OECD Health Policy Studies

Preventing Harmful Alcohol Use

Foreword

Alcohol can be a source of individual pleasure and social enjoyment, and its production and trade represent an important part of the economy in many countries. Harmful alcohol consumption, however, is a leading risk factor for premature mortality, injuries and many non-communicable diseases such as cancer, liver cirrhosis and injuries. These, in turn, have wider detrimental societal consequences.

The COVID-19 pandemic has led to changes in drinking habits, with a higher number of people reporting an increase in volume and frequency of drinking compared to the number reporting lower alcohol consumption. In Germany, the United Kingdom and the United States, overall alcohol sales slightly increased by 3-5% in 2020 compared to 2019, according to preliminary estimates. COVID-19 has also changed the places where people drink: while bars and restaurants were badly hit by lockdowns, retail stores and e-commerce significantly increased their sales. The pandemic has also highlighted the problems – in particular within the family sphere – associated with harmful levels of alcohol consumption. Tackling harmful alcohol use therefore remains an important priority for governments.

Policies to tackle harmful alcohol consumption are complex and require trade-offs. This report sheds light on these trade-offs by presenting new evidence on the health and economic impact of alternative options. Analyses in this report focus on 52 OECD, European Union (EU27) and Group of 20 (G20) countries, and show that life expectancy will be 0.9 years lower over the next 30 years due to diseases and injuries caused by drinking more than 1 drink per day for women and 1.5 drinks per day for men, corresponding to a lower-risk threshold specifically used for the simulation. These diseases and injuries cause medical costs equal to about 2.4% of total health expenditure each year; they also damage children's school performance and labour force productivity. As a result, it is estimated that gross domestic product (GDP) will be 1.6% lower on average in OECD countries annually over the next 30 years.

This report identifies policy gaps at the national level. For example, in many countries the implementation of policies on the ground and their effectiveness at the population and individual levels are hindered by poor implementation, limited resources or practical problems. Upscaling action to tackle harmful alcohol consumption is effective in reducing harm and is shown to be an efficient investment. Combining policies into packages that focus on limiting the promotion of alcohol to children; better police enforcement to prevent alcohol-related traffic injuries; upscaling coverage of counselling for patients with harmful alcohol consumption; and price policies to limit the affordability of alcohol, particularly for cheap alcohol, maximises the impact. Investing in such policy packages can save millions of lives and generate savings that are greater than the implementation costs. For every USD 1 invested, the estimates in this report suggest that up to USD 16 is returned in economic benefit, excluding the impact on alcohol-related businesses. The report also discusses approaches to minimise consequences for industry and businesses.

This report is a clear illustration of how better policies lead to better lives. By investing in health prevention, policy-makers have the opportunity to reduce the burden of harmful alcohol consumption for future generations, and to benefit economies.

Acknowledgements

The Organisation for Economic Co-operation and Development (OECD) work on harmful alcohol use was conducted on behalf of its Health Committee, between 2018 and 2020. Michele Cecchini was responsible for the project, overseeing its development. He also led the production of Chapter 1. The production of Chapters 2 and 8 was led by Sabine Vuik. Marion Devaux co-ordinated the production of the report and led the production of Chapters 3, 5 and 7 as well as the country notes. Yevgeniy Goryakin led the production of Chapter 4, while Jane Cheatley led the production of Chapter 6. Alexandra Aldea was in charge of the modelling work, which is led by Aliénor Lerouge. Yvan Guillemette, from the Economics Department, ran the analyses on the OECD long-term economic model and contributed to Chapters 4 and 7. Antoine Marsaudon, Marta Bertanzetti and Laura Suhlrie gave substantial contributions to, respectively, Chapters 3, 6 and 7, while Andrea Feigl contributed to Chapter 4.

Many more people deserve credit for the work presented in this book. The production of this report benefited greatly from the inputs and comments received from other OECD colleagues, national experts, member states representatives and other stakeholders.

Within the OECD, the authors would like to thank Lucy Hulett and Lydia Wanstall for the editorial assistance. Hannah Whybrow and Guillaume Haquin provided administrative assistance. Stefano Scarpetta, Mark Pearson and Francesca Colombo provided senior leadership and advice throughout the project. Franco Sassi provided inputs in the initial phases of the designing of the project. Francesca Borgonovi from the Education Directorate provided inputs and comments.

Special thanks go to Artur Furtado, Attila Balogh and Hana Horka (European Commission) who followed the development of the project since its conceptualisation and provided inputs throughout. The authors would like to thank both French bodies “Mission Interministérielle de Lutte contre les Drogues et les Conduites Addictives” and “Délégation à la sécurité routière”, and the members of the Swiss Federal Office of Public Health who commented on earlier versions of the work and contributed to the development of this project since its initiation.

For its work on public health, the OECD maintains a close partnership with the World Health Organization (WHO) and its Regional Offices. Authors would like to Carina Ferreira-Borges (WHO-Europe) and Maristela Monteiro (PAHO) for their comments on the different drafts of the report.

Preliminary versions of the chapters of this book were presented and discussed at meetings of the OECD Expert Group on the Economics of Public Health (EGEPH), chaired by Brian Ferguson and Amber Jessup, and at the December 2020 meeting of the OECD Health Committee, chaired by Hans Brug. Country experts and delegates are too many to name individually, but the authors would like to thank in particular delegates from Australia, Canada, Chile, Colombia, Costa Rica, Czech Republic, France, Germany, Israel, Japan, Korea, Lithuania, Portugal, Slovenia, Switzerland, the United Kingdom, the United States, the European Commission and the Joint Research Centre of the European Commission for their constructive comments throughout the process. In addition, the authors would like to acknowledge useful comments from the Business and Industry Advisory Committee to the OECD (BIAC) and the Trade Union Advisory Committee to the OECD (TUAC).

The authors would like to thank the following organisations and institutions for providing the data used in the analyses presented in this report. These organisations and institutions do not bear any responsibility for the analysis or interpretation of the data.

- The Health Behaviour in School-aged Children (HBSC) surveys (2001/02, 2005/06, 2009/10, 2013/14) produced by the HBSC international network co-ordinated by the HBSC International Co-ordinating Centre based at the Child and Adolescent Health Research Unit in the University of St Andrews, Scotland. The HBSC data are managed by the HBSC Data Management Centre based at the Department of Health Promotion and Development of the University of Bergen, Norway.
- The Global Information System on Alcohol and Health (GISAH) managed by the World Health Organization.
- The European Health Interview Survey (EHIS) 2014, managed by Eurostat.
- The Canadian Community Health Survey 2015-16, managed by Statistics Canada.
- The 1970 British Cohort Study, managed by the Centre for Longitudinal Studies at University College London, funded by the Economic and Social Research Council, and accessed through the UK Data Service.
- The Health Survey for England 2016, managed by Health Surveys Unit of NatCen Social Research and the Research Department of Epidemiology and Public Health at University College London.
- The French 'Baromètre santé' 2017, run by Santé Publique France.
- The Korean National Health and Nutrition Examination Survey (KNHANES) 2018, managed by the Korea Centers for Disease Control and Prevention.
- The Mexican 'Encuesta Nacional de Consumo de Drogas, Alcohol y Tabaco' (ENCODAT) 2016-17, managed by Comisión Nacional contra las Adicciones.
- The New Zealand Christchurch Health and Development Study (CHDS), run by the University of Otago, made available for this study upon request.
- The US National Health and Nutrition Examination Survey (NHANES) 2015, managed by National Center for Health Statistics, Centers for Disease Control and Prevention.
- The US National Longitudinal Study of Adolescent to Adult Health (Add Health) 1994-2009, managed by the Carolina Population Center, University of North Carolina at Chapel Hill, and accessed through the CPC Dataverse.
- The Russia Longitudinal Monitoring Survey (RLMS), conducted by the Higher School of Economics and ZAO "Demoscope", together with the Carolina Population Center, University of North Carolina at Chapel Hill, and the Institute of Sociology of the Russian Academy of Sciences, accessed through the CPC Dataverse.

The work was funded through regular contributions from OECD member countries and received support from grants from the Health Programme of the European Union, and from the governments of France and Switzerland.

Editorial: Preventing harmful alcohol consumption to promote healthier and stronger recovery after COVID-19

The COVID-19 pandemic has significantly changed the way we live. To contain the spread of the virus and avoid overwhelming our health services, following the two or even three waves of the virus, governments around the world implemented drastic measures to limit physical interaction and mobility. This led to the shutdown of most non-essential activities – from schools to factories; from shops to recreational activities – in the first wave and to repeated, albeit often less stringent, measures in the following waves. These measures have been effective in keeping people at home. For example, 39% of workers in OECD countries shifted to teleworking, and millions of children switched to online learning and home schooling. Leisure time was also affected with, for example, a sharp increase in time spent online.

Early evidence suggests that the "new normal" caused by the pandemic had a significant effect on our lifestyles, including drinking habits. Across 11 countries, 36% of individuals said that they had increased consumption of alcohol. An overall increase in consumption was also confirmed by government sources monitoring sales, at least in some countries for which data are available. For example, in the United Kingdom, total alcohol duty receipts showed a 4.5% increase in the period April to October 2020, compared to the same period in the previous year. Similarly, US data from 15 states suggest a 4% increase in the quantity of alcohol sold in the period January to August 2020, compared to the same period in the previous year. German data show an increase in alcohol tax revenues of 3.3% in 2020, compared to 2019.

People increased drinking frequency. Among individuals in the 11 countries, 43% increased their drinking frequency, compared to a quarter of adults who decreased their drinking. The probability of binge drinking – drinking more than 80% of a bottle of wine or 1.5 litres of beer per drinking occasion – did not change for nearly half of the population. About 29% of the respondents reported binge drinking less frequently, though 23% said they were binge drinking more frequently.

Predictably, **people also changed the places where they drink alcohol**. Restaurant reservations declined sharply, falling to practically zero when lockdowns were enforced. Alcohol sales in bars and restaurants therefore plummeted, but alcohol consumption increased at home. Sales in retail stores, and in particular online sales, also grew significantly. Stockpiling in the early phases of the pandemic may have been a key driver of these trends.

Lockdown and stay at home orders exacerbated some of the negative behaviours associated with harmful alcohol consumption, such as domestic violence. One in four women experience intimate partner violence in their lifetime, and one in three children experience some form of violence by parents or other family members. During the pandemic, there was an increase in the number of emergency calls to hotlines to report domestic violence in countries including Austria, Italy, Mexico, Spain and the United Kingdom, to name a few. Across EU countries there was a 60% rise in emergency calls about domestic violence.

It is difficult to know whether these changes will continue when living conditions go back to normality, but the **experience of previous crises suggests that we may see an increase in problematic drinking in the medium term**. Excessive alcohol consumption can be a response to high stress levels. Increased alcohol use is also common after traumatic events. Undoubtedly, COVID-19 has disrupted people and communities across the world, creating the conditions for long-term physical and mental distress. The associated economic crisis caused unemployment to rise by almost 60% (from 5.3% to 8.4%) across OECD countries in 2020. The reopening of the economy will also be associated with the removal of support measures for distressed companies and workers, possibly leading to bankruptcies and further unemployment, which will take time to reabsorb. The path to recovery therefore remains long and difficult, increasing the risk that individuals will engage in harmful patterns of drinking to cope with stress.

These factors make the findings of this report even more relevant and timely. *Preventing Harmful Alcohol Use* highlights the fact that harmful patterns of alcohol consumption such as underage drinking, heavy drinking or binge drinking are highly prevalent in some population groups. Monthly binge drinking is a habit for one in three adults in OECD countries, and women with higher education and people with the lowest and the highest incomes are particularly at risk. Among adolescents, one in five has been drunk at least twice in their lifetime. During confinement, women, parents of young children, middle-aged people, people with higher incomes and individuals with depressive and anxiety symptoms reported the highest increases in alcohol consumption.

Preventing alcohol-related diseases and injuries reduces the burden on health care services, which are already under heavy pressure from COVID-19, and will foster a stronger economic and social recovery in the aftermath of the pandemic. For many people, alcohol consumption is an enjoyable part of their social life. But harmful patterns of alcohol consumption are dangerous for health and costly for societies. Preventing harmful alcohol use has a triple dividend. First, during the pandemic it helps individuals cope with infections by protecting against the effects of harmful alcohol use on the immune system. Second, it reduces pressure on health care services. Hospitals and health care workers are already under enormous strain to provide care to patients with COVID-19. Reducing health system utilisation from harmful alcohol use helps doctors focus both on patients with COVID-19 and on patients requiring urgent care for other conditions. For example, South Africa – one of the countries implementing an alcohol sales ban – experienced a 65% drop in access to emergency rooms for trauma-related cases linked with alcohol use during the pandemic. Third, a healthier and more productive population will be better able to help restart economic activities and social life in the aftermath of the pandemic.

The OECD analyses conclude that a comprehensive "PPPP approach" – including actions to protect children from alcohol **p**romotion; **p**olicing to limit alcohol-related injuries and violence; **p**rimary care to help patients with harmful patterns of alcohol consumption; and **p**ricing to limit the affordability of cheap alcohol – is both effective and cost-effective to tackle harmful alcohol consumption. Investing in a policy package built around the PPPP approach saves millions of lives and generates savings that are greater than the implementation costs.

Investing in protecting children and people with problematic drinking is particularly important. During the pandemic, children increased screen time by 50%, including TV and social media, on-demand and online video, and online entertainment. This is likely to have increased their exposure to alcohol advertising, which is correlated to the probability of experimenting with drinking for the first time. Only a handful of countries have strong legislation to protect children from online alcohol advertising on social media, however. In addition, there is a need for further support for people with harmful drinking patterns and alcohol use disorders. It is estimated that less than 10% of them receive support from health care services in Europe and the United States. If, as seems conceivable, the number of individuals with harmful patterns of alcohol consumption and alcohol use disorders increases in the aftermath of the pandemic, health services need to be ready to meet the challenge.

COVID-19 has caused huge suffering. But, as with any crisis, it also brings opportunities. It has put a spotlight on the effects of stress, anxiety and depression on individuals. Part of the response must be to help people deal with the problems they have with alcohol consumption. This report shows that tackling harmful alcohol drinking and preventing chronic diseases can support efforts to “build back better”.

Stefano Scarpetta

Director for Employment, Labour and Social Affairs

OECD

Table of contents

FIGURES

INFOGRAPHICS

TABLES

Acronyms and abbreviations

ABAC	Alcohol Beverages Advertising Code
ABV	Alcohol by volume
Add Health	The National Longitudinal Study of Adolescent to Adult Health
AIHW	Australian Institute of Health and Welfare
AMPHORA	Alcohol Measures for Public Health Research Alliance
ASSIST	Alcohol Smoking and Substance Involvement Screening Test
ASTRA	Australian Subscription Television and Radio Association
AUD	Australian Dollar
AUDIT	Alcohol Use Disorders Identification Test
AUDs	Alcohol Use Disorders
AWRI	Australian Wine Research Institute
BAC	Blood Alcohol Content
BMI	Body Mass Index
CAD	Canadian Dollar
CCHS	Canadian Community Health Survey
CHDS	Christchurch Health and Development Study
COICOP	Classification Of Individual COnsumption by Purpose
COPD	Chronic Obstructive Pulmonary Disease
CVD	Cardiovascular disease
DALY	Disability-adjusted life year
EHIS	European Health Interview Survey
EMCDDA	European Monitoring Centre for Drugs and Drug Addiction
ENCODAT	Encuesta Nacional de Consumo de Drogas, Alcohol y Tabaco
EU	European Union
EU27	The 27 member states of the European Union
EUIPO	European Union Intellectual Property Office
FASD	Foetal Alcohol Spectrum Disorder
FAST	Fast Alcohol Screening Test
FMI	Food Marketing Institute
FSANZ	Food Standards Australia New Zealand
G20	The Group of Twenty
GBP	British Pound
GDP	Gross domestic product
GISAH	Global Information System on Alcohol and Health
GPA	Grade point average
HALE	Healthy life expectancy
HBSC	Health Behaviour in School-aged Children (survey)
HE	Healthcare expenditure
HSM	Hello Sunday Morning
IARD	International Alliance for Responsible Drinking
IAS	Institute of Alcohol Studies
ICAP	International Center for Alcohol Policies

IHME	Institute for Health Metrics and Evaluation
KNHANES	Korean National Health and Nutrition Examination Survey
LY	Life year
MSDs	Musculoskeletal disorders
MUP	Minimum Unit Pricing
NCD	Non-communicable disease
NHANES	National Health and Nutrition Examination Survey
NHS	National Health Service
NIAAA	National Institute on Alcohol Abuse and Alcoholism
OECD	Organisation for Economic Co-operation and Development
OECD SPHeP-NCDs	OECD Strategic Public Health Planning for NCDs
PAHO	Pan-American Health Organization
PISA	Programme for International Student Assessment
PPP	Purchasing power parity
R&D	Research and development
RCT	Randomised Controlled Trial
RII	Relative index of inequality
RLMS	Russia Longitudinal Monitoring Survey
RR	Relative risk
RSOD	Risky Single-Occasion Drinking
SBIs	Screening and Brief Interventions
SDGs	Sustainable Development Goals
SES	Socioeconomic status
SKUs	Stock-Keeping Units
UN	United Nations
UNSD	United Nations Statistics Division
USD	United States Dollars
VAT	Value-Added Tax
WHO	World Health Organization
WHO-CHOICE	WHO CHOosing Interventions that are Cost-Effective

Infographic 1. Preventing harmful alcohol use

Mixed impact of COVID-19 on alcohol consumption

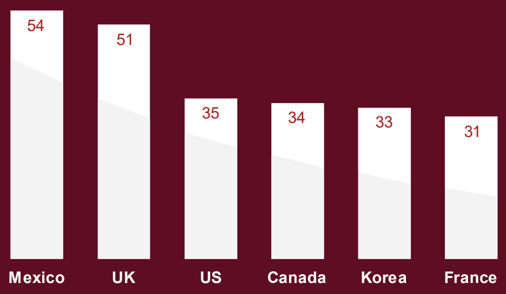
During the first COVID-19 lockdown, 43% of people reported that they drank more frequently; 25% said less frequently and 32% reported no change.*

Due to restrictions, sales of alcohol in bars and restaurants plummeted but were replaced by an increase in off-premise sales (e.g. online and retail stores).

*Average across 11 countries

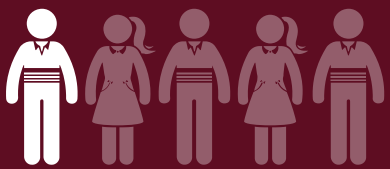
A large share of alcohol is drunk by a minority of drinkers

% of total pure alcohol consumption consumed by people who drink heavily*



*Heavy drinkers are defined as men and women consuming more than 40 or 20 grammes of pure alcohol per day, respectively, and make up between 4% to 14% of the population depending on the country.

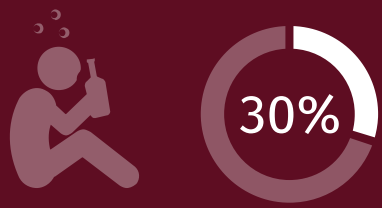
Drunkenness among adolescents remains a major source of concern



One in five adolescents have experienced being drunk (15 year-olds).*

*Average of 27 OECD countries

Binge drinking remains prevalent



On average across OECD countries, 30% of adults engage in binge drinking at least once a month. This corresponds to drinking more than 80% of a bottle of wine or 1.5 litres of beer per occasion.

Harmful alcohol consumption reduces life expectancy & is costly to society

On average across OECD countries, diseases and injuries from drinking more than 1 drink a day for women* and 1.5 drinks a day for men* cause:

- Life expectancy to be almost 1 year lower than it otherwise would be over the next 30 years.

- Medical treatment costs up to 2.4% of total health expenditure each year over the next 30 years.

*Lower-risk threshold specifically used for the simulation.

How to tackle harmful alcohol consumption

Sobriety checkpoints to counter drink-driving

Strengthening counselling in primary care

Alcohol advertising regulation

Ban on alcohol advertising to children

Minimum unit pricing targeting cheap alcohol

Alcohol taxation

Executive summary

This publication was finalised at the time when the COVID-19 crisis hit and when people's habits, including drinking habits, were deeply affected. Early evidence suggests that the crisis has triggered risky drinking behaviours in certain population groups. Some have been drinking more, some less; some have done more binge drinking, others have not. The long-term impact of the pandemic on alcohol consumption is uncertain, but the crisis has put the spotlight on some of the problems that can arise from its harmful use. Alcohol is usually part of social life, but harmful use of alcohol is relatively common; for instance, 30% of adults binge drink at least once a month. Harmful patterns of alcohol consumption cause important health, social and economic costs. Alcohol-related diseases and injuries incur a high cost to society. Life expectancy is nearly a year lower than it would be, on average, if people consumed a lower amount of alcohol. An average of 2.4% of health spending goes on dealing with the harm caused by alcohol consumption – and the figure is much higher in some countries. In addition, poor health due to alcohol consumption has detrimental consequences on labour participation and productivity.

Harmful alcohol consumption remains concentrated in certain population groups, including during the COVID-19 pandemic

Alcohol consumption in individuals aged 15 and over, calculated from recorded sales and unrecorded data, was estimated at 10 litres of pure alcohol per person in 2018 – this is equivalent to two bottles of wine, or nearly 4 litres of beer, per week per inhabitant in OECD countries. This level of consumption has shown little variation over the last decade. However, this apparent stability masks significant variations both across countries and, within the same country, across different population groups:

- **Harmful drinking patterns are highly concentrated.** Prior to the pandemic, nearly one in three adults in OECD countries had engaged in binge drinking at least once in the previous month; this corresponds to drinking more than 80% of a bottle of wine, or 1.5 litres of beer on a single occasion. In addition, alcohol is disproportionately consumed by a minority: people who drink heavily make up 4% to 14% of the population, depending on the country, but they consume between a third and a half of all alcohol consumed, according to an analysis of six OECD countries.
- **Harmful alcohol drinking among young adults is widespread.** More than 60% of teenagers aged 15 drink alcohol and one in five has already experienced drunkenness at least twice. Younger generations are less likely than a decade ago to have experienced drunkenness. Those who have never experienced drunkenness are 30% more likely to perform well at school.
- **Significant inequalities exist in patterns of alcohol consumption.** Certain population groups, such as women with high levels of education and individuals at the two extremes of the income distribution, are more likely to binge drink.
- **COVID-19 lockdowns have affected both drinking patterns and alcohol sales**. Survey data suggest that a higher share of population increased their alcohol consumption and frequency of drinking. Government data from a few countries suggest a 3% to 5% increase in alcohol sales. At the same time, however, a slightly higher share of the population reported a decrease in binge

drinking. People also changed the place of consumption: alcohol sales in on-licence premises (e.g. bars, pubs and restaurants) plummeted during lockdowns, while off-premise sales – and in particular online sales – grew significantly.

Alcohol-related diseases damage population health, health care budgets and the economy

According to OECD simulations, life expectancy is estimated to be almost a year (0.9) lower in the period 2020-50 due to medical conditions caused by drinking more than 1 drink per day for women and 1.5 drinks per day for men, which corresponds to a lower-risk threshold because at these levels alcohol may have some protective effects on specific diseases such as ischaemic cardiovascular diseases and diabetes for some age groups. In the same period, diseases and injuries caused by drinking above 1/1.5 drinks per day will cause 1.1 million premature deaths in OECD, European Union (EU27) and Group of 20 (G20) countries. Harmful alcohol consumption is also the cause of injuries such as road traffic crashes and interpersonal violence, foetal alcohol spectrum disorders and chronic diseases such as alcohol dependence, cancers and liver cirrhosis.

Drinking more than 1/1.5 drinks per day leads to additional costs for the health system. These account, on average, for 87% of all treatment costs for dependence, 35% of treatment costs for cirrhosis and a significant share of treatment costs for injuries, cancers and other diseases. According to simulations, on average over 2020-50 about 2.4% of annual health expenditure will be devoted to treating the diseases caused by drinking above this level. A total of USD 138 billion, adjusted for differences in purchasing power, will be spent annually on treating these diseases across the 52 countries included in the analysis (i.e. OECD, EU27 and G20 countries). This is equivalent to, for instance, the current health spending in Australia or more than twice the current health spending in Belgium.

Adolescents are particularly affected by harmful drinking. Adolescents who have experienced drunkenness show lower life satisfaction; they are up to twice as likely to bully their classmates; and they have lower performance at school, although the causal link cannot be asserted. Students with harmful drinking patterns are less likely to complete higher education, particularly in the case of girls. Lower education outcomes affect the formation of human capital, economic growth and social welfare, and worsen inequalities.

According to OECD simulations, diseases caused by drinking more than 1/1.5 drinks per day will lower participation in the labour market and damage labour productivity over the period 2020-50, reducing the workforce by an equivalent of 33 million full-time workers per year across the 52 countries analysed, or the equivalent of 0.62% of the total workforce on average across countries.

Combining the effects on life expectancy, health expenditure, employment and productivity, GDP could be 1.6% lower over the period 2020-50 in OECD countries due to diseases caused by drinking more than 1/1.5 drinks per day, according to simulations. To cover the increased fiscal pressure caused by alcohol-related diseases, each person pays an additional USD 232 in taxes (adjusted for differences across countries in purchasing power) per year in OECD countries.

Tackling harmful alcohol consumption is an excellent investment

Countries' policy responses to tackling harmful alcohol use can be improved by using the most effective intervention in each policy domain and by extending coverage. Too often, the implementation of policies "on the ground" and their effectiveness at the population level is hindered by poor implementation, limited resources or practical problems.

Tackling harmful alcohol consumption requires a combination of policy measures. Those can operate both at the population level (such as communication campaigns and pricing policies) and at the individual level, directly targeting individuals consuming high quantity of alcohol (such as drink-driving policies, counselling in primary care and personalised pharmacological treatment for dependence). All these interventions are effective and cost-effective, but combining them into coherent policy packages offers higher results than implementing single interventions in isolation.

For example, a package of policies built around the “PPPP approach”, including interventions such as limiting the promotion of alcohol to children, better police enforcement to prevent alcohol-related road traffic injuries, upscaling coverage of primary care counselling for patients with harmful alcohol consumption and pricing policies to limit the affordability of alcohol – particularly cheap alcohol, would:

- save 4.6 million life years annually across 48 countries; which broadly corresponds to, for instance, the total life years lost due to lung cancer in the United States each year, or the total life years lost due to cardiovascular diseases in Germany;
- save about USD 28 billion annually (adjusted for purchasing power) in health expenditure, broadly equivalent to 0.5% of health spending, which is equivalent to, for instance, the current health spending in Israel or half the current health spending in Sweden;
- generate savings that are greater than the implementation costs – for every USD 1 invested in a comprehensive policy package, up to USD 16 are returned in economic benefits.

Alcohol production and trade represent an important part of the economy in some countries. While alcohol industry revenues may be affected by policy measures, in either profitable or unprofitable ways, countermeasures exist to minimise additional costs. Comprehensive, well-designed policy packages associated with approaches to reduce consequences for the alcohol industry can get the expected health gains and limit any impact on the industry and related businesses.

While cost-effective, and with an excellent return on investment, measures to tackle harmful alcohol consumption will always require complex trade-offs – for instance, regarding their impact on the economy and the labour market, as well as which type of consumer the policy aims to target. For example, interventions targeting all consumers are highly effective and efficient, but they affect those to drink at low to moderate levels, as well as those who consume alcohol heavily. On the other hand, interventions targeting only people who engage in risky drinking have a significant short-term to medium-term impact on those people, but they have a lower impact at the population level and higher implementation costs.

Ultimately, it is up to each country to consider the most appropriate mix of policies to implement to address such trade-offs. This report provides detailed estimates of policy impacts both at the population level and in specific subgroups, thereby supporting an evidence-based approach to such decisions.

1 Addressing harmful alcohol use

Michele Cecchini and Marion Devaux

Harmful alcohol use is a pressing public health issue and a key driver of non-communicable diseases, injuries and premature deaths. This chapter brings together the main messages of this publication and describes the policy implications identified by new OECD analyses of the health, social and economic burden of alcohol-related diseases. It presents trends and projections for up to 52 OECD, Group of 20 (G20) and European Union (EU27) countries, and makes a strong economic case for upscaling investment in policies to tackle harmful alcohol consumption. The chapter presents the expected effectiveness, impact on health expenditure and return on investment for ten policy interventions and four policy packages aimed at addressing harmful alcohol use. It concludes by analysing the potential impact public health policies may have on the industry and approaches to mitigate costs.

Key findings

- While alcohol is highly valued by many consumers as a source of individual pleasure and social enjoyment, and its production and trade represent an important part of the economy in many countries, harmful alcohol consumption is among the leading risks to population health, causing many non-communicable diseases which, in turn, have wider detrimental societal consequences. Measures that governments can implement to address harmful alcohol consumption can target either all consumers or those that drink more heavily. Interventions targeting all consumers – such as alcohol taxation or regulation of advertising – are highly effective at the population level but, by affecting all people who drink independently of their level of alcohol consumption, they also involve interpersonal trade-offs in welfare. To the extent that policies to tackle harmful alcohol use require such complex trade-offs to be made, it is ultimately up to each country to consider the most appropriate mix of policies to implement. The work undertaken by the OECD seeks to provide evidence on the health and economic impacts of alternative policies to tackle this risk factor to help countries make these complex decisions.

Average alcohol consumption remained stable over the last ten years, but harmful patterns are highly concentrated

- Once both recorded and unrecorded alcohol consumption are taken into account, World Health Organization (WHO) data suggest that people aged 15 years and over in OECD countries drank on average 10 litres of pure alcohol per person per year in 2018 – equivalent to about 20 cl of wine or half a litre of beer per day. While average alcohol consumption in OECD countries changed little between 2010 and 2018, significantly different trends can be observed across countries. During this period, alcohol consumption increased most in Spain and Iceland, while it decreased significantly in Estonia and Lithuania.
- Harmful patterns of alcohol consumption remain highly prevalent in the OECD population. According to WHO data, 30% of adults engaged in binge drinking at least once in the previous month, while OECD analyses show that more than 60% of teenagers aged 15 years drink alcohol and one in five has experienced drunkenness at least twice in life. In addition, analyses of six OECD countries suggest that between a third and a half of all alcohol is consumed by people who drink heavily.

Alcohol-related diseases and injuries impose a significant burden on societies and the economy

- The OECD Strategic Public Health Planning for non-communicable diseases (SPHeP-NCDs) model shows that diseases caused by drinking more than 1 drink per day for women and 1.5 drinks per day for men will reduce life expectancy at birth by 0.9 years over the period 2020-50. By 2050, around 1.1 million premature deaths from alcohol-related diseases will occur in OECD, Group of 20 (G20) and European Union (EU27) countries.
- Drinking above the 1/1.5 drinks per day cap is responsible, on average, for 87% of all treatment costs for dependence, 35% of treatment costs for cirrhosis and 4% of treatment costs for injuries and cancers.
- According to the simulations, on average, OECD countries will spend about 2.4% of their total health expenditure on treating diseases caused by drinking more than 1 drink per day for women and 1.5 drinks per day for men, each year over the next 30 years. This is equivalent to USD PPP 61 per capita per year. In total, USD PPP 138 billion per year will be spent on treating these diseases across all the countries included in the analysis. This is equivalent to, for instance, the current health spending in Australia, or more than twice the current health spending in Belgium.

- Among teenagers, never experiencing drunkenness is associated with a 30% higher likelihood of performing well at school. Analysis of longitudinal datasets from New Zealand, the United Kingdom, the United States and the Russian Federation suggests that, in the long term, students who weekly drink alcohol may have lower educational performances and lower educational attainment, at least in some countries, and particularly in the case of girls.
- Individuals with medical conditions caused by drinking more than 1 drink per day for women and 1.5 drinks per day for men are less likely to be employed and, if employed, are likely to have reduced productivity. When reduced labour force participation and productivity due to alcohol-related diseases are converted into an economic value, OECD countries lose about USD PPP 595 billion per year. This is roughly equivalent to the annual gross domestic product (GDP) of Belgium or Sweden.
- Medical conditions caused by drinking more than the 1/1.5 drinks per day cap and their consequences on life expectancy, health expenditure, employment and productivity cause GDP to be 1.6% lower in OECD countries. They also exact a heavy toll on personal budgets, corresponding to about a 0.43 percentage point increase in total fiscal pressure, or USD PPP 232 per capita per year.

Gaps remain in the policy response to harmful alcohol consumption

- OECD countries can further upscale policy initiatives to tackle harmful alcohol consumption. Six categories of policy are usually implemented by countries, including modifying the cost of alcohol; modifying the availability of alcohol; countering drink-driving; regulating alcohol marketing; enhancing screening and brief interventions; and modifying consumption through consumer information. Once implemented, however, the level of implementation of policies “on the ground” and their effectiveness at the population level vary.
- Upscaling countries’ efforts to tackle harmful alcohol consumption – both by implementing new policy options and by strengthening policies currently in place – would bring health benefits to the whole population and save money. The choice of which types of intervention to implement remains with countries, based on a careful assessment of various trade-offs.

Policies to tackle harmful alcohol consumption are a good investment for countries

- Overall, the assessed policies may significantly reduce the burden of disease caused by harmful alcohol consumption and increase population health. The OECD microsimulation model shows that interventions targeting the whole population tend to have the largest impact, but these affect all people who drink – including those drinking at low/moderate levels – creating the need for trade-offs from policy-makers. Targeted interventions, such as alcohol counselling in primary care and personalised pharmacological treatment, have a significant short- to medium-term impact on people who engage in harmful drinking only. This can avoid some of the difficult trade-offs, but such interventions are less effective at the population level.
- Savings in health expenditure can be significant, ranging from USD PPP 207 billion (minimum unit pricing) to USD PPP 6 billion (workplace programmes) between 2020 and 2050 across all the countries included in the analysis.
- Combining interventions in “prevention packages” would return higher benefits. For example, investing in a mixed package to upscale policies already in place in many OECD countries – including regulation of advertising, sobriety checkpoints, alcohol taxation and alcohol counselling in primary care – results in a gain of 3.5 million life years per year across all 48 countries included in the analysis and saves about USD PPP 16 billion annually in health expenditure.

- Prevention packages to tackle the consequences of harmful alcohol consumption are a good investment for countries. By considering changes in population health, health and other government expenditure and labour force productivity, the OECD long-term economic model evaluates that for every USD 1 invested in any of the packages, economic benefits for countries vary between USD 1.4 and USD 16.4, depending on the policy package studied. Such public health policies may affect industry revenue, but countermeasures exist to minimise costs.

1.1. Harmful alcohol consumption is a major public health threat that can be prevented by effective policy action

During the last decade, per capita alcohol consumption in OECD countries largely remained stable, although some countries experienced significant shifts in consumption. Beyond average trends, the analyses identified some worrying statistics related to harmful alcohol consumption.[1] First, binge drinking is highly prevalent in OECD countries,[2] with 30% of adults engaging in heavy episodic drinking at least once in the past 30 days. Second, despite it being illegal in many countries, more than 60% of teenagers aged 15 drink alcohol, and one in five reported having ever been drunkenness at least twice. Third, large inequalities exist: alcohol consumption is heavily concentrated in specific population groups, such as women with a high level of education and individuals in the lowest and highest income groups.

Alcohol-related diseases such as cancers, cardiovascular diseases, injuries and alcohol dependence pose a serious threat to the economy of countries and to the budgets of their citizens. In total, USD PPP 138 billion per year is spent across the 52 assessed countries,[3] including OECD, Group of 20 (G20) and European Union (EU27) countries, on medical conditions caused by drinking above 1 drink per day for women and 1.5 drinks per day for men. In addition, the same chronic diseases negatively affect labour force productivity: individuals with at least one chronic disease are less likely to be employed in the following year and, if employed, are more likely to be absent or less productive. Similarly, children who have experienced drunkenness and initiate drinking at an early age show a lower likelihood of performing well at school. This can lower educational attainment later on, which in turn lowers the level of human capital in the future. All these factors combine to depress the social welfare and economy of countries, resulting in a total economic burden that may be vary between 0.2% (in Turkey) to 3.8% (in Lithuania) of gross domestic product (GDP).

More can be done to tackle harmful alcohol consumption and its associated conditions. Of the 52 countries included in the analysis, 41 have adopted a national written alcohol policy; among these, 19 countries have an aligning action plan to implement the national policy on alcohol. The vast majority of countries have also implemented comprehensive sets of policies consistent with the ten key areas of policy actions and interventions identified in the World Health Organization (WHO) *Global Strategy to Reduce the Harmful Use of Alcohol* (WHO, 2010[1]). However, the high health and economic burden caused by harmful alcohol consumption shows that there is scope to scale up efforts further. Too often, policy actions are not implemented in their most effective form, or are not uniformly implemented throughout the country. In other cases – such as interventions delivered by the health system – limited resources or practical problems limit their coverage.

Governments should consider upscaling efforts in a number of areas, chosen according to whether they want to implement population-wide policies or individual-level policies that specifically target high-risk individuals. These groups of policies have different characteristics, implementation costs and impacts on population health. Further, the decision to upscale action on any of these interventions also requires consideration of other trade-offs that often go beyond their public health impact. For example, the impact on the economy and the labour market, as well as which type of consumer the policy aims to target, should all be considered. The decision on where to strike a balance between population and individual approaches to alcohol policy must be left to individual governments. The work undertaken by the OECD provides detailed estimates of policy impacts both at the population level and in specific subgroups, thereby supporting an evidence-based approach to such decisions.

By using its microsimulation model – the OECD Strategic Public Health Planning for non-communicable diseases (SPHeP-NCDs) model – the OECD has calculated that scaling up action by increasing investments in highly effective "best practices" would have a significant impact on the health of the population and the economy. Greater results would be achieved by implementing packages of policies. For example, between 2020 and 2050, the most effective package – the mixed package plus- would prevent a total of 265 million cases of major chronic diseases across the 48 countries analysed,[4] including liver cirrhosis, cancers, cardiovascular diseases, injuries and cases of alcohol dependence, leading to a gain of up to 4.6 million life years (LYs) annually. Savings in health expenditure would equal around USD PPP 28 billion annually in the 48 countries studied. A healthier population and reductions in government spending on health would also improve labour market participation and productivity, with positive effects for the broader economy. While some of these public health interventions carry direct implications and costs for the alcohol industry, available evidence and new OECD analyses suggest that consumers may reallocate expenditure to other discretionary goods, possibly offsetting some of the broader economic implications of these policies.

1.1.1. Harmful use of alcohol: the size of the problem

On average, across OECD countries, a person aged 15 years and over consumes 10 litres of pure alcohol per year, which is roughly equivalent to two bottles of wine or nearly 4 litres of beer per week. Men consume more alcohol than women in all countries, with about a three-fold gender gap. Beer is the most consumed type of alcoholic beverage in OECD countries, corresponding to about 42% of all alcohol consumed; wine accounts for 29% and spirits, including all distilled beverages, for 23%. Among G20 countries the average alcohol consumption is lower, at 7.9 litres per capita. This is driven by a number of countries with very low levels of consumption, including Saudi Arabia, Indonesia, India and Turkey. On the other hand, the EU27 average is higher, at 11.3 litres per capita.

Per person alcohol consumption increases significantly when figures are related to the number of people who drink rather than the total population. On average in OECD countries, 32% of the population abstained from alcohol consumption in the past year, with women more likely to be abstainers than men (42% of women vs. 21% of men). In OECD countries, people who drink consume on average 15.4 litres of pure alcohol per year, ranging from 7.0 litres in Israel to 28.5 litres in Turkey per capita in 2018.[5] While the average consumption in G20 countries is lower, the per-drinker consumption is equal to the OECD at 15.4 litres per year per consumer. This is due to a number of countries (such as South Africa, Turkey, the Russian Federation and Brazil) where the number of people who drink is lower, but where those who do drink consume larger quantities than in other countries.

According to WHO data, per capita total alcohol consumption – including both recorded and unrecorded alcohol consumption – has remained stable since 2010, but large cross-country differences exist. Between 2010 and 2018, total per capita consumption decreased by 0.17 litres in OECD countries (from 10.18 litres to 10.01 litres), by 0.20 litres in EU27 countries (from 11.48 litres to 11.28 litres) and by 0.37 litres in G20 countries (from 8.24 litres to 7.88 litres). However, some countries that had high levels of consumption in 2010 have seen large decreases, including Estonia (-3.2 litres) and Lithuania (-2.0 litres). Conversely, about half of the countries analysed saw alcohol consumption increase; this increase was highest in Spain (+2.7 litres) and Iceland (+1.6 litres). Usually, across countries, men experienced a greater increase in alcohol consumption than women between 2010 and 2018.

It is still too early to understand any long-term effect that the COVID-19 pandemic may have produced on patterns of alcohol consumption. Nonetheless, early evidence would suggest that people modified their drinking habits during the first wave of the pandemic, with different population groups reporting either a decrease or an increase in alcohol consumption (Box 1.1).

Box 1.1. People modified their drinking habits during the first wave of the COVID-19 pandemic

At the beginning of 2020, the COVID-19 pandemic spread across the globe, leading countries to enforce national lockdowns. Emerging evidence shows that these lockdowns had an impact on people's lifestyles, including their drinking habits. While it is too early to say whether this impact will be temporary or long-lasting, some population groups reported either an increase or a decrease in alcohol use. Researchers have explored the impact of policies to contain COVID-19 on patterns of alcohol consumption through two types of data: market sales data and self-reported and survey-based data.

Analyses of alcohol market data show a collapse in on-premise markets (e.g. bars, pubs and restaurants) and an increase in off-premise markets (e.g. retail outlets, online) during the COVID-19 pandemic. For instance, off-premise markets for Belgium, Spain and the United States show a significant increase in sales, up to +234% in online sales in the case of the United States (Eurocare, 2020[2]; Nielsen, 2020[3]). Especially, alcohol e-commerce has increased in 19 countries (Australia, Brazil, Canada, China, Colombia, France, Germany, India, Italy, Japan, Mexico, Poland, the Russian Federation, South Africa, Spain, Thailand, Turkey, the United Kingdom, and the United States) (IWSR, 2020[4]).

Globally, considering both on- and off-premise markets, the overall alcohol market shows resilience, especially in a few countries (IWSR, 2020[4]), although an overall decline is pronounced in others, for instance in Switzerland (Movendi International, 2020[5]). Governmental sources monitoring sales – mainly for taxation purpose- show an overall increase in alcohol consumption, in a few countries for which data is available. For example, in the United States, data from 15 States suggest a 4.0% increase in the quantity of alcohol sold in the period January to August 2020, compared to the same period in the previous year (National Institute on Alcohol Abuse and Alcoholism, 2020[6]). German data suggest an increase in alcohol tax revenues of 3.3% in 2020, compared to 2019 (Bundesministerium der Finanzen, 2021[7]). Finally, in the United Kingdom, the provisional 2020-21 financial year to date totals for alcohol duty receipts show an increase by 4.5% compared to the same period in the previous year. More specifically, the beer and cider duty receipts decreased by 9.7% and 11.3%, while the wine and spirits duty receipts increased by 13.1% and 10.7% (HM Revenue and Customs, 2020[8]). Another study based on household purchases data in the United Kingdom found a 41% excess of alcohol purchases during the confinement relative to the preceding year, but no excess purchase once adjusted for expected normal purchases from on-licenced premises. Excess purchases, without these adjustments, were higher the lower the age of the main shopper and the higher the income (Anderson et al., 2020[9]).

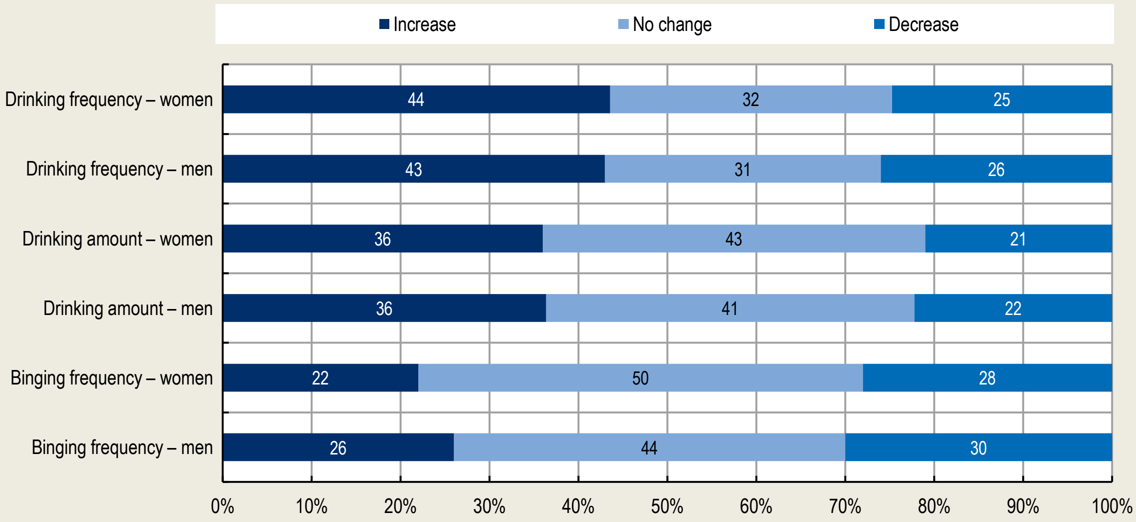
Self-reported data tend to be less accurate, but they usually facilitate better segmentation of the analysis by population groups. Data from national public health agencies in France and Belgium show that the closure of bars and restaurants during the lockdown was associated with an overall reduction in alcohol consumption, especially among young adults. In the same period, some other population groups (such as people aged 35-50 and parents of young children) reported higher than usual consumption (Gisle et al., 2020[10]; Santé Publique France, 2020[11]). Similarly, a study from the United States showed a significant increase in the frequency, but not the quantity, of consumption during the lockdown compared to the year before, especially among people aged 30-59, women and non-Hispanic White individuals (Pollard, Tucker and Green, 2020[12]).

A notable example of self-reported data is the Global Drug Survey special edition on COVID-19 (Winstock et al., 2020[13]), which was run for seven weeks between May and June 2020 and gathered responses from about 60 000 individuals across 11 countries (Figure 1.1). Findings from the survey show that:

- Overall, 31% of respondents did not report any change in their drinking frequency during the first lockdown, 26% had decreased frequency and 43% had increased frequency, with little difference across sexes. Half of women and 44% of men reported no change in the frequency of binge drinking.
- Among the individuals surveyed, 43% reported no change in the quantity drunk, while 21% had decreased consumption and 36% had increased consumption.
- The context of drinking alcohol has changed since before COVID-19: 75% of respondents declared drinking alone at home, with or without other people connected by calls or chats. Among these, 42% reported that they drank alone more often during the lockdown, while 39% reported no change and 19% reported drinking alone less often. Data also show large reductions in the proportion of people consuming alcohol at house parties, smaller gatherings, nightclubs and events.

Figure 1.1. Evolution of alcohol consumption after the first wave of COVID-19

Change in alcohol consumption since before COVID-19, average across 11 countries



Note: Data collected in May and June 2020 in Australia, Austria, Brazil, France, Germany, Ireland, the Netherlands, New Zealand, Switzerland, the United Kingdom and the United States

Source: Winstock et al. (2020[13]), *GDS COVID-19 Special Edition: Key findings report*, https://www.globaldrugsurvey.com/gds-COVID-19-special-edition-key-findings-report.

StatLink https://stat.link/28kopj

The averages presented mask significant inequalities both across countries and within the same country, across different population groups. The OECD has analysed the available data and identified trends and patterns suggesting that specific population groups are more likely to bear the bulk of the health, social and economic burden of harmful alcohol consumption. Specifically, the analysis focused on high-risk patterns of alcohol consumption, on alcohol consumption in underage individuals and on socio-economic inequalities by income and education levels. The analysis also used a sex lens to highlight inequalities.

1.1.2. People who drink heavily consume a large share of total alcohol, while almost one in three people in the OECD binge drink

Heavy drinking – drinking volumes of alcohol above guideline amounts – and binge drinking (or heavy episodic drinking) – drinking at least 60 grammes or more of pure alcohol in one single occasion – are considered particularly dangerous patterns of alcohol consumption as they carry additional risks. For example, people who drink heavily are at increased risk of developing alcohol dependence (CDC, 2020[14]), which affects 3.7% of the population in OECD countries or about 50 million people. Binge drinking increases the risk of injuries and has been shown to be a risk factor for heart disease, even when overall alcohol consumption is low to moderate (Rehm et al., 2003[15]).

New OECD analyses on micro-level data for Canada, England (United Kingdom), France, Korea, Mexico and the United States concluded that people who drink heavily make up only 4% to 14% of the population, but they consume between a third and a half of all alcohol. As these calculations are based on self-reported alcohol consumption – which is known to be considerably underestimated, especially in people who drink heavily (Boniface, Kneale and Shelton, 2014[16]) – the actual proportion of alcohol consumed by people who drink heavily is probably even higher. An additional set of analyses looking at the 20% of people who drink the most shows that this group accounts for 65% to 87% of all alcohol consumed. Results from the OECD analyses are broadly aligned with previous evidence showing that people who drink heavily generally consume the majority of all alcohol (see, for example, Livingston and Callinan (2019[17]); Richard et al. (2019[18])).

Binge drinking is highly prevalent in OECD countries, with 30% of adults having engaged in heavy episodic drinking at least once in the past 30 days. Prevalence of binge drinking is particularly high in Central and Eastern European countries. For example, 49% of the population in Lithuania engages in heavy episodic drinking at least once in 30 days (see additional analyses on regional differences in Box 1.2). Within countries, binge drinking is not uniform across the population: some groups are at higher risk. Specifically, as discussed in Section 1.1.4, women with higher levels of education and individuals in the lowest and highest income groups show the highest likelihood for binge drinking, while the middle socio-economic classes have the lowest rates of monthly binge drinking.

1.1.3. More than 60% of teenagers aged 15 drink alcohol and one in five has experienced drunkenness at least twice

OECD analysis shows that a significant share of teenagers aged 15 years have both drunk alcohol and experienced episodes of drunkenness. In addition to being illegal, drinking in childhood is predictive of future drinking – even after adjusting for family income and minority status, which are two well-known confounders. OECD analyses of longitudinal data from the United States found that among teenagers who drank weekly when aged 15-18, boys were 56% more likely and girls 121% more likely to drink weekly when aged 21-25 than peers who rarely drank during childhood. Even monthly drinking during childhood increased the risk of weekly drinking six years later by 49% in men and 79% in women. Findings from the OECD analyses on the US dataset are broadly confirmed by other analyses in the literature, which conclude that children who begin drinking are more likely to continue drinking at an older age.

Analyses of the 31 countries included in the 2017-18 wave of the Health Behaviour in School-aged Children (HBSC) survey[6] identified the following patterns:

- About one in five teenagers, both boys and girls, aged 15 years and attending school have experienced drunkenness at least twice in their life. Within the OECD, Iceland shows the lowest prevalence: 7% of both boys and girls reported experiencing drunkenness. Conversely, Denmark reported the highest percentages for both boys (37%) and girls (47%).

