

# **5** The relationship between alcohol consumption and educational outcomes in children

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This chapter investigates the relationship between alcohol use and a variety of educational outcomes. A data analysis covering 32 countries explores the association between performance at school and alcohol use in children aged 11 to 15, and assesses the degree of inequality across countries. A longitudinal analysis investigates a potential causal relationship between alcohol use and both educational performance and educational attainment in four countries. Finally, the chapter discusses the broader consequences of the relationship between alcohol and educational outcomes, for individuals and the economy.

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## Key findings

- Alcohol use and educational outcomes are interrelated, and mediated by biological (e.g. cognitive function), behavioural (e.g. school attendance) and emotional or mental health factors (e.g. poor social connection).
- An analysis of Health Behaviour in School-aged Children (HBSC) data shows that compared to lifetime abstainers, children who had ever consumed alcohol or experienced drunkenness had lower life satisfaction and a higher probability of bullying their classmates. This can lead to antisocial behaviour problems, lower class participation and reduced educational performance.
- The relationship between drunkenness and poor academic performance is significant in 21 (out of 32) countries for boys and 24 countries for girls. Children who had never been drunk were 30% more likely to perform well at school than those who had ever experienced drunkenness.
- Analysis of longitudinal data suggests that this relationship may be causal, as the presence of alcohol use during young ages affects school marks and educational attainment.
- Alcohol use during high school negatively affects the grade point average of US students: weekly binge drinking was linked to a reduction in the grade point average of boys (0.25 points) and girls (0.21 points) in the following year.
- In the United States, the United Kingdom and New Zealand some evidence was found that alcohol use during high school reduces the likelihood of completing higher education and lowers the age at which students leave full-time education.
- Any impact of alcohol use on educational outcomes also has an impact on the formation of human capital, economic growth, inequalities and social welfare, making it a concern for individuals and societies.

### 5.1. Alcohol use can affect educational outcomes through different pathways

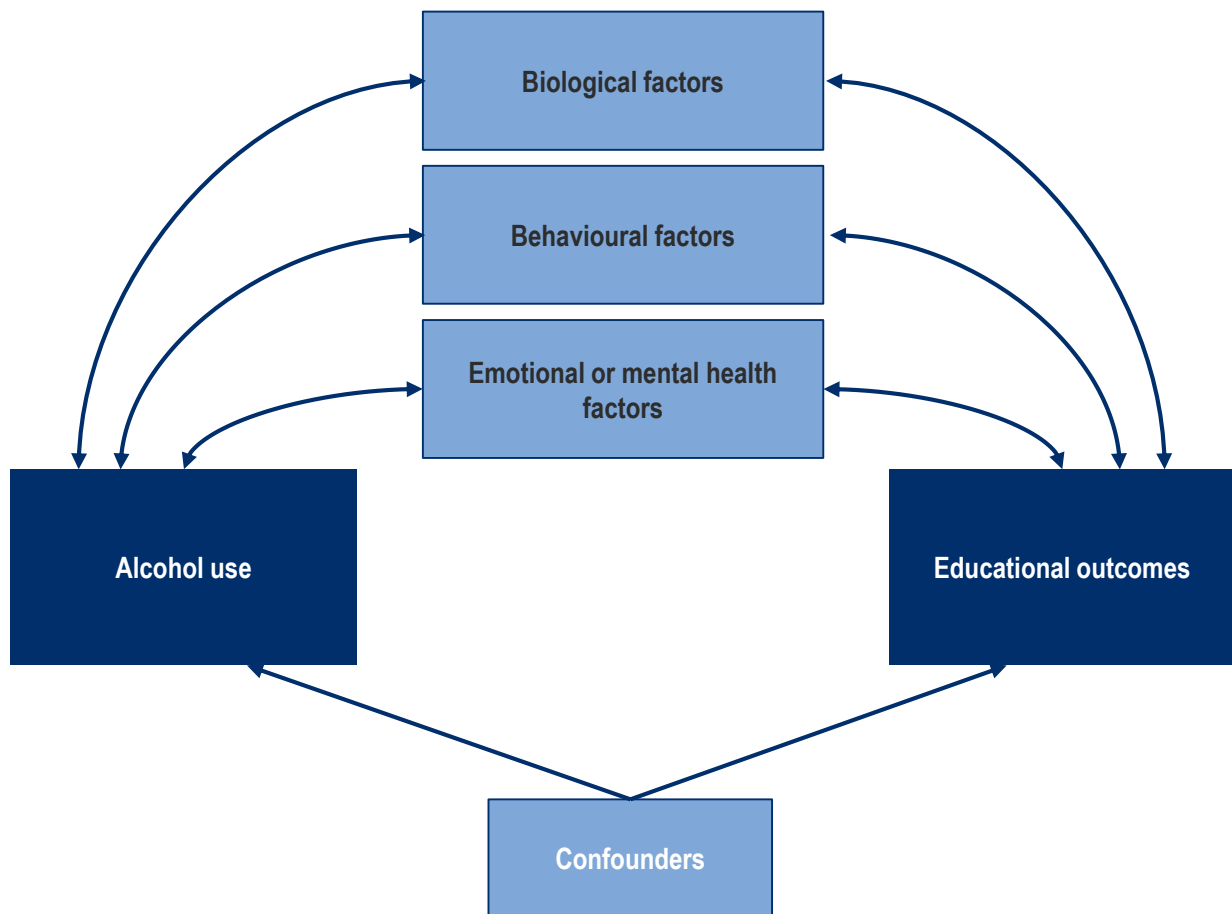
Data and trends in alcohol consumption among adolescents are presented in Section 2.3 in Chapter 2, while the drivers of alcohol consumption and initiation are reviewed in Section 3.4 in Chapter 3. This chapter aims to explore the relationship between adolescents' alcohol consumption and educational outcomes.

#### **5.1.1. Biological, behavioural and emotional factors mediate the relationship between alcohol use and education**

Harmful alcohol consumption is a major risk factor across the OECD and in all population groups. Notably, heavy episodic drinking (or binge drinking) is a prevalent drinking pattern in all age groups, and is especially predominant among the young (see Chapter 2). These risk-taking behaviours are associated with a large number of chronic diseases, including cancer, liver disease, mental health conditions and injuries. In addition to the impact on population health, alcohol consumption in children and young people may also have an impact on educational outcomes.

Alcohol use can influence educational outcomes through a number of different pathways. These include the three following mediating factors: biological factors, behavioural factors and emotional or mental health factors (Figure 5.1).

