



Figure above: Swiss Dental Journal SSO: Snus Sachets and Loose Ground Tobacco (Sieber et al., 2017)

Snus

Fact Sheet

Snus is a smokeless tobacco product that has gained popularity among youth. Snus produces a similar nicotine dependence to smoking and has no advantages over cigarettes or other electronic nicotine delivery products, due to the risk of inducing, maintaining, and reinforcing combustible cigarette consumption, as well as major risks to oral health.

What is Snus?

Snus is the name given to a form of smokeless snuff tobacco traditionally widespread in Sweden. It is a moist, ground oral tobacco product in small sachets similar to teabags, typically placed between the upper lip and the gum. Snus is typically held in the mouth (without chewing) for approximately 30 minutes before it is discarded.^{2,3} Typically, added ingredients include sodium chloride, humectants (substances used to keep the snus moist), sodium bicarbonate, and flavouring. Although different products vary in their pH levels, snus typically has a pH in the range 7.8–8.5, in order to ensure that nicotine is rapidly absorbed through the mucosal membrane. For example, one study found that a leading Swedish snus brand had a higher pH and therefore a more efficient nicotine delivery than those with a lower pH.^{2,4} Today, more tobacco-free snus containing nicotine is entering the market.



Snus is Not a Healthier Alternative to Smoking

Due to the increased pressure by public health authorities to reduce smoking, the tobacco industry has marketed numerous products as being less harmful than conventional cigarettes, including snus. Snus probably does not generate the same level of toxicants as smoked tobacco; however, it is far from free of health risks. One study showed that snus use did not have any beneficial effects on young men in Switzerland and was probably detrimental. The researchers indicated that among smokers, those who used snus were more likely to continue smoking. On the other hand, smokers who quit snus were found to quit smoking more often. Moreover, consistent smokers who stopped using snus also significantly reduced the number of cigarettes smoked per day, highlighting that stopping snus use is positively correlated with smoking cessation.⁵ These findings are consistent with numerous studies among young people in Nordic countries and in the USA.^{6–11} Thus, there is overwhelming evidence countering the use of smokeless tobacco products as an effective smoking cessation strategy.¹²

Health Risks

Snus is not smoked or inhaled, therefore some health risks such as lung cancer are lower than smoking tobacco. However, other risks appear to be more prominent. Global evidence on smokeless tobacco use suggests strong associations with various oral and pharyngeal cancers, ischaemic heart disease, stroke, and adverse perinatal outcomes.¹³ As with combustible tobacco, smokeless tobacco use has also been linked to a range of oral problems that include tooth staining and erosion, periodontal disease, halitosis, and tooth loss.^{14 15} While it is non-combustible and does not expose



Figure above: Form of Pharyngeal

non-users to tobacco smoke, snus and other smokeless tobacco products that lead to consumers spitting out the chewed product increase risks for others of contracting airborne pathogens, such as COVID-19.¹⁵ Moreover, there is evidence that long-term use of these products may be associated with a modest risk of fatal myocardial infarction and fatal stroke, suggesting that smokeless tobacco use may complicate or reduce the chance of surviving both of these events.¹² Recently published research from eight cohort studies indicated that in around 170,000 men who never smoked, snus use was associated with an increased risk of all-cause mortality, cardiovascular mortality, and cancer mortality, with the risks increasing with the duration of snus use.¹⁶ In another cohort study of 130,000 male construction workers who never smoked, snus use was associated with an increased risk of pancreatic cancer in comparison to those who never used tobacco.¹⁷

An updated 2019 report by the Norwegian Institute of Public Health further lists the risks of Swedish snus use, presenting among their main findings an increased risk of oesophageal and pancreatic cancers, high blood pressure, and type 2 diabetes, and metabolic syndrome. In terms of pregnancy outcomes, the authors state that consumption of Swedish snus increases the risk of premature births, and possible stillbirth.¹⁸ Persistent snus use thus has important public health implications, and research shows that it is not an adequate method to reduce harm among nicotine addicts. Since snus use has been mainly limited to Sweden in the past, research on snus issues in other countries, including Switzerland, is insufficient. This is the case for health impacts on women and the development of mental health disorders.

