

## RESEARCH PAPER

# Adolescent snus use in Finland in 1981–2003: trend, total sales ban and acquisition

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**Objective:** To study changes in adolescent snus use from 1981 to 2003, the effects of the total snus sales ban (1995) and snus acquisition.

**Design:** Biennial postal surveys in 1981–2003.

**Setting and participants:** Entire Finland; 12-, 14-, 16-, and 18-year-olds ( $n = 73\,946$ ; 3105–8390 per year).

**Main outcome measures:** Snus use (experimental, daily/occasionally), snus acquisition (2001, 2003).

**Results:** Snus experimentation grew in popularity before the total sales ban in 16- and 18-year-old boys and after the ban in all age and sex groups. A decrease was seen between 2001 and 2003, except for 18-year-old boys. Daily/occasional use mainly followed the same pattern in boys while in girls the daily/occasional use was rare and no significant changes were observed. In 2003, boys experimented with snus more often than girls (12-year-olds 1% v 0%, 14-year-olds 9% v 4%, 16-year-olds 30% v 12%, 18-year-olds 44% v 18%). Hardly any girls used snus daily/occasionally, but 1% of 14-year-old boys, 7% of 16-year-olds, and 9% of 18-year-olds did. Of daily/occasional users, 84% acquired snus from friends or acquaintances, 55% from tourist trips to neighbouring countries (Estonia, Sweden), and 7% through sport teams; 24% obtained it from under-the-counter sources. For experimenters, the corresponding figures were 79%, 18%, 0.3%, and 5%.

**Conclusions:** The total sales ban did not stop snus use; instead, the increase continued after the ban. Friends who travel to neighbouring countries act as go-betweens reselling snus. Snus is used even by the youngest adolescents, thus contributing to the nicotine dependence process.

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In consideration of sales prohibition of tobacco products, Finland has been a pacesetter. As early as 1977, a law was enforced restricting sales of any tobacco products to minors under 16 years in Finland, including snus. In the entire European Union (EU) region, the sale of snus was totally banned on 1 July 1992.<sup>1</sup> The essential point was to ban snus from commercial import, sale or other assignment in contrast to the retail sales of cigarettes. The decision was based on the World Health Organization's recommendation to prevent snus use in countries where it was not yet established, and aimed to protect young people in particular.<sup>2</sup> In joining the EU in 1995, Finland applied for a total ban of snus sales as part of a comprehensive amendment to the existing tobacco legislation. All tobacco advertising has been prohibited since 1977.<sup>3</sup>

After snus was suggested to be a less harmful alternative for current cigarette smokers in the 1980s, and again in the beginning of the 21st century, it has become a topic of increasing scientific interest and public concern within the EU. Based on health claims, there are claimants and scientists who have supported the campaign to lift the EU ban on snus.<sup>4–6</sup> However, not all health researchers are convinced about the evidence of snus being less harmful. Persons who would forego other tobacco products might be attracted to try snus. Furthermore, owing to the addictive effect of snus, the number of experiments may have increased.<sup>7,8</sup> In the discussions on lifting the snus ban, the role of snus in the development of nicotine dependence in adolescence has not attracted much attention.

Initiation of tobacco use starts at adolescence.<sup>9</sup> Adolescents have often not stabilised their tobacco use and may, therefore, use different tobacco products in parallel.<sup>7,10</sup> Use of any form of tobacco, whether cigarettes or snus or other, contributes to the development of a dependence process.

Nicotine addiction is a key factor in sustaining overall tobacco use. In the study of Holm and associates, snus users and cigarette smokers reported similar levels of subjective dependence on tobacco.<sup>11</sup>

Figures on adolescent smokeless tobacco use are known in the United States<sup>8,12,13</sup> and in a small number of European countries, namely in Sweden,<sup>14</sup> Norway and Finland.<sup>15–17</sup> European cross-national adolescent surveys have even failed to ask about snus use ([www.hbsc.org](http://www.hbsc.org)). In the USA, 15% of male high school students were current users of smokeless tobacco in 2001,<sup>8</sup> in Norway,<sup>15</sup> 40% of 15-year-old boys had experimented with snus and nearly 20% used it daily, and in Sweden, approximately 20% of 15–16-year-old boys were current users.<sup>10</sup>

