TRENDS IN ALCOHOL USE AMONG CZECH ADOLESCENTS: FINDINGS FROM THE HBSC STUDY 2014–2022

Ladislav Csémy[1], Petr Baďura[2], Ladislav Kážmér[1]
[1]National Institute of Mental Health, Klecany, Czech Republic
[2]Sts Cyril and Methodius Faculty of Theology, Olomouc University Social Health Institute, Palacký University Olomouc, Olomouc, Czech Republic

SUMMARY

Objectives: The present study aims to examine trends in adolescent alcohol use over the period from 2014 to 2022.

Methods: Data from the last three Health Behaviour in School-aged Children (HBSC) surveys conducted in 2014, 2018 and 2022 were used for this study. Three measures of adolescent alcohol use have been chosen for analyses: lifetime alcohol use, last 30 days alcohol use, and repeated lifetime drunkenness. The analyses comprised calculation of period-specific prevalence estimates and testing of the significance of between-period changes using survey-adjusted logistic regression models.

Results: Comparing prevalence rates between the periods, consistent decrease in adolescent alcohol use becomes apparent, particularly for drop of rates in 2018 compared to those in 2014. The corresponding data on the prevalence of lifetime alcohol use among 13-year-old boys was 59.7% in 2014 and 44.2% in 2018; and among 15-year-old boys 80.4% in 2014 and 74.9% in 2018. For 13-year-old girls, the estimated prevalence was 46.9% in 2014 and 41.1% in 2018; and for 15-year-old girls 83.7% in 2014 and 75.9% in 2018. This is the case for repeated lifetime drunkenness, and the decrease is consistent across boys and girls, as well as the respective age groups. In survey waves 2018 and 2022, we do not see a statistically significant decline, but rather a stabilisation of assessed prevalence at a level from the previous wave of the study.

Conclusions: The decline in alcohol use among Czech adolescents is part of a global trend of reducing alcohol drinking among young people, on the background of social mechanisms including the change of cultural status of alcohol and changes in young people's leisure preferences.

Key words: trends in alcohol use, adolescents, gender differences, Czech Republic, HBSC study

Address for correspondence: L. Csémy, National Institute of Mental Health, Topolová 748, 250 67 Klecany, Czech Republic. E-mail: ladislav.csemy@nudz.cz

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INTRODUCTION

The Czech Republic is among countries with the highest per capita alcohol consumption (1). Over the past two decades, per capita consumption has stagnated with minor fluctuations (2), and the same has been true of the drinking habits of the adult population (3). High alcohol consumption has a number of adverse health, social and economic effects (4). Chronic health consequences include liver disease, cardiovascular disease, and cancer. The acute consequences of excessive drinking include alcohol intoxication and poisoning, violent behaviour, and injuries. Recent studies show that alcohol-related mortality accounts for 4% of total annual mortality in Czechia and is higher than in most Western countries (5, 6).

During adolescence, alcohol consumption is associated with a range of negative health and social outcomes, some of which are specific to this developmental period. There is evidence for neural and cognitive consequences of repeated exposure to alcohol during adolescence. Research has confirmed deficits in the cognitive domain (poorer performance in verbal learning, attention, spatial vision, and memory tasks). Longitudinal studies have also shown deficits in motivation and increase in risk taking behaviour (7). It has also been confirmed that early initiation of alcohol consumption results in more frequent binge drinking and higher overall alcohol consumption in later life (8). Excessive alcohol consumption and heavy episodic drinking in adolescence correlate significantly with antisocial behaviour (9, 10).

The public health benefits of monitoring trends in alcohol consumption among adolescents are clear. On the one hand, we gain knowledge about the prevalence of risky forms of drinking and, indirectly, information about the effectiveness of alcohol policy. Changes in consumption behaviour stimulate the study of the effects of other hypothetical factors (parenting style, changes in leisure activity preferences, activity in the digital space – the internet and social networks).

