

Smoking and related factors of the social environment among adolescents in the Republic of Karelia, Russia in 1995 and 2004

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Background: To investigate changes in smoking prevalence associated with social factors and existing health policies among adolescents in Russia from 1995 to 2004. **Methods:** In 1995 and 2004 a confidential questionnaire was distributed to every 9th grade student of all 10 comprehensive schools of the Pitkäranta in Republic of Karelia, Russia. In 1995, 385 children participated in the survey (response rate 95%) and 395 children (response rate 85%) in 2004. **Results:** Twenty-nine percent of boys smoked daily in 1995 and 31% in 2004. Daily smoking doubled from 7% to 15% for girls. Smoking in the schoolyard increased among girls. The proportion of girls who reported smoking at home with their parents' knowledge increased. Both genders cited the ease of purchasing tobacco as a minor. Knowledge about the fast development of tobacco addiction increased statistically significantly among boys. Fewer numbers of respondents of either gender thought that young smokers look 'cool' and more grown up. Having a best friend who smoked was the strongest predictor for smoking for both genders. **Conclusion:** Smoking has increased among girls. Social environment is a predisposing factor. Anti-smoking legislation was implemented weakly. Minors purchase tobacco relatively easily. Knowledge about tobacco's harmfulness has somewhat increased but is not sufficient to deter starting smoking, especially among non-smoking girls. Adequate education of adolescents on the hazards of tobacco consumption is needed, accompanied by a more determined enforcement of health policies. The potent influence of peers should be considered when planning preventive interventions.

Keywords: adolescents, Russia, smoking, social environment, survey

Introduction

Tobacco consumption is well recognized as a preventable risk factor for early morbidity and mortality.^{1,2} In Russia, smoking is highest in the European region and one of the main causes of high mortality.^{3,4} Smoking prevalence among Russian men has remained quite stable during the past decade but recently a slightly decreasing trend has been observed in some urban areas. Smoking among Russian women shows steady growth.^{5,6} In general, smokers usually start the habit before the age of 18 years.⁷ In Russia, smokers of both genders start to smoke between the years of 16 and 20.⁸

Besides genetic, individual and socio-cultural interactions, smoking is also shaped by environment either promoting or preventing smoking in youth. The main predictors for smoking initiation is usually smoking of other family members and friends.⁹ Exposure to environmental tobacco smoke during childhood is associated with subsequent smoking in adolescence.¹⁰ Moreover, marketing is a powerful factor, providing models to emulate.¹¹

Initiation into smoking at an early age may have far-reaching consequences later in life. Adolescents who started smoking at an early age are more likely to continue when they are older^{12,13} and are less likely to quit smoking.¹⁴ Consequently, every third smoking adolescent transits into a regular adult smoker.¹⁵ Tobacco usage in adolescence predicts a range of early adult social and health problems, as this period

of life is prone to the acceptance of behaviours that influence health status in adulthood.^{15,16} Along with an increased likelihood of early adult tobacco use, tobacco smoking in adolescents is associated with alcohol consumption. There is also a link between tobacco use by youths and subsequent behavioural and mental health problems in adults.¹⁷

Little is known about changes in smoking prevalence in connection with social and environmental factors among Russian youth in the past decade. The present study aims to investigate changes in smoking behaviour in the Pitkäranta region of the Republic of Karelia in Russia between 1995 and 2004. The study particularly focuses on: existing health policies, the availability of tobacco and places for its consumption, opinions and attitudes regarding smoking as a means of enhancing self-image; together with the influences of the close environment such as relatives and friends upon prevalence of smoking among adolescents.

Methods and participants

The Republic of Karelia is located in Northwest Russia, bordered by Finland and has a population of 703 100 inhabitants. Pitkäranta is a typical region of the Republic of Karelia and is characterized by a high prevalence of chronic disease risk factors among the adult population.¹⁸ Total and CVD mortality are high in Pitkäranta. Life expectancy in 2004 was 54 years among men and 69 years among women. The mortality, associated with diseases of the circulatory system was 1004 and that of neoplasm was 199/100 000 inhabitants.¹⁹ The region of Pitkäranta consists of urban and rural districts without precise demarcation between them.

The present study is a part of a health survey, conducted among school children in all 10 secondary schools of the Pitkäranta region in 1995 and in 2004. The study group for both years comprised every 9th grade (15-year old) students.

