

Trends in smoking among Polish and Norwegian youth 1986-2014

Leif Edvard Aarø¹, Joanna Mazur², Witold A. Zatoński^{3,4}, Oddrun Samdal⁵

¹Norwegian Institute of Public Health, Bergen, Norway

²Institute of Mother and Child, Warsaw, Poland

³Health Promotion Foundation, Nadarzyn, Poland

⁴Maria Skłodowska-Curie Memorial Cancer Center and Institute of Oncology, Warsaw, Poland

⁵University of Bergen, Bergen, Norway

ABSTRACT

Introduction: Norway was the first country to establish a comprehensive tobacco programme. The programme has included action and interventions targeting adolescents. Poland was one of the first among the former socialist countries in Central and Eastern Europe to establish comprehensive smoking control. From year 2000 collaboration with Norway on smoking control targeting adolescents was established. The aims of this paper are to compare smoking rates among adolescents in Poland and Norway in 2014 and trends during the period 1990-2014.

Material and methods: Data stem from the WHO Collaborative Study of Health Behaviour in School-aged Children (HBSC). School classes were used as the sampling unit. All age groups, 11, 13, and 15 year olds, were included in the comparison of 2014 ($n = 7647$). Only 15 year olds were included in the analysis of trends ($n = 23\ 595$).

Results: A substantial reduction in the prevalence of daily smokers among 15 year olds has taken place in both countries since 2002. In Poland, until 2010, the prevalence was markedly higher among boys than among girls. The proportion of daily smokers among Norwegian 15 year olds in 2014 is negligible (2.1% and 0.6% among boys and girls), and somewhat higher for Poland (10.0% and 9.6%).

Discussion: Establishing links between specific tobacco control action targeting adolescents and changes in trends is hardly possible with the kind of data available. The reduction in smoking among adolescents in both countries coincides with reduction in smoking among adults and with action targeting adolescents.

Conclusions: The strong reduction in prevalence of daily smokers among 15 year olds in Norway and Poland since 2002 probably represents a trend which covers a wider range of age cohorts, and may prove to reduce burden of disease substantially.

KEY WORDS: smoking, adolescents, Poland, Norway, trends.

ADDRESS FOR CORRESPONDENCE: Leif Edvard Aarø, PhD, Chief Scientist, Department of Health Promotion, Mental and Physical Health, Norwegian Institute of Public Health, Bergen, Norway, phone: +47 53 20 41 02, e-mail: Leif.Edvard.Aaro@fhi.no

INTRODUCTION

The Health Behaviour in Schoolchildren Study (HBSC) was initiated by researchers from a few European countries in the early 1980s [1]. Cross-sectional school-based data collections have been carried out every 4 years. Over the years, a substantial number of new countries

have joined the study. In the 2013/2014 data collection, 43 countries participated [2]. Since the same instruments for data collection are used repeatedly, and since efforts are made to ensure comparability across countries, the HBSC study provides excellent opportunities for cross-country comparisons of trends [3]. In the present

paper, trends in smoking behaviour of school students in two countries, Poland and Norway will be described and compared.

During the 1950s and 1960s smoking control action (materials to be used in schools and by health services) was mainly carried out by the Norwegian Cancer Society. Norway was the first country to establish a governmental nation-wide smoking control programme. The report which laid the ground for this programme, published in 1967, was translated and made available internationally by the Union for International Cancer Control [4]. The programme was based on three pillars: Public education on smoking and health, restrictive measures (legislative measures, taxation of tobacco products) and assisted smoking cessation. In 1971 the Norwegian Council on Smoking and Health was established, and in 1975 a law on tobacco control entered into force. The new law prohibited smoking advertisements, prohibited selling of cigarettes to adolescents younger than 16, and labelling of tobacco products with health warnings was introduced. Mass media campaigns and public tobacco and health education in schools, health services and communities have been administered. For many years assisted smoking cessation was less developed than the other pillars of the programme, but the establishment of a smoking quitline in 1996 and later improvements of the quitline helped a lot. In 2016, the ingredients of the smoking control programme are still basically the same as during its establishment.

