

Associations between adolescent socioeducational status and use of snus and smoking

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Received 23 October 2009

Accepted 23 February 2010

Published Online First

14 June 2010

ABSTRACT

Background Findings from studies on the association between smoking and socioeconomic status are mixed. While adolescent smoking is reduced in many countries, use of smokeless tobacco seems to increase.

Associations between socioeducational status and smoking as well as use of snus (smokeless tobacco), and to what extent these associations had changed significantly from 2004 to 2007 (a period of relatively abrupt changes in tobacco use in Norway), were examined.

Methods Data from two national representative cross-sectional studies of Norwegian 16–20 year olds, where participants were asked questions allowing us to construct indicators of socioeducational status, was used. Information was also collected about the adolescents' smoking and use of snus, as well as their intentions with regard to future use of these products.

Results Adolescents with a lower socioeducational status had much higher odds for smoking compared to those with higher socioeducational status (ORs ranged from 2.9 to 3.8). There was no similar association between socioeducational status and snus use (ORs ranged from 0.6 to 1.2). No support was found for a change in the socioeducational status—smoking/snus use association from 2004 to 2007.

Conclusions Adolescents' socioeducational status was associated with smoking for boys and girls, while there was no similar association with snus use. This may indicate that snus truly deviates from how smoking is distributed across social strata or that snus is at a much earlier stage in the social diffusion process.

INTRODUCTION

The finding that health is associated with indicators of socioeconomic status (SES) is among the more well established and consistent ones in social epidemiology.¹ Explanatory models illustrating this frequently include smoking as a main factor.¹ One obvious reason for this is that smoking contributes to so many different diseases and health problems.^{2,3} And, across the Western world, higher smoker rates are repeatedly found among those of lower SES, consistent with the predictions of the tobacco epidemic diffusion model.^{3–5} Such SES differentials in smoking rates could reflect higher cessation rates in the higher SES groups,⁶ but also a higher rate of smoking initiation in lower SES strata. The latter would suggest an association between SES and smoking in adolescence, the age when the vast majority of smokers pick up and establish the habit. Several studies suggest that associations between socioeconomic status and health in general, are modest among adolescents.^{7–9} However for

smoking, a review from 2007 showed that of 44 included studies, 30 (68%) indicated more smoking with lower SES.¹⁰ Broken down by age group, 8 of 15 studies on adolescents aged 15–21 supported such a negative association, 3 found no association, while 4 found a positive association with more smoking among those of higher SES.¹⁰ The authors reported a paucity of studies examining gender-specific associations on this topic, and nearly all the studies used indicators of parent SES such as parents' education or family income. The validity of parent-defined SES for adolescents has been questioned.⁸ At some point, most adolescents undertake their own choices of what to do in terms of education and what kind of career they will aim for. These choices may be a better indicator of their social position at present and in the future than parent derived variables, and may be more strongly associated with their own health behaviours.

A recent Norwegian study demonstrated a strong reduction in adolescent smoker rates over the period 2004–2007. This coincided with a strong increase in use of snus (the most common form of smokeless tobacco in Norway): For girls, the rates tripled (from 2 to 7%), while in boys use increased from 19 to 25% (see figure 1).¹¹ Increasing use of snus has also been found in Finland,¹² Sweden,¹³ and the US.¹⁴ This development should spur more studies of the SES correlates of snus use than the two studies we were able to identify; a Swedish study has shown more snus use among children whose parents have compulsory school only, and also among boys and girls who attended vocational upper secondary schooling.¹⁵ A Norwegian study found no association between family economy and snus, but significantly less snus use among adolescents with plans for taking higher education themselves.¹⁶ Both papers suggest a negative SES—snus use association, and indicate that adolescents' own SES indicators could reflect this better than parent-derived measurements. In the present study, we examined associations between the adolescents' main daily activity, reflecting their socioeducational status, and use of snus and smoking.