Figure 5.1. Relationship between alcohol use and educational outcomes



First, alcohol use and related diseases (such as mental health issues) may have a direct biological effect on cognitive function and concentration at school. Alcohol has been shown to cause neurodegeneration and impaired functional brain activity (Balsa, Giuliano and French, 2011<sup>[1]</sup>), and can create learning and recognition problems (Brown et al., 2000<sup>[2]</sup>). Second, alcohol use can lead to behaviours that affect educational performance, such as lower attendance or commitment. For example, alcohol use has been shown to be associated with absenteeism from school (Holtes et al., 2015<sup>[3]</sup>), less time spent on studying and lower school attendance (Wolaver, 2002<sup>[4]</sup>). Third, emotional or mental health factors related to alcohol use can affect educational performance. Alcohol use has been shown to negatively affect relationships with other students and teachers and commitment to school work (Hemphill et al., 2014<sup>[5]</sup>). For instance, alcohol use by students may increase the odds of disengaging from school (such as through truancy or school suspension), which may in turn favour connections with antisocial peers.

However, the relationship between alcohol use and educational outcomes is complex and multidirectional. Inverse relationships may also exist. For example, students who do less well in school may be more likely to engage in binge drinking as a coping mechanism (Donath et al., 2012<sup>[6]</sup>). In addition, a wide range of confounding factors may influence both the risk factors and the educational outcomes, such as family income, parental education, self-esteem and motivation. The presence of confounders can create the appearance of a relationship where none exists, or can obscure or alter a relationship.

### 5.1.2. Bullying is linked to alcohol use

Alcohol use, bullying and social exclusion are interrelated. An OECD analysis of Health Behaviour in School-aged Children (HBSC) survey data (HBSC, 2020<sup>[7]</sup>) shows a significant association between drunkenness and the probability of bullying others (Figure 5.2; see data and methods in Box 5.1). Children who reported frequent drunkenness were twice as likely as those who had always abstained from alcohol to present antisocial behaviour with their classmates. In particular, 50% of boys who had experienced drunkenness 11 times or more in their lifetime reported that they bullied their classmates, compared to 24% among abstainers.

#### Box 5.1. Data and methods for the OECD analyses of the HBSC survey data

Analyses are based on data from the 2013-14 HBSC survey, which collects information on school students aged 11, 13 and 15 years every four years (HBSC, 2020<sup>[7]</sup>). Individual-level data for HBSC 2017-18 were not available at the time of this report, so the analysis could not include the latest wave of the survey. School and health information are self-reported by children (e.g. school performance compared to classmates, life satisfaction, height and weight, smoking and alcohol use and drunkenness). Alcohol use is defined as a categorical variable: lifetime abstainer, drank at least once in life, while the variable “drunkenness” is categorised into: having experienced drunkenness once in lifetime, drunk 2-3 times, drunk 4-10 times, drunk 11 times or more. Body mass index (BMI), calculated from height and weight, is categorised into healthy weight, pre-obese and obese, using the WHO age- and sex-specific BMI cut-off points for children (Cole et al., 2000<sup>[8]</sup>). Analyses presented cover 32 HBSC countries: 26 European Union countries plus Canada, Iceland, Israel, Norway, Switzerland and the Russian Federation.

A pooled country multivariate logistic regression analysis was performed to assess the probability of having good performance at school, and a linear model was used for assessment of life satisfaction. Country-specific analyses of the probability of having good performance at school were performed using a mixed logit model with random effects on the intercepts and the alcohol use coefficient at the country level, while controlling for individual characteristics. Predicted probabilities of self-perceived good performance at school were estimated for the categories of alcohol use. The relative index of inequality, which is a summary measure of inequality, was used to gauge alcohol use-related inequalities in school performance across countries.

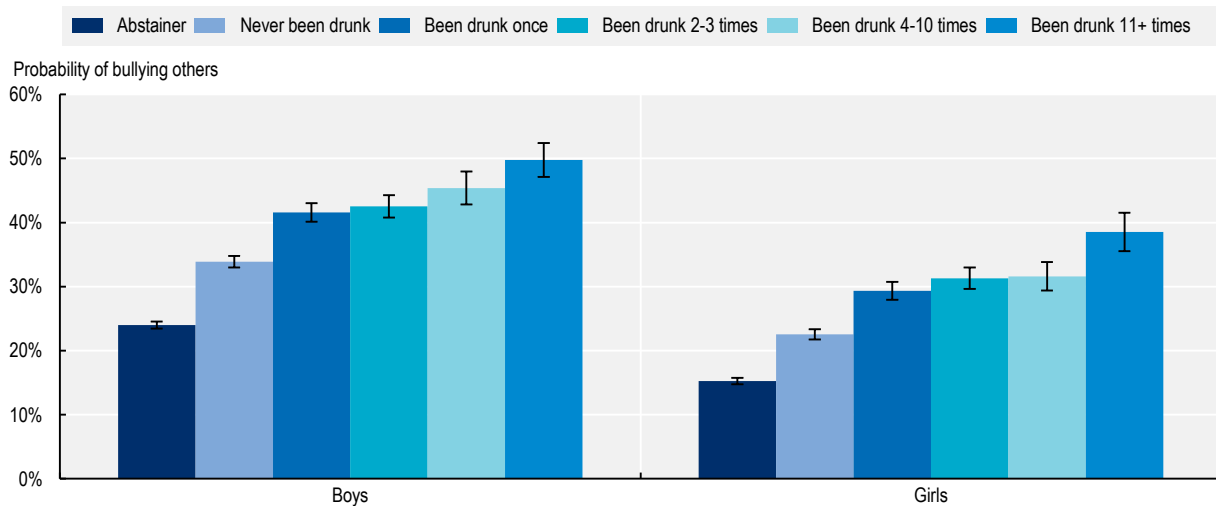
#### Time-trend analysis

Four waves of the HBSC survey (2001-02, 2005-06, 2009-10, and 2013-14) were combined for the time-trend analysis. A pooled country logistic model of the probability of good performance at school was used to assess the effect of alcohol use, survey year (continuous) and their interaction term, while controlling for age, smoking status, BMI categories and socio-economic background. Separate models were run for boys and girls.

Further information on HBSC survey is available at <http://www.hbsc.org/>.

**Figure 5.2. Bullying by drunkenness frequency, children aged 11-15, OECD countries, 2013-14**

Probability of bullying others, with 95% confidence interval



Note: Since bullying can be affected by many factors, the analysis is controlled for a range of covariates (i.e. age, family affluence, smoking and body mass index categories).

Source: OECD estimates based on 29 countries from 2013-14 HBSC survey data.

