Open Peer Review on Qeios

[Commentary] Snus Has Saved Many Lives in Sweden – And Can Save Many More

Lars Ramström[1]

1 Institute for Tobacco Studies (ITS)

Funding: No specific funding was received for this work.

Potential competing interests: No potential competing interests to declare.

Abstract

In Sweden, there has been a massive transition from cigarette smoking to snus, the Swedish kind of low toxicity oral tobacco. This product poses very little health risk compared to cigarettes, as illustrated by the fact that Sweden has Europe's lowest level of mortality attributable to tobacco. The current study tries to estimate how much higher the Swedish mortality would have been if there had been no snus in Sweden. Actual Swedish data are compared with two scenarios without snus – a group of comparable countries, and a hypothetical Sweden with no snus use. Both scenarios suggest that around 4,000 lives per year have been saved by the use of snus.

Lars M. Ramstrom PhD

Principal Investigator, Institute for Tobacco Studies, Taby, Sweden

1. Background

It has long been well known that the proportion of smokers among men in Sweden is substantially lower than in all other EU countries [1]. It is also generally recognized that this is largely due to the fact that snus in Sweden has both reduced the initiation of smoking and increased the cessation of smoking [2][3]. Less attention has been paid to the subsequent effects in terms of reductions in mortality attributable to smoking. In this study, the effects of snus in these respects are highlighted by comparing the mortality attributable to smoking observed in Sweden with two scenarios without snus use. These comparisons illustrate how snus has saved many lives in Sweden and the importance of official policies strongly supporting snus as an alternative to cigarettes.

2. Comparing Sweden with analogous countries where snus use is virtually absent

The potential of snus to reduce mortality attributable to smoking can be elucidated by comparing mortality data from Sweden with corresponding data from countries where snus use is virtually absent, while otherwise resembling Sweden as far as possible. Switzerland and all EU countries except Sweden have banned the sale of snus and therefore have virtually no snus use. However, comparisons between Sweden and snus-free countries are also affected by other differences, e.g., conditions linked to the countries' levels of development. As a measure of this level, the United Nations Development Programme, UNDP, determines every year *The Human Development Index (HDI)*. It summarizes the average performance of different countries in three basic areas: life expectancy, educational attainment, and standard of living [4]. Switzerland has the highest HDI index (0.962) [5]. Moldova has the lowest index in Europe (0.767), and South Sudan has the lowest in the world (0.385). In order to get the best possible comparability, we have chosen as comparison countries the ten snus-free European countries with *HDI* closest to the *HDI* for Sweden. Since comparisons of death rates in different countries are affected by differences in age distribution, we base our analysis on the age-standardised smoking-attributable death rate for Sweden compared with the average of age-standardized smoking-attributable death rates for the comparison countries.

Our analysis is based on the data shown in TABLE 1. The *Global Burden of Disease* study, *GBD*, has estimated that for men in Sweden the age-standardized death rate attributable to smoking in 2019 is 68 per 100,000 [6]. In the snus-free but otherwise Sweden-like countries, the corresponding death rates are substantially higher. It can be assumed that in a hypothetical Sweden without snus, the death rate attributable to smoking would have been of roughly the same magnitude as the average for the snus-free comparison countries, 111 per 100,000. It would then be reasonable to assume that, in a hypothetical Sweden without snus, the mortality attributable to smoking among men in 2019 would have been 111/68 = 1.6 times as high as the one now observed.

The number of deaths attributable to smoking among men in Sweden in 2019 has been estimated by *Global Burden of Disease* to be 7,079. It would be reasonable to estimate the corresponding number in a hypothetical Sweden without snus to be 7,079 × 1.6 = 11,326. The difference, 11,326 – 7,079 = 4,247, suggests that snus use among men in Sweden has saved around 4,000 lives per year at the end of the 2010s.

While Swedish men started the transition from cigarettes to snus already in the late 20th century, a corresponding

development among Swedish women did not start until quite recently [7]. TABLE 1 shows that for women in Sweden the death rate attributable to smoking is roughly the same as the average of the comparison countries. Further, the GBD has estimated that the number of deaths attributable to smoking has been fairly constant, around 6,500 per year, during the period 1990 – 2019. These observations suggest that the use of snus among women in Sweden had not had time to yield visible reductions in mortality in the middle of the 2010s. But, if current transition practices will persist, snus can save many lives also among women.