First, we examined the general and gender-specific associations between socioeducational status and smoking and use of snus. Next, we ran supporting analyses examining the associations between socioeducational status and intentions of future use of these tobacco products, and also the associations between the adolescents' plans for higher education and current smoking and snus use status. Finally, we wanted to see if the strength of the hypothesised associations between socioeducational status and use of tobacco products had changed from 2004 to 2007.

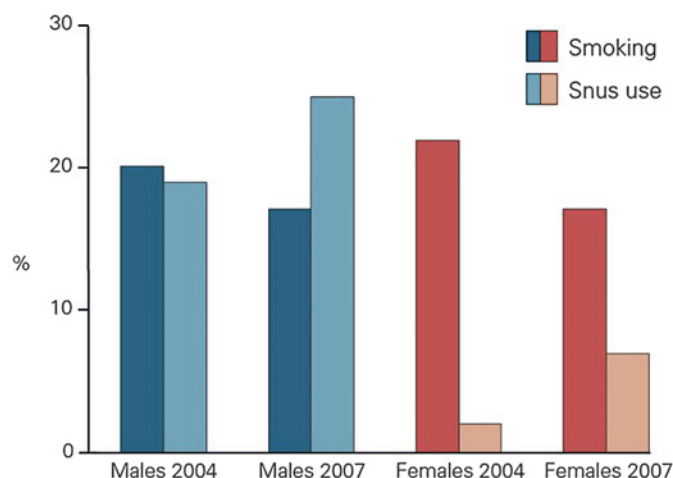


Figure 1 Rate (%) of smokers and snus users (every day or every week) in the two surveys for men and women (reproduced with permission from *The Journal of the Norwegian Medical Association*).

METHODS

The data used in the present study originate from two separate surveys on tobacco use and related topics carried out in 2004 and 2007. The participants composed representative samples of Norwegian adolescents and young adults aged 16–20. All variables relevant for the present study were framed in the exact same wording, and we could therefore combine the datasets to examine if the associations examined changed in a period of strong changes in adolescent tobacco consumption. The surveys, funded by the Norwegian Directorate of Health, were performed as telephone interviews, carried out by professional survey bureaus.

Data collection procedure

In 2004, 6632 adolescents born in the period 1984–1988 were randomly drawn from the Norwegian population registry within predefined quotas reflecting age, gender and geographical distribution in the source population. These adolescents were sent a letter with brief information about the study, the interview procedure involved and that they, upon participation, would enter a draw for 10 gift certificates, each worth NOK 500 (about £50). In October 2004, the survey was carried out with interviews being conducted until the predefined goal population of 2400 was achieved (1230 boys, 1170 girls). Of the potential informants reached, 348 persons responded but refused to participate, while 1768 calls were made without anybody picking up the phone. This translates to a formal response rate of 53% and cooperation rate of 87%.

The 2007 data collection was carried out over 2 weeks starting in mid September. This time a sample of 5000 potential participants was drawn from the population registry and invited and informed in writing. During this interview process, 1188 persons responded to the calls but refused to be interviewed, while 1246 calls were never answered, translating to a formal response rate of 50% and cooperation rate of 67%. The data collection was ended after reaching a sample of 2415 respondents; 1211 boys and 1204 girls.

Variables

The participants were asked about what their current main daily activity was, within the following predefined alternatives: 1='working', 2='general upper secondary school', 3='vocational upper secondary school', 4='university or college studies',

5='military service', 6='civil service', 7='folk college', 8='unemployed/benefit recipient', or 9='other'. In Norway, general upper secondary schools have an emphasis on theoretical subjects (social studies, mathematics, history etc), while vocational upper secondary schools focus more on practical and theoretical teaching towards specific occupations such as accountant, carpenter, electrician and so forth. Most Norwegian men are drafted to mandatory military service, often immediately after upper secondary school, with civil service as an alternative for those refusing due to, for example, ideological reasons. The various 'Folk colleges' provide a widely varied curriculum and usually last for 1 year. We collapsed the response categories into three predefined categories reflecting differences in SES: 'vocational' (categories 1 and 3), 'academic' (categories 2 and 4) and 'other' (categories 5 to 9).

