

SUMMARY OF HEALTH EFFECTS OF SWEDISH SNUS

| Health Effect | Summary of Available Data |
|---------------------------|---|
| Esophageal cancer | <ul style="list-style-type: none"> ▪ The evidence that the use of Swedish snus causes esophageal cancer is contradictory. Four analytic epidemiology studies have examined the relationship between snus use and esophageal cancer; one found evidence of a significant association with one type of esophageal cancer (squamous cell), but not another type (esophageal adenocarcinoma). ▪ An international research group concluded that the evidence supports a causal relationship between snus use and esophageal cancer in humans. An author of a meta-analysis (a study that combines results of several epidemiological studies that address a similar hypothesis) also concluded that the available evidence points to a causal association of snus with esophageal cancer, while the author of a second meta-analysis concluded that the analyses show no real indication of an effect of snus in Scandinavia. |
| Kidney and bladder cancer | <ul style="list-style-type: none"> ▪ The available evidence that use of Swedish snus is associated with kidney or bladder cancers is inadequate because this relationship has not been studied extensively. ▪ A single cohort study found that snus use was not associated with increased risk of these cancers (Boffetta et al. 2005). ▪ A recent review and two public health agency reports suggest that smokeless tobacco in general (including snus) is not associated with kidney or bladder cancers. |
| Lung cancer | <ul style="list-style-type: none"> ▪ The available evidence suggests that use of Swedish snus is not associated with an increased risk of lung cancer. Three analytic epidemiology studies have examined this relationship; none found an increased risk. ▪ Lung cancer mortality rates among men in Sweden are among the lowest in Europe, and this has been attributed to the low smoking rate among Swedish males. ▪ A recent meta-analysis (a study that combines results of several studies that address a similar hypothesis) and public health agency report concluded that the evidence does not indicate a clear relationship between lung cancer and snus use. |
| Oral cancer | <ul style="list-style-type: none"> ▪ The available evidence suggests that use of Swedish snus is not associated with an increased risk of oral cancer. Three high-quality epidemiology studies specifically examined the possibility that use of snus causes oral cancer, and found no relationship. Of three additional studies that looked at the development of multiple cancer types and an association with snus use, only one study found a significant association with oral cancer. ▪ Two public health agency reports have concluded that there is “sufficient evidence” that smokeless tobacco use causes oral cancer in humans; however, both reviews combine data from studies of different types of smokeless tobacco from around the world which have known composition differences. ▪ Three meta-analyses (a study that combines results of several studies that address a similar hypothesis) restricted to Swedish snus did not find a significantly increased risk of oral cancer. |

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| Pancreatic cancer | <ul style="list-style-type: none"> ▪ Evidence from available studies of Swedish snus and risk of pancreatic cancer is limited because of contradictory findings in the two available studies. A recent study of smokeless tobacco products used in Western countries did not observe an increased risk of pancreatic cancer. ▪ Two public health agency reports have concluded that there is “sufficient evidence” that smokeless tobacco use causes pancreatic cancer in humans, but these conclusions were drawn before the most recent study of smokeless tobacco and pancreatic cancer was available. ▪ Two recent meta-analyses (a study that combines results of several studies that address a similar hypothesis) reported an increased risk of pancreatic cancer, while a third did not. Again, these analyses were conducted prior to publication of the most recent study. ▪ Much debate remains in the scientific community, so further research needs to be conducted before the question of whether or not the use of Swedish snus leads to increased risk of pancreatic cancer can be conclusively answered. |
| Stomach cancer | <ul style="list-style-type: none"> ▪ The available evidence suggests that use of Swedish snus is not associated with an increased overall risk of stomach cancer; however there is limited evidence that use of Swedish snus may be associated with an increased risk of one specific type of stomach cancer (noncardia, the lower portion of stomach). ▪ Five epidemiology studies conducted in Scandinavia have examined this relationship. None found that use of snus was associated with any significant increase in risk of overall or cardia stomach cancer (cardia is the upper portion of the stomach), but one study found an elevated risk for the noncardia subtype of stomach cancer. Additional research will help resolve this uncertainty. ▪ A recent meta-analysis (a study that combines results of several studies that address a similar hypothesis) concluded that the evidence does not indicate an effect of smokeless tobacco (including snus) use on the risk of stomach cancer. |
| Body weight | <ul style="list-style-type: none"> ▪ Limited research has suggested that use of Swedish snus may be associated with weight loss in some circumstances or may play a role in limiting the weight gain that is often seen after quitting smoking. Other research indicates that use of snus may be associated with weight gain. ▪ Overall, the results are mixed and the data suggest a possible relationship between snus use and effects on body weight, though the remaining effects of previous smoking habits may have complicated this relationship. ▪ No firm conclusions can be drawn at this time. It is likely that there will be more research on this topic, given the significance of body weight as a public health issue, and the fact that some people are deterred from trying to quit smoking because they fear gaining weight. |