The results of the European School Survey Project on Alcohol and Other Drugs (ESPAD) make it possible to track changes in alcohol consumption among adolescents aged 15–16 since 1995. Recent results, including data collected in 2024, show a decline in prevalence estimate of alcohol consumption over the last 30 days from 63% in 2003 to 43% in 2024 and a decline in the prevalence of heavy episodic drinking (HED) from 42% in 2007 to 30% in 2024 (these are results for all countries) (11). Of course, the changes differed from country to country. The most

significant decline was recorded in the Nordic countries, there was a slight decline in the Mediterranean countries, and in Central European countries the decline occurred later, after 2011. Pape et al. (12) analysed trends in 26 countries participating in the ESPAD study and report that they found a decline in all countries surveyed, among both heavier and lighter users, among boys and girls, and across socioeconomic groups. As for the causes of the changes, they conclude that no convincing explanatory factors for the decline have been identified. The ESPAD study data also show that alcohol use indicators peaked in the Czech Republic in 2011, and a significant decline has been recorded since that year: the prevalence of drinking in the last 30 days was 79% in 2011 and 56.2% in 2024, while respective values for HED were 53.6% and 37.8% (13).

The second international study from which we can draw evidence on alcohol consumption is the Health Behaviour in School-aged Children (HBSC). Its results confirm the same trends as the ESPAD study (14). Vashishtha et al. (15) published a report using data from various studies, including ESPAD and HBSC, pointing to different timing of the decline in drinking in different parts of the world and varying degrees of decline. Kážmér and Csémy (16) conducted a detailed analysis of trends in adolescent alcohol use in the Czech Republic for the period 1994–2014, based on data from the HBSC. Their findings confirmed a statistically significant decline in the prevalence of weekly alcohol use and repeated drunkenness between 2010 and 2014, observed among both boys and girls across all three monitored age groups (11-, 13- and 15-year-olds). The present study aims to build upon this previous research by examining trends in adolescent alcohol use over the subsequent period, from 2014 to 2022. Possible causes of the observed changes are also discussed.

MATERIALS AND METHODS

Data

In the previous article (16), we assessed temporal changes in adolescent alcohol use up to the 2014 HBSC survey. For this study, we used data from the last three HBSC surveys conducted in 2014, 2018 and 2022. Only the final Czech datasets that entered the HBSC international reports were used in the study.

Survey Sampling Design

The Czech HBSC surveys employed a stratified two-stage clustered sampling design, with schools serving as primary sampling units (PSUs) and classes as secondary sampling units. Due to the absence of explicit sampling probabilities and finite population corrections in the HBSC data, schools were used as the PSUs for variance estimation. This choice is common practice in HBSC studies and was further supported by the empirical structure of the data. Specifically, within each age group, most schools contained only one sampled class; even though in the overall survey design each school typically contributed multiple classes (typically, one class for each age group). Comparisons of variance design effects between different sampling definitions also showed minimal differences (≤5%) between school-level and class-level PSU definitions, further justifying the use of schools as the primary units.

To account for the complex survey design, the Taylor linearisation method was applied (17, 18). This widely used approach produces robust standard errors in the presence of clustering and stratification in survey data. Post-stratification weights were applied to align with the known distribution of the target population.

Dependent Variables

Three measures of adolescent alcohol use have been chosen for analyses in this study: lifetime alcohol use, last 30 days alcohol use, and repeated lifetime drunkenness (i.e., at least twice in lifetime). All these measures were assessed using Likert-type response scales. Respondents reporting use one or more times were classified as having engaged in lifetime or last 30 days alcohol use. We dichotomized drunkenness as repeated, i.e., twice or more often, in order to eliminate completely exceptional excessive consumption occasions.

Demographic Subgroups Approach

Analyses were conducted separately for six demographic subgroups defined by cross-classification of three target age groups (11-, 13- and 15-year-olds) with gender (boys vs. girls). This subgroup-specific approach allowed examination of potential heterogeneity in prevalence trends across demographic groups, providing a more nuanced understanding of adolescent alcohol use. Gender and age are well-established moderators of drinking behaviour, and cross-classification by these variables enables tailored estimation of period effects.