As a supporting analysis, we used another item on plans for higher education: 'Are you planning to take higher education at a university or university college' (alternatives: 'yes', 'no' and 'not sure'). Those already reporting university or higher education as a main daily activity were not asked this question (n (2004)=273, n (2007)=316).

The participants' own smoking and use of snus were measured through items for each product by first asking: 'have you ever smoked (cigarettes)/tried snus?' If yes, the participant was asked: 'how often do you smoke (cigarettes)/use snus these days?' with response categories provided: 'every day', 'every week', 'less than once a week' and 'not at all'. Relatively few reported weekly use, and consistent with previous operationalisations of user status in this age group, those reporting using snus and/or smoking every day or every week were grouped together as 'snus users' and 'smokers'.^{11 17} Based on this we constructed three mutually exclusive dichotomous dummy variables on tobacco use: smokers, snus users and dual smoker and snus user.

We also asked the participants: 'Do you think you will be a smoker/snus user 5 years from now?', with response categories: 1='Yes, certainly', 2='Yes, I think so', 3='No, I don't think so', 4='No, definitely not' and 5='Uncertain'. We combined categories 1 and 2 into one category, and 3 and 4 into a second one, ending up with categories: 'Yes', 'No' and 'Uncertain'.

Information about the participants' age, gender and which region of Norway they lived in (the capital city Oslo, Eastern region except Oslo, Western, Central or Northern Norway) was also registered.

Statistical analysis

First, employing data from both surveys, we examined how the key variables distributed across our main measure of socio-educational status, and tested for differences using χ^2 tests and two-way analysis of variance (ANOVA). Second, combining the 2004 and 2007 data and using logistic regression analysis, we examined gender-specific main effects between socioeducational status and the dummy variables on smoking/snus use/dual use, and adjusted for age and region in a second step of the regression model. To support this analysis, we repeated it using educational ambitions as the dependent variable. We also examined the associations between socioeducational status and plans for future smoking and use of snus. Finally, to test for differences in the associations between socioeducational status and tobacco use over the two surveys, we constructed three additional variables: 'a', participation in 2004=0 and participation in 2007=1; 'b', 'academic=1' and 'vocational and other'=0; and 'c', the product of these (a*b) representing the interaction term.

Then, in a logistic regression model we predicted smoking/snus use from variables a and b in a dataset combining the 2004 and 2007 data. In the second model we entered the interaction term 'c', and examined if adding the interaction term made a significant contribution to the explained variance in the model. A significant contribution from entering this interaction term would indicate that the strength of the association between SES and smoking/snus use had changed between the two surveys. There were 3 years between the two surveys, and the surveys covered an age span of 5 years. To avoid overlapping cohorts from the two data collection occasions in the regression models that included interaction with year, we ran two sets of interaction analyses; one on all 16–17 year olds and another on the 18–20 year olds.

RESULTS

Of the 4815 participants in our surveys, half ($n=2411$, 50.1%) belonged to the group 'academic' as they attended a general upper secondary school or had started higher education at the time of the survey. Less than half (41.5%, $n=1998$) were classified as 'vocational' through attending a vocational upper secondary school or since they were working at the time of the survey. The last 8.4% ($n=406$) were classified as 'other' through reporting military services, folk school or unemployment as their main daily activity. Between the 2004 and 2007 surveys, there was a minor decrease in the rate of participants in the 'academic' and 'other' groups, and a corresponding slight increase in the 'vocational' group ($\chi^2=9.5$, $df=2$, $p<0.01$). As described in figure 1 and previously reported from these data, there was a reduction in smoking rates between the surveys, and an increase in use of snus in boys and girls from 2004 to 2007 (figure 1).¹¹