In Finland, snus has been used for a century, but it has not been very popular during the last decades. Among Finnish adults, 4.2% of men use snus, but among women the use is rare (0.2%).<sup>18</sup> In Sweden, a neighbouring country of Finland, the prevalence of snus use is among the highest worldwide, with about 20% of Swedish men using snus daily.<sup>10</sup> In the other Scandinavian countries, snus use has likewise become a well-established phenomenon, but the prevalence has been clearly lower than in Sweden. Partly due to its longstanding historical heritage of snus use, Sweden was the only country in the EU who applied and was granted a special exemption to manufacture and market snus when joining the EU in 1995.

There is evidence that the sales ban of cigarettes to minors diminishes the purchase by adolescents, but it fails to stop them from obtaining cigarettes. The acquisition takes place through friends, siblings, parents, or even strangers and from holiday trips to countries where sales limitations do not exist or are not properly implemented.<sup>3,19–21</sup> Cigarette acquisition is, however, made much easier if they are legally sold in the

country and the prohibition concerns only minors. The total ban in Finland presumes that snus is not available in the country, although it can be imported for own use.

The aim of this study is to investigate changes in the use of snus from 1981 to 2003 among Finnish adolescents and the effect of the total snus sales ban in 1995. Channels of acquisition of snus are investigated in 2001 and 2003. For comparison, changes in cigarette smoking are presented.

## MATERIAL AND METHODS

The data were collected as part of a national monitoring system on adolescent health and health behaviours (Adolescent Health and Lifestyle Survey). As of 1977, self-administered 12-page questionnaires have been mailed biennially to nationally representative samples of 12-, 14-, 16- and 18-year-olds with two re-inquiries to non-respondents. The samples were obtained from the Population Register Centre so that all Finns born on sample days were included. Data were collected during February–April each study year. Comparability of results over time was ensured by keeping the data collection method, timing of survey, size of questionnaire and questions as similar as possible throughout the years.

Questions on snus use were included in 1981–2003 with the exception of 1985. The question of snus acquisition was asked in 2001 and 2003. Response rates decreased in all age groups, from 88% in 1981 to 69% in 2003, especially among older boys. Table 1 shows the numbers of respondents and response rates (%) by age, sex and study year. The mean ages of respondents were 12.6, 14.6, 16.6 and 18.6 years.

In the survey, two questions concerning snus use were presented. Experimental use of snus was asked with the formulation: “Have you ever tried snus? How many times in your lifetime?” The alternatives were “I have never tried”, “I have tried once”, “I have used snus 2–50 times”, “I have used snus more than 50 times”. The current use of snus was asked by the question “Do you use snus at present?” with

alternatives “not at all”, “occasionally”, “once a day or more often”.

Acquisition of snus was measured in 2001 using the question: “If you have tried snus or if you use it at present, where do you get it?” The alternatives were “I buy it in Finland, at kiosk, store, service station etc”, “on trips to Sweden or Estonia”, “from friends or acquaintances”, “from strangers”, “through a sport club”, “from street vendors”, “other, where?”. Respondents were allowed to identify several alternatives. In 2003, the question was presented as open-ended.

Daily smokers were defined as having smoked over 50 cigarettes during their lifetime, having smoked during the last week and at least once per day or more often. Those who answered that they smoked at least once per week but not daily, and smoked more than one cigarette, cigar or pipeful of tobacco per day were also defined as daily smokers.

Respondents were categorised as Finnish and Swedish speaking according to the official language of the municipality where they lived.

In 2003, sub-samples of 14- and 16-year-olds ( $n = 400 + 400$ ) were selected from the original subject series at random. To those among these groups who responded to the original questionnaire ( $n = 582$ ), a repeat questionnaire was mailed four weeks later. Altogether, 447 repeat questionnaires were returned. The test–retest reliability over a one-month period was found to be good with coefficient  $\kappa = 0.85$  for experimental use and  $\kappa = 0.66$  for daily or occasional use of snus.