- Younger generations are less likely to experience drunkenness at age 15 than a decade ago; if they had been drunk, this had occurred at an older age, although differences are small. Over the period 2001-14, the average age of first drunkenness increased slightly from 13.7 to 14.0 years old in boys and from 13.9 to 14.2 years old in girls across 21 OECD countries.[7]
- Despite a small decline in the period 2014-18, lifetime alcohol use among adolescents remained high, varying from 64% in 2014 to 62% in 2018 among boys and from 64% to 63% among girls, on average across OECD countries.

Harmful patterns of alcohol consumption continue in young adulthood. On average across OECD countries,[8] monthly binge drinking is most common in the two youngest age groups (those aged 15 to 44), after which it becomes less prevalent with increasing age.

1.1.4. Women with a high level of education and individuals in the lowest and highest income groups are more likely to binge drink

Patterns of drinking across different socio-economic groups are not straightforward. The OECD analysis took into consideration both income and education levels, as well as the sex effect on these relationships, given that the literature generally finds different patterns.

Analyses focusing on the level of income found a U- or J-shaped curve relationship between income and the likelihood of binge drinking in many countries, and many see the lowest rates of monthly binge drinking in the middle socio-economic classes. On average in OECD countries, women and men are more likely to binge drink monthly if they are in the lowest or two highest income groups. Exceptions are Belgium, Canada and Slovenia, where a positive relationship between income and binge drinking is observed, with those in the highest income group most likely to binge drink monthly. France, Greece and the United States see a negative relationship, where people on a lower income are more likely to binge drink monthly.

Analyses focusing on binge drinking by level of education show inequalities that differ by sex. On average across 26 OECD countries, women with higher educational attainment are 13% more likely to engage in monthly binge drinking (14% of women with higher education binge drink monthly versus 12% of women without higher education). For men, however, roughly half of countries show an inverse relationship – those with lower educational attainment are more likely to binge drink monthly. Findings from both analyses should be interpreted in the light of the fact that data are based on self-reported alcohol consumption from national surveys, and may be subject to misreporting by the heaviest drinkers or some socio-economic groups.

Box 1.2. In European countries there is no clear north – south divide in terms of drinking patterns and outcomes, but Baltic countries bear the highest burden in term of both drinking patterns and health outcomes

Much attention has been paid to potential differences in drinking behaviours between countries in Northern and Southern Europe. While in the past, drinking patterns were considered very different between countries in Northern Europe – where alcohol was traditionally consumed less frequently but at higher levels – and those in Southern Europe – where heavy episodic drinking was less common – patterns of alcohol consumption have increasingly converged over the past 40 years.

An OECD analysis explored regional differences in patterns and outcomes of alcohol drinking across Europe and investigated the potential reasons behind these differences. The analysis covered five European regions: the Nordic, Eastern, Baltic, West-Central and Southern regions.[1] The main findings show that there is no clear geographical north – south divide in drinking patterns and outcomes. Rather, the picture is more complex:

- The Southern region countries show lower drinking levels, low prevalence of risky drinking patterns and smaller burden on health.
- The Nordic countries generally have relatively lower drinking levels and a lower burden on health, but they have relatively higher prevalence of alcohol dependence.
- The Baltic countries have the highest drinking levels, having experienced the sharpest increase in alcohol consumption over recent decades. They have relatively higher prevalence of alcohol dependence, and a higher burden on health.
- Countries in the Eastern and West-Central regions are globally in an intermediate position on these dimensions.

European countries have implemented a battery of policy actions to prevent harmful alcohol use, although the level of implementation varies. Notably, alcohol control policies are more stringent in Nordic countries and in Lithuania.

Beyond policy actions, other factors such as genetics, individual characteristics, socio-economic status and environmental factors – such as societal drinking norms – also influence drinking patterns and outcomes over the life course.

[1] The Nordic region includes: Finland, Iceland, Norway and Sweden; the Baltic region: Estonia, Latvia and Lithuania; the Eastern region: Bulgaria, Croatia, Hungary, the Czech Republic, Poland, Romania, the Slovak Republic and Slovenia; the West-Central region: Austria, Belgium, Denmark, Germany, Ireland, Luxembourg, the Netherlands, Switzerland and the United Kingdom; and the Southern region: Cyprus, France, Greece, Italy, Malta, Portugal and Spain.

1.2. Chronic diseases caused by alcohol consumption damage population health and the economy

While alcohol is highly valued by many consumers as a source of individual pleasure and social enjoyment, and its production and trade represent an important part of the economy in many countries, harmful alcohol consumption is among the leading risks to population health, causing many NCDs which, in turn, produce a detrimental effect on the global economy. Alcohol is a causal factor for more than 200 disease and injury conditions, including alcohol dependence, liver cirrhosis, some cancers and cardiovascular diseases, with differences by gender (WHO, 2018[19]). Globally, men drink more than women and bear the bulk of the burden of alcohol-related diseases and injuries, but alcohol affects women differently. Owing to biological differences, women have a higher risk of alcohol-related diseases such as liver diseases and breast cancer. Moreover, alcohol use can cause harm to others, as it can contribute to injuries resulting from violence, road traffic crashes and foetal alcohol spectrum disorders. However, the impact of alcohol consumption is not limited to the health of the general population. Harmful alcohol consumption also has important personal, social and economic consequences. First, treatment of patients with alcohol dependence and alcohol use disorders and other alcohol-related chronic conditions increases health expenditure. Second, students – young students in particular – with harmful patterns of alcohol consumption show a higher probability of lower academic performance which, in the long run, may lead to lower educational attainment; this negatively affects an individual's socio-economic status in adulthood and the human capital of countries. Third, alcohol-related chronic conditions affect individuals' productivity and workforce participation, with a negative impact on labour market outputs. At a macroeconomic level, all these dimensions negatively affect the GDP of a country and create the conditions for increased fiscal pressure.

The OECD carried out a comprehensive assessment of the health and economic burden of alcohol-related diseases in 52 countries, using the OECD SPHeP-NCDs model and the OECD long-term economic model (Box 1.3) to evaluate the impact of two different scenarios:

- A first scenario uses a ceiling of alcohol consumption at 1 drink per day for women and 1.5 drinks per day for men – that is equivalent to 12 grammes of pure alcohol per day for women and 18 grammes per day for men. In addition, this scenario assumes no binge drinking, as this has been shown to be a risk factor for disease even when overall alcohol consumption is light to moderate (Roerecke and Rehm, 2010[20]).[9] Throughout the rest of this chapter, this is referred to as the 1/1.5 drinks per day cap. To account for uncertainty on the possible protective effect of alcohol consumption on ischaemic cardiovascular diseases and diabetes, a sensitivity analysis on this scenario is also presented in Box 1.4.
- The second scenario calculates the total burden of alcohol-related medical conditions. For practical purposes, and following a standard approach, this is done by simulating a scenario that evaluates how assessed outcomes change resulting from a fictitious elimination of the risk factor and, consequently, of all alcohol-related diseases. Results for this scenario are discussed in Box 1.5.

Box 1.3. The OECD SPHeP-NCDs model – a tool to assess the medium- and long-term effects of harmful alcohol consumption

The OECD SPHeP-NCDs model is an advanced systems modelling tool for public health policy and strategic planning. It is used to predict the health and economic outcomes of the population of a country, or a region, up to 2050. The model simulates synthetic populations of 52 countries, including OECD member countries, G20 countries, EU27 countries and OECD accession and selected partner countries.

The model covers 12 categories of disease, including seven directly related to alcohol (alcohol dependence, cirrhosis, injuries, cancer, depression, diabetes and cardiovascular diseases). Incidence and prevalence of diseases in a specific country's population are calibrated to match estimates from international datasets. The links between alcohol consumption and diseases are modelled through age- and sex-specific relative risks retrieved from the literature and depend on both the volume and the patterns of alcohol consumption, as relevant (see Box 4.1 in Chapter 4).

The impact of harmful alcohol consumption on labour market outcomes is simulated through the effects mediated by chronic diseases, given that the evidence on the links between alcohol consumption and diseases, and between diseases and reduced labour force productivity is much stronger. While this approach is likely to be conservative (by disregarding, for example, the negative effect that heavy drinking can have on employment or productivity independently of any medical condition), the resulting findings rely on stronger evidence.

The model was used to simulate various scenarios, including the burden related to different levels of alcohol consumption (two scenarios described in Section 1.2) and policy scenarios (described in Section 1.4). Policy scenarios were modelled on evidence of the highest quality, which includes effectiveness of interventions at the individual level; time to the maximum effectiveness achieved and effectiveness over time; eligible population and exposure; and cost of running the intervention.

To assess the population-level impact of a scenario, model outputs were evaluated against a "business-as-usual" scenario, in which age- and sex-specific exposures to risk factors remain unchanged over 2020-50, and the provision of preventive and health services is implemented at the current levels, specific to a country. Comparison of the business-as-usual scenario and the analysis scenario returned the impact on health, health care expenditure and labour market outcomes. The impact on labour market outcomes was evaluated using the human capital approach, which is based on assumptions including, for example, those on reserve labour force, friction costs and the impact on reserve wages. To assess the uncertainty of the effectiveness of an intervention, a sensitivity analysis was undertaken to look at the variability of the estimates of the impact of the policy interventions.

Assessment of the long-term effects of a scenario (either policy scenario or the burden of different levels of consumption) on the whole economy was carried out by linking the OECD SPHeP-NCDs model and the OECD long-term economic model, which is a macroeconomic model. The two models are linked through changes in population structure and life expectancy, employment and productivity and health care expenditure to measure their impact on GDP and fiscal pressure. The calculation of the costs presented in this report does not take into account some dimensions. For example, the analysis does not include the following costs:

- the cost of justice (e.g. alcohol-related violence and injuries)
- expenditure on lobbying and litigation to avoid the implementation of policies incurred by the industry
- the cost to counter industry-led actions incurred by the government and civil society organisations
- the social burden of alcohol use related to, for example, unwanted teenage pregnancies and the long-term consequences of foetal alcohol syndrome
- broader factors related to social bonding and pleasure of drinking in moderation, maintenance of the landscape and vineyards, tourism and potential population resistance to stringent policy-making.

The analysis makes no assumptions about substitution effects from alcohol to other goods and services that could result from an intervention, which could mitigate the effects on the wider economy (e.g. tax revenues or employment).

For more information on the OECD SPHeP-NCDs model, see Box 4.1 in Chapter 4 and Box 7.1 in Chapter 7, and the SPHeP-NCDs Technical Documentation, available at: http://oecdpublichealthexplorer.org/ncd-doc.

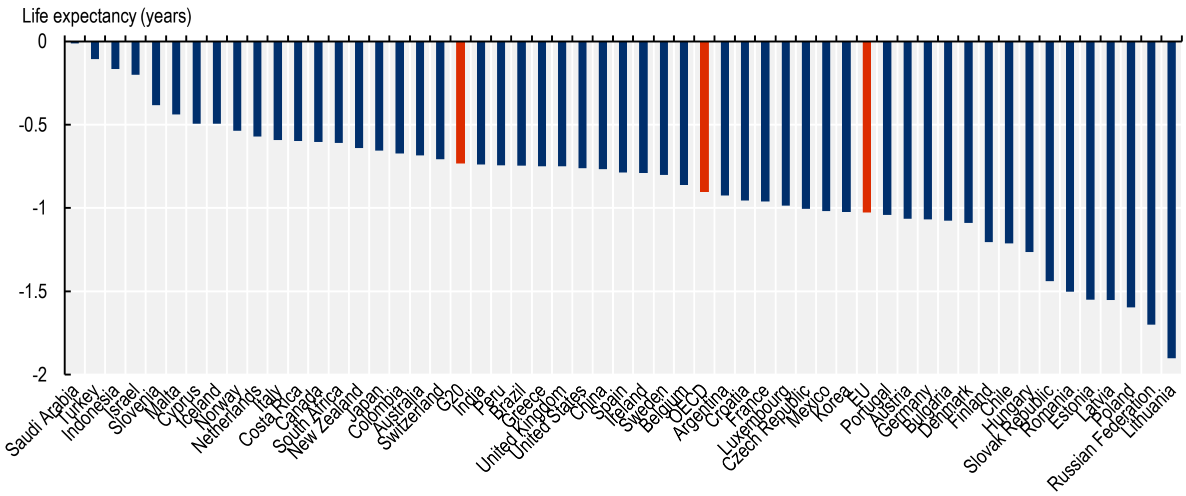
1.2.1. Alcohol-related chronic diseases worsen population health and decrease life expectancy

Alcohol-related medical conditions, including chronic diseases and injuries, produce detrimental long-term consequences and reduce the quality of life of the affected individuals. In addition, many of these conditions cannot be cured, and increase the probability of premature mortality. The burden of disease caused by drinking more than the 1/1.5 drinks per day cap is significant:

- Over the period 2020-50, diseases caused by this level of alcohol consumption will reduce life expectancy by about 0.9 years across OECD countries. In individual countries, life expectancy will be reduced by between 0.01 years in Saudi Arabia and 1.90 years in Lithuania (Figure 1.2).
- As many as 1.1 million people will die prematurely in OECD, EU27 and G20 countries by 2050. On average in OECD countries, 24 people per 100 000 population will die prematurely each year due to alcohol consumption above the 1/1.5 drinks per day cap. In the EU27, this average is higher, at 28 per 100 000, mostly driven by relatively high premature mortality rates in Central and Eastern European countries.
- Related diseases greatly affect a person's quality of life. Drinking above the 1/1.5 drinks per day cap causes 1.1 billion cases of dependence, corresponding to 88% of all cases. Similarly, this level of drinking is responsible for 38% of all cases of liver cirrhosis and 4% of all injuries.

Figure 1.2. Chronic diseases caused by alcohol consumption above the 1/1.5 drinks per day cap for women and men decrease life expectancy

Annual impact of alcohol consumption above 1 and 1.5 drinks per day for women and men, on life expectancy in years, average over 2020-50



Source: OECD SPHeP-NCDs model, 2020.

StatLink https://stat.link/vi6cj3

Not surprisingly, at the population level, the health burden (measured in terms of healthy life expectancy, an indicator capturing both the length of life and the quality of life) tends to be greatest in countries with higher volume and more detrimental patterns of alcohol consumption, such as Latvia and Lithuania, and lowest in countries with lower average consumption, such as Turkey and Israel.

The effectiveness of national health care services in treating the medical consequences of alcohol consumption can also influence the overall health burden. Effective health care systems can reduce complications and reduce fatalities, as in the case of certain cancers or cardiovascular diseases. For example, Canada and Iceland show a lower burden than other countries with similar levels of alcohol consumption, such as Estonia and Chile.

A further element to take into account is the contribution of other diseases not caused by alcohol (such as certain infectious diseases) in driving the total burden of disease in a country. For example, the burden of any alcohol consumption on liver cirrhosis is significant, but it can only explain a share of the total burden of cirrhosis across assessed countries. Other factors, such as viral hepatitis, would remain a significant driver of liver cirrhosis (particularly in countries where this group of infections is highly prevalent) even if all the cases linked to alcohol consumption were eliminated.

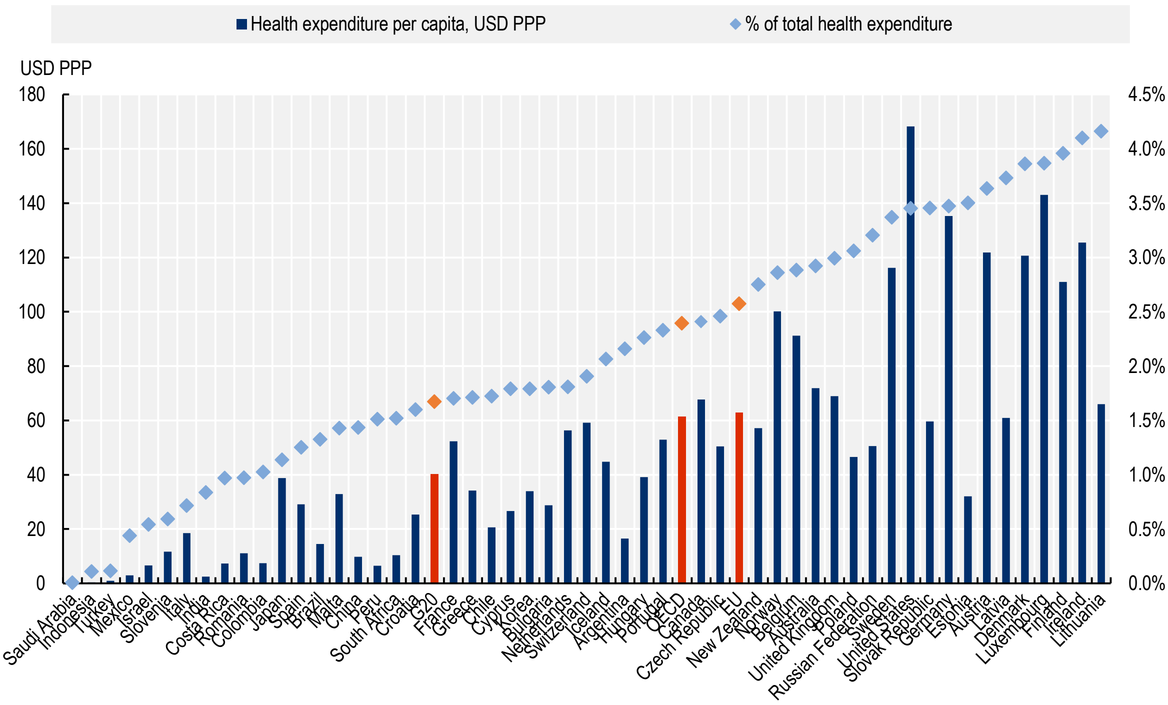
1.2.2. Alcohol-related diseases account for a significant share of total health expenditure

Previous analyses, using different methods, concluded that the impact of alcohol consumption on health expenditure would range between 1% and 7% of a country's total health expenditure. New OECD calculations, based on the most recent evidence and cross-country comparable data applied to the OECD microsimulation model, broadly confirm this range of estimates and extend analyses to a comprehensive set of countries. The OECD analyses show that drinking more than the 1/1.5 drinks per day cap will significantly increase health expenditure in 2020-50:

- In OECD countries, 2.4% of total health spending will be devoted to treating diseases caused by drinking above the 1/1.5 drinks per day cap. Lithuania will devote nearly 4.2% of health expenditure to this, while Turkey will devote 0.12% (Figure 1.3). In total, USD PPP 138 billion per year will be spent across all the countries included in the analysis (OECD and partner countries, EU27 and G20 countries).
- OECD countries will spend on average USD PPP 61 annually per capita. The United States (USD PPP 168 per capita), Luxembourg (USD PPP 143) and Germany (USD PPP 135) will spend the most (Figure 1.3).
- Drinking above the 1/1.5 drinks per day cap is responsible, on average, for 87% of all treatment costs for dependence, 35% of treatment costs for cirrhosis and 4% of treatment costs for injuries and cancers.

Figure 1.3. The impact of alcohol-related diseases on health expenditure

Annual health expenditure due to diseases caused by alcohol consumption above the 1/1.5 drinks per day cap, in USD PPP per capita and as a percentage of total health expenditure, average 2020-50



Source: OECD SPHeP-NCDs model, 2020.

StatLink https://stat.link/xnrvjd

Not all cross-country variability in alcohol-related health expenditure can be attributed to differences in patterns of alcohol consumption. The price of delivering health care services, the mix of health care services used and the share of the population with access to effective health care services are some examples of factors that play a role in modulating total health expenditure. For example, Ireland, Luxembourg and the United States show an alcohol-related health burden just below the OECD average but, at the same time, they rank among the top countries in terms of alcohol-related disease impact on health expenditure. Conversely, Romania and Mexico show an impact of alcohol-related diseases on population health that is significantly higher than the corresponding impact on their health expenditure.

Box 1.4. The burden of alcohol-related diseases on health expenditure is much higher if no protective effect is assumed on ischaemic cardiovascular diseases and diabetes

Analyses carried out with the OECD model used data from the Global Burden of Disease Study (GBD 2016 Alcohol Collaborators, 2018[21]) and accounted for a protective effect of alcohol consumption on ischaemic cardiovascular diseases and diabetes for some age groups. However, these effects are debated: some studies conclude that there is no protective cardiovascular effect once lifetime abstainers are separated from those who quit and do not drink for health reasons (Naimi et al., 2017[22]; Stockwell et al., 2016[23]). To account for this uncertainty around relative risks, a sensitivity analysis was carried out (only for OECD countries) to take out any protective effect. Results from the modified version of the model found that under the assumption of no protective effect of alcohol consumption:

- Any alcohol consumption continues causing greater population health harms compared to drinking above the 1/1.5 drinks per day cap. For instance, any alcohol consumption contributes to lowering life expectancy by 1.1 years, compared to 0.8 years for the burden of drinking above the 1/1.5 drinks per day cap.
- Medical conditions caused by any alcohol drinking lead to higher medical spending (USD PPP 58 per capita per year) compared to only drinking above the 1/1.5 drinks per day cap (USD PPP 52 per capita per year).
- Medical conditions caused by any alcohol drinking contribute to a higher loss of employment and productivity (USD PPP 506 per capita per year) compared to drinking above the 1/1.5 drinks per day cap (USD PPP 334 per capita per year).
- Estimates of the burden of any alcohol drinking obtained in the sensitivity analysis are higher than those in the analysis assuming some protective effects.

1.2.3. Harmful alcohol consumption negatively affects educational outcomes and human capital formation

The OECD analysed micro-level data for adolescents aged 11-15 in 32 countries and studied the association between performance at school and alcohol consumption. In many countries, adolescents who had never experienced drunkenness in their lifetime were more likely to report better performances at school. This was demonstrated, for example, by self-reporting of higher marks and lower probability of antisocial behaviours. Relationships are significant after controlling for mediating and confounding factors such as age, gender, family affluence, overweight categories and smoking status. Specific findings suggest that:

- Girls had a higher probability of good performance at school compared to boys when they had never experienced drunkenness in all countries but Portugal. However, if they had ever experienced drunkenness, girls performed less well than boys in a third of the countries (10 countries).
- An analysis of 29 OECD countries showed that from 2002 to 2014 the difference in school performance by drunkenness slightly widened among girls and remained constant among boys. Specifically, the data suggest a small but significant reduction in school performance among girls who had ever drunk and a stable trend among those who had never experienced drunkenness. Among boys, the trends in school performance were similar in both groups, maintaining a constant level of inequality.
- On average across countries, boys and girls who had never experienced drunkenness were 30% more likely to perform well at school. The largest inequalities were seen in Iceland, Spain and Italy

for boys, and in Iceland, Hungary and Belgium for girls. The lowest degree of inequality was observed in Denmark and Portugal for boys, and in the Czech Republic and Denmark for girls.

- Children who reported frequent drunkenness were twice as likely as those who never drank alcohol to exhibit antisocial behaviour with their classmates. In particular, 50% of boys who had experienced drunkenness 11 times or more in their lifetime reported bullying their classmates, compared to 24% among abstainers.
- Initiation of alcohol drinking was 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 was 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.

Alcohol use is also negatively associated with life satisfaction, particularly in the case of girls. Specifically, girls who had never drunk 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 never drunk alcohol. The association between life satisfaction and alcohol consumption is complex, and other unmeasured factors such as mental health problems and trauma may underlie both outcomes.

Alcohol consumption in adolescents may also produce long-term consequences for educational outcomes. Analysis of longitudinal datasets from New Zealand, the United Kingdom, the United States and the Russian Federation suggests that, in the long term, students with harmful patterns of alcohol consumption may have lower educational performance and attainment, at least in some countries and particularly in the case of girls. Specifically, the OECD analyses found the following relationships to be statistically significant:

- In the United States, monthly drinking was associated with a decrease in the grade point average (GPA)[10] one year later of 0.11 points for boys and 0.11 points for girls, and weekly drinking with a decrease of 0.19 points for boys and 0.20 points for girls compared to those who rarely or never drank. Binge drinking has an even greater association with GPA, as weekly binge drinking is 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 fortieth percentile.
- In the United States, girls who drank weekly were 21% less likely to complete higher education than those who rarely or never drank, and girls who binge drank weekly were 32% less likely to complete higher education.
- In the United Kingdom, girls reporting weekly drinking during high school were more likely to leave full-time education 0.35 years earlier than girls who never or rarely drank. In addition, both sexes reporting binge drinking more than once in two weeks saw a decrease in the number of years spent in full-time education, by 0.60 years for boys and 0.56 years for girls, compared to those who never binge drank.
- In New Zealand, weekly drinking was associated with a 0.56 year decrease in the age at which boys left full-time education.

Educational outcomes are key determinants for the formation of human capital and for the individual's future socio-economic status. Improving the cognitive skills of the population can lead to significant economic gains, and relatively small improvements to labour force skills can have a large impact on the future well-being of a nation.[11] In addition, differences in health and health behaviours, resulting from alcohol use at young ages, can also reinforce existing social inequalities; this 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, 2010[24]).

Alcohol use can influence educational outcomes through various pathways. First, alcohol use and related diseases (such as mental health issues) may have a direct biological effect on cognitive function and concentration at school – for example, by creating learning problems. Second, alcohol use can lead to behaviours that affect educational performance, such as lower attendance or commitment. Third, emotional or mental health factors related to alcohol use can affect educational performance. However, the relationship between alcohol use and educational outcomes is complex and multidirectional, and inverse relationships may also exist. 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.

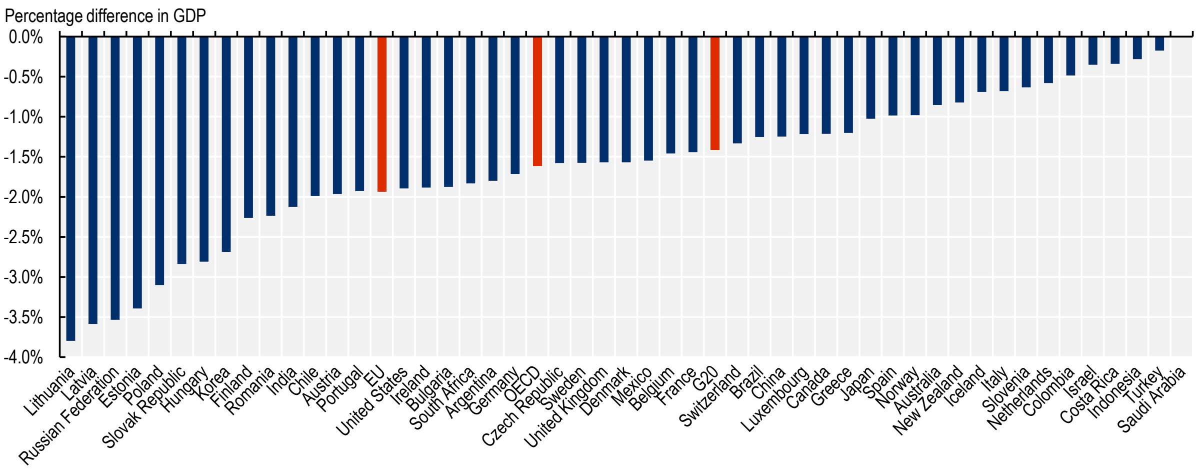
1.2.4. Chronic diseases caused by alcohol consumption damage labour force productivity, personal budgets and the economy

Individuals with chronic diseases, including those caused by alcohol consumption, are more likely to be unemployed and to miss days of work. Further, when they are at work, they are less likely to be productive than healthy individuals. The new OECD analyses looked at the relationship between alcohol consumption and chronic diseases and how chronic diseases affect labour force productivity (Box 1.3). The analyses showed that chronic diseases caused by drinking more than the 1/1.5 drinks per day cap affect the productivity of the labour force by reducing the workforce by the equivalent of about 33 million people per year: about 26 million due to reduced employment, 5 million due to presenteeism and 2 million due to absenteeism in all the countries studied. When all these effects are converted into an economic value using the human capital approach, OECD countries lose about USD PPP 595 billion per year. This is roughly equivalent to the annual GDP of Belgium or Sweden.

At the macroeconomic level, medical conditions caused by drinking above the 1/1.5 drinks per day cap and their broader societal consequences causes GDP to be 1.6% lower on average in OECD countries over the next 30 years (Figure 1.4). The impact on G20 countries is slightly smaller, with GDP 1.4% lower, but larger in 24 EU countries, at 1.9%. In absolute terms, and across all the 48 countries included in the analysis, this impact on GDP translates into a loss of about USD PPP 1.6 trillion per year from 2020 to 2050 – similar to the average annual GDP of Canada or Spain.

Figure 1.4. The impact of diseases caused by alcohol consumption on GDP

Percentage difference in GDP due to diseases caused by alcohol consumption above the 1/1.5 drinks per day cap, average 2020-50



Source: OECD analyses based on the OECD SPHeP-NCDs model and OECD long-term economic model, 2020.

StatLink https://stat.link/hrd8kv

Medical conditions caused by drinking above the 1/1.5 drinks per day cap and their broader societal consequences also exact a heavy toll on personal budgets. All these factors are responsible for a 0.43 percentage point increase in total fiscal pressure, measured as government primary revenue as a share of GDP. This is equivalent to an increase in tax rate of USD PPP 232 per capita per year in OECD countries. In Ireland, the OECD country experiencing the highest impact, the disease-mediated consequences of drinking above the 1/1.5 drinks per day cap cost more than USD PPP 573 per capita per year. Other countries that show a significant impact on fiscal pressure include the United States, Austria and Sweden.

Box 1.5. The burden of all alcohol-related diseases on population health, health care expenditure and the economy

Alongside the evaluation of the impact of alcohol consumption above the 1/1.5 drinks per day cap, the OECD models were used to calculate the impact of all alcohol-related diseases. This is not considered a policy option in itself; rather, an interesting thought experiment. The risk of some diseases such as alcohol dependence, cancers, cirrhosis and injuries is increased even at low levels of alcohol consumption, and this has an impact on other related dimensions, such as health care expenditure, labour force productivity and the economy. The OECD model calculated that cumulatively over the next 30 years in 52 countries:

- An extra 4.2 people per 100 000 population will die prematurely, causing a loss of an additional two months on the population's life expectancy. This is a 17% greater reduction in life expectancy compared to drinking above the 1/1.5 drinks per day cap.
- Compared to drinking above the 1/1.5 drinks per day cap, it is estimated that individuals will develop approximately 14% more cases of dependence (1 263 million cases) as well as 128% more cases of injuries (48 million cases) and 97% more cases of cancers (10 million cases).[1]
- The burden of all alcohol-related diseases on health expenditure will be USD PPP 40 per capita per year. The small protective effect of alcohol on ischaemic cardiovascular diseases (Box 1.4) and longer life expectancy are the main drivers explaining the difference between the two estimates.
- On average, all alcohol-related diseases will contribute to a loss in productivity equal to USD PPP 404 per capita annually. This is about 45% larger in magnitude than the USD PPP 278 economic loss resulting from the diseases attributable to alcohol consumption above the 1/1.5 drinks per day cap.
- All alcohol-related diseases will cause GDP to be 2.1% lower on average. This is greater than the 1.6% difference resulting from the diseases attributable to alcohol consumption above the 1/1.5 drinks per day cap.
- In the OECD, the tax rate will be 0.51 percentage points of GDP higher due to all the alcohol-related diseases. This is greater than the 0.40 percentage points of GDP found in the scenario looking at alcohol consumption above the 1/1.5 drinks per day cap.

[1] The OECD analyses do not take into account the impact of alcohol consumption on foetal alcohol spectrum disorder (FASD) and foetal alcohol syndrome, which are two highly crippling and prevalent conditions. For example, FASD is estimated at 19.8 per 1 000 population of children and young people in European countries (Lange et al., 2017[25]).

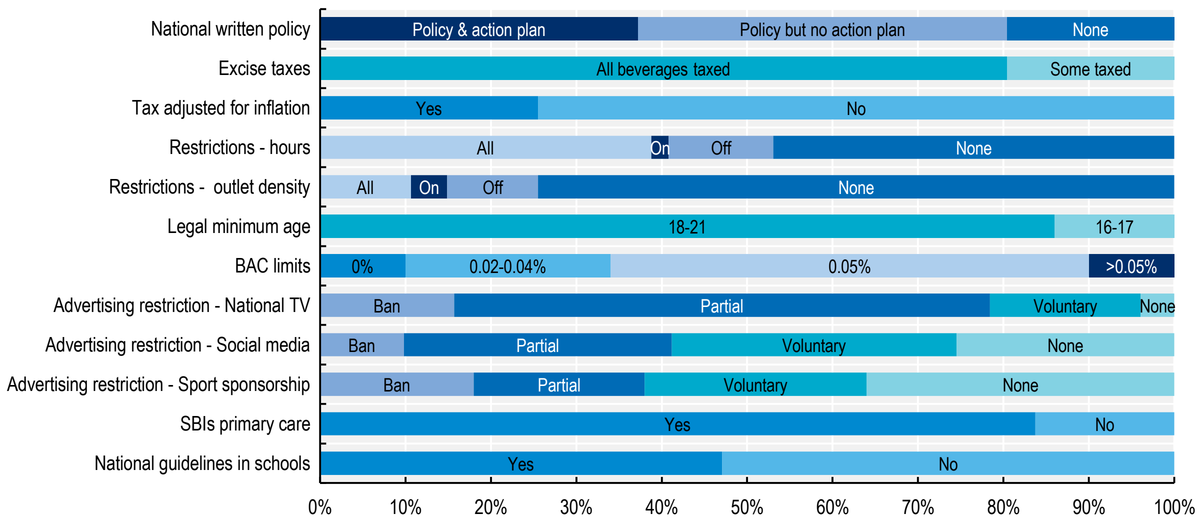
1.3. The policy response to harmful alcohol use can be improved by using the most effective intervention in each policy domain and by extending coverage

The rationale for government intervention to tackle harmful alcohol consumption is strong and has a global mandate. In 2010, WHO Member States agreed to the *Global Strategy to Reduce the Harmful Use of Alcohol* (WHO, 2010[1]), thereby recognising the issue as a key public health priority. As part of the Global Strategy, ten target areas were identified to assist national policy-makers with developing an effective, holistic policy response. More recently, given that harmful alcohol use is a key risk factor for NCDs, the Global Strategy played an important role in shaping the WHO Global NCD Action Plan 2013-20 (WHO, 2013[26]), which includes a specific global target to reduce harmful use of alcohol by 10%. Finally, the United Nations Sustainable Development Goals, as part of its target to ensure healthy lives and promote well-being (Goal 3), includes a target to reduce harmful alcohol use in line with the Global Strategy. Specifically, target 3.5 relates to strengthening the prevention and treatment of substance abuse, including alcohol.

At the national level, the fight against harmful alcohol consumption has advanced primarily around national action plans, sometimes developed on the basis of the WHO Global Strategy and relevant global action plans. The ability of governments to design, implement and monitor the effectiveness of prevention strategies, which combine different best practice policy approaches, is critical to success.

OECD countries can further upscale their policy action to tackle harmful consumption of alcohol. Of the 37 OECD member countries, 32 have a written alcohol policy in place, and almost half (17 countries) also have a specific action plan for their national policy (Figure 1.5). Similarly, the vast majority of G20 countries have a written alcohol policy, and South Africa is the only non-OECD G20 country that also has a national action plan.

Figure 1.5. Policies to tackle harmful alcohol consumption – summary of all countries



Note: The figure includes information for OECD countries, non-OECD European countries, non-OECD G20 countries and OECD accession countries. BAC = blood alcohol concentration. SBIs = screening and brief interventions. A similar figure, focusing only on OECD countries can be found in Annex Figure 1.A.1.Results do not include missing data.
Source: WHO (2020[27]) Global Information System on Alcohol and Health (GISAH), https://www.who.int/data/gho/data/themes/global-information-system-on-alcohol-and-health.

StatLink https://stat.link/mgtej5

Most OECD countries have implemented a wide range of policies to tackle harmful alcohol consumption. Despite this, the implementation of policies "on the ground" and their effectiveness at the population level are hindered by a number of factors. In some cases, policies are implemented in forms that are not the most effective or may not be uniformly implemented throughout the country. In other cases, the policy may not be implemented as intended. Finally, limited resources or practical problems may end up limiting the number of individuals that may benefit from the policy.

By reviewing available evidence and international datasets, OECD work has identified six categories of policy broadly implemented by countries. These domains include those within WHO's SAFER framework in addition to consumer information (WHO, 2018[28]):

- policies to modify the cost of alcohol
- policies to modify the availability of alcohol
- policies to counter drink-driving
- policies to regulate alcohol marketing
- policies to enhance screening, brief interventions and treatment
- policies to modify consumption through consumer information.

Given the complexity of tackling harmful consumption of alcohol, the review also identified that countries generally implement a set of complementary policies to create an environment that hinders harmful drinking. For example, since the mid-1990s, the Russian Federation has implemented significant policy reforms including policies targeting pricing, production, drink-driving, availability and advertising. WHO evaluated that, because of these reforms, between 2003 and 2016 alcohol consumption fell by 43%, with significant decreases in heavy episodic drinking (WHO Regional Office for Europe, 2019[29]). Alcohol dependence and mortality also fell markedly over this period; regarding the latter, rates of death attributable to suicide dropped by approximately 60%, homicides by approximately 80% and transport crashes by over 50%.

In the OECD, Ireland is among the countries currently in the process of reforming their alcohol strategy. In 2018, Ireland approved the Public Health (Alcohol) Act to reduce annual alcohol consumption by 2 litres per person by 2020. Example policies in the Act include minimum unit pricing (MUP); restrictions/bans on alcohol sponsorship during certain events; restrictions on alcohol advertising across different media and locations, as well on advertisement content; restrictions on promotions such as "buy one get one free"; and health labelling on alcohol products including energy value, alcohol content and health risks.

1.3.1. Policies to modify the cost of alcohol, such as taxes and MUP

Policies to modify the price of alcohol are among the most widely implemented interventions by OECD, EU27 and G20 countries, and may take a number of forms. Various forms of taxation, such as unitary tax (based on the size of the beverage), volumetric tax (based on the ethanol content) and ad valorem tax (based on the value of the beverage) have been used for many years, either in isolation or in combination with one another. MUP is a more recent policy intervention that aims to set a mandatory floor price per unit of alcohol or standard drink.[12] Finally, policies to increase the price of alcohol may take different forms such as bans on below-cost selling; bans on volume discounts; and minimum mark-ups and profit margins, which cap minimum profit margins for wholesalers and retailers.

An OECD review of policies to modify the cost of alcohol concluded that 80% of reviewed countries mandate taxation for all beverage types, with the remaining countries taxing only beer and spirits. Countries may also choose to combine taxes, as in Australia, where beer and spirits are subject to a volumetric tax and wine is subject to an ad valorem tax. In addition to excise taxes, alcohol products in all OECD countries are subject to a value-added tax (VAT), ranging between 7.7% (Switzerland) and 27% (Hungary). Only 27% of OECD countries periodically adjust alcohol taxes for inflation, while the remainder do not have an automatic system in place. Implementing such a mechanism is particularly important for unitary and volumetric taxes, as opposed to ad valorem taxes, as otherwise the impact of the excise tax decreases over time, contributing to making alcoholic beverages more affordable (Box 1.6). A common approach to ensure a periodic adjustment of the excise tax is to link it to consumer price indexes; this is done in Australia, Italy and Israel, among others.

In addition to such taxes, some governments have become increasingly interested in MUP. The main characteristic of MUP is that it specifically targets cheap alcoholic beverages. In addition, unlike taxes, it prevents retailers from absorbing the additional cost of production. Finally, MUP is particularly effective in targeting people with problematic drinking and young people, as these population groups are more likely to consume cheap forms of alcohol. Several countries have implemented MUP, including Canada (British Columbia, Manitoba, Newfoundland and Labrador, Nova Scotia and Quebec), one territory in Australia, the United Kingdom (Scotland and Wales) and the Russian Federation. An OECD analysis of the implementation of MUP in OECD countries found great variability across jurisdictions. Specifically, MUP was found to be USD 1.09-1.10 per standard drink in Scotland and Wales (United Kingdom) and between USD 2.26-3.42 plus taxes per standard drink in British Columbia (Canada), depending on the type of alcohol product.

Box 1.6. Alcohol affordability has increased significantly since 2010

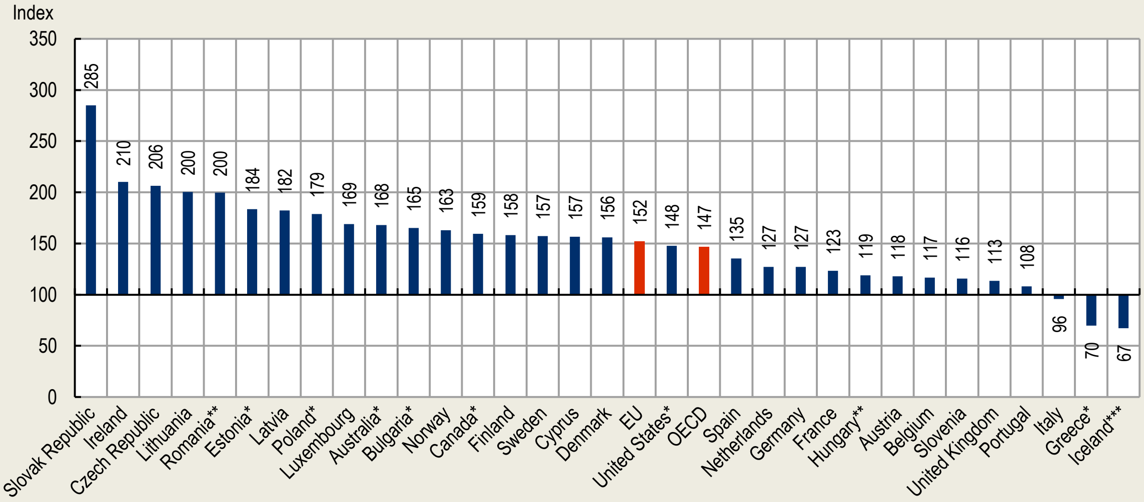
Alcohol affordability is a determinant of alcohol consumption and is affected by three key factors: income, the price of alcohol (which is influenced by taxation) and the price of other goods.

OECD analysed alcohol affordability in the off-premise market (e.g. supermarkets) across several European countries and Australia, Canada and the United States for the period 2000-18 (Figure 1.6). Findings from this analysis show that:

- Across the 28 OECD countries analysed, alcohol affordability in off-premise market increased by nearly 50% over the period. This means that in 2018, purchasing the same quantity of alcohol was on average 50% more affordable when compared to 2000, once changes in real income and the relative price of alcohol are taken into account.
- Alcohol became more affordable in the majority of countries, particularly among those located in Eastern Europe. Only three countries experienced a decline in affordability, by 33% (Iceland), 30% (Greece) and 4% (Italy).

Figure 1.6. Trends in alcohol affordability 2000-18 (or earliest and latest year)

Alcohol affordability index (index year 2000 = 100)



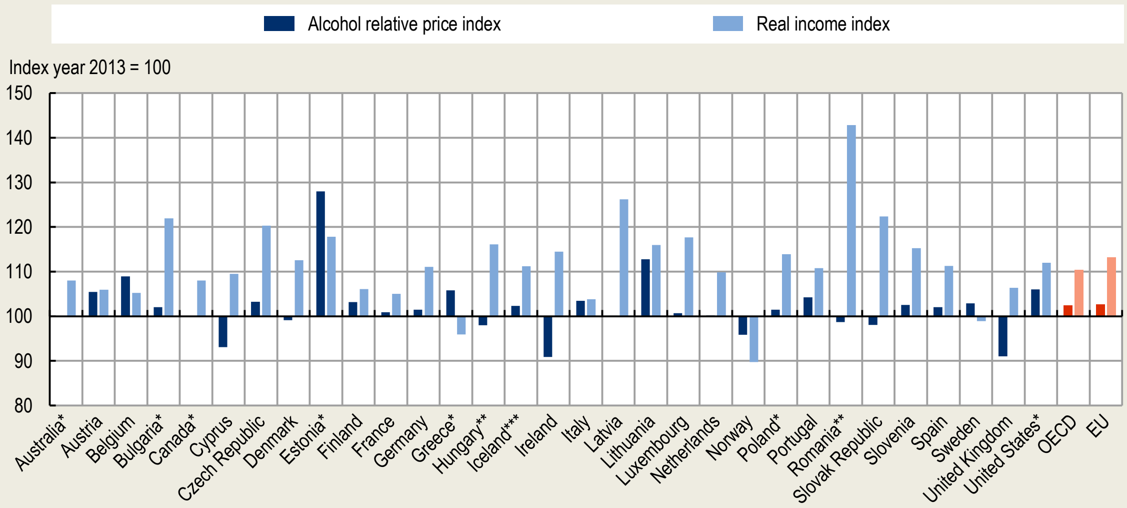
Note: An alcohol affordability value below 100 indicates that alcohol is less affordable owing to either (or both) a decline in real income or a rise in the relative price of alcohol, and vice versa. *Latest data from 2017, **starting year 2001, ***latest data from 2014. Missing data in Europe for Turkey, Switzerland, Croatia and Malta.

Source: Eurostat (2019[30]), Harmonised Index Of Consumer Prices: All items, https://ec.europa.eu/eurostat/databrowser/view/prc_hicp_aind/default/table?lang=en; Eurostat (2019[31]), Harmonised Index Of Consumer Prices: Alcoholic beverages, https://ec.europa.eu/eurostat/databrowser/view/PRC_HICP_AIND__custom_287314/default/table?lang=en; Eurostat (2019[32]), Adjusted Disposable Income, Gross, https://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do; Australian Bureau of Statistics (2019[33]), 6401.0 Consumer Price Index: Alcoholic beverages, https://www.abs.gov.au/statistics/economy/price-indexes-and-inflation/consumer-price-index-australia/dec-2019; Australian Bureau of Statistics (2019[34]), 6401.0 Consumer Price Index, All groups CPI, https://www.abs.gov.au/statistics/economy/price-indexes-and-inflation/consumer-price-index-australia/dec-2019; Statistics Canada (2019[35]), Table 18-10-0005-01 Consumer Price Index: Annual average, not seasonally adjusted, https://doi.org/10.25318/1810000501-eng; U.S. Bureau of Labor Statistics (2019[36]), Alcoholic Beverages in U.S. City Average: All urban consumers, not seasonally adjusted (series ID: CUUR0000SAF116), https://www.bls.gov/cpi/#data.

StatLink https://stat.link/gzonmy

- The main driver of alcohol affordability was examined for the period 2013-18. This period was chosen to limit the influence of the global financial crisis and the subsequent marked fall in real income. Nevertheless, the analysis found that rising real incomes were behind the increase in affordability in the majority of countries studied (i.e. growth in real income exceeded growth in the relative price of alcohol) (Figure 1.7). Exceptions, however, included Belgium, Estonia, Greece, Sweden and the United Kingdom. For example, in Belgium, real income rose by 5%, which was lower than the 9% increase in the relative price of alcohol, causing alcohol affordability to decline.
- Of the eight countries that saw a decline in the relative price of alcohol between 2013 and 2018, seven do not adjust their alcohol excise tax rate for inflation (including the United Kingdom, Ireland and Norway). Conversely, countries that do adjust for inflation – Australia, Belgium, Canada, France, Italy and Spain – experienced either no change or an increase in the relative price of alcohol.

Figure 1.7. Driving force behind trends in alcohol affordability, 2013-18 (or latest year)



Note: For the alcohol relative price index, a figure above 100 indicates that alcohol is more expensive, while for the real income index, a figure above 100 indicates that real income has risen. *Latest data from 2017; **starting year 2001; ***latest data from 2014. Data are missing for Croatia and Switzerland in Europe.

Source: Eurostat (2019[30]), Harmonised Index of Consumer Prices: All items, https://ec.europa.eu/eurostat/databrowser/view/prc_hicp_aind/default/table?lang=en; Eurostat (2019[31]), Harmonised Index of Consumer Prices: Alcoholic beverages, https://ec.europa.eu/eurostat/databrowser/view/PRC_HICP_AIND__custom_287314/default/table?lang=en; Eurostat (2019[32]), Adjusted Disposable Income, Gross, https://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do; Australian Bureau of Statistics (2019[33]), 6401.0 Consumer Price Index: Alcoholic beverages, https://www.abs.gov.au/statistics/economy/price-indexes-and-inflation/consumer-price-index-australia/dec-2019; Australian Bureau of Statistics (2019[34]), 6401.0 Consumer Price Index: All groups CPI, https://www.abs.gov.au/statistics/economy/price-indexes-and-inflation/consumer-price-index-australia/dec-2019; Statistics Canada (2019[35]), Table 18-10-0005-01 Consumer Price Index: Annual average, not seasonally adjusted, https://doi.org/10.25318/1810000501-eng; U.S. Bureau of Labor Statistics (2019[36]), Alcoholic Beverages in U.S. City Average: All urban consumers, not seasonally adjusted (series ID: CUUR0000SAF116), https://www.bls.gov/cpi/#data.

StatLink https://stat.link/zv2mq8

1.3.2. Policies to modify the availability of alcohol, such as legal minimum age and sales restrictions

Traditional policies under this heading include, for example, restrictions on hours and days of alcohol sales, restrictions on the density of alcohol outlets and minimum legal purchasing age. While different in their implementation, the objective of all these actions is to limit the opportunity for people to purchase and consume alcohol to specific hours of the day (or days of the week), to specific population groups or, finally, to a limited number of outlets in a given area. Restrictions may apply to on-premise (e.g. restaurants and bars) and/or off-premise establishments (e.g. liquor stores). In the case of restrictions on hours and days of alcohol sales, the intervention typically targets late-night drinking in order to reduce alcohol-related violence and injury or, in the case of sales restrictions during days, drinking during the weekend.

About half (53%) of countries included in the analysis restrict alcohol sales to specific hours; a similar proportion of countries apply no restrictions at all. Among countries implementing such a policy, the majority (73%) restrict sales in both on- and off-premise outlets, with another 23% of countries only restricting sales in off-premise outlets. The remaining 4% of countries instead restrict on-premise sales. Restrictions according to the day (such as on a public holiday) tend to be significantly less common. For example, in the OECD, just 11% of countries apply this restriction to both premise types, while 73% of countries apply no restrictions (the remainder of countries either have no data or apply restrictions to off-premise establishments only).

In addition to restricting hours and days of sale, policy-makers may also limit the number and concentration (e.g. by population size) of outlets in a given area with a permit to sell alcohol (for consumption on site or elsewhere). The sale of alcohol can also be restricted by the location and type of outlet, such as petrol stations. For example, as of January 2020, Lithuania has banned alcohol sales on beaches and pavilions, as well as during public events for drinks with an alcohol content above 7.5%. While recommended by WHO, restricting the number of outlets is only applied by a minority of countries. Only about one in four countries reviewed have some form of restriction on outlet density – either for on- and off-premise outlets (11%), or for on-premise (4%) or off-premise (11%) outlets only. Among OECD countries, Chile and Ireland restrict outlet density for on- and off-premise outlets, while in Canada responsibility for regulating outlet density lies with municipalities (with the exception of New Brunswick and Prince Edward Island for off-premise outlets). Jurisdictions with the greatest restrictions on outlet density are Quebec, Alberta, British Columbia, Manitoba and Yukon.