There were significant associations between the measure of socioeconomic status and age, gender and region in 2004 and 2007 (table 1). Examining the surveys combined, there were minor regional differences in smoking ($\chi^2=13.2$, $df=4$, $p<0.05$), snus use ($\chi^2=11.7$, $df=4$, $p<0.05$) but no difference in dual use ($\chi^2=8.1$, $df=4$, $p=0.09$). There was a higher mean age among smokers ($t=9.5$, $p<0.001$), snus users ($t=4.1$, $p<0.001$) and dual users ($t=3.1$, $p<0.01$). More girls were smokers ($\chi^2=30.4$, $df=1$, $p<0.001$), while more men reported snus use ($\chi^2=206.5$, $df=1$, $p<0.001$) and dual use ($\chi^2=67.5$, $df=1$, $p<0.001$).

In the main effects analyses combining the 2004 and 2007 datasets, boy and girl adolescents classified as 'vocational' had higher odds for smoking with ORs 3.8 and 3.5, respectively (tables 2 and 3), after adjustment for age and region, compared to those classified as 'academic'. A similar association was found in analyses for smoking and plans for higher education: Compared to those confirming plans for higher education, those who disconfirmed had an OR=2.5 (95% CI 2.1 to 3.1) of smoking after adjusting for age, gender and region. Having a present socioeducational status as 'vocational' gave higher odds for confirming an intention to smoke 5 years from the time of the survey (after adjustment for age, gender and region: OR=2.8, 95% CI 2.2 to 3.5).

For boys and girls, there were no socioeducational status–snus associations regardless of adjustment for age and region (table 2). As for smoking, the repeated analyses with plans for higher education showed similar associations: There were no significant differences in snus use between those confirming plans for higher education versus those disconfirming such plans (adjusted for age, gender and region: OR=0.9 (95% CI 0.7 to 1.1). Those grouped as 'vocational' and 'other' had no higher odds for

Table 1 The distribution (%) on key variables across indicators of social status in 2004 and 2007

