Social Determinants of Smoking, Alcohol and Drug Use Among Lithuanian School-Aged Children: Results From 5 Consecutive HBSC Surveys, 1994–2010

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Summary. *The aim of this study was to analyze the changes in the prevalence of smoking, alcohol and drug use among Lithuanian school-aged children in relation to the place of residence, family affluence, and family structure.*

Material and Methods. National surveys (26 556 anonymous questionnaires analyzed) of schoolchildren aged 11, 13, and 15 years were conducted in 1994, 1998, 2002, 2006, and 2010 in the framework of the international Health Behaviour in School-aged Children (HBSC) study.

Results. In 1994–2010, a significant increase in smoking prevalence was observed both among boys (11.3% to 21.5%, P<0.05) and girls (3.6% to 14.8%, P<0.05). Weekly alcohol consumption increased from 9.6% to 12.9% (P<0.05) among boys and from 4.3% to 7.9% (P<0.05) among girls. The prevalence of "ever use" of any psychoactive substance (data for 15-year-old group only) increased both in boys (14.6% to 33.5%) and girls (6.7% to 18.4%). Urban girls smoked more often than their rural peers. For both genders, such a residential gradient was observed in the use of alcohol and drugs. The respondents from intact families used drugs less frequently than the adolescents from not intact families. The adolescents from affluent families smoked less often, while the prevalence of alcohol and drug use was higher (except weekly alcohol use in girls).

Conclusions. The study has demonstrated a significant increase in the prevalence of smoking, drinking, and drug use among Lithuanian school-aged children during the period of transition to market economy. This study provides some insight that should be addressed in equity-oriented control policies of substance use.

Introduction

The potential health risks and economic costs of smoking, alcohol and drug use for the health of young generation have been shown by the multiple international studies (1–4). These data demonstrate that the use of mentioned psychoactive substances is among the most important ill-health determinants in Europe and at the global scale (4, 5). Despite internationally well-documented substance-related harm and recent attempts to reverse substance use trends through a health policy intervention, there is strong evidence that the use of psychoactive substances continued to be a significant threat during the last 2 decades among the populations of Central and East European countries including the Baltic States (6–8). The transition to market economy in these countries has resulted in enormous pressure on the health attitude and lifestyle change of the young people (8). All this leads to an increasing need for

information about the determinants of substance use of smoking, drug and alcohol use in our countries including their trends (1, 9, 10). In addition, there has been very little research done on the role of the changing socioeconomic environment, market regulatory measures (alcohol and tobacco taxation, advertisement ban, prevention of drug use, etc.), and their effects on risk-taking behaviors such as alcohol drinking and drug use among young people in societies going through a period of transition.

The international community was focusing its efforts to take control on the use of psychoactive substances in youth (6, 10). The target 12 of the WHO policy document Health-21 was devoted for "Reducing the Harm From Alcohol, Drugs and Tobacco." This document projects and encourages to reduce yearly alcohol consumption "to zero in under 15-years-olds," the "nonsmoking close to 100%," and drug use by at least 25% by the year 2015 (11). Similar ambitious targets were set up in the Lithuanian Health Program for the period 1998–2010. However, only limited progress has been achieved (9). Such a situation calls for renewed efforts in research focusing on the monitoring and evaluation of

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the social determinants of health-related behaviors as well as looking for new approaches in tackling the problems of substance use in the country. The Health Behaviour in School-aged Children (HBSC) study, which started in Lithuania in 1994, provides a realistic opportunity to contribute to the implementation of the abovementioned tasks by monitoring trends and analyzing the school and family context in which addictions to the substances occur.

Our research analysis was aimed at getting a deeper insight into the time trends of the prevalence of smoking, alcohol and drug use among Lithuanian school-aged children (11, 13, and 15 years old) during a 16-year period (1994–2010) and demonstrating how the place of residence (urban vs. rural), family affluence, and family structure were related to the existing inequalities in the prevalence as well as changes over time.

Material and Methods

Study Population and Survey Procedures. The research was carried out within the framework of the collaborative HBSC study coordinated by the World Health Organization. Five cross-sectional questionnaire-based surveys were carried out in the Lithuanian national representative samples of 11-, 13-, and 15-year-old children regularly during March–April in 1994, 1998, 2002, 2006, and 2010. A cluster sampling design was applied. A school and a class were used as the sampling units. The samples were drawn to be representative by age, gender, place of residence (urban and rural), and teaching language at school. The recommended sample size for each of the 3 age groups was approximately 1500 students.

Quality of data collection (sampling, development of survey instrument, conducting questionnaire survey, data collection and management) was ensured by strictly following the standardized international HBSC research protocol (12). The survey was approved by the Ministry of Education as well as by the national or regional bioethics committee. Pretrained personnel supervised the completion of questionnaires in classrooms. The completed questionnaires were collected in individually sealed envelopes. The participation was voluntary, ensuring confidentiality and anonymity.

After completion of the fieldwork, the data from each country was checked, recorded into the files, and submitted to the HBSC International Data Bank at the University of Bergen, Norway. The analysis presented here is based on the total number of 26 556 records (5428, 4513, 5645, 5632, and 5338 from the surveys of 1994, 1998, 2002, 2006, and 2010, respectively) selected by the quality criteria of the international HBSC database. The percentage of questionnaires selected for final analysis accounted for more than 80% of the whole selected sample.

