Tobacco use by early adolescents in Norway

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Background: This study examined trends in the prevalence of smoking and snuff use among Norwegian adolescents in lower secondary school (ages 13–15 years) from a national survey conducted every 5 years between 1975 and 1995. Methods: Pupils completed a brief written questionnaire on tobacco use and related information. Local school administrators coordinated data collection and forwarded a sample of completed questionnaires to the National Council on Tobacco and Health for compilation and analysis. Effects for age, gender and survey year were examined using logistic regression analysis. Overall, 24,127 pupils in five different cohorts were included. Results: Smoking was highest in 1975 when 45.5% of youth reported smoking either daily or occasionally (figures adjusted for age and gender). Smoking declined each year thereafter through to 1990 (23.6%) but increased in 1995 (26.0%), primarily due to an increase in occasional smoking. Like smoking, snuff use declined between 1985 and 1990 but increased in 1995. All changes across survey years were statistically significant. Smoking was higher among girls than boys, while snuff use was much higher among boys. Conclusion: Several hypotheses that might account for the recent increase were examined with the most likely factor being Norway's low allocation of resources for educational interventions and public information campaigns during the years studied. However, in the past 2 years Norway has undertaken a number of new tobacco control initiatives that may result in reversal of the most recent trends.

Keywords: adolescents, Norway, tobacco use

Norway has long been active in legislative efforts aimed at reducing tobacco use. National legislation that took effect in 1975 eliminated direct advertising of tobacco, required warning labels on tobacco products and established a minimum purchase age of 16 years. In 1988, sharp restrictions were placed on smoking in public places and work sites and legislation taking effect in 1996 eliminated indirect advertising and the sale of tobacco through vending machines, banned smoking in schools and raised the minimum purchase age to 18 years. Over that period of time some success in reducing tobacco use has been achieved. The per capita consumption of tobacco has steadily declined[1] and the proportion of daily smokers among men declined from 51% in 1973 to 34% in 1998.[2,3]

However, other statistics provide cause for concern. The proportion of Norwegian women who smoke daily, 32% in 1998, is unchanged from 1973.[2,3] In addition, the decline in men's daily smoking occurred primarily in the late 1970s and 1980s and levels remained stable in the 1990s. Similarly, smoking by Norwegian young adults (16–24 years) declined from 44.2% in 1973 to a low of 28.6% in 1989, but then rose to 31.2% in 1998. Overall, in addition to the 33% of Norwegian adults who were daily smokers in 1998, 11% reported that they smoke on an occasional basis and, in a national survey conducted between 1996 and 1998, 10% of Norwegian men reported that they use snuff either daily or occasionally.[3] In comparison with other Scandinavian countries, a 1996 WHO[4] report found Norway's smoking prevalence among persons 16 years and older (33% at that time) to be lower than Denmark's (42%) but considerably higher than that of either Sweden (23%) or Finland (24%).

In a recent analysis of Norway's tobacco prevalence patterns and policy responses, Kraft and Svendsen[5] noted that, although legislative and legal measures have indeed been well used, other kinds of measures have not. The control of tobacco prices through tax policies – a mechanism that can be particularly effective with regard to youth[6] – has not been used fully and should be strengthened as a strategy for reducing overall tobacco consumption. Hand-rolled tobacco in particular has been inadequately taxed, an important omission in Norway where the use of this product is as widespread as the use of manufactured cigarettes. In 1998 Norwegians consumed 758 g per capita of hand-rolled cigarettes compared to 770 g for manufactured cigarettes.[3] Yet despite this heavy usage, in 1998 the taxes on hand-rolled tobacco constituted only approximately 60% of the taxes on manufactured cigarettes.[7]

However, the most significant conclusion of Kraft and Svendsen[5] was that health information and education had been severely underused in Norway over the previous 10 years, an anomaly that stands in contrast to Norway's active legislative record on tobacco control. For example, they cited a 1994 survey of 11 countries that placed Norway next to last in per capita public spending on tobacco prevention. The pressing need to increase

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Norway's level of informational and educational tobacco prevention activity has been voiced by other observers as well.[8]

In recent years, the Norwegian Government has taken significant steps to rectify that problem. Whereas public funding for tobacco control totalled 16.1 million Norwegian crowns in 1997, in 1999 the corresponding figure was 34.1 million.[9] New initiatives are being developed with regard to national and local media campaigns, preventive educational programmes for adolescents and support for smokers wishing to quit. In addition, attention is being focused on greater enforcement of existing statutes. Thus, tobacco prevention efforts in Norway stand at a crossroads and there is strong reason for optimism that these various actions might be reflected in lower levels of tobacco consumption over the coming years.

