

ORIGINAL INVESTIGATION

Patterns of Dual Use of Snus and Cigarettes in a Mature Snus Market

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ABSTRACT

Introduction: We examine the prevalence of dual use of snus and cigarettes among Norwegian men by categorizing dual use into four categories according to the frequency of use of each product, considering the order of uptake of both products, and examining reasons for additional snus use. We compare dual users and exclusive cigarette smokers with respect to their smoking intensity, plans for quitting smoking, and future smoking identity.

Methods: We used a data pool of six cross-sectional, national representative surveys conducted annually in the period 2005–2010 containing a total of 3,524 males aged 16–74.

Results: 6.8% of men had some kind of current concomitant use of snus and cigarettes—but only 1% reported a daily consumption of both products. The most typical pattern of dual use was a combination where daily use of one product was paired with occasional use of the other. Dual users consumed significantly fewer cigarettes per week (56.6; $n = 226$; SD , 53.82) than smokers who had either quit snus (79.6; $n = 108$; SD , 61.47) or single smokers with no history of snus use (80.2; $n = 621$; SD , 55.86). Only 24% with a history of dual use reported snus to be their first tobacco product, but the proportion who had initiated tobacco use with snus increased significantly with younger age. Among dual users with daily intake of snus, a majority of 53.6% reported that the purpose of their snus use was to quit smoking. A higher proportion of dual users (74.4%; 95% CI , 68.8–80.0; $n = 235$) than exclusive smokers (61.3%; 95% CI , 57.6–65.0; $n = 658$) reported that they most definitely or probably would be totally smoke-free 5 years into the future.

Conclusions: In the mature snus market of Norway, the magnitude of dual use of cigarettes and snus is relatively small. Dual users consume fewer cigarettes, and a higher proportion portray themselves as smoke-free in the future than do exclusive cigarette smokers.

INTRODUCTION

In Norway, use of noncombustible tobacco has a long tradition. Until 1930, plug tobacco for chewing was the most popular tobacco product holding a 60% market share at the most. After World War II, the sale of plug tobacco rapidly declined and moist snuff—a product not unlike what nowadays is called snus—became the most popular smokeless tobacco product. During the period 1910–1965, moist snuff held a stable market share of approximately 10%, followed by a 25-year period where the sale of snus was at a historic minimum with market share below 5%. The spread of smoke-free ordinances, growing antismoking norms, several tax hikes on cigarettes, and hard-hitting antismoking campaigns might explain why the sale of moist snuff started to increase after 1990. This rise was first observed among men but from 2005 also among women. The tobacco industry also diversified its product offerings. The new

snus products differed from conventional smokeless tobacco in that they were lower in major carcinogens such as tobacco-specific nitrosamines and polycyclic aromatic hydrocarbons (Stepanov, Jensen, Hatsukami, & Hecht, 2008; Stepanov et al., 2010), they did not require spitting, they came in a variety of flavors such as mint and eucalyptus, and they were packed in elegant and colorful tin boxes in which the tobacco was baked into small pouches. These innovations certainly made snus more user-friendly and probably also increased its appeal, not only to established smokers, but also to young people without any prior history of tobacco use.

In 2011, the market share for snus in Norway reached a record of 30%. However, applying the theory of diffusion of innovations (Rogers, 2003), the snus epidemic has recently started to show some signs of peaking. Among young men—the historic pilots in the post 1990-diffusion of snus—the increase in the proportion of snus users has leveled off. In this

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segment, use of snus is no longer over-represented among male university students—who often represent early adopters of new trends—but is evenly distributed across all socioeconomic groups (Lund, Tefre, Amundsen, & Nordlund, 2008).

The present configuration of the snus epidemic in Norway carries many of the characteristics typical for stage II and III in the descriptive four-stage model of the diffusion of cigarettes in industrialized countries (Lopez, Collishaw, & Piha, 1994). Given the fact that the male snus epidemic is at present in a relatively progressed stage—in contrast with the U.S. tobacco market where the sale of snus has only recently started to increase—Norway might represent an interesting case to study the combined use of snus and cigarettes among men. Dual use leads to increased exposure to toxicants and might represent a particular health risk to smokers beyond the risk from exclusive use of cigarettes, as was found in the U.S. INTERHEART study (Teo et al., 2006). Even if there is a medical consensus that snus is far less harmful than cigarettes (Scientific Committee on Emerging and Newly Identified Health Risks [SCENIHR], 2008), there is a concern that the availability of snus might result in dual use and therefore jeopardize the potential role of snus from a harm-reduction perspective (Tomar, Alpert, & Connolly, 2010; Tomar, Fox, & Severson, 2009).