Questionnaire and Variables. The survey questionnaire was developed and approved by the international experts involved in the HBSC study. The national questionnaire was adopted after the translation of the standard English version into the national language and retranslation it to English. Information on different health behaviors (nutrition, physical activity, etc.) and substance use – tobacco smoking, alcohol (for all age groups), and cannabis (only for 15 years olds) – was included.

Age at smoking and drinking initiation was assessed by answering the question, "At what age did you first smoke a cigarette (drink alcohol)?" The answer categories were "never" and "11 years old" through "16 years old" (7 response categories in total). Median was calculated for every year and gender in the further analysis. Therefore, statistical median was not calculated for some age and gender groups, because in these cases at age 15, less than 50% of respondents self-reported the initiation of smoking or drunkenness.

Data on current smoking were obtained by the question, "How often do you smoke tobacco at present?" The answers were categorized into 3 categories: smoking "everyday," "at least once a week, but not every day," "less than once a week," and "I do not smoke." The respondents who reported any of the first 3 categories were attributed to the group of smokers.

The frequency of alcohol use was assessed by the question, "At present, how often do you drink anything alcoholic like: a) beer; b) wine; c) vodka, brandy, whisky or spirits/liquor; d) champagne or sparkling wine; e) alcoholic mixes (alcopops, cider, Mix, Fizz, and similar drinks?)" (The last type as a separate item was introduced only for 2006 and 2010 surveys). Five response options were offered for respondents to choose: "every day," "every week," "every month," "rarely," and "never." The respondents who reported the first 2 categories were assigned to the "weekly consumption" group.

Self-reports on drunkenness were obtained by asking, "Have you ever had so much alcohol that you were really drunk?" The response categories "yes, 2–3 times" or "more" were included in our analysis as the indicators of excessive alcohol use.

For measuring the cannabis use, the question "Have you ever taken cannabis in your life?" was presented. The respondents who reported the experience of cannabis use once or more times were included into the analysis.

For the evaluation of inequalities in smoking, alcohol and cannabis use in different socioeconomic groups, the following question, which was designed to measure young people's perception on their own family's socioeconomic status, was given, "How well off do you think your family is?" The response

options were as follows: a) very well off; b) quite well off; c) average; d) not so well off; and e) not at all well off. In analyses, the first 2 categories were merged into high wealth, and the last 2 categories were recoded into low wealth.

In addition, the place of residence (urban vs. rural) and family composition (living in intact families, i.e., with mother and father, vs. not intact families, i.e., with mother or father) were used as independent variables for measuring these demographical and social health behavior inequalities.

Statistical Analysis. For individual variation analysis, the Statistical Package for the Social Sciences, version 15.0 (SPSS Inc., Chicago, IL, USA), was used (13). The Z and χ^2 tests were applied for the evaluation of statistical hypotheses on difference in the distribution of variables between respondents' groups. Odds ratios (OR) were standardized by age. For that purpose, the Mantel-Haenszel test for estimating odds ratios was used. The level of statistical significance was established at $P<0.05$.

Results

Smoking and Alcohol Use. The data on the trends of median age when the first cigarette was tried and the first episode of drunkenness was experienced by respondents are presented in Table 1. In boys, the median age at cigarette smoking initiation declined from 13.42 to 11.36 years during 1994–1998, but was increased again to 12.47 in 2010. In girls, the median age when first cigarette was tried gradually declined from over 15 in 1994 to 12.98 years in 2002. Therefore, it increased again in the period 2006–2010. In case of alcohol use in boys, the median age when the first episode of drunkenness was experienced declined from 14.97 in 1994 to 12.96 years in 2002 and started to increase again in the later surveys. A trend in the decreasing median age at the first episode of drunkenness in girls was observed during the period from 1994/1998 to 2006.

The 16-year trends of weekly smoking prevalence in Lithuanian school-aged children are presented in Fig. 1. During 1994–2002, a significant increase in the proportion of smoking boys and girls was observed (from 11.3% to 23.6%, $P<0.05$, and 3.6% to 14.6%, $P<0.05$, respectively). After some decrease in 2006, the prevalence of smoking started to rise again.

During 1994–2002, the prevalence of weekly alcohol consumption increased in boys from 9.3% to 13.4% ($P<0.05$), and after a decline in 2006, it started to rise again (12.9% in 2010) (Fig. 2). In girls, a continuous increase was observed during the period from 1994 to 2006 (from 4.3% to 9.3%).