In all the countries reviewed, the legally mandated minimum age for purchasing alcohol ranges from 16 to 21 years, with 86% of countries setting the minimum threshold at 18 years or above. Among OECD countries, 84% apply the same threshold across all alcohol types. Country exceptions typically increase the minimum age by two years for spirits. For example, in Norway and Finland (off-premise), the minimum age is 18 for beer and wine and 20 for spirits.

1.3.3. Policies to counter drink-driving, such as enforcement of sobriety checkpoints or blood alcohol concentration limits

Policies to counter drink-driving are among the most common implemented by countries. A frequently applied policy is to set blood alcohol concentration (BAC) limits, given that for every 0.02% increase in the proportion of alcohol in a person's bloodstream, the probability of being in a fatal motor vehicle crash increases by approximately 70% (Taylor and Rehm, 2012[37]). However, BAC limits alone are not sufficient to alter behaviours and, therefore, to reduce alcohol-related crashes. Drivers must also believe that they are at risk of being identified and prevented from driving under the influence of alcohol. Therefore, other policies within this category aim to enforce BAC limits and to limit the possibility that people with a BAC above the threshold will drive a vehicle. Policy tools commonly employed by countries include sobriety checkpoints, penalties for drink-driving and, to a lesser extent, ignition interlock systems.

All countries included in the review enforce a BAC limit, but significant variation exists on the maximum limit. The majority of countries (56%) set the BAC limit at 0.05% for the general population; another 34% set BAC limits at lower than 0.05%. The highest BAC limit is 0.08% and is enforced in five countries: Canada, Mexico, Malta, the United Kingdom (with the exception of Scotland, which is set at 0.05%) and the United States (with the exception of Utah). Conversely, Brazil, the Czech Republic, Hungary, Romania and the Slovak Republic enforce a zero tolerance policy (i.e. the maximum BAC level is 0.00%). In addition, it is common for countries to employ lower BAC limits for novice or young drivers and professional drivers than for those in the general population. In the OECD, over half of member countries (21 countries) enforce lower BAC limits for professional and novice/young drivers. In these countries, BAC limits range between zero tolerance and 0.03% for professional and novice/young drivers.

Enforcement of sobriety checkpoints is also commonly employed. Sobriety checkpoints can be implemented in two forms. The first type – selective breath tests – consists of pre-determined checkpoints where police officers must have reason to believe the driver is under the influence of alcohol to test blood alcohol levels. Under the second type – random breath tests – drivers are selected at a random to have their blood alcohol level tested. With the exception of Mexico, all OECD member countries implement one or both sobriety checkpoints. To maximise their potential, it is important that sobriety checkpoints are widely publicised, highly visible and conducted frequently.

If drink-drivers are identified, they are subject to penalties or, in some countries, to compulsory participation in an ignition interlock programme. The majority of OECD member countries (33 countries) penalise drink-drivers by suspending or revoking their licence and/or imposing a fine. Long- or short-term detention is another common tool to punish drink-drivers (in 27 countries), and to a lesser extent vehicle impoundment, mandatory treatment and community service. Penalties typically become stricter for repeat offenders. Some countries also implement ignition interlock programmes, which require drivers to take a breath test to assess their blood alcohol level in order to start their vehicle. The review found that five OECD countries (Belgium, Canada, Denmark, France and certain states in the United States) currently penalise first-time drink-drivers with ignition interlocks; in some places (New Zealand and certain states in the United States) this penalty is used for repeat offenders.

1.3.4. Policies to regulate alcohol marketing, such as regulation of advertising and sponsorships

This category of policies includes all actions to regulate the promotion and marketing of alcohol products. The OECD review focused on some of the most common forms of regulation, particularly related to regulation of advertising on traditional media platforms (e.g. television, radio and print media) and new digital media platforms (e.g. social media), as well as on sport sponsorship. However, other forms of policy exist that target advertising through, for example, direct mail and product placement, which entails placing a specific product in another work – such as a film – with promotional intent. The policy-making process in this category is changing more rapidly than in other sectors, particularly in the case of new digital media, to follow the evolution of the technology.

Restrictions on marketing efforts – how, when and where they can be used and who they can target – are widely applied, although very few countries have comprehensive bans in place. Across analysed countries, 96% employ some form of restriction on alcohol advertising on national TV, and only two countries – Chile and Croatia (only for beer) – do not implement any restrictions. However, in the majority of cases, restrictions are implemented as either partial restrictions (i.e. the restriction applies during a certain time of day or for a certain place, or to the content of events) or voluntary restrictions (i.e. the alcoholic beverage industry follows its internal voluntary rules). Evidence regarding the effectiveness of voluntary restrictions indicates that young people are frequently exposed to alcohol advertisements under this arrangement (Noel, Babor and Robaina, 2017[38]). Specifically, 63% of the countries reviewed enforce partial restrictions, while 18% employ voluntary restrictions. Only seven OECD countries and one non-OECD G20 country (16% of the countries reviewed) enforce statutory bans. Active surveillance to monitor adherence to regulations also exists and is implemented by 35 of the 37 OECD member countries. In Australia, alcohol marketing is characterised as a “quasi-regulatory” system, with guidelines set by industry, advertising and government representatives. Similar arrangements exist in the United Kingdom, New Zealand and Japan.

During the last few years, the advertising landscape has altered significantly, with brands shifting their focus from traditional forms of media to digital media platforms, including social media. This is reflected by advertising expenditure – for example, in the United Kingdom, online advertising expenditure grew by 189% between 2007 and 2016; conversely, television experienced a 2% decline (Ofcom, 2017[39]). Despite this, fewer OECD countries have regulatory arrangements in place to limit alcohol advertising via social media compared to via traditional media. Further, where regulatory arrangements do exist, they are partial restrictions. The review of policies in place to limit advertising on digital media platforms found that 25% of countries do not have any regulation in place and that another 33% employ voluntary regulation. A further 31% of countries enforce partial bans, while only five countries (10% of the countries reviewed) have a statutory ban in place, including Lithuania, Norway and Turkey in the OECD.

The alcohol industry is a key sponsor of sporting events, sporting teams and individual athletes across the world, as this is a vast sector, providing high levels of exposure. In addition, available evidence shows that alcohol sponsorship in sport is associated with initiation of drinking for previous abstainers and higher levels of consumption among people who currently drink (Smith and Foxcroft, 2009[40]; Houghton et al., 2014[41]). In response to these concerns, 64% of countries reviewed have implemented some form of ban to restrict the alcohol industry's influence in sport. In the OECD, Spain, France, Norway and Turkey have implemented legally binding bans on sport sponsorship across all beverages. A further 17 countries apply partial or voluntary restrictions (e.g. restrictions on sponsoring sporting teams and/or sporting events), while 14 countries apply no restrictions.

1.3.5. Policies to enhance screening, brief interventions and treatment

The health system response to tackling harmful alcohol use mainly includes two types of policy, which aim to identify individuals with a real or potential problem with alcohol and to help them address the issue through motivation and/or pharmaceutical support. Screening and brief interventions (SBIs) is an example of this group of interventions. SBIs target people who consume hazardous amounts of alcohol that are identified through standard questionnaires (e.g. AUDIT, CAGE or FAST). Those identified as at risk receive further assistance via a brief intervention. Specialised treatment for people who are dependent on alcohol is another intervention in this category that specifically targets patients with alcohol use disorders, particularly in the most severe forms. The intervention entails more intensive treatment and pharmacotherapy.

Among the countries reviewed, 84% have developed and implemented national guidelines and standards of care for SBIs in primary care related to hazardous and harmful alcohol use. In the OECD, only three countries – Greece, Korea and the Slovak Republic – do not report SBI guidelines for alcohol use in primary care. Conversely, in some countries such as England (United Kingdom), SBIs are undertaken as part of a normal health check. In other countries such as Finland, Hungary, Latvia, the Netherlands, Portugal, Spain, Sweden and the rest of the United Kingdom, SBIs are also used in emergency departments and during obstetric visits. Outside the sector, SBIs are used by workplaces, particularly in fields where harmful alcohol use is dangerous to others (e.g. driving, public safety and national security roles), but these initiatives are often rolled out by the private sector and comprehensive mapping of their implementation is not possible. Finally, advances in technology are increasingly allowing replacement of traditional face-to-face interventions with digital interventions. For example, this is an approach being implemented in Australia.

One of the characteristics of this category of interventions is that they target populations at high risk and those that have already developed dependency without affecting individuals with low and moderate levels of alcohol consumption. Despite the high share of countries reporting the existence of guidelines for this type of intervention, their implementation on the ground has significant room for improvement. Finding recent data on the actual coverage is difficult but, for example, a WHO publication in 2009 concluded that less than 10% of the population at risk for harmful alcohol consumption are routinely identified, and less than half of those diagnosed are offered advice (WHO Regional Office for Europe, 2009[42]).

1.3.6. Policies to modify consumption through consumer information, such as warning labels and campaigns

Communication-based approaches are among the most widely implemented public health interventions by OECD countries, and may take a number of forms. For example, in the field of tackling harmful alcohol consumption, they can help consumers make informed purchases by providing relevant information on alcohol container labels. They can be employed as part of health promotion and social marketing campaigns, including through the use of mobile apps, aimed at increasing awareness and at changing patterns of alcohol consumption. They can also be used to support other disease prevention policies, such as aiding health education campaigns targeting schoolchildren and other population groups.

Information provided by alcohol container labels differs across OECD member countries, with no uniform approach applied. Generally, the review identified two main types of labels.

- Nutritional information aims to educate consumers on relevant nutritional aspects – mainly calorie content – of the specific alcoholic product. Across the OECD, only five countries have a national legal requirement to provide consumers with calorie information on all alcohol containers: Greece, Ireland, Israel, Mexico and Turkey. Several other countries have engaged, or plan to engage, in voluntary agreements with industry to provide this information. For example, at the EU level, signed memorandums of understanding committed representatives of the spirits industry to provide energy labels on 66% of all spirit containers and Brewers of Europe to provide energy labels on all beer bottles and cans by the end of 2022.
- Health warnings aim to inform consumers of the potential health risks associated with consuming alcohol. Health warning labels on alcohol containers are currently mandatory in 12 OECD countries (Colombia, France, Greece, Israel, Japan, Lithuania, Mexico, Norway, Korea, Portugal, Turkey and the United States), and are in the process of implementation in another three (Australia, Ireland and New Zealand). However, several other countries have voluntary arrangements in place.

While there is little evidence to suggest that mass media campaigns reduce alcohol consumption (Young et al., 2018[43]), they are a commonly implemented policy tool among OECD countries. Different forms of mass media campaigns exist and include those focusing on tackling drink-driving; those aiming to improve awareness and knowledge of the long-term risks associated with alcohol consumption; and those “challenging” people to abstain from alcohol for one month. Several other campaigns are also in use, including those targeted at short-term consequences (e.g. financial consequences or “hangovers”) and parental behaviour (e.g. educating parents on how their actions influence a child’s attitude towards alcohol).

Despite being illegal, it is common for underage schoolchildren to consume alcohol. This is cause of concern for many reasons, including – as discussed in Section 1.2.3 – poorer performance at school and lower life satisfaction. For reasons such as those outlined above, school-based drug prevention programmes are common across the countries reviewed: 47% have in place national guidelines regarding prevention and reduction of alcohol-related harm in schools. This figure increases to 51% when considering only OECD countries. If a country has no national school guidelines, however, it does not necessarily mean that students are not accessing alcohol prevention programmes.

1.4. Upscaling public health actions to tackle harmful alcohol consumption has a positive impact on population health and is an excellent investment for OECD countries

To tackle harmful alcohol consumption, countries should upscale their efforts, both by implementing new policy options and by strengthening policies currently in place. Drawing on available evidence, the OECD used its microsimulation model to assess the impact on population health, health expenditure and the broader economy of a comprehensive set of highly effective policy actions (Table 1.1 and Annex Table 1.A.1). The choice of policies modelled was based on a number of criteria, including the availability of quantitative evidence to feed the OECD model. In addition, these policies needed to be aligned with the WHO *Global Strategy to Reduce the Harmful Use of Alcohol* (WHO, 2010[1]) and, ideally, to be part of countries’ policy priorities. Finally, as far as possible, policies were selected with the objective of covering a multitude of targets and providing a comprehensive set of options, depending on countries’ policy priorities. For example, individuals with patterns of high-risk drinking are specifically targeted by health care policies and workplace-based programmes, and are highly responsive to MUP – given that they are more likely to consume cheap alcohol, which is specifically targeted by MUP. Children are instead most responsive to regulation of advertising, and are specifically targeted by school-based interventions. Injuries and violence are prevented particularly effectively by restrictions on outlet opening hours and sobriety checkpoints. Actions were also combined into four "policy packages", including both existing and innovative policies, to show the advantages of comprehensive strategies, in line with the discussion in Section 1.3. The analysis assumes that interventions are implemented at the beginning of 2020, and the impact of interventions is assessed for 30 years, up to 2050.[13] It covers up to 48 countries, including OECD countries together with other non-OECD EU27 Member States, Brazil, the People's Republic of China, Costa Rica, India, the Russian Federation and South Africa.

Simulation models like the one used in the OECD analysis have many strengths. They can provide evidence in areas in which direct empirical investigation may be difficult or impossible. However, they also require assumptions, and have to rely on a variety of input data, which may vary in terms of quality. Further, they simplify certain aspects by including in the calculation only particular dimensions, depending on the availability of high-quality data (see Box 1.3 above). Finally, outputs from models cannot replace the need for policy-makers to decide where to strike a balance between different policy options but, as in the case of this analysis, they can provide detailed estimates of policy impacts, thereby supporting an evidence-based approach to such decisions.

Table 1.1. Policy actions to tackle harmful consumption of alcohol included in the analysis

Regulation and/or restriction of alcohol	Pricing policies	Health care policies to advise and treat people	Health education and promotion
Restrictions on outlet opening hours	Alcohol taxation	Alcohol counselling in primary care	School-based programmes
Statutory ban on alcohol advertising to children	MUP	Personalised pharmacological treatment	Workplace-based programmes
Regulation of alcohol advertising			
Sobriety checkpoints			

1.4.1. Policies to tackle harmful alcohol consumption: What works and provides a good return on investment

Findings from the OECD microsimulation model show that all the assessed interventions have the potential to promote population health, produce savings in health expenditure and increase labour force participation and productivity. The return on investment is extremely high for many of the assessed policies. In some cases, however, the average return on investment across countries is below 1, meaning that each USD 1 invested in these policies produces an impact on GDP lower than the investment.

Pricing policies and some interventions to regulate and/or restrict alcohol (restrictions on outlet opening hours and sobriety checkpoints) consistently show the highest impact on the assessed outcomes. Three reasons may explain why these interventions are particularly effective. First, these are all population-wide actions, affecting a large share of the population: virtually all people who drink – not just those who drink heavily – in the case of price policies and regulation of opening hours. Second, some of these interventions have a specific focus on people who engage in high-risk drinking, as is the case for sobriety checkpoints and for MUP, which has a larger impact on people who engage in hazardous and harmful drinking. Third, interventions such as restrictions on outlet opening hours and sobriety checkpoints have a direct effect on injuries and assaults, which can produce long-term benefits – for example, in the case of young adults killed in car crashes.

Actions targeting either specific individuals (alcohol counselling in primary care and personalised pharmacological treatment) or specific population groups (e.g. individuals employed in medium-sized and large-sized enterprises through workplace-based programmes) target high-risk individuals and patients with either alcohol dependence or alcohol use disorders, and can produce a significant short- to medium-term benefit in those exposed to the intervention. An additional advantage of these interventions is that they do not affect other individuals, such as those that do not have dependence. As described in Section 1.3.5, these interventions currently cover only a very limited share of the potential beneficiaries, and there is great potential for improvement, even beyond the level investigated by this analysis. Among this group of interventions, upscaling coverage of alcohol counselling in primary care to cover 20% of people who drink heavily and who are not alcohol dependent shows the most positive impact on the assessed outcomes and, particularly, on containing health expenditure.

Finally, actions targeting children and regulation of advertising generally show the smallest impact over a 30-year period. While some of the actions targeting children are particularly effective (for example, statutory bans on alcohol advertising to children decrease underage drinking by 35%), they generally require longer periods to produce significant health effects at the population level, so the potential of these policies is not fully captured by an analysis over 30 years. In addition, for some of these interventions, such as school-based interventions, the evidence suggests no long-term effects after the end of the period of exposure (MacArthur et al., 2018[44]). In the case of regulation of advertising, this is an intervention entailing only partial restrictions – rather than a comprehensive statutory ban – limiting, but not avoiding, exposure to alcohol advertising.

Substantial health gains may be achieved by scaling up many of the assessed policies to the national level

Overall, the assessed policies may significantly reduce the burden of disease caused by harmful alcohol consumption, and may increase population health. The impact of actions on morbidity (measured in disability-adjusted life years – DALYs), taking into account how chronic diseases affect quality of life, is generally greater than their impact on mortality (measured in LYs), indicating that public health actions delay the development of chronic diseases to later in life, rather than preventing their development completely. Specifically, findings from the OECD microsimulation model show that:

- Interventions can have a very large impact on alcohol dependence and injuries. Between 2020 and 2050, up to 74 million cases of dependence can be prevented by MUP and up to 48 million cases of injuries by sobriety checkpoints. To put this in context, 74 million cases of dependence roughly correspond to 7% of all cases of alcohol dependency.
- Interventions such as increased taxation, MUP and sobriety checkpoints produce the largest health gains, resulting in between 1.1 million and 1.5 million LYs gained annually in the 48 countries included in the analysis.
- The effect of the interventions on DALYs does not decline over time, even after discounting, suggesting that these interventions have long-lasting effects, with future cohorts of people who will be also affected.

Many interventions have a significant impact on health expenditure, and MUP, taxation and restrictions on opening hours are cost-saving

An improvement in population health goes hand in hand with a positive impact on health expenditure. Although it might seem intuitive to expect that reducing the burden caused by harmful alcohol consumption will lead to a reduction in health expenditure, this is by no means guaranteed, since people avoiding alcohol-related disease conditions may still suffer from other competing diseases and/or accumulate additional health expenditure as a result of living longer. Nevertheless, the OECD model suggests that this is not the case for public health actions tackling harmful alcohol consumption, and all the interventions modelled contribute to a reduction in health expenditure. More specifically, the OECD model suggests that:

- All interventions have a significant impact on health expenditure, cumulatively saving between USD PPP 6 billion (workplace programmes) and USD PPP 207 billion (MUP) between 2020 and 2050 in the 48 countries studied.

- In terms of impact on health expenditure per capita, MUP and taxation can save about USD PPP 4 per capita per year, and counselling in primary care is the third most effective intervention on this dimension, producing savings equal to about USD PPP 1.4 per capita per year. All the other interventions produce average savings between USD PPP 0.1 and USD PPP 1.0 per capita per year.
- MUP, taxation and restrictions on opening hours are cost-saving, meaning that health expenditure savings significantly outweigh the intervention costs. For all the other interventions, the implementation cost is higher than the health expenditure savings in all countries, or – for advertising regulation and bans, counselling in primary care and sobriety checkpoints – in selected, mainly non-OECD, countries.
- A sensitivity analysis was carried out to test the uncertainty around these results. It confirms that MUP, taxation and restrictions on opening hours produce significant gains in DALYs while being cost-saving. Six of the other interventions are cost-effective, since they save DALYs at a cost below USD 50 000/DALY, a threshold often used to define cost-effective interventions in health. School-based and workplace programmes produce health gains at a cost above or close to the USD 50 000/DALY threshold (see Annex Figure 7.A.3 in Chapter 7).

All the interventions show potential to increase labour force participation and productivity, but the impact on early retirement is more limited

In addition to reduced health costs, implementation of the assessed policies also leads to a reduction of costs caused by suboptimal productivity of the labour force. By reducing the incidence of alcohol-related chronic diseases and injuries, all the interventions show potential to increase labour force participation and productivity, mainly through an increase in employment and reductions in presenteeism and absenteeism. It is calculated that taxation – the most effective policy action – would help bring an additional 809 000 people to the labour market through increased employment, while another 371 000 individuals would be "virtually" gained through decreased absenteeism and presenteeism. Overall, each year, this would correspond to up to USD PPP 31 billion in lost productivity that can be saved in all the 48 countries combined for this intervention. More than half of this sum would be produced by higher labour force participation, with another 37% due to labour force productivity. Reductions in early retirement can generally be considered a less important driver. In general, savings from avoiding reduced labour force productivity considerably exceed the savings from reduced health expenditure.

All the interventions are affordable, and in the majority of cases the return on investment is significantly greater than the implementation cost

Implementation costs vary substantially across interventions and countries. The cost of implementing the policy actions varies according to a number of factors, including whether the intervention aims to cover the whole population (e.g. price policies and regulation and/or restriction of alcohol availability) or aims to target individuals (e.g. health care policies to advise and treat people). The latter are generally more costly on a per capita basis. Other factors such as the involvement of specialised workforce (medical personnel or police) or of the private sector to deliver the intervention (as in workplace-based programmes) may also have an impact on total costs. Low-resource interventions cost from as little as USD PPP 0.05 to USD PPP 0.1 per capita per year, depending on the country and the characteristics of the interventions. More resource-intensive interventions can cost up to about USD PPP 5 per capita per year.

Implementation of the policies analysed in this report may also entail other costs, some of which may have to be directly disbursed by governments; in other cases, these costs may be borne by private entities, including individuals and the alcohol industry. Many of these costs are difficult to estimate because of poor evidence or the absence of publicly available data. Box 1.3 above reports a list of cost items that are not included in this analysis, while Section 1.5 discusses the potential impact that specific public health policies to tackle harmful alcohol consumption may have on industry revenues.

When all the costs and savings considered in the analysis are taken into account, the OECD model concludes that, consistently across geographical settings, the majority of the policy actions considered are a good investment for countries. Results from the analysis show that most investments in these measures completely pay for themselves and, in many cases, produce an effect on the economy of the countries and on the budget of their citizens that is significantly greater than their implementation cost. Policies are generally expected to contribute to an increase in GDP above trend for the 45 countries[14] analysed in the range of 0.001-0.055% annually, corresponding to an additional output of up to USD PPP 10-11 per capita per year for the interventions with the highest impact.

Further, the OECD microsimulation model found that for each USD 1 invested in the prevention of harmful alcohol consumption, there is a return of up to USD 183 in the form of total economic benefits (in terms of GDP) on average each year over the next 30 years. Figure 1.8 summarises the health and economic impact of the ten policy interventions studied and the four policy packages that are presented in the next section. When the calculation is carried out only by considering OECD countries, the return on investment is even higher, at up to USD 371 for each USD 1 invested (Annex Figure 1.A.2). More importantly, all the assessed policies prolong life, not just during a person's later years but also by keeping people healthy during the central part of their life and allowing them to do the things that they enjoy and that society needs.

Figure 1.8. Health and economic impacts of interventions to tackle harmful alcohol consumption

Average per year for the period 2020-50

Interventions and packages	DALYs gained per year (per 100 000 population), average across countries	Health expenditure saved per year (per capita USD PPP), average across countries	Additional full-time workers per year (in thousands of workers), total across countries	Return on investment (USD), average across countries
Workplace programmes	1.8	0.1	49	0.1
School-based programmes	3.3	0.3	40	0.2
Pharmacological treatment	6.1	0.7	72	0.7
Regulation of advertising	3.2	0.3	73	2.0
Ban on advertising to children	7.6	0.7	87	2.7
Counselling in primary care	18.4	1.5	339	4.3
Sobriety checkpoints	63.7	1.0	963	11.3
Restriction on opening hours	43.0	0.6	634	43.6
MUP	47.1	4.1	1038	125.6
Taxation	48.7	4.1	1179	183.4
Promoting individual responsibility package	90.7	3.3	1434	1.4
Availability restriction package	117.8	2.6	1761	10.4
Mixed package	136.5	7.1	2652	13.1
Mixed package plus	192.3	11.9	3851	16.4

Note: Estimates for the return on investment are the result of the total increase in GDP in the 45 countries produced by the policy, divided by the total cost of implementing the policy in these countries.
Source: OECD analyses based on the OECD SPHeP-NCDs model and OECD long-term economic model, 2020.

1.4.2. Combining policies into a coherent prevention strategy helps countries reach a critical mass with a greater impact

Combining public health actions into prevention packages provides multiple advantages. Harmful alcohol consumption affects population health and the economy through different pathways, and a number of factors underpin the development of unhealthy patterns of harmful alcohol consumption. A first substantial advantage of combining single actions into prevention strategies is that packages of interventions can address multiple determinants at the same time. In addition, packages can target different population groups simultaneously, producing better results for the whole population. Finally, policies within a package can interact with one another, sustaining positive behavioural changes in a more than additive fashion. As discussed in Section 1.3, countries are increasingly interested in implementing policy packages; the case of the Russian Federation provides interesting evidence of their impact. Analyses carried out with the OECD model take into account these first two components, but adopt a conservative assumption on the potential super-additivity of combining policies into packages, given the lack of robust data to model interactions.

Previous OECD work on tackling harmful alcohol consumption concluded that a multi-pronged strategy would provide a comprehensive, effective and cost-effective response to harmful alcohol consumption by addressing some of its key determinants. The strategy was nicknamed "the PPPP approach", based on the four key dimensions it aimed to address: promotion of alcohol to children; police to limit the negative consequences of harmful alcohol consumption on others (e.g. violence and traffic injuries); primary care to help patients with harmful alcohol consumption; and price to limit the affordability of cheap alcohol (Sassi, 2015[45]).

In this round of analyses, the OECD gauged the effect of four promising policy packages (Table 1.2):

- The mixed package broadly overlaps with the PPPP approach and focuses primarily on the most cost-effective interventions by upscaling their implementation. Actions included in this package are already implemented in many (but not all) countries included in the study, but with a lot of variability in terms of implementation and design.
- The mixed package plus considers the same policies included in the mixed package but boosts these with promising and innovative policies such as MUP and statutory bans on alcohol advertising targeting children.
- The availability restriction package focuses primarily on interventions to limit the accessibility of alcoholic beverages. This entails implementation of the most effective version of these interventions, scaling up interventions already in place.
- The promoting individual responsibility package focuses on interventions that are less intrusive for individuals and less politically sensitive to implement.

Table 1.2. Packages of policy actions to tackle harmful alcohol consumption included in the analysis

Mixed package	Mixed package plus	Availability restriction package	Promoting individual responsibility package
Alcohol taxation	Alcohol taxation	Regulation of alcohol advertising	Sobriety checkpoints
Regulation of alcohol advertising	Regulation of alcohol advertising	Sobriety checkpoints	School-based programmes
Sobriety checkpoints	Sobriety checkpoints	Statutory ban on alcohol advertising to children	Workplace-based programmes
Alcohol counselling in primary care	Alcohol counselling in primary care	Restrictions on outlet opening hours	Alcohol counselling in primary care
	MUP		Personalised pharmacological treatment
	Statutory ban on alcohol advertising to children		

The mixed package and, in particular, the mixed package plus produce the highest impact during the timeframe considered for the analysis (between 2020 and 2050) (Figure 1.8). Conversely, the package promoting individual responsibility would be about 50-90% less effective than the mixed package plus, depending on the explored outcomes. More specifically, the OECD model calculates that:

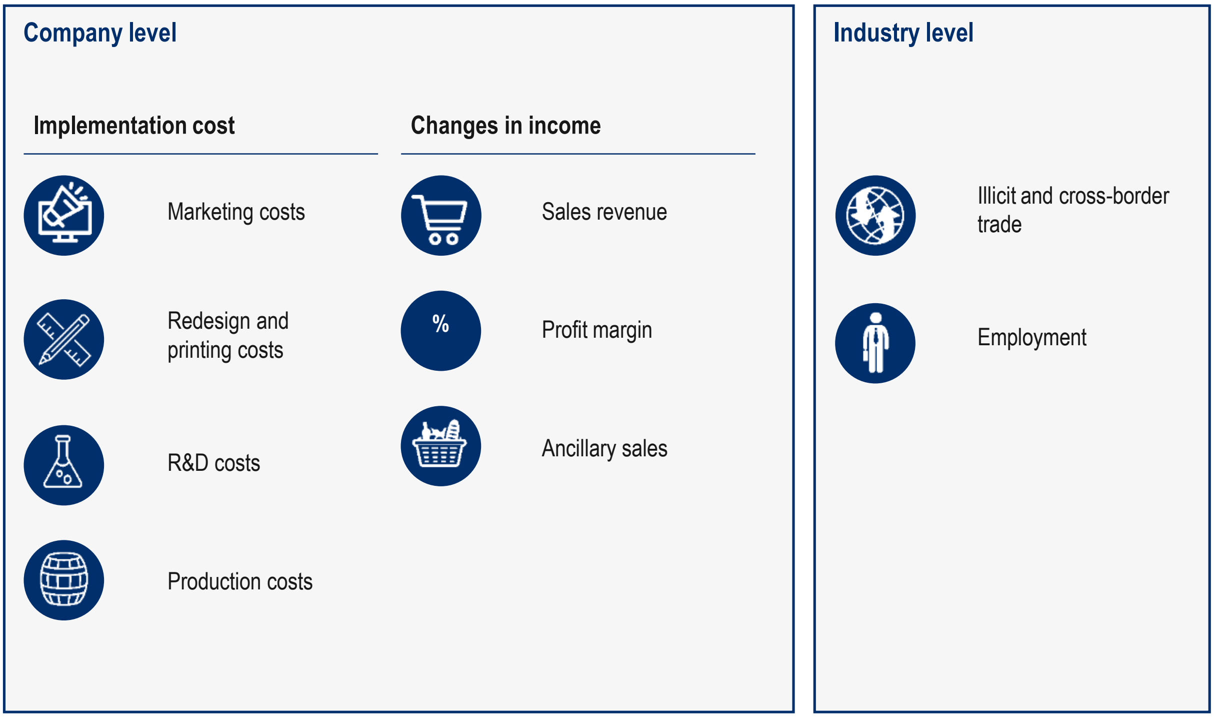
- Overall, for each USD PPP 1 invested in one of the policy packages, a return of USD PPP 1.4 to USD PPP 16.4 can be expected in the form of economic benefits. The return on investment is highest for the mixed package plus. The return on investment for OECD countries would be even greater, ranging from USD PPP 2.4 to USD PPP 30.9 for each USD PPP 1 invested.
- The return on investment for policy packages is lower than for some specific interventions. The implementation cost of policy packages is greater than the implementation cost for single interventions – in particular, for interventions entailing price increase and regulation (Annex Table 1.A.1). It should be remembered, however, that the return on investment is not the only dimension to consider when selecting interventions, and policy packages have much greater effectiveness (e.g. on population health) than single interventions; this is another dimension to take into account in the policy-making process.
- Up to USD PPP 28 billion in health expenditure can be saved annually across the 48 countries included in the study, following implementation of the mixed package plus. The mixed package produce savings of USD PPP 16 billion and the availability restriction package savings of USD PPP 4 billion.
- There is also a substantial impact on GDP, with the mixed package plus expected to increase GDP between 0.05% and 0.34% across the countries included in the study. The mixed package and the availability restriction package produce a lower effect, ranging from 0.03% to 0.21%. The promoting individual responsibility package would have the lowest impact, ranging from 0.01% to 0.11%.
- Each year, the total labour force of the 48 countries included in the analysis would increase by an equivalent of about 3.9 million employees from the mixed package plus, 2.7 million from the mixed package, 1.8 million from the availability restriction package and 1.4 million from the package promoting individual responsibility, owing to increased labour force participation and productivity. Overall, the output of the labour force increases by between USD PPP 22 billion (promoting individual responsibility package) and USD PPP 90 billion (mixed package plus) per year.
- All the packages would lead to a gain in LYs every year: 4.6 million LYs from the mixed package plus, 3.5 million LYs from the mixed package, 2.6 million LYs from the availability restriction package and 2.2 million LYs from the promoting individual responsibility package. The four packages would also save between 4.3 million and 8.4 million DALYs per year in all modelled countries.

1.5. Public health policies may affect industry revenues, but countermeasures exist to minimise additional costs

Public health policies to reduce harmful alcohol consumption carry direct implications for industry and business, particularly in the case of the alcohol industry. Consisting of alcohol producers and both off- and on-trade vendors, the alcohol industry can be required to change a marketing strategy, invest in research and development (R&D) or change production methods, which can result in implementation costs. Policies can also affect the income of companies directly, as they may change sales revenues, profit margins or ancillary sales. In some cases – as, for example, with MUP – policies may actually may have a positive impact on industry by providing additional revenues. At the industry level, policies may have an impact in terms of illicit and cross-border trade and on employment. Finally, alcohol policies may have a broader impact on other industries, as individuals’ income not spent on alcohol products may be used for other purposes.

The OECD reviewed factors that may affect industry revenues following the implementation of public health actions to tackle harmful alcohol consumption (Figure 1.9). Overall, costs to industry are difficult to calculate, given the lack of publicly available data. Moreover, this analysis was not able to identify sound evidence on certain dimensions, such as expenditure on lobbying and litigation to avoid the implementation of policies incurred by the industry and others. Based on information available in the academic literature or government publications, the review did not find evidence indicating that costs to industry outweigh costs caused by harmful alcohol consumption.

Figure 1.9. Overview of the impact of public health policies on the alcohol industry



1.5.1. Alcohol policies may trigger implementation costs such as changes in packaging and marketing strategies as well as R&D costs

Any policy that affects alcohol products based on the amount of alcohol they contain may lead alcohol producers to reformulate their products. Changes in advertising regulations or pricing policies may require companies to modify their packaging and marketing strategies. The most important cost items that result from these policies are changes in marketing and advertising spend; redesign and printing costs; investment in development of techniques to lower the alcohol content of beverages; and changes in production costs. Additional compliance costs may also be associated with employing staff or consultants to work on regulatory compliance, administration and reporting. The OECD review looked at all these dimensions.

Policies that change the regulations around alcohol marketing – such as advertising restrictions and policies that restrict competition on price – may cause alcohol companies to develop a new advertising strategy, change their product portfolio or divert marketing funding to other channels. Accordingly, industry may have to spend money on advertising agency fees (or commit time internally) to review and redesign marketing strategies. Changes in advertising regulations may also force companies to switch to other marketing channels. However, in specific cases, it has been shown that current advertising practices may be adapted to meet new standards (for example, targeting an older audience or airing at a different time), without affecting the cost (Ross, Sparks and Jernigan, 2016[46]).

Price policies such as taxes or minimum prices may result in costs for vendors for changing menus and price displays – in terms of both printing and labour costs. However, where prices are displayed on shelves, digitally or on single-use paper menus, these costs may be minimal. Similarly, the introduction of warning labels on alcohol containers can incur redesign and printing costs. In 2020, Food Standards Australia New Zealand (FSANZ, 2020[47]) estimated the average cost per stock-keeping unit for including a pregnancy warning label at AUD 4 924 (USD 3 420). This cost could be lowered for companies that voluntarily change labels once a year or more, as mandatory label changes can be combined with voluntary changes.

If producers decide to respond to new policies by reducing the alcohol content of their products, they have to invest in R&D, and may incur higher production costs. While many techniques for producing lower-alcohol products exist, producers need to experiment to find the right approach for their product. This includes costs for consumer testing of new products, as taste remains one of the main issues for the acceptability of lower-alcohol products. In the production phase, the reformulated product may also entail higher production costs, depending on the type of process used to produce the lower-alcohol beverage. For example, the cost of buying a reverse osmosis machine to lower the alcohol content may vary between USD 30 000 and more than USD 2 million. In Australia, the cost to rent an alcohol removal machine was estimated at AUD 0.10 (USD 0.07) per litre to reduce the alcohol content by 1%.

1.5.2. Alcohol policies designed to reduce consumption directly affect the earnings of alcohol industry

Many alcohol policies are designed to reduce the consumption of alcohol; they therefore affect the earnings of the industry. However, the impact of policies on the industry can differ widely. For example, taxes can affect either sales or profits; price policies have different impacts on off-trade and on-trade vendors; minimum prices and reformulation may actually increase income for the industry; and a reduction in sales of alcohol products can lead to a reduction in sales of other products.

The impact of taxation on alcohol producers and vendors is strongly dependent on the amount of tax they decide to pass on to consumers through higher prices – the pass-through rate. If the tax is not passed on to the consumer, industry covers the cost by reducing its profit margin. Conversely, if the industry passes on the tax, sales are likely to be lower. Factors that affect industry's choice between these two options include the expected response of consumers, the competitiveness of the market and negotiations between producers and vendors, based on their relative bargaining power.

Within the industry of alcohol vendors, policies such as sales restrictions and price policies may affect off-trade and on-trade vendors differently depending on their design. For example, taxation is likely to have a greater impact on off-trade than on-trade sales, as price elasticity is generally greater in off-trade. Similarly, MUP has a greater impact on off-trade vendors as on-licence prices are between two and four times higher than for the off-trade (Rabinovich et al., 2012[48]).

Among alcohol producers, minimum prices can be expected to benefit both premium brands and low-priced products, although through different mechanisms. One the one hand, the increase in price for products at the low end reduces the price gap with higher-priced, premium products, making them more attractive. On the other hand, increased income from minimum prices remains with the industry, and the higher price charged in low-priced products may partly or completely offset the losses in sales. For example, a study for the Welsh Government looking at a GBP 0.50 (USD 0.60) MUP showed a decrease in consumption of 3.6% across the population (with, importantly, the greatest effect among people who engage in harmful drinking), but a 1.4% increase in spending (Angus et al., 2017[49]).

1.5.3. Alcohol policies may also have a broader impact for the whole alcohol industry and beyond

In addition to the company-level impacts discussed above, alcohol policies can also affect the industry as a whole. Stricter regulation of price or availability may lead to an increase in unrecorded alcohol sales, such as illicit sales or cross-border trade. Policies that affect the alcohol industry can have consequences for employment in this sector. In addition, other alcohol policies such as advertising restrictions may also have an industry-level impact on competition between companies – in particular, in the case of smaller companies and new entrants. While any impact greatly depends on the competitive landscape and alcohol market in each country, as well as the specifics of the policy, previous OECD work recommends that policy-makers should consider how any new regulation may affect the competitive process (OECD, 2020[50]).

Policies such as taxation and those modifying the availability of alcohol may make illicit products seem more convenient or more available. Ineffective enforcement of policies, including inadequate penalties for activities related to illicit alcohol and corruption, also play a role in enabling illicit trade of alcohol products. The amount of unrecorded alcohol consumption in OECD countries is estimated at 1.4 litres per person per year, corresponding to 14% of total annual consumption. Illicit sales reduce income for the industry and, through avoided taxation, negatively affect government revenues (OECD, 2016[51]). For example, in the EU27, the sale of counterfeit wine and spirits was estimated to result in an annual loss of EUR 2.7 billion in sales for the industry, and EUR 2.2 billion in tax revenue and reduced social security contributions for governments (EUIPO, 2018[52]). In addition, where taxes or regulations are introduced in one country only, or where they are significantly higher or stricter than in other countries, this may contribute to an increase in cross-border trade.

Reductions in employment levels in the alcohol industry are likely to be offset by growth in employment in other industries. Changes in alcohol sales as a result of price policies or any other policy aimed at reducing alcohol consumption could lead to a loss of employment in the alcohol industry. However, the displacement of demand and jobs could cause employment in other industries to grow. For example, evidence from previous – mostly modelling-based – studies suggests that:

- A potential small decrease in jobs in the Australian wine industry as a result of volumetric wine taxes (between 0.5% and 6.8% of total employment depending on the tax scenario) could be met with an increase in employment in the industries taking over the irrigated regions formerly used for vines (Fogarty and Jakeman, 2011[53]).
- The additional revenue generated by an excise tax increase of USD 0.05 per drink would lead to a net increase of 8 183 jobs in the five US states[15] included in the analysis, with this figure declining to 7 792 when introducing a 5% sales tax on beer, wine, and distilled spirits (Wada et al., 2017[54]).
- If the United Kingdom used a theoretical 10% increase in alcohol tax to increase spending on public services, then there would be over 17 000 more full-time equivalent jobs. In addition, gross value added would increase by GBP 847 million (USD 1 039 million) (Connolly et al., 2019[55]).

It is important to note that these studies primarily look at the impact of taxes on trade in various industries – they do not take into account the health impacts of reduced alcohol consumption, which also affect employment. Finally, some studies suggest that there may be friction costs in the short term, which can include time off work in between jobs and the costs of hiring and (re)training (Kigozi et al., 2016[56]).

An OECD analysis of household expenditure data complemented the Fogarty and Jakeman (2011[53])., Wada et al. (2017[54]) and Connolly et al. (2019[55]) studies by examining the potential impact of alcohol policies on other industries. It found that a policy-induced decrease in alcohol purchases could potentially encourage alcohol-purchasing households to switch consumption to other goods and services. Specifically, the study analysed the share of household budget that is devoted to purchasing alcohol, and compared spending habits between households that do and do not purchase alcohol to better understand how they may reallocate expenditure in response to a reduction in alcohol purchases. The analysis, which incorporated 19 European countries and the United States,[16] found that:

- Households spent between USD PPP 294 and USD PPP 1 349 on alcohol in 2015, or between 1.0% and 3.4% of their total budget. Consequently, a policy inducing a 10% decrease in alcohol purchases would make available an additional USD PPP 29 per household in Hungary and up to USD PPP 135 per household in Ireland, which may be reallocated to other industries.
- Alcohol-spending households spend a higher proportion of total expenditure on discretionary (non-essential) items, including restaurants and hotels (5.9% vs. 4.9%), and recreation and culture (6.4% vs. 5.6%).
- Given that discretionary items are more responsive to changes in income due to higher elasticity (Jääskelä and Windsor, 2011[57]), the findings suggest that a decrease in alcohol expenditure could be offset by additional expenditure on other discretionary goods.

1.6. Conclusion: tackling harmful alcohol consumption and its related chronic diseases should be a policy priority and can be economically sound

Harmful consumption of alcohol has been widely acknowledged as one of the key risk factors to population health, and alcohol-related chronic diseases have a significant impact on the global economy. Despite policy efforts by countries across the world, gaps remain in the policy response to this top public health threat. The current and projected health burdens caused by alcohol-related chronic diseases are enormous, as are their costs to health systems and society, and the personal costs borne by the general population through increased taxation, lower probability of being employed and lower educational attainment.

Positive results achieved by countries that have implemented far-reaching policy packages show that more can be done to address this public health threat. Policy-makers have a comprehensive menu of "traditional" public health interventions from which to choose. Emerging policies, such as MUP – which targets cheap alcohol that is more likely to be consumed by people with harmful patterns of alcohol consumption – and policies to modify the environment in which we live offer further opportunities to prevent harmful alcohol consumption. Health systems also need to do more to support those suffering from hazardous and harmful drinking, as well as individuals with alcohol dependence. Preventing the exposure of children to alcohol promotion and avoiding harm to others – for example, by tightening policies to counter drink-driving – also fit well in a comprehensive package to tackle harmful alcohol consumption. Investing in policy packages saves millions of lives and generates savings that are greater than the implementation costs. The OECD simulations show that for every USD 1 invested in a policy packages that include all the policies set out above, up to USD 16 is returned in economic benefits. While industry revenues may be affected by policy measures, either in profitable or unprofitable ways, countermeasures exist to minimise additional costs.