In a much cited simulation study, to evaluate the health impact of snus promotion as part of a harm-reduction strategy in the United States, the prevalence of dual use was regarded the single most important predictor of population health effects (Mejia, Ling, & Glantz, 2011). However, a review of available literature that was initiated by the tobacco company Altria Group concluded that there were no unique health risks associated with the dual use, which were not anticipated or observed from single use of these products. Moreover, the authors concluded that dual users were more likely to reduce smoking intensity and eventually quit smoking but were less likely to stop all tobacco use altogether (Frost-Pineda, Appleton, Fisher, Fox, & Gaworski, 2010).

Research on dual use of snus and cigarettes is in its infancy and an exact definition does not exist as yet. Information on prevalence and complexity of dual use will be an essential input in simulation models designed to estimate net effects on public health from the availability to snus. Direct observations of dual use from Norway and Sweden, two countries with a full-blown snus epidemic, might be a more valid input in such models than different scenarios of dual use disconnected from any empirical basis, as was the case in a model from the relatively snus-naïve United States (Mejia et al., 2011).

In this report, we examine the prevalence of dual use of snus and cigarettes among men by categorizing dual use into four categories according to the frequency of use of each product, considering the order of uptake of both products, and examining reasons for additional snus use. We compare dual users and exclusive cigarette smokers with respect to their smoking intensity, plans for quitting smoking, and future smoking identity using a representative sample of adult Norwegian males ($N = 3,524$) who contributed data on tobacco use from 2005–2010.

METHODS

Samples and Procedures

We used data from six annual cross-sectional surveys of tobacco behavior, comprising a representative sample of the

adult Norwegian population (16+ years). Data were collected by telephone by Statistics Norway—a governmental body responsible for official statistics. Samples were drawn from Statistics Norway's own population database, which is updated every month with the National Population Register. The original annual sample was $N = 2,000$ (both sexes), minus a small sample each year that was not eligible due to death or emigration (varied between 13 and 32 respondents). Dual use of cigarettes and snus has been monitored since 1985. The samples were adjusted for gender, age, and region—but not education level—in accordance with the population numbers for each survey year. Calculations regarding order of uptake, cigarette consumption, reasons for additional snus use, plans for quitting smoking, and future smoking identity were based on a data pool consisting of six independent annual surveys for the period 2005–2010 including a total of 3,524 men. The annual response rate for these surveys was 65% (2005), 62% (2006), 62% (2007), 59% (2008), 60% (2009), and 57% (2010).

Measures

The wordings of the questions for the variables used in this study were identical for every survey year. Smoking status was measured in two steps. The screening question was: "Do you smoke sometimes?" Those who answered yes were then asked: "Do you smoke daily or occasionally?" Those who answered no to the screening question were asked: "Have you ever smoked daily or occasionally?" Those who answered yes to either of these alternatives were termed former smokers. Snus use was measured by the question: "Do you use snus daily, occasionally, or not at all?" Those who answered no were asked: "Have you ever used snus?" in a yes/no format. Based on these questions, we were able to identify dual use in accordance with a soundly based proposal for definition recently put forward by Klesges et al. (2011); daily use of one product and at least weekly use of the other. Moreover, we could also identify groups with the combination of current exclusive use of one product and former use of the other.

Exclusive and dual users of cigarettes and snus were asked to state their average number of cigarettes consumed per day (daily smokers) or per week (occasional smokers). When comparing smoking intensity across groups, daily consumption was computed into weekly consumption. Significant differences between group means were identified with p values using independent t tests.

People who had lifetime experience with both products were asked "Which tobacco product did you start to use first—snus or cigarettes?" with response categories "cigarettes first," "snus first," and "at about the same time (within 3 months)."

Current dual users were asked how well three relevant motives for additional snus use (Gilljam & Galanti, 2003) described their situation: "I use snus to (a) stop smoking completely, (b) reduce the amount of cigarettes I smoke, and (c) to replace cigarettes in places where smoking is allowed." Response categories ranged from 1 (*apply fully*) to 5 (*do not apply at all*). In order to identify significant differences in motives for snus use between daily and occasional snus users, 95% CI were calculated.