The effect of a decrease in response rates on the prevalence of daily or occasional use of snus has been assessed indirectly. The respondents were categorised into three groups based on how promptly they returned the questionnaire (original, first re-inquiry, second re-inquiry). It was assumed that the later the person answered, the more he or she resembled a non-respondent. The use of snus varied systematically, suggesting that snus use among non-respondents differed from that

**Table 1** Numbers of respondents and response rates (%) by age and sex in 1981–1983 and 1987–2003

	1981	1983	1987	1989	1991	1993	1995	1997	1999	2001	2003
<b>Age 12</b>											
Boys											
Respondents (n)	483	450	414	406	426	399	395	427	442	351	368
Response rate (%)	88	85	81	76	77	73	78	76	79	72	69
Girls											
Respondents (n)	514	440	367	430	399	437	424	440	407	425	390
Response rate (%)	92	91	83	82	82	84	86	87	85	82	75
<b>Age 14</b>											
Boys											
Respondents (n)	488	429	1128	361	1196	1203	1177	1168	1187	1251	1092
Response rate (%)	87	78	81	75	74	74	75	69	74	66	66
Girls											
Respondents (n)	548	482	1202	431	1337	1299	1301	1347	1313	1485	1245
Response rate (%)	92	86	90	90	86	86	85	84	85	79	78
<b>Age 16</b>											
Boys											
Respondents (n)	535	413	1183	362	1008	1168	1232	1126	1110	892	1003
Response rate (%)	85	75	77	70	68	70	72	68	68	62	59
Girls											
Respondents (n)	529	509	1284	380	1272	1389	1469	1379	1333	1138	1296
Response rate (%)	91	91	89	82	86	87	88	87	85	82	79
<b>Age 18</b>											
Boys											
Respondents (n)	519	489	1134	328	893	1029	1071	1088	1112	774	570
Response rate, %	81	75	69	63	61	66	67	60	63	53	50
Girls											
Respondents (n)	524	509	1401	407	1103	1265	1313	1415	1315	976	797
Response rate (%)	88	87	84	80	82	83	86	83	80	76	74
<b>Total</b>											
Respondents (n)	4140	3721	8113	3105	7634	8189	8382	8390	8219	7292	6761
Response rate (%)	88	83	81	77	77	78	79	76	76	70	69

among respondents and may have led to underestimation of the actual figures. The magnitude of underestimation in experimental snus use among boys increased from 1% to 5% from year 1981 to 2003. In daily or occasional snus use, the magnitude of underestimation was around 1%.

The results are displayed mainly as percentages and the statistical significance of differences in prevalence of snus use before and after the sales ban was assessed by using  $\chi^2$  test. The Cochran-Armitage test for trend was used to assess the statistical significance of the increase of snus use separately over two different time spans, from 1981 to 1995 and from 1995 to 2001. The analyses were carried out with SPSS for Windows 11.1 and StatXact-4 version 4.01 software.

## RESULTS

Nearly half of the 18-year-old boys and every sixth girl had tried snus in 2003 (table 2). Less than 1% of girls used snus daily or occasionally, while among the boys the figure was much higher. Interestingly, even at age 12, a small number of boys had tried snus and a few used it daily/occasionally.

Until 1995, it was permissible to sell tobacco products to children at age 16 or older. Among the boys aged 16 and 18, experimental use of snus showed a significantly increasing trend in both age groups ( $p < 0.001$ ) from 1981 to 1995 (fig 1). An increase in daily/occasional use was observed in 18-year-old boys only ( $p < 0.001$  for trend). There was no significant change in experimental and daily/occasional use of snus among the 14-year-olds or among the girls.

After the 1995 sales ban, a significantly increasing trend ( $p < 0.05$ ) was seen from 1995 to 2001 in experimental use of snus in all age-sex groups (fig 1). An increase in daily/occasional use was observed in 16- and 18-year-old boys ( $p < 0.001$  for trend). The increasing trends levelled off in 2001–2003 (fig 1). Right after the sales ban (1997), there were significantly more experimental snus users than just before the ban (1993) in all age-sex groups except in 16-year-old boys, and when comparing to daily/occasional users, in all age-sex groups except in 16-year-old girls.