An increasing trend in self-reported drunkenness ("two or more times in lifespan") was recorded for boys during 1994–2002 (from 9.7% to 30.1%) and girls during 1994–2006 (from 5.7% to 22.3%). Some decline in the prevalence of this behavior was observed among boys starting in 2006 and among girls in 2010 (Fig. 3).
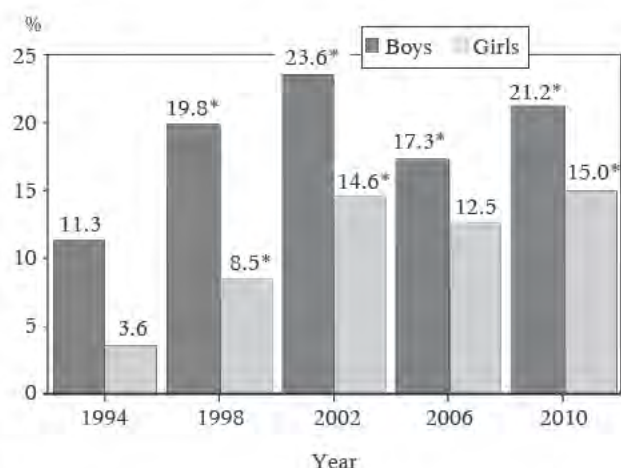

Fig. 1. Trends in the prevalence of smoking reported by Lithuanian schoolchildren aged 11–15 years during 1994–2010
*$P<0.05$ as compared with the last previous survey.

Table 1. Median Age of 15-year-old Respondents When the First Cigarette Was Tried and the First Episode of Drunkenness Was Experienced (by Gender and Survey Year)

Gender	1994	1998	2002	2006	2010
Age when the first cigarette was tried					
Boys	13.42 (13.32–13.52)	11.36 (11.25–11.47)	11.50 (11.39–11.61)	12.10 (11.98–12.21)	12.47 (12.36–12.57)
Girls	Over 15 years*	14.28 (14.16–14.40)	12.98 (12.86–13.10)	13.46 (13.34–13.58)	13.26 (13.14–13.38)
Age when the first episode of drunkenness was experienced					
Boys	14.97 (14.86–15.08)	14.07 (13.96–14.19)	12.96 (12.85–13.07)	13.00 (12.88–13.12)	13.58 (13.47–13.70)
Girls	Over 15 years*	Over 15 years*	13.85 (13.73–13.98)	13.62 (13.50–13.74)	14.06 (13.95–14.18)

Values are median (95% confidence interval).
*The estimate was not calculated, because at age 15 less than 50% of respondents self-reported the initiation of smoking or alcohol drunkenness.
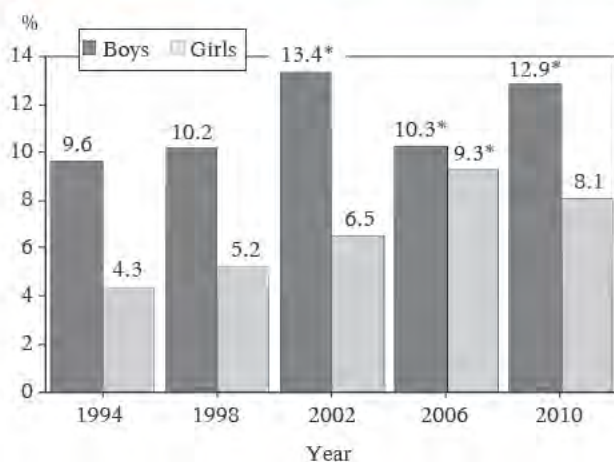
Fig. 2. Trends in the prevalence of weekly consumption of alcohol by Lithuanian schoolchildren aged 11–15 years during 1994–2010
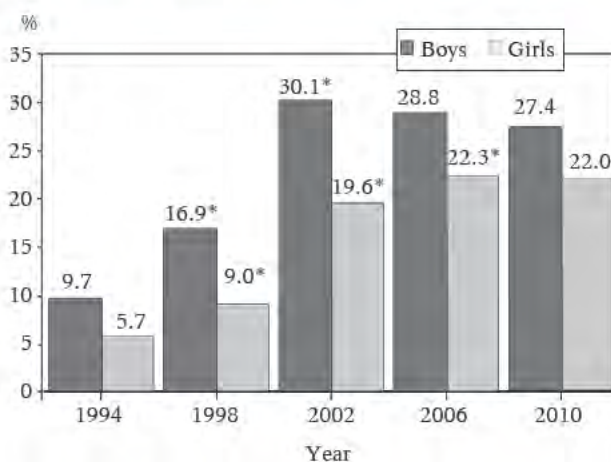
*P<0.05 as compared with the last previous survey.

Fig. 3. Trends in the prevalence of self-reported alcoholic drunkenness by Lithuanian schoolchildren aged 11–15 years during 1994–2010

*P<0.05 as compared with the last previous survey.

The changes in alcohol consumption habits during the 16-year period were considerable (Table 2). During 1994–2002, beer consumption increased both among boys and girls (from 8.9% to 12.7%, P<0.05, and from 3.4% to 5.4%, P<0.05, respectively). Beer consumption significantly dropped after 2002 while an evident increase in the use of new teenage market-oriented alcoholic beverages such as cider and alcoholic mixes was observed. There was no significant increase in wine and spirit consumption during the period of our observations.