One of the most critical subpopulations in these efforts, as with any tobacco control activities, is early adolescents. These youths are in the age range during which initial experimentation with tobacco is likely to be at or near its peak[6] and they constitute a population towards which a high proportion of the activities will be targeted. If the new initiatives are to be assessed and evaluated accurately, the long-term trends within this age group need to be well understood.

This article presents data on smoking and snuff use by Norwegian schoolchildren of 13–15 years of age between 1975 and 1995. The source of these data is a comprehensive and ongoing national survey that is carried out in all Norwegian lower secondary schools every 5 years. We will seek to address whether the trends found among young adults – decreases in prevalence through the 1980s followed by levelling out or slight increases in the 1990s – are also to be found in this younger age range. Thus, this article will provide an extension of Kraft and Svendsen's[5] analysis of tobacco use among Norwegians of 16 years and older.

METHOD

Survey design and participants

Since 1975 and at 5 year intervals thereafter, Norway's National Council on Tobacco and Health has co-ordinated a survey of Norwegian lower secondary school youth corresponding to ages 13–15 years. (In 1997 the Norwegian educational system was changed, so that children now begin first grade at age 6 years rather than age 7 years as had occurred previously. Consequently, the correspondence between age and grade has shifted. The lower secondary school years continue to be ages 13–15 years, but the grade designation for these years, previously grades 7–9, is now grades 8–10.) In each of the five survey administration years through to 1995, all lower secondary schools in Norway were sent a letter from the national Ministry of Education describing the survey and inviting them to participate. Participation was obtained in each instance from over 90% of the schools. The National Council provided the schools with necessary materials and instructions. The questionnaires were completed by pupils in their regular classrooms under the supervision of their classroom teachers.

Between 125,000 and 150,000 lower secondary school pupils completed the surveys anonymously in each survey year. In order to facilitate data management and analysis, a sample was selected that consisted of all pupils born on the sixth day of any month. This criterion was judged to be an unbiased systematic sampling procedure that could be implemented by local school personnel with greater ease and accuracy than more conventional sampling options. Thus, the sample in the present analysis constitutes approximately 3.3% (i.e. 12/365) of all youth attending lower secondary school in Norway and responding to the survey. Overall, 24,127 pupils in five different cohorts were included in this data set. The sample sizes for each of the individual years are as follows: 5,160 in 1975, 5,430 in 1980, 5,146 in 1985, 4,293 in 1990 and 4,098 in 1995.

Survey instrument

At each of the five data points the youth survey has consisted of one or two pages with closed-ended items. Some of the survey questions have varied over the years, but a core set of identical items have addressed several standard areas of information. The core items that form the basis of this report include demographic information about gender and grade, lifetime and current smoking and, for smokers, number of cigarettes usually smoked per week. Items on lifetime and current snuff use were introduced in 1985 and are included here as well.

Procedure

The packet of information sent to schools included procedural instructions, reporting forms and survey questionnaires for all pupils. Teachers were instructed to administer the survey on a designated day in the autumn of the year of the survey. The questionnaire required approximately 15 min to complete. During administration, pupils were instructed not to write their names on the questionnaires.

Prior to survey administration, teachers were given a list of pupils in their class who were born on the sixth day of a month. After the survey was completed, those pupils were asked to put their questionnaires in a separate envelope which was sealed and sent to the National Council on Tobacco and Health for analysis. In order to avoid the possibility of bias, no information about this sampling plan was shared with pupils beforehand and during data collection the experience of pupils born on the sixth day of a month was identical to that of their peers. Results from the other pupil questionnaires were compiled locally by school personnel and the schools were encouraged to use those results in their own tobacco education activities.