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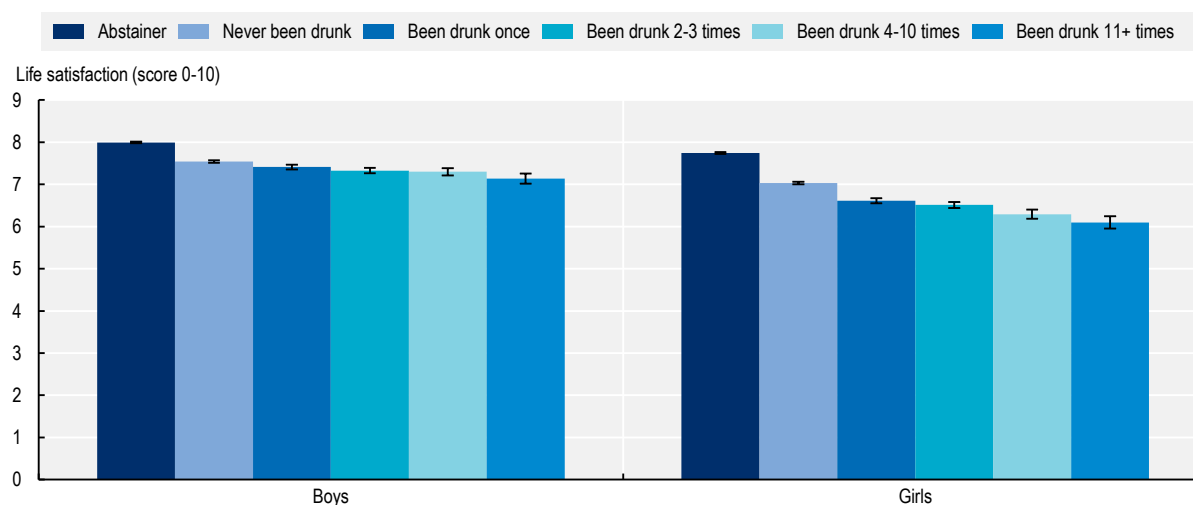
### 5.1.3. Life satisfaction is negatively associated with alcohol use

An OECD analysis of the 2013-14 HBSC survey data points to a significant association between drunkenness frequency and poor life satisfaction, especially in girls. In particular, girls who had always abstained from alcohol self-reported a score of life satisfaction 27% higher than those who had been drunk more than ten times (score 7.74 vs. 6.10; i.e. 1.64 points higher on a scale of 0 to 10). For boys, the difference in life satisfaction score was 0.86 points (score 7.99 vs. 7.13), corresponding to a 12% higher score in those who had always abstained from alcohol (Figure 5.3).

Interestingly, the relationship is monotonic but non-linear, as the biggest reduction in life satisfaction is observed between those who had always abstained from alcohol and those who had drunk alcohol at least once in their life but without any episode of drunkenness. This suggests that the first episode of drinking (compared to subsequent episodes and drunkenness) is associated with the biggest effect on emotional and mental well-being. In policy terms, reducing drunkenness in children is a relevant objective, but tackling early drinking initiation is even more important.

**Figure 5.3. Life satisfaction and drunkenness frequency, children aged 11-15, OECD countries, 2013-14**

Predicted score of life satisfaction (0-10), with 95% confidence interval



Note: Since life satisfaction can be affected by many factors, the analysis is controlled for a range of covariates (i.e. age, family affluence, smoking and BMI categories).

Source: OECD estimates based on 29 countries from 2013-14 HBSC survey data.

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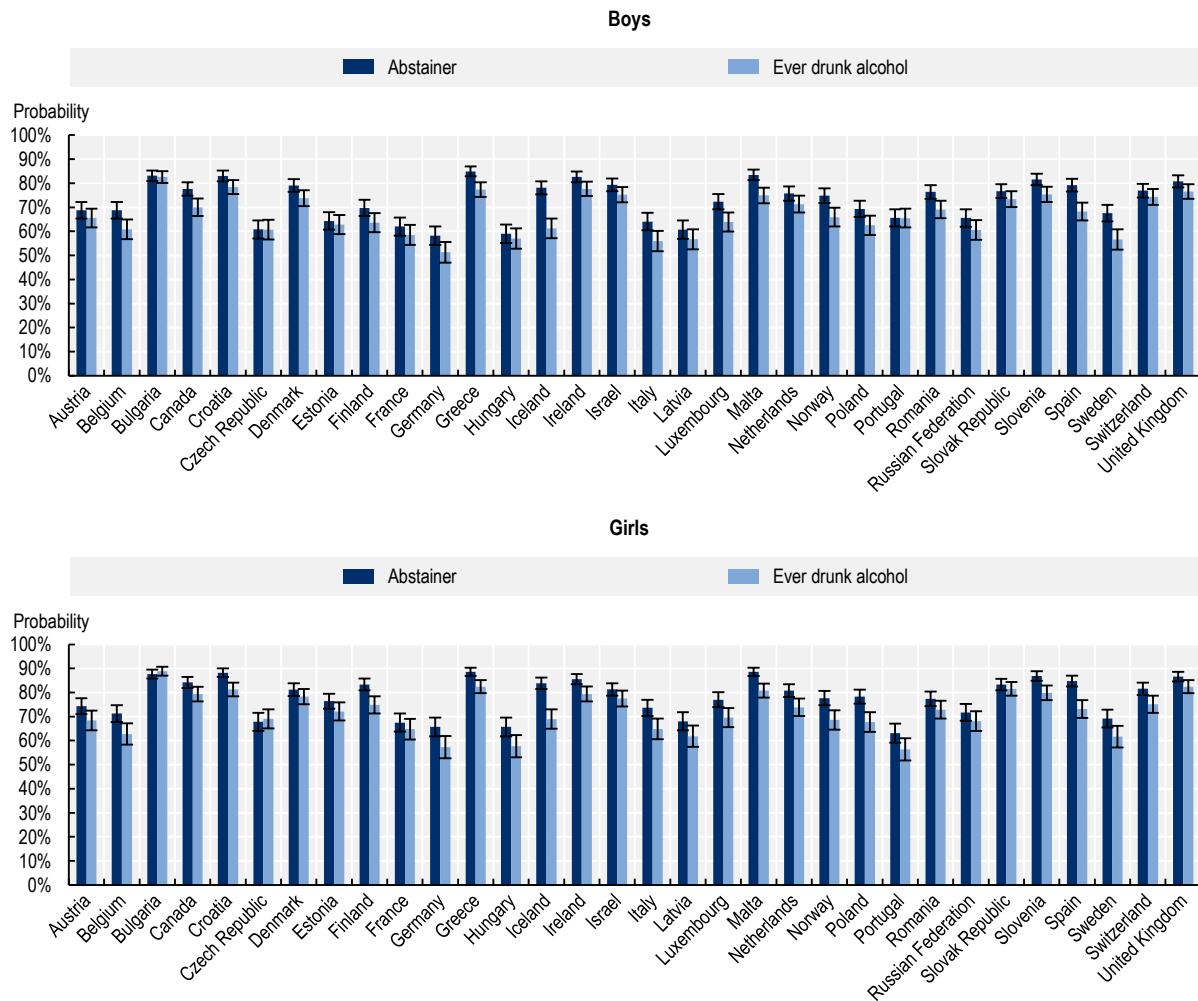
## 5.2. There is a clear association between school performance and alcohol use in OECD countries

### 5.2.1. Drinking initiation is negatively associated with performance at school

An OECD analysis based on 2013-14 HBSC survey data shows that adolescents aged 11 to 15 who had always abstained from alcohol in their lifetime had higher performance at school than their counterparts who had ever consumed alcohol in nearly half of the 32 studied countries. This relationship remains significant after controlling for mediating and confounding factors such as age, gender, family affluence, BMI categories and smoking status. Figure 5.4 shows that drinking alcohol is significantly associated with poorer school performance in 12 (out of 32) countries for boys and 15 countries for girls, with the strength of the relationship varying across countries. For instance, in Austria, 69% of abstainer boys were likely to perform well at school compared to 66% of boys who had ever consumed alcohol. The gradient is steeper and significant in Belgium, where 69% of abstainer boys were likely to perform well compared to 61% of boys who had ever consumed alcohol.