Drug Use. The prevalence of self-reported "ever use" of any drugs (including cannabis) in 15-year-old schoolchildren increased more than 2-fold among boys (from 14.6% to 33.5%) and almost 3-fold among girls (from 6.7% to 18.4%) during 2002–2010 (Fig. 4)

The most common drug, which was used by adolescents aged 15 years, was cannabis. The data from the survey 2010 showed that 28.6% of boys and 13.4% of girls reported "ever use" of cannabis during their life. Less than one-fifth (19.4%) of boys and 8.6% of girls answered that they used the drugs during last 12 month. As an alternative for illegal drugs, some schoolchildren (approximately 5%) reported the snuffing of solvents or glues.
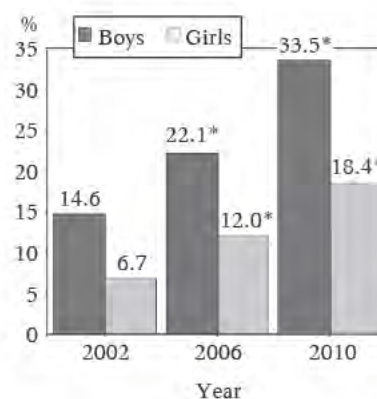

Fig. 4. Trends in the prevalence of self-reported "ever use" of any drugs in Lithuanian schoolchildren aged 15 during 2002–2010

*P<0.05 as compared with the last previous survey.

Demographic and Socioeconomic Determinants of Smoking, Alcohol and Drug Use. The prevalence of smoking in Lithuanian schoolchildren by gender, place of residence (urban/rural), family structure, and family affluence are presented in Table 3. These data indicate that the place of residence did not play a significant role in smoking prevalence among boys. However, the rural girls were less likely to

Table 2. Proportions of Schoolchildren Who Weekly Consumed Different Alcoholic Beverages by Gender and Survey Year

Type of Alcoholic Beverages	Boys					Girls				
	1994	1998	2002	2006	2010	1994	1998	2002	2006	2010
Beer	8.9	10.2	12.7*	7.9	9.1	3.4	4.6	5.4*	2.5	2.9
Wine	0.6	1.6	2.0	3.0	1.7	0.6	1.3	1.7	1.6	0.4
Spirits	1.4	0.9	2.4	3.7	3.5	0.6	0.1	0.7	1.5	1.3
Alcoholic mixes, cider, alcopops	–	–	–	9.0	7.3	–	–	–	8.9	6.1

Values are percentage.
*P≤0.05 as compared with 1994.

report smoking than their urban peers (9.1% vs. 12.2%, $P<0.001$; OR=0.72, 95% CI, 0.64–0.80). It was observed that the respondents from not intact families were more frequently reporting smoking compared with those from intact ones (25.3% vs. 16.8%, $P<0.001$; OR=1.69, 95% CI, 1.53–1.86 in boys; 14.7% vs. 9.3%, $P<0.001$; OR=1.68, 95% CI, 1.49–1.89 in girls). Economic status also played an important role in smoking. Boys and girls from high affluence families reported a lower prevalence of smoking (17.2% vs. 21.5%, $P<0.001$; OR=0.76, 95% CI, 0.67–0.86 in boys and 9.6% vs. 12.4%, $P<0.001$; OR=0.75, 95% CI, 0.64–0.88 in girls).

The data on the prevalence of weekly alcohol consumption in Lithuanian schoolchildren by gender, place of residence (urban/rural), family structure, and family affluence are presented in Table 4. Rural boys and girls were less likely to consume alcohol on the weekly basis (10.4% vs. 12.4%, $P<0.05$; OR=0.82, 95% CI, 0.73–0.91 and 6.0% vs. 7.3%, $P<0.05$; OR=0.80, 95% CI, 0.70–0.92, respectively). The respondents from not intact families also reported a higher prevalence of alcohol use and were more likely to consume alcohol (12.7% vs. 10.9%, $P<0.01$; OR=1.19, 95% CI, 1.05–1.35 in boys and 7.6% vs. 6.3%, $P<0.01$; OR=1.23, 95%

Table 3. Prevalence and Odds Ratios (95% CI) For Smoking in Lithuanian Schoolchildren by Gender, Place of Residence, Family Structure, and Family Affluence: Data From 5 Cross-Sectional Surveys During 1994–2010