Exclusive smokers and dual users were asked in a yes/no format if they had intentions to quit smoking within the next 6 months. Moreover, both groups were asked whether they perceived themselves to be smokers 5 years in the future. Response categories were as follows: definitely yes, probably

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yes, probably no, and definitely no. All data analyses were performed in SPSS version 19.1.

RESULTS

The share of Norwegian men who reported daily or occasional use of cigarettes, but no other tobacco product, has declined from close to half in 1985 to below one in five in 2010. For the same period, the percent of exclusive snus users (daily or occasional) increased from 3% to 12%. The segment of dual users of cigarettes and snus has been stable (4%–7%) for the whole period. The overall percentage of tobacco users decreased from 54.4% to 37% (Figure 1).

For the period 2005–2010, 6.8% of men had some kind of current concomitant use of snus and cigarettes—but only 1% reported a daily consumption of both products. Moreover, 5.3% of men who had quit smoking were using snus at the time of the survey and 3.3% had quit snus and were exclusively smokers. An additional 3.5% reported to have quit both snus use and smoking, but for these people, no information exists as to whether this had been simultaneous use (Table 1).

The most typical pattern of dual use was a combination where daily use of one product was paired with occasional use of the other. Among daily snus users, 21.6% were smoking occasionally, whereas 9.8% were using cigarettes on a daily basis. Among occasional snus users, 40.9% smoked daily, whereas 15.6% smoked occasionally (Table 2).

Dual users consumed significantly fewer cigarettes per week (56.6; $n = 226$; $SD, 53.82$) than smokers who had either quit snus (79.6; $n = 108$; $SD, 61.47$) or were exclusively smokers with no history of snus use (80.2; $n = 621$; $SD, 55.86$; data not shown).

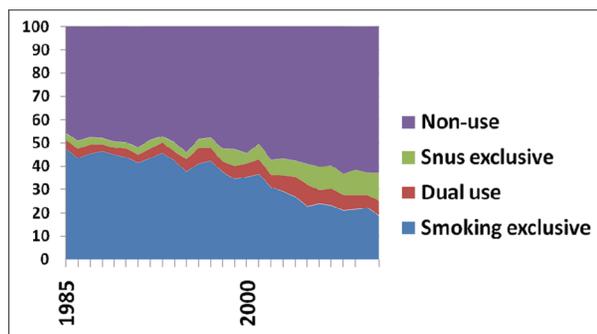


Figure 1. Use (daily + occasional) of snus and cigarettes in Norwegian males aged 16–74 for the period 1985–2010.

Table 1. Status of Tobacco Use Among Norwegian Males Aged 16–74 ($N = 3,524$; Total Percentages, Pooled Data, 2005–2010)

Smoking status	Snus use status				Total
	Daily	Occasional	Former	Never	
Daily	1.0	2.6	2.4	15.1	21.1
Occasional	2.2	1.0	0.9	4.1	8.2
Former	4.0	1.3	3.5	21.0	29.8
Never	3.0	1.5	1.8	34.6	40.9
Total	10.2	6.4	8.6	74.8	100.0

Nearly 75% of dual use had started with cigarettes. Only 24% reported snus to be their first tobacco product. However, the proportion who had initiated tobacco use with snus, increased significantly with younger age (Table 3). Among men with a history of dual use, 42.9% (95% $CI, 35.9$ – 49.9 ; $n = 191$) of the cigarette initiators and 57.5% (95% $CI, 46.2$ – 68.8 ; $n = 73$) of the snus initiators reported to be exclusive snus users at the time of the survey (data not shown).

The percentages for current dual users who agreed fully or partly (score 1 or 2) to the motives for additional snus use are displayed in Table 4. Among dual users, 43.3% ($n = 238$) reported that the purpose of their snus use was to quit smoking. A significantly higher proportion of daily snus users (53.6%, $n = 112$) as compared with occasional snus users (34.1%, $n = 126$) reported that the purpose of their snus use was to quit smoking. Among smokers with occasional snus use, smoking reduction (53.2%, $n = 126$) and smoking substitution (55.6%, $n = 126$) were significantly more prevalent reasons to use snus than smoking cessation, mirroring the pattern with all dual users. Among smokers with a daily intake of snus, this difference was not significant (Table 4).

No significant difference was observed between dual users (49.8%; 95% $CI, 43.5$ – 56.1 ; $n = 238$) and exclusive smokers (43.2%; 95% $CI, 39.5$ – 46.9 ; $n = 679$) with respect to the proportion that planned to quit smoking within the next 6 months (data not shown). However, a significant higher proportion of dual users (74.4%; 95% $CI, 68.8$ – 80.0 ; $n = 235$) than exclusive smokers (61.3%; 95% $CI, 57.6$ – 65.0 ; $n = 658$) reported that they most definitely or probably would be totally smoke-free 5 years into the future (data not shown).