Snus Risks during Pregnancy

Snus use during pregnancy entails similar health risks to the risks of smoking. A recently published literature review showed that numerous negative effects of using snus in pregnancy were observed in several human studies. Studies showed that the use of snus in pregnancy increased the risk of preterm

birth, especially before 32 weeks, with an increased risk for stillbirth. Other studies indicated a link between snus use in pregnancy and pre-eclampsia, a pregnancy-related disorder causing seizures. Others included an increased risk of neonatal apnoea and oral cleft malformation, as well as heart rate variability similar to that found in infants exposed to cigarettes in pregnancy.¹⁹ Moreover, numerous studies have shown that the consumption of nicotine during pregnancy has consequences for the physical and neurological development of the foetus.²⁰ A total abstinence from all forms of nicotine should thus be advised to pregnant women.

Nicotine Delivery and Dependence

Snus, like some other forms of smokeless tobacco, contains and delivers quantities of nicotine comparable to those typically absorbed from smoking cigarettes. These nicotine levels are very similar to those found in cigarette smokers, as shown in the Figure below, with the main difference that in smokeless tobacco, nicotine is absorbed slightly more slowly and in lower concentrations than when inhaled.^{2 12} These nicotine levels obtained from snus are about twice as high as the nicotine concentrations typically obtained from nicotine replacement therapy. Due to the heterogeneity of snus, different brands supply different levels of nicotine over time. The Siberia white Dry brand for example, is a particularly powerful snus. The nicotine content is 43mg/g, which is more than five times that of normally found snus (8mg/g).²¹ Given the pattern of nicotine absorption described, there can be no doubt that snus is causing nicotine dependence in much the same way as other forms of tobacco consumption, if not even higher dependence with the use of high nicotine content products. There is evidence that the dependence potential of nicotine is related to its speed of delivery to the brain. Since snus produces similar nicotine dependence to smoking, it does not have any advantages over cigarettes or other smokeless nicotine delivery products.¹² The recent use of nicotine salts in tobacco-free nicotine pouches similarly facilitates the dependence risk.

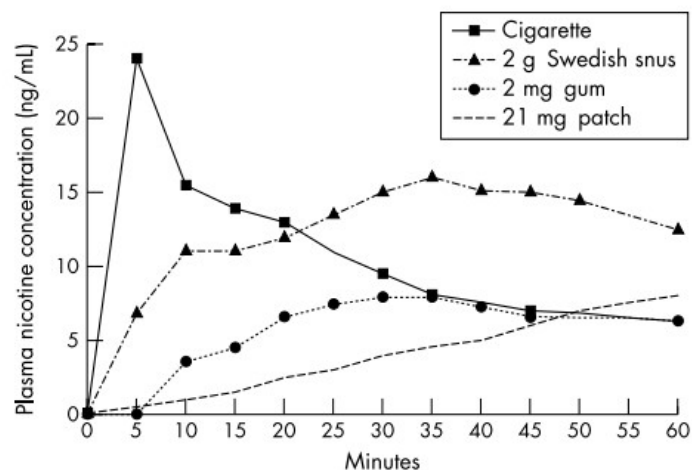


Figure above: Venous blood concentrations in nanograms of nicotine per millilitre (ng/ml) of plasma as a function of time for various nicotine delivery systems (Foulds et al., 2003)

Snus Use among Youth

Snus use is common in younger generations. Since tobacco use is one of the key determinants of many diseases, changing patterns of tobacco use, including the use of snus, could be influential to the health status of these generations when they grow older. Evidence shows that snus use could either be a pathway to an even healthier form of tobacco use, or a way to maintain rather than leave tobacco dependency.²² In Norway, snus use has increased dramatically, particularly among youth. In 2016, 25% of 16–25-year-olds were daily or occasional snus users. Daily use was slightly more prevalent among males (21%) than females (17%). In Sweden, similar levels of snus use can be found.²³