	1994	1998	2002	2006	2010	Total
	N=5428	N=4513	N=5645	N=5632	N=5338	N=26 556
Total	378 (7.0)	624 (13.9)	1084 (19.2)	841 (15.0)	969 (18.2)	8668 (31.9)
Boys	272 (11.3)	424 (19.8)	681 (23.6)	501 (17.3)	588 (21.5)	2466 (18.9)
Girls (reference)	106 (3.6)	200 (8.5)	403 (14.6)	340 (12.5)	381 (14.8)	1430 (10.7)
OR (95% CI)	3.46 (2.74–4.36)***	2.66 (2.22–3.18)***	1.80 (1.57–2.07)***	1.47 (1.26–1.70)***	1.58 (1.37–1.82)***	1.95 (1.81–2.09)***
Boys						
Place of residence						
Urban (reference)	135 (9.5)	207 (19.6)	315 (25.6)	232 (17.8)	297 (21.3)	1186 (18.5)
Rural	137 (13.9)	217 (20.0)	336 (22.1)	269 (16.9)	289 (21.6)	1278 (19.2)
OR (95% CI)	1.54 (1.19–1.98)*	1.03 (0.83–1.27)	0.83 (0.69–0.98)*	0.94 (0.77–1.14)	1.02 (0.85–1.22)	1.05 (0.96–1.14)
Family structure						
Intact (reference)	217 (10.6)	318 (18.2)	484 (21.2)	313 (15.3)	340 (18.1)	1672 (16.8)
Not intact	54 (14.7)	106 (26.5)	197 (32.6)	155 (20.6)	235 (28.5)	747 (25.3)
OR (95% CI)	1.44 (1.05–1.99)*	1.62 (1.25–2.08)***	1.80 (1.47–2.19)***	1.44 (1.16–1.77)***	1.80 (1.49–2.18)***	1.69 (1.53–1.86)***
Subjective evaluation of family affluence						
Low (reference)	101 (13.4)	121 (24.3)	202 (27.3)	108 (20.3)	111 (23.9)	643 (21.5)
Medium	119 (10.9)	212 (18.5)	358 (23.9)	244 (17.8)	276 (21.1)	1209 (18.9)
High	29 (10.2)	91 (18.6)	119 (18.8)	135 (14.3)	193 (20.5)	567 (17.2)
OR (95% CI)	0.74 (0.48–1.14)	0.71 (0.52–0.96)*	0.62 (0.48–0.80)***	0.65 (0.49–0.86)**	0.82 (0.63–1.07)	0.76 (0.67–0.86)***
Girls						
Place of residence						
Urban (reference)	74 (4.2)	115 (9.8)	193 (16.5)	198 (15.5)	240 (18.5)	820 (12.2)
Rural	32 (2.7)	85 (7.2)	210 (13.2)	142 (9.8)	141 (11.0)	610 (9.1)
OR (95% CI)	0.63 (0.41–0.96)*	0.72 (0.54–0.97)*	0.77 (0.62–0.95)*	0.60 (0.47–0.75)***	0.54 (0.44–0.68)***	0.72 (0.64–0.80)***
Family structure						
Intact (reference)	73 (3.0)	140 (7.6)	275 (13.1)	201 (10.6)	242 (13.6)	931 (9.3)
Not intact	33 (5.8)	60 (11.7)	128 (19.7)	118 (16.0)	139 (17.6)	478 (14.7)
OR (95% CI)	1.99 (1.30–3.03)***	1.61 (1.17–2.22)**	1.63 (1.29–2.05)***	1.60 (1.25–2.05)***	1.35 (1.08–1.70)**	1.68 (1.49–1.89)***
Subjective evaluation of family affluence						
Low (reference)	41 (4.0)	65 (9.7)	160 (17.6)	105 (17.4)	98 (16.9)	469 (12.4)
Medium	43 (3.5)	93 (7.9)	193 (14.9)	160 (12.0)	191 (14.4)	680 (10.7)
High	13 (4.20)	42 (8.3)	49 (9.1)	74 (9.5)	90 (13.4)	268 (9.6)
OR (95% CI)[1]	1.05 (0.57–1.99)	0.84 (0.56–1.25)	0.47 (0.34–0.66)***	0.50 (0.36–0.69)***	0.76 (0.56–1.04)	0.75 (0.64–0.88)***

Values are number (percentage) unless otherwise indicated.
[1]Comparison of high and low affluent families; OR, odds ratio; CI, confidence interval.
*$P\leqslant0.05$; **$P\leqslant0.01$; ***$P\leqslant0.001$.

Table 4. Prevalence and Odds Ratios (95% CI) for Weekly Alcohol Use in Lithuanian Schoolchildren by Gender, Place of Residence, Family Structure, and Family Affluence: Data From 5 Cross-Sectional Surveys During 1994–2010