RESULTS

Prior to data analysis, individual cases were identified in which the respondent provided logically inconsistent information. This included the following possibilities: i) reported never having tried smoking but also reported being a daily or occasional smoker, ii) reported never having tried smoking but also reported smoking one or more cigarettes weekly, iii) reported never having tried snuff

but also reported daily or occasional snuff use, iv) reported being a current non-smoker but also reported smoking one or more cigarettes weekly and v) reported being a daily smoker but also reported smoking zero cigarettes weekly. There were only 80 such cases (0.33% of the total database) and they were eliminated from further analysis.

Cigarette smoking

Table 1 presents the percentages of boys and girls in each grade who reported smoking either daily or occasionally. As the table illustrates, daily smoking was at its highest level for all groups in 1975. It decreased substantially in 1980, particularly for girls, and generally continued to decrease, though at a slower rate, in the periods through to 1990. However, between 1990 and 1995 the trend becomes less clear. Girls and boys in grade 9 continued to decrease, while slight increases occurred for both genders in both grades 7 and 8.

Occasional smoking showed a similar pattern to daily smoking between 1975 and 1990 with sharp early decreases followed by slower decreases. However, between 1990 and 1995 the trend was clearly towards an upturn with all gender–grade categories showing higher levels. Among ninth-grade boys in particular, occasional smoking increased by one-third over the 5 year period from 14.3% of respondents to 19.3%. When the two smoking categories were combined, almost all demographic categories were up in 1995, with the sharpest increase among seventh-grade girls (10.7 to 16.2%).

The apparent trends were tested for significance by means of logistic regression (see *table 4*, first part). The percentage of pupils who smoked either daily or occasionally was regressed on grade, gender and survey year. For grade and survey year, the final level of the variable was used as the indicator criterion. The likelihood of smoking increased with age and females were more likely to smoke than males. In addition, the trend in smoking over time was confirmed. With the effects of gender and age controlled, the odds of being a smoker were approximately 2.5 times higher in 1975 than 1995. Statistically significant declines (as illustrated by the lack of overlap in confidence intervals) occurred in 1980, 1985 and 1990. However, the statistically significant ratio of 0.88 in 1990 illustrates the trend reversal, indicating higher odds of smoking in 1995 than 1990.

Table 2 shows the mean number of cigarettes smoked per week by those students who had identified themselves as smoking either occasionally or daily. Contrary to the previous table, which showed greatest smoking activity in 1975 followed by declines through to 1990, this variable has generally increased over the 20 year period, particularly among boys. For daily smokers, boys in all grades of the 1995 cohort reported the highest levels ever for weekly cigarette consumption, while the pattern for girls was less consistent. Among occasional smokers the trend was, disturbingly, more consistent for both genders. In

Table 1 Proportion of youths who smoke daily or occasionally

		1975	1980	1985	1990	1995
Daily smoking						
Full sample		16.3	12.8	11.2	9.1	8.5
All boys		15.2	13.5	11.7	8.6	7.8
All girls		17.3	12.0	10.6	9.5	9.2
Boys	ninth grade	22.7	21.6	21.0	17.0	14.0
	eighth grade	16.4	13.1	11.0	6.6	7.1
	seventh grade	6.5	5.9	3.1	2.2	2.4
Girls	ninth grade	28.4	20.7	18.9	19.2	16.4
	eighth grade	16.5	10.9	10.3	7.8	8.5
	seventh grade	7.0	4.4	2.6	1.5	2.8
Occasional smoking						
Full sample		29.2	20.9	17.5	14.6	17.5
All boys		27.3	20.3	18.1	12.8	15.1
All girls		31.1	21.4	16.8	16.3	19.8
Boys	ninth grade	23.9	20.3	21.9	14.3	19.3
	eighth grade	29.4	23.3	17.4	15.2	16.2
	seventh grade	28.7	17.2	15.1	8.8	9.7
Girls	ninth grade	30.3	25.7	20.0	22.9	25.6
	eighth grade	34.1	24.0	16.8	16.9	20.5
	seventh grade	29.0	14.6	13.7	9.2	13.4
Daily or occasional						
Full sample		45.5	33.6	28.6	23.6	26.0
All boys		42.5	33.8	29.8	21.4	22.9
All girls		48.4	33.4	27.4	25.8	29.1
Boys	ninth grade	46.6	41.9	42.9	31.3	33.3
	eighth grade	45.8	36.4	28.4	21.8	23.3
	seventh grade	35.2	23.1	18.2	11.0	12.1
Girls	ninth grade	58.7	46.4	38.9	42.1	42.0
	eighth grade	50.6	34.9	27.1	24.7	29.0
	seventh grade	36.0	19.0	16.3	10.7	16.2