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| Cardiovascular effects | <ul style="list-style-type: none"> ▪ The majority of the available evidence suggests that use of Swedish snus is not associated with increased risk of cardiovascular diseases, such as heart attacks (myocardial infarction). More than ten epidemiology studies have examined the relationship between use of Swedish snus and cardiovascular disease incidence or mortality (death) and found no significant association; however, two studies, of one cohort, reported that snus use may be associated with increased risk of fatal myocardial infarction or overall ischemic heart disease. ▪ An international research group concluded that the use of snus does not increase the risk of cardiovascular disease, although it may increase cardiovascular disease mortality. An author of a meta-analysis (a study that combines results of several studies that address a similar hypothesis) concluded that there is no clear evidence that snus is associated with cardiovascular disease. The authors of a second meta-analysis also found no evidence of increased overall cardiovascular disease, however, a small signification association was observed for fatal myocardial infarction (death from heart attack). ▪ The relationship between use of snus and hypertension (chronic elevated blood pressure) is unclear. Two studies (of the same population) suggest that snus use is associated with hypertension. ▪ Snus use has not been associated with other risk factors for cardiovascular disease, such as atherosclerosis (buildup of fat in the arteries). ▪ There is evidence that Swedish snus may cause transient changes in the cardiovascular system during use (such as increased blood pressure and elevated heart rate). These changes reverse when use of snus ceases. ▪ All the available evidence indicates that any increased risk of cardiovascular disease and hypertension that may be conferred by use of snus is substantially less than that conferred by cigarette smoking. |
| Diabetes and Metabolic Syndrome | <ul style="list-style-type: none"> ▪ There is some evidence suggesting that heavy use of Swedish snus is associated with metabolic syndrome, diabetes, or its precursor conditions. Other evidence suggests no associations with these conditions. ▪ Six epidemiology studies have examined the relationship between use of Swedish snus and diabetes or metabolic syndrome. Three studies found an association between these conditions among heavy snus users, but the three other studies found no association. ▪ Additional studies are needed to fully understand the relationship between use of snus and risk of developing diabetes and metabolic syndrome. |

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| Gastrointestinal conditions | <ul style="list-style-type: none"> ▪ The available evidence suggests that use of Swedish snus is not associated with any of a variety of gastrointestinal conditions, including heartburn, peptic ulcer, Crohn's disease, irritable bowel syndrome, gastroesophageal reflux symptoms (including heartburn), dyspepsia, epigastric pain, abdominal pain, esophagitis, or gallstones. While one study found that use of Swedish snus is associated with a significantly increased risk of ulcerative colitis, another found no association. ▪ Four epidemiology studies done in Scandinavia have specifically examined whether snus is associated with gastrointestinal conditions, while a fifth study investigated chronic inflammatory diseases including some gastrointestinal diseases. None found that use of snus was associated with any significant increase in risk of the outcomes listed above, after the effect of smoking was ruled out. |
| Noncancerous oral conditions | <ul style="list-style-type: none"> ▪ Swedish snus causes a characteristic type of oral mucosal lesion. These lesions are considered to be harmless and regress following cessation of snus. There is no evidence that they progress to cancer, even with long-term use. ▪ There is no evidence that snus use is associated with dental caries, tooth wear, tooth loss, periodontitis, or gingivitis. There is weak and conflicting evidence that suggests snus use may be associated with gingival recession. ▪ Some studies have reported that these conditions occur more often among snus users than non-users, but the studies have significant weaknesses and firm conclusions cannot be drawn. |
| Pregnancy outcomes | <ul style="list-style-type: none"> ▪ An international research group concluded that the data on reproductive effects in relation to oral tobacco use during pregnancy are too sparse to allow conclusions, however four additional studies have been conducted since this review was published. ▪ Five epidemiology studies have been conducted on the association between snus use and pregnancy outcomes. The most recent studies did not find an increased risk of preeclampsia, but did report significantly increased risks of preterm birth and stillbirth. An additional study shows that breastfed infants of women who use snus are exposed to nicotine, but the significance of this exposure is not known. ▪ The single available study of male reproductive parameters suggests that snus does not affect male reproductive factors. ▪ Researchers will undoubtedly continue to investigate these issues. The wisest course for women who are pregnant or breastfeeding is to avoid exposure to nicotine through any source. |
| Stroke | <ul style="list-style-type: none"> ▪ The available evidence suggests no overall increased risk of stroke among users of Swedish snus. ▪ Seven analytic epidemiology studies have been done. None found that snus users were more likely to have all types of stroke or hemorrhagic stroke than people who had never used snus, but one study found an elevated risk for fatality following one type of stroke (ischemic). ▪ A recent meta-analysis (a study that combines results of several studies that address a similar hypothesis) reported no overall increased risk of stroke or fatal stroke among Swedish snus users. |