3. Comparison between observed data and a hypothetical scenario: “If there had been no snus in Sweden”

Another way to highlight how snus has saved lives in Sweden is to compare actually observed data with a hypothetical scenario: “If there had been no snus in Sweden”. The hypothetical scenario is based on findings from a large nationwide representative population survey [3]. Data from that survey are shown in the left-hand section of TABLE 2 and TABLE 3. Columns A–E represent categories of pathways that different groups of respondents have used for the progression of their tobacco use from the onset of daily tobacco use to the status at the time of the survey. The key outcome is the proportion with remaining daily smoking at the time of the survey. This proportion is highest in category A, where no daily snus use has been included. In the categories which also include daily snus use, the proportion of maintained daily smoking is significantly lower. This is another proof of the potential of snus to keep down smoking.

Since there is no snus in the hypothetical scenario, there will be just two categories of onset conditions for pathways of tobacco use: start or no start of daily smoking.

An assessment of the proportion of remaining daily smoking in the hypothetical scenario can be based on assumptions regarding how the individuals in categories A - E would have been located in the hypothetical categories G and H.

1. The individuals in categories A, B, and D have all started daily smoking at some stage. They would presumably have started daily smoking even if there had been no snus in Sweden. In the hypothetical scenario, they would then be located in category G.
2. The individuals in category E have abstained from all daily tobacco use. They would presumably have abstained from daily smoking also if there had been no snus in Sweden. In the hypothetical scenario, they would therefore be located in category H.
3. The individuals in category C have abstained from daily smoking, but they show a propensity for daily tobacco use by having started daily snus use. It can be assumed that in the hypothetical scenario, the lack of availability of snus would have induced the start of daily smoking to a similar extent as daily smoking was started in the total study population, 41 % for men and 40 % for women (see TABLE 2 resp. TABLE 3). In the hypothetical scenario, 41 % of the men in category C (1,699 individuals) and 40 % of the women (194 individuals) would therefore be located in category G, and the others would be located in category H.
4. The individuals in category G would, in the absence of snus, have progressed their smoking behaviour under the

same conditions as those in category A, and it can therefore be assumed that they have the same proportion of remaining daily smoking; 40 % for men and 40 % for women.

3.1. Hypothetical scenario, men

In the hypothetical scenario, 13,256 men started daily smoking (category G), and the proportion with remaining daily smoking is assumed to be 40 %, i.e., 5,302 individuals. This number constitutes 19 % of the total population (category I) and is significantly higher than the corresponding proportion (12 %) in the actually observed scenario (category F). It is reasonable to assume that the numbers of deaths attributable to smoking in the hypothetical and observed scenarios are proportional to these percentages. According to *GBD*'s estimates for 2019, there were 7,079 smoking-attributable deaths among men in Sweden [6]. In the hypothetical scenario, the corresponding number would then have been (19/12) x 7,079 = 11,208. The difference, 4,129, suggests that snus has saved around 4,000 lives per year in the 2010s.

3.2. Hypothetical scenario, women

For women, there is no significant difference between the proportion of remaining daily smoking in the observed and the hypothetical scenario, 15% resp. 16%. The disparity between men and women is well compatible with the development of tobacco use patterns in Sweden. Among men, the transition from smoking to snus use started in the 20th century, while it did not gain momentum among women until quite recently [7].

4. Trends in Sweden regarding smoking-attributable mortality

Estimates by the Global Burden of Disease indicate that Sweden has lower smoking-attributable mortality than other EU countries, but still, there are around 14,000 such deaths per year (approx. 13% of all), and the continued reduction appears to be slowing down [6]. It is therefore important from a public health point of view that official policies take strong action to embrace snus as a smoking-reducing factor.

5. Obstacles and opportunities for support of snus

Among the general public, there are widespread misconceptions about snus[8][9]. Such perceptions are promoted by misinformation from various seemingly credible sources [10]. For example, there are exaggerated claims about the health risks of snus and questioning of the solid evidence regarding the effectiveness of snus as a smoking cessation aid. It is also often implied that the transition from cigarettes to snus would inevitably induce lifelong nicotine addiction. However, a significant proportion of those who have quit daily smoking after taking up daily snus use have subsequently also quit daily snus use [3].

The misconceptions about snus are obstacles to such a real large-scale transition from cigarettes to snus that would be desirable from a public health point of view. A heavy responsibility, therefore, rests on health authorities and their grantees

to strengthen their efforts to make clear the benefits of switching from smoking to snus.