Figures listed under all boys and all girls are adjusted for grade. Figures listed under full sample are adjusted for both grade and gender.

almost all cases (eighth-grade girls being the sole, slight exception) the number of cigarettes smoked weekly was at its highest level ever in 1995. Across the full sample, occasional smokers smoked more than twice as many cigarettes in 1995 than 1990, with increases of 123% (5.83 versus 2.61) among boys and 93% (4.87 versus 2.52) among girls.

Snuff use

Table 3 shows categories of snuff use for 1985 through to 1995, including both lifetime use and current (daily or occasional) use. The percentages of youths who had tried snuff were at their highest levels in 1985, followed by a sharp decline in 1990 and, in general, a somewhat increased level in 1995. The same pattern held for current use. As is generally found in most populations, snuff use was much higher among boys than girls.

Table 4 (second part) shows the results from a logistic regression of snuff use on gender, grade and survey year. The odds of being a user were almost six times higher among males than females. There was also a strong grade effect, with grades 8 and 9 both displaying higher odds ratios than the grade before. Finally, the analysis revealed that both the 1985–1990 decline and the 1990–1995 increase were statistically significant changes. Thus, for both smoking and snuff, decreases in the late 1980s followed by increases in the early 1990s were evident.

Further analysis revealed that snuff use tended to be an additional activity engaged in by smokers rather than a substitute for smoking. As *table 5* illustrates, levels of more frequent smoking were clearly associated with higher proportions of snuff users. This trend was consistent across survey years: the γ values for ordered categorical statistics were 0.66 in 1985, 0.79 in 1990, and 0.77 in 1995 ($p<0.001$ in each case).

Table 3 Proportion of youths who have tried snuff and who currently use snuff

		1985	1990	1995
Have tried				
Full sample		27.6	17.2	18.3
All boys		39.5	24.9	27.3
All girls		15.6	9.4	9.3
Boys	ninth grade	51.7	34.9	40.1
	eighth grade	39.7	24.9	26.0
	seventh grade	27.1	15.0	15.8
Girls	ninth grade	23.8	16.5	15.5
	eighth grade	14.1	8.4	8.3
	seventh grade	9.0	3.4	4.0
Currently use				
Full sample		10.3	6.0	7.2
All boys		17.3	9.8	11.9
All girls		3.2	2.2	2.5
Boys	ninth grade	25.1	15.2	19.7
	eighth grade	17.0	9.6	11.5
	seventh grade	9.9	4.5	4.5
Girls	ninth grade	4.9	3.8	4.2
	eighth grade	3.1	2.0	2.0
	seventh grade	1.5	0.7	1.3

Figures listed under all boys and all girls are adjusted for grade. Figures listed under full sample are adjusted for both grade and gender. Currently use includes daily or occasional use.

Table 2 Mean number of cigarettes smoked per week

		1975	1980	1985	1990	1995
Daily smoking						
Full sample		41.73	45.41	46.67	47.43	47.67
All boys		42.98	49.43	48.54	50.87	53.17
All girls		40.55	40.79	44.44	44.03	42.80
Boys	ninth grade	49.66	56.60	53.45	56.41	59.00
	eighth grade	37.79	43.83	45.80	41.72	46.25
	seventh grade	34.15	36.53	26.19	34.87	38.18
Girls	ninth grade	45.48	47.84	46.07	47.60	46.52
	eighth grade	36.73	33.95	41.67	37.08	37.45
	seventh grade	30.47	25.92	43.14	30.75	26.25
Occasional smokers						
Full sample		4.91	2.89	3.24	2.57	5.35
All boys		5.37	3.01	3.15	2.61	5.83
All girls		4.48	2.78	3.35	2.52	4.87
Boys	ninth grade	5.79	3.23	3.92	2.47	4.80
	eighth grade	5.75	3.43	2.96	2.46	6.69
	seventh grade	4.59	2.20	2.26	3.11	6.51
Girls	ninth grade	5.46	3.02	4.24	2.71	6.04
	eighth grade	4.09	3.03	3.14	2.49	3.96
	seventh grade	3.97	1.91	2.38	2.13	4.12