DISCUSSION

The increase in snus use has not been paralleled by an increase in dual use of snus and cigarettes, and dual users constitute a small percentage (<7%) of males in Norway—a country where both products have been on the market for more than 100 years. The typical pattern of dual use is a combination where daily use of one product is paired with occasional use of the other. Second, among respondents with a history of dual use, only 24% had started with snus before cigarettes, but this fraction increased to 40% in the youngest age group. Third, cigarette consumption was significantly lower among dual users compared with exclusive smokers (~3 cigarettes/day fewer). Fourth, among dual users smoking reduction and smoking substitution were significantly more prevalent reasons to use snus than smoking cessation. Finally, compared with exclusive

Table 2. Smoking Status Across Snus Use Status Among Males (Column Percentage and 95% CI)

Smoking status	Snus use status				Total
	Daily	Occasional	Former	Never	
Daily	9.8 (6.7–12.9)	40.9 (34.5–47.3)	28.0 (22.9–33.1)	20.2 (18.7–21.7)	21.2
Occasional	21.6 (17.3–25.9)	15.6 (10.9–20.3)	10.0 (6.6–13.4)	5.5 (4.6–6.4)	8.1
Former	39.5 (34.4–44.6)	20.4 (15.3–25.7)	41.3 (35.7–46.9)	27.9 (26.2–29.6)	29.8
Never	29.1 (24.4–33.8)	23.1 (17.6–28.6)	20.7 (16.1–25.3)	46.3 (44.4–48.2)	40.9
Total	100 (<i>n</i> = 357)	100 (<i>n</i> = 225)	100 (<i>n</i> = 300)	100 (<i>n</i> = 2,642)	100 (<i>N</i> = 3,524)

Table 3. Order of Use of Cigarettes and Snus Among Males With a History of Dual Use (Column Percentage and 95% CI)

	Age group			
	15–24 years	25–44 years	45+ years	All age groups
Cigarettes first	55.0 (45.7–64.3)	72.5 (66.4–78.6)	94.3 (89.9–98.7)	73.4
About same time	4.6 (0.7–8.5)	1.9 (0.1–3.8)	1.9 (0.0–4.5)	2.6
Snus first	40.4 (31.2–49.6)	25.6 (19.7–31.6)	3.8 (0.1–7.5)	24.0
Total (<i>n</i>)	100 (109)	100 (207)	100 (105)	100 (421)

Table 4. Percentage of Dual Users of Snus and Cigarettes (Daily and Occasional) Agreeing With Statements Concerning Motives for Snus Use

	Snus use status		
	Daily (<i>n</i> = 112)	Occasional (<i>n</i> = 126)	Both groups (<i>n</i> = 238)
I use snus to quit smoking completely	53.6 (44.4–62.8)	34.1 (25.8–42.4)	43.3 (37.0–49.6)
I use snus to reduce the amount of cigarettes I smoke	63.4 (54.5–72.3)	53.2 (44.5–61.9)	58.0 (51.7–64.3)
I use snus to replace cigarettes in places where smoking is not allowed	64.3 (55.4–73.2)	55.6 (46.9–64.3)	59.7 (53.5–65.9)

smokers, there was no evidence that dual use–lessened plans to quit smoking.

Magnitude of Dual Use

The relatively small magnitude of dual use in Norway resembles what has been observed in neighboring Sweden (Engström, Magnusson, & Galanti, 2010; Lundqvist, Sandström, Öhman, & Weinehall, 2009; Ramström & Foulds, 2006; Stegmayr, Eliasson, & Rodu, 2005)—another country with a long history of extensive snus use. In countries where promotion of snus is permitted, dual use may eventually develop to higher proportions than what is observed in Scandinavia. In the United States, nearly the entire smokeless tobacco market is controlled by cigarette manufacturers (Tomar, Fox, & Severson, 2009), who typically advertise snus to smokers for situational use when they cannot smoke due to smoke-free policies (Timberlake, Pechmann, & Tran, 2011). There is a concern that such promotion of snus to smokers could result in dual use rather than completely switching to snus (Mejia et al., 2011; Tomar et al., 2010). In fact, tobacco industry documents indicate that the dual use of cigarettes and snus is an industry marketing goal (Carpenter, Connolly, Ayo-Yusuf, & Wayne, 2009). However, a recent study found that the concomitant use of snus and cigarettes is relatively uncommon in the United States at this stage (Tomar et al., 2010), but the magnitude depends very much upon the operational definition of dual use (Klesges et al., 2011).