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Table 1 Smoking prevalence and friends and relatives smoking

All participants	Boys			Girls		
	1995 % (N)	2004 % (N)	χ^2 , P-value	1995 % (N)	2004 % (N)	χ^2 , P-value
Best friend smoking	50 (159)	61 (158)	3.50, 0.061	37 (164)	40 (164)	0.32, 0.517
Father is smoking	65 (162)	65 (155)	0.29, 0.864	73 (162)	66 (154)	1.63, 0.202
Mother is smoking	10 (171)	16 (166)	2.97, 0.085	28 (184)	24 (160)	0.49, 0.482
Older sister is smoking	13 (92)	22 (123)	2.37, 0.124	23 (104)	39 (127)	6.36, 0.012
Older brother is smoking	38 (122)	46 (120)	1.64, 0.200	63 (94)	50 (124)	3.53, 0.060

In each analyses those who reported that they do not have a friend/father/mother/sisters/brothers were excluded

The sample size was 385 students (response rate 95%) for 1995 and 395 students (response rate 85%) for 2004. The final data included 176 boys and 192 girls for 1995, and 171 boys and 169 girls for 2004. Each student filled in a confidential questionnaire with mainly pre-coded answers for the assessment of their smoking status. A detailed methodology was published earlier.²⁰

The smoking status of each participant was sought by asking: 'Are you currently a smoker?' (I do not smoke; 1–2 times a month or less; 1–2 times a week; I smoke daily). Exposure to smoking was assessed by the questions: 'Does your father, mother, brother or sister (who is older than you by 10 years), or friend smoke?' Smoking occasions, places and related were assessed using questions/statements: 'Do you smoke during breaks at school?; Smoking on the school premises is easy; I smoke at home and my parents do know; I smoke at home and my parents do not know'. Answers were categorical: never; seldom; sometimes; often. Information about sources of tobacco acquisition was gathered through the statements: 'I buy cigarettes myself from kiosks; older friends buy cigarettes for me; I get cigarettes from somewhere else'. The degree of difficulty associated with tobacco acquisition for minors was assessed by a question about the relative ease of purchasing tobacco when under age of 16 years old and under the legal age of 18 years. Opinions and attitudes on the development of smoking addiction were sought through the extent of agreement with the following statements: 'Dependence on tobacco develops fast; Tobacco should be sold to children under 16 years old; Nobody should smoke at home; Young smokers are "cool" and look more grown up; Youth smokers have more friends; Young people can easily stop smoking.' Categorical responses were: agree, partly agree, do not agree. Agreement or disagreement with these statements indicated to what extent smoking was perceived by the young as being a means of enhancing self-image and a facilitator for meeting and socializing with new friends. They also indicated attitudes towards existing smoking policies.

Informed consent was obtained from participants and their parents. The main reason for the non-response was the pupil's absence from school on the day of the survey.

Data analysis

Data were analysed separately for boys and girls according to the status of being either: a smoker or non-smoker. In all analyses the smoker category included daily and occasional smokers. Places of tobacco acquisition, smoking occasions and venues were analysed only for smokers. Analyses conducted using SPSS 14 software. The Chi-square test used to assess changes in smoking prevalence, places of tobacco acquisition and general attitudes toward smoking. Logistic regression for binominal variables applied to predict the association between

best friends or close relatives smoking with adolescents smoking, using combined data for the years 1995 and 2004.

Results

Smoking prevalence

Prevalence of daily smoking increased among girls from 7% to 15% between 1995 and 2004, ($P=0.015$). Among boys the daily smoking prevalence was 29% for 1995 and 31% for 2004, and did not change statistically significantly. The mean number of cigarettes consumed daily among girls was 5.1 (median 4.5). Among boys the mean number of cigarettes smoked daily was 6.8 (median 5.0).

Smoking among family and friends

Boys reported similar levels of smoking prevalence among best friends, fathers, mothers and older siblings for 1995 and 2004. Girls reported an increase in smoking prevalence among older sisters from 23% for 1995 to 39% for 2004 ($P=0.012$), smoking prevalence of best friends, mother, father or brother(s) remained unchanged (table 1).

Places and occasions of tobacco-smoking occurrence

About 80% of smokers smoked during the breaks at school. No changes occurred for boys regarding smoking venues, occasions and parents being informed about their smoking between the survey years.

Among girls, smoking at school increased from 39% for 1995 to 76% for 2004 ($P=0.003$). The number of girls reporting smoking at home with their parents' knowledge was 11% for 1995 and 33% for 2004, ($P=0.047$). Among smokers, 67% of girls and 62% of boys reported 'smoking within the school premises is easy' for 2004. Fifty percent of girls reported smoking at home without their parents' knowledge whereas the corresponding result for boys was 42% (table 2).

Places of tobacco acquisition

The main outlet of tobacco acquisition for self-consumption among young smokers in Pitkäranta remained kiosks: 84% of the boy-smokers reported for 1995 and 83% for 2004. Among the girl-smokers, tobacco purchasing from kiosks increased from 54% for 1995 to 94% for 2004, ($P<0.001$). Older friends were a source of tobacco supply for 32% girls for 1995, which decreased to 6% for 2004, ($P<0.001$). Among boys-smokers the respective value was 7% for both years.