In 2015, the Swiss Addiction Monitoring found that 0.5% of the approximately 11,000 people interviewed in the survey used snus. The share of men (90%) was clearly higher than that of women (10%). In 2016, the Addiction Monitoring results showed that among 15–25-year-olds, 7.4% consumed at least one smokeless tobacco product, with 2.3% regularly using snus.²⁴ These results fit with the data collected on snus use in other countries, as these monitoring studies show that the consumption of snus has increased the most among young men.²⁵ It is important to note that as the Swiss Addiction Monitoring was taking place, snus products were not yet legally sold in Switzerland. In the past two years, sales and market availability of snus has hugely increased in Switzerland. Increasingly, larger quantities are sold at persistently decreasing prices, particularly over the internet. No recent research in Switzerland has been conducted to adequately assess the evolution of snus usage among teenagers.

Snus as a Gateway to Smoking

Some research has shown that orally consumed tobacco might be a gateway drug that leads to smoking, and that the availability and marketing of smokeless tobacco may keep smokers from quitting. One study assessed 4-year initiation rates of smokeless tobacco use and cigarette smoking in relation to each other.¹¹ The researchers state that young males who were not smokers in 1989 but regularly used smokeless tobacco were more than three times as likely as never users to be current smokers 4 years later (23.9% vs. 7.6%). In contrast, 2.4% of current smokers and 1.5% of never smokers at baseline became current regular smokeless tobacco users by follow-up. More than 80% of baseline current smokers were still smokers 4 years later, and more than 40% of baseline current regular smokeless tobacco users became smokers either in addition to or in place of smokeless tobacco use. Another study showed that smokeless tobacco appears to be an important predictor of smoking initiation among young adult males, as following a 1-year follow-up current smokeless tobacco users were 233% more likely to have initiated

smoking than nonusers.⁹ Two studies on teenage boys in Switzerland and Norway echoed the results by showing that smokeless tobacco users were more likely to start smoking as adults.^{5 26} Therefore, smokeless tobacco products such as snus should be seen as a starter product for subsequent smoking and has very little, if any, effect on quitting smoking.^{11 27} Furthermore, as it is the case for certain ENDS products like the “puff bars,” the possibility to consume snus without being detected allows what is called “stealth consumption” (as is shown in the advertisement for ZYN snus below), making them very popular in school classes or during sport activities.²⁸



Market Availability

In Switzerland, the sale of snus was banned in 1995 on public health grounds, as it was in the rest of the European Union, where the ban remains in place. However, after 1995, the import for personal consumption was legal and consumption slowly increased, especially with the development of online shopping. In a ruling in 2019, the federal court lifted the sales ban in Switzerland, arguing that the current tobacco ordinance

does not apply to snus. Since then, a range of new snus brands and products have been introduced, including a variety of products with flavour additives such as mint, fruit, or chocolate. Moreover, snus containers that resemble an ice hockey puck are also available in a wide variety of colours and designs to further entice various groups, particularly youth. Data from a cohort study of more than 45,000 adults and youth in the US showed that current flavoured product use was highest in youth (80% aged 12–17 years) and young adult users (73%, aged 18–24 years), with participants stating that flavour was a primary reason for use.²⁹

In Switzerland, snus is readily available in various stores, including kiosks, petrol stations, and grocery stores. Product heterogeneity is high, with large selections available on various platforms online, with one website offering up to 126 different brands of snus, with each brand offering a selection of flavours and varying strengths.³⁰ The T45 brand snus for example may be purchased at a price as low as CHF 4.49. In comparison, the cheapest cigarette pack costs CHF 5.50 per pack. Additionally, each pack of

cigarettes contains 20 cigarettes, while snus packs contain around 24 or more pouches of snus, meaning that not only can snus be bought for less than cigarettes, but more snus pouches are also provided. Stronger snus may even be the equivalent of 60 cigarettes.¹ Moreover, special offers are provided for all brands, presenting consumers with the opportunity to purchase a 10-, 30-, 40-, 50-, or 100-packs of snus at reduced prices, bringing down the price of T45 snus, for example, to CHF 3.70 per piece. On another website, prices as low as CHF 3.40 per snus pack of the brand G.4 may be found.³¹