	Full 2004 sample	2004 survey: socioeducational status				Full 2007 sample	2007 survey: socioeducational status			
		Academic	Vocational	Other	Difference*		Academic	Vocational	Other	Difference*
Male gender	1230 (51.3)	550 (44.9)	536 (64.3)	144 (64.3)	$\chi^2=45.0$, $df=2$, $p<0.001$	1211 (50.1)	494 (50.1)	607 (58.0)	110 (60.4)	$\chi^2=67.6$, $df=2$, $p<0.001$
Mean age (SD)	18.0 (1.4)	17.8 (1.4)	18.0 (1.4)	19.1 (0.9)	$F=94.3$, $p<0.001$	18 (1.4)	17.8 (1.4)	18.0 (1.4)	19.0 (1.1)	$F=56.6$, $p<0.001$
Region					$\chi^2=28.3$, $df=8$, $p<0.001$					$\chi^2=26.7$, $df=8$, $p<0.01$
East	993 (41.4)	486 (39.7)	401 (42.2)	106 (47.3)		988 (40.9)	462 (39.0)	455 (43.5)	71 (39.0)	
Oslo	188 (7.8)	116 (9.5)	63 (6.6)	9 (4.0)		205 (8.5)	119 (10.0)	63 (6.0)	23 (12.6)	
West	684 (28.5)	351 (28.7)	266 (28.8)	67 (29.9)		644 (26.7)	333 (28.1)	268 (25.6)	43 (23.6)	
Mid	306 (12.8)	172 (14.0)	106 (11.1)	28 (12.5)		314 (13.0)	160 (13.5)	127 (12.1)	27 (14.8)	
North	229 (9.5)	100 (8.2)	115 (12.1)	14 (6.3)		264 (10.9)	112 (9.4)	134 (12.8)	18 (9.9)	
Smokers	437 (18.2)	135 (11.0)	240 (25.2)	62 (27.7)	$\chi^2=87.5$, $df=2$, $p<0.001$	307 (12.7)	65 (5.5)	208 (19.9)	34 (18.7)	$\chi^2=110.0$, $df=2$, $p<0.001$
Snus users	183 (7.6)	97 (7.9)	61 (6.4)	25 (11.2)	$\chi^2=6.0$, $df=2$, $p=0.5$	282 (11.7)	123 (10.4)	131 (12.5)	28 (15.4)	$\chi^2=5.1$, $df=2$, $p=0.08$
Dual users	72 (3.0)	16 (1.3)	46 (4.8)	10 (4.5)	$\chi^2=79.6$, $df=2$, $p<0.001$	106 (4.4)	33 (2.8)	62 (5.9)	11 (6.0)	$\chi^2=14.3$, $df=2$, $p<0.001$
Smoking 5 years from now?					$\chi^2=79.6$, $df=4$, $p<0.001$					$\chi^2=51.1$, $df=4$, $p<0.001$
Yes	250 (10.4)	69 (5.6)	141 (14.8)	40 (17.9)		204 (8.4)	55 (4.6)	120 (11.5)	29 (15.9)	
No	2050 (85.4)	1122 (91.6)	757 (79.6)	171 (76.3)		2188 (90.6)	1123 (94.7)	913 (87.2)	152 (83.5)	
Uncertain	100 (4.2)	34 (2.8)	53 (5.6)	13 (5.8)		23 (1.0)	8 (0.7)	14 (1.3)	1 (0.6)	
Using snus 5 years from now?					$\chi^2=22.5$, $df=4$, $p<0.001$					$\chi^2=15.2$, $df=4$, $p<0.01$
Yes	204 (8.5)	85 (6.9)	90 (9.5)	29 (12.9)		330 (13.7)	134 (11.3)	168 (16.0)	28 (15.4)	
No	2154 (89.9)	1124 (91.8)	845 (88.9)	185 (82.6)		2045 (84.7)	1036 (87.4)	861 (82.2)	148 (81.3)	
Uncertain	42 (1.8)	16 (1.3)	16 (1.7)	10 (4.5)		40 (1.7)	16 (1.3)	18 (1.7)	6 (3.3)	

*Tested with χ^2 for categorical variables and one-way analysis of variance (ANOVA) for age (continuous variable).

Table 2 Male smoking, snus use and dual use by socioeducational status; crude associations are given and adjusted for age and region

	Smokers (n=308)				Snus users (n=383)				Dual users (n=144)			
	Crude model		Adjusted model		Crude model		Adjusted model		Crude model		Adjusted model	
	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI
Academic	Reference		Reference		Reference		Reference		Reference		Reference	
Vocational	4.1	3.0 to 5.6	3.8	2.8 to 5.2	1.1	0.9 to 1.4	1.1	0.8 to 1.4	2.5	1.7 to 3.6	2.3	1.6 to 3.4
Other	5.2	3.4 to 8.0	3.5	2.2 to 5.4	1.7	1.2 to 2.5	1.2	0.8 to 1.8	2.4	1.3 to 4.4	1.7	0.9 to 3.2

intentions of using snus in the future compared to the group 'academic' at OR=1.2 (95% CI 1.0 to 1.4) and OR=1.0 (95% CI 0.7 to 1.4), respectively.

Dual use among boys was associated with socioeducational status with ORs in between those for smoking and snus use only (table 2), whereas the ORs for dual use in girls were higher than for smoking and snus use alone (table 3).

Our final aim was to examine if the socioeducational status–tobacco use association changed in the period 2004 and 2007. As described in the methods, we ran the analyses separately for the age groups 16–17 and 18–20, to compare different cohorts over the gap of 3 years. In all of the regression models (also when stratified by gender), the interaction terms came out as not significant.