Figures listed under all boys and all girls are adjusted for grade. Figures listed under full sample are adjusted for both grade and gender.

DISCUSSION

As these data show, the percentage of youths who smoked either daily or occasionally was at its highest level in 1975 and dropped significantly at each measurement period thereafter through to 1990. However, the trend reversed in the early 1990s during which the proportion of youths who smoke increased. In particular, occasional smoking rose among all categories of age and gender in 1995, with relatively sharp increases among older boys and

younger girls. A gender difference was apparent as well which was underscored by the finding that, within each of the three grades surveyed, the percentage of both daily smokers and occasional smokers was higher among girls than boys.

These results clearly echo the patterns for young adults that were noted by Kraft and Svendsen.[5] Those researchers reported that, in the 16–19 year old age group, the early 1990s witnessed an increase in the percentage of daily and occasional smoking for males and occasional smoking for females. The striking similarity between these reports is underscored by the fact that they entailed entirely different methodologies for data collection. Kraft and Svendsen's[5] data were collected via home and telephone interviews, while the data reported here were collected via group administrations at schools. Thus, these trends appear to be robust against differences in survey method. The overall conclusion is that an overall downward trend in tobacco use among Norwegian teenagers, which occurred in the 1970s and 1980s, appears to have stopped in the early 1990s, with the most important difference in this period being an increase in occasional smoking.

On the other hand, a different picture emerges when one considers the amount of smoking undertaken by daily and occasional smokers in this 13–15 year old age group. There was a steady increase in the number of cigarettes consumed by male daily smokers between 1975 and 1990, whereas there was no consistent trend over time among occasional smokers or female daily smokers. However, in 1990–1995 the number of cigarettes consumed by youths who smoked increased sharply in almost all categories. Thus, while it appears that overall smoking increased only slightly when viewed in terms of population proportions, when viewed in terms of actual tobacco consumption among smokers, the increase was more substantial.

Finally, the use of snuff was at its highest level at its first measurement point in 1985, followed by a sharp decrease in 1990 and a smaller though significant increase in 1995. With 40% of 15 year old boys having experimented with it and almost 20% reporting that they used it daily or occasionally, it is clearly an area that requires attention from health researchers and educators in Norway. The high correlation between the products indicates that many youths were consuming particularly large levels of tobacco.

Table 4 Logistic regressions of smoking and snuff use on gender, grade and survey year; odds ratio (OR), 95% confidence interval (95% CI)

Variable	OR	95% CI	p-value
Equation 1: smoking			
Gender			
Male	0.88	0.84–0.93	<0.0001
Female	1.00		
Grade			
7	0.33	0.31–0.36	<0.0001
8	0.64	0.60–0.69	<0.0001
9	1.00		
Survey year			
1975	2.48	2.27–2.72	<0.0001
1980	1.47	1.34–1.61	<0.0001
1985	1.15	1.05–1.27	0.0026
1990	0.88	0.79–0.97	0.0115
1995	1.00		
Equation 2: snuff use			
Gender			
Male	5.85	4.94–6.91	<0.0001
Female	1.00		
Grade			
7	0.27	0.22–0.32	<0.0001
8	0.58	0.50–0.67	<0.0001
9	1.00		
Survey year			
1985	1.52	1.30–1.77	<0.0001
1990	0.81	0.68–0.97	0.0188
1995	1.00		

The significance of occasional smoking

As noted, the recent increases in overall adolescent smoking stemmed from increases in occasional rather than daily smoking. In fact, daily smoking levels actually decreased slightly between 1990 and 1995. This trend was also evident in older Norwegian populations during that time period. Among 16 to 19 year olds, occasional smoking essentially doubled between 1990 and 1995, rising from 10.6% to 20.0%, while daily smoking declined from 22.3% of respondents to 21.6%.[3] Therefore, it is important to examine and understand the significance of occasional as opposed to daily smoking.

