = unique sample population may limit generalizability.
(Boyle, 1998)	Use of smokeless tobacco by young adult females	Survey, ST, 20 adult women, average age 22 years (range, 19-39 years).	<p>“All participants (n = 20) acknowledged that there are health risks associated with ST use.”</p> <p>“The most frequently cited risks included cancer (75%), gum disease (30%), and tooth loss (30%).”</p>	Limitation = small sample size.
(Kury, 1998)	Smokeless tobacco and cigarettes: differential attitudes and behavioral intentions of young adolescents toward a hypothetical new peer	Survey; ST; 562 middle school students in rural Florida; mean ages of ST condition = 13.27 years, nontobacco condition = 12.45 years, and cigarette condition = 12.97 years.	<p>Participants beliefs about ST use — ST is harmful to your health:</p> <ul style="list-style-type: none"> <li>• Agree = 79.4%</li> <li>• Not sure = 8.9%</li> </ul> <p>Participants beliefs about ST use — ST is safer than cigarettes:</p> <ul style="list-style-type: none"> <li>• Agree = 24.9%</li> <li>• Not sure = 32.8%</li> </ul>	Limitation = sample is self-selected and data are self-reported.
(Chakravorty, 1997)	Cessation related perceptions and behavior of former and current smokeless tobacco consumers	Survey, ST, 414 former and 73 current consumers of ST, typical user = 22 years.	“Among the former ST consumers, the most commonly cited motive for quitting was concern about developing health problems: 60% expressed fear of developing oral cancer or precancerous conditions, and 20% said that they had quit because they had already developed ST related mouth sores.”	Limitations = none noted.

**Table 7.5.7-1-1: Beliefs About the Health Risks of Using the Product Relative to Other Tobacco Products, Including Those within the Same Class, and Relative to Quitting All Tobacco Use (Continued)**

Author and Date	Report Title	Study Methods and Participant Characteristics	Beliefs About the Health Risks of Using the Product Relative to Other Tobacco Products, Including Those within the Same Class, and Relative to Quitting All Tobacco Use	Comments
(Fabian, 1996)	Tobacco, alcohol, and oral cancer: the patient's perspective	Survey, ST, 134 oral cancer patients, mean age 51.1 years (range, 11-92 years).	"Of the 20 patients who were aware of the causes of mouth cancer, only four were aware of chewing tobacco and two of alcohol as potential causes."	Limitation = presenting data in bar graph format limits independent secondary calculations.
(Kenny, 1996)	Survey of smokeless tobacco use in basic trainees and armor basic course officers	Survey, ST, 256 U.S. Army trainees and 98 armor officer basic course students, mean age 20.2 years (range, 17-35 years).	"The typical consumers chose moist snuff or dip, was white, and had high or moderately high levels of knowledge concerning potential health effects of ST."	Limitation = unique survey population may limit generalizability.
(Riley, 1996)	Perceived Smokeless Tobacco Addiction Among Adolescents	Survey, ST, 11,057 adolescents, Grades 9-12	"Those using SLT for 1 year or longer had perceived addiction rates of 37% and were over 12 times more likely to report being addicted than were those using for less than 1 year."	Limitations = "addiction" self-reported, no definition for "addiction"
(Daughety, 1994)	Surveying smokeless tobacco use, oral lesions and cessation among high school boys	Survey, ST, 821 11th and 12th grade boys.	ST harmful to health: <ul style="list-style-type: none"> <li>• Very unlikely = 4.6%</li> <li>• Unlikely = 6.6%</li> <li>• Likely = 34.8%</li> <li>• Very Likely = 54.0%</li> </ul>	Limitation = sample limited to eastern Iowa, may limit generalizability.
(Lee, 1994)	Psychosocial factors influencing smokeless tobacco use by teen-age military dependents	Survey, ST, 2,257 teenage military dependents, Grades 6-12.	ST is harmful to general health = 73.0% ST can cause mouth cancer = 76.1% ST can be addictive = 73.1 ST causes as much or more harm than smoking = 75.3%	Limitations = differences in populations sampled and questionnaire content limits generalizability.
(Lopez, 1994)	Smokeless tobacco consumption by Mexican-Americans and Anglo-Americans in southwestern New Mexico	Survey; chewing tobacco and snuff; 210 Anglo-Americans and Mexican-Americans; average ages of Anglo-American females 52 years, Mexican-American females 45 years, Anglo-American males 41 years, Mexican-American males 31 years.	Did not know ST caused cancer among; Mexican-American: <ul style="list-style-type: none"> <li>• Snuff consumers = 75%</li> <li>• Chewing tobacco consumers = 42%</li> </ul> Anglo-American: <ul style="list-style-type: none"> <li>• Snuff consumers = 27%</li> <li>• Chewing tobacco consumers = 14%</li> </ul>	Limitation = findings generalized to only one county in New Mexico.
(Backinger, 1993)	Knowledge, intent to use, and use of smokeless tobacco among sixth grade school children in six selected U.S. sites	Survey, ST, 781 6th grade students in 15 schools.	"From these survey results, it appears that sixth grade students are aware of the health risks of ST use, that is, ST is not a safe alternative to cigarettes, and ST use is an increased risk for cancer."	Limitation = study is not representative of Indian and non-Indian 6th grade students in the United States.
(Gottlieb, 1993)	Patterns of smokeless tobacco use by young adolescents	Survey; ST; 2,018 students in 6th-9th grades; ages 11-12 (7.3%), 13 (11.6%), 14 (14%), 15-16 (18.3%).	Percentage of ST consumers who believe effects of snuff to be: <ul style="list-style-type: none"> <li>• Serious = 45.2%</li> <li>• Mild = 57%</li> <li>• Good = 80%</li> </ul>	Limitations = sample limited to one state, definition of ST user not clear.