References

Anderson, P. et al. (2020), "Impact of COVID-19 Confinement on Alcohol Purchases in Great Britain: Controlled Interrupted Time-Series Analysis During the First Half of 2020 Compared With 2015–2018", *Alcohol and Alcoholism*, Vol. 2020, pp. 1-11, http://dx.doi.org/10.1093/alcalc/agaa128. [9]

Angus, C. et al. (2017), *Model-based Appraisal of the Comparative Impact of Minimum Unit Pricing and Taxation Policies in Wales: Interim report*, Welsh Government, Cardiff, http://gov.wales/statistics-and-research/research-likely-impact-public-attitudes-towards-minimum-unit-price-alcohol/?lang=en (accessed on 22 February 2018). [49]

Australian Bureau of Statistics (2019), *6401.0 Consumer Price Index: Alcoholic beverages*, Australian Bureau of Statistics, Canberra, https://www.abs.gov.au/statistics/economy/price-indexes-and-inflation/consumer-price-index-australia/dec-2019. [33]

Australian Bureau of Statistics (2019), *6401.0 Consumer Price Index: All groups CPI*, Australian Bureau of Statistics, Canberra, https://www.abs.gov.au/statistics/economy/price-indexes-and-inflation/consumer-price-index-australia/dec-2019. [34]

Boniface, S., J. Kneale and N. Shelton (2014), "Drinking pattern is more strongly associated with under-reporting of alcohol consumption than socio-demographic factors: Evidence from a mixed-methods study", *BMC Public Health*, Vol. 14/1, p. 1297, http://dx.doi.org/10.1186/1471-2458-14-1297. [16]

Bundesministerium der Finanzen (2021), *Steuereinnahmen 2020*. [7]

CDC (2020), *Alcohol Use and Your Health*, Centers for Disease Prevention and Control, Atlanta, GA, https://www.cdc.gov/alcohol/fact-sheets/alcohol-use.htm (accessed on 12 November 2020). [14]

Connolly, K. et al. (2019), "Can a policy-induced reduction in alcohol consumption improve health outcomes and stimulate the UK economy? A potential 'double dividend'", *Drug and Alcohol Review*, Vol. 38/5, pp. 554-560, http://dx.doi.org/10.1111/dar.12962. [55]

EUIPO (2018), *Synthesis Report on IPR Infringement*, European Union Intellectual Property Office, Alicante, http://dx.doi.org/10.2814/833376. [52]

Eurocare (2020), *Alcohol Consumption in Times of COVID-19*, Eurocare, Brussels, https://www.eurocare.org/cares.php?sp=alcohol-and-health&ssp=alcohol-consumption-in-times-of-covid-19 (accessed on 10 November 2020). [2]

Eurostat (2019), *Adjusted Disposable Income, Gross*, European Commission, Luxembourg, https://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do. [32]

Eurostat (2019), *Harmonised Index Of Consumer Prices: Alcoholic beverages*, European Commission, Luxembourg, https://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do. [31]

Eurostat (2019), *Harmonised Index Of Consumer Prices: All items*, European Commission, Luxembourg, https://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do. [30]

Fogarty, J. and G. Jakeman (2011), "Wine tax reform: The impact of introducing a volumetric excise tax for wine", *Australian Economic Review*, Vol. 44/4, pp. 387-403, http://dx.doi.org/10.1111/j.1467-8462.2011.00653.x. [53]

FSANZ (2020), *Proposal P1050: Pregnancy warning labels on alcoholic beverages*, Food Standards Australia New Zealand, Canberra, https://www.foodstandards.gov.au/code/proposals/Pages/P1050Pregnancywarninglabelsonalcoholicbeverages.aspx. [47]

GBD 2016 Alcohol Collaborators (2018), "Alcohol use and burden for 195 countries and territories, 1990-2016: A systematic analysis for the Global Burden of Disease Study 2016", *Lancet*, Vol. 392/10152, pp. 1015-1035, http://dx.doi.org/10.1016/S0140-6736(18)31310-2. [21]

Gisle, L. et al. (2020), *Deuxième Enquête de Santé COVID-19: Résultats préliminaires*, Sciensano, Brussels, https://www.sciensano.be/en/biblio/deuxieme-enquete-de-sante-covid-19-resultats-preliminaires (accessed on 10 November 2020). [10]

HM Revenue and Customs (2020), *National Statistics: Alcohol Bulletin Commentary (August to October 2020)*, HM Revenue and Customs, London, https://www.gov.uk/government/publications/alcohol-bulletin/alcohol-bulletin-commentary (accessed on 8 February 2021). [8]

Houghton, F. et al. (2014), "Children's awareness of alcohol sponsorship of sport in Ireland: Munster Rugby and the 2008 European Rugby Cup", *International Journal of Public Health*, Vol. 59/5, pp. 829-832, http://dx.doi.org/10.1007/s00038-014-0568-4. [41]

IWSR (2020), *Beverage alcohol in 2020 performs better than expected - IWSR*, https://www.theiwsr.com/beverage-alcohol-in-2020-performs-better-than-expected/ (accessed on 5 March 2021). [4]

Jääskelä, J. and C. Windsor (2011), "Insights from the household expenditure survey", *Reserve Bank of Australia Bulletin*, pp. 1-12, https://www.rba.gov.au/publications/bulletin/2011/dec/pdf/bu-1211-1.pdf. [57]

Kigozi, J. et al. (2016), "Estimating productivity costs using the friction cost approach in practice: A systematic review", *European Journal of Health Economics*, Vol. 17/1, pp. 31-44, http://dx.doi.org/10.1007/s10198-014-0652-y. [56]

Lange, S. et al. (2017), "Global prevalence of fetal alcohol spectrum disorder among children and youth: A systematic review and meta-analysis", *JAMA Pediatrics*, Vol. 171/10, pp. 948-56, http://dx.doi.org/10.1001/jamapediatrics.2017.1919. [25]

Livingston, M. and S. Callinan (2019), "Examining Australia's heaviest drinkers", *Australian and New Zealand Journal of Public Health*, Vol. 43/5, pp. 451-456, http://dx.doi.org/10.1111/1753-6405.12901. [17]

MacArthur, G. et al. (2018), "Individual-, family-, and school-level interventions targeting multiple risk behaviours in young people", *Cochrane Database of Systematic Reviews*, Vol. 2018/10, p. CD009927, http://dx.doi.org/10.1002/14651858.CD009927.pub2. [44]

Marmot, M. (2010), *Fair Society, Healthy Lives: The Marmot Review*, University College London, http://www.instituteofhealthequity.org/resources-reports/fair-society-healthy-lives-the-marmot-review/fair-society-healthy-lives-full-report-pdf.pdf (accessed on 3 September 2018). [24]

Movendi International (2020), *Switzerland: Alcohol sales collapse during COVID-19 lockdown*, Movendi International, Stockholm, https://movendi.ngo/news/2020/06/05/switzerland-alcohol-sales-collapse-during-covid-19-lockdown/ (accessed on 10 November 2020). [5]

Naimi, T. et al. (2017), "Selection biases in observational studies affect associations between "moderate" alcohol consumption and mortality", *Addiction*, Vol. 112/2, pp. 207-214, http://dx.doi.org/10.1111/add.13451. [22]

National Institute on Alcohol Abuse and Alcoholism (2020), *Alcohol Sales During the COVID-19 Pandemic, Surveillance Report #115*, https://pubs.niaaa.nih.gov/publications/surveillance-covid-19/COVSALES.htm (accessed on 15 March 2021). [6]

Nielsen (2020), *Rebalancing the "COVID-19 Effect" on Alcohol Sales*, Nielsen, Chicago, Il, https://nielseniq.com/global/en/insights/2020/rebalancing-the-covid-19-effect-on-alcohol-sales/ (accessed on 10 November 2020). [3]

Noel, J., T. Babor and K. Robaina (2017), "Industry self-regulation of alcohol marketing: a systematic review of content and exposure research", *Addiction*, Vol. 112, pp. 28-50, http://dx.doi.org/10.1111/add.13410. [38]

OECD (2020), *Regulatory Impact Assessment*, OECD Best Practice Principles for Regulatory Policy, OECD Publishing, Paris, https://dx.doi.org/10.1787/7a9638cb-en. [50]

OECD (2016), *Illicit Trade: Converging Criminal Networks*, OECD Reviews of Risk Management Policies, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264251847-en. [51]

Ofcom (2017), *Communications Market Report*, Ofcom, London, https://www.ofcom.org.uk/__data/assets/pdf_file/0017/105074/cmr-2017-uk.pdf. [39]

Pollard, M., J. Tucker and H. Green (2020), "Changes in adult alcohol use and consequences during the COVID-19 pandemic in the US", *JAMA Network Open*, Vol. 3/9, p. e2022942, http://dx.doi.org/10.1001/jamanetworkopen.2020.22942. [12]

Rabinovich, L. et al. (2012), *Further Study on the Affordability of Alcoholic Beverages in the EU*, RAND Corporation, Santa Monica, CA, https://ec.europa.eu/health//sites/health/files/alcohol/docs/alcohol_rand_2012.pdf (accessed on 2 August 2017). [48]

Rehm, J. et al. (2003), "The relationship of average volume of alcohol consumption and patterns of drinking to burden of disease: An overview", *Addiction*, Vol. 98/9, pp. 1209-1228, http://dx.doi.org/10.1046/j.1360-0443.2003.00467.x. [15]

Richard, J. et al. (2019), "La consommation d'alcool chez les adultes en France en 2017", *Bulletin Epidémiologique Hebdomadaire*, Vol. 5-6, pp. 89-97, https://www.santepubliquefrance.fr/docs/bulletin-epidemiologique-hebdomadaire-19-fevrier-2019-n-5-6 (accessed on 3 March 2020). [18]

Roerecke, M. and J. Rehm (2010), "Irregular heavy drinking occasions and risk of ischemic heart disease: A systematic review and meta-analysis", *American Journal of Epidemiology*, Vol. 171/6, pp. 633-644, http://dx.doi.org/10.1093/aje/kwp451. [20]

Ross, C., A. Sparks and D. Jernigan (2016), "Assessing the impact of stricter alcohol advertising standards: The case of Beam Global Spirits", *Journal of Public Affairs*, Vol. 16/3, pp. 245-254, http://dx.doi.org/10.1002/pa.1584. [46]

Santé Publique France (2020), *Tabac, Alcool: Quel impact du confinement sur la consommation des Français?*, Santé Publique France, Paris, https://www.santepubliquefrance.fr/presse/2020/tabac-alcool-quel-impact-du-confinement-sur-la-consommation-des-francais (accessed on 10 November 2020). [11]

Sassi, F. (ed.) (2015), *Tackling Harmful Alcohol Use: Economics and Public Health Policy*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264181069-en. [45]

Smith, L. and D. Foxcroft (2009), "The effect of alcohol advertising, marketing and portrayal on drinking behaviour in young people: Systematic review of prospective cohort studies", *BMC Public Health*, Vol. 9, p. 51, http://dx.doi.org/10.1186/1471-2458-9-51. [40]

Statistics Canada (2019), *Table 18-10-0005-01 Consumer Price Index: Annual average, not seasonally adjusted*, Statistics Canada, Ottawa, https://doi.org/10.25318/1810000501-eng. [35]

Stockwell, T. et al. (2016), "Do 'moderate' drinkers have reduced mortality risk? A systematic review and meta-analysis of alcohol consumption and all-cause mortality", *Journal of Studies on Alcohol and Drugs*, Vol. 77/2, pp. 185-198, http://dx.doi.org/10.15288/jsad.2016.77.185. [23]

Taylor, B. and J. Rehm (2012), "The relationship between alcohol consumption and fatal motor vehicle injury: High risk at low alcohol levels", *Alcoholism: Clinical and Experimental Research*, Vol. 36/10, pp. 1827-1834, http://dx.doi.org/10.1111/j.1530-0277.2012.01785.x. [37]

U.S. Bureau of Labor Statistics (2019), *Alcoholic Beverages in U.S. City Average: All urban consumers, not seasonally adjusted*, U.S. Bureau of Labor Statistics, Washington DC, https://www.bls.gov/cpi/#data. [36]

Wada, R. et al. (2017), "Employment impacts of alcohol taxes", *Preventive Medicine*, Vol. 105, pp. S50-S55, http://dx.doi.org/10.1016/J.YPMED.2017.08.013. [54]

WHO (2020), *Global Information System on Alcohol and Health (GISAH)*, World Health Organization, Geneva, http://www.who.int/substance_abuse/activities/gisah/en/ (accessed on 4 August 2020). [27]

WHO (2018), *Global Status Report on Alcohol and Health 2018*, World Health Organization, Geneva, https://apps.who.int/iris/bitstream/handle/10665/274603/9789241565639-eng.pdf?ua=1 (accessed on 10 September 2019). [19]

WHO (2018), *SAFER: A World Free from Alcohol Related Harms*, World Health Organization, Geneva, https://www.who.int/substance_abuse/safer/msb_safer_brochure.pdf. [28]

WHO (2013), *Global Action Plan for the Prevention and Control of NCDs 2013-2020*, World Health Organization, Geneva, https://apps.who.int/iris/bitstream/handle/10665/94384/9789241506236_eng.pdf?sequence=1&isAllowed=y. [26]

WHO (2010), *Global Strategy to Reduce the Harmful Use of Alcohol*, World Health Organization, Geneva, https://www.who.int/publications/i/item/9789241599931. [1]

WHO Regional Office for Europe (2019), *Alcohol Policy Impact Study: The effects of alcohol control measures on mortality and life expectancy in the Russian Federation*, WHO Regional Office for Europe, Copenhagen, https://apps.who.int/iris/bitstream/handle/10665/328167/9789289054379-eng.pdf?sequence=1&isAllowed=y. [29]

WHO Regional Office for Europe (2009), *Evidence for the Effectiveness and Cost-effectiveness of Interventions to Reduce Alcohol-related Harm*, WHO Regional Office for Europe, Copenhagen, https://www.euro.who.int/__data/assets/pdf_file/0020/43319/E92823.pdf (accessed on 23 November 2020). [42]

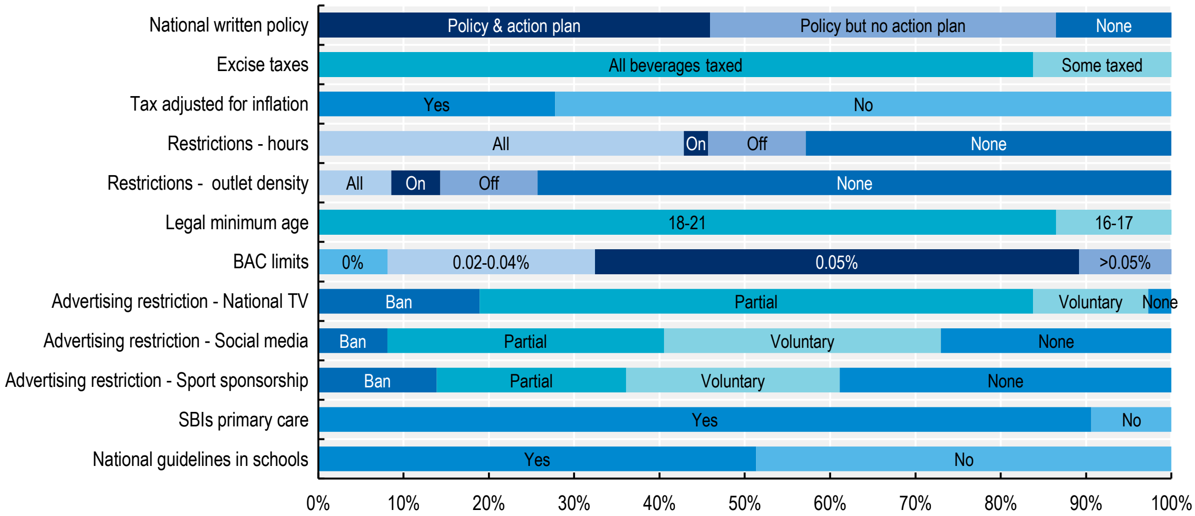
Winstock, A. et al. (2020), *GDS COVID-19 Special Edition: Key findings report*, Global Drug Survey, London, https://www.globaldrugsurvey.com/gds-covid-19-special-edition-key-findings-report/ (accessed on 10 November 2020). [13]

Young, B. et al. (2018), "Effectiveness of mass media campaigns to reduce alcohol consumption and harm: A systematic review", *Alcohol and Alcoholism*, Vol. 53/3, pp. 302-316, http://dx.doi.org/10.1093/alcalc/agx094. [43]

Annex 1.A. Policy progress

Annex Figure 1.A.1 provides a breakdown of key policies to tackle harmful alcohol consumption among OECD countries. For example, 84% of all OECD countries tax all alcohol beverages; 86% have a legal minimum age of 18 or over; and 46% have a national written policy for alcohol and an aligning action plan.

Annex Figure 1.A.1. Polices to tackle harmful alcohol consumption – OECD countries only



Note: Results do not include missing data.
Source: WHO (2020[27]), GISAH, https://www.who.int/data/gho/data/themes/global-information-system-on-alcohol-and-health.

StatLink https://stat.link/9q8vx1

Annex Figure 1.A.2 presents the health and economic impacts of interventions and policy packages, as well as the return on investment, for OECD countries only.

Annex Figure 1.A.2. Health and economic impacts of interventions to tackle harmful alcohol consumption, OECD countries only

Average per year over the period 2020-50

Interventions and packages	DALYs gained per year (per 100 000 population), average across countries	Health expenditure saved per year (per capita USD PPP), average across countries	Additional full-time workers per year (in thousands of workers), total across countries	Return on investment (USD), average across countries
Workplace programmes	1.8	0.1	15	0.2
School-based programmes	3.3	0.4	13	0.4
Pharmacological treatment	6.3	0.8	30	1.1
Regulation of advertising	2.8	0.3	4	1.0
Ban on advertising to children	7.7	0.8	31	6.0
Counselling in primary care	18.0	1.6	102	7.2
Sobriety checkpoints	63.2	1.1	188	17.2
Restriction on opening hours	40.4	0.7	241	82.0
MUP	46.7	4.6	353	263.6
Taxation	48.1	4.6	372	370.6
Promoting individual responsibility pack	89.9	3.7	340	2.4
Availability restriction package	114.2	2.9	471	17.6
Mixed package	134.9	8.0	723	23.3
Mixed package plus	190.5	13.4	1147	30.9

Note: Estimates for the return on investment are the result of the total increase in GDP in the 45 countries produced by the policy divided by the total cost of implementing the policy in these countries.
Source: OECD analyses based on the OECD SPHeP-NCDs model and OECD long-term economic model, 2020.

Annex Table 1.A.1 provides a brief summary of the key inputs to replicate the effects of the ten policy interventions (described in Section 1.4) within the OECD SPHeP-NCDs model.

These key inputs include:

- age of the target population
- proportion of people exposed to the intervention – these two first inputs help to define the coverage of the intervention
- effectiveness of the intervention at the individual level – this parameter captures how individual behaviour changes, following exposure to the interventions, and as far as possible, this evidence is taken from peer-reviewed meta-analyses, preferably from randomised control trials
- cost of implementing the intervention (e.g. costs related to its planning, administration, monitoring and evaluation and so on, as well as costs of providing material).

Annex Table 1.A.1. Inputs to model: selected policy interventions targeting harmful alcohol use

	Workplace	School-based	Taxation	MUP	Sobriety checkpoints	Sales hours restriction	Regulation of advertising	Ban on advertising to children	Counselling	Treatment of dependence
Target age	18-65 years	10-15 years	all	all	>18 years	all	all	<18 years	all	all
Exposure	0.9-2.5%	90%	100%	100%	80%	40-99%	100%	90%	20%	20%
Effectiveness	Alc cons: -41 g/week	Drinking initiation: -20%; dependence: -30%	10% price increase reduces alc cons by: -4% to -7%	Alc cons: -0.6% to -3.3%	Traffic injuries: -25% (year 1); 15% (year 2); -16% thereafter	Assault injuries: -34%; traffic injuries: -1.5%	Alc cons in young people: -0.84%; number of people who binge drink: -1.6%	Underage drinking: -35%; prob of dependence: -30%	Alc cons: -42 g/week (men), -30 g/week (women)	Alc cons: Acamprosate: -31%; Naltrexone: -122 g/week
Per capita cost, USD PPP	3.7-5.4	0.5-0.7; per child: 10-15	0.05-0.08	0.07-0.11	0.6-0.8	0.1-0.2	0.3-0.4	0.3-0.4	0.2-0.3; per person treated: 24-35	0.2-0.3; per person treated: 171-521

Note: Alc cons: alcohol consumption; prob: probability.

Notes

[1] This report acknowledges the concept of harmful alcohol use reported in the WHO *Global Strategy to Reduce the Harmful Use of Alcohol*.

[2] Unless otherwise specified (e.g. due to lack of data) Costa Rica is normally included in the OECD averages, as it is expected that Costa Rica will become an OECD member country before the release of the report.

[3] The 52 countries are Argentina, Australia, Austria, Belgium, Brazil, Bulgaria, Canada, Chile, the People's Republic of China, Colombia, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Malta, Mexico, the Netherlands, New Zealand, Norway, Peru, Poland, Portugal, Romania, the Russian Federation, Saudi Arabia, the Slovak Republic, Slovenia, South Africa, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States.

[4] The 48 countries considered for this analysis are Australia, Austria, Belgium, Brazil, Bulgaria, Canada, Chile, China, Colombia, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, India, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Mexico, Malta, the Netherlands, Norway, New Zealand, Poland, Portugal, Romania, the Russian Federation, the Slovak Republic, Slovenia, South Africa, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States.

[5] Alcohol consumption per person who drinks is equal to the quantity of alcohol consumed divided by the number of people who drink. In Turkey, the number of people who drink is small, but the volume of alcohol consumption per person who drinks is high.

[6] The HBSC survey includes the following countries: Austria, Belgium, Bulgaria, Canada, Croatia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, the Russian Federation, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

[7] Individual-level data for HBSC 2017-18 were not available at the time of this report, and the analysis could not include data from the most recent wave.

[8] The countries included in this analysis are: Austria, Belgium, Bulgaria, Canada, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Greece, Hungary, Iceland, Ireland, Korea, Latvia, Lithuania, Luxembourg, Malta, Mexico, Norway, Poland, Portugal, Romania, the Slovak Republic, Slovenia, Spain, Sweden, the United Kingdom and the United States. The analyses were carried out on data from NHANES 2015 (United States); Baromètre santé 2017 (France); ENCODAT 2016-17 (Mexico); Canadian Community Health Survey 2015-16 (Canada); KNHANES 2018 (Korea); and EHIS 2014 (remaining 26 countries). Further information can be found in Chapter 2.

[9] The 1/1.5 drinks per day cap was chosen because at these levels alcohol may have some protective effect on specific diseases such as ischaemic cardiovascular diseases and diabetes for some age groups (GBD 2016 Alcohol Collaborators, 2018[21]).

[10] The GPA is the standard grading system used in the United States ranging from 0 to 4.0, where 4.0 is the best.

[11] For example, it has been evaluated that a modest goal of all OECD countries boosting their average Programme for International Student Assessment scores by 5% (corresponding to 25 points) over the next 20 years would increase the GDP of OECD countries by USD 115 trillion over the lifetime of the generation born in 2010.

[12] A standard drink is a measure of alcohol consumption in a drink and differs across beverage types and countries. In Australia, for example, one standard drink includes 10 grammes of alcohol, so a 750 ml bottle of wine (13.5% alcohol by volume) contains eight standard drinks.

[13] Unless otherwise specified, all the results presented in this section are undiscounted, meaning they are not calculated by accounting for the present value of future outcomes.

[14] Out of the 48 countries included in this analysis, three countries were not included in the OECD long-term economic model and could not be included in the analysis of the impact on GDP (Croatia, Cyprus and Malta). For the same reason, Costa Rica could not be included in the analysis of the impact on fiscal pressure.

[15] The five US states included in the analysis are Arkansas, Florida, Massachusetts, New Mexico and Wisconsin.

[16] In addition to the United States, the following European countries were analysed: Belgium, Denmark, Estonia, Finland, France, Greece, Hungary, Ireland, Italy, Lithuania, Latvia, Luxembourg, Poland, Portugal, the Slovak Republic, Slovenia, Spain, Sweden and the United Kingdom.

2 Trends and patterns in alcohol consumption

Sabine Vuik and Jane Cheatley

This chapter presents trends and patterns in alcohol consumption for OECD countries, OECD accession and selected partner countries, Group of 20 (G20) countries and European Union (EU27) member states. It looks at overall consumption rates over time and by alcohol type, as well as the prevalence of heavy drinking, heavy episodic (binge) drinking and alcohol dependence. The chapter explores changes in alcohol consumption over the life course and social inequalities in drinking prevalence. Lastly, it looks at trends in alcohol affordability.

Key messages

Alcohol consumption remained stable over the last 10 years, but harmful patterns are highly concentrated

- People in OECD countries drink on average 10 litres of pure alcohol per year per person – this is equivalent to two bottles of wine, or nearly 4 litres of beer, per week. The average alcohol consumption in the OECD changed little between 2010 and 2018, but different trends can be observed across countries.
- Heavy episodic or binge drinking (drinking at least 60 grammes or more of pure alcohol in one single occasion) poses health threats that go beyond the impact on overall consumption. On average, 30% of adults in OECD countries engage in heavy episodic drinking at least once within 30 days.
- Heavy drinkers (men and women consuming more than 40 or 20 grammes of pure alcohol per day, respectively) consume a disproportionate amount of alcohol: across six OECD countries for which data were available, heavy drinkers make up only 4% to 14% of the population, but consume between a third and half of all alcohol.
- Due to repeated or continuous use of alcohol, 3.7% of the population in OECD countries is alcohol dependent, but in some countries over 10% of the population is alcohol dependent.

Alcohol consumption evolves over the life course, with more than 60% of teenagers aged 15 drinking alcohol

- Drinking patterns change with age, with older age groups more likely to drink frequently and younger age groups more likely to engage in binge drinking.
- One in five teenagers aged 15 years attending school had experienced drunkenness at least twice in life, in 2017-18. Younger generations are less likely than a decade ago to have experienced drunkenness. The proportion of 15-year-old boys who had ever got drunk decreased from 40% in 2001-02 to 23% in 2017-18 (the rate reduced from 33% to 20% in girls) on average in OECD countries.
- New OECD analyses on longitudinal data from the United States show that drinking in childhood is predictive of future drinking: monthly or weekly drinking at ages 15 to 18 increased the likelihood of weekly drinking at ages 28 to 31 by 55% to 68%. These findings are supported by similar studies for other OECD countries in the literature.

Large inequalities exist, with alcohol consumption heavily concentrated in specific population groups

- On average in OECD countries, people in higher income groups are more likely to drink weekly and to binge drink than those in lower income groups. However, a U- or J-shaped curve can be observed for some countries – where prevalence is highest for both the lowest and highest income groups.
- In almost all countries, people who have completed tertiary or university education are more likely to drink weekly. This effect is especially strong for women, who are on average 60% more likely to drink alcohol weekly if they have completed higher education. The picture for binge drinking is more varied.

Alcohol affordability is among the key factors determining alcohol consumption

- Trends in real income and the relative price of alcohol show that alcohol has become more affordable in nearly all OECD countries over the past 20 years. The main driver of alcohol affordability has been the rise in real income. Conversely, alcohol prices have remained relatively stable, or in some cases declined.

2.1. Why is harmful alcohol consumption a public health concern?

Alcohol consumption is a causal factor for more than 200 disease and injury conditions (WHO, 2018[1]). The diseases include alcohol dependence, liver cirrhosis, and some cancers and cardiovascular diseases. Moreover, alcohol use can cause harm to others, as it can contribute to injuries resulting from violence, road traffic accidents and foetal alcohol spectrum disorders (i.e. a range of adverse effects in a child that results from alcohol exposure during pregnancy – see additional information in Box 4.3 in Chapter 4 of this report).

In addition to its impact on population health, harmful alcohol use also carries considerable economic and societal costs. As described in Chapters 4 and 5 of this report, diseases caused by harmful alcohol consumption increase health care costs, decrease labour force output, depress gross domestic product (GDP) and affect the formation of human capital through its effects on educational outcomes in children.

However, the impact of alcohol on health and the economy is complex. While overall volume of consumption is an important determinant of health outcomes, the pattern of consumption (frequency, quantity and heavy episodic drinking) also plays a role (WHO, 2018[1]). Moreover, alcohol consumption differs across sex, age and social group. It is therefore important to understand the trends and patterns.

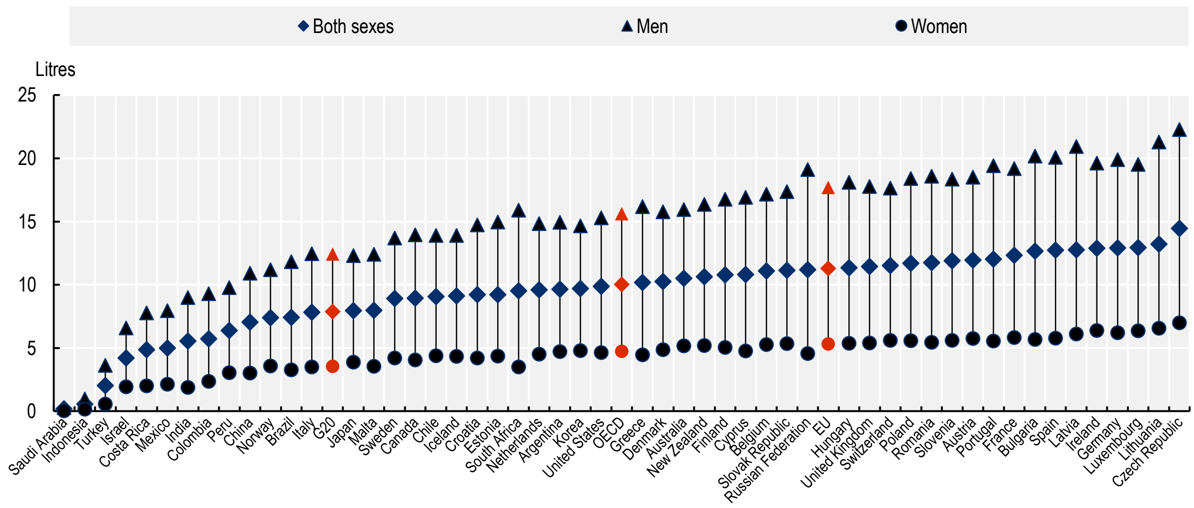
2.2. Alcohol consumption varies across OECD, G20 and EU27 countries

2.2.1. How much alcohol is consumed in OECD, G20 and EU27 countries?

People in OECD countries drank on average 10.0 litres of pure alcohol in 2018 (Figure 2.1) (see Box 2.1 for more details on definitions and data sources of alcohol consumption). This is roughly equivalent to two bottles of wine, or nearly 4 litres of beer, per week. In G20 countries the average is lower, at 7.9 litres per capita. This is driven by a number of very low-consumption countries, including Saudi Arabia, Indonesia, India and Turkey (which is also an OECD member country). On the other hand, the EU27 average is higher at 11.3 litres per capita, as many European countries have relatively high consumption levels. Men consume more alcohol than women in all countries, with around a three-fold gender gap.

Figure 2.1. Alcohol consumption by gender

Total per capita (aged 15+) alcohol consumption (litres of pure alcohol), 2018



Note: Additional information on the comparability of these data with data in OECD.Stat can be found in Box 2.1.
Source: WHO (2020[2]) Global Information System on Alcohol and Health (GISAH) data, https://www.who.int/data/gho/data/themes/global-information-system-on-alcohol-and-health.

StatLink https://stat.link/0grelf

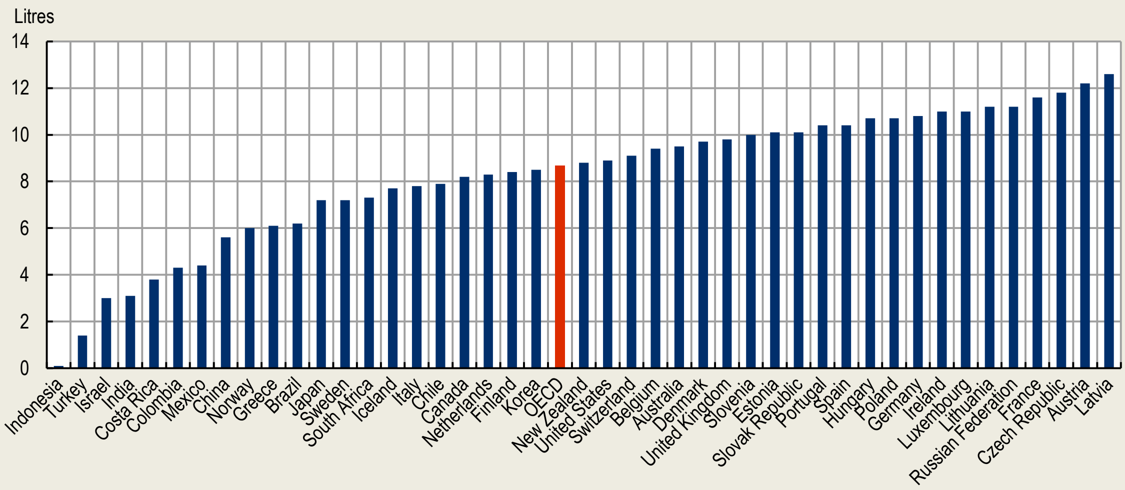
Box 2.1. Data on alcohol consumption

There are different ways of measuring alcohol consumption in a country. The World Health Organization (WHO) Global Information System on Alcohol and Health (GISAH) database contains both recorded and total consumption. Recorded alcohol consumption only takes into account the consumption recorded in country statistics from production, import, export and sales data, often via taxation. Recorded alcohol consumption is expressed in litres of pure alcohol per person aged 15 years and over. Total alcohol consumption also looks at unrecorded (and untaxed) alcohol, and subtracts the amount of alcohol consumed by tourists (WHO, 2020[2]). Unless otherwise specified, this report uses the GISAH database as it covers all 52 countries,[1] and reports total alcohol consumption. Additional information on definitions, sources and methods used to collect and harmonise the WHO data on alcohol can be found elsewhere (WHO, 2014[3]).

The OECD also reports data on recorded alcohol consumption in its Health Statistics (Figure 2.2). For some countries GISAH data are used, while for others data are supplied to the OECD by the country's government. Additional information on definitions, sources and methods used to collect and harmonise the OECD data on alcohol can be found elsewhere (OECD, 2020[4]). For selected countries, the Health Statistics data, presented in other OECD reports, may differ from the data in this report because they only relate to recorded alcohol consumption.

Figure 2.2. OECD data on recorded alcohol consumption

Recorded alcohol consumption (litres of pure alcohol) among adults (aged 15+), 2018 (or nearest year)



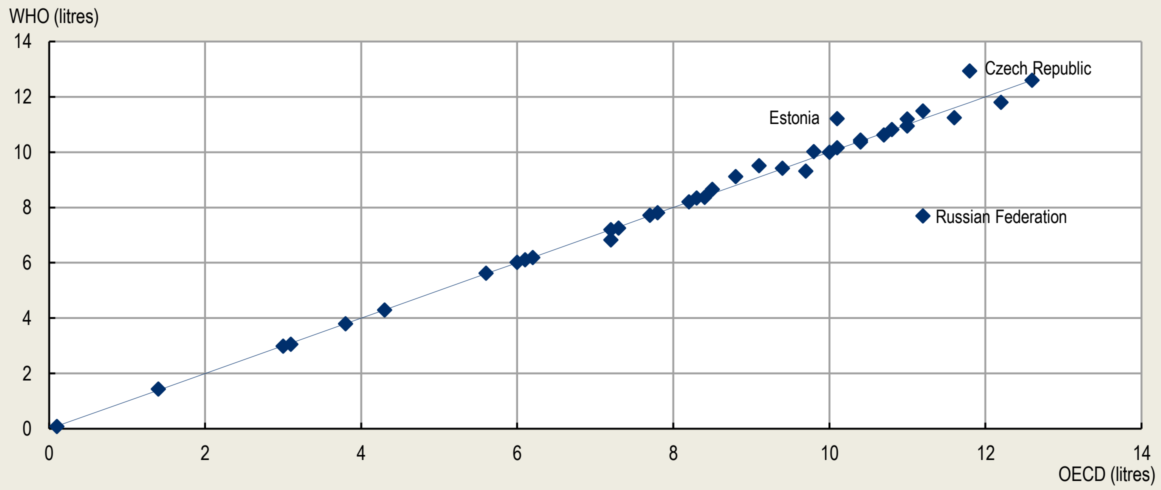
Source: OECD (2020[5]), OECD Health Statistics (database), https://doi.org/10.1787/health-data-en.

StatLink https://stat.link/2pqcrz

When considering only recorded alcohol consumption, the OECD Health Statistics data and WHO GISAH data are very closely aligned for almost all countries (Figure 2.3). Exceptions are data for the Czech Republic, Estonia and the Russian Federation, where the government figures (reported in the OECD Health Statistics data) may differ from the WHO figures owing to methodological differences. In the Czech Republic, the government figures use more accurate and detailed information on the alcohol content of different types of beers. In Estonia and the Russian Federation, the government figure includes a correction for tourist consumption, cross-border trade and illegal alcohol trade and consumption. These adjustments reduce the level of alcohol consumption in Estonia owing to foreign tourist consumption, while they increase the level in the Russian Federation due to unrecorded alcohol trade and consumption.

Figure 2.3. Comparison of OECD and WHO data on recorded alcohol consumption

Recorded alcohol consumption (litres of pure alcohol) among adults (aged 15+), 2018



Note: This graph only includes those countries for which 2018 data were available in both datasets.
Source: OECD (2020[5]), OECD Health Statistics (database), https://doi.org/10.1787/health-data-en; WHO (2020[2]), GISAH, https://www.who.int/data/gho/data/themes/global-information-system-on-alcohol-and-health.

StatLink https://stat.link/35hksq

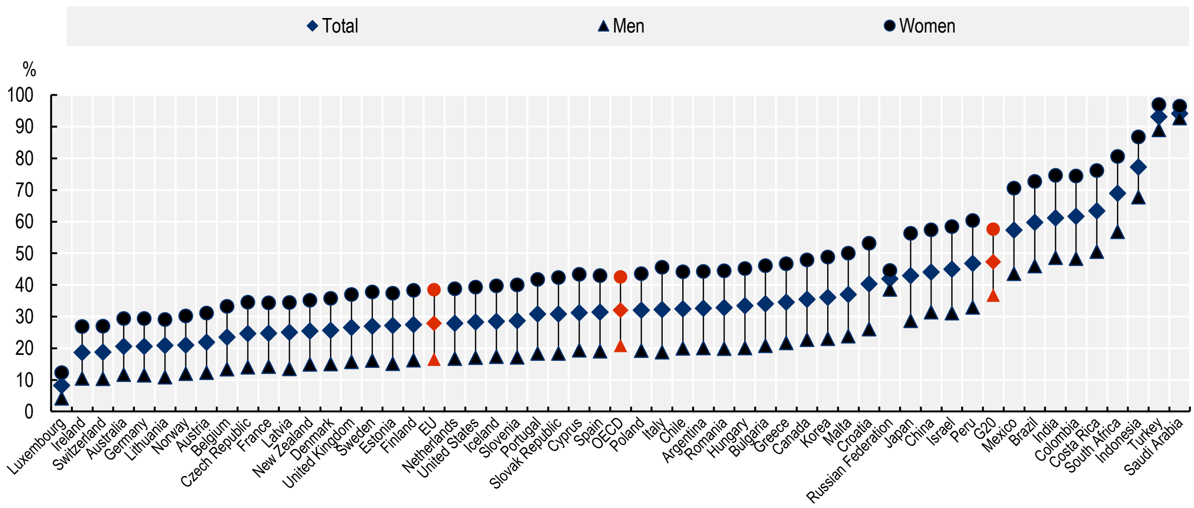
1. The 52 countries include: Argentina, Australia, Austria, Belgium, Brazil, Bulgaria, Canada, Chile, China, Colombia, Costa Rica, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Malta, Mexico, the Netherlands, New Zealand, Norway, Peru, Poland, Portugal, Romania, the Russian Federation, Saudi Arabia, the Slovak Republic, Slovenia, South Africa, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States.

The per capita alcohol consumption of a country depends on the total consumption of alcohol in the country and the size of the population (those aged 15 and over in the OECD and WHO statistics). The per-drinker alcohol consumption depends on how many people drink and how much they drink. In OECD countries, drinkers consume on average 15.4 litres of alcohol per year per consumer (Annex Figure 2.A.1), compared to the population average of 10.0 litres per capita. While the average consumption in G20 countries is lower, the per-drinker consumption is equal to the OECD at 15.4 litres per year per consumer. This is due to a number of countries (including South Africa, Turkey, the Russian Federation, and Brazil) where the number of drinkers is relatively low, but where those who do drink consume quantities that are relatively large compared to other countries.

These countries have a larger prevalence of abstainers – defined as people who did not consume alcohol in the preceding 12 months. On average in OECD countries, 32% of the population had abstained from alcohol consumption in the past year in 2016 (Figure 2.4). In G20 countries this figure is 47%, driven by countries such as Saudi Arabia and Turkey, where abstainers make up over 90% of the population. In all countries analysed, more women than men are abstainers: on average 42% of women in OECD countries abstain, compared to 21% of men. In the Russian Federation, the gap between men and women is notably small, but considerable differences between sexes are seen when it comes to other drinking behaviours. Men are much more likely to drink heavily and to binge drink; this is driven by traditional gender roles (Bobrova et al., 2010[6]).

Figure 2.4. Prevalence of abstainers by sex

Proportion of population (aged 15+) that abstained from drinking alcohol in the past 12 months (%), 2016



Source: WHO (2020[2]) GISAH data, https://www.who.int/data/gho/data/themes/global-information-system-on-alcohol-and-health.

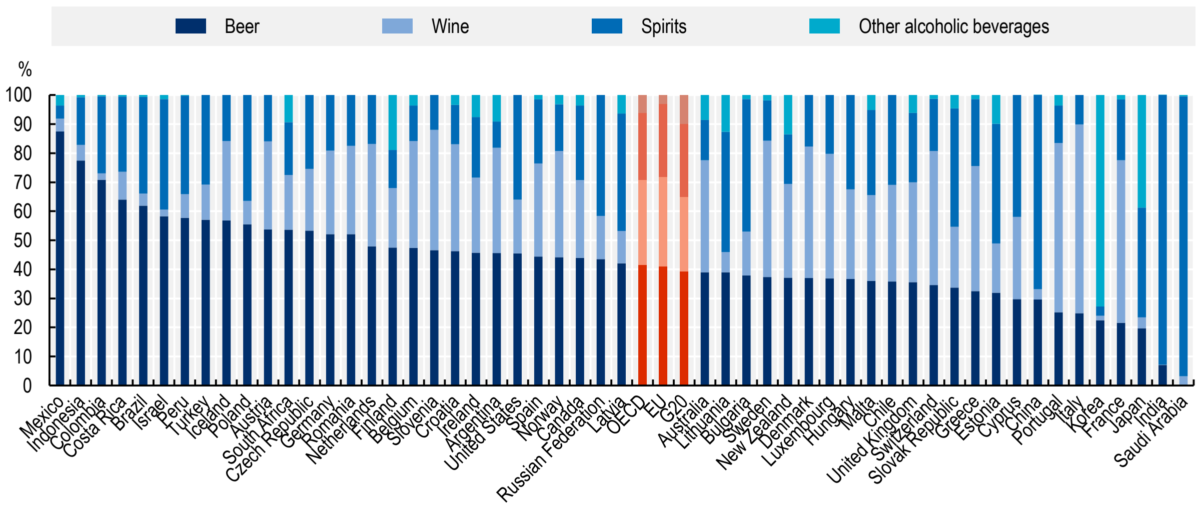
StatLink https://stat.link/ofjxvq

2.2.2. What are the most consumed types of alcohol?

On average in OECD countries, 42% of alcohol is consumed in the form of beer, 29% as wine and 23% as spirits[1] (Figure 2.5). In 34 out of 52 countries, beer is the most consumed alcoholic beverage, as measured by alcohol volume. Latin American countries in particular see a high proportion of beer consumption – with the exception of Argentina and Chile. In eight countries – including other major wine-producing countries such as France, Italy and Portugal – wine accounts for the largest proportion of alcohol consumption. While spirits are often the second most consumed alcoholic beverage type, they rank first in eight countries, including some Central and Eastern European countries like the Slovak Republic, Estonia and Bulgaria. Fermented wheat and fermented rice wines – such as soju and sake, which are popular in Korea and Japan – increase the “other” category in those countries (OECD, 2020[7]).

Figure 2.5. Alcohol consumption by type of beverage

Recorded consumption of pure alcohol by type of beverage (%), 2018



Note: Share of alcohol consumption by type of beverages is calculated by WHO using a standard approach across all the countries. Individual counties may use different approaches, which may result in slightly different estimates, as, for example, in Estonia.
Source: WHO (2020[2]) GISAH data, https://www.who.int/data/gho/data/themes/global-information-system-on-alcohol-and-health.

StatLink https://stat.link/wml80b

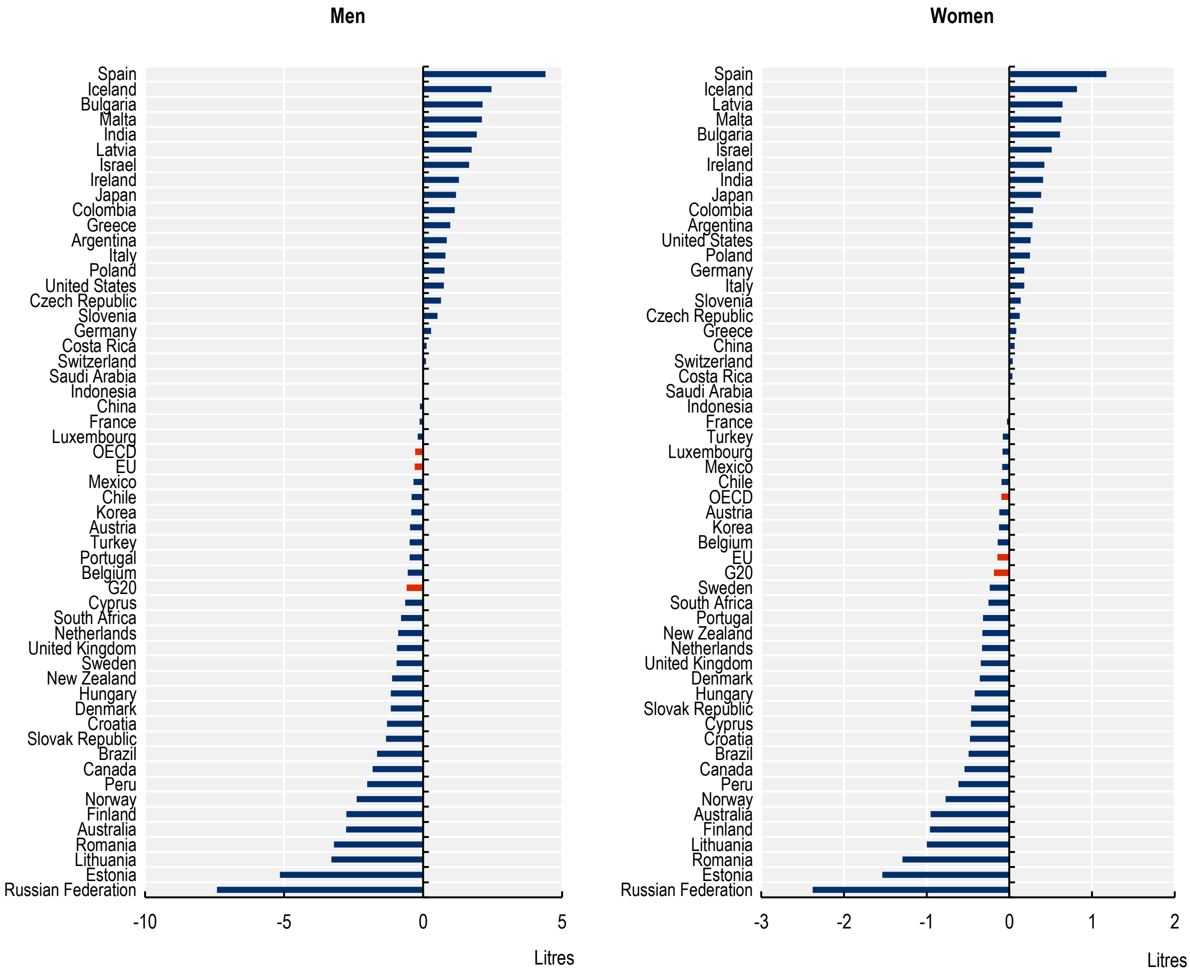
On average in OECD countries, about 1.4 litres of unrecorded alcohol were consumed per capita per year over 2016 to 2018 (WHO, 2020[2]), corresponding to 14% of total annual consumption. (See Box 2.1 for more details on definitions and data sources of alcohol consumption, and see also Figure 8.2 in Chapter 8.) The G20 average is slightly lower at 1.2 litres per capita, while the EU27 average is higher at 1.5 litres. Countries with relatively high consumption of unrecorded alcohol are Greece (4.2 litres), the Russian Federation (3.5 litres) and India (2.6 litres). On average across the 52 countries studied, unrecorded consumption represents 18% of total alcohol consumption, ranging from 3% in Austria to nearly 50% in India and Saudi Arabia, and up to 83% in Indonesia. Unrecorded alcohol can include homemade or informally produced alcohol, smuggled alcohol, surrogate alcohol (alcohol not intended for human consumption) or alcohol obtained through cross-border shopping (WHO, 2020[8]).

2.2.3. Is alcohol consumption increasing or decreasing?

Between 2010 and 2018, alcohol consumption changed little for the OECD on average: total per capita consumption decreased by 0.17 litres, dropping from 10.18 litres in 2010 to 10.01 litres in 2018. In the EU27 it decreased by 0.20 litres, while in G20 countries consumption dropped by 0.37 litres. However, at the country level different trends can be observed. Some countries have seen great decreases, including the Russian Federation (-7.4 litres in men; -2.4 in women), Estonia (-5.2 in men; -1.5 in women) Lithuania (-3.3 in men and -1.0 in women) and Romania (-3.2 in men; -1.3 in women) (Figure 2.6). On the other hand, about half of the countries analysed saw alcohol consumption increase. This increase in consumption was highest in Spain (+4.4 in men; +1.2 in women), Iceland (+2.5 litres in men; +0.8 in women), Bulgaria (+2.2 in men; +0.6 in women) and Malta (+2.1 litres in men; +0.6 in women). While the magnitude of the change was generally greater in men, in almost all cases the direction of the trend for men and women was the same (i.e. both sexes saw an increase, or both sexes saw a decrease).

Figure 2.6. Changes in alcohol consumption over time

Change in total per capita (aged 15+) alcohol consumption between 2010 and 2018 (litres of pure alcohol)



Note: Positive numbers indicate an increase in alcohol consumption between 2010 and 2018, while negative numbers reflect a decrease in per capita consumption. Additional information on the comparability of these data with data in OECD.Stat can be found in Box 2.1.
Source: OECD analysis of WHO (2020[2]) GISAH data, https://www.who.int/data/gho/data/themes/global-information-system-on-alcohol-and-health.

StatLink https://stat.link/4s18we

2.2.4. How common is heavy episodic drinking?

While consuming large quantities of alcohol carries significant public health risks, heavy episodic drinking – drinking a large amount in a single sitting – poses health threats that go beyond the impact on overall consumption (Box 2.2). On average, 30% of adults in OECD countries engage in heavy episodic drinking at least once within 30 days (Figure 2.7). Many Central and Eastern European countries have relatively high rates: 49% of the population in Lithuania engages in heavy episodic drinking at least once within 30 days. In all countries, the rate of heavy episodic drinking in men is considerably higher than in women.

Box 2.2. Heavy episodic drinking

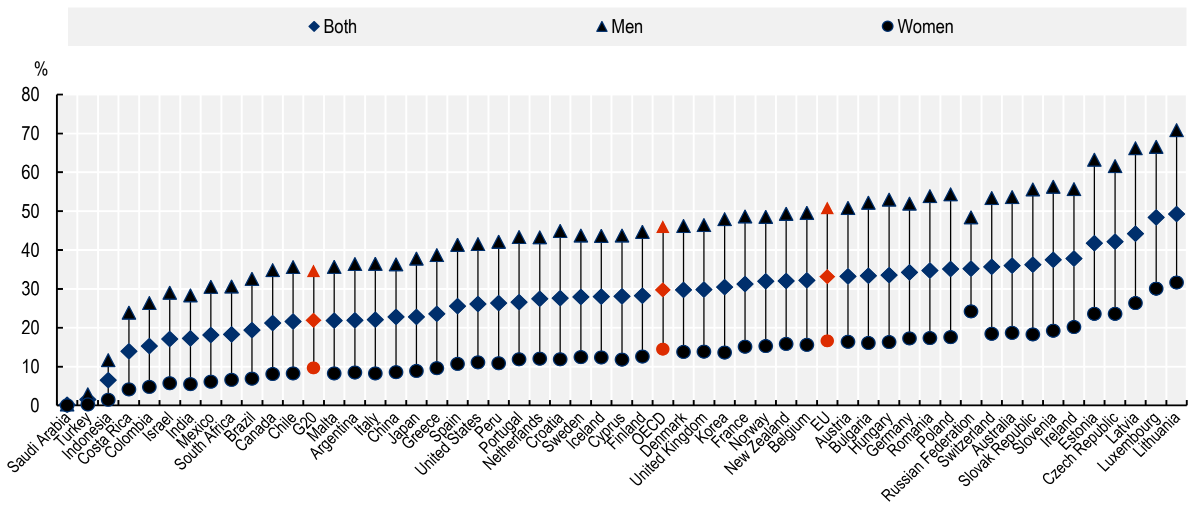
Heavy episodic drinking (also known as “binge drinking”) can been defined as drinking at least 60 grammes or more of pure alcohol in one single occasion, although different cut-off values are used (Llerena et al., 2015[9]).[1] This high level of alcohol consumption in a short amount of time raises the blood alcohol concentration, which has multisystemic pathophysiological consequences (Molina and Nelson, 2018[10]). As a result, heavy episodic drinking carries additional risks (such as an increased risk of injuries) beyond those resulting from the overall alcohol consumption level.

Heavy episodic drinking has been shown to be a risk factor for heart disease, even when overall alcohol consumption is low to moderate. A meta-analysis found that heavy irregular drinking occasions increased the risk of ischaemic heart disease by 45% compared to regular moderate drinking (Roerecke and Rehm, 2010[11]). As such, the authors conclude that the cardioprotective effect of moderate alcohol consumption disappears when, on average, light to moderate drinking is mixed with irregular heavy drinking occasions. This is reflected in the OECD Strategic Public Health Planning for non-communicable diseases (SPHeP-NCDs) model, where the presence of binge drinking cancels out any protective effects of alcohol consumption on cardiovascular diseases.

1. WHO and the data presented from GISAH define heavy episodic drinking as more than 60 grammes per occasion for both men and women. The OECD SPHeP-NCDs model sets the cut-off at 60 grammes for men and 48 grammes for women.

Figure 2.7. Prevalence of heavy episodic drinking

Percentage of adult population (aged 15+) with at least one occasion of heavy episodic drinking in the past 30 days, 2016



Note: Heavy episodic drinking is defined as consuming at least 60 grammes or more of pure alcohol.
Source: OECD analysis of WHO (2020[2]), GISAH, https://www.who.int/data/gho/data/themes/global-information-system-on-alcohol-and-health.

StatLink https://stat.link/dr7ecs

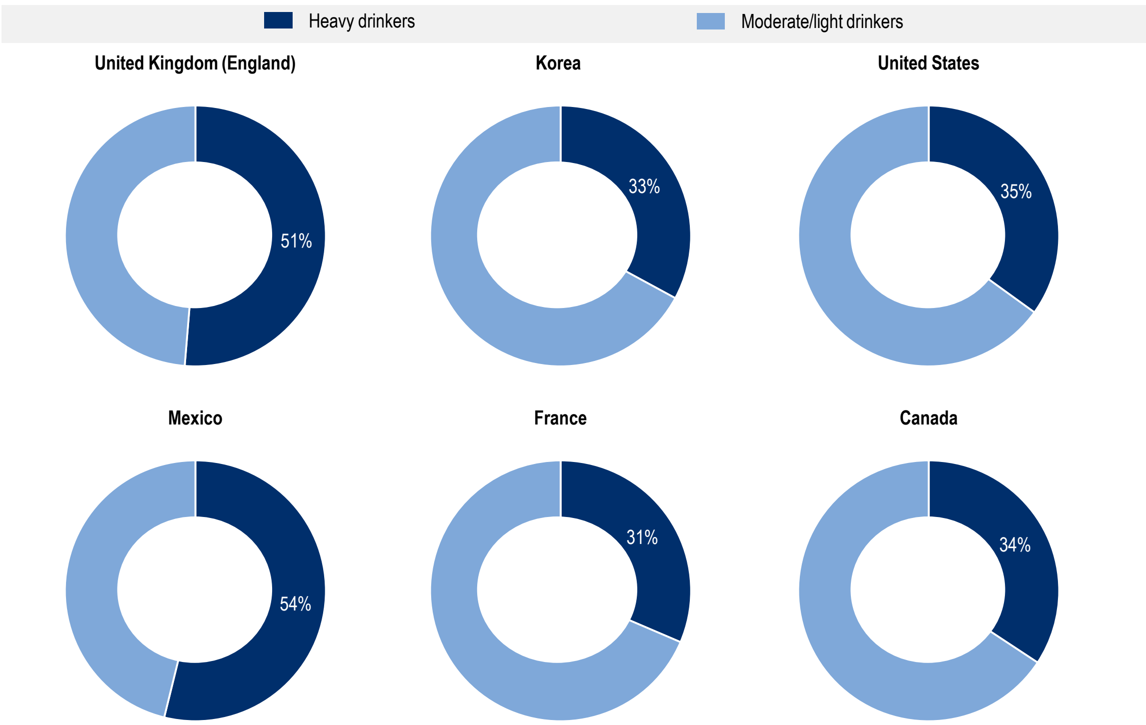
2.2.5. How much alcohol is drunk by heavy drinkers?

