



June 2007

Smokeless Tobacco and *Snus*: The Current Evidence for Health Risks

What is Smokeless Tobacco?

Smokeless tobacco, a leaf tobacco product, provides nicotine to users through absorption across the membranes of the mouth or nose. Two main forms of smokeless tobacco are used in North America: chewing tobacco and oral snuff. The predominant form is oral snuff, which is sold in powder form as dipping snuff or in small pre-measured pouches that are placed in the mouth between the cheek and gum. Swedish *snus* is a type of oral snuff (see below).

Smokeless tobacco contains sweeteners, flavourings, abrasives, salt and other chemicals. Over two dozen cancer-causing agents have been identified in traditional smokeless tobacco. The primary carcinogens are tobacco-specific nitrosamines (TSNAs)¹ but the level of TSNAs is affected by processing, refrigeration and length of storage.²

Health Effects of Traditional North American Smokeless Tobacco

While health risks for smokeless tobacco are lower than for cigarettes, use of smokeless tobacco has a number of serious health consequences:

- An increased risk of oral cancer (up to 50-fold for cheek and gum cancer among long-term users),
- Soft tissue lesions including oral leukoplakias, thickened white patches on the cheek, gums or tongue that can be precursors to cancer,
- Periodontal disease, including receding gums, and loss of tooth structure,
- Nicotine addiction,
- Possible contribution to the development of cardiovascular disease, peripheral vascular disease, hypertension, peptic ulcers, and fetal morbidity and mortality.

What is *Snus*?

Snus is the Swedish word for moist snuff. It is manufactured and mainly consumed in Sweden and Norway. *Snus* is subjected to a heating treatment process that sharply reduces microorganism content; no fermentation has been used in its production since 1981. This processing method and refrigerated storage reduce the formation of nitrates and nitrosamines, resulting in a product low in TSNAs.²

A Recent Systematic Review on Health Effects of *Snus*

A review of the health effects of Swedish *snus* was released in New Zealand in March 2007.³ The review found that *snus* use is associated with a lower risk of several types of cancer compared to cigarette smoking and has no significantly increased risk of cardiovascular disease. However, there are several limitations to the studies discussed below, and there are many unanswered questions about the long term safety of *snus* and the role it might play, if any, in reducing smoking.

Among the studies reviewed, certain types of *snus* use were linked to significantly higher risks of cancer and heart disease. For example, one study found a two-fold risk of esophageal cancer with moderately

intense *snus* use; another found a two-fold risk of ischemic heart disease and cardiovascular disease among middle-aged men who used *snus* exclusively. Many other findings relating to oral cancer and stroke do not show statistical significance, but the substantial Odds Ratios (1.7-1.9) are a cause for concern and suggest the need for larger studies with longer follow-up.

Limitations of the Evidence

The New Zealand review included only twelve studies of Swedish *snus*: six on cancer and six on cardiovascular disease, all case-control studies, except for one retrospective cohort study. Small sample sizes and failure to adequately control for potential confounders, such as cigarette smoking, alcohol use, or exposure to second hand smoke, limited the findings of some studies. Not included in this review was a recent large well-controlled retrospective cohort study of *snus* users that showed a doubling of risk of pancreatic cancer, but no increased risk of oral or lung cancer compared to those who had never used tobacco.⁴

Discussion

Potential health hazards for smokeless tobacco products clearly exist, more so for traditional smokeless tobacco products. Although *snus* contains TSNAs at relatively lower levels than conventional smokeless tobacco, evidence points to increased risk of some cancers and heart disease. Further, there is no guarantee that products marketed as *snus* in North America will continue to be processed or stored in the same way as in Sweden, which could result in increased levels of TSNAs.

The long-term health effects of *snus* use starting early in life are also unclear. This has become a concern as new types of smokeless *snus* are introduced to North America (e.g., Camel *Snus*, Marlboro *Snus*, Taboka), and some of these products are clearly aimed at youth (e.g., Taboka packaging resembles a cell phone).

Although smokeless tobacco has lower risks than cigarettes, its potential role in reducing smoking is unknown. Widespread substitution of smokeless tobacco, particularly *snus*, for cigarettes would likely reduce the overall health burden of tobacco among continuing tobacco users. Smokeless tobacco is already widely available and advertised in Canada, yet regular use remains at less than 1%. Heavy promotion would be required to persuade current smokers to switch, but might encourage new smokeless tobacco users. In fact, smokeless tobacco has been marketed as an alternative to smoking in places where smoking is prohibited rather than as a substitute for cigarettes. Few women use smokeless, so this would not likely be an option for most. Pharmaceutical quitting aids such as nicotine gum, or the patch, provide nicotine but contain extremely low or no TSNAs^{5,6} and are typically used for short periods, while smokeless use is not usually temporary. Further research is needed to assess the health hazards of various smokeless tobacco products, their impact on the uptake of smoking and their utility, if any, as an aid to quitting.

References

1. International Agency for Research on Cancer. Smokeless tobacco and tobacco-specific nitrosamines. In: IARC Monographs on the Evaluation of Carcinogenic Risks to Humans (Vol 89) Lyon, France: In press 2006.
2. Savitz DA, Meyer RE, Tanzer JM, Mirvish SS, Lewin F. Public health implications of smokeless tobacco use as a harm reduction strategy. *Am J Public Health* 2006;93:1934-9.
3. Broadstock M. Systematic review of the health effects of modified smokeless tobacco products. *New Zealand Health Technology Assessment Report* 2007;10(1).
4. Luo J, Ye W, Zendehdel K, et al. Oral use of Swedish moist snuff (*snus*) and risk for cancer of the mouth, lung, and pancreas in male construction workers: a retrospective cohort study. *Lancet* 2007;369:2015-20.
5. Stepanov I, Jensen J, Hatsukami D, Hecht SS. Tobacco-specific nitrosamines in new tobacco products. *Nicotine Tob Res* 2006;8:309-13.
6. Hatsukami DK, Lemmonds C, Zhang Y, et al. Evaluation of carcinogen exposure in people who used "reduced exposure" tobacco products. *J Natl Cancer Inst* 2004;96:844-52.