Table 2 Smoking occasions, places and related opinions among smokers

Prevalence of those who reported smoking	Boys			Girls		
	1995	2004	χ^2 , P-value	1995	2004	χ^2 , P-value
	n = 63 (%)	n = 74 (%)		n = 28 (%)	n = 37 (%)	
Smoking during breaks at school	82	78	0.28, 0.595	39	76	8.84, 0.003
Smoking at the school yard is easy	75	62	2.42, 0.120	46	67	2.21, 0.137
Smoking at home, parents do know	44	30	2.48, 0.115	11	33	3.95, 0.047
Smoking at home, without parents knowing	44	42	0.054, 0.816	44	50	0.19, 0.662

Table 3 Possibility of tobacco acquisition, all participants included in analysis

Possibility to purchase tobacco if under 16-years old	Boys			Girls		
	1995 (%)	2004 (%)	χ^2 , P-value	1995 (%)	2004 (%)	χ^2 , P-value
All participants						
Always	48	32	10.73 P=0.013	46	20	28.14 P<0.001
Often	24	26		26	35	
Sometimes	16	25		17	31	
Never	12	17		11	14	
Non-smokers						
Always	45	35	2.74 P=0.433	47	18	26.75 P<0.001
Often	25	31		26	39	
Sometimes	16	15		15	26	
Never	14	19		12	17	
Smokers						
Always	51	27	12.54 P=0.006	40	24	2.52 P=0.471
Often	23	19		26	24	
Sometimes	16	39		30	50	
Never	10	15		4	6	
if under 18-years old						
All participants						
Always	67	48	15.67 P=0.001	67	35	46.36 P<0.001
Often	19	22		21	29	
Sometimes	8	21		4	22	
Never	6	9		8	14	
Non-smokers						
Always	63	55	2.17 P=0.539	66	36	29.78 P<0.001
Often	22	24		21	30	
Sometimes	7	8		4	19	
Never	8	13		9	15	
Smokers						
Always	73	40	17.30 P=0.001	78	30	17.71 P=0.001
Often	16	20		18	27	
Sometimes	9	37		4	35	
Never	2	3		0	8	
N	100	100		100	100	

The ease of purchasing tobacco when under age

Tobacco purchasing became slightly more difficult for minors in Pitkäranta in 2004. However, 30% of boys and 20% of girls in 2004 reported being able to buy tobacco when under 16-years old. In contrast, 48% of boys and 35% of girls reported purchasing tobacco when under 18-years old (table 3).

Smoking-related opinions

Opinions related to smoking and sociological perceptions of smokers differed between the genders and also between smokers and non-smokers.

Dependence on tobacco is developing fast

The proportion of boys who supported the opinion that tobacco dependency develops fast increased from 53% for 1995 to 75% for 2004, ($P=0.001$). This increase was from 47% for 1995 to

70% for 2004 among non-smokers ($P<0.001$) compared with 62% for 1995 to 81% for 2004 among smokers ($P=0.015$).

Among girls, the increase was significant ($P=0.052$) only among smokers, from 56% in 1995 to 78% in 2004 (table 4).

Young smokers are 'cool'

The proportion of the boys who think that young smokers are 'cool' decreased from 38% for 1995 to 9% for 2004 ($P<0.001$) among non-smokers. However, there was no corresponding statistically significant change among smokers. The proportion of girls who think that young smokers are 'cool' decreased among smokers ($P<0.001$) and non-smokers ($P=0.029$) by 2004 (table 4).

'Young smokers look more grown up'

The proportion of boys who agreed with the opinion that 'young smokers look more grown up' decreased ($P=0.001$). The decrease was greater among boy-smokers, from 30% for 1995 to 10% for 2004 ($P=0.002$) (table 4).

'Young people can easily stop smoking'

The proportion of girl non-smokers who believe that quitting smoking is easy for young people increased from 29% for 1995 to 46% for 2004, ($P=0.002$). Among boys there was no statistically significant change in this opinion (table 4).

In Pitkäranta, a best friend who smoked was the strongest predictor for both boys and girls to smoke ($P<0.001$). The univariate model revealed that smoking among close relatives was also significantly associated with an adolescent smoking. However, in the multivariate model analyses only the best friend's smoking remained associated with the respondents' smoking ($P<0.001$) (table 5).