A large proportion of alcohol is consumed by people who drink at high levels. An Australian study found that the top 10% of the population with the highest alcohol consumption accounted for more than half (54.4%) of all alcohol consumed (Livingston and Callinan, 2019[12]). Similar results were found in France, where the top 10% of the population with the highest alcohol consumption drank 58% of all alcohol (Richard et al., 2019[13]). In the United States, it was found that the top 10% of current drinkers (as opposed to the top 10% of the entire population) accounted for 55.3% of total alcohol consumption (Kerr and Greenfield, 2007[14]). In the United Kingdom, 77% of alcohol units were consumed by people drinking more than the drinking guidelines (Bhattacharya et al., 2018[15]).

Heavy drinkers (men and women consuming more than 40 or 20 grammes of pure alcohol per day, respectively; see Box 2.3) consume a disproportionate amount of alcohol. Across six OECD countries, heavy drinkers make up only 4% to 14% of the population, but they consume between a third and half of all alcohol (Figure 2.8). As these calculations are based on self-reported alcohol consumption – which is known to be considerably underestimated, especially in heavy drinkers (Boniface, Kneale and Shelton, 2014[16]) – the actual proportion of alcohol consumed by heavy drinkers is likely to be even higher. Looking at the 20% of drinkers who drink the most, the analysis shows that they account for 65% to 87% of all alcohol consumed (Annex Figure 2.A.2).

Figure 2.8. Proportion of alcohol consumed by heavy drinkers

Percentage of total pure alcohol consumption consumed by heavy drinkers



Note: Heavy drinkers are defined as men/women consuming more than 40/20 grammes of pure alcohol per day. Analysis is based on self-reported alcohol consumption from national surveys; for this reason, the proportion of heavy drinkers – and the alcohol they consume – is likely to be underestimated. The assumed alcohol content of a glass or standard drink differs widely across surveys, which limits cross-country comparability.
Source: OECD analysis of Health Survey for England 2016 (United Kingdom (England)); NHANES 2015 (United States); Baromètre santé 2017 (France); ENCODAT 2016-17 (Mexico); Canadian Community Health Survey 2015-16 (Canada); KNHANES 2018 (Korea) (see survey details in Annex Table 2.A.1).

StatLink https://stat.link/zy7whd

Box 2.3. Definitions of patterns of alcohol use

Definitions and limits of drinking patterns differ by country and study. This report uses the following definitions:

- **Heavy or hazardous drinking** = more than 20 grammes (women) or 40 grammes (men) of pure alcohol per day. This is an often-used definition in alcohol research (Rehm et al., 2006[17]) and corresponds roughly to the various national guidelines set by countries (see Table A.2 in *Tackling Harmful Alcohol Use: Economics and Public Health Policy* (Sassi, 2015[18])).
- **Heavy episodic ("binge") drinking** = consuming 60 grammes or more of pure alcohol on a single occasion. This is in line with the definition used by the WHO (2020[19]).

In this study, the amount of alcohol is quantified in grammes of pure alcohol for the sake of simplicity and harmonisation across the various types of beverage. The density of alcohol is 0.8 grammes per millilitre. However, the common usage is to quantify alcohol in volume. ABV stands for alcohol by volume and measures the amount of alcohol as a percentage of the drink's volume (here in millilitres). For example, various types of beverage contain different levels of alcohol:

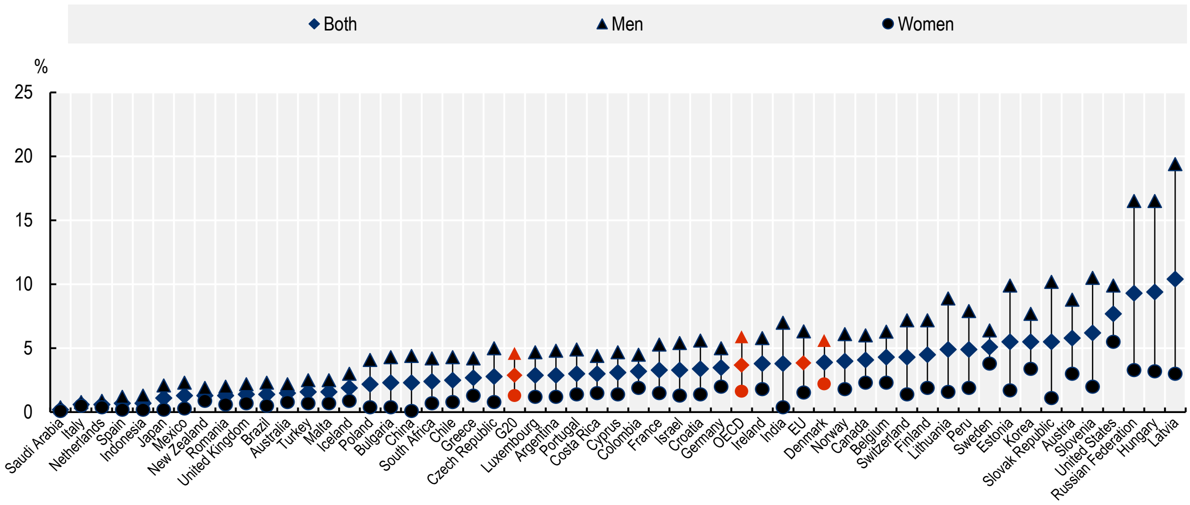
- A 500 mL can of beer at 5% ABV contains 25 mL (or 20 grammes) of pure alcohol.
- A 100 mL glass of wine at 12.5% ABV contains 12.5 mL (or 10 grammes) of pure alcohol.

2.2.6. How prevalent is alcohol dependence?

Repeated or continuous use of alcohol can result in alcohol dependence. In OECD countries, 3.7% of the population is alcohol dependent (Figure 2.9), which represents about 50 million people. While the EU27 average is similar, the average for G20 countries is lower, at 2.9%. In all countries, as for heavy episodic drinking, prevalence is greater in men than in women. Prevalence is relatively high in some Central and Eastern European countries, including Latvia, Hungary, the Russian Federation, Slovenia, the Slovak Republic and Estonia. This is primarily driven by high prevalence rates for men, as the prevalence of alcohol dependence in women is more in line with other countries.

Figure 2.9. Prevalence of alcohol dependence

Alcohol dependence (population aged 15+) by sex, 12-month prevalence (%), 2016



Source: WHO (2020[2]), GISAH, https://www.who.int/data/gho/data/themes/global-information-system-on-alcohol-and-health.

StatLink https://stat.link/vzn9l1

2.3. Alcohol consumption changes over the life course

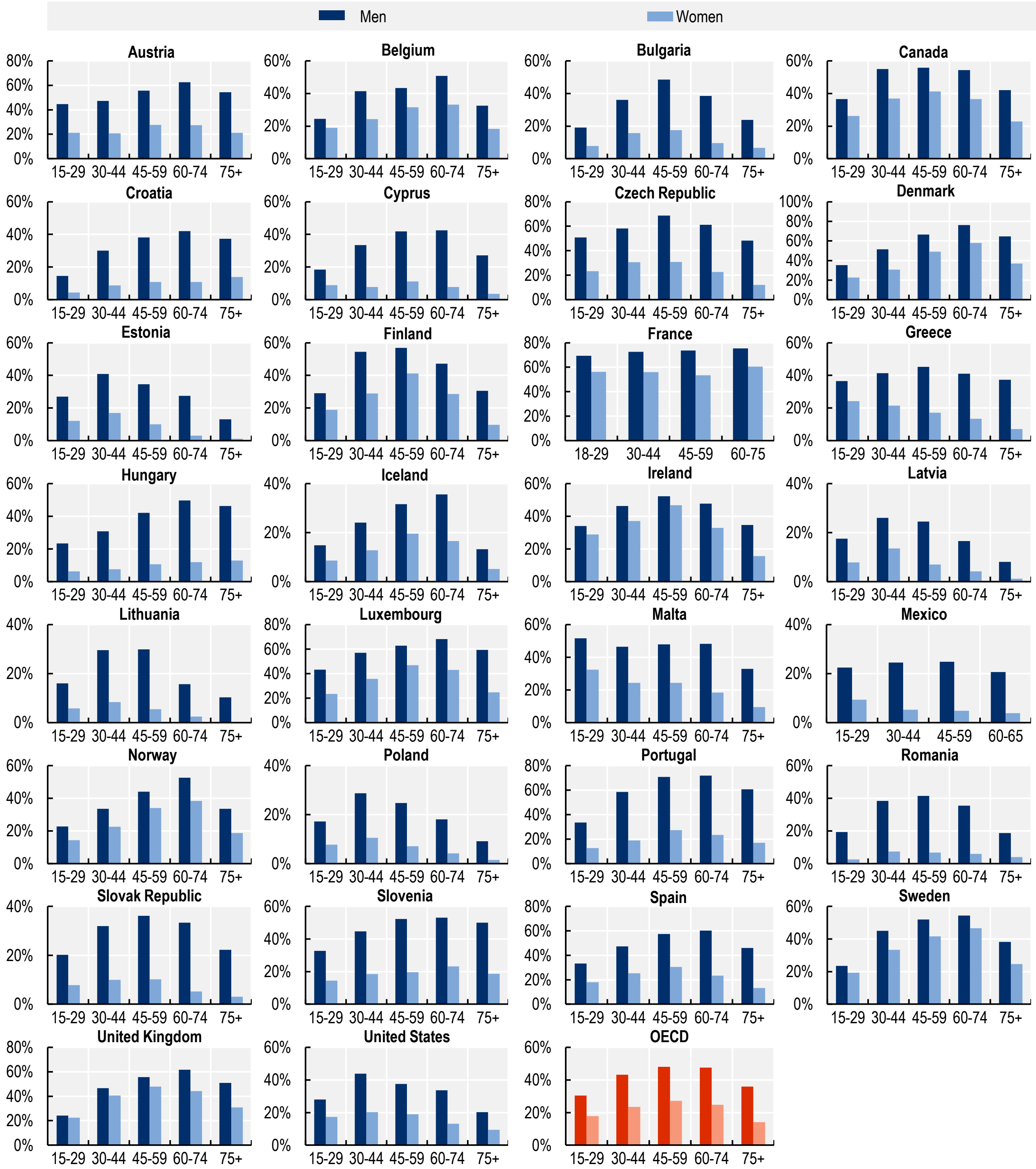
2.3.1. At what age is alcohol consumption most prevalent?

Drinking patterns change with age, with older age groups more likely to drink frequently and younger age groups more likely to engage in binge drinking (Chaiyasong et al., 2018[20]). In many countries analysed for this report, weekly alcohol consumption is most common around middle age, peaking between the ages 45 and 74 (Figure 2.10). On average across 25 OECD countries, weekly drinking is most common between the ages 45 and 59 in both men and women. However, in a number of Central and Eastern European countries (including Estonia, Latvia, Lithuania and Poland), weekly alcohol consumption is most prevalent in people aged 30 to 44. Other notable exceptions are Malta and the United States, where the prevalence of weekly alcohol consumption decreases with age. Other studies have found a similar pattern for the United States (Delker, Brown and Hasin, 2016[21]; Moore et al., 2005[22]).

The age distribution of binge drinking looks quite different: on average across OECD countries, monthly binge drinking is most common in the two youngest age groups, after which it becomes less prevalent with increasing age (Figure 2.11). The pattern is different for men in Bulgaria, Cyprus and the United Kingdom, and for both sexes in Romania, where those between the ages of 45 and 59 are more likely to engage in monthly binge drinking than any other age group. One study from the United Kingdom found that binge drinking was more common in men aged 45-54 than in those aged 35-44, but that it was still more common in those under the age of 35 (Castillo, Jivraj and Ng Fat, 2017[23]).

Figure 2.10. Prevalence of weekly drinking by age and sex

Share (%) of population that drinks alcohol at least once a week, by age group

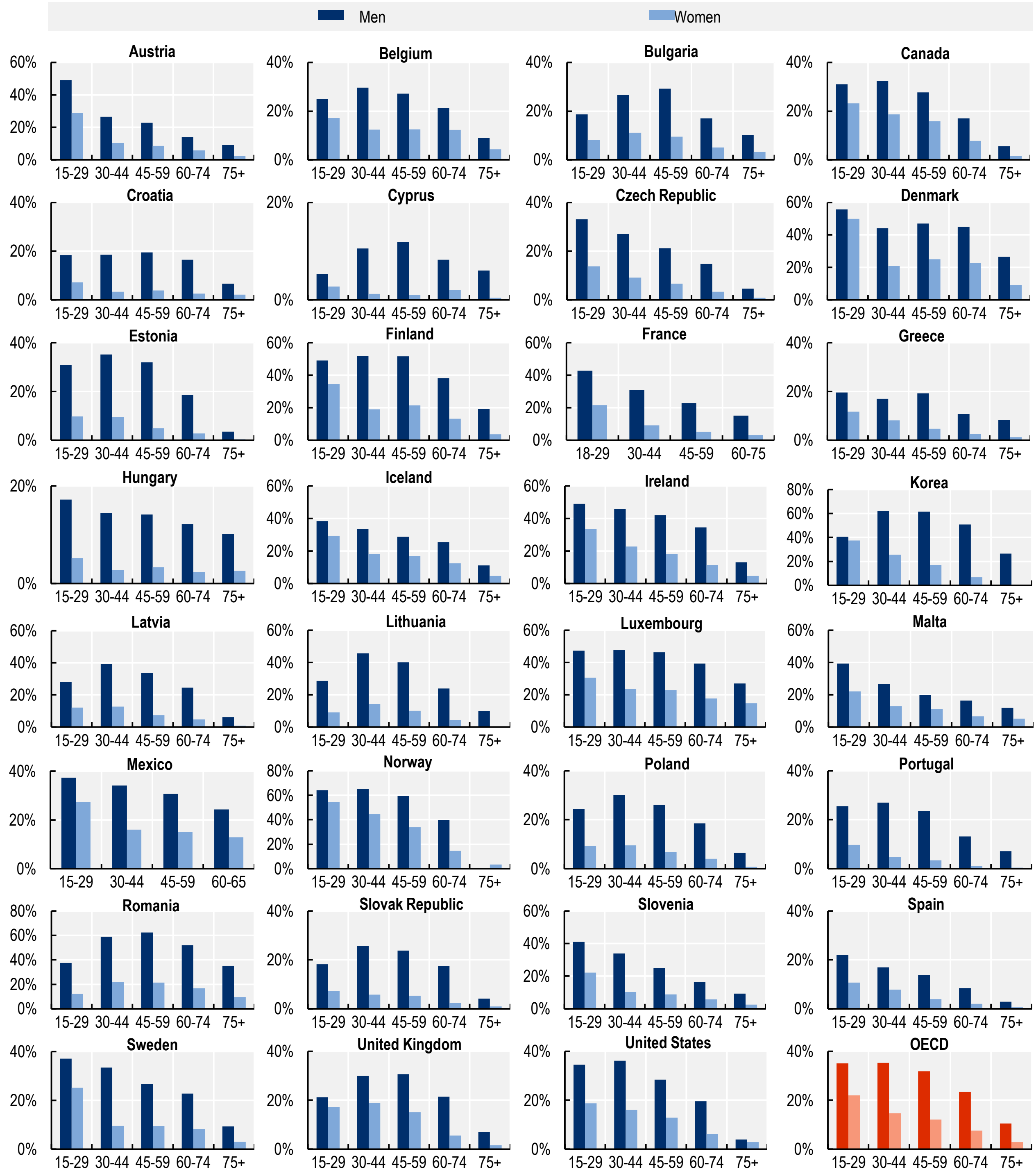


Note: Due to data differences between surveys, the absolute prevalence cannot be compared between countries or to other data sources.
Source: OECD analysis of NHANES 2015 (United States); Baromètre santé 2017 (France); ENCODAT 2016-17 (Mexico); Canadian Community Health Survey 2015-16 (Canada); European Health Interview Survey 2014 (remaining 26 countries) (see survey details in Annex Table 2.A.1).

StatLink https://stat.link/79tz0b

Figure 2.11. Prevalence of monthly binge drinking by age and sex

Share (%) of population that binge drinks alcohol at least once a month, by age group



Note: Data differences between surveys should be accounted for when comparing countries.
Source: OECD analysis of NHANES 2015 (United States); Baromètre santé 2017 (France); ENCODAT 2016-17 (Mexico); Canadian Community Health Survey 2015-16 (Canada); KNHANES 2018 (Korea); EHIS 2014 (remaining 26 countries) (see survey details in Annex Table 2.A.1).

StatLink https://stat.link/0hg6kf

2.3.2. How has youth drinking evolved over time?

In 2017-18, about one in five teenagers aged 15 attending school had experienced drunkenness at least twice in life, according to the Health Behaviour in School-aged Children (HBSC) survey (Inchley et al., 2020[24]). This is despite the fact that the legal drinking age is 18 in most countries (WHO Regional Office for Europe, 2019[25]).

Younger generations are less likely to experience drunkenness at age 15 than a decade ago; if they have been drunk, it has been at an older age, although the differences are small. The proportion of 15-year-old boys who experienced drunkenness decreased from 40% in 2001-02 to 23% in 2017-18 (the proportion of girls decreased from 33% to 20%) on average in OECD countries (Figure 2.12). This pattern is observed in most countries, albeit with a few exceptions. For example, boys in Austria, Denmark and Germany, and girls in Austria and Italy reported an increase in the proportion of those who experienced drunkenness in 2014-18, while boys in Malta reported such an increase in 2006-18.

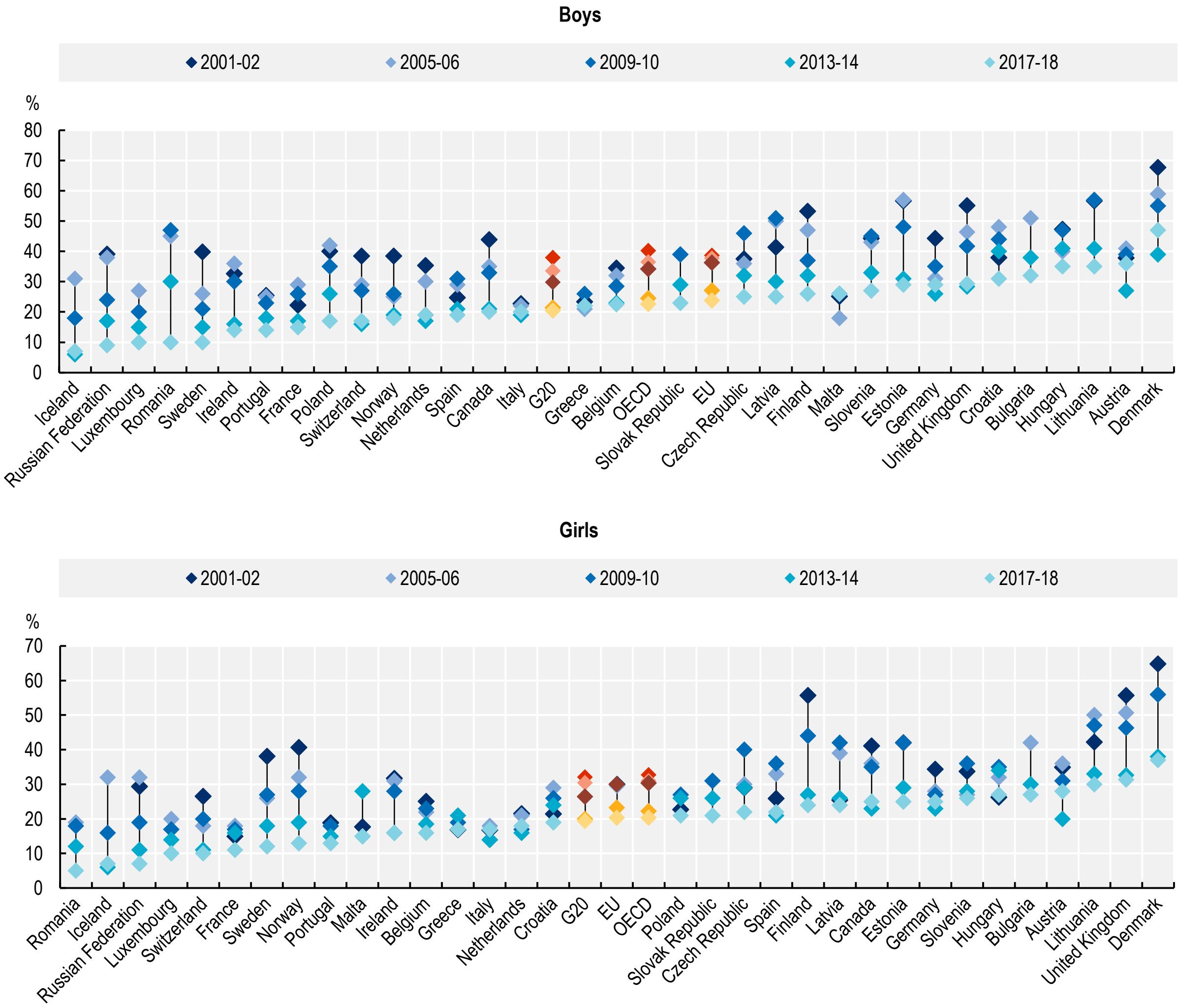
Sex differences in the proportion of those who experienced drunkenness vary across countries. The proportion of boys who experienced drunkenness exceeds by 3 percentage points or more the proportion of girls in 17 countries in 2017-18, whereas three countries show the reverse pattern.

Over 2001-14, the average age of first drunkenness increased slightly from 13.7 to 14.0 years in boys and from 13.9 to 14.2 years in girls across 21 OECD countries.[2]

The picture of drinking initiation is quite similar to that of drunkenness. There was a small decline in lifetime alcohol use among adolescents between 2014 and 2018, from 64% to 62% among boys and from 64% to 63% among girls on average across OECD countries (Inchley et al., 2020[24]). The proportion of 15-year-olds who have started to drink alcohol has decreased since 2014 in a majority of countries. The largest reductions (greater than 11 percentage points in both boys and girls) are observed in Estonia, the Russian Federation and Sweden. On the other hand, the proportion of boys who have ever drunk alcohol increased by 3-4 percentage points in France, Germany and Spain, and for girls it increased by 5-8 percentage points in France, Denmark and Ireland (Annex Figure 2.A.5).

Several reasons have been proposed to explain declining rates of youth drinking (Kraus et al., 2019[26]; Törrönen et al., 2019[27]; IAS, 2016[28]). While there may be a change following reinforced policy actions or a change in the social perception of alcohol as a social reaction to the negative effects of alcohol, other explanations include changes in technology, social norms, family relationships and gender identity, as well as trends in health, fitness, well-being and lifestyle behaviour (Kraus et al., 2019[26]). The increasing use of new technology and social media may contribute to reductions in drinking in youth, since nowadays young people mainly exchange virtual communications (e.g. via smartphones and social media), which may create fewer occasions for drinking. Social norms may also play a role: first, there is less peer pressure to drink; second, young people may wish to control their drinking to avoid the public diffusion of disreputable images of extreme drinking (occurring in private circumstances) through social media and networks. Family relationships may also contribute to declining youth drinking – in particular, with parents taking a stricter line on alcohol. Finally, changes in gender identity may be associated with less drinking in young men, as masculinity is less attached to heavy drinking than in the past (Törrönen et al., 2019[27]).

Figure 2.12. Proportion of 15-year-olds who experienced drunkenness at least twice, by country, 2001-02 to 2017-18



Source: Currie et al. (2004[29]), Young People's Health in Context. Health Behaviour in School-aged Children (HBSC) study: International Report from the 2001/2002 Survey, https://www.euro.who.int/__data/assets/pdf_file/0008/110231/e82923.pdf; Currie et al. (2008[30]), Inequalities In Young People's Health: HBSC International Report from the 2005/2006 Survey, https://www.euro.who.int/__data/assets/pdf_file/0005/53852/E91416.pdf; Currie et al. (2012[31]); Social Determinants of Health and Well-being among Young People. Health Behaviour in School-aged Children (HBSC) Study: International Report from the 2009/2010 Survey, https://www.euro.who.int/en/publications/abstracts/social-determinants-of-health-and-well-being-among-young-people.-health-behaviour-in-school-aged-children-hbsc-study; Inchley et al. (2016[32]), Growing Up Unequal: Gender and Socioeconomic Differences in Young People's Health and Well-being: Health Behaviour in School-Aged Children (HBSC) Study – International Report from the 2013/2014 Survey, https://www.euro.who.int/en/publications/abstracts/growing-up-unequal.-hbsc-2016-study-20132014-survey; Inchley et al. (2020[24]), Spotlight on Adolescent Health and Well-being: Findings from the 2017/2018 Health Behaviour in School-aged Children (HBSC) Survey in Europe and Canada. International Report Volume 2. Key Data, https://www.euro.who.int/en/health-topics/Life-stages/child-and-adolescent-health/health-behaviour-in-school-aged-children-hbsc/publications/2020/spotlight-on-adolescent-health-and-well-being.-findings-from-the-20172018-health-behaviour-in-school-aged-children-hbsc-survey-in-europe-and-canada.-international-report.-volume-2.-key-data.

StatLink https://stat.link/80lxcs

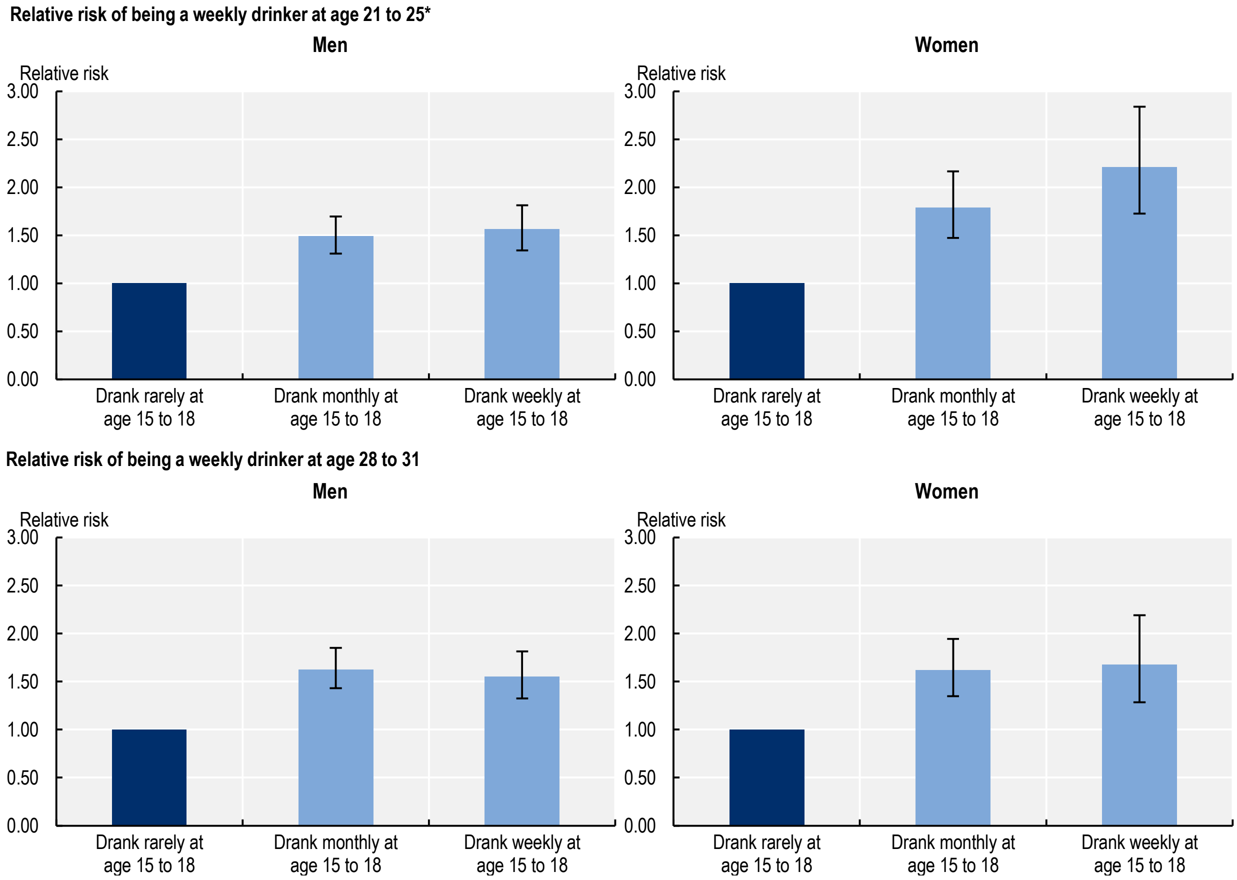
2.3.3. Does drinking in childhood predict future drinking patterns?

Several studies have found that early drinking is associated with drinking later on in life (Zucker, 2008[33]; Englund et al., 2008[34]). For instance, early onset of drinking and early onset of excessive drinking were related to hazardous drinking in young adulthood in Norway and Australia (Enstad et al., 2019[35]). Using longitudinal data from the United States (Harris and Udry, 2015[36]), OECD analysis shows that drinking in childhood (between ages 15 and 18) is predictive of future drinking, even after adjusting for family income and minority status. Men who drank weekly when aged 15 to 18 were 56% more likely to drink weekly when aged 21 to 25 than men who rarely drank during childhood (Figure 2.13). Even monthly drinking during childhood increased the risk of weekly drinking six years later by 49% in men. For women, the effect was even larger, as women who drank weekly when aged 15 to 18 were more than twice as likely to drink weekly when aged 21 to 25, compared to women who rarely drank during childhood.

These effects were still observed 13 years later in both sexes, at ages 28 to 31. Monthly and weekly drinking at age 15 to 18 increased the likelihood of weekly drinking at age 28 to 31 by 55% to 68%.

Figure 2.13. Risk of drinking weekly in adulthood based on drinking pattern in childhood

Relative risk of being a weekly drinker at age 21 to 25* / 28 to 31, based on drinking pattern when aged 15 to 18, the United States



Note: * Due to the timing of the survey the age range is slightly larger in this wave; rarely drinking at age 15 to 18 was used as the reference category with a relative risk of one; bars indicate the 95% confidence interval; results are adjusted for age, ethnicity and income.
Source: OECD analysis of the Add Health cohort study, waves 1, 3 and 4 (1994-2009).

StatLink https://stat.link/1xvone

2.4. Social inequalities are a driver of variations in drinking patterns

Patterns of drinking across different social groups are not straightforward. This section looks at the relationship between alcohol consumption and social factors such as income and educational attainment, and the gender effect on this relationship. There are other dimensions of social inequalities in drinking that are overlooked here, such as differences in drinking related to ethnicity, minority or migrant status, and differences in drinking during pregnancy related to social conditions.

2.4.1. Are people with a higher income more or less likely to drink?

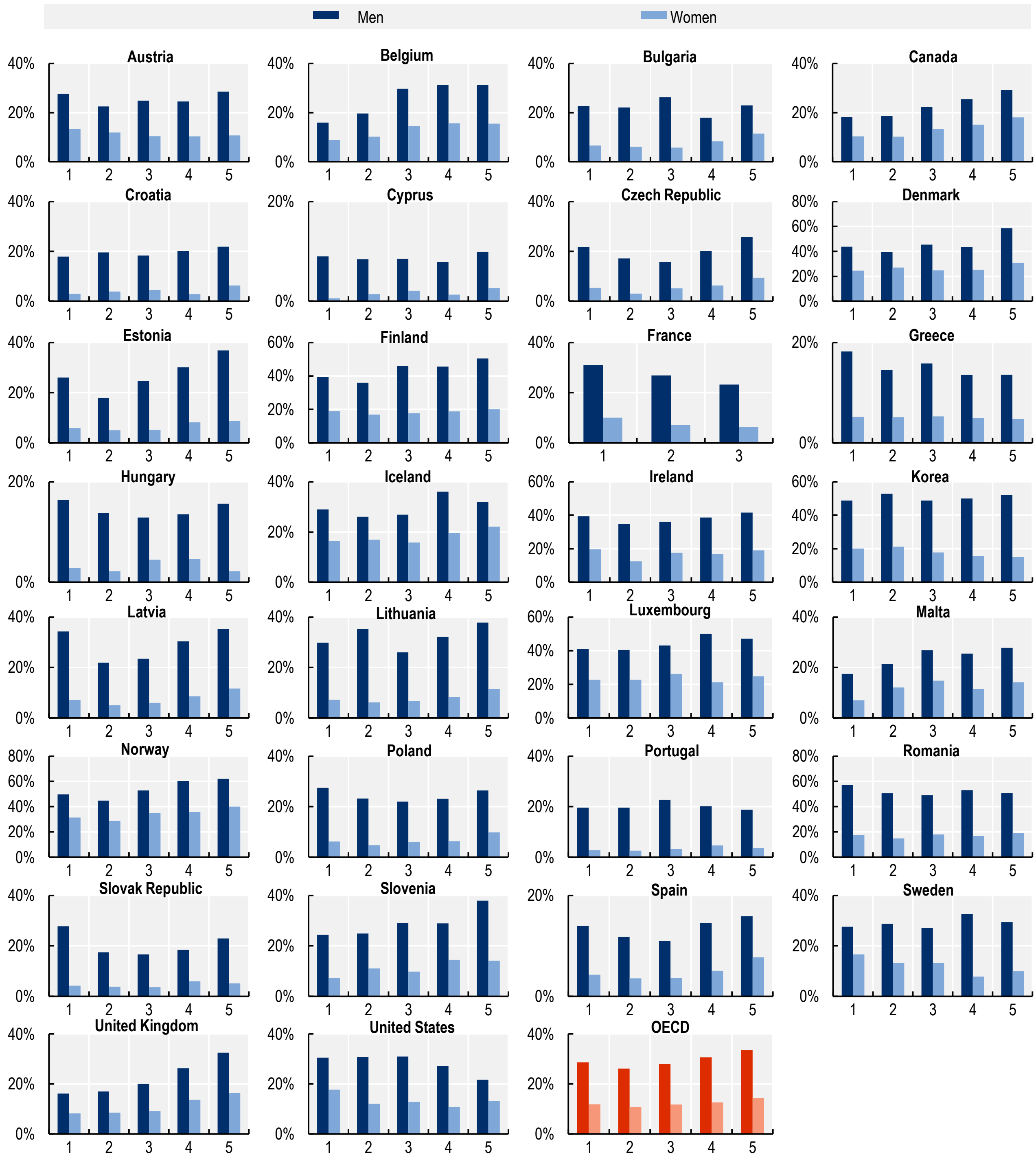
In many countries, there is a clear relationship between income and the likelihood of drinking alcohol at least weekly. On average in OECD countries, both men and women in higher income groups are more likely to drink weekly (Annex Figure 2.A.3). In some countries, including Belgium, Canada, Finland, Luxembourg and the United Kingdom, the gradient is steep. However, other countries see a U- or J-shaped curve, for one or both sexes, according to which individuals in the highest and lowest income categories are more likely to be weekly drinkers, compared to individuals in the middle-income categories. For example, men in Estonia, Greece, Latvia and Lithuania are less likely to be weekly drinkers if they are part of the middle socio-economic groups, with peaks in drinking at both the high and low ends of the income distribution. The same effect can be observed for women in Ireland, Lithuania and the Slovak Republic.

When looking at binge drinking, this U- or J-shaped curve is even more common (Figure 2.14). Many countries see the lowest rates of monthly binge drinking in the middle socio-economic classes. On average in OECD countries, women and men are more likely to binge drink monthly if they are in the lowest or two highest income groups. Exceptions are Belgium, Canada and Slovenia, where a positive relationship between income and binge drinking is observed. France, Greece and the United States see a negative relationship, where people on a lower income are more likely to binge drink monthly.

The U-shaped curve in binge drinking prevalence may be partly driven by other drinking patterns. In particular, evidence from two different studies suggests that the specific act of binge drinking increases with income, while some people in the lowest income groups exceed binge drinking limits owing to their generally heavy drinking (Cerdá, Johnson-Lawrence and Galea, 2011[37]; Lewer et al., 2016[38]). In addition, these findings should be interpreted in the light of the fact that data are based on self-reported alcohol consumption from national surveys. Self-reported alcohol consumption is known to be considerably underestimated, especially among heavy drinkers (Boniface, Kneale and Shelton, 2014[16]). Further, different population groups may underestimate their consumption to various degrees, creating misestimations in the size of social inequalities (Devaux and Sassi, 2016[39]).

Figure 2.14. Prevalence of monthly binge drinking by income group and sex

Proportion (%) of population that binge drinks alcohol at least once a month, lowest (1) to highest (5) income group



Note: Data differences between surveys should be accounted for when comparing countries; household income was equivalised for household size; data for France are split over three instead of five income groups, with 3 being the highest.

Source: OECD analysis of NHANES 2015 (United States); Baromètre santé 2017 (France); Canadian Community Health Survey 2015-16 (Canada); KNHANES 2018 (Korea); EHIS 2014 (remaining 26 countries).

StatLink https://stat.link/z51dja

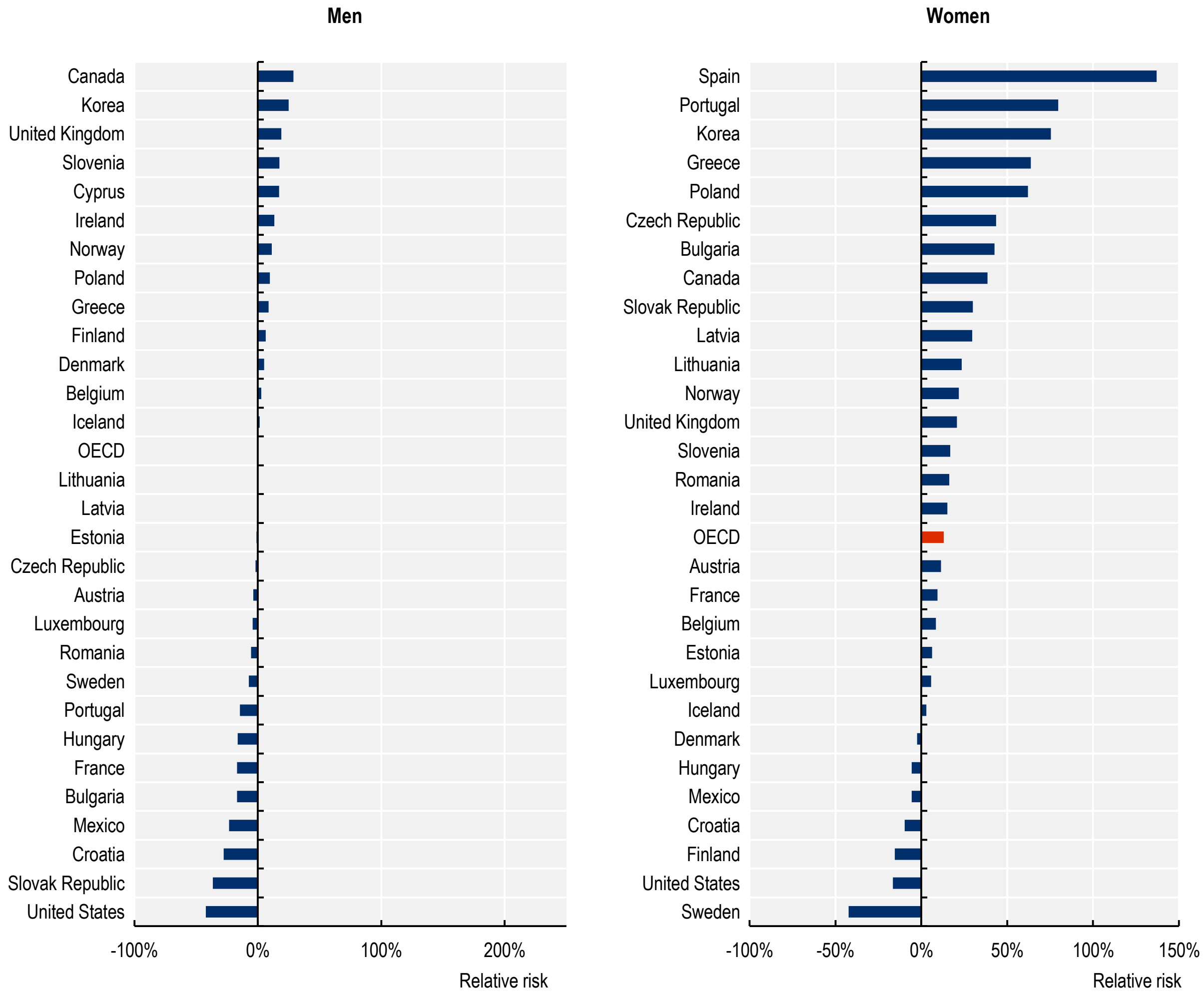
2.4.2. Are people with a higher education more or less likely to drink?

In almost all countries, people with higher educational attainment (i.e. those who have completed tertiary or university education) are more likely to be weekly drinkers (Annex Figure 2.A.4). This effect is considerably stronger in women, who are up to three times more likely to drink weekly if they have completed tertiary education in Latvia. On average across 25 OECD countries, women with higher educational attainment are 60% more likely to drink alcohol weekly (30% of women with higher education drink weekly versus 19% of women without higher education). For men, this effect is only 24% (49% versus 40%). Moreover, in the Slovak Republic, Lithuania, Mexico and Romania, men with a lower education are more likely to drink weekly. Previous studies have also found that people with a higher education are more likely to be current drinkers, with a greater effect in women than in men for most countries (French et al., 2014[40]; Grittner et al., 2013[41]).

Binge drinking presents a more varied inequalities picture than weekly drinking. On average across 26 OECD countries, women with higher educational attainment are 13% more likely to engage in monthly binge drinking (14% of women with higher education binge drink monthly versus 12% of women without higher education) (Figure 2.15). However, for men a considerable number of countries show an inverse relationship – where people with lower educational attainment are more likely to binge drink monthly. As noted above, these findings should be interpreted in the light of the fact that self-reports on alcohol use may vary across different population groups, creating misestimations in the size of social inequalities. Grittner et al. (2013[41]) also found mixed results on the relationship between education and risky single-occasion drinking (RSOD), with a significant relationship between lower education and RSOD among men, but no significant relationship between education and RSOD among women. However, they did find a significant association between higher education and RSOD for women in lower-income countries.

Figure 2.15. Relative risk of monthly binge drinking, by educational attainment and sex

Relative risk of binge drinking at least monthly for people with tertiary education versus those without



Note: Values represent an x% higher chance of binge drinking monthly if the person has tertiary education – values below zero indicate that people without tertiary education are more likely to binge drink monthly. Educational attainment was dichotomised into tertiary versus non-tertiary. The relative risk compares the proportion of people who monthly binge drink in the two groups of education.
Source: OECD analysis of NHANES 2015 (United States); Baromètre santé 2017 (France); ENCODAT 2016-17 (Mexico); Canadian Community Health Survey 2015-16 (Canada); KNHANES 2018 (Korea); EHIS 2014 (remaining 25 countries) (see survey details in Annex Table 2.A.1).

StatLink https://stat.link/1g3nke

2.5. Trends in alcohol affordability affect levels of consumption

Alcohol affordability plays a key role in determining the level of consumption and is influenced by three key factors: income, the price of alcohol (which is affected by the rate of taxation) and the price of other goods (Elder et al., 2010[42]; Rabinovich et al., 2009[43]).

This section analyses trends in alcohol affordability in the off-premise market (e.g. supermarkets) across several European countries as well as Australia, Canada and the United States for 2000-18.[3] The analysis takes into account both the relative price of alcohol and real income (see Annex Box 2.A.1 for further methodological details).

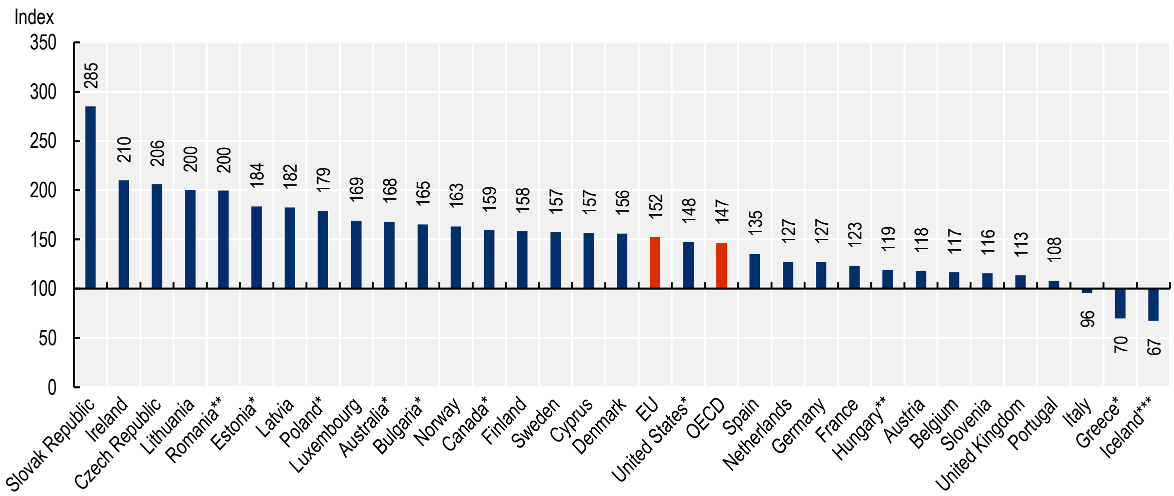
2.5.1. Is alcohol becoming more affordable?

Figure 2.16 shows the change in alcohol affordability between 2000 and 2018, with figures above 100 indicating an increase in affordability relative to the year 2000, and vice versa.[4] Across the 28 OECD countries analysed, alcohol affordability increased by nearly 50% over 2000-18. This means that in 2018, purchasing the same quantity of alcohol was, on average, 50% cheaper than in 2000, once changes in real income and the relative price of alcohol are taken into account.

It is important to reiterate that these findings represent the off-premise sector only, given previous research indicates affordability in the off-premise market has grown at a faster rate than in the on-premise market (Public Health England, 2016[44]; Rabinovich et al., 2009[43]).

Figure 2.16. Trends in alcohol affordability, 2000-18 (or earliest and latest year)

Alcohol affordability index (index year 2000 = 100)



Note: An alcohol affordability value below 100 indicates that alcohol is less affordable owing to either (or both) a decline in real income or a rise in the relative price of alcohol, and vice versa. *Latest data from 2017, **starting year 2001, ***latest data from 2014. Missing data in Europe for Turkey, Switzerland, Croatia and Malta.

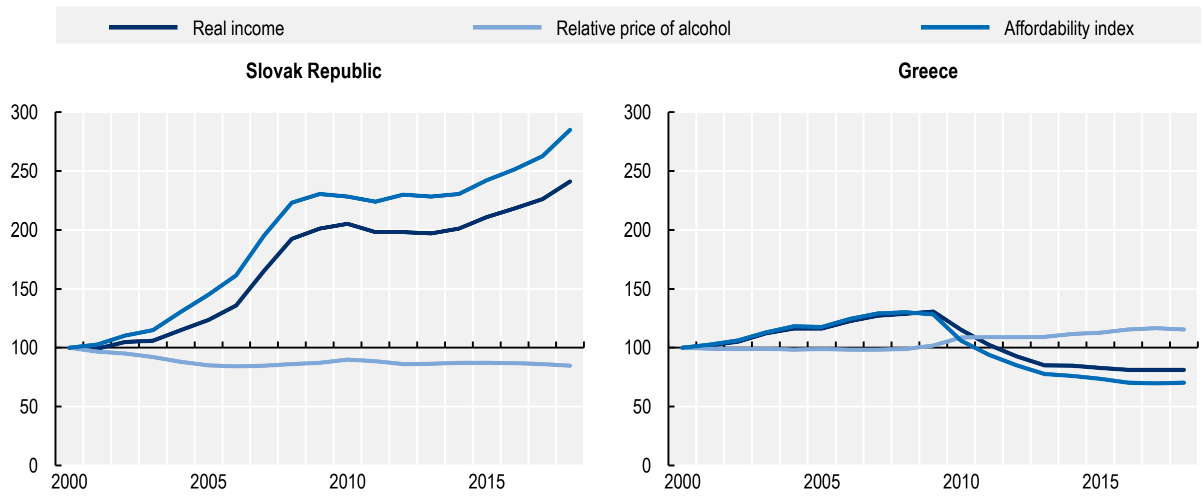
Source: Eurostat (2019[45]), Harmonised Index of Consumer Prices: All items, https://ec.europa.eu/eurostat/databrowser/view/prc_hicp_aind/default/table?lang=en; Eurostat (2019[46]), Harmonised Index of Consumer Prices: Alcoholic beverages, https://ec.europa.eu/eurostat/databrowser/view/PRC_HICP_AIND__custom_287314/default/table?lang=en; Eurostat (2019[47]), Adjusted Disposable Income, Gross, https://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do; Australian Bureau of Statistics (2019[48]), 6401.0 Consumer Price Index: Alcoholic beverages, https://www.abs.gov.au/statistics/economy/price-indexes-and-inflation/consumer-price-index-australia/dec-2019; Australian Bureau of Statistics (2019[49]), 6401.0 Consumer Price Index: All groups CPI, https://www.abs.gov.au/statistics/economy/price-indexes-and-inflation/consumer-price-index-australia/dec-2019; Statistics Canada (2019[50]), Table 18-10-0005-01 Consumer Price Index: Annual average, not seasonally adjusted, https://doi.org/10.25318/1810000501-eng; U.S. Bureau of Labor Statistics (2019[51]), Alcoholic Beverages in U.S. City Average: All urban consumers, not seasonally adjusted (series ID: CUUR0000SAF116), https://www.bls.gov/cpi/#data.

StatLink https://stat.link/3l1a2w

Between 2000 and 2018, alcohol became more affordable in the majority of countries, particularly among those located in Eastern Europe. Only three countries – Iceland, Greece and Italy – experienced a decline in affordability: specifically by 33%, 30% and 4%, respectively. These results are not surprising, given that they were all severely affected by the global financial crisis. As an example, in the aftermath of the global financial crisis Greece saw the relative price of alcohol increase, while real incomes dropped markedly from 2009 onwards.

Figure 2.17 shows alcohol affordability in two countries experiencing significantly different trends: the Slovak Republic and Greece.

Figure 2.17. Alcohol affordability in the Slovak Republic and Greece, 2000-18 (or latest year)



Note: An alcohol affordability value below 100 indicates that alcohol is less affordable. Real income data for Greece are for 2000-17.
Source: Eurostat (2019[45]), Harmonised Index of Consumer Prices: All items, https://ec.europa.eu/eurostat/databrowser/view/prc_hicp_aind/default/table?lang=en; Eurostat (2019[46]), Harmonised Index of Consumer Prices: Alcoholic beverages, https://ec.europa.eu/eurostat/databrowser/view/PRC_HICP_AIND__custom_287314/default/table?lang=en; Eurostat (2019[47]), Adjusted Disposable Income, Gross, https://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do.