Table 1 provides basic description of the data structure, as compiled from the three recent HBSC surveys conducted in the Czech Republic since 2014. To compile the data for this study, the final Czech datasets that serve also for the HBSC international reports were used.

Compared between the periods, the input datasets varied in their sample sizes. While in 2014, a total of 5,055 adolescent respondents were included into the Czech HBSC final report, in later periods the sample sizes were more than twice as large: 11,564 in 2018; and 12,906 in 2022. Number of sampling units

Table 1. *Study sample by gender, age and period, HBSC 2014–2022, Czech Republic*

Gender	Age group	Period		
		2014	2018	2022
Boys	11-year-olds	738	1,897	2,070
	13-year-olds	818	1,990	2,300
	15-year-olds	852	1,934	2,162
	Total boys	2,408	5,821	6,532
Girls	11-year-olds	836	1,899	2,097
	13-year-olds	903	1,964	2,176
	15-year-olds	908	1,880	2,101
	Total girls	2,647	5,743	6,374
Total sample size		5,055	11,564	12,906
Number of schools (PSU)		93	227	246
Number of classes		271	664	720

PSU – primary sampling unit

surveyed in each of the Czech HBSC period is also provided in Table 1. The varying sample sizes are thus reflected also by the number of schools (primary sampling units) and/or classes surveyed. Summing up through all the three HBSC periods, the total sample size used in our compiled dataset was 29,525 respondents (14,761 boys and 13,764 girls), in the age ranging from 11 to 15 years and approximately equal numbers across the three age groups (11-, 13- and 15-year-olds).

Missing Responses

Overall, missing data were very low – below 5%, depending on the survey period and the specific alcohol measure. Missing responses were slightly more frequent in 2022 (under 5%) compared to 2014 and 2018 (under 2%). Listwise deletion was applied in all analyses to handle missing data.

Statistical Analysis

The analyses comprised two consecutive steps. First, period-specific prevalence estimates were calculated for each demographic subgroup. Second, the significance of between-period changes was formally tested using survey-adjusted logistic regression models that accounted for clustering, stratification and post-stratification weights. This stepwise strategy provided both descriptive and inferential evidence on changes in adolescent alcohol use across the analysed time periods.

In the logistic regression models, survey period was included as a categorical predictor, with 2018 specified as the reference category. This specification enabled estimation of two pre-planned contrasts (2014 vs. 2018 and 2022 vs. 2018), thereby formally testing changes in prevalence rates between consecutive survey periods. By structuring the analysis in this sequential manner, no additional adjustments for multiple testing were required. We included only the age groups of 13- and 15-year-olds, i.e., adolescents in puberty, in the logistic regression models. For the age group of 11-year-olds, confidence intervals alongside prevalence estimates are listed in Table S1 in the Supplementary Materials.

In the logit models, coefficients are estimated on the logit (log-odds) scale. Therefore, exponentiated coefficients were reported to provide interpretable estimates in terms of odds ratios. To enhance interpretability, model-implied estimates of prevalence rate differences were also computed, as these are more directly grasped by readers than odds ratios.

RESULTS

Point estimates of the adolescent alcohol use prevalence rates and 95% confidence intervals are provided in a temporal perspective of the three recent HBSC survey periods, with three measures on alcohol use – lifetime use, use in last 30 days, and repeated lifetime drunkenness, respectively (Table S1, Fig. 1–3). The detailed series of period-specific data, cross-classified for each gender- and age-specific subgroup, is presented.