**Table 7.5.7-1-1: Beliefs About the Health Risks of Using the Product Relative to Other Tobacco Products, Including Those within the Same Class, and Relative to Quitting All Tobacco Use (Continued)**

Author and Date	Report Title	Study Methods and Participant Characteristics	Beliefs About the Health Risks of Using the Product Relative to Other Tobacco Products, Including Those within the Same Class, and Relative to Quitting All Tobacco Use	Comments
(Westman, 1993)	Smokeless tobacco use in an outpatient veteran population	Survey, ST, 20 male patients who had a high prevalence of ST use (45%), mean age 61 years.	“Most smokeless tobacco users thought chewing was harmful to their health (N=10), and all but one stated they would consider quitting smokeless tobacco if they were told to do so by a health care professional.”	Limitation = small sample size.
(Gottlieb, 1992)	Attitudes, subjective norms and models of use for smokeless tobacco among college athletes: Implications for prevention and cessation programming	Survey, ST, 338 male university varsity and intramural football and baseball players, average age 20.4 years. .	“Non-intenders had stronger beliefs about the health and social consequences of SL T use and placed more value on health concerns than did intenders.”	Limitation = limited measurement of addiction-related outcomes
(Rinchuse, 1992)	Demographic and psychosocial characteristics of western Pennsylvania school-age tobacco consumers	Survey, ST, 2,189 school-age tobacco consumers, ages- 7 or younger=0.2%; 8=0.1%; 9=5.4%; 10=9.4%; 11=8.7%; 12=12.2%; 13=12.8%; 14=11.5%; 15=12.0%; 16 or older = 27.6%.	Percentage of students who believe ST is: <ul style="list-style-type: none"> <li>• Just as harmful as cigarettes = 71.5%</li> <li>• More harmful than cigarettes = 14.9%</li> <li>• Less harmful than cigarettes = 11.3%</li> <li>• Not harmful = 2.4%</li> </ul>	Limitation = sample from western Pennsylvania, may limit generalizability.
(Riley, 1991)	The role of race and ethnic status on the psychosocial correlates of smokeless tobacco use in adolescent males	Survey, ST, 5,374 adolescent high school males. Limitation = sample male only, may limit generalizability.	“The perceived negative consequences and health behavior factors had significant but less powerful associations with smokeless tobacco use.”	Limitation = sample male only, may limit generalizability.
(Brownson, 1990)	Patterns of cigarette and smokeless tobacco use among children and adolescents	Survey; snus or chewing tobacco; 5,431 students in Grades 5, 8, and 12.	Belief that ST causes mouth cancer: <ul style="list-style-type: none"> <li>• Male consumers = 75%</li> <li>• Male non-consumers = 80%</li> <li>• Females = 80%</li> </ul> Belief that ST is safer than smoking: <ul style="list-style-type: none"> <li>• Male users = 51%</li> <li>• Male non-users = 15%</li> <li>• Females = 6%</li> </ul>	Limitations = subjects only from Missouri, which may limit generalizability.
(Riley, 1990)	Smokeless tobacco use in adolescent females: prevalence and psychosocial factors among racial/ethnic groups	Survey, ST, 5,683 adolescent females, average age (SD) 16.03 (1.01) years.	“Perceived negative consequences, which contributed minimally to the prediction of initial smokeless tobacco use, was a major predictor of level of use in those who have tried smokeless tobacco. Knowledge of these negative consequences appears to have little impact in dissuading initial experimentation with smokeless tobacco but may have important implications for decreasing level of use.”	Limitation = sample female only, may limit generalizability.