Some elements of the programme are of particular relevance to adolescents. In 1996 the age for legal purchase of tobacco was changed to 18 years, and in 2004 there was a total ban on smoking indoors in pubs and restaurants. A first smoking control programme for schools was tested and made available to schools all over the country in 1976 [5]. A new programme "BE smokeFREE" was piloted and made available to schools in 1997 [6]. The programme was later (2006) revised in order to fit better into the curricula of secondary schools (the FREE tobacco control programme) and in order to include other forms of tobacco use, primarily wet snuff (snus). On several occasions taxation of tobacco products was raised. This is of particular relevance to young people since the price elasticity for tobacco products is generally higher among younger segments of populations [7].

In Poland, already in 1960 the Interministerial Committee for Limiting Smoking was established (from 1964: The Social Committee for Limiting Smoking; from 1979: The Polish Anti-Tobacco Society). In 1966 the first smoking cessation clinics were established. In 1988 Poland participated in the World No Tobacco Day for the first time. In 1991 the Health Promotion Foundation is founded by Professor Witold Zatoński. It coordinated the cele-

brations of the World No Tobacco Day in Poland. It also organized the popular Great Polish Smoke-out, the main prize of which was a visit to Rome and an audience with Pope John Paul II. Every year over 500,000 Poles credit the action as the reason for attempting to quit smoking. From 1992 the Honorary President of the Foundation was Cardinal Józef Glemp, the Primate of Poland. In 1996 a comprehensive Act on tobacco control entered into force, banning smoking in healthcare and educational facilities, and closed rooms in workplaces and offices. It introduced a text warning on smoking harm covering 40% of the tobacco packets, and a warning covering 20% of tobacco billboards. In 1998 Poland introduced the largest health warning of any country on tobacco packets. And in 1999 the Polish Parliament passed the complete ban on advertising tobacco in Poland. In addition, a provision was added on spending 0.5% of the tobacco excise tax on financing programmes tackling tobacco-related diseases. In 2000 cigarette adverts were removed from all street billboards in Poland and in 2001 cigarette adverts in the press were prohibited.

Already in the Polish Anti-tobacco Law of 1995/1996 a number of key areas related to limiting smoking among children have been addressed. The programmes aiming to reduce smoking among children were an important element of the entire antitobacco effort¹. A smoking ban was introduced in schools; bans were put in place on the sale of tobacco to under-18s and on cigarette vending machines; large health warnings (at the time the biggest in the world) were introduced on cigarette packaging; by the end of the 1990s a cigarette advertising ban was also passed by the Parliament [8].

The programmes aiming to reduce smoking among children were an important element of the entire anti-tobacco effort. The anti-smoking programmes for children in Poland were established in the mid-1990s, and are continued today [9]. In the last years the programme entitled "Clean air around us", was addressed to kindergarten children and their carers and parents. In the years 2010-2014, almost 900,000 children were included in the programme. It involved 3,441 kindergartens (38% of all kindergartens in Poland). The next programme, addressed at pupils of the Grades 1-3 of primary school, entitled "Don't smoke next to me, please" in the years 2013-2014 included 350,000 pupils (33% of pupils) in 5,837 schools. The third programme, "Find the right solutions", was addressing pupils of higher grades in primary school, and pupils of secondary schools (*gimnazjum*). In the years 2013-2014 as many as 2,535 primary schools participated in the programme (28% of schools), and 3,016 gymnasiums (46%). The programme included over 460,000 students. These programmes were co-ordinated by the Chief Sanitary Inspectorate [10].

¹ The description of the anti-tobacco programmes for children in Poland was prepared in part by Professor Janusz Szyborski, paediatrician and long-term director of the Mother and Child Institute in Warsaw, and co-ordinator of the anti-tobacco programmes for children in Poland.

Other programmes, also addressed to children, were the results of the implementation of the European Code Against Cancer [11]. Poland participated in the formulation of the Code (Witold Zatoński) and anti-tobacco programmes were its key element. Thousands of schools and millions of children took part in the programme. The programme initially, in the 1990s and early 2000s, was co-ordinated by the Health Promotion Foundation (also in collaboration with Norwegian partners), and in the last decade by the Cancer Centre and Institute of Oncology in Warsaw. The southern Polish region of Małopolska (regional capital – Kraków) was particularly active in promoting the Code (co-ordinators: Urszula Blicharz, Anna Czech, Leszek Kołodziejski) and its efforts were highly evaluated by the Association of European Cancer Leagues.

Another programme with an anti-tobacco component was the “Keep Fit” programme, the description of which can be found in one of the publications in this issue of *Journal of Health Inequalities* (pp. 67-76). It was co-ordinated by the Chief Sanitary Inspectorate (Andrzej Wojtyła).