For the most part, occasional smoking represents a pre-addictive phase of the smoking habit[10] which carries the likelihood that the individual will become addicted within a short period of time. For example, Patton et al.[11] demonstrated that occasional smoking is a strong predictor of later becoming a daily smoker. From an epi-

Table 5 Percentage of youths within each smoking status category who also use snuff

Year	Smoking status	Levels of frequency for snuff use: Daily	Occasional	Never	Daily plus occasional
1985	Daily	3.9	27.3	68.8	31.2
	Occasional	4.4	14.4	81.2	18.8
	Never	0.6	4.4	95.0	5.0
1990	Daily	2.1	27.9	70.0	30.0
	Occasional	1.9	10.3	87.8	12.2
	Never	0.4	1.7	97.9	2.1
1995	Daily	6.0	28.1	65.9	34.1
	Occasional	1.6	12.7	85.7	14.3
	Never	0.3	2.4	97.3	2.7

The figures refer to row percentages. For example, among daily smokers in 1995, 6.0% were also daily snuff users, 28.1% were occasional snuff users and the remaining 65.9% were never users of snuff. The final column sums the previous columns of daily and occasional in order to present the percentage of youths within the identified category who use any snuff at all.

demiological perspective as well, increases in smoking within a population may be first signalled through an increase in occasional smokers, as demonstrated by Hines et al.[12] in a study among US college students. Thus, the rise in the prevalence of occasional smoking reported here among Norwegian adolescents merits a strong public health response, particularly since interventions will have a higher likelihood of effectiveness when less addicted groups are targeted.

Why did tobacco use among Norwegian youth rise in the 1990s?

Previous observers have argued that the decreases in smoking by young Norwegians that occurred through the 1980s were largely due to the country's ban on tobacco advertising and other legislative measures.[13] What then might account for the departure from this pattern that occurred in the early 1990s in which adolescent smoking increased? Below, we consider several different hypotheses in turn.

- Was the observed increase in youth smoking a reflection of an international trend?

Trends in smoking that cross national boundaries could be due to macrosocial factors such as changes in media communications or global tobacco production levels and marketing strategies. Indeed, there are several countries besides Norway in which tobacco use increased during the early 1990s. For example, among tenth graders in the USA (approximately 15 years old), the prevalence of previous-30-day smoking increased from 20.8% in 1991 to 30.4% in 1996, while daily smoking increased from 12.6% to 18.3%.[14] In addition, figures reported by the WHO[15] indicated that in several countries (including, for example, Austria, Poland and Scotland) smoking went up among 15 year old boys and girls between 1989–1990 and 1993–1994.

However, national patterns are not uniform and there are also countries in which adolescent smoking levels declined during this period. One example is Finland which witnessed a decrease between 1989–1990 and 1993–1994 in the percentage of weekly smokers among both boys (from 33 to 30%) and girls (from 32 to 26%).[15] During this same period, in Sweden smoking within this age group was generally unchanged. Thus, while there appears to be some validity to the suggestion of an international trend in the 1990s towards higher adolescent smoking, there are several countries, including Norway's Scandinavian neighbours, which did not experience this phenomenon. Since the patterns are not consistent across countries, one must seek additional explanations pertinent to the tobacco-related milieu within Norway itself.

- Did the trends in the 1990s represent a generational effect due to smoking by these youths' parents?

Smoking levels among adolescents in Norway peaked around 1975.[16] One might propose that the recent sample included, to some degree, the children of that earlier cohort. Furthermore, if many of the 1975 cohort were still smoking in midlife and, in turn, had promoted smoking in their offspring, might the 1995 increase have been a generational effect? More direct data do not support this hypothesis. The current survey included items on parental smoking, which indicated that, in 1995, parents' smoking was lower than in any previous year. Only 40.9% of respondents reported that their fathers smoked (compared with 57.0% in 1975 and 45.8% in 1990), while 40.8% reported that their mothers smoked (compared with 41.3% in 1975 and 45.4% in 1990).