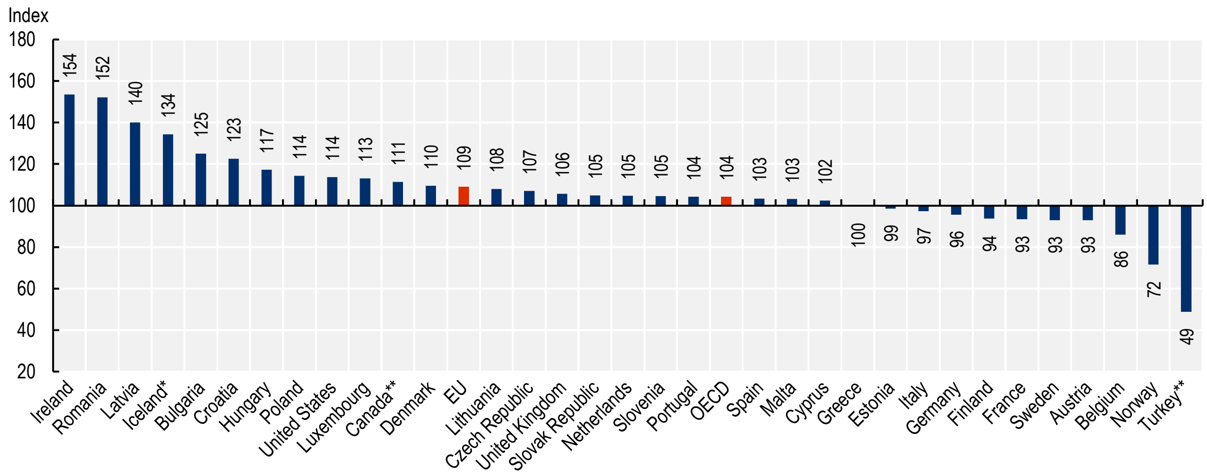
StatLink https://stat.link/jd28qw

Trends in alcohol affordability were also assessed post-global financial crisis, given that trends in affordability between 2000 and 2018 were largely driven by marked falls in real income. Between 2013 and 2018, the number of countries that experienced a fall in alcohol affordability increased from three (Italy, Greece and Iceland) to five (Greece, Norway, Sweden, Belgium and Estonia) (Annex Figure 2.A.6).

Alcohol affordability trends were also examined for young people: those aged between 16 and 24 (Figure 2.18). There was greater variation in alcohol affordability trends for young people, with approximately one-third of all countries experiencing a decline in alcohol affordability between 2013 and 2018. Countries where alcohol affordability declined for all ages between 2013-18 experienced the same trend for young people (Belgium, Estonia, Greece, Norway and Sweden). In Austria, Germany, France and Finland, however, alcohol affordability fell for young people only.

Figure 2.18. Trends in alcohol affordability for young people, 2013-18 (or latest year)

Alcohol affordability index for young people 2013-18 (Index year 2013 = 100)



Note: An alcohol affordability value below 100 indicates that alcohol is less affordable, and vice versa. The analysis period 2013-18 was chosen given high levels of missing income data up to 2005. *Latest data from 2016, **latest data from 2017.

Source: Statistics Canada (2020[52]), Table 11-10-0239-01 Income of Individuals by Age Group, Sex and Income Source: Canada, provinces and selected census metropolitan areas, https://doi.org/10.25318/1110023901-eng; Eurostat (2019[45]), Harmonised Index of Consumer Prices: All items, https://ec.europa.eu/eurostat/databrowser/view/prc_hicp_aind/default/table?lang=en https://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do; Eurostat (2019[46]), Harmonised Index of Consumer Prices: Alcoholic beverages, https://ec.europa.eu/eurostat/databrowser/view/PRC_HICP_AIND__custom_287314/default/table?lang=en; Eurostat (2019[53]), Mean Equivalised Net Income (for ages 16 to 24), https://ec.europa.eu/eurostat/databrowser/view/ILC_DI03__custom_287499/default/table?lang=en; U.S. Bureau of Labor Statistics (2020[54]), Weekly and Hourly Earnings Data from the Current Population: Median usual weekly earnings – in current dollars (series ID: LEU0252886 300), https://beta.bls.gov/dataViewer/view/timeseries/LEU0252886300.

StatLink https://stat.link/x9n15l

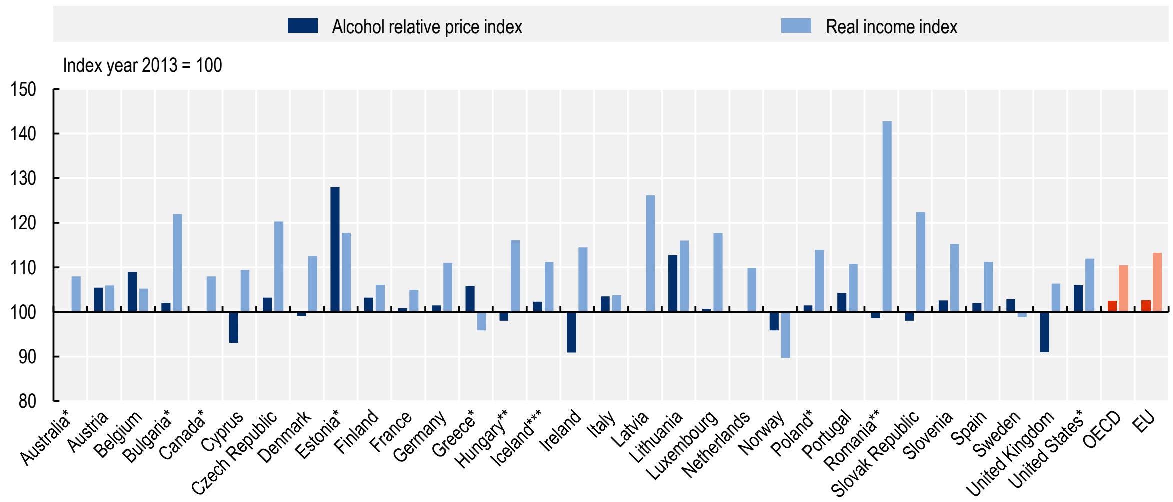
Among OECD countries, the largest disparity in alcohol affordability trends between the total population and young people occurred in Norway, the Slovak Republic, Germany and Belgium (Annex Figure 2.A.7). Both Norway and Belgium experienced declines in affordability for young people and all ages, while in Germany affordability fell for young people only. Conversely, the Slovak Republic saw affordability increase in both groups. Given the same data for alcohol prices were used across age groups, these results reflect differences in real income.

2.5.2. What is driving the trend in alcohol affordability?

Figure 2.19 outlines the "driving force" behind trends in alcohol affordability between 2013 and 2018 for all people.[5] That is, whether the change in real income was greater than the change in the relative price of alcohol, or vice versa. Results from the analysis show that the growth in real income was the main driver of affordability, with the exceptions of Belgium, Estonia, Greece, Sweden and the United Kingdom. For example, in Belgium, real income rose by 5%, which was lower than the 9% increase in the relative price of alcohol, causing alcohol affordability to decline.

Of the eight countries that saw a decline in the relative price of alcohol between 2013 and 2018, seven do not adjust their alcohol excise tax rate for inflation (e.g. United Kingdom, Ireland and Norway) (see Figure 6.4 in Chapter 6). Conversely, countries that do adjust for inflation – i.e. Australia, Belgium, Canada, France, Italy and Spain – experienced either no change or an increase in the relative price of alcohol.

Figure 2.19. Driving force behind trends in alcohol affordability, 2013-18 (or latest year)



Note: For the alcohol relative price index, a figure above 100 indicates that alcohol is more expensive, while for the real income index, a figure above 100 indicates that real income has risen. *Latest data from 2017; **starting year 2001; ***latest data from 2014. Data are missing for Croatia and Switzerland in Europe.

Source: Eurostat (2019[45]), Harmonised Index of Consumer Prices: All items, https://ec.europa.eu/eurostat/databrowser/view/prc_hicp_aind/default/table?lang=en; Eurostat (2019[46]), Harmonised Index of Consumer Prices: Alcoholic beverages, https://ec.europa.eu/eurostat/databrowser/view/PRC_HICP_AIND__custom_287314/default/table?lang=en; Eurostat (2019[47]), Adjusted Disposable Income, Gross, https://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do; Australian Bureau of Statistics (2019[48]), 6401.0 Consumer Price Index: Alcoholic beverages, https://www.abs.gov.au/statistics/economy/price-indexes-and-inflation/consumer-price-index-australia/dec-2019; Australian Bureau of Statistics (2019[49]), 6401.0 Consumer Price Index: All groups CPI, https://www.abs.gov.au/statistics/economy/price-indexes-and-inflation/consumer-price-index-australia/dec-2019; Statistics Canada (2019[50]), Table 18-10-0005-01 Consumer Price Index: Annual average, not seasonally adjusted, https://doi.org/10.25318/1810000501-eng; U.S. Bureau of Labor Statistics (2019[51]), Alcoholic Beverages in U.S. City Average: All urban consumers, not seasonally adjusted (series ID: CUUR0000SAF116), https://www.bls.gov/cpi/#data.

StatLink https://stat.link/itc9xr

2.6. Conclusion: Understanding trends and patterns is crucial to address alcohol consumption

Alcohol consumption is a risk factor for numerous diseases, and can cause harm to others. People in OECD countries drink on average 10 litres of pure alcohol per year per person – this is equivalent to two bottles of wine, or nearly 4 litres of beer, per week. Men consume more than women. On average across OECD countries, 14% of total alcohol consumed is through unrecorded channels, such as illicit alcohol production and trade. During the last decade, per capita alcohol consumption in OECD countries remained largely stable, with few countries experiencing significant shifts in consumption.

But beyond average trends, the analyses presented in this chapter identified a number of risky drinking behaviours such as binge drinking, heavy drinking, alcohol dependence and early onset of drinking in childhood. As discussed in Chapter 4, these drinking behaviours have significant implications for the burden of disease, the health costs and the wider economy.

Analyses in this chapter also showed that alcohol use evolves over the life course. Inequalities exist, since some population groups are more at risk for alcohol consumption, including teenagers, women with higher education and people in both the lowest and highest income groups. Over the past two decades, while real income has increased, relative alcohol prices have remained stable, making alcohol more affordable. Understanding individual patterns and the drivers of drinking is crucial for designing better policies to tackle harmful alcohol use, as discussed in Chapter 6 and Chapter 7.

References

Australian Bureau of Statistics (2019), *6401.0 Consumer Price Index: Alcoholic beverages*, Australian Bureau of Statistics, Canberra, https://www.abs.gov.au/statistics/economy/price-indexes-and-inflation/consumer-price-index-australia/dec-2019. [48]

Australian Bureau of Statistics (2019), *6401.0 Consumer Price Index: All groups CPI*, Australian Bureau of Statistics, Canberra, https://www.abs.gov.au/statistics/economy/price-indexes-and-inflation/consumer-price-index-australia/dec-2019. [49]

Bhattacharya, A. et al. (2018), "How dependent is the alcohol industry on heavy drinking in England?", *Addiction*, Vol. 113/12, pp. 2225-2232, http://dx.doi.org/10.1111/add.14386. [15]

Bobrova, N. et al. (2010), "Gender differences in drinking practices in middle aged and older Russians", *Alcohol and Alcoholism*, Vol. 45/6, pp. 573-580, http://dx.doi.org/10.1093/alcalc/agq069. [6]

Boniface, S., J. Kneale and N. Shelton (2014), "Drinking pattern is more strongly associated with under-reporting of alcohol consumption than socio-demographic factors: Evidence from a mixed-methods study", *BMC Public Health*, Vol. 14/1, p. 1297, http://dx.doi.org/10.1186/1471-2458-14-1297. [16]

Castillo, J., S. Jivraj and L. Ng Fat (2017), "The regional geography of alcohol consumption in England: Comparing drinking frequency and binge drinking", *Health and Place*, Vol. 43, pp. 33-40, http://dx.doi.org/10.1016/j.healthplace.2016.11.007. [23]

Cerdá, M., V. Johnson-Lawrence and S. Galea (2011), "Lifetime income patterns and alcohol consumption: Investigating the association between long- and short-term income trajectories and drinking", *Social Science and Medicine*, Vol. 73/8, pp. 1178-1185, http://dx.doi.org/10.1016/j.socscimed.2011.07.025. [37]

Chaiyasong, S. et al. (2018), "Drinking patterns vary by gender, age and country-level income: Cross-country analysis of the International Alcohol Control Study", *Drug and Alcohol Review*, Vol. 37/Suppl Suppl 2, pp. S53-S62, http://dx.doi.org/10.1111/dar.12820. [20]

Currie, C. et al. (eds.) (2008), *Inequalities In Young People's Health: HBSC International Report from the 2005/2006 Survey*, WHO Regional Office for Europe, Copenhagen, https://www.euro.who.int/__data/assets/pdf_file/0005/53852/E91416.pdf (accessed on 16 October 2020). [30]

Currie, C. et al. (eds.) (2004), *Young People's Health in Context. Health Behaviour in School-aged Children (HBSC) study: International Report from the 2001/2002 Survey*, WHO Regional Office for Europe, Copenhagen, https://www.euro.who.int/__data/assets/pdf_file/0008/110231/e82923.pdf (accessed on 16 October 2020). [29]

Currie, C. et al. (eds.) (2012), *Social Determinants of Health and Well-being among Young People. Health Behaviour in School-aged Children (HBSC) Study: International Report from the 2009/2010 Survey*, WHO Regional Office for Europe, Copenhagen, https://www.euro.who.int/en/publications/abstracts/social-determinants-of-health-and-well-being-among-young-people.-health-behaviour-in-school-aged-children-hbsc-study (accessed on 16 October 2020). [31]

Delker, E., Q. Brown and D. Hasin (2016), “Alcohol consumption in demographic subpopulations: An epidemiologic overview”, *Alcohol Research: Current Reviews*, Vol. 38/1, pp. 7-15. [21]

Devaux, M. and F. Sassi (2016), “Social disparities in hazardous alcohol use: Self-report bias may lead to incorrect estimates”, *European Journal of Public Health*, Vol. 26/1, pp. 129-134, http://dx.doi.org/10.1093/eurpub/ckv190. [39]

Elder, R. et al. (2010), “The effectiveness of tax policy interventions for reducing excessive alcohol consumption and related harms”, *American Journal of Preventive Medicine*, Vol. 38/2, pp. 217-229, http://dx.doi.org/10.1016/j.amepre.2009.11.005. [42]

Englund, M. et al. (2008), “Childhood and adolescent predictors of heavy drinking and alcohol use disorders in early adulthood: A longitudinal developmental analysis”, *Addiction*, Vol. 103/s1, pp. 23-35, http://dx.doi.org/10.1111/j.1360-0443.2008.02174.x. [34]

Enstad, F. et al. (2019), “Predicting hazardous drinking in late adolescence/young adulthood from early and excessive adolescent drinking: A longitudinal cross-national study of Norwegian and Australian adolescents”, *BMC Public Health*, Vol. 19/1, http://dx.doi.org/10.1186/s12889-019-7099-0. [35]

Eurostat (2019), *Adjusted Disposable Income, Gross*, European Commission, Luxembourg, https://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do. [47]

Eurostat (2019), *Harmonised Index of Consumer Prices: Alcoholic beverages*, European Commission, Luxembourg, https://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do. [46]

Eurostat (2019), *Harmonised Index of Consumer Prices: All items*, European Commission, Luxembourg, https://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do. [45]

Eurostat (2019), *Mean Equivalised Net Income (for ages 16 to 24)*, European Commission, Luxembourg, https://ec.europa.eu/eurostat/databrowser/view/ILC_DI03__custom_287499/default/table?lang=en. [53]

French, D. et al. (2014), “Gender differences in alcohol consumption among middle-aged and older adults in Australia, the United States and Korea”, *Australian and New Zealand Journal of Public Health*, Vol. 38/4, pp. 332-339, http://dx.doi.org/10.1111/1753-6405.12227. [40]

Grittner, U. et al. (2013), “Alcohol consumption and social inequality at the individual and country levels: Results from an international study”, *European Journal of Public Health*, Vol. 23/2, pp. 332-339, http://dx.doi.org/10.1093/eurpub/cks044. [41]

Harris, K. and R. Udry (2015), *National Longitudinal Study of Adolescent to Adult Health (Add Health) Wave IV, 2008*, UNC Dataverse, V3, http://dx.doi.org/doi:10.15139/S3/11920. [36]

IAS (2016), *Youthful Abandon: Why Are Young People Drinking Less?*, Institute of Alcohol Studies, London, http://www.ias.org.uk/uploads/pdf/IAS%20reports/rp22072016.pdf (accessed on 27 March 2020). [28]

Inchley, J. et al. (eds.) (2020), *Spotlight on Adolescent Health and Well-being: Findings from the 2017/2018 Health Behaviour in School-aged Children (HBSC) Survey in Europe and Canada. International Report Volume 2. Key Data*, WHO Regional Office for Europe, Copenhagen, https://www.euro.who.int/en/health-topics/Life-stages/child-and-adolescent-health/health-behaviour-in-school-aged-children-hbsc/publications/2020/spotlight-on-adolescent-health-and-well-being.-findings-from-the-20172018-health-behaviour-in-school-aged-children-hbsc-survey-in-europe-and-canada.-international-report.-volume-2.-key-data (accessed on 20 July 2020). [24]

Inchley, J. et al. (2016), *Growing Up Unequal: Gender and Socioeconomic Differences in Young People's Health and Well-being: Health Behaviour in School-Aged Children (HBSC) Study – International Report from the 2013/2014 Survey*, WHO Regional Office for Europe, Copenhagen, https://www.euro.who.int/en/publications/abstracts/growing-up-unequal.-hbsc-2016-study-20132014-survey (accessed on 23 May 2018). [32]

Kerr, W. and T. Greenfield (2007), "Distribution of alcohol consumption and expenditures and the impact of improved measurement on coverage of alcohol sales in the 2000 national alcohol survey", *Alcoholism: Clinical and Experimental Research*, Vol. 31/10, pp. 1714-1722, http://dx.doi.org/10.1111/j.1530-0277.2007.00467.x. [14]

Kraus, L. et al. (2019), "Long waves of consumption or a unique social generation? Exploring recent declines in youth drinking", *Addiction Research and Theory*, Vol. 28/3, pp. 183-193, http://dx.doi.org/10.1080/16066359.2019.1629426. [26]

Lewer, D. et al. (2016), "Unravelling the alcohol harm paradox: A population-based study of social gradients across very heavy drinking thresholds", *BMC Public Health*, Vol. 16/1, p. 599, http://dx.doi.org/10.1186/s12889-016-3265-9. [38]

Livingston, M. and S. Callinan (2019), "Examining Australia's heaviest drinkers", *Australian and New Zealand Journal of Public Health*, Vol. 43/5, pp. 451-456, http://dx.doi.org/10.1111/1753-6405.12901. [12]

Llerena, S. et al. (2015), "Binge drinking: Burden of liver disease and beyond", *World Journal of Hepatology*, Vol. 7/27, pp. 2703-2715, http://dx.doi.org/10.4254/wjh.v7.i27.2703. [9]

Molina, P. and S. Nelson (2018), "Binge drinking's effects on the body", *Alcohol Research: Current Reviews*, Vol. 39/1, pp. 99-109. [10]

Moore, A. et al. (2005), "Longitudinal patterns and predictors of alcohol consumption in the United States", *American Journal of Public Health*, Vol. 95/3, pp. 458-464, http://dx.doi.org/10.2105/AJPH.2003.019471. [22]

NHS Digital (2019), *Statistics on Alcohol, England*, https://digital.nhs.uk/data-and-information/publications/statistical/statistics-on-alcohol/2019. [55]

OECD (2020), *OECD Health Statistics*, OECD Publishing, Paris, https://doi.org/10.1787/health-data-en. [5]

OECD (2020), *OECD Health Statistics 2020, Definitions, Sources and Methods*, OECD Publishing, Paris, http://stats.oecd.org/Index.aspx?DataSetCode=SHA_HK (accessed on 26 October 2020). [4]

OECD (2020), *OECD Reviews of Public Health: Korea: A Healthier Tomorrow*, OECD Reviews of Public Health, OECD Publishing, Paris, https://dx.doi.org/10.1787/be2b7063-en. [7]

Paraje, G. and P. Pincheira (2018), "Asequibilidad de cerveza y bebidas azucaradas para 15 países de América Latina", *Revista Panamericana de Salud Pública*, Vol. 42, http://dx.doi.org/10.26633/rpsp.2018.49. [56]

Public Health England (2016), *The Public Health Burden of Alcohol and the Effectiveness and Cost-Effectiveness of Alcohol Control Policies: An evidence review*, Public Health England, London, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/733108/alcohol_public_health_burden_evidence_review_update_2018.pdf. [44]

Rabinovich, L. et al. (2009), *The Affordability of Alcoholic Beverages in the European Union: Understanding the Link Between Alcohol Affordability, Consumption and Harms*, RAND Europe, Cambridge, http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.183.3387&rep=rep1&type=pdf. [43]

Rehm, J. et al. (2006), "Alcohol", in *Disease Control Priorities in Developing Countries, 2nd edition*, The International Bank for Reconstruction and Development/The World Bank, Washington DC, https://www.ncbi.nlm.nih.gov/books/NBK11728/. [17]

Richard, J. et al. (2019), "La consommation d'alcool chez les adultes en France en 2017", *Bulletin Epidémiologique Hebdomadaire*, Vol. 5-6, pp. 89-97, https://www.santepubliquefrance.fr/docs/bulletin-epidemiologique-hebdomadaire-19-fevrier-2019-n-5-6 (accessed on 3 March 2020). [13]

Roerecke, M. and J. Rehm (2010), "Irregular heavy drinking occasions and risk of ischemic heart disease: A systematic review and meta-analysis", *American Journal of Epidemiology*, Vol. 171/6, pp. 633-644, http://dx.doi.org/10.1093/aje/kwp451. [11]

Sassi, F. (ed.) (2015), *Tackling Harmful Alcohol Use: Economics and Public Health Policy*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264181069-en. [18]

Statistics Canada (2020), *Table 11-10-0239-01: Income of Individuals by Age Group, Sex and Income Source: Canada, provinces and selected census metropolitan areas*, Statistics Canada, Ottawa, https://doi.org/10.25318/1110023901-eng. [52]

Statistics Canada (2019), *Table 18-10-0005-01 Consumer Price Index: Annual average, not seasonally adjusted*, Statistics Canada, Ottawa, https://doi.org/10.25318/1810000501-eng. [50]

Törrönen, J. et al. (2019), "Why are young people drinking less than earlier? Identifying and specifying social mechanisms with a pragmatist approach", *International Journal of Drug Policy*, Vol. 64, pp. 13-20, http://dx.doi.org/10.1016/j.drugpo.2018.12.001. [27]

U.S. Bureau of Labor Statistics (2020), *Weekly and Hourly Earnings Data from the Current Population: Median usual weekly earnings – in current dollars (series ID: LEU0252886300)*, U.S. Bureau of Labor Statistics, Washington DC. [54]

U.S. Bureau of Labor Statistics (2019), *Alcoholic Beverages in U.S. City Average: All urban consumers, not seasonally adjusted*, U.S. Bureau of Labor Statistics, Washington DC, https://www.bls.gov/cpi/#data. [51]

WHO (2020), *Alcohol: Heavy episodic drinking (drinkers only) past 30 days*, World Health Organization, Geneva, https://www.who.int/data/gho/indicator-metadata-registry/imr-details/458 (accessed on 10 February 2020). [19]

WHO (2020), *Alcohol: Unrecorded per capita (15+ years) consumption (in litres of pure alcohol)*, World Health Organization, Geneva, https://www.who.int/data/gho/indicator-metadata-registry/imr-details/466 (accessed on 10 February 2020). [8]

WHO (2020), *Global Information System on Alcohol and Health (GISAH)*, World Health Organization, Geneva, https://www.who.int/data/gho/data/themes/global-information-system-on-alcohol-and-health (accessed on 28 October 2020). [2]

WHO (2018), *Alcohol Fact Sheet*, World Health Organization, Geneva, https://www.who.int/news-room/fact-sheets/detail/alcohol (accessed on 22 January 2020). [1]

WHO (2014), *Global Information System on Alcohol and Health Indicator Code Book*, World Health Organization, Geneva, https://www.who.int/substance_abuse/activities/gisah_indicatorbook.pdf (accessed on 26 October 2020). [3]

WHO Regional Office for Europe (2019), *Status Report on Alcohol Consumption, Harm and Policy Responses in 30 European Countries*, WHO Regional Office for Europe, Copenhagen, https://www.euro.who.int/en/health-topics/disease-prevention/alcohol-use/publications/2019/status-report-on-alcohol-consumption,-harm-and-policy-responses-in-30-european-countries-2019 (accessed on 28 May 2020). [25]

Zucker, R. (2008), “Anticipating problem alcohol use developmentally from childhood into middle adulthood: What have we learned?”, *Addiction*, Vol. 103/s1, pp. 100-108, http://dx.doi.org/10.1111/j.1360-0443.2008.02179.x. [33]

Annex 2.A. Additional data and graphs

Various data sources were used in Chapter 2 to analyse the levels and trends in alcohol consumption. Both international data collection, and international and national health surveys were employed. International surveys and data collection are generally harmonised to allow comparison across countries and over time. National survey data provide the opportunity to make an assessment of a situation in a country. Annex Table 2.A.1 provides information on data sources, including country, survey name, survey years, data providers and a link to the survey where more information (survey sampling method, response rates and representativeness of the general population) can be sought.

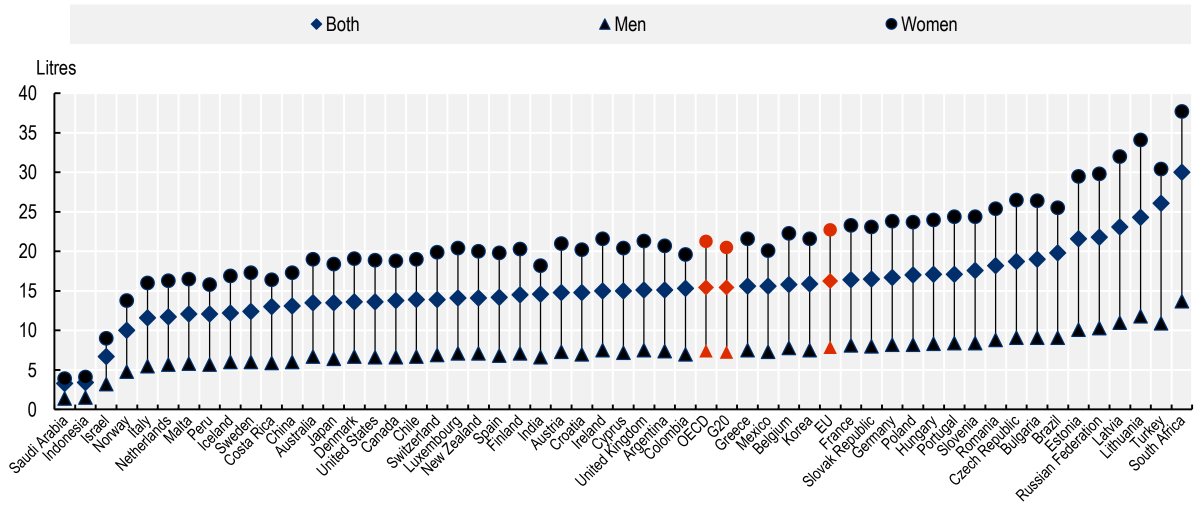
Annex Table 2.A.1. Data sources

Country	Survey name	Survey years available	Data provider/manager	Link to survey information
Multiple countries	Health Behaviour in School-aged Children (HBSC)	2001/02; 2005/06; 2009/10; 2013/14	HBSC Data Management Centre is based at the Department of Health Promotion and Development in the University of Bergen, Norway	http://www.hbsc.org/methods/index.html
Multiple countries	European Health Interview Survey (EHIS)	2014	Eurostat	https://ec.europa.eu/eurostat/web/microdata/european-health-interview-survey
Multiple countries	Global Information System on Alcohol and Health (GISAH)	Varies by indicator	World Health Organization (WHO)	https://www.who.int/substance_abuse/activities/gisah/en/
Canada	Canadian Community Health Survey	2015-16	Statistics Canada	https://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=3226
United Kingdom (England)	Health Survey for England	2016	Health Surveys Unit of NatCen Social Research and the Research Department of Epidemiology and Public Health at University College London	https://digital.nhs.uk/data-and-information/publications/statistical/health-survey-for-england/health-survey-for-england-2016
France	Baromètre santé	2017	Santé Publique France	https://www.santepubliquefrance.fr/etudes-et-enquetes/barometres-de-sante-publique-france/barometre-sante-2017
Korea	Korean National Health and Nutrition Examination Survey (KNHANES)	2018	Korea Centers for Disease Control and Prevention	https://knhanes.cdc.go.kr/knhanes/eng/index.do
Mexico	Encuesta Nacional de Consumo de Drogas, Alcohol y Tabaco (ENCODAT)	2016-17	Comisión Nacional contra las Adicciones	https://encuestas.insp.mx/ena/encodat2017.php
United States	National Health and Nutrition Examination Survey (NHANES)	2015	National Center for Health Statistics, Centers for Disease Control and Prevention	https://wwwn.cdc.gov/nchs/nhanes/ContinuousNhanes/Default.aspx?BeginYear=2015

Country	Survey name	Survey years available	Data provider/manager	Link to survey information
United States	The National Longitudinal Study of Adolescent to Adult Health, Add Health	1994-2009	Harris, K.M. (2009), Chapel Hill, NC: Carolina Population Center, University of North Carolina at Chapel Hill	https://addhealth.cpc.unc.edu/documentation/

Annex Figure 2.A.1. Alcohol consumption, drinkers only

Total per capita (aged 15+) alcohol consumption (in litres of pure alcohol) for drinkers only, 2016

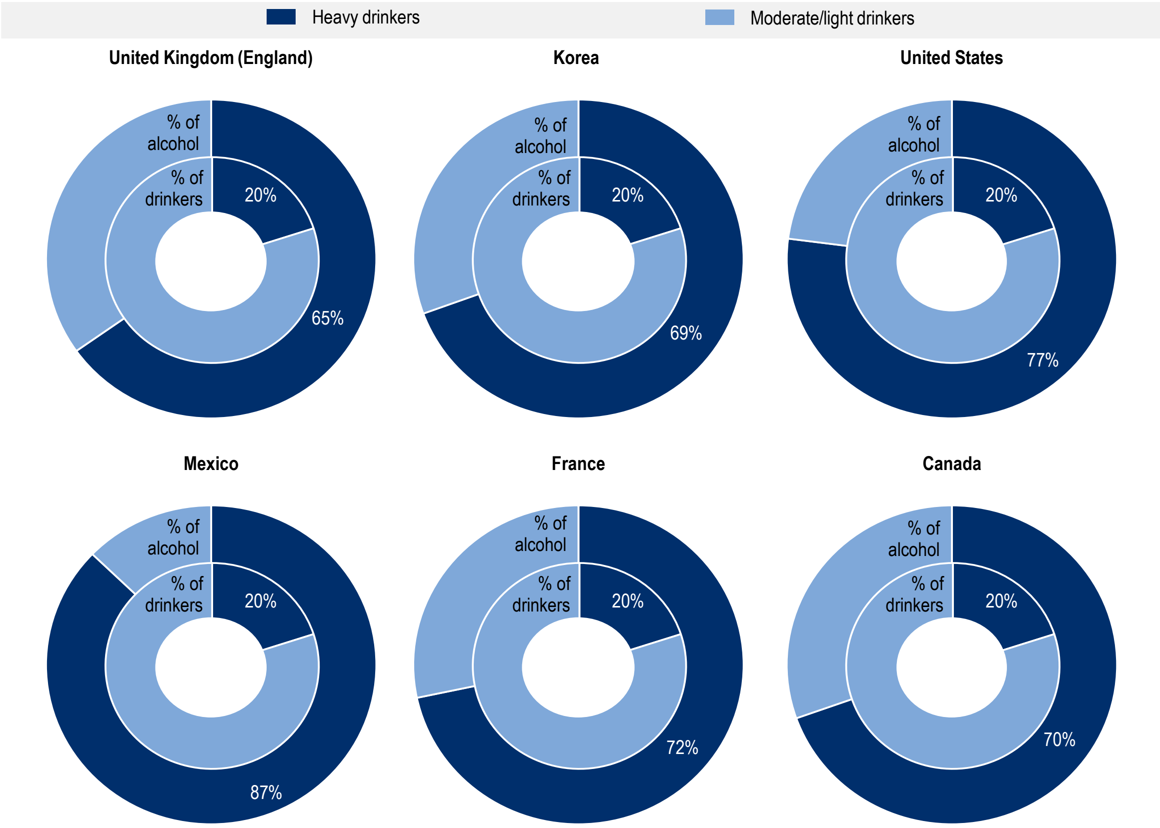


Note: Total alcohol consumption among drinkers is defined as the total (recorded and unrecorded) amount of alcohol consumed per adult (15+ years) drinker over a calendar year, in litres of pure alcohol.
Source: OECD analysis of WHO (2020[2]) GISAH, https://www.who.int/data/gho/data/themes/global-information-system-on-alcohol-and-health.

StatLink https://stat.link/xjkhsb

Annex Figure 2.A.2. Proportion of alcohol drunk by the 20% of drinkers who drink the most

Percentage of total pure alcohol consumption consumed

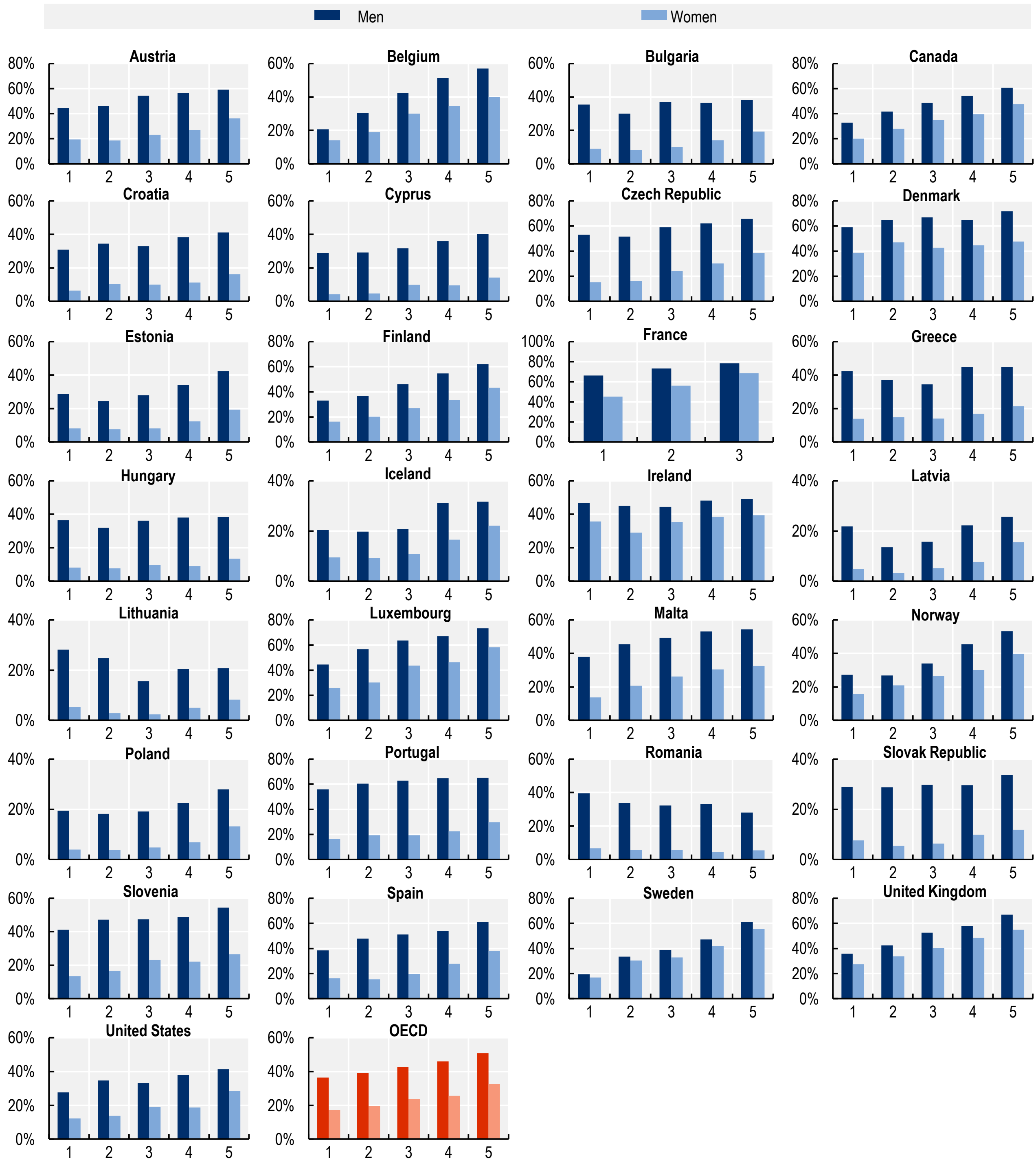


Note: Analysis is based on self-reported alcohol consumption from national surveys – for this reason, the amount of alcohol consumed is likely to be underestimated.
Source: OECD analysis of Health Survey for England 2016 (United Kingdom (England)); NHANES 2015 (United States); Baromètre santé 2017 (France); ENCODAT 2016-17 (Mexico); Canadian Community Health Survey 2015-16 (Canada); KNHANES 2018 (Korea) (see survey details in Annex Table 2.A.1).

StatLink https://stat.link/tu3m41

Annex Figure 2.A.3. Prevalence of weekly drinking by income group and sex

Proportion (%) of population that drinks alcohol at least once a week, lowest (1) to highest (5) income group



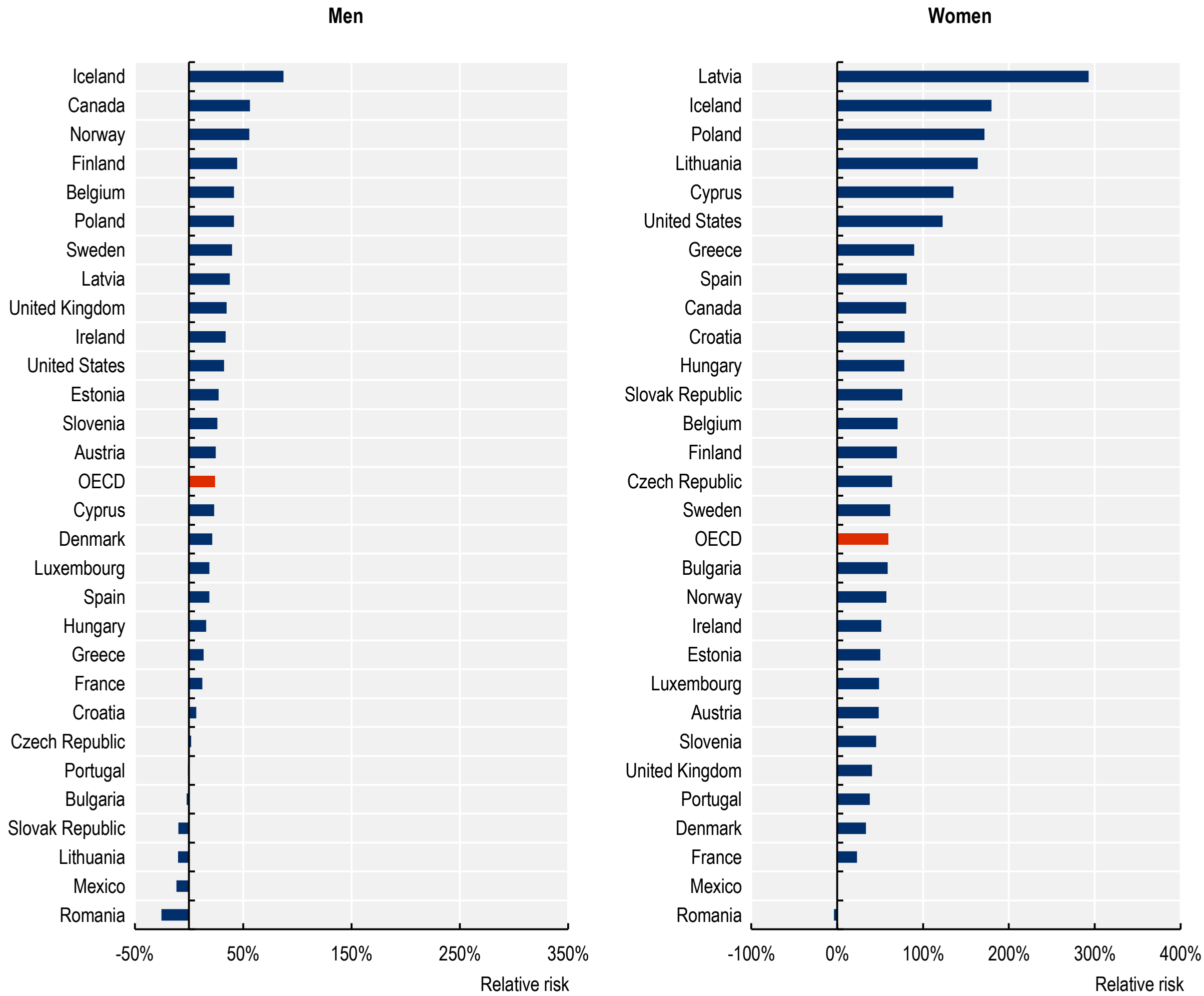
Note: Due to data differences between surveys, the absolute prevalence cannot be compared between countries or to other data sources; household income was equivalised for household size; data for France are split over three instead of five income groups, with 3 being the highest.

Source: OECD analysis of NHANES 2015 (United States); Baromètre santé 2017 (France); Canadian Community Health Survey 2015-16 (Canada); EHIS 2014 (remaining 26 countries).

StatLink https://stat.link/f1qwgt

Annex Figure 2.A.4. Relative risk of weekly drinking by educational attainment and sex

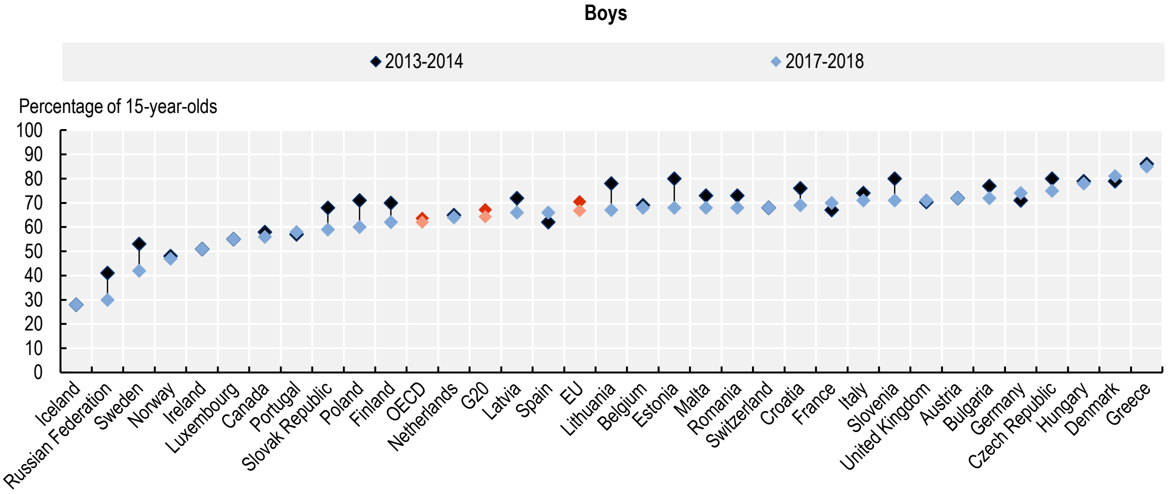
Relative risk of weekly drinking for people with tertiary education versus those without

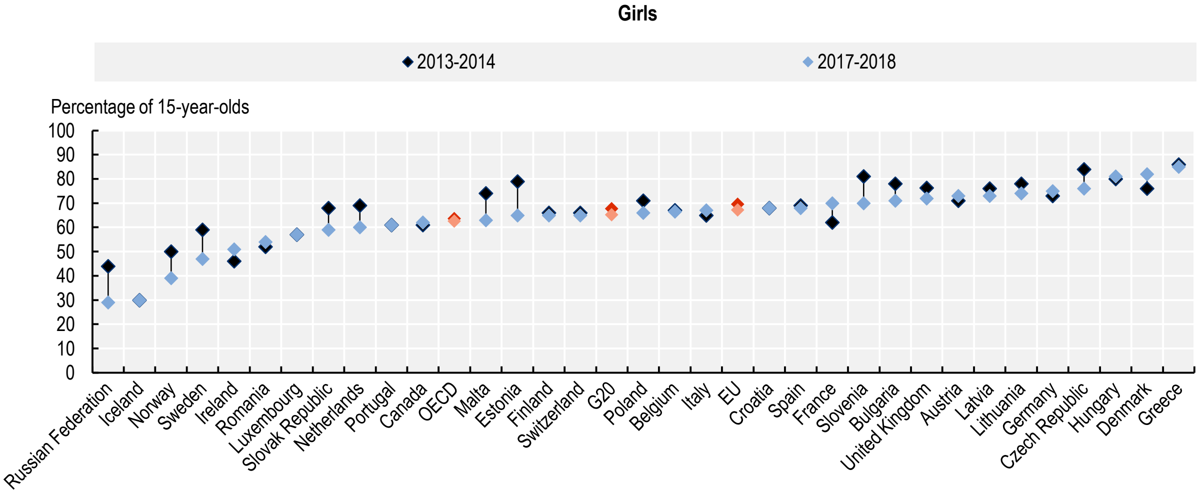


Note: Values represent an x% higher chance of being a weekly drinker if the person has tertiary education – values below zero indicate that people without tertiary education are more likely to be weekly drinkers.
Source: OECD analysis of NHANES 2015 (United States); Baromètre santé 2017 (France); ENCODAT 2016-17 (Mexico); Canadian Community Health Survey 2015-16 (Canada); EHIS 2014 (remaining 25 countries) (see survey details in Annex Table 2.A.1).

StatLink https://stat.link/d2jixv

Annex Figure 2.A.5. Proportion of 15-year-olds who ever drank alcohol, 2014 and 2018





Source: Inchley et al. (2020[24]), Spotlight on Adolescent Health and Well-being: Findings from the 2017/2018 Health Behaviour in School-aged Children (HBSC) Survey in Europe and Canada. International Report Volume 2. Key Data, https://www.euro.who.int/en/health-topics/Life-stages/child-and-adolescent-health/health-behaviour-in-school-aged-children-hbsc/publications/2020/spotlight-on-adolescent-health-and-well-being.-findings-from-the-20172018-health-behaviour-in-school-aged-children-hbsc-survey-in-europe-and-canada.-international-report.-volume-2.-key-data.

StatLink https://stat.link/7uwqve

Annex Box 2.A.1. Measuring alcohol affordability

Methodology

Alcohol affordability was calculated using a method similar to the one used by NHS England in their annual *Statistics on Alcohol* report (NHS Digital, 2019[55]).* The three-stage methodology is outlined below:

Step 1: Calculate the relative price of alcohol index (RAPI) by dividing the alcohol price index by the consumer price index.

$$RAPI = \left(\frac{alcohol\ price\ index}{consumer\ price\ index}\right) * 100$$

Step 2: Calculate the adjusted real household disposable income index (ARHDI) by dividing the adjusted disposable income index by the consumer price index.

$$ARHDI = \left(\frac{adjusted\ disposable\ income\ index}{consumer\ price\ index}\right) * 100$$

Step 3: Divide the ARHDI by the RAPI to get the relative alcohol affordability index (RAAI).

$$RAAI = \left(\frac{ARHDI}{RAPI}\right) * 100$$

The RAAI equation shows that alcohol becomes more affordable with a rise in real income or a fall in the relative price of alcohol.

Additional methodological notes

Income for young people

As with (Rabinovich et al., 2009[43]), due to data limitations, mean equalised net income (adjusted for inflation) as opposed to adjusted real disposable income was used for the analysis of data on young people. Therefore, results for the total population and young people are not directly comparable.

Non-EU27 countries

All age analysis: Data on real income for the United States, Canada and Australia were collected from OECD statistics – i.e. index of net real household adjusted disposable income – and may not be directly comparable with EU27 countries. This data source was not used for European countries in order to compare results with (Rabinovich et al., 2009[43]), with the exception of Germany, Ireland and Austria owing to missing data. For these countries, OECD data were also used.

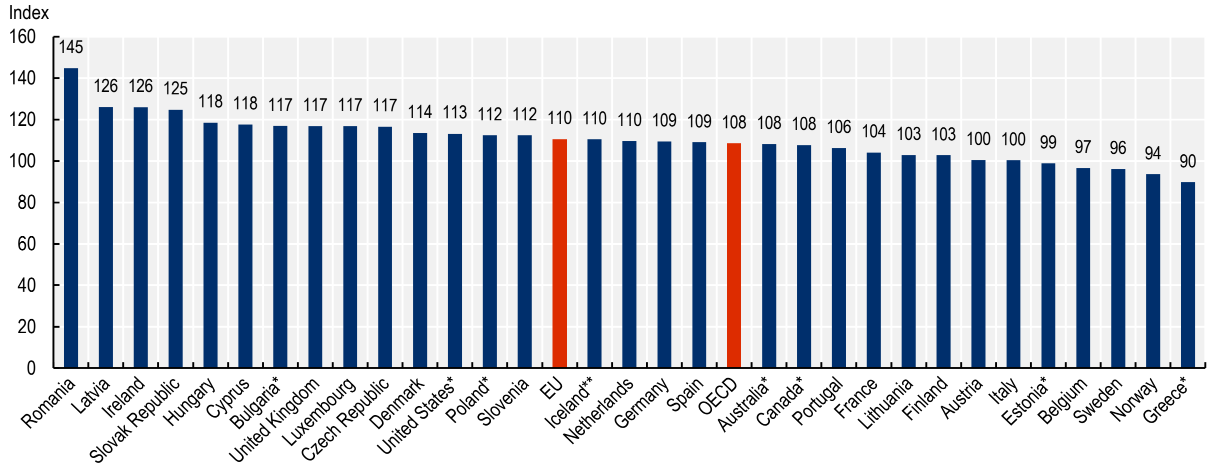
Young population analysis: Data for the United States and Canada were collected from the U.S. Bureau of Labor Statistics (annual usual weekly earnings in current dollars, which was converted into constant dollars) and Statistics Canada (total median income in constant dollars), and therefore may not be directly comparable with European countries.