Comparing prevalence rates between the periods, consistent decrease in adolescent alcohol use becomes apparent, particularly for drop of rates in 2018 compared to those in 2014. This is the case for lifetime alcohol use and repeated drunkenness, and is consistent across boys and girls, as well as the respective age groups. For example, for 15-year-old boys, the estimated prevalence of lifetime alcohol use dropped from 80.4% in 2014 to 74.9% in 2018, and the estimated prevalence for drunkenness declined from 31.5% in 2014 to 25.0% in 2018. Similarly, for 15-year-old girls, the estimated lifetime prevalence dropped from 83.7% in 2014 to 75.9% in 2018; for repeated lifetime drunkenness, decline from 28.6% in 2014 to 22.4% in 2018 was recorded. Similar declines between periods 2014 and 2018 were present in these two indicators also for the younger age groups of 11 as well as 13 years, both among boys and girls (Fig. 1 and 3). When it comes to alcohol

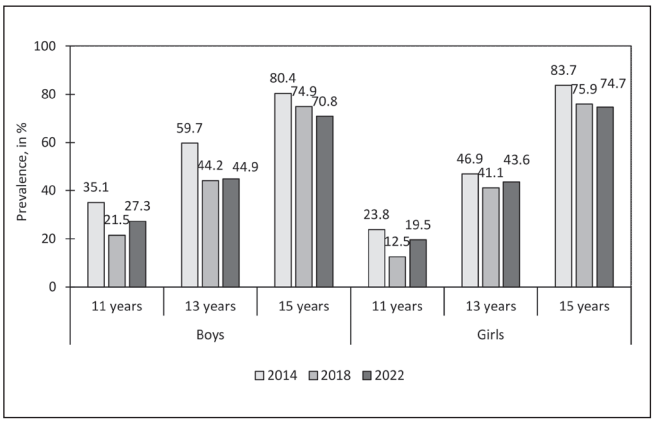

Fig. 1. *Prevalence of lifetime alcohol use.*

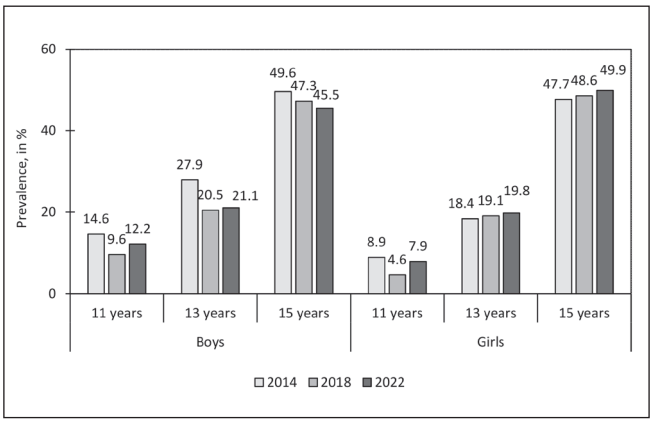

Fig. 2. *Prevalence of last 30 days alcohol use.*

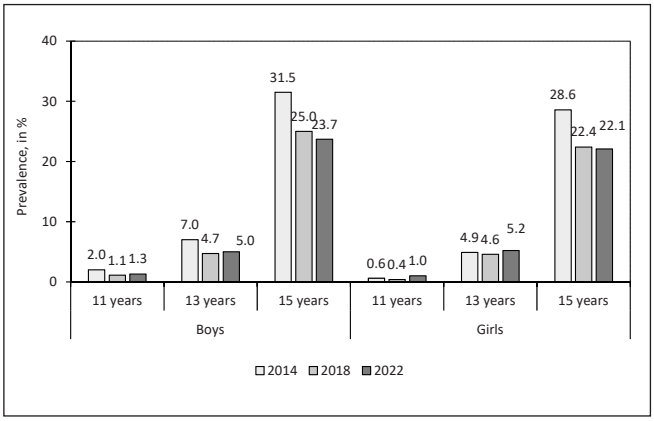

Fig. 3. *Prevalence of repeated lifetime drunkenness, at least twice.*

Table 2. *Testing for changes in the prevalence of lifetime alcohol use among adolescents by gender and age, HBSC 2014–2022, Czech Republic*