The aims of the present paper are (i) to compare smoking rates in Poland and Norway in 2014 and (ii) to compare trends during the period 1990-2014. Based on the history of smoking control in the two countries, briefly described above, it is expected that the prevalence of smokers started decreasing at an earlier stage in Norway, and that smoking prevalence in 2014 are lower in Norway. Since changes in smoking behaviour is a gradual process influenced by a large number of factors, also factors external to smoking control programmes, it is not expected that we will be able to identify sudden changes related to specific smoking control activities. Also the rather long time intervals between data collections (four years) reduce the possibilities of establishing such connections.

MATERIAL AND METHODS

The HBSC study surveys nation-wide representative samples of school students aged 11, 13, and 15 years. As mentioned above, data collections take place every four years, following a standardized protocol [12]. This study focuses on independent samples of 15-year-olds in Norway and Poland through five waves of data collections: 1985/86 (Norway only), 1989/90, 1993/94, 1997/98, 2001/02, 2005/06, and 2009/10. Each data collection took place before and after New Year. In this publication we will refer to the last year of data collections only, so 1990 actually means 1989/90. The numbers of respondents in the eight data collection were 3955 (1986, Norway only), 9650, 9479, 9887, 11 406, 10 200, 8604, and 7967, for the respective survey years, the total being a sample of 71 148 school students. The actual numbers presented in tables may be lower, depending on missing observations on relevant variables.

The selection process followed a systematic cluster sampling strategy. All students in the relevant grades (grades 6, 8 and 10 in Norway and grades 5, 7 and 9, in Poland) were included in the sampling frame and – using a random start – classes were selected for invitation to the study.

The sampling procedure identified school classes, rather than schools. For each class selected, the school's headmaster was contacted and invited to coordinate the participation of the relevant class in the study. In each country, data collections were conducted by the classroom teacher on a specified day, following a strict protocol that ensured students' anonymity. In 2014, the percent of students in participating classes in all three grades who completed questionnaires and were included in the dataset were 4490 for Poland and 3157 for Norway, 86% and 73% of students in the participating classes. The number of students across the survey years (age group 15 only) were 1288 (1986, Norway only), 3179, 3169, 3286, 3743, 3811, 2739, and 2380. The proportion of participating students in the relevant classes (all age groups included) were 86%, 82%, 79%, 82%, 93%, 88%, 85%, and 73%, respectively, across the eight waves (1986-2014) for Norway. For Poland the corresponding numbers across five latest data collections (1998-2014) – for which such information is available – were: 93%, 88%, 82%, 89%, 86%.

Smoking status was defined by the question, “How often do you smoke tobacco at present?”. Response categories were “Every day”, “At least once a week but not every day”, “Less than once a week”, and “Do not smoke”. For the cross sectional analysis (2014) all categories were kept separate. In the analysis of trends, two categories (“Less than once a week” and “Do not smoke”) were collapsed, resulting in categories “Daily smokers”, “Weekly smokers” and “Smoking seldom or not at all”. Gender and age (grade) were included as demographic variables. When analysing differences in smoking habits between Poland and Norway (2014), control for the cluster effect was done with the “Complex” module in SPSS. Since information about the clustering variable (school class) was not available on the data files for the first years of the study (1986 and 1990 for Norway and 1990, 1994 and 1998 for Poland), control for the cluster effect could not be done in the analysis of differences earlier than 2002. Instead ordinary chi square statistics for crosstabs are reported. When comparing Poland and Norway in 2014, we use an F-test, an adjusted variant of the second-order Rao-Scott adjusted chi-square statistic. Significance is based on the adjusted F and its corresponding degrees of freedom.

RESULTS

In 2014 the proportion of daily smokers and weekly smokers in our samples of school students was higher in Poland than in Norway in all age groups