Discussion

Daily smoking prevalence doubled among the girls between 1995 and 2004. However, there was no change among the boys over the same period, though their smoking prevalence was twice that of the girls. The prevalence of smoking among youths in Pitkäranta is among the highest in Russia, after those reported for Moscow and Tomsk (about 30%).²¹ Smoking prevalence in adolescents (smoking at least once a week) varies across regions in Russia from 3% up to 40%.^{21,22} In the Moscow region, every third adolescent boy and every fifth girl smoke daily.²³

The change in the prevalence of smoking in youths in Pitkäranta correlated with that among adults from the same area. Since 1992, the prevalence of smoking among men remained steady (about 65%), whereas among women, it increased from 11% to 22% by 2004.^{20,24} However the gender gap in the prevalence of smoking among adolescents in Pitkäranta is narrower than among adults.

Table 4 Opinions (percentage of those who agree or partly agree)

Opinions	Boys			Girls		
	1995 % (N)	2004 % (N)	χ^2 , P-value	1995 % (N)	2004 % (N)	χ^2 , P-value
Dependence on tobacco is developing fast						
All participants	53 (167)	75 (171)	17.96, <0.001	60 (185)	69 (169)	3.22, 0.073
Non-smokers	47 (106)	70 (97)	10.95, 0.001	60 (156)	66 (132)	1.21, 0.272
Smokers	62 (61)	81 (74)	5.93, 0.015	56 (27)	78 (37)	3.78, 0.052
Tobacco should be sold to children under 16						
All participants	27 (172)	21 (170)	1.45, 0.228	11 (188)	11 (169)	0.02, 0.875
Non-smokers	17 (109)	10 (96)	1.60, 0.205	11 (158)	9 (32)	0.41, 0.522
Smokers	44 (63)	35 (74)	1.23, 0.266	11 (28)	16 (37)	0.40, 0.525
Youth smoking should be prohibited by law						
All participants	40 (171)	49 (171)	3.03, 0.082	56 (189)	60 (169)	0.67, 0.414
Non-smokers	49 (109)	58 (97)	1.71, 0.191	60 (159)	64 (132)	0.33, 0.569
Smokers	24 (62)	38 (74)	2.90, 0.088	32 (28)	49 (37)	1.78, 0.181
Nobody should smoke at home						
All participants	80 (172)	75 (171)	1.14, 0.285	85 (188)	86 (169)	0.11, 0.745
Non-smokers	85 (109)	76 (97)	2.73, 0.099	87 (158)	88 (132)	0.02, 0.890
Smokers	71 (63)	74 (74)	0.15, 0.704	68 (28)	78 (37)	0.91, 0.339
Young smokers are 'cool'						
All participants	34 (172)	14 (171)	18.27, <0.001	33 (189)	13 (169)	19.45, <0.001
Non-smokers	38 (109)	9 (97)	22.42, <0.001	33 (159)	14 (132)	13.90, <0.001
Smokers	27 (63)	20 (74)	0.857, 0.355	29 (28)	8 (37)	4.74, 0.029
Young smokers look more grown up						
All participants	23 (169)	10 (171)	10.66, 0.001	18 (189)	15 (169)	0.66, 0.416
Non-smokers	19 (106)	10 (97)	2.95, 0.086	18 (159)	15 (132)	0.49, 0.483
Smokers	30 (63)	10 (74)	9.48, 0.002	18 (28)	14 (37)	0.23, 0.631
Smoking youth have more friends						
All participants	25 (169)	19 (171)	2.23, 0.135	12 (186)	19 (168)	2.53, 0.112
Non-smokers	21 (106)	16 (97)	0.95, 0.329	11 (159)	17 (131)	2.11, 0.146
Smokers	33 (63)	23 (74)	1.82, 0.177	21 (28)	24 (37)	0.08, 0.784
Young people can easily stop smoking						
All participants	39 (171)	48 (171)	2.68, 0.102	29 (189)	47 (169)	12.62, <0.001
Non-smokers	40 (109)	47 (97)	1.33, 0.249	29 (159)	46 (132)	9.20, 0.002
Smokers	39 (62)	49 (74)	1.35, 0.245	32 (28)	51 (37)	2.40, 0.121

Table 5 Odds ratio and 95% CI of smoking among Pitkäranta adolescents in relation to smoking among best friends and family