Period		Exp (coef.)[a]	SE[b]	t-statistic	p-value	95% CI	Prevalence rate difference	95% CI
Boys 13-year-old	2014	1.871***	0.197	5.95	< 0.001	1.521; 2.300	0.155	0.105; 0.205
	2022	1.030	0.081	0.37	0.709	0.882; 1.202	0.007	−0.031; 0.045
	Constant (Ref. 2018)	0.791[c]	0.046	–	–	0.705; 0.888	Reference period	
Boys 15-year-old	2014	1.367*	0.166	2.58	0.010	1.077; 1.735	0.054	0.014; 0.094
	2022	0.812*	0.070	−2.41	0.016	0.685; 0.963	−0.041	−0.074; −0.008
	Constant (Ref. 2018)	2.992[c]	0.189	–	–	2.643; 3.387	Reference period	
Girls 13-year-old	2014	1.269*	0.137	2.21	0.028	1.027; 1.569	0.059	0.006; 0.111
	2022	1.111	0.096	1.22	0.221	0.938; 1.316	0.026	−0.015; 0.067
	Constant (Ref. 2018)	0.697[c]	0.044	–	–	0.617; 0.788	Reference period	
Girls 15-year-old	2014	1.630**	0.235	3.39	0.001	1.228; 2.164	0.078	0.036; 0.120
	2022	0.936	0.084	−0.74	0.459	0.786; 1.115	−0.012	−0.045; 0.020
	Constant (Ref. 2018)	3.147[c]	0.206	–	–	2.768; 3.579	Reference period	

[a]Exponentiated logit coefficient (odds ratio); [b]linearised standard errors; [c]exponentiated constant estimates are the 2018 baseline odds.
Significant change compared to the 2018 reference period at the probability level: ***p < 0.001, **p < 0.01, *p < 0.05.

Table 3. *Testing for changes in the prevalence of repeated lifetime drunkenness among adolescents by gender and age, HBSC 2014–2022, Czech Republic*

Period		Exp (coef.)[a]	SE[b]	t-statistic	p-value	95% CI	Prevalence rate difference	95% CI
Boys 13-year-old	2014	1.513*	0.303	2.07	0.039	1.021; 2.241	0.023	0.000; 0.046
	2022	1.058	0.181	0.33	0.741	0.756; 1.482	0.003	−0.013; 0.018
	Constant (Ref. 2018)	0.050[c]	0.006	–	–	0.039; 0.063	Reference period	
Boys 15-year-old	2014	1.378*	0.173	2.55	0.011	1.077; 1.765	0.065	0.014; 0.116
	2022	0.929	0.087	−0.79	0.429	0.773; 1.116	−0.014	−0.048; 0.020
	Constant (Ref. 2018)	0.334[c]	0.024	–	–	0.291; 0.384	Reference period	
Girls 13-year-old	2014	1.054	0.232	0.24	0.809	0.685; 1.623	0.002	−0.017; 0.022
	2022	1.133	0.202	0.70	0.484	0.798; 1.609	0.006	−0.011; 0.022
	Constant (Ref. 2018)	0.049[c]	0.006	–	–	0.038; 0.063	Reference period	
Girls 15-year-old	2014	1.390**	0.152	3.00	0.003	1.121; 1.723	0.062	0.020; 0.104
	2022	0.984	0.087	−0.18	0.855	0.827; 1.171	−0.003	−0.033; 0.027
	Constant (Ref. 2018)	0.289[c]	0.018	–	–	0.255; 0.326	Reference period	

[a]Exponentiated logit coefficient (odds ratio); [b]linearised standard errors; [c]exponentiated constant estimates are the 2018 baseline odds.
Significant change compared to the 2018 reference period at the probability level: ***p < 0.001, **p < 0.01, *p < 0.05.

use in the last 30 days, we observed a decline in 2018 compared to 2014 among 11-, 13- and 15-year-old boys and 11-year-old girls. When comparing the prevalence estimates between the periods 2018 and 2022, we did not observe any further consistent decline; in most cases, the prevalence estimates for 2022 were very close to those for 2018. This applies to all three indicators, adolescents in the 13-year-old and 15-year-old groups, and both genders. However, among the youngest age group of 11-year-olds slight increase was recorded in 2022 (Fig. 2).