**Figure 5.4. School performance and alcohol use, children aged 11-15, country-specific results, 2013-14**

Probability of good performance at school by drinking status, with 95% confidence interval



Note: Mixed model with random slope. Adjusted for age, family affluence, smoking and BMI categories. Covariates are set at fixed values (age 13, middle family affluence, never smoked, healthy weight).

Source: OECD estimates based on 2013-14 HBSC survey data.

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### 5.2.2. Drunkenness is negatively associated with performance at school

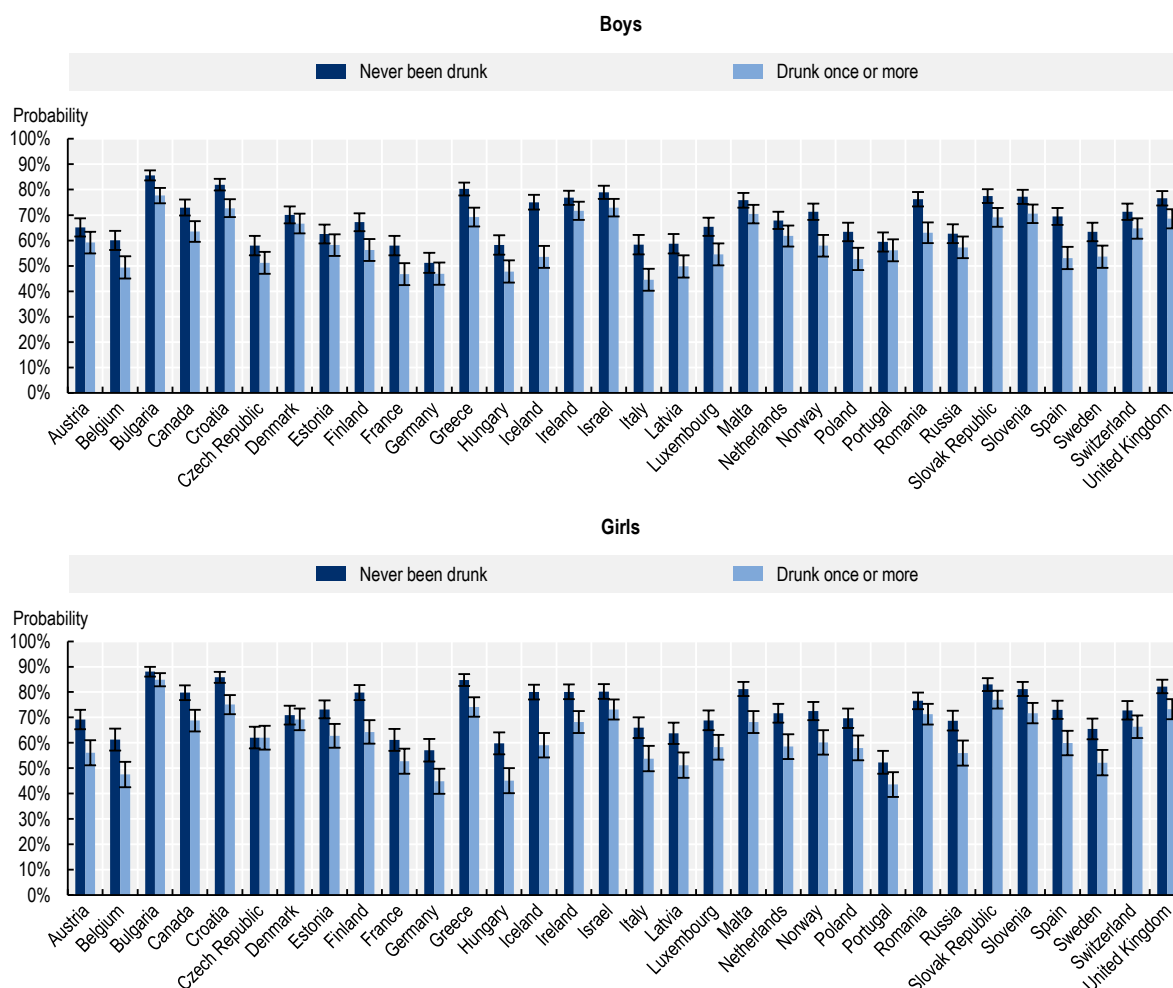
Beyond drinking initiation, a high level of consumption measured by drunkenness is linked with performance at school. An analysis based on 2013-14 HBSC survey data, similar to the one conducted above, shows that adolescents aged 11 to 15 who had never been drunk in their lifetime had higher performance at school than their counterparts who had ever experienced drunkenness in the vast majority of the 32 countries studied. Figure 5.5 shows that experiencing drunkenness is significantly associated with poorer school performance in 21 (out of 32) countries for boys and 24 countries for girls, with the strength of the relationship again varying across countries. For instance, in Latvia, 59% of boys who had never been drunk were likely to perform above the average at school compared to 51% of boys who had

ever experienced drunkenness. The gradient is steeper in Italy, where 59% of boys who had never been drunk were likely to perform above the average compared to 45% of boys who had ever experienced drunkenness.

Girls had a higher probability of good performance at school compared to boys when they had never been drunk in all countries except Portugal. However, as soon as they had experienced drunkenness, girls performed less well than boys in a third of the countries (10 countries). For instance, in Austria, among teenagers who had never been drunk, 69% of girls performed well at school compared to 65% of boys. But among those who had experienced drunkenness at least once, 56% of girls performed well at school compared to 59% of boys. A more detailed comparison between boys and girls is displayed in Annex Figure 5.A.1.