TABLE 1
Mortality data for countries with living conditions comparable with those in Sweden (as measured by the *Human Development Index, HDI*)

Countries without a history of snus use	HDI	Age standardized death rates per 100,000 attributable to smoking (Source: Global Burden of Disease, GBD)	
		Men	Women
Switzerland	0.962	80	36
Denmark	0.948	130	84
Ireland	0.945	104	62
Germany	0.942	110	45
Netherlands	0.941	119	65
Belgium	0.937	127	48
Luxembourg	0.930	96	41
United Kingdom	0.929	113	71
Austria	0-916	102	42
Spain	0.905	126	24
Average of above countries	*0.936*	*111*	*52*
Sweden	0.947	68	52

TABLE 2. Pathways for progressing of tobacco use. Men in Sweden.

	Findings from a nationwide representative survey 2003 - 2011 (Ramström, Borland, Wikmans 2016.)						Hypothetical scenario: "If there had been no snus in Sweden"		
Categories of onset conditions	A Start by daily smoking. Never daily snus use. n = 6,943	B Start by daily smoking. Later daily snus use. n = 3,737	C Start by daily snus use. Never daily smoking. n = 4,144 1,699 + 2,445	D Start by daily snus use. Later daily smoking. n = 877	E Never any daily tobacco use. n = 12,601	F TOTAL n = 28,302	G Started daily smoking. n = 13,256	H Never started daily smoking. n = 15,046	I TOTAL n = 28,302
Remaining daily smoking at the end of the survey.	n = 2,790 40 %	n = 490 13 %	n = 0 0 %	n = 210 24 %	n = 0 0 %	n = 3,490 12 %	n = 5,302 40 %	n=0 0 %	n = 5,302 19 %

TABLE 3. Pathways for progression of tobacco use. Women in Sweden.

	Findings from a nationwide representative survey 2003 - 2011 (Ramström, Borland, Wikmans 2016.)						Hypothetical scenario: "If there had been no snus in Sweden"		
Categories of onset conditions.	A Start by daily smoking. Never daily snus use. n = 11,794	B Start by daily smoking. Later daily snus use. n = 961	C Start by daily snus use. Never daily smoking. n = 484 194 + 290	D Start by daily snus use. Later daily smoking. n = 43	E Never any daily tobacco use. n = 19,091	F TOTAL n = 32,373	G Started daily smoking. n = 12,942	H Never started daily smoking. n = 19,431	I TOTAL n = 32,373
Remaining daily smoking at the end of the survey.	n = 4,694 40 %	n = 129 13 %	n = 0 0 %	n = 17 40 %	n = 0 0 %	n = 4,890 15 %	n = 5,177 40 %	n=0 0 %	n = 5,177 16 %

References

1. ^ *Statistical Office of the European Union (Eurostat). Daily smokers of cigarettes among persons aged 15 and over, 2019. Tobacco consumption statistics. Tobacco consumption statistics - Statistics Explained (europa.eu).*
2. ^ *Royal College of Physicians. "Ending Tobacco Smoking in Britain. Radical Strategies for Prevention and Harm Reduction in Nicotine Addiction"; The Tobacco Advisory Group of the Royal College of Physicians: London, UK, 2008; ISBN: 978-1-86016-345-6.: https://cdn.shopify.com/s/files/1/0924/4392/files/ending-tobacco-smoking.pdf?2801907981964551469.*
3. a, b, c *Ramström L, Borland R, Wikmans T. Patterns of smoking and snus use in Sweden: implications for public health. Int J Environ Res Public Health. 2016;13(11). www.mdpi.com/1660-4601/13/11/1110.*
4. ^ *United Nations Development Programme. Human Development Index (HDI). Human Development Rep (undp.org).*
5. ^ *United Nations Development Programme. HDI data. Country Insights | Human Development Reports (undp.org).*
6. a, b, c *Institute for Health Metrics and Evaluation. Global Burden of Disease study (GBD). https://vizhub.healthdata.org/gbd-compare/#.*
7. a, b *The Public Health Agency of Sweden. The national public health survey, Living habits. Tobacco and nicotine use (self-reported) by age, sex and year. Percentage.. PxWeb (folkhalsomyndigheten.se).*
8. ^ *Wikmans T, Ramström L. Harm perception among Swedish daily smokers regarding nicotine, NRT-products and Swedish Snus. Tobacco Induced Diseases 2010 8:9. http://dx.doi.org/10.1186/1617-9625-8-9.*
9. ^ *Lund K E, Vedoy T F. Relative Risk Perceptions between Snus and Cigarettes in a Snus-Prevalent Society—An Observational Study over a 16 Year Period. Int. J. Environ. Res. Public Health 2019, 16, 879. https://doi.org/10.3390/ijerph16050879.*
10. ^ *Snuskommisionen. The Betrayal of Smokers A Report on Sweden's Misinformation Campaign. Rapport-snuskommissionen_180312_eng.pdf.*