TABLE 1. Smoking by age, gender and country 2014

Country	Gender	Age	Smoke daily	Weekly	Less than once a week	Don't smoke	Total		Significance (adjusted for cluster effects)
			%	%	%	%	%	<i>n</i>	
Poland	Boys	11	1.5	0.6	1.8	96.0	100.0	775	F = 16.841 df 1 = 5.560 df 2 = 1929.417 <i>p</i> < 0.001
		13	4.2	2.6	3.4	89.7	100.0	758	
		15	10.0	5.5	6.8	77.7	100.0	692	
		Total	5.1	2.8	3.9	88.2	100.0	2225	
	Girls	11	1.4	0.4	0.5	97.7	100.0	728	F = 20.226 df 1 = 5.466 df 2 = 191.173 <i>p</i> < 0.001
		13	5.3	2.4	4.2	88.1	100.0	756	
		15	9.6	5.1	8.3	77.0	100.0	781	
		Total	5.5	2.7	4.5	87.3	100.0	2265	
Norway	Boys	11	0.5	0.2	0.2	99.2	100.0	618	F = 9.175 df 1 = 5.785 df 2 = 1243.751 <i>p</i> < 0.001
		13	1.7	0.8	1.3	96.2	100.0	479	
		15	2.1	3.7	4.2	90.0	100.0	429	
		Total	1.3	1.4	1.6	95.7	100.0	1526	
	Girls	11	0.0	0.0	0.0	100.0	100.0	636	F = 5.633 df 1 = 2.066 df 2 = 440.162 <i>p</i> < 0.01
		13	0.0	0.0	0.6	99.4	100.0	527	
		15	0.6	2.1	5.1	92.1	100.0	468	
		Total	0.2	0.6	1.7	97.5	100.0	1631	

among both genders (Table 1). Among the 15 year olds, the proportion of daily smokers in Poland was 10.0% among boys and 9.6% among girls. The corresponding figures for Norway were significantly lower; 2.1% and 0.6% ($F_{\text{BOYS adjusted}} = 23.188$, $df = 1$ and 193 , $p < 0.001$; $F_{\text{GIRLS adjusted}} = 40.099$; $df = 1$ and 179 , $p < 0.001$). The differences in proportion of daily smokers were significant also among 13 year olds ($p_{\text{BOYS}} < 0.05$; $p_{\text{GIRLS}} < 0.001$) and among 11 year old girls ($p < 0.01$), but only borderline significant among 11 year old girls ($p = 0.060$, remaining test statistics details not provided here). If we look at daily plus weekly smokers the contrasts between Poland and Norway in terms of percentage points are slightly higher (all differences being statistically significant at the $p < 0.05$ level or lower). Interestingly, among Norwegian girls there were no smokers at all among 11 year old girls in 2014, and no daily or weekly smokers among girls aged 13.

In 1990, the proportions of daily smokers among adolescents in Norway were as high as 17.2% for boys and 15.6% for girls. Among Polish school students the corresponding proportions were lower, 14.4% and 6.2% (Table 2). With ordinary chi square tests for cross-tabulations the difference was not statistically significant for boys ($\chi^2 = 2.383$, $df = 1$, $p = 0.123$), but significant for girls ($\chi^2 = 34.682$, $df = 1$, $p < 0.001$). Although correction for cluster effects is not applied in this testing (reasons explained in the methods section), such corrections would not have changed the observed combination of insignificance for boys and significance for girls.

The changes in proportion of daily smokers over time are markedly different (Figs. 1 and 2). From 1986 to 1994 there was a remarkable stability in Norway and then a sudden increase from 1994 to 1998. From 2002 to 2014 the proportion of daily smokers among the 15 year olds in Norway has decreased to very low levels. In Poland there was a steady increase from 1990 to 1998. The decrease seems to have started in 1998 for Polish girls, followed by Polish boys in 2002. There was actually an unexpected, but not statistically significant increase in the proportion of daily smokers among Polish girls from 2010 to 2014 ($F_{\text{Adjusted}} = 1.671$, $df = 1$ and 194 , $p = 0.294$).

DISCUSSION

In Poland as well as in Norway the decrease in smoking during the period 2002 to 2014 has been substantial.

In Norway daily smoking is practically eliminated among 15 year old girls, and negligible (about 2%) among boys. The figures have come down a long way since 1975, when there were 28% daily smokers among girls and 23% among boys [13]. Changes in smoking prevalence among 15 year olds in Norway over the last 50 years have not followed a smooth curve with increase, levelling off and then period of decrease. There was a peak in the mid-1970s, a slight decrease and stability towards the end of the century [14], and as shown by the present study an increase during the period 1994-1998 and then first a small decrease during the next four years and a strong decrease continuing until 2014. The stability in the late 1980s and early 1990 has its parallel in the age

TABLE 2. Daily and weekly smoking by gender and year, 15 year olds, Norway and Poland