Among the girls and younger boys, the trends for experimental snus use mostly followed the trends for cigarette smoking both before and after the sales ban. However, among the 16- and 18-year-old boys, the increase seen in snus use after the ban was not observed in smoking (fig 1).

When daily and occasional snus use were analysed separately, they followed the same pattern in all age groups.

Although the clear difference between the Swedish and Finnish speaking areas before the snus sales ban has diminished gradually, snus use is still more common in the Swedish speaking areas in all age groups.

In 2001, the most frequently reported channel through which adolescents obtained snus was social sources, "from friends or acquaintances" (table 3). Among experimenters and daily/occasional users alike, four out of five respondents reported this channel. The use of all other channels was more common in the latter group. The second important source

comprised trips to neighbouring countries, and the third comprised kiosks, stores or service stations.

It was separately studied how many of daily/occasional users had obtained snus entirely from the sources where snus sales were illegal in the country. The following two sources were combined: purchase at kiosk, store or service station and street vendors. Only three of the daily/occasional users reported having obtained snus from these sources only.

The open-ended question in 2003 about acquisition of snus gave parallel results. Of daily/occasional users ( $n = 154$ ), 53% named friends or acquaintances as the most common source, and 48% named Estonia or Sweden. The other sources (father, brother, store) were mentioned 13 times in all. The answers given by experimenters ( $n = 836$ ) clustered to three common categories; from friends 62%, abroad (Sweden, Estonia) 15%, and under the counter (kiosk, store or service station) 3%. Thirteen respondents (2%) reported obtaining snus from father or brother. The other single sources were named three times.

## DISCUSSION

The growing popularity of snus use among 16- and 18-year-old boys was noted in the 1980s and the early 1990s when sales of snus was still allowed except to minors under age 16. Unexpectedly, the total sales ban of 1995 brought no sign of slowing the increase. On the contrary, the highest snus use figures since 1981 were seen 4–6 years after the ban. Although the increase of snus use after the ban was a surprising finding, an investigation revealed several plausible explanations. Easiness of obtaining snus was the primary reason, particularly because import for personal use was allowed; other explanations were the increased discussion in the media and the implied charm of novelty, growing awareness of the health hazards of passive smoking and of smoking restrictions, and the price. In addition, Swedish Match, the largest producer of smokeless tobacco in the Nordic countries, increased its marketing efforts<sup>22</sup>