Figure above: G4 Snus available for as little as CHF 3.40 per pack



Figure above: More expensive Snus, containing 30 pouches, for CHF10.12 per pack

Tobacco-free snus has entered the market as well, such as the brands Snus Kickup, or Lyft, also sold under the name Epok, which are all owned by British American Tobacco. These nicotine pouches are a new, unregulated form of oral nicotine product, which are similar in appearance and use to traditional snus. Similar to traditional tobacco-containing snus, they come in a range of flavours that appeal to youth, such as tropical breeze, or royal purple. Moreover, special offers are available as well, allowing consumers to purchase packs at CHF 3.30 each.



Figure above: Flavours such as Tropic Breeze have been shown to appeal to youth



Figure above: Royal purple flavour from Lyft



References

- 1 Foulds J, Ramstrom L, Burke M, Fagerström K. Effect of smokeless tobacco (snus) on smoking and public health in Sweden. *Tob Control* 2003;12: 349–59.
- 2 Henninger S, Fischer R, Cornuz J, Studer J, Gmel G. Physical Activity and Snus: Is There a Link? *International journal of environmental research and public health* 2015;12: 7185–98.
- 3 Brunnemann, Qi, Hoffmann. *Aging of oral moist snuff and the yields of tobacco-specific N-nitrosamines (TSNA)*, 2001. <https://hams.cc/tobacco1/aging.pdf>.
- 4 Gmel G, Clair C, Rougemont-Bücking A, Grazioli VS, Daeppen J-B, Mohler-Kuo M, et al. Snus and Snuff Use in Switzerland Among Young Men: Are There Beneficial Effects on Smoking? *Nicotine & tobacco research : official journal of the Society for Research on Nicotine and Tobacco* 2018;20: 1301–9.
- 5 Galanti MR, Rosendahl I, Wickholm S. The development of tobacco use in adolescence among "snus starters" and "cigarette starters": an analysis of the Swedish "BROMS" cohort. *Nicotine Tob Res* 2008;10: 315–23.
- 6 Grøtvedt L, Forsén L, Stavem K, Graff-Iversen S. Patterns of snus and cigarette use: a study of Norwegian men followed from age 16 to 19. *Tob Control* 2013;22: 382–8.
- 7 Haukka A, Vartiainen E, Vries H de. Progression of oral snuff use among Finnish 13-16-year-old students and its relation to smoking behaviour. *Addiction (Abingdon, England)* 2006;101: 581–9.
- 8 Haddock CK, Weg MV, DeBon M, Klesges RC, Talcott GW, Lando H, et al. Evidence that smokeless tobacco use is a gateway for smoking initiation in young adult males. *Preventive medicine* 2001;32: 262–7.
- 9 Severson HH, Forrester KK, Biglan A. Use of smokeless tobacco is a risk factor for cigarette smoking. *Nicotine Tob Res* 2007;9: 1331–7.
- 10 Tomar SL. Is use of smokeless tobacco a risk factor for cigarette smoking? The U.S. experience. *Nicotine Tob Res* 2003;5: 561–9.
- 11 Bhatnagar A, Whitsel LP, Blaha MJ, Huffman MD, Krishan-Sarin S, Maa J, et al. New and Emerging Tobacco Products and the Nicotine Endgame: The Role of Robust Regulation and Comprehensive Tobacco Control and Prevention: A Presidential Advisory From the American Heart Association. *Circulation* 2019;139: e937-e958.