	Univariate model			Multivariate model		
	OR	95% CI	P	OR	95% CI	P
Boys (n = 347)						
Best friend smokes	7.17	4.19–12.30	<0.001	8.95	3.60–22.24	<0.001
Father smokes	2.00	1.23–3.30	0.006	1.47	0.64–3.36	0.360
Mother smokes	2.04	1.08–3.87	0.028	1.29	0.43–3.88	0.643
Older sister smokes	2.37	1.16–4.83	0.018	1.79	0.58–5.49	0.308
Older brother smokes	2.43	1.44–4.13	0.001	1.02	0.44–2.32	0.969
Girls (n = 361)						
Best friend smokes	7.20	3.80–13.64	<0.001	7.16	2.40–21.37	<0.001
Father smokes	1.98	0.97–4.01	0.060	1.71	0.52–5.57	0.375
Mother smokes	3.80	2.10–6.87	<0.001	1.53	0.52–4.46	0.441
Older sister smokes	2.34	1.21–4.52	0.011	1.26	0.43–3.62	0.674
Older brother smokes	3.58	1.71–7.48	0.001	2.47	0.80–7.67	0.118
All (n = 708)						
Best friend smokes	7.77	5.18–11.65	<0.001	8.66	4.41–17.00	<0.001
Father smokes	1.82	1.22–2.68	0.003	1.44	0.75–2.76	0.272
Mother smokes	1.96	1.32–2.92	0.001	1.34	0.64–2.82	0.434
Older sister smokes	1.82	1.16–2.85	0.010	1.15	0.56–2.34	0.711
Older brother smokes	2.32	1.55–3.47	0.001	1.35	0.72–2.54	0.345

Tobacco use among adolescents is becoming a serious problem for developed and developing countries.²⁵ Smoking trends among European youth develop differently. In Andorra and Slovakia a growth in smoking prevalence is reported

among both genders, whereas in Denmark, Latvia, Ireland, Sweden and Switzerland decreasing trends have been observed. In Finland, the Czech Republic and Germany smoking prevalence among girls is growing and also exceeds the

prevalence among boys.²⁶ In Russia, a general growth in smoking is reported among girls and a decrease in smoking among boys. Similarly, increases in smoking among girls in: Estonia, Lithuania, Malta and Portugal have been reported.²⁷

Other indicators reflecting an increase in smoking among girls are: easier to smoke during the breaks at school, increased number of girls smoking at home with their parents' knowledge together with the an increase in the number of girls buying cigarettes for themselves. The increases in smoking rates among pupils in school reflects on the existing smoking policy and its implementation.²⁸ Strict non-smoking rules and strict compliance with the school authority rules are protective factors against smoking among schoolchildren.²⁹ Nevertheless, prevailing school culture may provide either risk factors, or a protective environment for smoking and adolescents' health in general.³⁰ Increased opportunities for girls to smoke at school and also at home with their parents' knowledge indicate less control on girls smoking at schools and increased societal acceptance of female smoking.

Tobacco legislation in Russia bans tobacco sales to youths <18 years of age.³¹ Tobacco acquisition by youths under 16 or under the legal age of 18 years in Pitkäranta became somewhat difficult. However, sufficient access to tobacco products was still reported by both genders. Tight implementation of legislation on tobacco sales to minors decreases the contribution of commercial sources for tobacco supply to youth and increases that of social sources as friends and other outlets.³² Friends were a less important source of tobacco supply for adolescents in Pitkäranta. This should be taken into account when enforcing the tobacco sales ban. Simultaneous health-promotion measures should also be applied to decrease the influence of youth's social channels of tobacco supply.

Despite widespread smoking in the USSR,³³ several initiatives had been implemented to assist the anti-tobacco campaigns. These aimed at intensifying anti-smoking information and establish a negative image of smoking within the population.⁵ In 1980, the age limit for tobacco sales were set at 16-years old.³⁴ Since then tobacco legislation in Russia has undergone subsequent changes (table A1).

Partial prohibition of tobacco advertising, by date,^{35,36} increased indoor promotions, especially in the city metros. In bigger cities, smoking rates are highest in Russia and the metro is the most visited public place by different age groups. Tobacco advertising to children in the media is actually forbidden. However, tobacco is widely advertised in women's magazines, with unrestricted access to girls. As a whole, people are unaware of the hazards of smoking and the popularity of non-smoking environments is low. The equipment and facilities of smoke-free areas in public places with adequate ventilation are mostly poor and the implementation of smoke-free public policy is rather weak. Russia has recently ratified the Framework Convention on Tobacco Control.³⁷ Due to the difficulties experienced in Russia with policy implementation, it is unlikely that the harmful influence of tobacco will be reduced significantly in the near future. Therefore, urgent measures must be actively taken in accordance with regulations of the FCTC to counter the tobacco epidemic.

In our study, smoking in close environments such as the family and among friends was found to be an influential factor for smoking initiation among adolescents. Having a best friend who smokes was the strongest predictor for both genders. Smoking among peers and within the family predisposes children towards initiation and the subsequent maintenance of the smoking habit.¹¹ A mother who smokes was the second strongest predictor for girls. These findings correlated with earlier studies from Russia and other countries.^{38,39} An acceptance of smoking by adults at home, at school or early

access to tobacco products is ideal for furthering the smoking habit among minors in Pitkäranta.