- Did the increase stem from increases in economic well-being in the 1990s?

If the level of disposable income generally enjoyed by families increased, part of that increase may have been reflected in more spending money for teenagers, which in turn could result in higher adolescent smoking. As has been reliably demonstrated, adolescent consumption of tobacco can be highly sensitive to fluctuations in price.[17] In fact, it is true that family disposable income increased between 1990 and 1995. During those years, after-tax household income adjusted for inflation and size of household increased by 5% for all households in Norway and 6% in households with children.[18] However, this hypothesis is undermined by the fact that the price of tobacco rose at a considerably higher level between 1990 and 1995 than did family income. In those years, the price of a pack of 20 cigarettes adjusted for inflation increased by 30%, while the price of a pack of rolling tobacco increased by 44%.[3] Thus we regard the economic hypothesis as unlikely.

- Was the increase due to changes in the marketing of tobacco products within Norway?

Direct tobacco advertising was banned in the 1975 legislation, but indirect advertising was not banned until 1996, so youths may well have been exposed to various forms of marketing. In addition, there is concern about how stringently many of Norway's legislative directives have been enforced. Thus, one must consider whether there may have been subtle changes in the marketing environment for tobacco products within Norway. The only data we have that can shed light on this question is from the school survey itself. In both 1990 and 1995 (though not earlier), youths were asked whether they remembered seeing displays which appeared to be advertisements for tobacco. Indeed, a considerable percentage of youths reported seeing such displays, with the most frequently named sites being ashtrays, carrier bags and clothing. However, this percentage declined from 56% in 1990 to 49.4% in 1995, providing some evidence against this hypothesis as an explanation for the smoking increase during those 5 years.

- Was the increase due to a lack of tobacco prevention activity?

As previous observers have pointed out, one characteristic that has clearly distinguished Norway from other western countries over the past two decades has been its significant lag in resources allocated to educational interventions and public information campaigns.[5,8] Between 1975 and 1980, approximately 9 million Norwegian crowns were spent per year on tobacco prevention and control, but by the early 1990s the annual expenditures

were less than 10% of that earlier figure.[5,19] Furthermore, although Norway's legislative record on tobacco control has been strong, there has been insufficient enforcement of the existing statutes.[20] The hypothesis of a link between this lack of activity and the increase in youth smoking is compelling, particularly since several potential competing explanations – international trends, generational effects, economic factors and tobacco marketing – have been deemed insufficient to explain the trend.

Therefore, Norway's recent turnaround in tobacco prevention activity comes as welcome news. In addition to the aforementioned budget increases for the National Council on Tobacco and Health, a nationwide, school-based programme for the prevention of smoking among adolescents has been launched. This initiative, called BE smokeFREE, has been established through collaboration between the Norwegian Cancer Society, the National Association for Public Health and the National Council on Tobacco and Health.

CONCLUSIONS

The trends in tobacco use among early adolescents in Norway parallel the results found for older populations. The most recent sample, who responded in 1995, are now entering their twenties and their reports may offer a glimpse of what to expect in terms of future population patterns. The many years of low activity in the education and public information arenas are evident in these figures.

In some other countries, the growth in the early 1990s may have reversed somewhat in the latter years of the decade. For example, in the USA, a slight downturn in adolescent smoking seems to have finally occurred in 1997.[21] However, the marketing of tobacco and the political environment of the tobacco industry have become so different in various parts of the globe that we cannot presume with confidence that the experiences of one country will reflect the experiences of others.

Currently, there is substantial reason for optimism in Norway. The recent new initiatives undertaken at the national level have led to a renewed commitment to tobacco prevention and control. Undoubtedly some time will be needed for the benefits of these activities to become evident. Nevertheless, progress in preventing tobacco use among early adolescents – the population that is most at risk for initial experimentation and uptake of tobacco – will occur only through a sustained and energetic combination of education, public policy, programme evaluation and scientific study within Norway over the next few years.

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