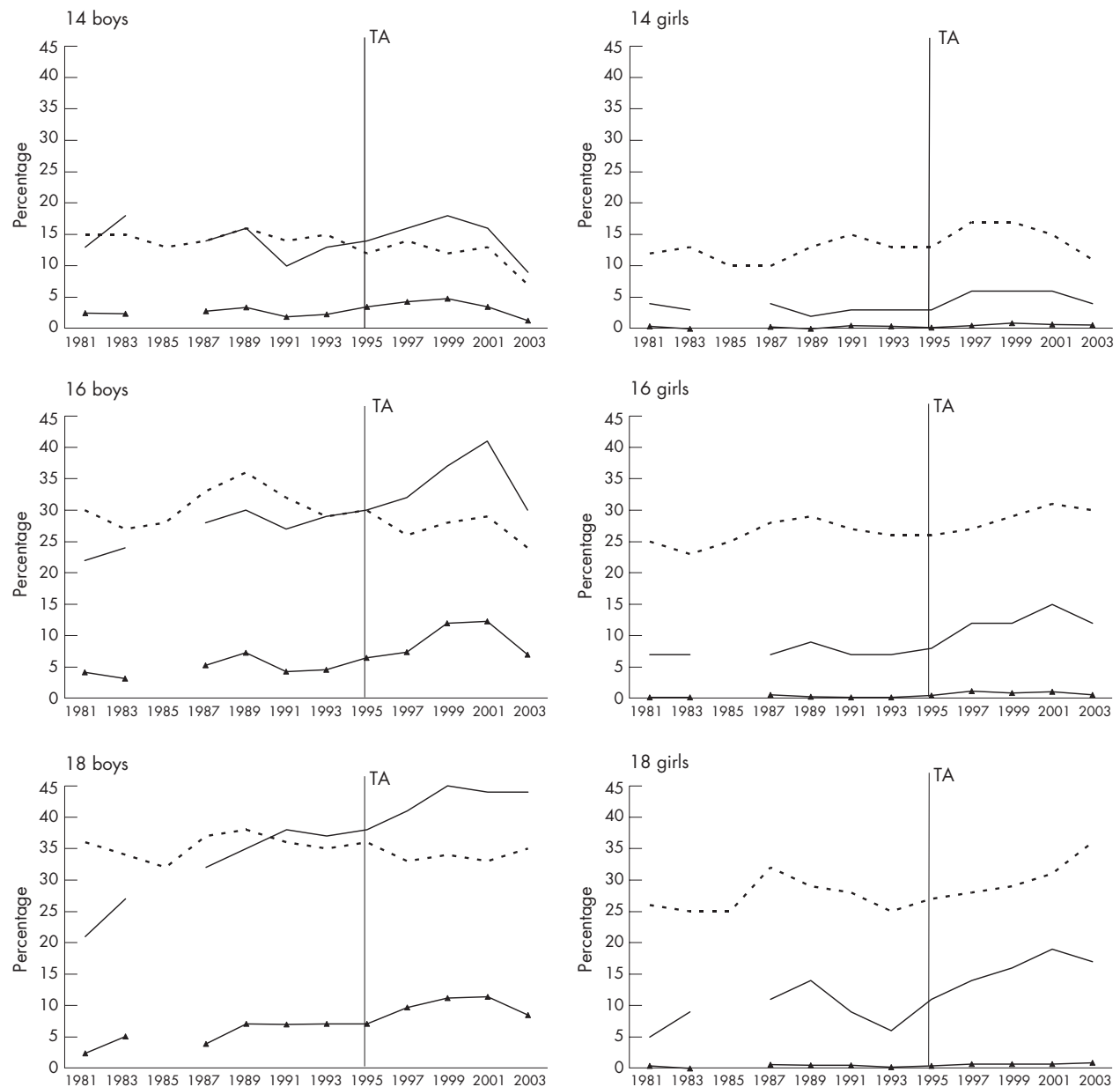
When the sale of snus ended in the Finnish mainland, the sales continued on the passenger ships registered in the neighbouring countries of Sweden, Estonia, and the semi-autonomous Åland Islands belonging to Finland. Owing to short distances and frequent connections from the main ports, snus imports from ferries operating between the countries was easy, as well as legal for personal use. Thus, a convenient channel was created for importing snus, not only for personal use but also for friends and the black market. School trips by ferries to Sweden were common among schoolchildren, further increasing the opportunities for obtaining snus and being exposed to it. It is likely that buying tobacco in the ferries was easy albeit the Swedish law forbade selling tobacco to minors under age 18. The magnitude of this channel is illustrated by the over 15 million passengers per year, compared to the total population of the three countries of 15.45 million. The influence of Sweden is also manifested in a higher frequency of snus use among Swedish than Finnish speaking adolescents.

When investigating cigarette acquisition by under-aged Finnish adolescents, Rimpelä and Rainio found that friends were a common source, even more important among the younger adolescents than commercial sources.<sup>3</sup> The acquisition of snus followed the same pattern. Travelling adolescents, older friends or even adults can act as go-betweens or dealers reselling snus to friends and acquaintances. This shows that not even a complete ban is sufficient as people find ways to get around it. In the Finnish case this was easy as import for personal use was allowed and no clear limit for the amount was set.

Regular snus users rarely reported obtaining their products from commercial sources. The National Product Control

**Table 2** Percentage of experimental and daily or occasional snus users by age and sex in 2003

Age group	Have experimented with snus (%)		Daily or occasional use of snus (%)	
	Boys	Girls	Boys	Girls
12 years	0.8	0	0.3	0.0
14 years	8.7	3.5	1.3	0.5
16 years	30.4	12.0	7.1	0.6
18 years	44.0	17.6	8.5	0.9



**Figure 1** Proportion (%) of adolescents who had tried snus (—), who use snus daily/occasionally (—▲—), and daily smokers (-----) by age (14-, 16-, 18-year-olds), sex and study year. TA=(Tobacco Act), 1995 snus sales ban.