The relative price of alcohol for non-EU27 OECD countries was taken from each country's national statistical agency.

*Alterations to NHS England's methodology were made owing to data availability – adjusted disposable income (gross) as opposed to income per capita, and the harmonised consumer price index instead of the retail prices index were used for the analysis.

Annex Figure 2.A.6. Trends in alcohol affordability, 2013-18 (or latest year)

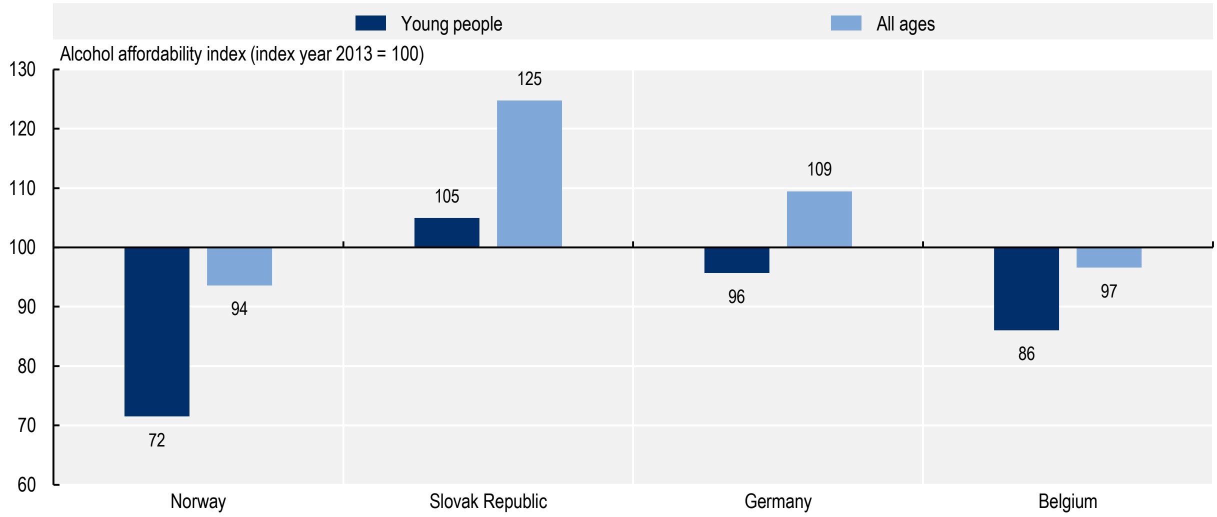
Alcohol affordability index (index year 2013 = 100)



Note: An alcohol affordability value below (above) 100 indicates that alcohol is less (more) affordable due to either (or both) a decline in real income or a rise in the relative price of alcohol. Missing data in Europe for Croatia, Switzerland and Malta. *Latest data from 2017. **Latest data from 2014. Figures for alcohol affordability were rounded to whole numbers.
Source: Eurostat (2019[45]), Harmonised Index of Consumer Prices: All items, https://ec.europa.eu/eurostat/databrowser/view/prc_hicp_aind/default/table?lang=en; Eurostat (2019[46]), Harmonised Index of Consumer Prices: Alcoholic beverages, https://ec.europa.eu/eurostat/databrowser/view/PRC_HICP_AIND__custom_287314/default/table?lang=en; Eurostat (2019[47]), Adjusted Disposable Income, Gross, https://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do; Australian Bureau of Statistics (2019[48]), 6401.0 Consumer Price Index: Alcoholic beverages, https://www.abs.gov.au/statistics/economy/price-indexes-and-inflation/consumer-price-index-australia/dec-2019; Australian Bureau of Statistics (2019[49]), 6401.0 Consumer Price Index: All groups CPI, https://www.abs.gov.au/statistics/economy/price-indexes-and-inflation/consumer-price-index-australia/dec-2019; Statistics Canada (2019[50]), Table 18-10-0005-01 Consumer Price Index: Annual average, not seasonally adjusted, https://doi.org/10.25318/1810000501-eng; U.S. Bureau of Labor Statistics (2019[51]), Alcoholic Beverages in U.S. City Average: All urban consumers, not seasonally adjusted (series ID: CUUR0000SAF116), https://www.bls.gov/cpi/#data.

StatLink https://stat.link/gl0cke

Annex Figure 2.A.7. Alcohol affordability for young people and all age groups, 2013-18



Note: An alcohol affordability value below (above) 100 indicates that alcohol is less (more) affordable.
Source: Eurostat (2019[45]), Harmonised Index of Consumer Prices: All items, https://ec.europa.eu/eurostat/databrowser/view/prc_hicp_aind/default/table?lang=en; Eurostat (2019[46]), Harmonised Index of Consumer Prices: Alcoholic beverages, https://ec.europa.eu/eurostat/databrowser/view/PRC_HICP_AIND__custom_287314/default/table?lang=en; Eurostat (2019[47]), Adjusted Disposable Income, Gross, https://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do; Australian Bureau of Statistics (2019[48]), 6401.0 Consumer Price Index: Alcoholic beverages, https://www.abs.gov.au/statistics/economy/price-indexes-and-inflation/consumer-price-index-australia/dec-2019; Australian Bureau of Statistics (2019[49]), 6401.0 Consumer Price Index: All groups CPI, https://www.abs.gov.au/statistics/economy/price-indexes-and-inflation/consumer-price-index-australia/dec-2019; Statistics Canada (2019[50]), Table 18-10-0005-01 Consumer Price Index: Annual average, not seasonally adjusted, https://doi.org/10.25318/1810000501-eng; U.S. Bureau of Labor Statistics (2019[51]), Alcoholic Beverages in U.S. City Average: All urban consumers, not seasonally adjusted (CUUR0000SAF116), https://www.bls.gov/cpi/#data.

StatLink https://stat.link/4afzbx

Notes

[1] Spirits include all distilled beverages.

[2] Individual-level data for HBSC 2017-18 were not available at the time of writing, and the analysis could not include the latest year.

[3] An analysis of alcohol affordability, specifically for beer, in Latin America was undertaken by Paraje & Pincheira (2018[56]). Results from the study align with findings in this chapter, with the affordability of beer rising in most of the countries examined. For example, in Colombia, beer affordability rose by an average annual rate of 1.4% between 2009 and 2016.

[4] The alcohol affordability index is a relative measure; for example, alcohol affordability values in Figure 2.16 represent relative change since 2000. The results do not reflect absolute affordability or differences in affordability across countries. Lastly, the results represent changes in affordability in the off-premise market only. Further information on the limitations of the alcohol affordability index measure can be found in (Rabinovich et al., 2009[43]).

[5] Between 2000 and 2018, the relative price of alcohol rose in 11 out of 31 countries (i.e. in 20 countries, including Finland, Latvia and Ireland, the relative price of alcohol fell). Over the same period, real income rose in 28 of the 31 countries. In all but two countries (the United Kingdom and Italy), the change in real income drove the change in alcohol affordability.

3 Exploring the determinants of regional differences in alcohol consumption patterns in European countries: A special focus on the role of policies and social norms

Marion Devaux and Antoine Marsaudon

Much attention has been paid to the relative impact of various factors influencing drinking behaviour. In Europe, this debate has also been translated into analysing potential differences in drinking behaviours between countries in Northern and Southern regions. This special focus chapter describes the drinking patterns and outcomes and the severity of the alcohol policies in different regions of Europe. It also sheds new light on other factors, such as social norms, that may explain changes in drinking patterns and outcomes.

Key messages

- There is no simple north-south divide to characterise the regional differences in drinking patterns and outcomes in Europe. Southern region countries show low drinking levels, low prevalence of risky drinking patterns and low alcohol-attributable burden on health. The Nordic countries also report relative low drinking levels and low alcohol-attributable burden on health, but they have relatively high prevalence of alcohol dependence. In contrast, the Baltic countries have the highest drinking levels, having experienced the sharpest increase in alcohol consumption over recent decades. Baltic countries also have relatively high prevalence of alcohol dependence and high alcohol-attributable burden on health. Generally, countries in the Eastern and West-Central regions are in an intermediate position on these dimensions.
- European countries have implemented a battery of policy actions to prevent harmful alcohol use, but with different degrees of severity. The alcohol control policies are notably more stringent in Nordic countries and in Lithuania. Data for 15 countries show that the increase in the severity of policies observed from 1990 to 2016 is correlated to the reduction in alcohol consumption.
- Beyond policy actions, other factors including genetics, personal characteristics, socio-economic status and environmental factors such as societal drinking norms also influence drinking patterns and outcomes over the life course. These may further contribute to the reduction in alcohol consumption in Southern countries.

3.1. Regional differences exist in alcohol consumption patterns in Europe

Traditional drinking cultures are different between Southern and Northern Europe. Historically, in Southern wine-producing countries, alcohol was commonly consumed with meals, whereas in Northern countries, which often implement alcohol monopolies, alcohol was traditionally consumed less frequently but at higher levels. However, evidence shows some signs of harmonisation over the past 40 years in Europe (Anderson and Baumberg, 2006[1]). In particular, these traditional drinking patterns tend to vanish among the younger generations. In fact, as discussed in Chapter 2 (Section 2.3), youth drinking rates have generally decreased over time for numerous reasons, including technology and social norms.

This chapter aims to investigate regional differences in patterns of alcohol drinking across Europe and explore the potential reasons behind these differences. It collects evidence from the literature and examines data on drinking patterns and alcohol control policies in European countries. The first section presents drinking patterns and alcohol-attributable burden by contrasting regions in Europe. The second section deals with the severity of alcohol control policies and examines its relationship with alcohol consumption levels. Finally, the last section discusses factors other than the formal policies that influence drinking patterns and outcomes.

For the purposes of this research, European countries are grouped into five main regions, which broadly follow the categorisation proposed in the AMPHORA (Alcohol Measures for Public Health Research Alliance) study (Anderson et al., 2012[2]). The Nordic region includes: Finland, Iceland, Norway and Sweden; the Baltic region: Estonia, Latvia and Lithuania; the Eastern region: Bulgaria, Croatia, Hungary, the Czech Republic, Poland, Romania, the Slovak Republic and Slovenia; the West-Central region: Austria, Belgium, Denmark, Germany, Ireland, Luxembourg, the Netherlands, Switzerland and the United Kingdom; and the Southern region: Cyprus, France, Greece, Italy, Malta, Portugal and Spain.

3.2. The alcohol problem varies across the regions of Europe

This section presents the level and change in alcohol consumption in the five regions of Europe, and examines other drinking outcomes such as heavy episodic drinking, alcohol dependence and the burden of alcohol on morbidity. The analyses presented in this chapter differ from those in Chapter 2, since the focus here is primarily on European regions as opposed to individual countries. However, the data presented in this chapter match those in Chapter 2, as the same data source is used.

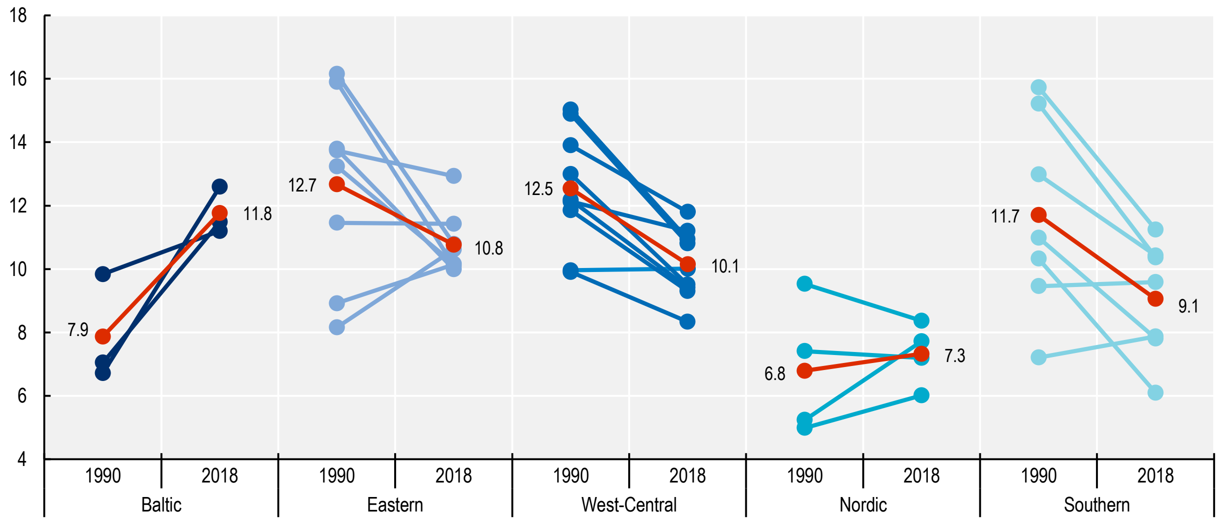
3.2.1. How high is the drinking level?

In 2018, the level of alcohol consumption in the Baltic and Eastern countries was the highest in Europe (see Chapter 2). Figure 3.1 shows that in 2018 adults consumed on average 11.8 litres of pure alcohol in the Baltic countries, 10.8 litres in Eastern countries and at the lower end 7.3 litres in Nordic countries. The level of alcohol consumption in the Nordic countries is lower than in most Southern countries.

The evolution of alcohol consumption varies by region of Europe. The level of drinking significantly increased in the three Baltic countries, from 7.9 litres in 1990 to 11.8 litres in 2018. It stagnated overall in the Nordic countries, although it clearly increased in Iceland. Alcohol consumption dropped in the period 1990-2018 in the other regions: from 11.7 litres to 9.1 litres in Southern countries, from 12.5 litres to 10.1 litres in West-Central countries and from 12.7 litres to 10.8 litres in Eastern countries with the exception of Poland and Romania, where alcohol consumption increased.

Figure 3.1. Change in the level of alcohol consumption, 1990-2018

Per capita recorded alcohol consumption, litres of pure alcohol per year



Note: Blue lines show country-specific trends while red lines show regional averages.
Source: World Health Organization (WHO) (2020[3]), Global Information System on Alcohol and Health (GISAH), https://www.who.int/data/gho/data/themes/global-information-system-on-alcohol-and-health.

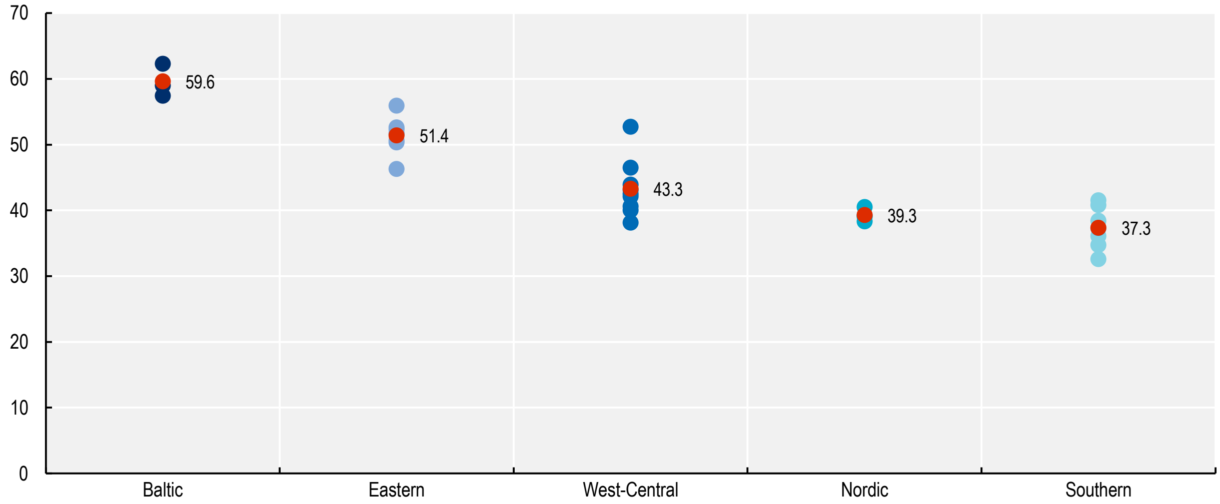
StatLink https://stat.link/dki86v

3.2.2. How risky is the drinking pattern?

The proportion of heavy episodic drinking in the Southern and Nordic regions is relatively low compared to other European countries. Heavy episodic drinking, also called “binge drinking”, corresponds to drinking large quantities of alcohol on a single occasion in the past 30 days. In 2016, 37% of drinkers reported binge drinking in Southern countries, 39% in Nordic countries, 43% in West-Central countries, 51% in Eastern countries and up to 60% in Baltic countries (Figure 3.2). While traditional drinking cultures tended to be historically different between Southern and Northern Europe, the data show that nowadays heavy episodic drinking in the Southern region is as frequent as in the Nordic countries.

Figure 3.2. Prevalence of heavy episodic drinking

Heavy episodic drinking (age 15+), drinkers only, past 30 days (%), 2016



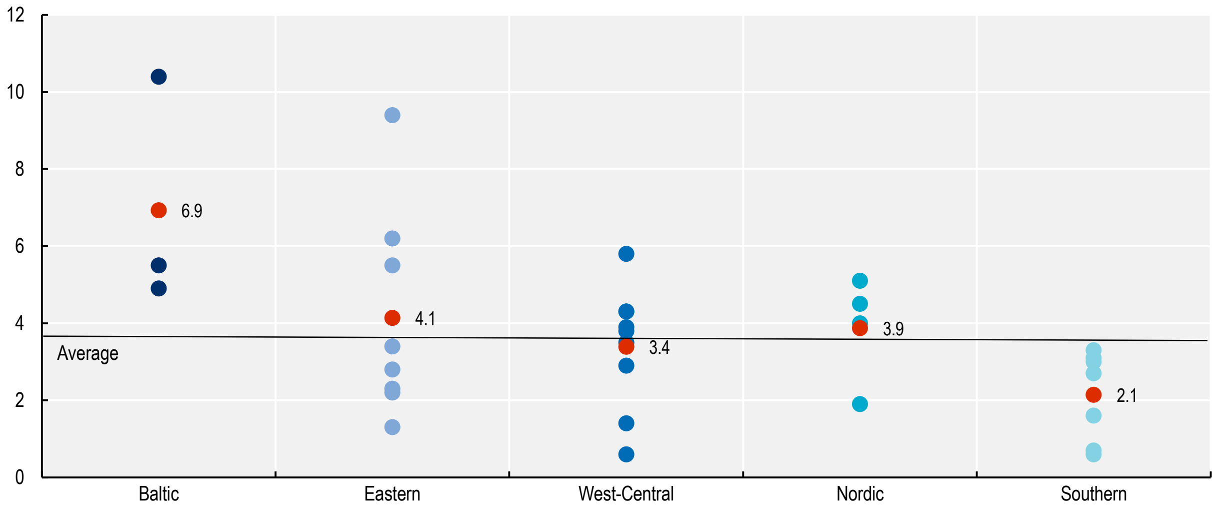
Note: Individual blue dots show country-specific estimates while red dots show regional averages.
Source: WHO (2020[3]), GISAH, https://www.who.int/data/gho/data/themes/global-information-system-on-alcohol-and-health.

StatLink https://stat.link/2luzrh

Nearly 7% of adults were alcohol dependent in the Baltic countries in 2016 (Figure 3.3). This proportion is close to 4% in Eastern and Nordic countries, 3% in West-Central countries and 2% in Southern countries. Alcohol dependence is most prevalent in the Baltic countries; this is mainly driven by the prevalence in Latvia (10.4% of adults). Among Eastern countries, the prevalence of alcohol dependence varies greatly from 1.3% in Romania to 9.4% in Hungary. Among Nordic countries, alcohol dependence in Norway, Sweden and Finland affects more than 4% of the population, which is relatively more prevalent than in Southern and most West-Central countries.

Figure 3.3. Prevalence of alcohol dependence

Alcohol dependence (age 15+), 12-month prevalence (%), 2016



Note: Individual blue dots show country-specific estimates while red dots show regional averages.
Source: WHO (2020[3]), GISAH, https://www.who.int/data/gho/data/themes/global-information-system-on-alcohol-and-health.

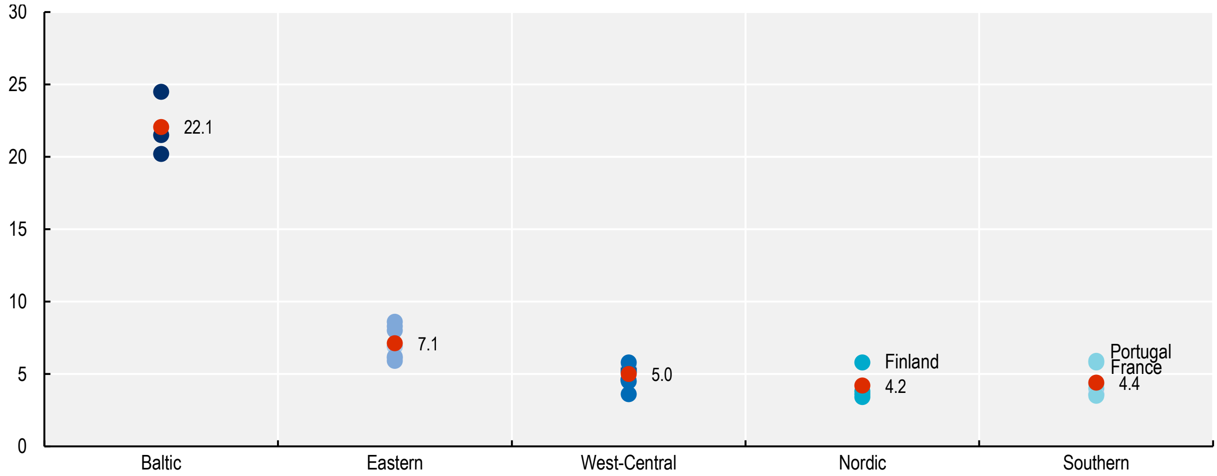
StatLink https://stat.link/58b0lv

3.2.3. How big is the burden of alcohol on health?

The burden of alcohol on mortality is heaviest in the three Baltic countries, where more than 20% of all-cause deaths are attributable to alcohol. It is lowest in Southern and Nordic countries, where less than 5% of deaths are attributable to alcohol. Figure 3.4 shows that the alcohol-attributable fraction of all-cause deaths is about 22% on average in the Baltic countries, while it is about 7% on average in the Eastern region and at or below 5% on average in the Nordic, West-Central and Southern regions. The burden in the Nordic countries is of the same magnitude as the burden in Southern countries, and it is relatively smaller when compared to other European regions (except for Finland, where the proportion of deaths attributable to alcohol is 70% higher than in Norway).

Figure 3.4. Proportion of all-cause deaths caused by alcohol

Alcohol-attributable fraction, all-cause deaths (%), 2016



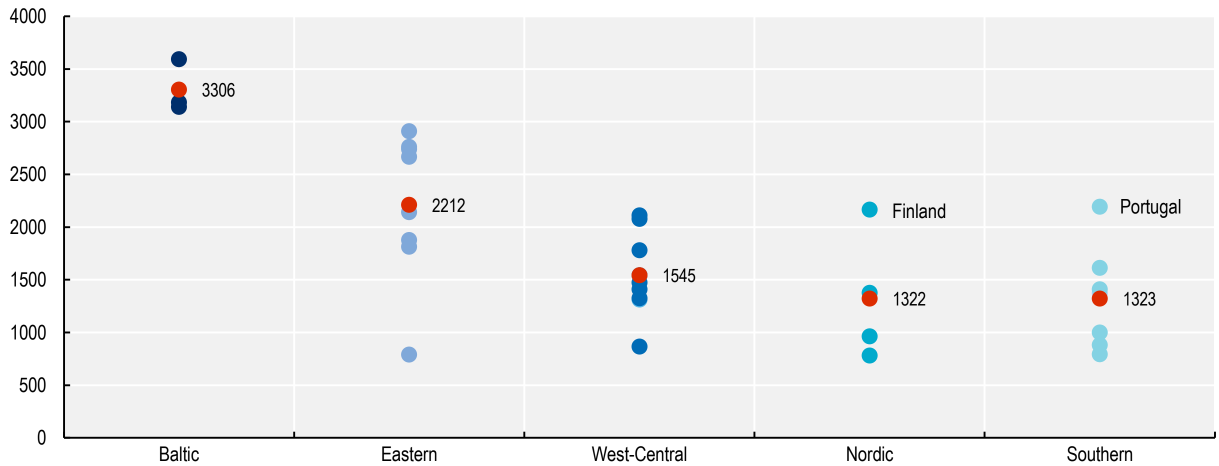
Note: Individual blue dots show country-specific estimates while red dots show regional averages.
Source: WHO (2020[3]), GISAH, https://www.who.int/data/gho/data/themes/global-information-system-on-alcohol-and-health.

StatLink https://stat.link/48c52j

Results from the OECD analyses on the health burden of alcohol confirm this picture of the alcohol-related burden on morbidity (see Chapter 4, Section 4.2). While the burden is greater in the Baltic countries than in other countries, it is smaller and of the same order of magnitude in both the Southern and Nordic regions. According to the simulation, the Baltic countries lose 3 306 life years in good health per 100 000 population on average each year as a result of harmful alcohol use (Figure 3.5). This is 2.5 times higher than the rates in the Nordic and Southern regions. Among the Nordic countries, Finland has the greatest alcohol-related burden, with more than 2 100 life years in good health per 100 000 population lost every year.

Figure 3.5. Life years in good health lost due to harmful alcohol use

Number of disability-adjusted life years per 100 000 population, per year



Note: Individual blue dots show country-specific estimates while red dots show regional averages.
Source: OECD Strategic Public Health Planning for non-communicable diseases (SPHeP-NCDs) model, 2020. See Chapter 4.

StatLink https://stat.link/ly3971

3.3. The level of implementation of alcohol policies differs across European countries

This section deals with the level of implementation of the alcohol control policies in Europe, and examines the evolution over time of the alcohol control policies and drinking levels.

All European countries have in place a series of policy actions to reduce harmful alcohol use. The most popular policy interventions include alcohol taxes, age restrictions, blood alcohol concentration limits for drivers and penalties for drink-driving, although these measures are implemented at differing levels of strength (see Chapter 6).

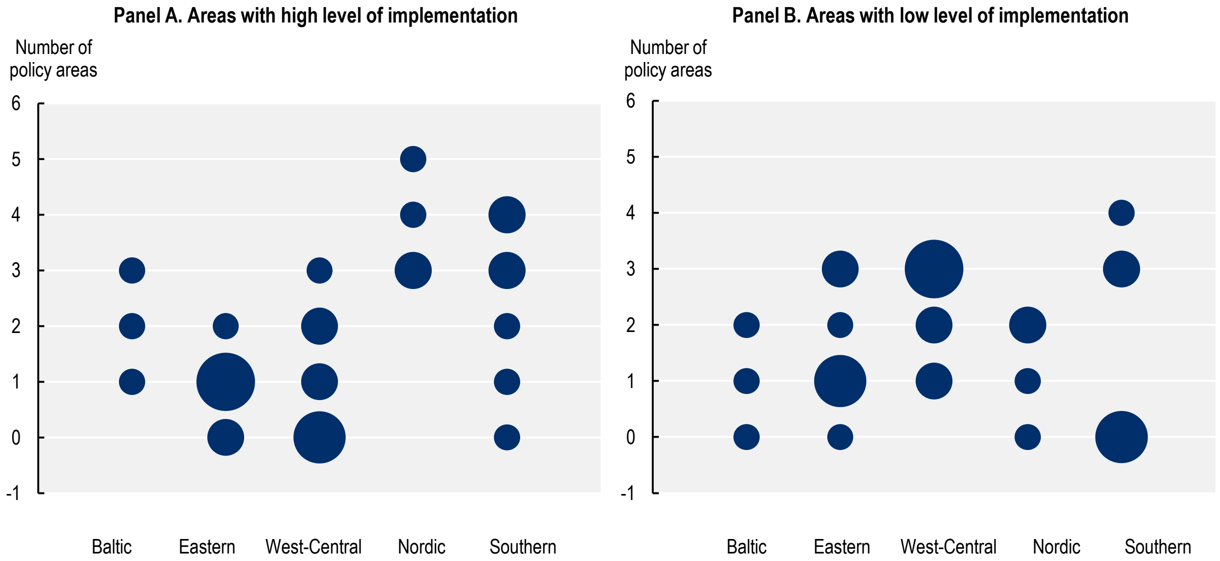
The level of implementation of a country's alcohol control policy can be assessed with reference to various dimensions of alcohol policy. Recently, the WHO published a set of ten composite indicators – one for each action area of the *Global Strategy to Reduce the Harmful Use of Alcohol* (WHO, 2010[4]) – that aim to measure not only the presence of alcohol policies but also their strictness and comprehensiveness (PAHO, 2018[5]; WHO Regional Office for Europe, 2017[6]). Table 6.3 in Chapter 6 presents the level of implementation of the alcohol policy across the ten areas in 51 countries, grouping the countries into quartiles from the lowest to highest level of policy implementation. Annex Table 3.A.1 summarises these results and shows how often a country belongs to the top or the bottom quartile.

Figure 3.6 shows the cross-country variation in the level of implementation of alcohol control policies by region, and suggests that no clear geographical pattern emerges. The countries with the highest levels of implementation are Finland, Sweden, Italy and France. In Finland, five of the ten areas of the alcohol control policy are implemented relatively more strongly than in other countries: leadership, awareness and commitment; health services' response; availability of alcohol; marketing of alcohol beverages; and monitoring and surveillance. In France, Italy and Sweden, four of the ten areas are implemented more strongly than in other countries. Conversely, Austria, Belgium, Croatia, Cyprus, Denmark, Greece, Hungary, Luxembourg, Malta and the United Kingdom show the lowest levels of implementation for at least three policy areas.

The four Nordic countries have the highest level of policy implementation concerning the availability of alcohol area. This is in line with previous findings showing that the four Nordic countries and Lithuania have by far the strictest alcohol control policies in Europe (Anderson et al., 2012[2]). Norway, Sweden, Finland and Iceland have a state monopoly to sell alcoholic beverages above a certain alcohol content, and have a long history of strict restrictions on physical availability of alcohol beverages and high prices. Lithuania has recently strengthened its national alcohol policy (Rehm et al., 2020[7]).

The evolution of the alcohol control policies in European countries may explain, to some degree, the different trends in alcohol consumption. For instance, the data show that Southern European countries generally decreased their level of alcohol consumption in the period 1990-2016 and, in many cases, also increased the severity of their alcohol control policies in the same period (see Annex Box 3.A.1). While this illustrates the relationship between the changes in alcohol consumption and in alcohol control policies, no causal impact of alcohol control policies on alcohol consumption can be deduced, in the absence of advanced analyses investigating the causal relationship after adjusting for potential confounders.

Figure 3.6. Level of implementation



Note: The vertical axis indicates the number of policy areas with high (low) level of implementation on Panel A (B). The size of the bubble indicates the number of countries. For example, on Panel A, among the four Nordic countries studied, one country has five policy areas with the highest level of implementation, another has four areas with the highest level of implementation and the two others have three areas with the highest level of implementation. On Panel B, among the Nordic counties, two countries have two policy areas with the lowest level of implementation, another has one area with the lowest level of implementation and the remaining one has no policy area with the lowest level of implementation.
Source: OECD calculations based on data from WHO (2020[3]), GISAH, https://www.who.int/data/gho/data/themes/global-information-system-on-alcohol-and-health.

StatLink https://stat.link/pors3k

These findings suggest that the strength of the alcohol control policy is associated with drinking levels, and this is broadly aligned with evidence from the literature. For instance, from the mid-1990s onwards, the Russian Federation introduced significant policy reforms to reduce alcohol consumption and its related harms. Following the introduction of these reforms, the country experienced significant declines in both alcohol consumption and related harms (WHO Regional Office for Europe, 2019[8]) (see details in Box 6.23 in Chapter 6). Conversely, when a control policy is relaxed, the effect on alcohol consumption and related harms is visible. Finland experienced an increase in alcohol consumption and related deaths following the change of alcohol control policy in 2004, which reduced excise duties on alcohol and abolished the quotas on tax-free imports of alcoholic beverages by travellers arriving in Finland from other European Union countries (Mäkelä and Österberg, 2009[9]).

Evidence on the effectiveness and cost-effectiveness of alcohol policies is widely documented, as presented in Chapters 6 and 7. Pricing policies, restrictions on the availability of alcohol, measures to counter drink-driving and bans on alcohol advertising have significant impacts on drinking patterns and outcomes. In particular, a policy package combining a mixture of these policies can be shown to reduce alcohol-related diseases and injuries, increase the numbers of life years in good health, be cost-effective – as it reduces health expenditure more than the cost of running the policies – and increase labour force participation and productivity (see Chapter 7). However, as discussed further in the section below, the decreases in the level of alcohol consumption over the last three decades observed in some Southern countries, such as Italy, may be also driven by other factors.

3.4. Factors beyond policy actions influence drinking patterns

Beyond policy interventions, other determinants can influence the alcohol consumption of an individual. These can be classified into personal characteristics and environmental determinants (WHO, 2018[10]). Both the factors in themselves and how they interact with one another shape drinking patterns and outcomes over the life course of individuals.

The first group of determinants refers to personal characteristics including genetics, demographics, personality traits, expectancies, family and peers, and socio-economic status. Genetics is involved in alcohol metabolism, alcohol dependence and physiological responses to drinking. Evidence supports the concept that the genes a person carries can influence how much he or she drinks, which in turn influences the risk of developing alcoholism (NIAAA, 2007[11]). Results from twins studies converge to show high levels of heritability of alcohol addiction, with estimates ranging from 50% to 70% of the total variance that can be attributed to genetic factors rather than environmental factors (Agrawal and Lynskey, 2008[12]).

Gender and age of an individual are key determinants of drinking patterns. Men drink more than women, and drinking patterns change with age, with older age groups more likely to drink frequently and younger age groups more likely to engage in binge drinking (see Chapter 2). In addition, drinking in childhood is predictive of future drinking. There is evidence that early onset of drinking leads to 30% higher probability of alcohol dependence later in life (Hingson, Heeren and Winter, 2006[13]).

Mental health status, stress and anxiety of an individual are also correlated to drinking problems. Having a “dual diagnosis” of alcohol use disorders and mental disorders is common (IAS, 2018[14]). For instance, data suggest that in the United Kingdom (England), 44% of community mental health patients have reported problematic drug use or harmful alcohol use in the previous year (Public Health England, 2016[15]). Equally, people with alcohol addiction are more at risk of suicide, depression and anxiety, and of personal disorders (Mental Health Foundation, 2006[16]). Personality traits such as risk-taking or antisocial behaviours (Malone et al., 2004[17]) can also influence drinking patterns.

Alcohol expectancies are the beliefs individuals have about what alcohol drinking can bring to them, and this strongly influences their drinking behaviours. These expectancies are correlated with reasons for drinking such as social gatherings, drinking to cheer up or relieve stress, and conformity to others; they also evolve with age (ICAP, 2009[18]).

Family and peers are recognised to have an effect on drinking patterns, and their influence also evolves over the life course. Family influences on drinking – either positive or negative – are strong in young ages, tend to shape drinking expectancies and persist into adulthood. In particular, the context of drinking initiation is as important as the age of initiation. For instance, people who start drinking outside a context of family gatherings have a greater risk of developing alcohol problems than those who start within a family context (Warner and White, 2003[19]). There is also a peer effect on drinking patterns. For instance, adolescents tend to mimic their peers’ drinking levels, and frequent drinkers make friends with those who drink similarly to them (McCann et al., 2019[20]). Also, pupils with low parental control tend to befriend each other.

Socio-economic status (SES) influences an individual’s drinking patterns. Data set out in Chapter 2 support the theory that SES – measured either by education level or by income level – is linked to drinking patterns. In virtually all the OECD countries, people who have completed tertiary or university education are more likely to drink weekly than those with only primary education. This effect is especially strong for women. Similarly, men and women in higher income groups are more likely to drink weekly than those in lower income groups on average in OECD countries. At the country level, a U-shaped curve can be observed – where prevalence is highest for the lowest and highest income groups compared to the middle income group. This U-shaped relationship is even more common for binge drinking. However, when looking at alcohol-related harm, people with low SES have higher rates of alcohol-related problems and mortality than better-off people, even for the same level of drinking (Grittner et al., 2012[21]; Mäkelä and Paljärvi, 2008[22]). This mismatch between the social gradient in alcohol drinking and the gradient in alcohol-related harm can be explained by differences in reports of alcohol drinking between people with low and high SES, differences in vulnerabilities and comorbidities, and differences in access to health care (Sassi, 2015[23]).

The second group of determinants relates to environmental factors, such as the social norms that shape drinking behaviours, the economic development of a country, the availability and affordability of alcohol, and the policy in place. One example of social norms is how religion affects people's drinking (Luczak et al., 2014[24]). Another example is the drinking culture that has been observed in the past: some countries were historically characterised by a greater tolerance of regularly drinking wine with meals and stigmatisation of heavy episodic drinking and drunkenness, while other cultures were less permissive of regular drinking and characterised by heavy episodic drinking and drunkenness. For instance, Italy experienced a significant decrease in alcohol consumption over recent decades, which was also attributed to changes in socio-demographic and economic factors (Allamani et al., 2014[25]). Drivers of underlying changes in consumption may be also related to overall changes in lifestyle and globalisation (such as people having shorter mealtimes and drinking less wine with meals) (Beekmann, 2016[26]).

The economic development of a country also influences drinking levels. As societies become more affluent, there is a strong tendency for the level of alcohol consumption to increase, except in Muslim-majority countries with a religion-based prohibition on drinking (WHO, 2018[10]). The physical availability of alcohol is a key determinant of the level of drinking (Babor et al., 2010[27]). For instance, easy and free access to alcoholic beverages in a store is linked to greater alcohol use. Alcohol affordability also plays a key role in determining the level of consumption and is influenced by three key factors: income, the price of alcohol (which is affected by the rate of taxation) and the price of other goods (Elder et al., 2010[28]; Rabinovich et al., 2009[29]) (see Section 2.5 in Chapter 2). Finally, this section focuses on the determinants of alcohol consumption other than policy interventions, while policies are discussed in Chapter 6.

3.5. Conclusion: Several dimensions affect the regional differences in alcohol consumption

This chapter shows that there is no clear north-south divide in drinking patterns and outcomes. There are several dimensions to consider (including drinking levels, patterns and health burden), and these vary across regions. Southern European countries have lower drinking levels, low prevalence of risky drinking patterns and low alcohol-attributable burden on health. The Nordic countries also present relative low drinking levels and low alcohol-attributable burden on health, but they have relatively high prevalence of alcohol dependence. In contrast, the three Baltic countries have the highest drinking levels, having experienced the sharpest increase in alcohol consumption over recent decades. They have relative high prevalence of alcohol dependence, and high alcohol-attributable burden on health. The Eastern and West-Central regions are generally in an intermediate position on these dimensions.

A large majority of countries have adopted a battery of policy interventions to reduce harmful alcohol use, with the most popular policies including alcohol taxes, age restrictions, blood alcohol concentration limits for drivers and penalties for drink-driving, as described in Chapter 6. The level of implementation of the alcohol policies varies across European regions. The Nordic countries and Lithuania have more stringent alcohol control policies than other European countries. Over the period 1990-2016, Southern countries increased the severity of their alcohol control policies, and also showed a reduction in their levels of drinking.

Change in alcohol consumption is also influenced by determinants of alcohol consumption that are beyond policy actions, as reviewed in this chapter. Personal characteristics include genetics, demographics, personality traits, expectancies, family and peers and SES. Environmental factors refer to social norms that shape drinking behaviours; the economic development of a country; and the availability and affordability of alcohol, which influence drinking patterns and outcomes over the life course.

References

Agrawal, A. and M. Lynskey (2008), “Are there genetic influences on addiction: Evidence from family, adoption and twin studies”, *Addiction*, Vol. 103/7, pp. 1069-1081, http://dx.doi.org/10.1111/j.1360-0443.2008.02213.x. [12]

Allamani, A. et al. (2014), “Italy between drinking culture and control policies for alcoholic beverages”, *Substance Use and Misuse*, Vol. 49/12, pp. 1646-1664, http://dx.doi.org/10.3109/10826084.2014.913386. [25]

Anderson, P. and B. Baumberg (2006), *Alcohol in Europe: A public health perspective*, Institute of Alcohol Studies, London, https://ec.europa.eu/health/archive/ph_determinants/life_style/alcohol/documents/alcohol_europe_en.pdf (accessed on 7 July 2020). [1]

Anderson, P. et al. (eds.) (2012), *Alcohol Policy in Europe: Evidence from AMPHORA*, AMPHORA Project, Gilbert, AZ, http://www.drugs.ie/resourcesfiles/ResearchDocs/Europe/Research/2012/Alco_Policy_Euro_Evidence_From_Amphora_2012.pdf (accessed on 7 July 2020). [2]

Babor, T. et al. (2010), *Alcohol: No ordinary commodity: research and public policy*, Oxford University Press, Oxford, http://dx.doi.org/10.1093/acprof:oso/9780199551149.001.0001. [27]

Beekmann, L. (2016), *Nordic Alcohol Policy Challenged by Italian Experience*, Nordic Alcohol and Drug Policy Network, Türi, https://nordan.org/nordic-alcohol-policy-challenged-by-italian-experience/ (accessed on 2 July 2020). [26]

Elder, R. et al. (2010), “The effectiveness of tax policy interventions for reducing excessive alcohol consumption and related harms”, *American Journal of Preventive Medicine*, Vol. 38/2, pp. 217-229, http://dx.doi.org/10.1016/j.amepre.2009.11.005. [28]

Grittner, U. et al. (2012), “Social inequalities and gender differences in the experience of alcohol-related problems”, *Alcohol and Alcoholism*, Vol. 47/5, pp. 597-605, http://dx.doi.org/10.1093/alcalc/ags040. [21]

Hingson, R., T. Heeren and M. Winter (2006), “Age at drinking onset and alcohol dependence: Age at onset, duration, and severity”, *Archives of Pediatrics and Adolescent Medicine*, Vol. 160/7, pp. 739-746, http://dx.doi.org/10.1001/archpedi.160.7.739. [13]

IAS (2018), *Alcohol and Mental Health: Policy and practice in England*, Institute of Alcohol Studies, London, https://www.centreformentalhealth.org.uk/sites/default/files/2018-09/CentreforMentalHealth_InstituteofAlcoholStudies_report_Apr2018.pdf (accessed on 23 July 2020). [14]

ICAP (2009), *Determinants of Drinking*, International Center for Alcohol Policies, Washington DC, https://preventionconversation.org/wp-content/uploads/2015/07/determinants-of-drinking-issues-briefing.pdf (accessed on 6 July 2020). [18]

Karlsson, T. and E. Österberg (2001), “A scale of formal alcohol control policy in 15 European countries”, *Nordic Studies on Alcohol and Drugs*, Vol. 18/1_suppl, pp. 117-131, http://dx.doi.org/10.1177/145507250101801s01. [30]

Luczak, S. et al. (2014), “Religious factors associated with alcohol involvement: Results from the Mauritian Joint Child Health Project”, *Drug and Alcohol Dependence*, Vol. 135/1, pp. 37-44, http://dx.doi.org/10.1016/j.drugalcdep.2013.10.028. [24]

Mäkelä, P. and E. Österberg (2009), “Weakening of one more alcohol control pillar: A review of the effects of the alcohol tax cuts in Finland in 2004”, *Addiction*, Vol. 104/4, pp. 554-563, http://dx.doi.org/10.1111/j.1360-0443.2009.02517.x. [9]

Mäkelä, P. and T. Paljärvi (2008), “Do consequences of a given pattern of drinking vary by socioeconomic status? A mortality and hospitalisation follow-up for alcohol-related causes of the Finnish Drinking Habits Surveys”, *Journal of Epidemiology and Community Health*, Vol. 62/8, pp. 728-733, http://dx.doi.org/10.1136/jech.2007.065672. [22]

Malone, S. et al. (2004), “Genetic and environmental influences on antisocial behavior and alcohol dependence from adolescence to early adulthood”, *Development and Psychopathology*, Vol. 16/4, pp. 943-966, http://dx.doi.org/10.1017/S0954579404040088. [17]

McCann, M. et al. (2019), “Longitudinal social network analysis of peer, family, and school contextual influences on adolescent drinking frequency”, *Journal of Adolescent Health*, Vol. 65/3, pp. 350-358, http://dx.doi.org/10.1016/j.jadohealth.2019.03.004. [20]

Mental Health Foundation (2006), *Cheers? Understanding the Relationship between Alcohol and Mental Health*, Mental Health Foundation, London, https://www.drugsandalcohol.ie/15771/1/cheers_report%5B1%5D.pdf (accessed on 23 July 2020). [16]

NIAAA (2007), *Alcohol Metabolism: An update*, National Institute on Alcohol Abuse and Alcoholism, Bethesda, MD, https://pubs.niaaa.nih.gov/publications/aa72/aa72.htm (accessed on 10 November 2020). [11]

PAHO (2018), *Alcohol Policy Scoring: Assessing the level of implementation of the WHO global strategy to reduce the harmful use of alcohol in the Region of the Americas*, Pan American Health Organization, Washington DC, https://iris.paho.org/bitstream/handle/10665.2/49679/9789275120453_eng.pdf?sequence=2&isAllowed=y (accessed on 7 July 2020). [5]

Public Health England (2016), *Health Matters: Harmful drinking and alcohol dependence*, Public Health England, London, https://www.gov.uk/government/publications/health-matters-harmful-drinking-and-alcohol-dependence/health-matters-harmful-drinking-and-alcohol-dependence (accessed on 23 July 2020). [15]

Rabinovich, L. et al. (2009), *The Affordability of Alcoholic Beverages in the European Union: Understanding the link between alcohol affordability, consumption and harms*, RAND Europe, Cambridge, http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.183.3387&rep=rep1&type=pdf. [29]

Rehm, J. et al. (2020), “Alcohol control policy and changes in alcohol-related traffic harm”, *Addiction*, Vol. 115/4, pp. 655-665, http://dx.doi.org/10.1111/add.14796. [7]

Sassi, F. (ed.) (2015), *Tackling Harmful Alcohol Use: Economics and public health policy*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264181069-en. [23]

Warner, L. and H. White (2003), "Longitudinal effects of age at onset and first drinking situations on problem drinking", *Substance Use and Misuse*, Vol. 38/14, pp. 1983-2016, http://dx.doi.org/10.1081/JA-120025123. [19]

WHO (2020), *Global Information System on Alcohol and Health (GISAH)*, World Health Organization, Geneva, https://www.who.int/data/gho/data/themes/global-information-system-on-alcohol-and-health (accessed on 24 June 2020). [3]

WHO (2018), *Global Status Report on Alcohol and Health 2018*, World Health Organization, Geneva, https://apps.who.int/iris/bitstream/handle/10665/274603/9789241565639-eng.pdf?ua=1 (accessed on 28 October 2020). [10]

WHO (2010), *Global Strategy to Reduce the Harmful Use of Alcohol*, World Health Organization, Geneva, https://www.who.int/publications/i/item/9789241599931 (accessed on 26 July 2020). [4]

WHO Regional Office for Europe (2019), *Alcohol Policy Impact Study: The effects of alcohol control measures on mortality and life expectancy in the Russian Federation*, WHO Regional Office for Europe, Copenhagen, https://apps.who.int/iris/bitstream/handle/10665/328167/9789289054379-eng.pdf?sequence=1&isAllowed=y (accessed on 6 November 2020). [8]

WHO Regional Office for Europe (2017), *Policy in Action: A tool for measuring alcohol policy implementation*, WHO Regional Office for Europe, Copenhagen, https://www.euro.who.int/en/health-topics/disease-prevention/alcohol-use/publications/2017/policy-in-action-a-tool-for-measuring-alcohol-policy-implementation-2017 (accessed on 23 July 2020). [6]

Annex 3.A. Additional data

Annex Table 3.A.1 presents the level of implementation of the alcohol control policy by country, focusing on the number of policy areas in the top and bottom quartiles.

Annex Box 3.A.1 presents an additional analysis of the changes in the level of alcohol consumption and in alcohol control policy in the period 1990-2016.

Annex Table 3.A.1. Level of implementation of the alcohol control policy, 2016

Number of policy areas in the top quartile (highest level of policy implementation) and bottom quartile (lowest level)

	Number of areas in the top quartile	Number of areas in the second quartile	Number of areas in the third quartile	Number of areas in the bottom quartile
Austria	2	2	3	3
Belgium	0	5	2	3
Bulgaria	1	5	3	1
Croatia	1	5	1	3
Cyprus	2	5	0	3
Czech Republic	1	5	2	2
Denmark	0	5	2	3
Estonia	2	4	2	2
Finland	5	3	0	2
France	4	6	0	0
Germany	0	7	1	2
Greece	1	5	1	3
Hungary	0	5	2	3
Iceland	3	4	1	2
Ireland	1	5	3	1
Italy	4	5	1	0
Latvia	1	8	1	0
Lithuania	3	5	1	1
Luxembourg	0	3	4	3
Netherlands	1	6	2	1
Norway	3	4	2	1
Poland	1	4	4	1
Portugal	3	7	0	0
Slovak Republic	2	5	2	1
Slovenia	1	8	1	0
Spain	3	6	1	0
Sweden	4	5	1	0
Switzerland	2	4	2	2
United Kingdom	3	1	3	3

Note: For example, for one of the ten areas listed in Table 6.18 in Chapter 6, the Czech Republic falls into the top quartile of countries with the highest level of policy implementation. For five other dimensions, the Czech Republic falls into the second quartile of countries ranked by the level of policy implementation.
Source: OECD calculations based on data from Source: WHO (2020[3]), GISAH, https://www.who.int/data/gho/data/themes/global-information-system-on-alcohol-and-health.

Annex Box 3.A.1. Additional analysis

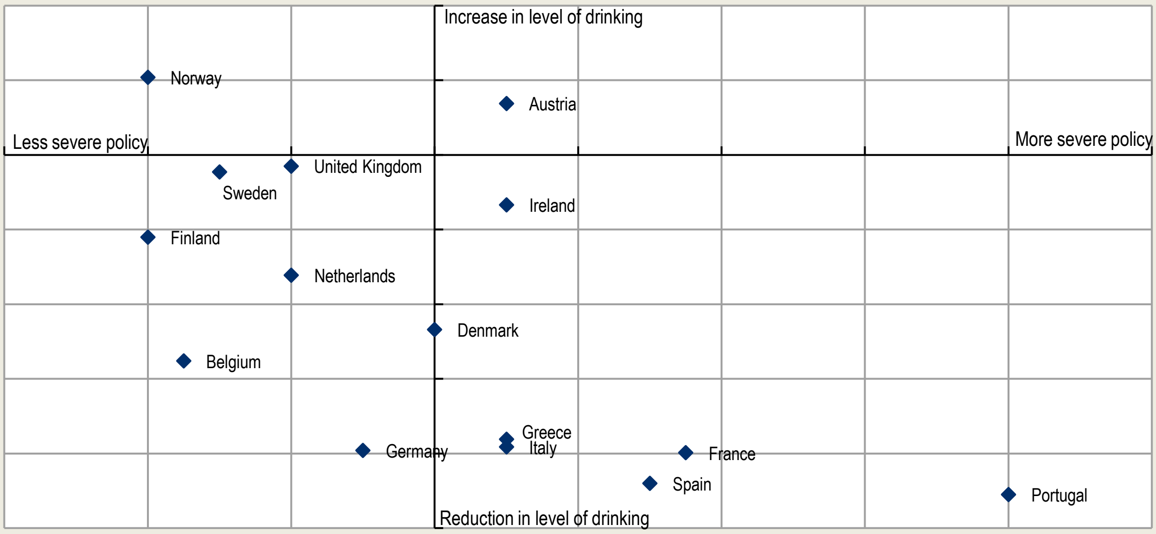
To measure the severity of the alcohol control policy, this study uses the Karlsson and Österberg (2001[30]) index for the period 1990 to 2000, and updates results for 2016.