**Table 7.5.7-1-1: Beliefs About the Health Risks of Using the Product Relative to Other Tobacco Products, Including Those within the Same Class, and Relative to Quitting All Tobacco Use (Continued)**

Author and Date	Report Title	Study Methods and Participant Characteristics	Beliefs About the Health Risks of Using the Product Relative to Other Tobacco Products, Including Those within the Same Class, and Relative to Quitting All Tobacco Use	Comments															
(Severson, 1990)	The inside scoop on the stuff called snuff: an interview study of 94 adult male smokeless tobacco consumers	Survey, ST, 94 adult males, mean age (SD) of chewers 37 (11.8) years, mean age (SD) of snuff consumers 32 (14.3) years.	<p>“Ninety-six percent of snuff users (N=81) acknowledged that there are health risks associated with the use of ST.”</p> <p>Believed that chewing was less harmful than smoking = 55%</p> <p>Believed that chewing and smoking were equally harmful = 32%</p> <p>Didn’t know which was more harmful = 10%</p> <p>Thought that chewing was more harmful than smoking = 4%</p>	No limitations noted.															
(Ary, 1989)	An in-depth analysis of male adolescent smokeless tobacco consumers: interviews with users and their fathers	Survey, ST, 191 male adolescent ST consumers, mean age 14.3 years.	<p>“...92% of the respondents believed that there were health risks associated with ST use.”</p>	Limitations-modest number of current ST consumers and self-selected sample															
(Boyle, 1989)	Adolescent knowledge of smokeless tobacco’s health consequences	Survey; ST; 841 8th grade students, aged 12 years (1.4%), 13-14 years (85.5%), 15 years (11.5%), 16 years (1.6%).	<p>“Students who had never tried smokeless tobacco were more likely to consider high blood pressure and harm to unborn babies as possible health concerns.”</p> <p>Regular consumers identified lip cancer more specifically (98%) than the two nonuser groups.</p> <p>72% of participants believed ST was addictive.</p> <p>“Using chewing tobacco is safer than smoking cigarettes.”</p> <p>%True %False</p> <p>Never used 31 69</p> <p>Tried 38 62</p> <p>Regular users 50 50</p>	Limitations = study is somewhat dated and may not reflect current perceptions.															
(Glover, 1989)	Smokeless tobacco use among American college students	Survey, ST, 5,894 college students.	<p>Health - Smokeless harms health question to smokeless users and non-users.</p> <table border="0"> <tr> <td></td> <td>Users</td> <td>Non-users</td> </tr> <tr> <td>very harmful</td> <td>14%</td> <td>44%</td> </tr> <tr> <td>Somewhat harmful</td> <td>43%</td> <td>42%</td> </tr> <tr> <td>slightly harmful</td> <td>36%</td> <td>12%</td> </tr> <tr> <td>Not harmful</td> <td>7%</td> <td>2%</td> </tr> </table>		Users	Non-users	very harmful	14%	44%	Somewhat harmful	43%	42%	slightly harmful	36%	12%	Not harmful	7%	2%	Limitations = unconventional definition of ST user, study is dated, use rates seem much higher than current rates.
	Users	Non-users																	
very harmful	14%	44%																	
Somewhat harmful	43%	42%																	
slightly harmful	36%	12%																	
Not harmful	7%	2%																	
(Novotny, 1989)	Smokeless tobacco use in the United States: the adult use of tobacco surveys	Survey, chewing tobacco, and snuff, 13,031 persons from the 1986 Adult Use of Tobacco Survey, ages 17 years and over.	<p>Believe that ST is a health hazard:</p> <ul style="list-style-type: none"> <li>• Consumers = 77.4%</li> <li>• Non-consumers = 83.4%</li> </ul>	Limitation = small number of consumers limits subgroup analyses.															