The statistical significance of temporal changes between the three analysed periods was tested in a series of logistic regression models. The models were run separately for each gender and age groups of 13- and 15-year-olds, with 2018 prevalence rates set as reference. The results are presented in Tables 3–5.

Table 2 provides the outputs from the models regressed on the prevalence of lifetime alcohol use. The exponentiated regression coefficients (odds ratios) are presented together with the corresponding test statistics and 95% CIs. The model-implied differences in the prevalence rates (with 95% CIs) between the compared HBSC periods are also provided.

Overall, the results in Table 2 confirmed the significance of the decline in lifetime alcohol use as already described in previous paragraphs. The statistical significances of the between-period changes were confirmed for 2014 against 2018 among all four demographic subgroups analysed, but for 2018 against 2022, the decline was significant only among the 15-year-old boys.

For example, among the 13-year-old boys, the odds of lifetime alcohol use were 1.871-fold (95% CI: 1.521–2.300) higher in

2014 compared to 2018, corresponding to 15.5 percentage points higher prevalence in 2014 (95% CI: 10.5–20.5). Similarly, among the 15-year-old girls, the prevalence in 2014 was 7.8 percentage points higher (95% CI: 3.6–12.0) than in 2018, with an odds ratio of 1.630 (95% CI: 1.228–2.164). However, this downward trend did not continue in 2022, as no further significant decline was observed.

Table 3 provides outputs for the measure of repeated lifetime drunkenness. Here, the statistical significance of decline was confirmed for 2018 against 2014 for 13- and 15-year-old boys and 15-year-old girls. The prevalence among 15-year-old boys decreased by 6.5 percentage points (95% CI: 1.4–11.6) and among girls of the same age by 6.2 percentage points (95% CI: 2.0–10.4). We observed no statistically significant change in the period 2022 against 2018.

Finally, Table 4 shows that the majority of results revealed no significant changes in the prevalence of alcohol use in the last 30 days across periods, gender and age groups. The only exception was among 13-year-old boys, where a decline of 7.5 percentage points (95% CI: 3.6–11.3) was observed from 2014 to 2018.

DISCUSSION

The analyses in this article follow on from the work mentioned in the introduction, which tracked trends in alcohol use up to 2014. We were interested in whether the decline in alcohol use among adolescents would continue in 2018 and 2022. The results confirmed a decline between 2014 and 2018 in lifetime alcohol use and lifetime repeated drunkenness indicators in all three age groups, as well as for boys and girls. In survey waves 2018 and 2022, we do not see a statistically significant decline, but rather a stabilisation of assessed prevalence at a level from the previous wave of the study. From 2014 to the more recent waves of the study, we also note a convergence in alcohol use indicators between boys and girls. In this respect, our findings are close to the global conclusions of the HBSC study from the latest waves of research in 2018 and 2022, which states that during the period in question there was an overall increase in current alcohol use and drunkenness among older girls. In contrast, a slight decrease in alcohol use was observed among 15-year-old boys (14). Interpreting the dynamics of trends is difficult, and it is clear that changes in individual countries do not occur synchronously but depend on a pattern of factors determining adolescents' attitudes and behaviour toward alcohol. Törrönen et al. (19) explain the decline in alcohol use among adolescents by social mechanisms that have changed the cultural status of drinking alcohol as a symbol of transition to adulthood. The still widespread hypothesis of the fundamental influence of the digital revolution on the decline in alcohol consumption has not been confirmed by the work of Pape et al. (12). Vashishtha et al. (20) published a systematic review summarizing the conclusions of 17 studies. Moderate evidence of parental practices was confirmed in five studies, while five studies examined the influence of alcohol policy, which, however, showed only weak evidence. There was no evidence of the substitution of alcohol use with other addictive substances, one study confirmed the influence of advertising exposure on the decline in alcohol use, and neither the economic crisis nor the arrival of immigrants who do not consume alcohol had any influence. Specifically for the situation in the Czech Republic, it was not possible to test a wider range of hypothesised factors. However, Chomynová and Kážmér (21) monitored the impact of changes in adolescents' leisure activity preferences and found that the decline in the frequency of going out with friends explained a major part of the decline in alcohol use. These results suggest that unorganized peer socialization has a significant impact on adolescents' consumption behaviour. The dynamics of changes in adolescents' attitudes and behaviours toward alcohol and the complexity of the factors that influence them present a challenge for further research, the results of which could contribute to a better understanding of the impact of social processes on behaviour and, not least, to the formation of rational alcohol policy.