It is important to emphasize that the market shift from cigarettes to snus in Norway and Sweden has happened in a “dark market” where any active promotion of snus has been banned for decades. Indeed, the Scandinavian health authorities have strongly warned smokers against all kinds of snus use even as a method for smoking cessation (Holm, Fisker, Larsen, Puska, & Halldórsson, 2009). The typical message has been that snus is not a safe alternative to cigarettes. At present, smokers woefully overstate the health risk from snus compared with cigarettes (Lund & Scheffels, 2012; Øverland, Hetland, & Aarø, 2008; Wikmans & Ramström, 2010; see Lund, 2012 for a discussion). Dissemination of information from the authorities to correct such misconceptions might speed up the trajectory from smoking to snus use, but it might also—temporary or permanently—increase the proportion of dual users.

Even if the fraction of dual users of snus and cigarettes was small in the total male population, 9.8% of daily snus users and 40.9% of occasional snus users were daily cigarette smokers. The prevalence of dual use has also been found to be high among smokeless tobacco users in some (Bombard, Pederson, Nelson, & Malarcher, 2007; Tomar, 2002; Tomar et al., 2010), but not all (Zhu et al., 2009), U.S. studies. As observed in the United States, “some day” snus users were more likely to be current daily smokers than any other group, while daily snus users had the lowest prevalence of daily smoking. There is some evidence that this relationship is caused by a certain

trajectory of tobacco use among dual users, many occasional snus users are at the time of the survey caught in an incomplete transition phase of stopping smoking daily and will replace cigarettes with daily use of snus later (Lindström & Isacson, 2002; Ramström & Wikmans, 2011; Rodu, Stegmayr, Nasic, & Asplund, 2002; Rodu, Stegmayr, Nasic, Cole & Asplund, 2003; Wetter et al., 2002; see Frost-Pineda et al., 2010 for a discussion). There is also some evidence that dual use is not entirely a transient phenomenon; many “some day” users of snus use both products interchangeably without trending toward either product (Norberg, Lundqvist, Nilson, Gilljam, & Weinehall, 2010). Longitudinal research targeting the nature of dual use and its relation to smoking cessation is warranted, as well as research into how this trajectory is influenced by provision of information on relative risks (for discussion, see Lund, 2012).

Smoking Intensity

A potential mechanism by which snus theoretically can reduce tobacco harm is by serving as a partial substitute for cigarettes among continuing smokers, supported here by the large proportion of dual users saying that this is why they were dual users. There is some evidence both from the United States (Hatsukami, Lemmonds, & Tomar, 2004; Tomar, 2002) and Sweden (Gilljam & Galanti, 2003) that dual users of cigarettes and snus smoke fewer cigarettes, on an average, than do exclusive smokers. In addition, in a study of U.S. military personnel, the proportion who smoked cigarettes everyday during the past month was significantly lower among dual smokers compared with exclusive smokers (Rae Olmsted, Bray, Reyes-Guzman, Williams, & Kruger, 2011). There is also some evidence that unsuccessful attempts at using snus to quit smoking is likely to result in reduced smoking intensity (Carpenter & Gray, 2010; Lund, McNeill, & Scheffels, 2010; Ramström & Foulds, 2006). Consistent with these findings, exclusive cigarette smokers in Norway reported a weekly cigarette consumption that was 40% above that of dual users of snus and cigarettes among men. In spite of lower cigarette consumption, Tomar et al. (2010) found that dual users tended to have the higher levels of serum cotinine—an indicator of nicotine intake—than exclusive smokers.