Country	Gender	Year	Smoke daily	Weekly	More seldom or don't smoke	Total		Significance (no adjustment for cluster effects)
			%	%	%	%	<i>n</i>	
Poland	Boys	1986	–	–	–	–	–	$\chi^2 = 82.578$ df = 12 $p < 0.001$
		1990	14.4	5.6	80.0	100.0	821	
		1994	17.5	5.0	77.5	100.0	806	
		1998	21.8	5.3	73.0	100.0	891	
		2002	21.5	4.7	73.8	100.0	1021	
		2006	14.9	3.7	81.5	100.0	1089	
		2010	12.2	3.5	84.3	100.0	682	
		2014	10.0	5.5	84.5	100.0	692	
	Girls	1986	–	–	–	–	–	$\chi^2 = 48.487$ df = 12 $p < 0.001$
		1990	6.2	3.5	90.3	100.0	715	
		1994	8.1	4.7	87.2	100.0	729	
		1998	14.0	6.4	79.6	100.0	745	
		2002	11.7	5.5	82.8	100.0	1105	
		2006	10.1	4.1	85.8	100.0	1194	
2010		7.7	4.4	87.9	100.0	725		
2014		9.6	5.1	85.3	100.0	791		
Norway	Boys	1986	15.7	4.4	80.0	100.0	664	$\chi^2 = 169.205$ df = 14 $p < 0.001$
		1990	17.2	4.4	78.4	100.0	798	
		1994	15.9	4.2	79.9	100.0	836	
		1998	18.2	5.1	76.7	100.0	837	
		2002	15.5	4.5	80.0	100.0	795	
		2006	7.1	2.2	90.7	100.0	815	
		2010	5.9	2.8	91.2	100.0	707	
		2014	2.1	3.7	94.2	100.0	429	
	Girls	1986	17.1	6.4	76.4	100.0	624	$\chi^2 = 239.155$ df = 14 $p < 0.001$
		1990	15.6	6.7	77.6	100.0	845	
		1994	15.0	6.0	78.9	100.0	798	
		1998	20.9	7.1	72.0	100.0	813	
		2002	19.8	6.7	73.5	100.0	822	
		2006	9.4	3.1	87.5	100.0	713	
2010		6.1	2.1	91.8	100.0	625		
2014		0.6	2.1	97.2	100.0	468		

group 16-24. In this group there was a stable decrease in smoking during the period 1973-1987, then there was more than ten years of stability, and finally a steady decrease until present [15]. Gender differences in this age group of young adults are negligible throughout the whole period 1973-2015.

The observed trends can to some extent be explained by variations in intensity of the Norwegian smoking control programme. During the 1970s and the early 1980s tobacco control activities had a high profile. The 1975 introduction of the first tobacco legislation, strong

increases in the price of manufactured cigarettes and frequent mass media campaigns may have contributed to the reduction in smoking prevalence which took place among adolescents and young adults. Reduced tobacco control budgets and reduced governmental prevention activities may explain the levelling off during the late 1980s and most of the 1990s. Towards year 2000 budgets for tobacco control in Norway increased, and when Dagfinn Høybråten took over as minister of health in Norway in 2001, he took the lead and fronted the public debate about smoking control. One of his aims was to

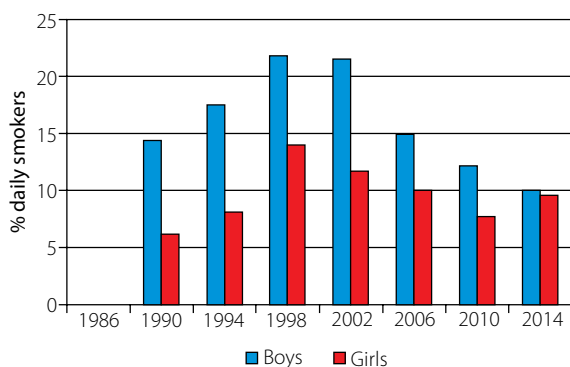


FIG. 1. Proportion of daily smokers among 15 years olds by gender and year, Poland