Table 4. *Testing for changes in the prevalence of alcohol use in last 30 days among adolescents by gender and age, HBSC 2014–2022, Czech Republic*

Period		Exp (coef.)[a]	SE[b]	t-statistic	p-value	95% CI	Prevalence rate difference	95% CI
Boys 13-year-old	2014	1.505***	0.158	3.90	<0.001	1.225; 1.849	0.075	0.036; 0.113
	2022	1.039	0.094	0.42	0.672	0.870; 1.241	0.006	−0.023; 0.036
	Constant (Ref. 2018)	0.258[c]	0.017	–	–	0.225; 0.294	Reference period	
Boys 15-year-old	2014	1.095	0.114	0.87	0.382	0.893; 1.344	0.023	−0.028; 0.074
	2022	0.931	0.078	−0.85	0.393	0.789; 1.098	−0.018	−0.059; 0.023
	Constant (Ref. 2018)	0.898[c]	0.057	–	–	0.793; 1.016	Reference period	
Girls 13-year-old	2014	0.955	0.129	−0.34	0.734	0.732; 1.246	−0.007	−0.047; 0.033
	2022	1.044	0.105	0.43	0.670	0.857; 1.271	0.007	−0.024; 0.038
	Constant (Ref. 2018)	0.236[c]	0.018	–	–	0.204; 0.274	Reference period	
Girls 15-year-old	2014	0.966	0.095	−0.35	0.725	0.797; 1.172	−0.009	–0.057; 0.040
	2022	1.053	0.084	0.65	0.515	0.901; 1.232	0.013	–0.026; 0.052
	Constant (Ref. 2018)	0.945[c]	0.053	–	–	0.846; 1.055	Reference period	

[a]Exponentiated logit coefficient (odds ratio); [b]linearised standard errors; [c]exponentiated constant estimates are the 2018 baseline odds.
Significant change compared to the 2018 reference period at the probability level: ***p < 0.001, **p < 0.01, *p < 0.05.

Limitations

The results presented in this study are based on large representative samples of adolescents. However, it should be noted that despite careful methodological preparation, these are questionnaire surveys in which responses may be at least partly influenced by social desirability or memory bias.

CONCLUSIONS

The study followed up on earlier work (16), which recorded a marked decline in alcohol use among school-aged children between 2010 and 2014. This study tracked trends between 2014 and 2022. The results showed continuing decline between 2014 and 2018 in lifetime alcohol use and lifetime repeated drunkenness indicators in all three age groups, as well as for boys and girls. In survey waves 2018 and 2022, we do not see a statistically significant decline, but rather a stabilisation of assessed prevalence at a level from the previous wave of the study. From 2014 to the more recent waves of the study, we also note a convergence in alcohol use indicators between boys and girls. Despite a continuing decline in alcohol use among adolescents until 2018 and subsequent stabilization of prevalence estimates, underage drinking remains a public health concern and requires critical assessment of the effectiveness of current national alcohol policies. Approaches to addressing this issue must also take gender specificities into account, particularly the convergence of consumption patterns among boys and girls.

Electronic Supplementary Materials

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Conflicts of Interest

None declared

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