**Table 3** Percentage of snus acquisition among daily or occasional and experimental snus users in 2001

	Snus use	
	Daily or occasional (n = 262)	Experimental (n = 1052)
Places to get snus		
From friends or acquaintances	83.6	79.3
Trips to Sweden or Estonia	54.6	18.6
Under the counter (kiosk, store or service station)	23.7	5.1
A sport team	6.5	0.3
From strangers	3.1	1.2
From street vendors	3.4	0.6
Somewhere else	4.2	1.4

Agency is responsible for overseeing and steering the Tobacco Act implementation at national level. During their regular inspections, the local health inspectors also check tobacco products, which is why snus, if sold illegally, is not on display. They can issue a warning if selling of snus is observed and set a time limit by which the activity shall be terminated. If disobedience continues, the authority should notify the public prosecutor, but only in the case of repeated violations can the retailer be fined. Between 1997 and 2003, only 1–5 cases of illegal snus sales were reported annually. On the other hand, even when large quantities of snus were found, this was claimed by the owner to be “for personal use”.

While the revision of the tobacco law in 1994 forbidding snus sales was being processed in the Parliament, a lively discussion was displayed in the media about snus. It is most likely that the interest of adolescents in this more or less novelty product grew, particularly as it was believed to be less



hazardous than smoking. That snus was seen as a kind of novelty finds corroboration in that even among young adults snus use was rare.<sup>18</sup>

Two factors working in favour of snus use before the sales ban need attention, namely snus use among athletes and the health hazards linked with passive smoking. The sales ban did not reduce their influence. Participants in team sports were remarkable snus users already in the 1980s, especially ice hockey and floor ball players.<sup>16–23</sup> That athletes preferred smokeless tobacco was seen also in an American study.<sup>24</sup> A likely explanation was twofold: it was less harmful than smoking inasmuch as it does not affect lung functioning, and it was used for relaxation after strenuous physical activity.<sup>25</sup>

The growing concern about the health hazards of passive smoking prepared the ground for a smokeless vehicle of nicotine. This awareness was highlighted in the discussion on the reform of tobacco legislation in 1995, simultaneously with the snus sales ban. The reform concerned restrictions of smoking in restaurants and cafeterias. Some years later, the discussion elaborated on further reforms of the tobacco legislation restricting smoking in work places. These reforms changed the general public attitude towards more anti-smoking. On the other hand, adolescents, like the majority of people, lack knowledge of the health hazards of snus, and are thus unable to assess its use or comprehend the hazards involved.

A major factor influencing tobacco use is the price. In adolescence, this fact carries even more weight. Comparing prices for snus and cigarettes is difficult, but in general one portion or pinch of snus bought from the ferries between Finland and Sweden costs much less than one cigarette. In Finland, price policy as a “regulating instrument” is not available because the product is not legally sold.

A further concern here is that experimenting with snus was observed already among the 12-year-olds. Among the 14-year-olds, nearly one in 10 had tried it. Snus seems to contribute to the development of nicotine addiction among the very young. Even the youngest age groups are interested in snus if available.

This study has limitations related to postal surveys. The comparability of surveys over time was ensured by keeping the data collection, sampling and questionnaires as similar as possible over the years. The main concern in comparability is the declining response rate, which, however, affects the trends only if a possible response bias changes over time. The test–retest reliability of snus questions was good, but indirect analysis of non-response indicated a slight underestimation of the prevalence of snus use. A non-direct analysis elsewhere showed that even if there is an underestimation of snus use, this does not affect the trends to any significant degree. There is no reason to believe that underreporting had changed much over time. Other studies confirm that adolescents in general give valid reports of their tobacco use.<sup>26</sup>