**Table 7.5.7-1-1: Beliefs About the Health Risks of Using the Product Relative to Other Tobacco Products, Including Those within the Same Class, and Relative to Quitting All Tobacco Use (Continued)**

Author and Date	Report Title	Study Methods and Participant Characteristics	Beliefs About the Health Risks of Using the Product Relative to Other Tobacco Products, Including Those within the Same Class, and Relative to Quitting All Tobacco Use	Comments
(Riley, 1989)	Typology and correlates of smokeless tobacco use	Survey, ST, 3,725 high school students, Grades 9-12.	"...96.8% agreed that smokeless tobacco can be harmful to teeth and gums. Significantly fewer agreed that smokeless tobacco causes mouth cancer. Compared to non-consumers, those trying smokeless tobacco were more likely to disagree that smoking causes lung cancer and that smokeless tobacco can be harmful to teeth and gums."	Limitation = study somewhat dated, may not reflect current perceptions.
(Williams, 1989)	Adolescent smokeless tobacco use: relationship between epidemiologic and cognitive factors	Survey, ST, 362 7th and 8th grade students.	<ul style="list-style-type: none"> <li>• At baseline, 91% of students believed ST caused oral cancer.</li> <li>• At baseline, 22% of students know why ST was addictive.</li> </ul>	Limitation = study is somewhat dated, may not reflect current perceptions.
(Wisniewski, 1989)	Comparative patterns of smokeless tobacco usage among major league baseball personnel	Survey, ST, 528 players, 80 managers/coaches, and 62 trainers, ages 20-47 years.	"More than three-quarters (81%) of the baseball players, managers/coaches and trainers completing the survey indicated that they felt smokeless tobacco can be harmful to their health."	Limitation = unique study sample, may not be generalizable.
(Creath, 1988)	The prevalence of smokeless tobacco use among adolescent male athletes	Survey, ST, 995 high school and junior high school adolescent male football players in Alabama, median age 15.25 years (range, 11-18 years).	"When the athletes were asked if they believed dipping tobacco could be harmful to their health, 53.9% strongly agreed, 39.8% agreed, 5.5% disagreed, and 0.8% strongly disagreed. Therefore, 93.7% believed smokeless tobacco could be harmful and 6.3% did not believe it could be harmful."	Limitations = study is somewhat dated, may not represent current perceptions.
(Flanders, 1988)	Smokeless tobacco prevalence and prevention in Illinois	Survey; ST; 7,118 children in Grades 5, 7, 9, and 11; ages 9-19 years	<p>Tobacco product thought to be most harmful to a person's health</p> <ul style="list-style-type: none"> <li>• Chewing tobacco = 9.3%</li> <li>• Snuff = 12.3%</li> <li>• Cigarettes = 78.4%</li> </ul> <p>Can using ST cause cancer?</p> <ul style="list-style-type: none"> <li>• Yes = 81.1%</li> <li>• No = 3.6%</li> <li>• Don't know = 15.3%</li> </ul>	Limitations not noted.
(Gross, 1988)	Smokeless tobacco: health hazard on the rise	Survey, ST, 60 patients and 170 physicians.	<p>"...more than 80% of physicians were aware that the use of smokeless tobacco is rising and potentially harmful..."</p> <p>"Fifty patients (83%) believed cigarette smoking had adverse health effects, whereas only 18 (30%) believed the same was true of smokeless tobacco."</p>	Limitation = study if dated, may not reflect current perceptions.
(Schroeder, 1988)	Proposed definition of a smokeless tobacco user based on 'potential' nicotine consumption	Survey, ST, 50 adult male smokeless tobacco consumers, ages 18-85 years.	<p>Thought ST was harmful:</p> <ul style="list-style-type: none"> <li>• Light ST consumers = 93%</li> <li>• Moderate ST consumers = 77%</li> <li>• Heavy ST consumers = 75%</li> </ul>	Limitation = study is somewhat dated, may not reflect current perceptions.