General knowledge on the effects tobacco somehow increased and smoking was perceived less as an image enhancing activity by adolescents in Pitkäranta. However, the underestimation of the power of tobacco addiction increased among non-smoker girls while the opposite trend was observed among girls who smoke. Another study from Russia reported that among Russian youth the attitude toward smoking as a 'harmful habit' decreased between 5th and 7th grade. In that study 90% of respondents of these grades agreed, compared with only 30% of respondents in the 8–11th grades.²⁰

In spite of growth in the negative attitudes towards the smoking habit, smoking prevalence has risen among girls in Pitkäranta. Girl non-smokers are not fully aware of the addictive effect of tobacco consumption. This indicates an insufficiency of delivered information and a deficiency in public health education. It also reflects existing norms related to smoking. It would be interesting to study whether such a phenomenon exists in other parts of Russia and CIS countries with similar developmental patterns of smoking among teenage girls. Better understanding of the factors related to the initiation of smoking among Russian children and youth would be needed.

The study samples included 95% for 1995 and 85% for 2004 of all secondary school students, from one age category (15-year olds), from the same area. High response rates ensured the study's credibility. The confidential personal questionnaire and the maintained anonymity of respondents predispose towards honesty in their answers. It is most likely this ensured that any underreporting of smoking was kept low. The Pitkäranta region is a typical area in the Republic of Karelia. Our findings could therefore be easily extrapolated to the whole of the republic. Questions on the exposure to environmental tobacco smoke, consumption of smokeless tobacco or the frequency of exposure to smoking advertisements and smoking as depicted in the movies were not included in our survey. Despite the lack of these data on children, the smoking prevalence among men is very high in Pitkäranta.²⁴

Recent significant social, political and economic changes in Russia, the aggressive influence of transnational tobacco companies combined with the weakness of the implementation of health policies have contributed to an increase in smoking among women.^{40,41} Tobacco companies in the Russian market use recognizable strategies as linking tobacco consumption to liberation, friendship and independence, deliberately targeting both genders. The price of tobacco in Russia is lower than in Europe and affordable for children. The promotion of smokeless tobacco and the increasing popularity of *nasvai/nass* (a homemade type of smokeless tobacco product, famous in Central Asia) is becoming more prevalent in different parts of Russia. The production of *nasvai* is not officially regulated. It is prepared privately in homes, sold in local markets and is purchased by youths.

The characteristics of smoking patterns and predisposing factors in Russia and the Republic of Karelia may reflect one another. The narrowing of the gender gap in smoking among adolescents suggests westernization of the smoking pattern. Further increase in smoking prevalence may be expected among females in Pitkäranta and in the Republic of Karelia. Increased societal tolerance to female smoking is a likely feature all over Russia. The liberalization towards females smoking, an increasing smoking rate among female adolescents, tobacco marketing and a lack of sufficient knowledge may lead to a gender switch in the smoking epidemic there.

Policy implications

Surveillance of smoking prevalence in association with the contributing factors of the social environment among adolescents is important. It allows detecting changes in health behaviour of youth early enough to respond adequately considering long-term outcomes of early smoking prevention.

There is a strong need for the enforcement of existing non-smoking health policies in Russia. Revision and further development of anti-smoking policies are required with the main emphasis on minors and women. All types of tobacco promotion including smoking scenes depicted in movies should be prohibited. The ban on smoking in public places should be implemented. Increasing prices and taxes on tobacco products would make them less affordable. It is essential that implementing preventive programmes aimed at reducing the prevalence of smoking and preventing its onset and uptake by the whole population in Russia is adopted as part of a national health strategy. Activities against smoking should not be implemented incidentally, but consistently included in governmental and political routines.

Acknowledgements

The study was supported by Ministry of Health and Social Development of the Republic of Karelia and was implemented in co-operation with Pitkäranta central hospital and the North Karelia Center for Public Health, Finland.

Funding

National Public Health Institute, Finland; European Union Interreg III A Karjala project (partial).

Conflicts of interest: None declared.

Key points

- Smoking prevalence doubled among girls.
- Implementation of anti-smoking legislation is weak in Russia.
- School and home environments became more permissive and foster the smoking habit, especially among girls.
- Knowledge on the harmful effects of tobacco has slightly increased in youths, but girl non-smokers are not fully aware of the actual risks of smoking.