**Figure 5.5. School performance and drunkenness, children aged 11-15, country-specific results, 2013-14**

Probability of good performance at school by drunkenness status, with 95% confidence interval

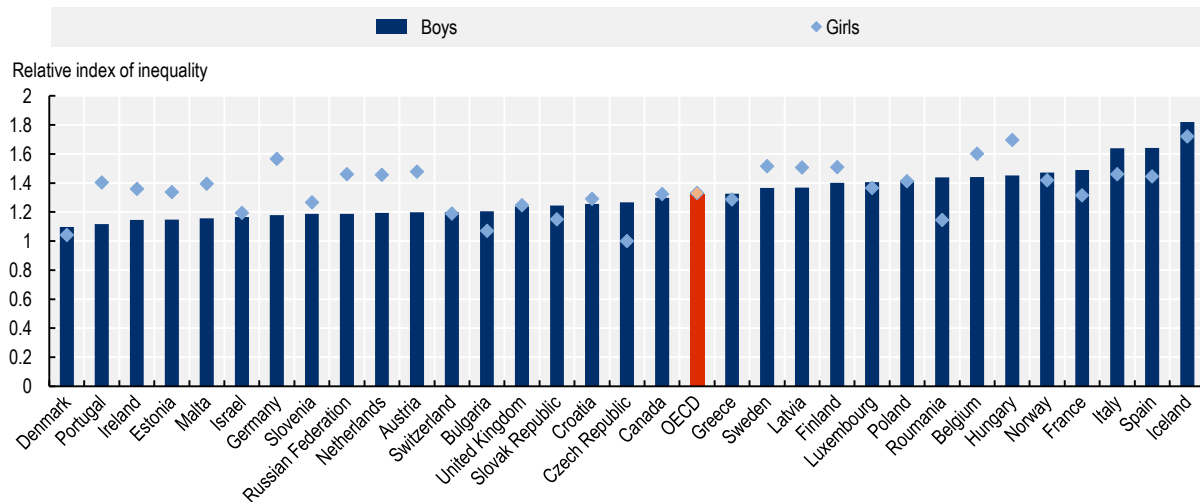


Note: Mixed model with random slope. Adjusted for age, family affluence, smoking and BMI categories. Covariates are set at fixed values (age 13, middle family affluence, never smoked, healthy weight).  
 Source: OECD estimates based on 2013-14 HBSC survey data.



On average across countries, boys and girls who had never been drunk were 30% more likely to perform well at school (Figure 5.6). The degree of inequality varies across countries and genders. The largest inequalities are seen in Iceland, Spain and Italy for boys, and Iceland, Hungary and Belgium for girls. The lowest degrees of inequality are observed in Denmark and Portugal for boys, and the Czech Republic and Denmark for girls. Inequalities in school performance related to drunkenness are more pronounced in girls than boys in 18 (out of 32) countries.

**Figure 5.6. Relative index of inequality for good performance at school by drunkenness, children aged 11-15, by sex and by country**



Note: The relative index of inequality (RII) is calculated as the ratio between the probability of people who have never been drunk divided by the probability of those who have ever experienced drunkenness, usually for positive outcomes (here, school performance). An RII greater than 1 means that the likelihood of good performance at school decreases with drunkenness. The greater the RII, the larger the inequality. For instance, in France, girls who have never been drunk have 32% more chance of performing well at school than girls who have ever experienced drunkenness. The OECD average is derived from a pooled country analysis weighted by the national sample size.

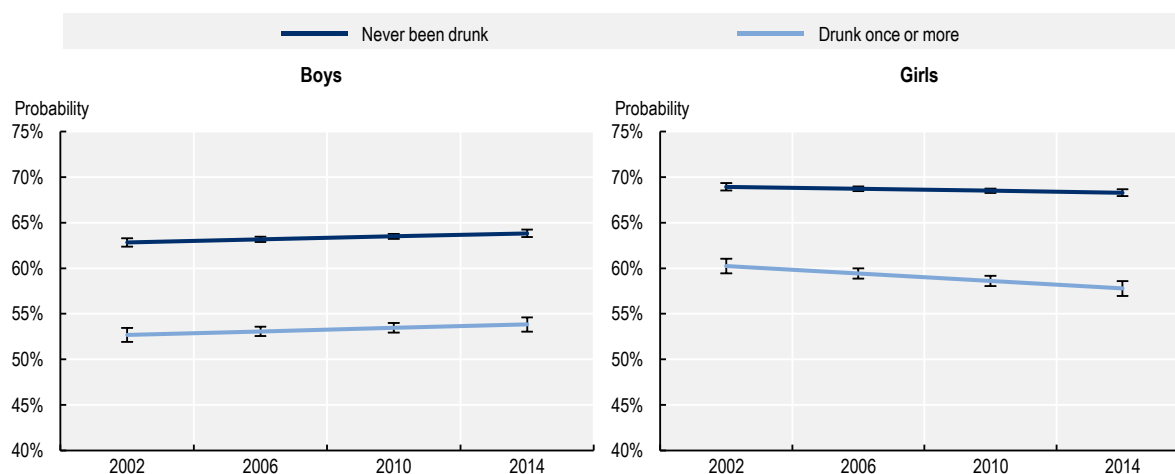
Source: OECD analysis based on 2013-14 HBSC survey data.

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The difference in school performance by drunkenness has slightly increased in girls over recent years, while remaining constant in boys. A time-trend analysis of 29 OECD countries shows that from 2002 to 2014 there was a slight but significant decrease in school performance in girls who had ever experienced drunkenness, while the trend remained stable in those who had never been drunk, slightly widening the level of inequality. In boys, the trends in school performance were similar in both those who had never been drunk and those who had ever experienced drunkenness, maintaining a constant level of inequality (Figure 5.7).


**Figure 5.7. Time evolution of the probability of good school performance, by drunkenness and by sex, OECD countries average**

Predicted probability of good performance at school, with 95% confidence intervals



Note: Predicted probabilities obtained from logistic model, and adjusted for drunkenness, survey year and their interaction term, as well as age, smoking status, BMI categories and family socio-economic background. Analysis for 29 OECD countries.

Source: OECD analysis based on four waves of HBSC survey data.

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### 5.3. Some evidence exists of a causal relationship between alcohol use and educational outcomes

It is important to understand whether the identified association between alcohol use and education outcomes is causal; in other words, whether alcohol use causes a change in education outcomes. If the relationship is causal, public health policies to reduce alcohol use could help improve not only child health but also educational outcomes and thus human capital in general.

#### 5.3.1. The literature presents mixed evidence for the causal effect of alcohol use on educational outcomes

The existing body of literature on the relationship between alcohol use and educational outcomes is based mostly on cross-sectional studies (El Ansari, Stock and Mills, 2013<sup>[9]</sup>; DeSimone and Wolaver, 2005<sup>[10]</sup>; Holtes et al., 2015<sup>[3]</sup>). The studies based on longitudinal data – which can be used to show that alcohol use precedes a change in educational outcomes – present mixed results.