**Table 7.5.7-1-1: Beliefs About the Health Risks of Using the Product Relative to Other Tobacco Products, Including Those within the Same Class, and Relative to Quitting All Tobacco Use (Continued)**

Author and Date	Report Title	Study Methods and Participant Characteristics	Beliefs About the Health Risks of Using the Product Relative to Other Tobacco Products, Including Those within the Same Class, and Relative to Quitting All Tobacco Use	Comments												
(Centers for Disease Control and Prevention, 1987)	Smokeless tobacco use in rural Alaska	Survey, ST, 4,965 boys and girls K-12th grades, ages 5-18 years.	“Sixty percent of respondents indicated that they were aware of health risks associated with smokeless tobacco use, and 93% of those respondents listed cancer as a possible health problem.”	Limitation = study limited to unique population and ST products.												
(Cohen, 1987)	Experimentation with smokeless tobacco and cigarettes by children and adolescents: relationship to beliefs, peer use, and parental use	Survey, ST, 2,185 students, Grades 3-12.	Percentages of students that believe that ST is harmful: <ul style="list-style-type: none"> <li>• Male: 45%-91%</li> <li>• Female: 61%-97%</li> </ul> (Percentages vary by grade level.)	Limitation = study somewhat dated, may not reflect current perceptions.												
(Guggenheimer, 1987)	A profile of tobacco use by teenage boys	Survey, ST, 394 teenage males, ages 12-18 years.	Opinion of 157 ST consumers about the harmfulness of ST: <ul style="list-style-type: none"> <li>• No harm in using = 13%</li> <li>• Less harmful than cigarettes = 86%</li> <li>• No more harmful than cigarettes = 45%</li> <li>• More harmful than cigarettes = 13%</li> </ul> Opinion of 137 ST abstainers about the harmfulness of ST: <ul style="list-style-type: none"> <li>• No harm in using = 3%;</li> <li>• Less harmful than cigarettes = 35%;</li> <li>• No more harmful than cigarettes = 50%;</li> <li>• More harmful than cigarettes = 49%</li> </ul>	Limitation = study is dated, may not reflect current perceptions.												
(Marty, 1986a)	Patterns of smokeless tobacco use in a population of high school students	Survey, ST, 901 high school students, Grades 10-12.	Perceptions of health effects of ST: <table style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td>No/little</td> <td>Moderate/Great</td> </tr> <tr> <td>Consumers:</td> <td>35.5%</td> <td>64.5%</td> </tr> <tr> <td>Nonconsumers:</td> <td>13.0%</td> <td>87.0%</td> </tr> <tr> <td>Total:</td> <td>17.0%</td> <td>83.0%</td> </tr> </table>		No/little	Moderate/Great	Consumers:	35.5%	64.5%	Nonconsumers:	13.0%	87.0%	Total:	17.0%	83.0%	Limitation = study is dated, may not reflect current perceptions.
	No/little	Moderate/Great														
Consumers:	35.5%	64.5%														
Nonconsumers:	13.0%	87.0%														
Total:	17.0%	83.0%														
(Marty, 1986b)	Prevalence and psychosocial correlates of dipping and chewing behavior in a group of rural high school students	Survey, ST, 179 students, mean age 15.9 years (range, 15-19 years).	Non-consumers were more likely than consumers to believe that ST had at least had a moderate effect on one’s health.	Limitation = study is dated, may not reflect current perceptions.												
(Schinke, 1986)	Smoking and smokeless tobacco use among adolescents: trends and intervention results	Prospective study with 2-year follow-up, ST, 1,281 5th and 6th grade students from western Washington state schools.	“...youths were one-half as likely to regard smokeless tobacco use as harmful as they did smoking. Just one in three users of smokeless tobacco perceived it as unhealthy; one in five saw the habit as personally risky.”	Limitation = study is somewhat dated, may not reflect current perceptions												
(Chassin, 1985)	Psychosocial correlates of adolescent smokeless tobacco use	Survey, ST, 323 high school students, mean age 16.35 years.	“Smoking was seen as more a cause of lung cancer, heart disease, high blood pressure, nicotine addiction, and loss of taste and smell than was chewing. Chewing was, however, seen as more a cause of gum disease and mouth cancer than smoking...”	Limitation = limited presentation of quantitative data.												