	1994	1998	2002	2006	2010	Total
	N=5428	N=4513	N=5645	N=5632	N=5338	N=26 556
Total	355 (6.7)	338 (7.6)	563 (10.0)	544 (9.8)	555 (10.5)	2355 (9.0)
Boys	228 (9.6)	216 (10.2)	385 (13.4)	292 (10.3)	351 (12.9)	1472 (11.4)
Girls (reference)	127 (4.3)	122 (5.2)	178 (6.5)	252 (9.3)	204 (7.9)	883 (6.6)
OR (95% CI)	2.36 (1.88–1.97)***	2.05 (1.63–2.59)***	2.23 (1.85–2.69)***	1.11 (0.93–1.33)	1.72 (1.43–2.07)***	1.81 (1.66–1.97)***
Boys						
Place of residence						
Urban (reference)	142 (10.1)	114 (10.9)	203 (16.5)	142 (11.1)	186 (13.4)	787 (12.4)
Rural	86 (8.8)	102 (9.5)	182 (11.1)	148 (9.5)	163 (12.3)	681 (10.4)
OR (95% CI)	0.86 (0.65–1.14)	0.86 (0.65–1.14)	0.63 (0.51–0.78)***	0.84 (0.66–1.07)	0.91 (0.72–1.13)	0.82 (0.73–0.91)***
Family structure						
Intact (reference)	193 (9.6)	175 (10.1)	296 (13.0)	200 (10.0)	213 (11.4)	1077 (10.9)
Not intact	33 (9.0)	41 (10.3)	89 (14.8)	77 (10.5)	132 (16.1)	372 (12.7)
OR (95% CI)	0.94 (0.64–1.38)	1.01 (0.71–1.45)	1.16 (0.90–1.50)	1.06 (0.80–1.39)	1.49 (1.18–1.89)***	1.19 (1.05–1.35)**
Subjective evaluation of family affluence						
Low (reference)	54 (7.2)	40 (8.1)	91 (12.3)	59 (11.4)	53 (11.5)	297 (10.0)
Medium	120 (11.2)	120 (10.5)	202 (13.5)	133 (9.9)	165 (12.6)	740 (11.6)
High	32 (11.6)	56 (11.5)	92 (14.6)	92 (9.9)	131 (14.0)	403 (12.4)
OR (95% CI)	1.69 (1.06–2.68)*	1.47 (0.96–2.25)	1.22 (0.89–1.66)	0.86 (0.61–1.22)	1.25 (0.89–1.76)	1.27 (1.08–1.49)**
Girls						
Place of residence						
Urban (reference)	87 (4.9)	64 (5.5)	85 (7.3)	140 (11.0)	252 (9.3)	486 (7.3)
Rural	39 (3.3)	58 (5.0)	93 (5.9)	112 (7.8)	110 (8.5)	396 (6.0)
OR (95% CI)	0.65 (0.44–0.96)*	0.90 (0.62–1.29)	0.79 (0.59–1.08)	0.69 (0.53–0.89)**	0.86 (0.64–1.14)	0.80 (0.70–0.92)**
Family structure						
Intact (reference)	106 (4.4)	98 (5.4)	123 (5.9)	167 (8.9)	132 (7.4)	626 (6.3)
Not intact	21 (3.7)	24 (4.7)	55 (8.5)	77 (10.5)	70 (8.9)	247 (7.6)
OR (95% CI)	0.84 (0.52–1.35)	0.87 (0.55–1.38)	1.50 (1.07–2.07)*	1.20 (0.90–1.60)	1.21 (0.90–1.64)	1.23 (1.06–1.43)**
Subjective evaluation of family affluence						
Low (reference)	42 (4.1)	30 (4.5)	63 (6.9)	58 (9.7)	43 (7.4)	236 (6.2)
Medium	58 (4.8)	61 (5.2)	91 (7.0)	129 (9.8)	102 (7.7)	441 (7.0)
High	20 (6.4)	31 (6.1)	23 (4.3)	64 (8.3)	57 (8.5)	195 (7.0)
OR (95% CI)[1]	1.61 (0.93–2.78)	1.39 (0.83–2.32)	0.61 (0.37–0.99)*	0.84 (0.58–1.23)	1.17 (0.77–1.76)	1.13 (0.93–1.37)

Values are number (percentage) unless otherwise indicated.
[1]Comparison of high and low affluent families.
OR, odds ratio; CI, confidence interval.
*$P \leqslant 0.05$; **$P \leqslant 0.01$; ***$P \leqslant 0.001$.

CI, 1.06–1.43 in girls). Alcohol consumption was more prevalent in schoolchildren from high affluence families (12.4% vs. 10.0%, $P<0.05$; OR=1.27, 95% CI, 1.08–1.49 in boys and 6.2% vs. 7.0%, $P>0.05$; OR=1.13, 95% CI, 0.93–1.37 in girls).

As shown by data in Table 5, the use of drugs ("ever used drugs during their life") was less related to rural dwelling, but more to urban in boys (10.4% vs. 12.4%, $P<0.001$; OR=0.58, 95% CI 0.49–0.70) and in girls (8.0% vs. 16.9%, $P<0.001$; OR=0.43, 95% CI 0.33–0.54). Living in not intact families was related to higher odds for involvement in drug

use (29.5% vs. 20.4%, $P<0.001$; OR=1.62, 95% CI, 1.34–1.96 in boys, and 15.2% vs. 10.6%, $P<0.001$; OR=1.52, 95% CI, 1.19–1.94 in girls). The respondents from high affluence families more frequently reported "ever use" of drugs in comparison with schoolchildren from low affluence families (29.4% vs. 20.8%, $P<0.001$; OR=1.58, 95% CI, 1.23–2.04 in boys; 14.4% vs. 9.9%, $P<0.05$; OR=1.54, 95% CI, 1.09–2.17 in girls).

The trends of changes in odds ratios of smoking, drinking, and drug use were also analyzed (Tables 3–5). Only a decrease in the frequency of smok-

Table 5. Prevalence and Odds Ratios (95% CI) For 15-Year-Old Respondents Who Reported "Ever Use" of Cannabis or Other Drugs During Their Life by Gender, Place of Residence (Urban/Rural), Family Structure, and Family Affluence: Data From 3 Cross-Sectional Surveys During 2002–2010