References

- 1 Paffenbarger RS Jr, Hyde RT, Wing AL, et al. Cigarette smoking and cardiovascular diseases. *IARC Sci Publ* 1986;74:45–60.
- 2 Ezzati M, Henley SJ, Thun MJ, et al. Role of smoking in global and regional cardiovascular mortality. *Circulation* 2005;112:489–97.
- 3 WHO. The European tobacco control report 2007. Available from: http://www.euro.who.int/InformationSources/Publications/Catalogue/20070226_1 (Accessed on 10 April 2007).
- 4 Zaridze DG, Karpov RS, Kiseleva SM, et al. [Smoking: the main cause of high mortality rate among Russian population]. *Vestn Ross Akad Med Nauk* 2002;9:40–5.
- 5 Loranskii DN, Popova EB, Khakimova LS, Shevchuk AG. The problem of smoking. *Sovetskoe zdravookhranenie/Ministerstvo zdravookhraneniia SSSR* 1983;6:33–8.

- 6 Perlman F, Bobak M, Gilmore A, McKee M. Trends in the prevalence of smoking in Russia during the transition to a market economy. *Tob Control* 2007;16:299–305.
- 7 WHO. The European Health Report 2005. Available from: http://www.euro.who.int/document/ehr05/e87325pt3_policy.pdf (Accessed on 25 November 2007).
- 8 Gilmore A, Pomerleau J, McKee M, et al. Prevalence of smoking in 8 countries of the former Soviet Union: results from the living conditions, lifestyles and health study. *Am J Public Health* 2004;94:2177–87.
- 9 Schepis TS, Rao U. Epidemiology and etiology of adolescent smoking. *Curr Opin Pediatr* 2005;17:607–12.
- 10 Becklake MR, Ghezzi H, Ernst P. Childhood predictors of smoking in adolescence: a follow-up study of Montreal schoolchildren. *CMAJ* 2005;173:377–9.
- 11 Wakefield M, Flay B, Nichter M, et al. Role of the media in influencing trajectories of youth smoking. *Addiction* 2003;98(Suppl 1):79–103.
- 12 Paavola M, Vartiainen E, Haukkala A. Smoking, alcohol use, and physical activity: a 13-year longitudinal study ranging from adolescence into adulthood. *J Adolesc Health* 2004;35:238–44.
- 13 Escobedo LG, Marcus SE, Holtzman D, et al. Sports participation, age at smoking initiation, and the risk of smoking among US high school students. *JAMA* 1993;269:1391–5.
- 14 Breslau N, Peterson EL. Smoking cessation in young adults: age at initiation of cigarette smoking and other suspected influences. *Am J Public Health* 1996;86:214–20.
- 15 Mathers M, Toumbourou JW, Catalano RF, et al. Consequences of youth tobacco use: a review of prospective behavioural studies. *Addiction* 2006;101:948–58.
- 16 Geckova A, van Dijk JP, van Ittersum-Gritter T, et al. Determinants of adolescents' smoking behaviour: a literature review. *Cent Eur J Public Health* 2002;10:79–87.
- 17 U.S. Department of Health and Human Services. Preventing tobacco use among young people: a report of surgeon General. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service, Center for Disease Control Prevention and Health promotion, Office on Smoking and Health, 1994.
- 18 Laatikainen T, DeLong L, Pokusajeva S, et al. Changes in cardiovascular risk factors and health behaviours from 1992 to 1997 in the Republic of Karelia, Russia. *Eur J Public Health* 2002;12:37–4.
- 19 Federal Office of Statistics. The Republic Of Karelia In Numbers. *Statistical handbook Petrivodsk* 2005;39, 41.
- 20 Rogacheva A, Laatikainen T, Tossavainen K, et al. Changes in cardiovascular risk factors among adolescents from 1995 to 2004 in the Republic of Karelia, Russia. *Eur J Public Health* 2007;17:257–62.
- 21 CINDI. Prevalence of behavioural risk factors among schoolchildren. Report, 2002. Available from: <http://cindi.gnicpm.ru/children-brf.htm> (Accessed on 5 December 2007).
- 22 Latyshevskaia NI, Davydenko LA, Mandrikov VB. Monitoring of lifestyle. *Gig Sanit* 2004;6:31–2.
- 23 Skvortsova ES, Zubkova NZ. Prevalence of smokers in Moscow Region. *Probl Sotsialnoi Gig Zdravookhraneniiai Istor Med* 2005;1:27–9.
- 24 Laatikainen T, Vlasoff T, Korpelainen V, et al. The Health Behaviour in the Pitkaranta: results of the health behaviour surveys in the Pitkaranta district in the Republic of Karelia, Russia in 1998, 2000 and 2004. Report. North Karelia Center for Public Health. Joensuu, 2006.
- 25 The Global Youth Tobacco survey collaborative Group. Tobacco use among youth: a cross country comparison. *Tob Control* 2002;11:252–70.
- 26 WHO Collaborative Cross-National Study. Health Behaviour in School Children. The HBSC 2001/02 health report: <http://www.hbsc.org/> (Accessed on 7 May 2007).
- 27 WHO Regional Office for Europe. Tobacco control database, 2006. Available from: <http://data.euro.who.int/tobacco/?TabID=93302> (Accessed on 15 May 2007).
- 28 Aveyard P, Markham WA, Cheng KK. A methodological and substantive review of the evidence that schools cause pupils to smoke. *Soc Sci Med* 2004;58:2253–65.