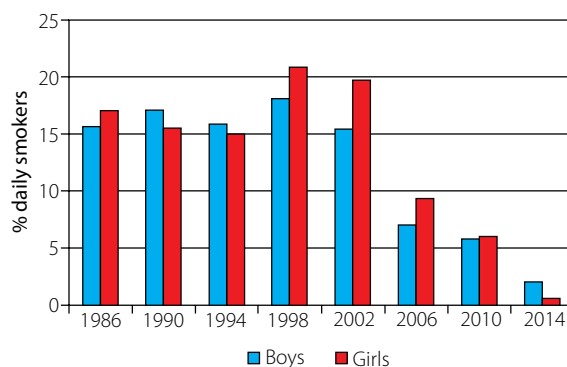


FIG. 2. Proportion of daily smokers among 15 year olds by gender and year, Norway

reduce smoking among adolescents in secondary school (age groups 13-15) by half in five years. This actually was achieved [14]. And gradually non-smoking has become the norm in younger age groups. The start of the reduction in smoking among 15 year olds in Norway also coincided with the nation-wide dissemination of the “BE smokeFREE” programme for secondary schools, which for several years was used in more than 60% of Norwegian secondary schools (corresponding to age 14-16) [6].

This is, however, not the whole story. After year 2000 use of wet snuff (snus) has become more widespread. At present, among adolescents and young adults, the prevalence of daily use of snus is higher than the prevalence of daily smoking [15]. The increase has been particularly strong among young males. Females seem to follow. This may have contributed to accelerating the decrease in smoking. Instead of starting smoking, some young people may have started using snus. The decrease in smoking among young females actually started shortly before the increase in snus use. This indicates that a downward trend in smoking might have taken place irrespective of the use of snus. To what extent use of snus contributed to the reduction in smoking is unclear.

Historically, in former socialist economy countries of Eastern Europe, smoking prevalence of children was significantly lower than in countries of Western Europe. And different from Western Europe, where the smoking prevalence of boys and girls was becoming similar, in Poland smoking prevalence of boys was many times higher than of girls. In 1990 in Poland, among 15-year old boys the prevalence of smokers was 14.4% and among girls 6.2% [16]. It seems that the reason for this was the paternalistic and conservative societies of Eastern Europe, quite different from the more liberal cultures in the West.

After the collapse of communism in the 1990s, a rapid increase in smoking prevalence took place among adolescents in Poland, for instance among 15-year old boys and girls as shown in this publication. The increase in girls was faster than among boys. In Poland the peak of smoking prevalence was reached at the end of the 21st century [17], and since then a decrease in smoking

prevalence has been observed both among boys and among girls (see Fig. 1). In 2014 there was no longer any gender difference in smoking prevalence among 15-year olds. This decrease in smoking prevalence among adolescents in Poland is congruent with the trend of decrease in smoking in the Polish adult population.

Changes taking place among 15 year olds in Poland followed a simple pattern. A steady increase during the period 1990-1998 was followed by a decrease which started already in 1998 among girls and became pronounced among boys from 2002. The general smoking control activities in Poland as well as action targeting adolescents in particular may have contributed to this new trend. We may also hypothesize that non-smoking became associated with the new life after the breakdown of the communist system in Eastern Europe, and therefore represented an aspect of a modern lifestyle.

The traditional gender difference, smoking prevalence being higher among males than among females was observable among 15 year olds in Poland, although gradually diminishing, from 1990 to 2010. This is consistent with the diffusion of innovations patterns frequently described in the research literature [18]. Smoking started among men in high-status segments of the European populations, spread gradually to other segments of the male populations, and women followed at a later stage. Decreases in smoking prevalence followed similar socio-economic patterns, but less so with regard to gender. The reduction in smoking prevalence among female medical doctors started simultaneously with male medical doctors without ever reaching the same high levels [19, 20].

The most surprising finding from the Polish data is the unexpected (insignificant) increase in proportion of daily smokers among girls from 2010 (7.7%) to 2014 (9.6%). In 2014 there is no longer any obvious gender difference in daily smoking. New data collections are needed before any firm conclusions can be drawn. If new studies confirm that there is no further reduction, or even increase in the prevalence of daily smokers among girls, it may turn out to be necessary to develop interventions targeting young

females specifically. A gender gap in smoking prevalence, lower among girls, still exists in rural areas [21].

Obvious strengths of the present study are the use of the same instruments and procedures for data collection over time and the efforts made to ensure comparability across countries. Nation-wide representative samples and low attrition are other strengths. Systematic under-reporting cannot be ruled out as a source of bias. Comparisons between Norway and Poland, between males and females and across years would still be valid if under-reporting is not too different across groups and relatively stable over time. We are not aware of studies which may confirm or disconfirm such differences and variation in reporting bias.

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DISCLOSURE

Authors report no conflict of interest.

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