	2002	2006	2010	Total
	N=5645	N=5632	N=5338	N=16 615
Total	205 (10.8)	313 (17.1)	460 (26.2)	978 (17.8)
Boys	143 (14.6)	203 (22.1)	307 (33.3)	653 (23.1)
Girls (reference)	62 (6.7)	110 (12.0)	153 (18.3)	325 (12.2)
OR (95% CI)	2.37 (1.73–3.24)***	2.07 (1.61–2.67)***	2.23 (1.79–2.78)***	2.17 (1.88–2.51)***
Boys				
Place of residence				
Urban (reference)	90 (19.4)	112 (27.0)	180 (37.4)	382 (28.1)
Rural	53 (10.3)	91 (18.2)	126 (28.7)	270 (18.5)
OR (95% CI)	0.48 (0.33–0.69)***	0.60 (0.44–0.82)***	0.67 (0.51–0.89)**	0.58 (0.49–0.70)***
Family structure				
Intact (reference)	101 (13.4)	125 (19.5)	184 (30.1)	410 (20.4)
Not intact	42 (18.2)	68 (28.3)	115 (39.2)	225 (29.5)
OR (95% CI)	1.43 (0.96–2.12)	1.64 (1.16–2.30)**	1.50 (1.12–2.01)**	1.62 (1.34–1.96)***
Subjective evaluation of family affluence				
Low (reference)	46 (16.0)	43 (21.5)	47 (28.3)	136 (20.8)
Medium	66 (12.4)	96 (19.6)	153 (32.1)	315 (21.0)
High	31 (19.1)	56 (26.4)	103 (37.9)	190 (29.4)
OR (95% CI)	1.24 (0.75–2.05)	1.31 (0.83–2.07)	1.54 (1.02–2.34)*	1.58 (1.23–2.04)***
Girls				
Place of residence				
Urban (c)	40 (9.6)	78 (18.5)	94 (22.6)	212 (16.9)
Rural	22 (4.3)	32 (6.5)	59 (14.1)	113 (8.0)
OR (95% CI)	0.42 (0.25–0.73)**	0.31 (0.20–0.48)***	0.56 (0.39–0.80)**	0.43 (0.33–0.54)***
Family structure				
Intact (reference)	38 (5.7)	61 (10.1)	95 (16.8)	194 (10.6)
Not intact	24 (9.3)	41 (15.3)	56 (21.0)	121 (15.2)
OR (95% CI)	1.68 (0.99–2.87)	1.61 (1.05–2.46)*	1.32 (0.91–1.90)	1.52 (1.19–1.94)***
Subjective evaluation of family affluence				
Low (reference)	20 (5.3)	25 (10.5)	34 (18.2)	79 (9.9)
Medium	31 (7.3)	55 (11.2)	91 (19.1)	177 (12.7)
High	10 (8.1)	30 (16.9)	28 (16.5)	68 (14.4)
OR (95% CI)[1]	1.57 (0.71–3.45)	1.72 (0.97–3.04)	0.89 (0.51–1.54)	1.54 (1.09–2.17)*

Values are number (percentage) unless otherwise indicated.
[1]Comparison of high and low affluent families.
OR, odds ratio; CI, confidence interval.
*P⩽0.05; **P⩽0.01; ***P⩽0.001.

ing between boys and girls was established: OR decreased from 2.46 (95% CI, 2.74–0.36) to 1.81 (95% CI, 1.81–2.09) during the period of observation. Other determinants did not change significantly during 1994–2010.

Discussion

The international HBSC study, which was launched in Lithuania in 1994, has provided an opportunity for the monitoring of such important health behaviors as smoking, drinking, and drug use in the schoolchildren population (14, 15). In this paper, the time trends in the prevalence of smoking, alcohol and drug use during the 16-year period are presented. Relations with some important socioeconomic and demographic health determinants (place of residence, urban vs. rural; family structure, intact vs. not complete family; and family's affluence, well-off vs. not well-off) were also analyzed.

An increasing trend in the prevalence of smoking, alcohol (for period of observations from 1994 to 2010) and drug use (for the period 2002–2010) in schoolchildren was found. The trend pattern for the whole period of observation could be divided into 2 subperiods when a different direction of changes was noticed. During the first subperiod of 1994–2002, both smoking and alcohol drinking increased in the prevalence. Such a sharp increase could be related to "early days" of the transition of market economy of the last decades, when access to tobacco and alcohol was faintly restricted and antitobacco or antialcohol legislations were weak (16, 17). The

data of our study showed the stabilization of smoking and alcohol use among school student population as recorded by the survey 2002.

These findings correspond with a series of health policy interventions implemented in the country as part of tobacco control measures such as increased tobacco taxation (since 1998), total ban of tobacco advertisement (since 2000), ban of smoking in public places (started in 2007), ban of sale of reduced cigarette packages, ban of tobacco product imitations, warnings on tobacco products, and introduction of youth smoking prevention programs in schools. All these measures should facilitate the achievement of the Lithuanian Health Programme goals in the future (18).

The data of the Lithuanian ESPAD study also is a valid instrument for monitoring addictive behavior trends on national and European scales. As in our study, the ESPAD data from 5 surveys (1995 to 2011) showed that "cigarette use during the last 30 days" increased from 25% to 41% during 1995–2003 and decreased to 37% after 2003 (15).