- 29 Pinilla J, Gonzalez B, Barber P, Santana Y. Smoking in young adolescents: an approach with multilevel discrete choice models. *J Epidemiol Community Health* 2002;56:227–32.
- 30 Aveyard P, Markham WA, Lancashire E, et al. The influence of school culture on smoking among pupils. *Soc Sci Med* 2004;58:1767–80.
- 31 Federal law on restriction of tobacco smoking. Gosudarstvennaja дума. Moscow: 2001. Available from: <http://www.akdi.ru/gd/proekt/086534GD.SHTM> (Accessed on 6 May 2007).
- 32 Rimpela AH, Rainio SU. The effectiveness of tobacco sales ban to minors: the case of Finland. *Tob Control* 2004;13:167–74.
- 33 Zaridze DG, Dvoirin VV, Kobljakov VA, et al. Smoking patterns in the USSR. *IARC Sci Publ* 1986:75–86.
- 34 To strengthen battle against smoking. Central Comity of Communistic Party. Resolution N-706. Moscow: 1980. Available from: <http://niv.ru/library/006/065.htm> (Accessed on 6 May 2007).
- 35 Federal law on promotion. Gosudarstvennaja дума. Moscow:14.05.1995. Available from: <http://www.sbras.nsc.ru/win/anons/560.html> (Accessed on 4 May 2007).
- 36 Federal law on promotion. Gosudarstvennaja дума. Moscow: 2006. Available from: <http://propel.ru/law/fzorek.php> (Accessed on 6 May 2007).
- 37 The official site of Government of Russian Federation. Available from: <http://www.government.ru/government/governmentactivity/insiderfgovernment/archive/2008/01/10/7393916.htm> (Accessed on 25 April 2008).
- 38 Prokhorov AV, Alexandrov AA. Tobacco smoking in Moscow school students. *Br J Addict* 1992;87:1469–76.
- 39 Parma K, Rahu K, Fischer K, et al. Smoking and associated factors among adolescents in Tallinn, Helsinki and Moscow: a multilevel analysis. *Scand J Public Health* 2003;31:350–8.
- 40 Gilmore AB, McKee M. Moving East: how the transnational tobacco industry gained entry to the emerging markets of the former Soviet Union-part I: establishing cigarette imports. *Tob Control* 2004;13:143–50.
- 41 Gilmore AB, McKee M. Exploring the impact of foreign direct investment on tobacco consumption in the former Soviet Union. *Tob Control* 2005;14:13–21.

Received 9 January 2008, accepted 18 July 2008

Appendix

Table A1 Development of existing anti-smoking legislation in Russia

The period of USSR

1970: Prohibition of smoking on public transport.⁷

1980: Prohibition of smoking on health premises for health personnel and patients. Age limit for tobacco sales is 16 years.³⁷

1981: Ban on smoking on internal lines of "Aeroflot".⁷

The period during and after Perestroika, Russian Federation

1995: Advertisement ban on local TV between 7 a.m. and 22 p.m.

Advertisement ban in media for minors.

Ban on advertising on the first and last page of newspapers and magazine.

Advertising ban for outside banners and displays nearer than 100 m to children's, health and sport facilities.

All types of tobacco promotion have to include a warning message. Duration of message is not <3 s during radio and TV promotions.

On other types of promotion, message has to occupy not <5% of advertisement area.

Ban on supply to minors with samples of tobacco products.³⁸

2001: Age limit for tobacco sales is set at 18 years.

Ban on tobacco sales in health, educational, cultural and sport settings.

Ban on smoking at health, educational, cultural and indoor sport facilities and offices of governmental bodies.

Smoking at work places is allowed only in specially designated places.

Ban on smoking in public transport This including airlines, if the duration of the flight is <3 h.

Permitted tar and nicotine content in cigarettes with filters is 14 and 1.2 mg and in cigarettes without filter is 16 and 1.3 mg.

Information on tar and nicotine content is located on smaller side of the packet with not <4% of surface area occupied.

Warning prints on packet: main warning sign and additional signs located on larger side of package have to occupy minimum 4% of the surface area.

Ban on single cigarette sales and sales through vending machines.³⁴

2006: Ban on outdoor promotion of tobacco products on buildings and specially created technical constructions.³⁹

2008: Ratification of Frame Convention on Tobacco Control.³⁷