Order of Initiation

Even if cigarette smoking (daily or occasional) is relatively common among daily (31.4%) and in particular occasional snus users (56.5%; Table 2), the group who began to use snus and then started to smoke cigarettes later represent only a small minority of present-day snus users. As found in the United States (Zhu et al., 2009) and in Sweden (Furberg, Lichtenstein, Pedersen, Bulik, & Sullivan, 2006), the majority of snus users either do not smoke in addition to using snus or else they began to smoke before they began to use snus. This indicates that any potential gateway effect from snus to cigarettes must be modest at the present stage of the snus diffusion curve. However, the concern is that the initiation of snus use has occurred at a younger age over time, whereas the age of starting smoking has been stable (Lund, 2009). At the same time, the proportion of snus users is increasing, whereas the proportion of smokers is decreasing. In other words, more and more people begin to use snus at an increasingly earlier age, while increasingly fewer young people begin to smoke. If a

gateway effect from snus to cigarettes exists, its effect will be enhanced under these conditions. Our study showed that the percentage of snus initiators among dual users increased from 3.8% in the group above 45 years to 40.4% in the age group 15–24 years. Assuming that this pattern is caused by a birth cohort effect and not a life cycle effect (age effect) (see Kleinbaum, Kupper, & Morgenstern [1982: 130–132] for a discussion), we have reasons to believe that the future pattern of tobacco initiation among adults will differ as today’s young people progress through life if other contextual factors (e.g., information on relative health risks) remain the same.

Plans to Quit Smoking

Snus may have the potential to reduce exposure to tobacco toxins, but snus may also have the unfavorable potential to delay cessation. A prospective study from the United States demonstrated that dual users were less likely to achieve abstinence from tobacco over a 4-year period compared with exclusive users of either product (Wetter et al., 2002). A recent study conducted in some of the test markets for snus in the United States revealed that smokers who had no immediate plans to quit were more likely to try snus (Biener, McCausland, Curry, & Cullen, 2011). Consistently, Timberlake (2009) and Gartner, Jimenez-Soto, Borland, O’Connor, and Hall (2009) also found that the intention to quit smoking was inversely associated with an interest in switching to snus. In our study, no such difference in intention to quit smoking within the next 6 months was observed between dual users of snus and cigarettes and exclusive smokers. This was consistent with recent findings from Sweden (Ramström & Wikmans, 2011). On the contrary, expectancies of being smoke-free 5 years into the future was significantly more prevalent among dual users than exclusive smokers. Thus, no empirical evidence in support of delayed smoking cessation among dual users was observed in our study.

Motives for Snus Use

Consistent with previous findings in Norway (Lund, Scheffels, & McNeill, 2010, Lund et al., 2010) and Sweden (Norberg, Malmberg, Ng, & Broström, 2011; Ramström & Foulds, 2006), former smokers made up the largest segment among daily snus users (39.5%) and former snus users (41.3%; Table 2). In accordance with this, we found that a majority of 53.6% ($n = 112$) of dual users with a daily intake of snus reported that the purpose of their snus use was to quit smoking (Table 4). However, consistent with observations in Sweden (Gilljam & Galanti, 2003), our study also indicates that harm-reduction issues such as smoking reduction (63.4%, $n = 112$) and smoking substitution (64.3%, $n = 112$) are important motives for additional snus use—motives that go along with nicotine maintenance. Among dual users with intermittent snus use, only 34.1% ($n = 126$) reported that the purpose of their snus use was to quit smoking. Smoking reduction (53.2%, $n = 126$) and smoking substitution (55.6%, $n = 126$) were significantly more prevalent reasons to use snus than smoking cessation in this group.

Strengths and Limitations

In evaluating our study findings, some strength and limitations should be noted. Strengths that lend confidence to our findings

include a population-based methodology, a robust data pool ($N = 3,524$), an acceptable ($>60\%$) and a relatively stable response rate, and standardized measures of tobacco behavior. However, all behavioral characteristics were based on self-reports and may be affected by under- or over-reporting or misclassification due to imperfect recall. The study findings are probably also product-, culture- and gender-specific, and the generalizability of our results to other populations than Norwegian males might be limited. Moreover, the under-representation of respondents with limited education in the samples from Statistics Norway may suggest that the observed findings only hold for more educated people.

CONCLUSIONS

The increase in snus use among men in Norway has not been paralleled by an increase in dual use of snus and cigarettes. The prevalence of smoking—the far most dangerous form of nicotine uptake—is quite low among men who use snus everyday but generally quite high among men who use snus on a less-than-daily basis. Use of snus also seemed to lower cigarette consumption. Dual use did not lessen plans to quit smoking within 6 months but increased expectancies of being smoke-free 5 years into the future. Reasons for additional snus use was related to smoking cessation but also to harm-reduction issues that go along with nicotine maintenance. Further research in this project will contrast risk profiles of dual use and single smokers using different definitions of dual use and eventually estimate health effects on the societal level in simulation models.

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DECLARATION OF INTERESTS

None declared.

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