The prevalence of alcohol use among schoolchildren also stopped growing after 2002 among boys and after 2006 among girls. This trend cannot be explained by the change in legislation or alcohol taxation, which continues to be quite liberal in Lithuania (19). Another cause of stabilization of drinking could be attributed to the phenomenon of geographical equalization in neighborhood countries. Lithuania could be attributed to the North area of Europe, where weekly drinking showed relatively low rates, and Lithuanian students were in the middle among 36 HBSC countries. It means that our country is close to the geographical neighbors by drinking customs. On the other hand, Lithuanian respondents were on the top position by the reports on the first episode of drunkenness at the age of 13 years or less (20). These explanations indicate a wide variation of the national data and the complexity of the causal inference.

The available data from our study demonstrated a significant increase in drug use during 2002–2010. The ESPAD study, which has been processing data on drug use since 1995, has demonstrated that Lithuania reported low percentages of 15-year-old respondents with lifetime experience of illicit drugs use in 1995 (4% of boys and 3% of girls). A sharp increase in drug use was noticed in 1995–1999 (rising up to 21% in boys and 10% in girls) with a subsequent slow increase during the second and third periods of observations. According to the ESPAD study, the pattern of changes in drug use among Lithuanian adolescents was very similar to that of Bulgaria and Hungary (15).

Relating substance abuse to some demographic and socioeconomic determinants, our findings confirmed existing multiple evidence that girls were less likely to be involved in risk-taking behaviors. Traditionally researchers relate substance abuse to peer influences, parents' practices, and performance at school (21). Other investigators emphasize the effects of ethnicity or isolation at school or family settings (22). In our analysis, we selected a less common possible predictor of substance abuse, i.e., family structure (23). We found that adolescents from intact families were more likely to be involved in alcohol drinking, cigarette smoking, and drug abuse although other authors point out the back of evidence that this phenomenon is universal and relate it to differences in family typology and cultures (24, 25).

Family affluence is also considered an important predictor of substance abuse, which is not universal through different cultures, gender and age groups (26). The Lithuanian HBSC data showed that students from affluent families were more likely to be involved in alcohol and drug use. On the other hand, smoking was more prevalent in school-aged children from less affluent families.

There is some evidence that urban and rural health behavior inequalities also could be a source of public health concern (2, 4, 7). Our analysis showed that such disparities were observed for both genders for weekly alcohol consumption and "ever use" of drugs. The data from the health behavior-monitoring project in an adult Lithuania population also demonstrated that urban adult women were more likely to consume any type of alcohol in comparison with rural women (27).

The high representativeness of the samples selected and high participation rate in each cross-sectional survey could be considered as the strengths of the current study allowing for valid international comparisons. In total, more than 90% of eligible selected students took part in surveys during 1994–2010. It is also important that our research was a part of the international collaborative HBSC cross-country study. The application of standardized methods including the HBSC questionnaire, which was developed by international experts, is another advantage of this study. The results of this type of research is also a step forward to filling the gap of mapping health inequalities in the context socioeconomic determinants of substance abuse in youth.

Some limitations of our study are related to an inherent problem as using the self-reported data on substance use could introduce some biases. It is well known that there is a tendency to underreport when asking the questions on such sensitive risk-taking behaviors as substance use, bullying at school, and early sexual involvements (28). To cope with this source of a potential bias of self-reporting, all possible efforts were made to ensure the anonymity of

responses. Underreporting could also occur due to a low participation rate. However, in our surveys, the overall response rate was more than 90% thus making its contribution to the bias negligible. Regardless of all possible limitations, such a study is an important source of information for a health policy formulation as well as public health interventions by tackling health inequalities among various youth population groups in Lithuania and other European countries.

Smoking- and alcohol-related issues have a strong commercial and political context (1, 29, 30). There is more than enough scientific evidence worldwide that alcohol and tobacco advertising influences the choices and behavior of young people thus stimulating a higher consumption of alcohol by both adolescents and adults (31, 32). At the same time, drug use is related to an illegal and often criminal context, which makes the problem even more complex (33). With no doubt, such a variety of contributing factors including peer pressure, risk-taking in adolescence, effects of mass media and youth culture, ethnicity, maladjustment at family and school settings, lack of systematic youth health education play an important role in the development of addiction to psychoactive substances (2, 22, 26, 34).

The results presented in the paper call for the urgent need for comprehensive solutions and evidence-based measures targeted for young generation aimed at smoking, alcohol and drug abuse control among school-aged children in Lithuania.

Conclusions

Smoking prevalence was increasing significantly during the first period (1994–2002) of observation both among boys and girls. Some decrease and stabilization took place after 2002, which could be related to tighter legislation on tobacco. The gap in the prevalence of smoking and alcohol use between boys and girls was shrinking during the last 8 years of observation. A sharp and stable increase in the prevalence of "ever use" of any drugs among students aged 15-years was observed during 2002–2010. Substance use (alcohol, drugs) and smoking was more prevalent among urban school-aged children, although rural and urban boys did not differ significantly by the involvement in smoking. Living in intact families was related with the lower prevalence of substance use and smoking. Adolescents from affluent families more frequently reported the use of alcohol and drugs, but less frequently indicated smoking in comparison with respondents from less affluent families.

Statement of Conflict of Interest
The authors state no conflict of interest.

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