**Table 7.5.7-1-1: Beliefs About the Health Risks of Using the Product Relative to Other Tobacco Products, Including Those within the Same Class, and Relative to Quitting All Tobacco Use (Continued)**

Author and Date	Report Title	Study Methods and Participant Characteristics	Beliefs About the Health Risks of Using the Product Relative to Other Tobacco Products, Including Those within the Same Class, and Relative to Quitting All Tobacco Use	Comments
(Schaefer, 1985)	Patterns of use and incidence of smokeless tobacco consumption in school-age children	Survey, ST, N=5,392 junior and senior high school students.	<p>“[C]an dipping and/or chewing cause cancer?”</p> <ul style="list-style-type: none"> <li>• Yes = 67%</li> <li>• Don't know = 12%</li> <li>• No = 27%</li> </ul> <p>“[H]ow harmful is dipping/chewing to a person's health?”</p> <ul style="list-style-type: none"> <li>• Very harmful = 40%</li> <li>• Somewhat harmful = 40%</li> <li>• Slightly harmful = 15%</li> <li>• Not harmful = 3%</li> </ul>	Limitation = study is somewhat dated, may not reflect current perceptions.

**Table 7.5.7-1-2: Consumer’s Beliefs About the Health Risks of Using the Product Relative to Cessation Aids**

Author and Date	Report Title	Study Methods and Participant Characteristics	Consumer’s Beliefs About the Health Risks of Using the Product Relative to Cessation Aids	Comments															
(Regan, 2012)	Smokeless and flavored tobacco products in the U.S.: 2009 Styles survey results	Survey, snus, and dissolvable tobacco products, 10,587 adults, ages 18-65+ years.	Harm beliefs vs. NRT or non-nicotine medications: <table style="margin-left: 20px;"> <tr> <td></td> <td>Snus</td> <td>Dissolvables</td> </tr> <tr> <td>More harmful:</td> <td>24.2%</td> <td>20.5%</td> </tr> <tr> <td>As harmful:</td> <td>22.1%</td> <td>23.6%</td> </tr> <tr> <td>Less harmful:</td> <td>1.7%</td> <td>1.9%</td> </tr> <tr> <td>Unsure:</td> <td>51.9%</td> <td>54.0%</td> </tr> </table>		Snus	Dissolvables	More harmful:	24.2%	20.5%	As harmful:	22.1%	23.6%	Less harmful:	1.7%	1.9%	Unsure:	51.9%	54.0%	Limitation = low response rate may cause non-responder bias.
	Snus	Dissolvables																	
More harmful:	24.2%	20.5%																	
As harmful:	22.1%	23.6%																	
Less harmful:	1.7%	1.9%																	
Unsure:	51.9%	54.0%																	
(Shiffman, 2007)	Smokers’ preferences for medicinal nicotine vs smokeless tobacco	Survey, ST, 521 smokers ages 25-50+ years.	Some subjects preferred medicinal nicotine over ST because they believed it offered health advantages (13%; referring to the safety of the product).	Limitation = participants reacted to verbal concepts without seeing or trying products.															
(Smith, 2007)	Harm perception of nicotine products in college freshmen	Survey, ST, 421 college freshmen, mean age 18.7 years.	Percent respondents who perceived a NRT product to be as harmful or more harmful than a regular cigarette: <ul style="list-style-type: none"> <li>• Nicotine patch = 19.6%</li> <li>• Nicotine gum = 24.1%</li> <li>• Nicotine inhaler = 52.9%</li> </ul>	Limitations = cross-sectional design limits causal, time order inferences.															
(Chakravorty, 1997)	Cessation related perceptions and behavior of former and current smokeless tobacco consumers	Survey, ST, 414 former and 73 current consumers of ST, typical user = 22 years.	ST consumers had negative perceptions and were unlikely to use pharmaceutical aids for cessation of ST use.	Limitations = none noted.															

## 7.5.7-1.8.Literature Cited

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