A number of studies found evidence of a temporal relationship between alcohol consumption and educational outcomes. Hemphill et al. looked at the effect of early adolescent alcohol use on mid-adolescent school suspension, truancy, commitment and academic failure in the United States and Australia (Hemphill et al., 2014<sup>[5]</sup>). They found that grade 7 alcohol use and binge drinking was associated with grade 8 suspension and grade 9 truancy (for example, students who used alcohol in grade 7 had 68% higher odds of being suspended in grade 8). However, there was no significant effect on academic achievement and school commitment.

Using data from the longitudinal Brain and Alcohol Research in College Students study, Meda et al. looked at the impact of alcohol and marijuana use on the United States students' grade point averages (GPAs) (Meda et al., 2017<sup>[11]</sup>). They showed that students using moderate to high levels of alcohol but low levels of marijuana had lower GPAs, but this difference became non-significant over time. However, students using both substances had lower GPAs throughout the two-year investigation period.

Other studies found no significant effect of alcohol use on educational outcomes. A study using the US Add Health cohort looked at the effects of binge drinking on GPA, and found no statistically significant relationship between the two (Sabia, 2010<sup>[12]</sup>). Silins et al. used three Australasian longitudinal cohorts to explore the relationship between adolescent alcohol use and educational attainment by age 25 (Silins et al., 2015<sup>[13]</sup>). They found weak and statistically insignificant relationships between frequency of alcohol use and non-attainment of secondary school and tertiary qualifications after adjustment for confounders.

Chatterji used two different methods to estimate the association between alcohol use while in high school and educational attainment at age 26 in the US National Education Longitudinal Study (Chatterji, 2006<sup>[14]</sup>). While ordinary regression indicated that the two are correlated, the results from model taking into account a potential association caused by common, unmeasured determinants suggested that alcohol use had no causal effect on educational attainment, despite the strong association between the variables.

Another study found different results for girls and boys. Balsa et al. also used the Add Health cohort to link alcohol consumption to GPA in a fixed effects model (Balsa, Giuliano and French, 2011<sup>[1]</sup>). While alcohol consumption resulted in a small but statistically significant reduction in GPAs for boys (0.07 points per 100 drinks per month), for girls this effect was not significant.

### **5.3.2. OECD analysis suggests there may be a negative causal relationship between alcohol use and educational outcomes in some countries**

An OECD analysis based on longitudinal data available for four countries suggests that there may be a causal relationship between alcohol use and educational outcomes in some countries. The data and methods for this analysis are described in Box 5.2, and the limitations of the analysis in Box 5.3.

#### **Box 5.2. Description of the longitudinal analysis**

The objective of this analysis was to identify a potential causal relationship between alcohol use and educational outcomes. To investigate whether the relationship is causal, longitudinal datasets were used. By measuring alcohol use in one wave and educational outcomes in a later wave, temporal precedence can be established – one of the requirements for causality (Oppewal, 2010<sup>[15]</sup>). Lagged regression models were used to test this relationship.

The results in this section are based on data from longitudinal cohort studies in the United Kingdom (the 1970 British Cohort Study), the United States (the National Longitudinal Study of Adolescent to Adult Health, or Add Health), the Russian Federation (Russia Longitudinal Monitoring Survey, or RLMS) and New Zealand (Christchurch Health and Development Study, or CHDS). These longitudinal cohorts were selected as they included school-aged children and collected data on alcohol use and educational performance or attainment.

Educational outcomes were measured as educational performance and educational attainment. Educational performance is the performance of a student during his or her time in school. This includes, for example, grades obtained in school subjects, teacher assessment of performance relative to other students and test scores. Educational attainment is the level of education ultimately achieved. This was measured as the number of years spent in full-time education or whether the student completed any degree-level higher education.

An effort was made to standardise the analyses across the different country datasets. However, due to differences in the collected and reported data, different variables and concepts were used per country. To correct for confounders, the models were adjusted for age, ethnicity or minority status, social class and/or income and alcohol consumption – depending on the availability of data.

Despite all these efforts, longitudinal analyses – as well as other similar analyses in the literature – suffer from a number of limitations that should be taken into account when interpreting the results. Box 5.3 provides additional information on the key limitations.

For more details on the datasets, the methods and the limitations, please refer to *OECD Health Working Paper 109* (Vuik, Devaux and Cecchini, 2019<sup>[16]</sup>).

### Box 5.3. Limitations of this analysis

Comparing effect sizes across countries is complicated by differences in survey data. The diverging results found across countries may be the result of the national context, but they may also be caused by differences in the data. All cohorts collected data at different ages and at different intervals. While efforts were made to standardise the variables used for analysis, the data collected in each cohort was not always fully comparable. In particular, the type of variables available on socio-economic status and ethnicity/minority status varied across datasets and may have caused differences in the results.

Under-reporting of alcohol use is a widely recognised issue with studies that use self-reported alcohol consumption data. While most participants underestimate their consumption, the degree to which consumption is underreported varies by gender, age and drinking pattern (Boniface, Kneale and Shelton, 2014<sup>[17]</sup>; Livingston and Callinan, 2015<sup>[18]</sup>). This may have affected the results in this study – in particular, the results based on the Russian data set. The estimates of alcohol consumption in the RLMS database have been reported to be unreliable (Nemtsov, 2004<sup>[19]</sup>).

The inclusion of smoking as a confounder had a considerable impact on the results of the analyses. A number of highly significant effects became non-significant when including smoking as a confounder, and in other cases effects became more significant. Other studies have also included smoking status as a confounder (Balsa, Giuliano and French, 2011<sup>[1]</sup>; Chatterji, 2006<sup>[14]</sup>; Meda et al., 2017<sup>[11]</sup>; Sabia, 2010<sup>[12]</sup>; Silins et al., 2015<sup>[13]</sup>). Smoking and alcohol use are known to be closely related risk-taking behaviours, and further research is needed to fully understand the interplay between alcohol use, smoking and educational outcomes.

For more details on the datasets, and the methods and the limitations, please refer to *OECD Health Working Paper 109* (Vuik, Devaux and Cecchini, 2019<sup>[16]</sup>).

#### *Alcohol use is associated with lower educational performance in the United States but not in New Zealand*

A significant relationship between alcohol use and educational performance was found in the United States (Table 5.1). Monthly and weekly drinking were associated with a decrease in GPA one year later of 0.11 and 0.19 points respectively for boys, and 0.11 and 0.20 points respectively for girls, compared to those who rarely or never drank. This is after adjusting for confounders such as socio-economic background and ethnicity (note: all results presented from this point are adjusted for confounders).

Binge drinking had an even greater association with GPA, as weekly binge drinking was linked to a reduction in the GPA of boys (0.25 points) and girls (0.21 points). A reduction of 0.25 points would bring a student with the median GPA of 2.75 down to the 40th percentile.