DISCUSSION

Main findings

The main findings of the present study were clear and consistent associations between socioeducational status and smoking. This was found for present socioeducational status in boys and girls, but also for plans for higher education, a proxy for future social and socioeconomic status. Present socioeducational status also predicted the participants' intentions to smoke in the future. For snus however, we found no association with any of the socioeducational status measures or intended future education. Although there were strong changes in rates of tobacco use among Norwegian adolescents in the period from 2004 to 2007, there was no significant difference in the socioeducational status–smoking/snus use association between the two data collections.

Strengths and limitations

Much of the previously published literature on these associations in older adolescence has been studied with measures of SES derived from parent or household indicators. Our measurement of socioeducational status was based on what the adolescents consider themselves as measures. In addition, we have included a measure of plans for higher education, which can be regarded as an indicator of future SES for the participants. The participants were sampled to represent the general population of Norwegian adolescents aged 16–20. It should also be considered a strength that we have repeated the same measurements at two separate occasions, allowing us to examine if the associations between socioeducational status and tobacco use are transient. Finally, we have included two frequently used forms of tobacco,

smoking and snus, and can therefore examine associations beyond smoking.

The main limitation is that we do not have a validated measurement of SES, and rely on reported socioeducational status. However, this measurement should have high face validity for the groups labelled 'academic' and 'vocational'. The third category ('other') may transcend socioeducational status (military or civil service is mandatory for all men regardless of socioeducational status) but also include the unemployed and benefit recipients, which would largely indicate low socioeducational status. These were nevertheless kept in the study as one group due to small numbers for each of them. In a post hoc analysis, those attending military service and civil service (n=103) were identified as a separate group, and had a borderline increased association with snus use, but no association with smoking compared to those with the highest socioeducational status (data not shown).

There was a difference in participation and cooperation rates between the two surveys. The interviews were performed using the same approach, at the same time of the year (September) mostly approaching adolescents by mobile phone number. Although the difference in participation rates represents a limitation of the study, we have no indication that the samples are biased. The prevalences of smoking and snus use are similar to those found in other studies. During the 2007 data collection, many more chose to not answer the phone at all. This might indicate changed patterns of phone use, rather than a systematic non-response related to the variables in this study, where more people now choose to ignore calls from numbers not already known to the receiver.

Interpretation

We found clear associations between smoking and socioeducational status. Based on Hanson and Chen's 2007 review, this result is in line with much of the SES–smoking literature, but not all, as several studies have found no associations, others present mixed findings across subgroups and yet others demonstrate positive associations between high SES and smoking.¹⁰ The studies included in their review are heterogeneous in terms of the age span covered, but homogenous in that nearly all have measured SES based on parents income, education or work. Although we did not compare our measure of socioeducational status with parent derived SES measures, our clear and consistent results lend support to using adolescent derived measurements to study the SES–health association in

Table 3 Female smoking, snus use and dual use by socioeducational status; crude associations are given and adjusted for age and region

	Smokers (n=436)				Snus users (n=82)				Dual users (n=34)			
	Crude model		Adjusted model		Crude model		Adjusted model		Crude model		Adjusted model	
	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI	OR	CI
Academic	Reference		Reference		Reference		Reference		Reference		Reference	
Vocational	3.6	2.8 to 4.5	3.5	2.8 to 4.4	1.0	0.6 to 1.6	1.0	0.6 to 1.7	4.8	2.2 to 10.6	4.8	2.2 to 10.7
Other	3.6	2.5 to 5.4	2.9	2.0 to 4.4	0.7	0.2 to 2.1	0.6	0.2 to 1.9	5.2	1.6 to 17.1	4.8	1.4 to 16.2

this age span reflecting late adolescence. Other studies that have compared own and parent based measurements also support the importance of measuring adolescent SES based on what they do themselves.^{18–19} Based on the previous widespread use of parent indicators,¹⁰ future studies of SES and health in older adolescents should consider the relative usefulness of measuring SES with reference to parents or to the adolescents themselves.