Figures on snus use in our study are in close conformity with other Finnish studies. The prevalence of experimental snus use among 15–24-year-old males was 39.2% and among females 16.7%, and the figure for daily/occasional use among males was 9.6% in 2003.<sup>18</sup> Figures from a classroom survey for 15-year-olds were compared with 16-year-olds in our study, showing a higher experimental snus use (32.8%) for boys than in our study and a somewhat lower rate (10.1%) for girls.<sup>23</sup>

## Conclusions

The first conclusion to be reached from our study is that eradication of snus use in Finland is difficult as long as snus is easily available through traffic to neighbouring countries and import for personal use is allowed. When Sweden was allowed an exception in the EU directive forbidding snus sales, it was required to prevent drift of snus across the borders.<sup>27</sup> The semi-independent Åland Islands of Finland

## What this paper adds

Figures for adolescent smokeless tobacco use are known in the United States but in only a few European countries. In European cross-national adolescent surveys, snus use has not even been asked about. There are no studies about the long term effects of total snus sales bans.

Our results show that the total sales ban in Finland did not stop snus use. Increase in snus use continued after the ban. Users rarely reported obtaining snus from commercial sources, but friends of adolescents who travel to neighbouring countries act as go-betweens reselling snus. Eradication of snus use is difficult as long as snus is easily available through traffic to neighbouring countries. Snus is even used by the youngest adolescents, thus contributing to the nicotine dependence process.

has been until now selling snus in its area. Secondly, snus is used by the youngest adolescents, thus contributing to the nicotine dependence process. Thirdly, as snus is sold in the EU area, there is a possibility that youth outside the Nordic region have adopted its use. As usually only smoking is asked about in youth surveys, we may have a false image of the non-existence of this phenomenon in other European countries.

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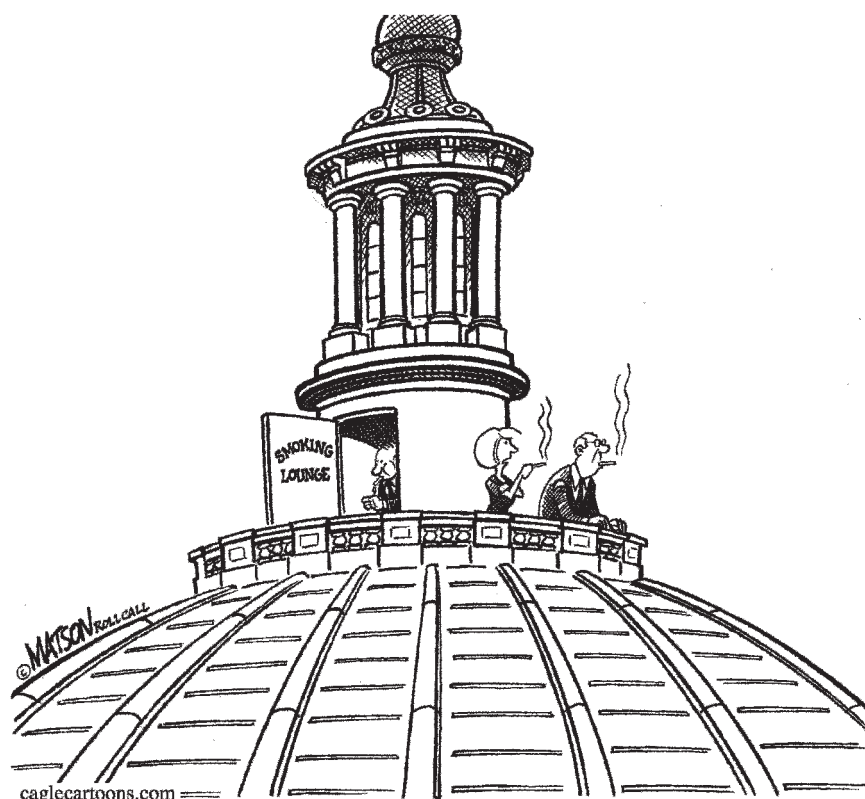
Competing interests: none declared

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## The Lighter Side



"NO, I DON'T REMEMBER WHEN TOBACCO WAS KING"

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