There was no strongly significant relationship between the frequency of drinking or binge drinking and test scores in New Zealand when using an adjusted lagged regression. However, this may be partly due to the test used to measure performance. Educational performance was measured at age 18 using the Burt word reading test, which reflects the number of words correctly read from a list of 110 words (Gilmore, Croft and Reid, 1981<sup>[20]</sup>). Since this test was designed for younger children (up to around age 12), the variable was strongly skewed towards higher scores and the results may have been subject to ceiling effects.

**Table 5.1. Lagged relationship between alcohol use and educational performance**

Country	Outcome	Exposure	Boys	Girls
United States	GPA (1 to 4)	Monthly drinking (vs. rarely or never drinking)	Coefficient: -0.11**	Coefficient: -0.11**
		Weekly drinking (vs. rarely or never drinking)	Coefficient: -0.19***	Coefficient: -0.20***
		Monthly binge drinking (vs. rarely or never binge drinking)	Coefficient: -0.21***	Coefficient: -0.22***
		Weekly binge drinking (vs. rarely or never binge drinking)	Coefficient: -0.25***	Coefficient: -0.21**
New Zealand	BURT reading score (up to 110)	Monthly drinking (vs. rarely or never drinking)	Coefficient: -1.16	Coefficient: 1.60
		Weekly drinking (vs. rarely or never drinking)	Coefficient: -1.66	Coefficient: -0.90
		Monthly binge drinking (vs. rarely or never binge drinking)	Coefficient: 0.47	Coefficient: 2.43
		Weekly binge drinking (vs. rarely or never binge drinking)	Coefficient: -2.38	Coefficient: 0.99

Note: \* significant at 0.1 level; \*\* significant at 0.05 level; \*\*\* significant at 0.01 level.

Results shown were obtained using a lagged linear regression, adjusted for age, ethnicity or minority status, social class and/or income and BMI (except for New Zealand where this information was not available). The coefficients of linear regression models can be interpreted as the increase in outcome for each unit increase in exposure.

Source: OECD analysis of Add Health and CHDS data.

### *The relationship between the frequency of alcohol use and educational attainment differs across countries*

In the United States, the frequency of alcohol use did not have a statistically significant effect on educational attainment for boys. For girls, on the other hand, there was a clear negative relationship: girls who drank weekly were 21% less likely to complete higher education than those who rarely or never drank (risk ratio: 0.79), and girls who binge drank weekly were 32% less likely (risk ratio: 0.68).

In the United Kingdom, no strongly significant relationship was found between the frequency of alcohol use and completing higher education. However, there was a significant negative association between alcohol use and the age at which individuals left full-time education. For girls, weekly drinking during high school was significantly associated with leaving full-time education 0.35 years earlier than girls who rarely or never drank.

There was also a clear negative relationship between binge drinking more than once in two weeks and educational attainment in the United Kingdom. Both boys and girls saw a decrease in the number of years spent in full-time education, by 0.60 and 0.56 years respectively, compared to those who never binge drank.

In New Zealand, the frequency of alcohol use was not significantly associated with completing any higher education. However, weekly drinking was associated with a 0.56-year decrease in the age at which boys left full-time education.

In the Russian Federation, a positive relationship was found between monthly drinking and completing higher education: girls who drank monthly were 56% (risk ratio: 1.56) more likely to complete higher education. A similar but less statistically significant effect was found for boys. Findings from this analysis deserve cautious interpretation, however, particularly given the limitations in the RLMS data (see Box 5.3 for additional information).

**Table 5.2. Lagged relationship between alcohol use and educational attainment**

Country	Outcome	Method	Exposure	Male	Female
United States	Any higher education	Lagged log-binomial regression	Monthly drinking (vs. rarely or never drinking)	Risk ratio: 0.95	Risk ratio: 0.95
			Weekly drinking (vs. rarely or never drinking)	Risk ratio: 0.94	<b>Risk ratio: 0.79**</b>
			Monthly binge drinking (vs. rarely or never binge drinking)	Risk ratio: 1.00	Risk ratio: 1.00
			Weekly binge drinking (vs. rarely or never binge drinking)	Risk ratio: 0.80*	<b>Risk ratio: 0.68**</b>
Russian Federation	Any higher education	Lagged log-binomial regression	Monthly drinking (vs. rarely or never drinking)	Risk ratio: 1.54*	<b>Risk ratio: 1.56***</b>
			Weekly drinking (vs. rarely or never drinking)	Risk ratio: 1.25	Risk ratio: 1.42
United Kingdom	Any higher education	Lagged log-binomial regression	Monthly drinking (vs. rarely or never drinking)	Risk ratio: 1.20*	Risk ratio: 1.03
			Weekly drinking (vs. rarely or never drinking)	Risk ratio: 1.10	Risk ratio: 0.93
			Binge drinking once in last 2 weeks (vs. not binge drinking)	Risk ratio: 1.13	Risk ratio: 1.01
			Binge drinking more than once last 2 weeks (vs. not binge drinking)	Risk ratio: 0.83*	Risk ratio: 0.86*
	Age leaving full-time education	Lagged linear regression	Monthly drinking (vs. rarely or never drinking)	Coefficient: 0.46*	Coefficient: 0.30
			Weekly drinking (vs. rarely or never drinking)	Coefficient: 0.04	<b>Coefficient: -0.35***</b>
			Binge drinking once in last 2 weeks (vs. not binge drinking)	Coefficient: -0.02	Coefficient: 0.10
			Binge drinking more than once last 2 weeks (vs. not binge drinking)	<b>Coefficient: -0.60***</b>	<b>Coefficient: -0.56***</b>
New Zealand	Any higher education	Lagged logistic regression	Monthly drinking (vs. rarely or never drinking)	Risk ratio: 0.99	Risk ratio: 0.87
			Weekly drinking (vs. rarely or never drinking)	Risk ratio: 1.04	Risk ratio: 0.91
			Monthly binge drinking (vs. rarely or never binge drinking)	Risk ratio: 0.98	Risk ratio: 0.72*
			Weekly binge drinking (vs. rarely or never binge drinking)	Risk ratio: 0.97	Risk ratio: 1.17

Country	Outcome	Method	Exposure	Male	Female
	Age leaving full-time education	Lagged linear regression	Monthly drinking (vs. rarely or never drinking)	Coefficient: -0.28	Coefficient: 0.27
Weekly drinking (vs. rarely or never drinking)			<b>Coefficient: -0.56**</b>	Coefficient: 0.17	
Monthly binge drinking (vs. rarely or never binge drinking)			Coefficient: -0.48	Coefficient: 0.52*	
Weekly binge drinking (vs. rarely or never binge drinking)			Coefficient: -0.62*	Coefficient: 0.38	

Note: \*: significant at 0.1 level; \*\*: **significant at 0.05 level**; \*\*\*: **significant at 0.01 level**.