We did not find any indications of an association between SES and snus use. Applying the tobacco diffusion model,⁴ seemingly comparable datasets can give different results depending on where in the diffusion process the population is. Thus, it is possible that snus use truly is associated with SES, but that Norwegian adolescents in the years 2004 and 2007 were at stages where the trajectories shifted, and that we cannot identify such associations in our data. Alternatively, the social pattern of snus use may follow a different pattern than for smoking, representing an exception from those described in Lopez *et al.*'s model. The few previous studies that exist on determinants and correlates of snus use all seem to suggest that snus use has been associated with lower SES.^{15–16} There is also support for higher prevalences of snus use in more rural areas.²⁰ As mentioned, we have seen a quite marked increase in the use of snus among Norwegian adolescents in the later years.¹¹ This was commensurate with the tobacco industry's development of a wider range of snus products, particularly on package design. From studies on the importance of cigarette package designs, we know that variations of product images are of importance for users.²¹ We can therefore speculate that the large expansion of the snus product portfolio has attracted new customers and that these may have reversed a possible previous low SES–snus use association. There is a need for more studies on the correlates of snus use in order to better understand the processes behind this increasing form of tobacco use.

With regard to gender differences, the 2007 review identified only two studies with gender-specific results,¹⁰ both with negative associations for girls only.^{22–23} Apart from a very strong association between socioeducational status and dual use, our results were very similar for boys and girls. Our seemingly deviating results might be explained by a number of factors. The previously mentioned studies were on younger adolescents from 12 to 16, and associations might differ at different ages. They were conducted in New Zealand²² and Minnesota, USA,²³ which might indicate cultural differences. The lack of studies precludes any firm conclusions on why we, contrary to the two previous studies, find such similar results for boys and girls.

Although we have combined two datasets from 2004 to 2007, our data are completely cross-sectional beyond overlapping cohorts. We therefore cannot make any strong inferences about the causal directions of associations found. Models proposing unidirectional mechanisms are obviously too simplistic, since previous studies with prospective, longitudinal designs have shown that health behaviour predicts educational tracks leading to future SES.^{24–25} However, the clear and consistent negative association between our SES indicator and smoking should perhaps be considered when planning and designing interventions against smoking among adolescents and young adults. This must obviously be balanced against possible negative consequences such as introducing stigma and the possible negative effects of implicitly linking negative health behaviours and specific types of schooling.

Regarding the increased use of snus, health authorities may at some point want to implement stronger measures to curb this trend. Communication of information about the detrimental effects of smoking has been an important tool in tobacco

What this paper adds

- Measuring socioeducational status from measures adolescents use themselves found clear and consistent associations with smoking, for boys and girls.
- There was no association between socioeducational status and snus use.
- Despite sharp changes in tobacco consumption between 2004 and 2007, there were no changes in the associations, or lack thereof, between socioeducational status and smoking/snus use over the same period.

control. At present, adolescents seem to overestimate the harmfulness of snus compared to smoking.¹⁷ Unless snus is found to be much more harmful than our current evidence suggests,²⁶ providing nuanced and accurate information about the health consequences of snus use might propagate increased use rather than cessation. Another important category of tobacco control measures directed at adolescents has been school restrictions and programs. Again, there is little evidence on the effects of restricting snus use at schools, but a recently published study suggests that such restrictions may have effects comparable to those of enforced smoking bans at school.²⁷ As we found no SES differences in snus use in the present study, a general restriction of snus use across school types might contribute towards a reduced increase of snus use.

Acknowledgements The data collection was sponsored by the Norwegian Directorate of Health.

Funding Funding was received from the Norwegian Directorate for Health.

Competing interests None.

Patient consent Obtained.

Ethics approval The study protocol was presented for the Regional Committee for Medical Research Ethics (REK-Vest), and was carried out within the general permits of Synovate MMI Inc. The sample of participants was drawn from the Norwegian Population Registry with approval from the Norwegian Tax Administration.

Provenance and peer review Not commissioned; externally peer reviewed.

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