- 12 Siddiqui F, Siddiqi K, Croucher R. *Action on Smoking and Health. Evidence into Practice: Smokeless Tobacco*, 2020.
- 13 Muthukrishnan A, Warnakulasuriya S. Oral health consequences of smokeless tobacco use. *The Indian Journal of Medical Research* 2018;148: 35–40.
- 14 AL Sieber, J Jeyakumar, MM Bornstein, CA Ramseier. *Snus und die Beeinträchtigungen der Mundgesundheit*, 2017.
https://www.swissdentaljournal.org/fileadmin/upload_sso/2_zahnaerzte/2_sdj/sdj_2016/sdj_9_2016/sdj_2016-09_praxis_d.pdf.
- 15 Byhamre ML, Araghi M, Alfredsson L, Bellocco R, Engström G, Eriksson M, et al. Swedish snus use is associated with mortality: a pooled analysis of eight prospective studies. *International journal of epidemiology* 2021;49: 2041–50.
- 16 Luo J, Ye W, Zendejdel K, Adami J, Adami H-O, Boffetta P, 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. *The Lancet* 2007;369: 2015–20.
- 17 Norwegian Institute of Public Health. Health risks from snus use, 2019.
<https://www.fhi.no/en/publ/2019/health-risks-from-snus-use2/> (accessed 4 Apr 2022).
- 18 Kreyberg I, Nordhagen LS, Bains KES, Alexander J, Becher R, Carlsen K-H, et al. An update on prevalence and risk of snus and nicotine replacement therapy during pregnancy and breastfeeding. *Acta Paediatrica* 2019;108: 1215–21.
- 19 Wickström R. Effects of nicotine during pregnancy: human and experimental evidence. *Current Neuropharmacology* 2007;5: 213–22.
- 20 snuskingdom.ch. Siberia Red White Dry Portion: buy snus Siberia Red White Dry Portion in Switzerland cheap online | Snuskingdom, 2021. <https://snuskingdom.ch/english/siberia-rot-white-dry-portion.html> (accessed 12 Oct 2021).
- 21 Norberg M, Malmberg G, Ng N, Broström G. Who is using snus? - Time trends, socioeconomic and geographic characteristics of snus users in the ageing Swedish population. *BMC Public Health* 2011;11: 929.
- 22 Scheffels J, Lund I. Cute as candy: a qualitative study of perceptions of snus branding and package design among youth in Norway. *BMJ open* 2017;7: e012837.
- 23 Kuendig H, Notari L, Gmel G. *Le tabagisme chez les 15 à 25 ans en 2016: Analyse des données du Monitoring suisse des addictions*. Lausanne, 2017.
- 24 Dülgeroglu, Ramseier, Schuurmans MM. Factsheet 5: Snus/Tabak zum oralen Gebrauch, 2018.
https://praxis-suchtmedizin.ch/praxis-suchtmedizin/images/stories/nikotin/01769_de_InformationenblattfrAerztinnen.pdf.

- 25 Grøtvedt L, Forsén L, Ariansen I, Graff-Iversen S, Lingaas Holmen T. Impact of snus use in teenage boys on tobacco use in young adulthood; a cohort from the HUNT Study Norway. *BMC Public Health* 2019;19: 1265.
- 26 Soneji S, Sargent JD, Tanski SE, Primack BA. Associations between initial water pipe tobacco smoking and snus use and subsequent cigarette smoking: results from a longitudinal study of US adolescents and young adults. *JAMA Pediatr* 2015;169: 129–36.
- 27 Ruggia L. Les nouveaux produits du tabac: évolutions et conséquences. *Bull Med Suisses* 2021.
- 28 Villanti AC, Johnson AL, Ambrose BK, Cummings KM, Stanton CA, Rose SW, et al. Flavored Tobacco Product Use in Youth and Adults: Findings From the First Wave of the PATH Study (2013-2014). *American Journal of Preventive Medicine* 2017;53: 139–51.
- 29 SnusMarkt.ch. *Alle Snus Marken* 10.06. <https://www.snusmarkt.ch/marken/>.
- 30 Pasquier C. Le snus, tabac à sucer qui séduit et inquiète. *Le Temps SA* 2018.
- 31 Swedish Match. *Swedish Match* 10.06. <https://www.swedishmatch.ch/>.