Results shown were obtained using a lagged linear regression, adjusted for age, ethnicity or minority status, social class and/or income and BMI (except for New Zealand where this information was not available). The coefficients of linear regression models can be interpreted as the increase in outcome for each unit increase in exposure. Risk ratios show how much more or less likely one group is to experience the outcome, with a negative value signifying a lower likelihood.

Source: OECD analysis of Add Health; the 1970 British Cohort Study, RLMS and CHDS data.

## 5.4. Conclusion: Early alcohol use is a concern for individuals and societies

Alcohol use and its related health conditions are known to affect the economy and society through health care costs, lost productivity and the impact of violence and accidents. Through its relationship with educational outcomes, alcohol use may also have an impact on the formation of human capital, economic growth, inequalities and social welfare.

School performance and educational outcomes are key determinants for the formation of human capital and an individual's future socio-economic status. Furthermore, reduced school performance may affect a country's economic growth. An OECD report using PISA (Programme for International Student Assessment) data showed that improving the cognitive skills of the population can lead to significant economic gains, and that relatively small improvements to labour force skills can have a large impact on the future well-being of a nation (OECD, 2010<sub>[21]</sub>). This report also shows that it is the quality of learning outcomes which makes the difference. A modest goal of all OECD countries boosting their average PISA scores by about 5% over the next 20 years would increase OECD gross domestic product by USD 115 trillion over the lifetime of the generation born in 2010 (OECD, 2010<sub>[21]</sub>).

Differences in health and health behaviours resulting from alcohol use at young ages can also reinforce existing social inequalities, which has an impact on social welfare. Differences in health at a young age are perpetuated in adulthood, and can lead to social inequalities, such as differences in job prospects and income gaps (Marmot et al., 2010<sub>[22]</sub>). Inequalities and social injustice can jeopardise a nation's social welfare. This is an important concern for European countries, which have agreed on the European Pillar of Social Rights that seeks to guarantee new and more effective rights for citizens. These range from equal opportunities and access to labour market to fairer working conditions and social protection and inclusion (European Commission Secretariat-General, 2018<sub>[23]</sub>).

Reducing early initiation of drinking and early alcohol use will help to build better future lives and stronger societies. Policy-makers should invest in a wide range of policy interventions aimed at tackling underage drinking, addressing bullying and improving the well-being and mental health of children. Such interventions have the potential to improve the lives of children by improving educational performance and attainment, future labour market prospects and overall health and well-being.



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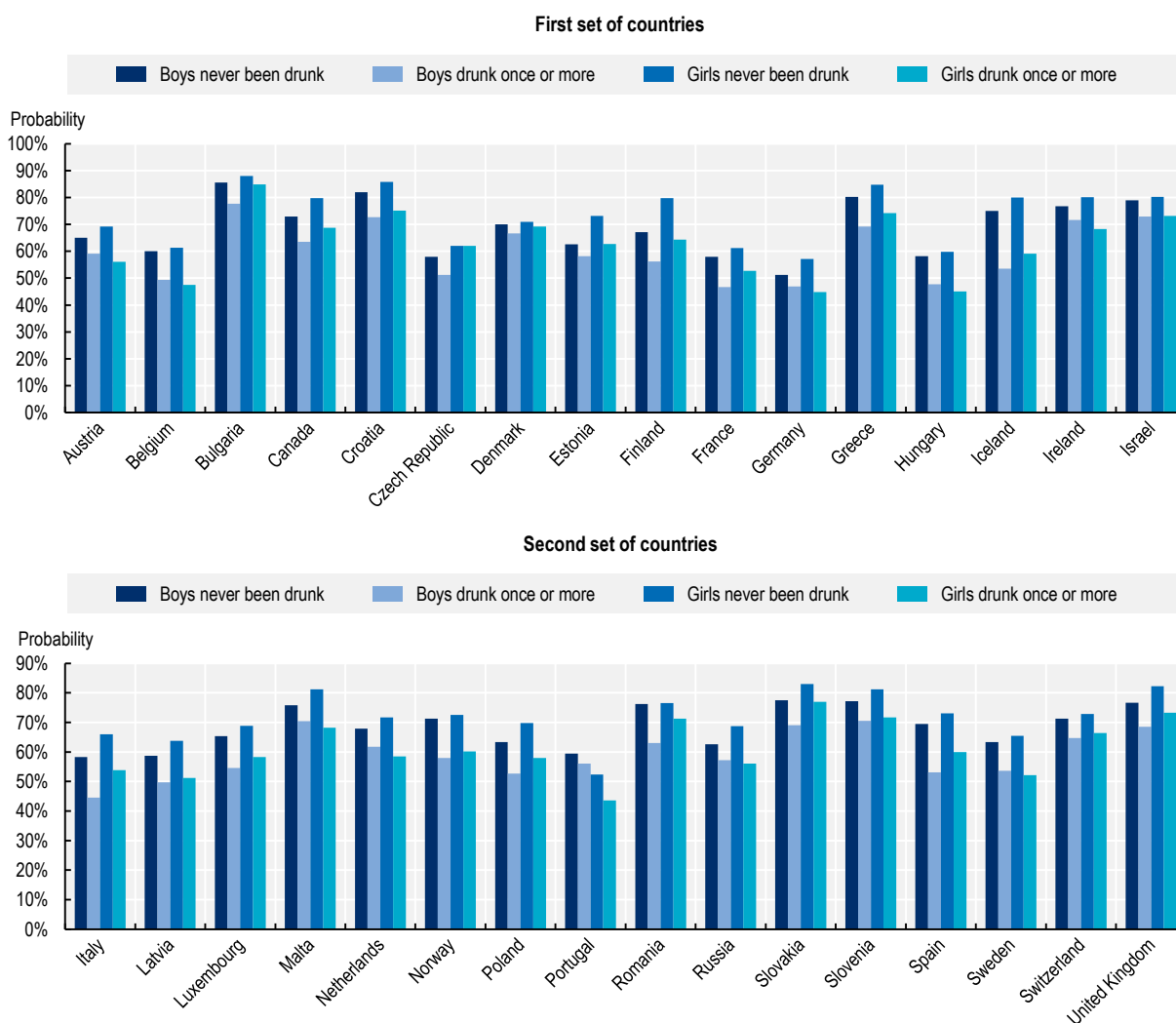
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# Annex 5.A. Additional graphs


## School performance by drunkenness: Comparison between boys and girls

Annex Figure 5.A.1. Probability of good performance at school by gender and by drunkenness

Probability of good performance at school



Note: Mixed model with random slope. Adjusted for age, family affluence, smoking and BMI categories. Covariates are set at fixed values (age 13, middle family affluence, never smoked, healthy weight).  
 Source: OECD estimates based on 2013-14 HBSC survey data.

StatLink  <https://stat.link/od8yk>



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