The Karlsson and Österberg index (2001[30]) – which is a simplified version of the WHO index (WHO Regional Office for Europe, 2017[6]) – summarises six different aspects of alcohol control policies that governments can implement: controls of production and wholesale, controls of distribution, personal controls, controls of marketing, social and environment controls and public policies. Each of these categories is weighted with points. The control of distribution category has the highest weight (7 points), whereas the controls of marketing and public policies categories have the lowest weights (2 points). The other categories have a weighted score of 3 points. All points are summed up by country to derive an index of the level of severity. The index ranges from 0 to 20 points, with higher values indicating a higher alcohol control policy.

The analysis presented here aims to compare the evolution in the severity of the alcohol control policy with the evolution in drinking between 1990 and 2016. The data for 1990 are retrieved from the study by Karlsson and Österberg (2001[30]) which covered 15 countries (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Italy, Ireland, the Netherlands, Norway, Portugal, Spain, Sweden and the United Kingdom). The data for 2016 are derived from the methodology developed by Karlsson and Österberg (2001[30]) using data from the GISAH database (WHO, 2020[3]).

Annex Figure 3.A.1 illustrates the evolution of the alcohol consumption and of the severity of alcohol control policy between 1990 and 2016 in 15 countries. It shows that 13 countries decreased their levels of alcohol consumption between 1990 and 2016. The reduction was greater in Southern countries (Greece, France, Italy, Portugal and Spain) and in Germany. All Southern countries, Austria and Ireland increased the severity of their alcohol control policy in the period 1990-2016. This was not the case in Belgium, Finland, Germany, the Netherlands, Norway, Sweden or the United Kingdom, where the severity of the alcohol control policy decreased in the same period. Results also show that reductions in the level of alcohol consumption are associated with a higher stringency of the alcohol policy in the countries studied. However, no causal impact of alcohol control policies on alcohol consumption can be deduced from this analysis, in absence of advanced analyses investigating the causal-effect relationship after adjusting for potential confounders.

Annex Figure 3.A.1. Changes in the level of alcohol consumption and in alcohol control policies, 1990-2016



Note: The vertical axis represents the difference in the level alcohol consumption between 1990 and 2016. The horizontal axis represents the difference in alcohol control severity index between 1990 and 2016. In Finland, the level of alcohol consumption decreased from 1990 to 2016, and the severity of the alcohol control policy decreased in this time period. Dark blue dots refer to the Southern region, light blue to the Nordic region, and medium blue to the West-Central region.
Source: OECD estimates based on WHO GISAH data, adapted from Karlsson and Österberg (2001[30]).

StatLink https://stat.link/jn4ua2

4 The health and economic burden of alcohol consumption

Yevgeniy Goryakin, Alexandra Aldea, Marion Devaux, Yvan Guillemette, Andrea Feigl, Sabine Vuik and Alienor Lerouge

This chapter provides an overview of the burden of diseases caused by alcohol consumption on population health and the economy. Based on the results of the OECD Strategic Public Health Planning for non-communicable diseases (SPHeP-NCDs) model, the chapter focuses on 52 countries, including OECD, European Union (EU27) and Group of 20 (G20) member countries, to assess the burden caused by consuming more than 1 drink per day for women and 1.5 drinks per day for men, and the burden of total alcohol consumption. Findings are produced for a number of dimensions including impacts on life expectancy, morbidity and mortality, health expenditure, employment and productivity. By using the OECD long-term economic model, the chapter explores the impact of alcohol-related diseases on gross domestic product (GDP) and tax rates.

Key findings

Alcohol consumption causes significant health harms

- Based on simulations for the period 2020-50 in 52 countries, consuming 1 drink per day for women and 1.5 drinks per day for men – equivalent to 12 grammes of pure alcohol per day for women and 18 grammes per day for men – accounts for 88% of all cases of dependence and 38% of all cases of cirrhosis. Specifically, 1.1 billion new cases of dependence, 37 million cases of injury, 12 million cases of diabetes, 24 million cases of cardiovascular disease (CVD), 5 million cases of cirrhosis and 10 million cases of cancer can be attributed to this level of alcohol consumption between 2020 and 2050.
- Alcohol consumption above the 1/1.5 drinks per day cap also contributes to people dying prematurely – i.e. between the ages of 30 and 70. Specifically, each year, 1.1 million people die prematurely in the 52 countries examined; this is equivalent to 24 people per 100 000 population. Consistently with levels of alcohol consumption, the premature death rate at the country level varies 100-fold across countries, from 0.5 per 100 000 population in Saudi Arabia to 50 per 100 000 population in Lithuania.
- In OECD countries, life expectancy in the overall population is 0.9 years lower over the next 30 years due to diseases caused by drinking above the 1/1.5 drinks per day cap.

The health impact of alcohol consumption above 1 drink per day for women and 1.5 drinks per day for men translates into an increase in health expenditure

- Alcohol consumption above the 1/1.5 drinks per day cap increases prevalence of a number of diseases, and costs on average USD 61 per capita annually, adjusted for purchasing power parity (PPP), in extra health care expenditure across OECD countries. This equates to about 2.4% of the total health care expenditure in OECD countries. In total, USD PPP 138 billion per year will be spent to treat these diseases across all the countries included in the analysis. This is equivalent to, for instance, the current health spending in Australia or more than twice the current health spending in Belgium.
- Alcohol consumption above the 1/1.5 drinks per day cap increases the expenditure associated with the treatment of CVDs, diabetes, injuries, alcohol-related cancers and cirrhosis. Incidence of other diseases that usually develop at older ages may decrease due to shortened life expectancy resulting from alcohol use. This may result in a reduction in the cost of treatment of some other conditions, such as non-alcohol-related cancers, dementia and musculoskeletal disorders (MSDs).

Diseases caused by alcohol consumption above 1 drink per day for women and 1.5 drinks per day for men negatively affect employment and productivity

- Diseases caused by drinking above the 1/1.5 drinks per day cap decrease labour force employment and productivity for the equivalent of 32.7 million full-time workers per year across the 52 countries analysed, or the equivalent of 0.62% of the total workforce on average across countries.
- When this effect is converted into an economic value, OECD countries lose about USD PPP 595 billion per year. This is roughly equivalent to the annual GDP of Belgium or Sweden.
- On average, OECD countries lose USD PPP 344 per capita per year in labour-related costs, which is about 5.5 times as high as the health spending attributable to alcohol consumption above the 1/1.5 drinks per day cap. The majority of such costs are due to decreases in employment and increases in absenteeism and presenteeism, while the effect on early retirement is smaller.

- The total burden caused by alcohol consumption above the 1/1.5 drinks per day cap and its associated diseases is the highest in Central and Eastern Europe, where the level of alcohol consumption is higher than in other regions. On the other hand, the burden measured by alcohol-attributable medical expenditure is higher in Western Europe and North America, where medical care is more expensive.
- The impact of diseases caused by alcohol consumption above the 1/1.5 drinks per day cap on life expectancy, health expenditure, employment and productivity can be combined into one overall macroeconomic effect. Gross domestic product (GDP) is estimated to be reduced by 1.6% each year on average in OECD countries owing to the impact of diseases. As the overall tax rate increases, individuals face an equivalent tax of USD PPP 232 per year.

Diseases caused by any alcohol consumption have additional negative effects on longevity, employment and productivity

- Any alcohol consumption contributes to lowering of life expectancy by an extra two months on average at the population level, on top of the lowering by 11 months of life expectancy for consumption above the 1/1.5 drinks per day cap. At the individual level, some people experience greater reductions in life expectancy than others.
- Diseases caused by any drinking can lead to an extra annual loss of USD PPP 126 per capita in decreased employment and productivity on average across the 52 countries studied. This is a 45% increase on the economic losses resulting from diseases attributable to alcohol consumption above the 1/1.5 drinks per day cap. The impact on health expenditure due to increased morbidity is evaluated at about USD PPP 40 per capita per year.

4.1. There is a strong economic case for investing in preventing harmful consumption and in treatment

Harmful alcohol use is a leading risk factor contributing to diseases and the economic burden of diseases. Alcohol is a causal factor in more than 200 disease and injury conditions, including alcohol dependence, liver cirrhosis and cancers. Harmful use of alcohol causes approximately 3.3 million global deaths annually (or 5.9% of all global deaths), and causes 5.1% of the global burden of disease (WHO, 2018[1]).

In OECD countries, alcohol consumption per capita is about twice the world average. The 2014 World Health Organization (WHO) *Global Status Report on Alcohol and Health* estimated that, despite the expected decrease of alcohol consumption by 0.6 litres per capita between 2005 and 2025, the European Region will still have the highest level of per capita consumption in the world (WHO, 2014[2]).

Although the health consequences of harmful use of alcohol are well researched, evidence on its economic costs, including on health care budget spending and on labour force productivity, is scarce and context-specific. This chapter brings together the evidence from the literature on the economic costs of alcohol use, as well as main modelling outputs produced under a scenario assuming a ceiling of alcohol consumption at 1 drink[1] per day for women and 1.5 drinks per day for men, compared to a business-as-usual scenario, in which alcohol consumption remains at the current levels and patterns. In addition, this chapter also estimates the burden caused by any alcohol consumption.

4.1.1. Previous studies estimated the health care cost of alcohol consumption to be up to 7% of total health expenditure

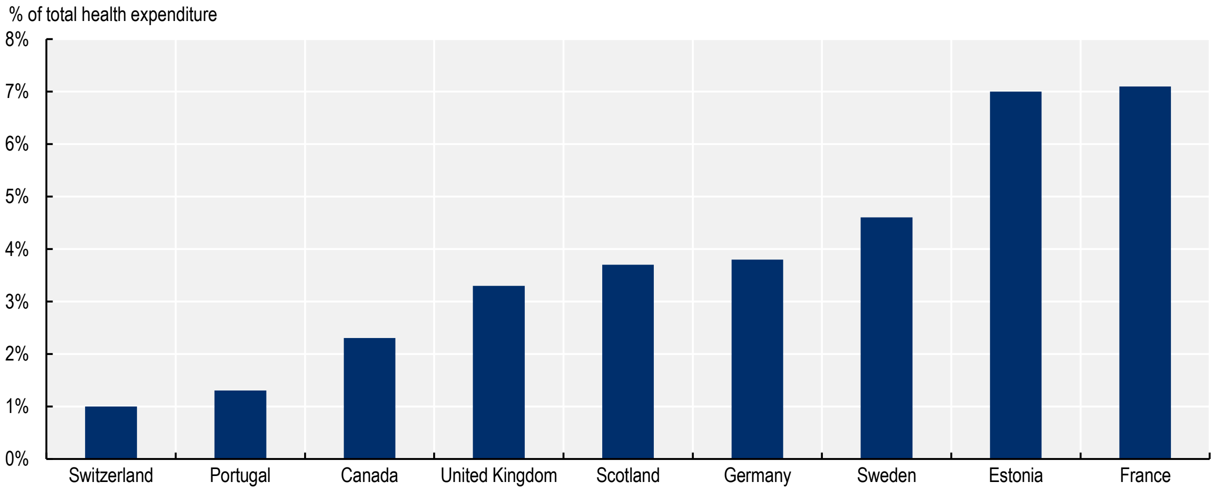
Previous estimates of the impact of alcohol consumption on health expenditure range from just under 1% of total health expenditure in Switzerland to just above 7% in France (see Figure 4.1). However, there is wide variation in the data sources underlying each study, in the methods used, and in the alcohol-related conditions and health care settings that are included to calculate health care costs.

For example, the study from Switzerland (Fischer et al., 2014[3]), where the lowest cost share (about 1%) was found, applied a top-down estimation approach, and only included hospital-based costs. Top-down approaches may underestimate costs as they do not account for the health care cost of minor health impairments associated with alcohol consumption, and often fail to account for the effect of comorbidities. The study from Canada (Canadian Substance Use Costs and Harms Scientific Working Group, 2020[4]) used a wider range of health care costs, including inpatient hospitalisations, day surgery, emergency department visits, specialised treatment, physician time and prescription drugs. As a result, the size of the burden estimate was higher, at about 2.3%.

In addition to methodological differences, studies also varied in other ways. For example:

- The age groups were not consistently defined. In one study, the population of interest was people older than 15; in two studies, people aged 15-74; and in the remaining studies, "adults" with unclear age boundaries.
- Different sets of diseases were included in the analyses. For example, 60 alcohol-related conditions were included in Switzerland, 54 in France and a slightly smaller set in Sweden, although in the case of the Swedish study the exact number of conditions was not specified. The costs for Estonia included 25 disease groups, whereas the Portuguese study included 44 alcohol-related conditions.

Figure 4.1. Health care costs for alcohol as percentage of total health care expenditure



Source: OECD analysis of France – Kopp (2015[5]), *Le Coût Social des Drogues en France*, https://www.ofdt.fr/BDD/publications/docs/eisxpkv9.pdf; Estonia – Saar, (2008[6]), "The social costs of alcohol misuse in Estonia", https://doi.org/10.1159/000173010; Canada – Canadian Substance Use Costs and Harms Scientific Working Group (2020[4]), *Canadian Substance Use Costs and Harms 2015-17*, https://www.ccsa.ca/sites/default/files/2020-06/CSUCH-Canadian-Substance-Use-Costs-Harms-Report-2020-en.pdf; Sweden – Jarl et al. (2008[7]), "The societal cost of alcohol consumption: An estimation of the economic and human cost including health effects in Sweden, 2002", https://doi.org/10.1007/s10198-007-0082-1; Germany – Konnopka, Bodemann and Konig (2011[8]), "Health burden and costs of obesity and overweight in Germany", https://doi.org/10.1007/s10198-010-0242-6; the United Kingdom (Scotland) – Johnston, Ludbrook and Jaffray (2012[9]), "Inequalities in the distribution of the costs of alcohol misuse in Scotland: A cost of illness study", https://doi.org/10.1093/alcalc/ags092; the United Kingdom – Balakrishnan et al. (2009[10]), "The burden of alcohol-related ill health in the United Kingdom", https://doi.org/10.1093/pubmed/fdp051; Portugal – Cortez-Pinto et al. (2010[11]), "The burden of disease and the cost of illness attributable to alcohol drinking: Results of a national study", https://doi.org/10.1111/j.1530-0277.2010.01229.x; Switzerland – Fischer et al. (2014[3]), *Alkoholbedingte Kosten in der Schweiz*, https://www.suchtmonitoring.ch/docs/library/fischer_mhrf7rn7ju.pdf.

StatLink https://stat.link/agnwfu

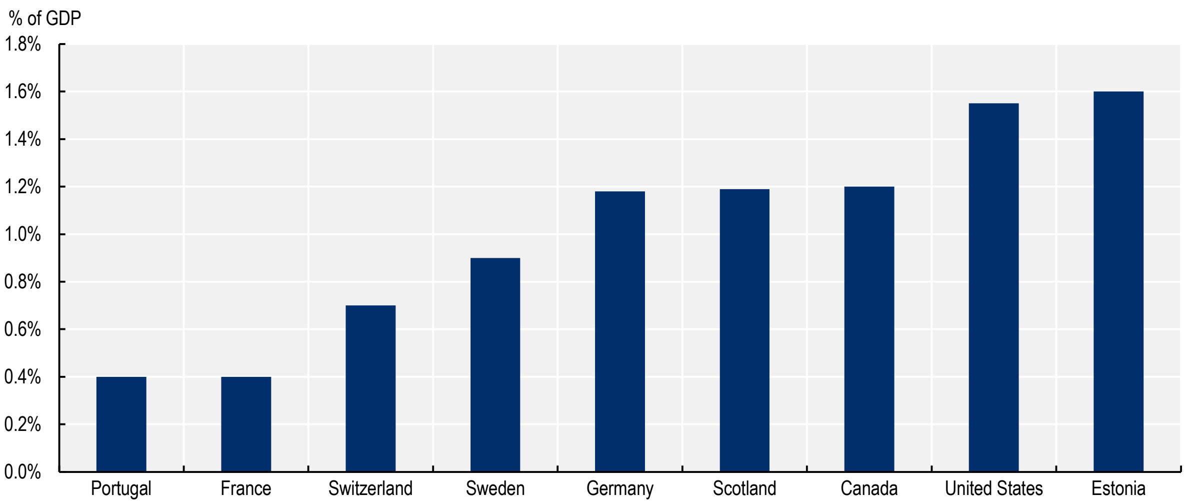
4.1.2. Existing studies suggest that the impact of alcohol consumption on the wider economy is between 0.4% and 1.6% of GDP

A number of studies go beyond health expenditure and try to estimate the impact of alcohol consumption on the wider economy. In nine reviewed studies, total non-health care costs ranged from 0.4% (Portugal and France) to 1.6% (Estonia) of GDP in the year the costs were incurred (Figure 4.2). For most countries for which data were available, the non-health care costs (excluding the social costs) ranged between 1% and 1.5% of GDP.

Among the approaches to model the non-health care costs associated with alcohol consumption, the human capital approach was the most common. This measures lost productivity, morbidity or mortality in terms of lost earnings based on wages. Again, the studies varied both in terms of the scope of the costs considered and in some other study characteristics, as discussed in Section 4.1.1 above.

For example, in some studies, only non-health care costs explicitly linked to labour market outcomes (such as labour productivity losses) were taken into account (Cesur and Kelly, 2014[12]), while in others, lost earnings resulting from premature mortality were also included (Fischer et al., 2014[3]). In several studies, other non-health care costs were included in the scope, including costs related to the use of social care (Johnston, Ludbrook and Jaffray, 2012[9]); economic losses and other costs resulting from increased crime (including policing, legal costs and costs of increased incarceration rates) (Jarl et al., 2008[7]); and other intangible costs such as pain and suffering (Johnston, Ludbrook and Jaffray, 2012[9]).

Figure 4.2. Estimates of the wider economic cost of alcohol consumption



Source: OECD analysis of: Estonia – Saar, (2008[6]), "The social costs of alcohol misuse in Estonia", https://doi.org/10.1159/000173010; the United States – Cesur and Kelly, (2014[12]) "Who pays the bar tab? Beer consumption and economic growth in the United States", https://doi.org/10.1111/ecin.12048; Canada – Rehm et al. (2007[13]), "The costs of alcohol, illegal drugs, and tobacco in Canada, 2002", https://doi.org/10.15288/jsad.2007.68.886; the United Kingdom (Scotland) – Johnston, Ludbrook and Jaffray (2012[9]), "Inequalities in the distribution of the costs of alcohol misuse in Scotland: A cost of illness study", https://doi.org/10.1093/alcalc/ags092; Germany – Konnopka and Konig (2007[14]), "Direct and indirect costs attributable to alcohol consumption in Germany", https://www.ncbi.nlm.nih.gov/pubmed/17610340; Sweden – Jarl et al. (2008[7]), "The societal cost of alcohol consumption: An estimation of the economic and human cost including health effects in Sweden, 2002", https://doi.org/10.1007/s10198-007-0082-1; Switzerland – Fischer et al. (2014[3]), *Alkoholbedingte Kosten in der Schweiz*, https://www.suchtmonitoring.ch/docs/library/fischer_mhrf7rn7ju.pdf; France – Kopp (2015[5]), *Le Coût Social des Drogues en France*, https://www.ofdt.fr/BDD/publications/docs/eisxpkv9.pdf; Portugal – Lima and Esquerdo (2003[15]), "The economic costs of alcohol misuse in Portugal", http://nima.eeg.uminho.pt/uploads/EEG161107NIMA24.pdf.

StatLink https://stat.link/dmr1eu

4.1.3. The OECD SPHeP-NCDs model estimates the health and economic burden of diseases caused by alcohol consumption

To quantify the impact of several risk factors – including alcohol consumption – on population health and the economy, the OECD developed the Strategic Public Health Planning for non-communicable diseases (SPHeP-NCDs) model. This simulates the impact of major risk factors on disease incidence, mortality, health expenditure[2] and employment and productivity (see Box 4.1 for more details on the model). The OECD SPHeP-NCDs model can be used to understand the economic burden of diseases caused by alcohol consumption, as well as the potential impact of interventions. As the model applies a standardised approach to all countries, it also allows cross-country comparison. This section presents the outputs of the OECD SPHeP-NCDs model and its estimates of the health and economic burden of diseases caused by alcohol consumption above 1 drink per day for women and 1.5 drinks per day for men, between 2020 and 2050, and estimates the burden caused by any alcohol consumption.

Box 4.1. The OECD SPHeP-NCDs model

The OECD SPHeP-NCDs model is an advanced systems modelling tool for public health policy and strategic planning. It is used to predict the health and economic outcomes of the population of a country or a region up to 2050. The model consolidates previous OECD modelling work into a single platform to produce a comprehensive set of key behavioural and physiological risk factors (e.g. obesity, physical activity, alcohol consumption, blood pressure) and their associated NCDs and other medical conditions. The model covers 52 countries, including OECD member countries, G20 countries, EU27 countries and OECD accession and selected partner countries such as Costa Rica and Peru.

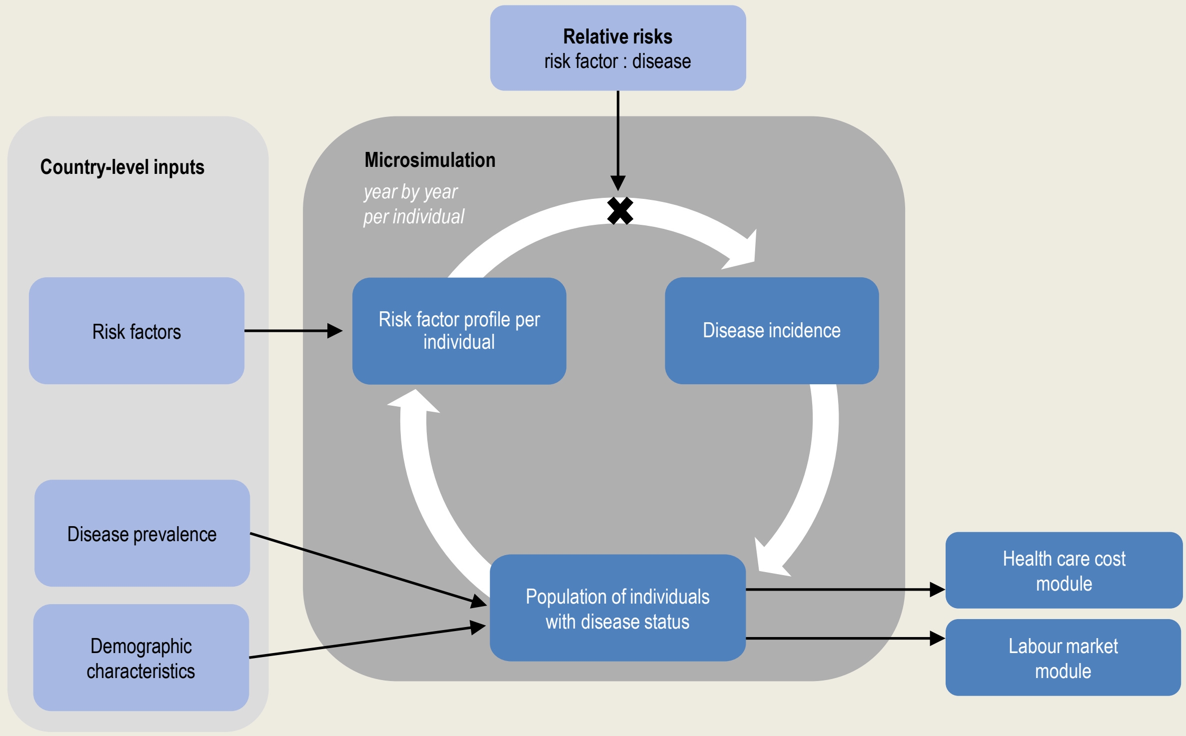
For each of the 52 countries, the model uses demographic and risk factor characteristics by age- and sex-specific population groups from international databases (see Figure 4.3). These inputs are used to generate synthetic populations, in which each individual is assigned demographic characteristics and a risk factor profile. Based on these characteristics, an individual has a certain risk of developing a disease each year. Individuals can develop twelve categories of disease, including seven directly related with alcohol (i.e. alcohol dependence, cirrhosis, injuries, cancer, depression, diabetes and CVDs). Therefore, the model takes into account the fact that individuals who do not develop an alcohol-related disease may develop other diseases that affect health care expenditure, labour force productivity and mortality. Incidence and prevalence of diseases in a specific country's population were calibrated to match estimates from international datasets (IHME, 2020[16]; IARC, 2020[17]).

The links between alcohol consumption and diseases are modelled through age- and sex-specific relative risks retrieved from the literature (Global Burden of Disease Collaborative Network, 2016[18]; GBD 2016 Risk Factors Collaborators, 2017[19]; Cecchini, Devaux and Sassi, 2015[20]) and depend on both the volume and, for some diseases (i.e. depression, CVDs and diabetes), the patterns of alcohol consumption. For example, moderate levels of alcohol consumption can have a protective effect on CVDs and diabetes, but, consistent with the evidence (Rehm et al., 2003[21]), this effect is cancelled if the individual is a binge drinker.

For each year, a cross-sectional representation of the population can be obtained, to calculate health status indicators such as life expectancy, disease prevalence and disability-adjusted life years using disability weights. Health care costs of disease treatment are estimated based on a per-case annual cost, which is extrapolated from national health-related expenditure data. The additional cost of multimorbidity is also calculated and applied. The extra cost of end-of-life care is also taken into account. In the model, people not dying from an alcohol-related disease or injury continue to consume medical care for other conditions (e.g. diabetes) and incur medical costs.

The labour market module uses relative risks to relate disease status to the risk of absenteeism, presenteeism (where sick individuals, even if physically present at work, are not fully productive), early retirement and employment. These changes in employment and productivity are estimated in number of full-time equivalent workers and costed based on a human capital approach,[1] using national average wages.

Figure 4.3. Schematic overview of the modules in the OECD SPHeP-NCDs model



Note: This schematic is highly simplified and focuses on the disease component – it does not reflect some other components of the model (including births, immigration, emigration, death, remission and fatality).
Source: OECD (2019[22]), SPHeP-NCDs Technical Documentation, http://oecdpublichealthexplorer.org/ncd-doc.

The OECD SPHeP-NCD model was used to simulate a scenario in which alcohol consumption is capped at about 1 drink per day for women and 1.5 drinks per day for men (assuming that a drink contains 12 grammes of alcohol – previous OECD analyses concluded that the definition of a standard drink generally varies between 8 g and 16 g of alcohol across countries, with 12 g as the mid-point of this range (Sassi, 2015[23])). In addition, this scenario assumes no binge drinking, as this has been shown to be a risk factor for disease even when overall alcohol consumption is light to moderate (Roerecke and Rehm, 2010[24]). The 1/1.5 drinks per day cap was chosen because at these levels alcohol may have some protective effect on specific diseases such as ischaemic CVDs and diabetes for some age groups (GBD 2016 Alcohol Collaborators, 2018[25]). However, these effects are debated, with some studies concluding that there is no protective cardiovascular effect once lifetime abstainers are separated from those who quit and do not drink for health reasons (Naimi et al., 2017[26]; Stockwell et al., 2016[27]). To account for this uncertainty around relative risks, a sensitivity analysis was carried out to take out any protective effect (Annex 4.A).

The OECD SPHeP-NCDs model was also used to calculate the total burden of any alcohol consumption. For practical purposes, and following a standard approach, this is done by simulating a scenario that evaluates how assessed outcomes change following a fictitious elimination of all alcohol drinking. Results on the total burden of alcohol consumption are shown in Annex 4.B, with key findings also summarised in the main text as boxes.

For more information on the OECD SPHeP-NCDs model, see the SPHeP-NCDs Technical Documentation, available at: http://oecdpublichealthexplorer.org/ncd-doc.

1. The human capital approach is based on assumptions simplifying the economic dynamics leading to economic losses – including, for example, assumptions about reserve labour force, friction costs, and the impact on reserve wages.

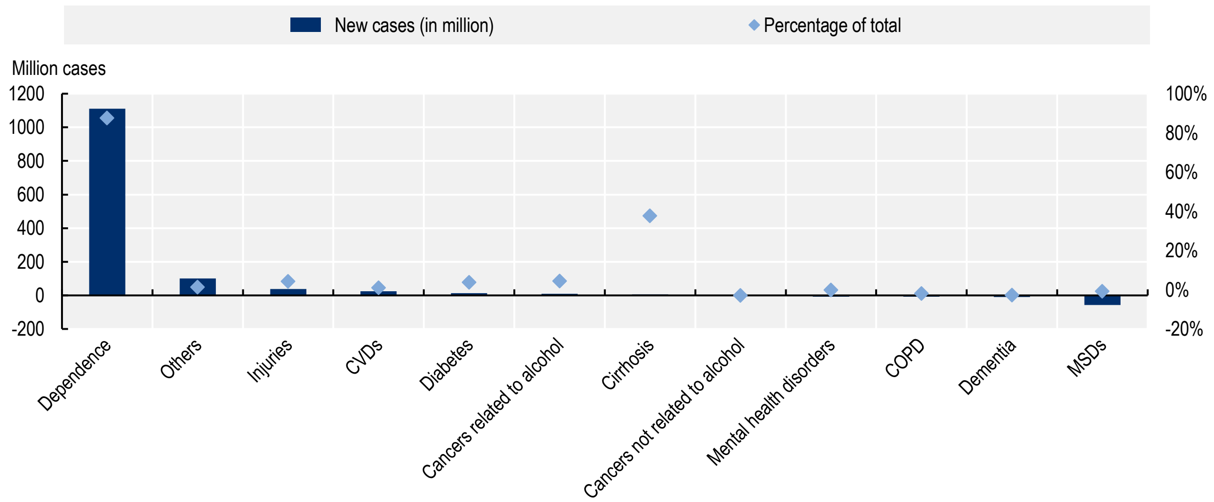
4.2. Alcohol consumption above the 1/1.5 drinks per day cap and its related diseases reduce life expectancy in OECD countries by 0.9 years

Alcohol consumption above 1 drink per day for women and 1.5 drinks per day for men has a considerable negative impact on population health. Specifically, drinking above these caps contributes to about 1.1 billion new cases of dependence, 37 million cases of injury, 12 million cases of diabetes, 24 million cases of CVDs, 5 million cases of cirrhosis and 10 million cases of cancer related to alcohol over the next 30 years in 52 countries. This accounts for about 88% of all cases of dependence, and 38% of all cases of cirrhosis projected for 2020-50 (Figure 4.4).

However, as alcohol consumption above the 1/1.5 drinks per day cap reduces life expectancy, it also reduces the amount of time available to develop other diseases or conditions. As a result, and because of shorter life expectancy, drinking above these caps decreases the incidence of several diseases such as MSDs, cancers not related to alcohol, chronic obstructive pulmonary disease (COPD) and dementia (Figure 4.4).

Figure 4.4. The impact of alcohol consumption on disease incidence

New cases due to alcohol consumption above 1 drink per day for women and 1.5 drinks per day for men, number and as a percentage of all new cases of disease, total 2020-50



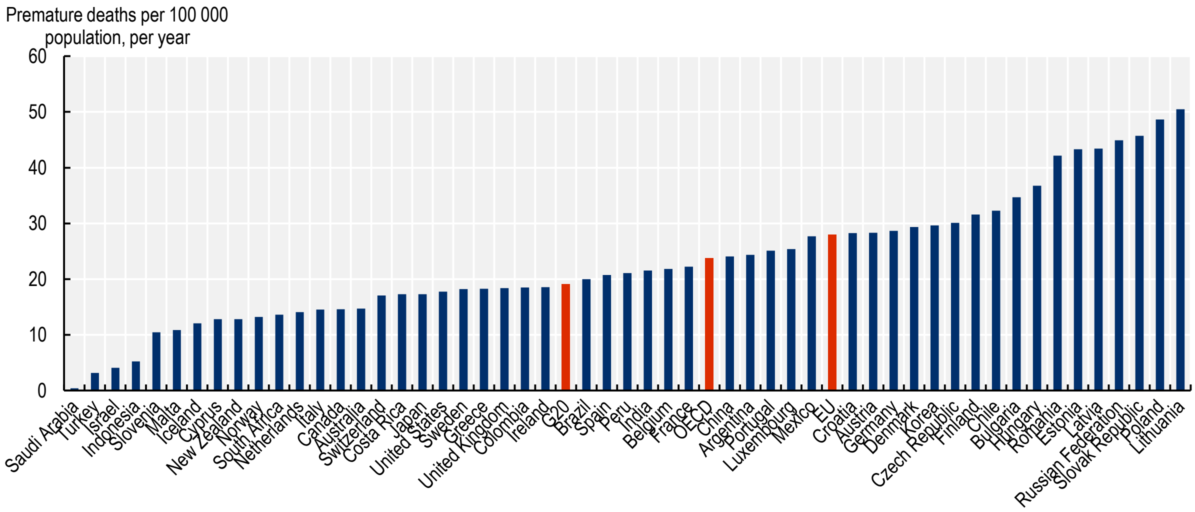
Note: Alcohol-related cancers include liver, breast, colorectal, oesophageal, nasopharynx, lip and oral cavity. Non-alcohol-related cancers include lung and stomach.
Source: OECD analyses based on the OECD SPHeP-NCDs model, 2020.

StatLink https://stat.link/i49ebx

Alcohol consumption above 1 drink per day for women and 1.5 drinks per day for men can also lead to people dying prematurely – between ages 30 and 70, according to the WHO definition (WHO, 2018[28]). Specifically, the model predicts that, compared to the business-as-usual scenario, an additional 1.1 million people will die early due to diseases caused by drinking above these caps in the 52 countries each year. On average across OECD countries, 24 people per 100 000 population will die prematurely each year due to alcohol consumption above the 1/1.5 drinks per day cap (Figure 4.5). In the EU27, this average is higher, at 28 per 100 000, mostly driven by relatively high premature mortality rates in Central and Eastern European countries.

Figure 4.5. The impact of alcohol consumption on premature mortality

Annual number of premature deaths per 100 000 population due to alcohol consumption above 1 drink per day for women and 1.5 drinks per day for men, average 2020-50



Source: OECD analyses based on the OECD SPHeP-NCDs model, 2020.

StatLink https://stat.link/pr9unj

The impact of alcohol consumption above the 1/1.5 drinks per day cap on population health can also manifest itself in shorter life expectancy (Figure 4.6). On average across all OECD countries, life expectancy is 0.9 years lower over 2020-50 due to drinking above the 1/1.5 drinks per day cap. For comparison, over the last 30 years, life expectancy in OECD countries has increased by about 6.7 years (World Bank, 2020[29]), driven by changes in a large number of medical and social factors. Alcohol consumption is only one determinant of population health, but drinking within the 1/1.5 drinks per day cap could potentially contribute to about 13% of the total life expectancy gain recorded over a similar period of time in the past. The largest reductions are predicted in Central and Eastern European countries, with more than 1.5 years of life expectancy lost in Lithuania, the Russian Federation, Poland, Estonia, Latvia and Romania. Given that the current life expectancy in Lithuania is about 74 years for both sexes, and in Japan – the country with the longest life expectancy – it is about 84 years, and given that life expectancy loss due to alcohol consumption above the 1/1.5 drinks per day cap in Lithuania is greater than in Japan by about 1.6 years, alcohol consumption above these caps potentially accounts for about 16% of the life expectancy gap between these two countries.

The effect of alcohol consumption above the 1/1.5 drinks per day cap on years of healthy life expectancy (HALEs) – i.e. after taking into account the quality of life years lived through disability-adjusted weights for people with diseases – is even greater. For example, across all OECD countries, 1.13 HALEs are lost over 2020-50 due to this level of alcohol consumption, with the largest effect predicted to be in Lithuania (2.3 HALEs lost), and the smallest in Turkey (0.11 HALEs lost).

Figure 4.6. The impact of alcohol consumption on life expectancy

Life expectancy and HALEs lost due to alcohol consumption above 1 drink per day for women and 1.5 drinks per day for men, average 2020-50

Source: OECD analyses based on the OECD SPHeP-NCDs model, 2020.

StatLink https://stat.link/2aim5w

Finally, a brief comparison of the health-related burden of alcohol consumption above the 1/1.5 drinks per day cap with the health-related burden of any alcohol consumption is made in Box 4.2 and discussed further in Annex 4.B.

Box 4.2. Any level of alcohol consumption causes population health harms

- The risk of some diseases and outcomes such as dependence, cancers, cirrhosis and injuries is increased even at low levels of alcohol consumption. This means that the burden of total alcohol consumption (i.e. any drinking at all, as opposed to drinking above the 1/1.5 drinks per day cap) is greater. More specifically, the OECD SPHeP-NCDs model calculates that, cumulatively over the next 30 years in 52 countries, any alcohol consumption causes approximately 14% more cases of dependence than drinking above the caps (1 263 million cases, or 100% of the total, vs. 1 111 million cases, or about 88% of the total).
- In addition, any alcohol consumption causes an additional 48 million cases of injury (128% more cases than the burden caused by drinking above the caps) and extra 10 million of cancer (97% more cases) over the next 30 years in all 52 countries.
- An extra 4.2 people per 100 000 population will die prematurely (18% more than the premature deaths caused by drinking above the 1/1.5 drinks per day cap). In total, about 1.1 million people will die prematurely each year across all 52 countries due to drinking above the 1/1.5 drinks per day cap, and about 1.3 million due to any level of alcohol consumption.
- Any alcohol consumption contributes to lowering of life expectancy by an extra two months on average at the population level, on top of the lowering by 11 months of life expectancy for consumption above the caps (17% greater reduction, compared to drinking above the 1/1.5 drinks per day cap).

These results are discussed further in Annex 4.B.

It should be also noted that the model produces conservative estimates as it does not take into account the impact of alcohol consumption on certain diseases, either because they represent a small part of the alcohol-attributable disease burden, or because of a lack of availability of reliable epidemiological data on these diseases as, for example, in the case of the foetal alcohol spectrum disorders (Box 4.3). In addition, alcohol consumption may lead to additional health problems – for example, by hindering effective management of medical conditions, either related or unrelated to drinking alcohol. For instance, alcohol consumption may be associated with lower adherence to medical therapies, or with the reduced likelihood of seeing a doctor (Ahmed, Karter and Liu, 2006[30]). Down the line, these are likely to increase the likelihood of disease progression or complications.

Box 4.3. Foetal alcohol spectrum disorder: Impact outside the scope of the current SPHeP-NCD model

The analyses do not take into account the impact of maternal alcohol consumption during pregnancy on foetal development, or foetal alcohol spectrum disorder (FASD). In the WHO European Region, the prevalence of FASD is estimated at 19.8 per 1 000 population of children and young people (Lange et al., 2017[31]). The prevalence of a more severe form of FASD – foetal alcohol syndrome – is 3.74 per 1 000 in the general population in WHO European Region (Popova et al., 2017[32]), and 2.25 per 1 000 in the general population in the United States (Popova et al., 2017[32]). A few studies have tried to estimate the cost of FASD, and estimates of lifetime cost of care for an individual vary from USD 596 000 in 1980 to USD 1.4 million in 1988 (Lupton, Burd and Harwood, 2004[33]). A more recent study estimated the economic burden of FASD at CAD 1.8 billion in 2013 in Canada (Popova et al., 2016[34]).

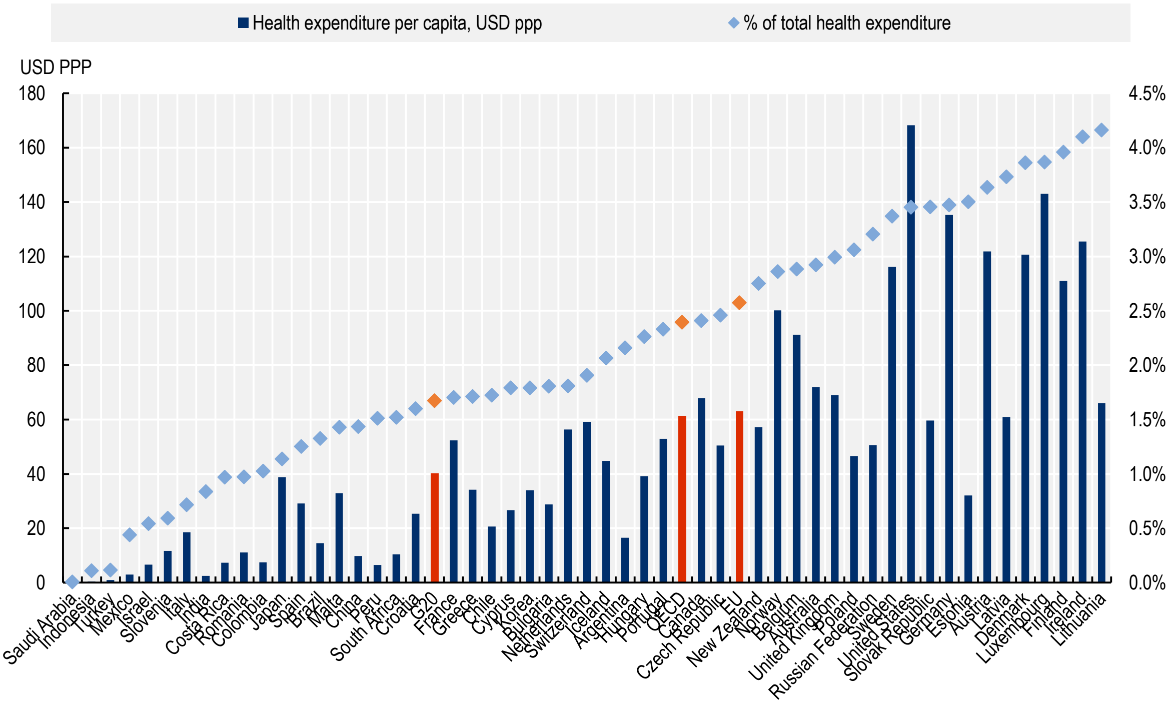
4.3. Diseases caused by alcohol consumption above 1 drink per day for women and 1.5 drinks per day for men account for over 2.4% of total health expenditure in OECD countries

On average, the treatment of diseases caused by alcohol consumption above 1 drink per day for women and 1.5 drinks per day for men increases per capita medical spending by about USD PPP 61 annually in OECD countries, which accounts for about 2.4% of the overall annual health expenditure across OECD countries in 2020-50, including both public and private expenditure on health (Figure 4.7). The largest spending is predicted to happen in countries where the cost of medical treatment is the highest, such as the United States, Luxembourg and Germany, with up to USD PPP 168 spent per capita annually in the United States. The lowest amount is predicted to be spent in Turkey, where both the level of alcohol consumption and treatment costs are relatively low. In total, USD PPP 138 billion per year will be spent to treat these diseases across all the countries included in the analysis. This is equivalent to, for instance, the current health spending in Australia, or more than twice the current health spending in Belgium.

Although the health burden of alcohol use is found to be relatively high in Central and Eastern European countries (see Figure 4.6), medical expenditure attributable to diseases caused by alcohol use (expressed in USD PPP) is relatively low (Figure 4.7). This difference in findings is mostly due to the lower costs of medical care in countries in these regions. Nevertheless, this spending accounts for a very large proportion of total medical spending in some of these countries, especially in Lithuania, Latvia and Estonia. In Lithuania, diseases caused by alcohol consumption above the 1/1.5 drinks per day cap account for the largest share of total medical spending compared to all the other countries, at 4.2%.

Figure 4.7. The health care expenditure associated with diseases caused by alcohol consumption

Annual health expenditure due to diseases caused by alcohol consumption above 1 drink per day for women and 1.5 drinks per day for men, in USD PPP per capita and as a percentage of total health expenditure, average 2020-50



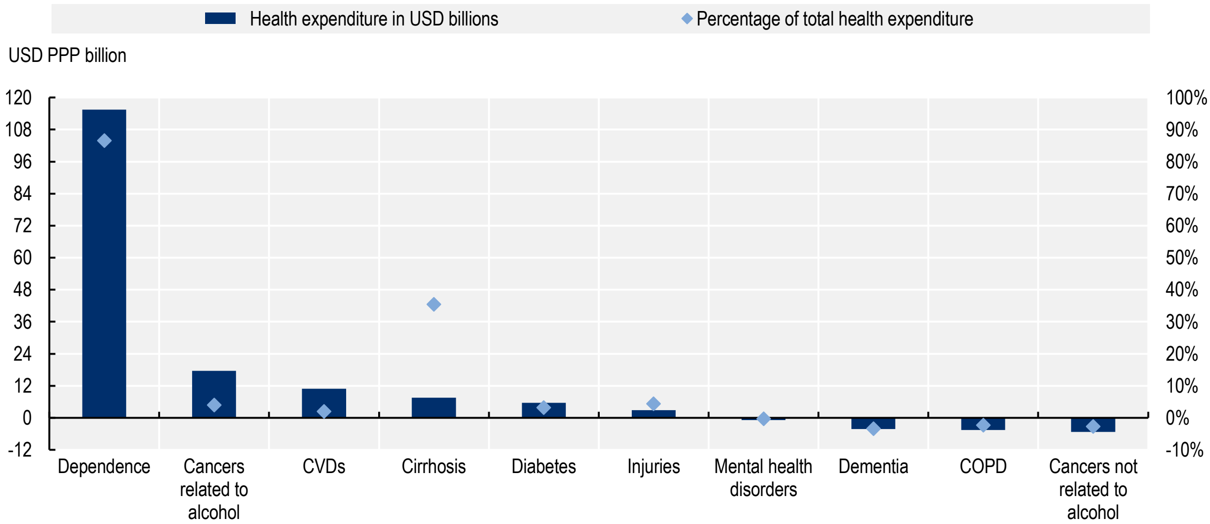
Source: OECD analyses based on the OECD SPHeP-NCDs model, 2020.

StatLink https://stat.link/fz0htg

On a disease-specific basis, alcohol consumption above 1 drink per day for women and 1.5 drinks per day for men contributes to a large increase in the costs of treating several diseases – most notably dependence, cirrhosis and certain cancers. It accounts for 87% of all dependence-related expenditure (or about USD PPP 115 billion annually in the 52 countries studied) and for 35% of all expenditure related to treating cirrhosis in 2020-50 (Figure 4.8). Alcohol consumption above the 1/1.5 drinks per day cap is also responsible for about 4% (USD PPP 17 billion) of all expenditure for treating alcohol-related cancers (including liver, breast, colorectal, oesophageal, nasopharynx, lip and oral cavity cancers).

Figure 4.8. The impact of alcohol consumption on disease-related health expenditure

Annual health expenditure due to alcohol consumption above 1 drink per day for women and 1.5 drinks per day for men, in USD PPP billions and as a percentage of total health expenditure for the disease, average 2020-50



Note: Alcohol-related cancers include liver, breast, colorectal, oesophageal, nasopharynx, lip and oral cavity. Non-alcohol-related cancers include lung and stomach.
Source: OECD analyses based on the OECD SPHeP-NCDs model, 2020.

StatLink https://stat.link/aijnf8

Finally, a brief comparison of the health expenditure burden of alcohol consumption above the 1/1.5 drinks per day cap with the burden on health expenditure of any alcohol consumption is made in Box 4.4 and discussed further in Annex 4.B.

Box 4.4. Effect of diseases caused by any alcohol consumption on medical spending

While drinking above 1 drink per day for women and 1.5 drinks per day for men has a negative impact on population health, and total drinking – including any level of alcohol consumption – has even larger negative effects, the case is less clear when the outcome is health spending. On the one hand, as shown above, any alcohol consumption can lead to even more diseases, with the associated costs of treatment. On the other hand, people who live longer continue to consume health care for conditions that are both related and unrelated to drinking alcohol. For example, a young adult not dying because of a road traffic crash caused by binge drinking can develop, later in life, another chronic condition (e.g. diabetes), which results in higher lifetime health expenditure.

Analyses carried out with the OECD model take into account that the majority of health expenditure is incurred towards the end of life, and consider a protective effect of alcohol consumption on ischaemic CVDs and diabetes (see Box 4.1). Under these postulates, analyses across all 52 modelled countries found that:

- The total burden of alcohol-related diseases on health expenditure is USD PPP 40 per capita per year, which is about 19% lower than the burden of disease caused by drinking above the 1/1.5 drinks per day cap (USD PPP 49).
- The small protective effect of alcohol on ischaemic CVDs and longer life expectancy are the main drivers explaining the difference between the two estimates.

These results are discussed further in Annex 4.B.

4.4. Diseases caused by alcohol consumption have a negative impact on employment and productivity

The impact of alcohol consumption on the labour market, including employment and productivity, is complex and depends on a number of different factors (Box 4.5). The approach chosen for this report involves modelling the labour market effect of alcohol consumption only through diseases and medical conditions, rather than through any other pathway, because previous OECD analyses identified the link between diseases and labour market outcomes as the strongest from a statistical point of view (Devaux and Sassi, 2015[35]).

Box 4.5. Alcohol consumption and labour market outcomes: Reconciling the evidence

The effects of alcohol consumption on labour market outcomes are complex. First, the relationship between alcohol consumption and labour market outcomes can be affected in either direction, and more robust analyses on longitudinal data are needed to disentangle the causal effects. On the one hand, some previous studies – including OECD work – suggest that harmful alcohol consumption may lead to reduced labour market inputs (Devaux and Sassi, 2015[35]). On the other hand, unemployment or other work-related problems may also be the cause of harmful drinking (Marchand, Parent-Lamarche and Blanc, 2011[36]), and establishing the direction of causal effect is not easy with the data that is usually available.

Second, some confounders may not be taken into account in studies, and this may hide or make false a relationship between alcohol consumption and labour market outcomes. While some studies find no significant relationship between alcohol consumption and employment (Feng et al., 2001[37]), others highlight some associations. There is some evidence that heavy drinking reduces employment (MacDonald and Shields, 2004[38]), but alcohol consumption, especially at lower levels of drinking, can also be associated with better labour market outcomes (Jarl and Gerdtham, 2012[39]). Whether this reflects some sort of true causal effect (e.g. occasional drinkers can be more likely to socialise and build stronger social networks, which in turn can help improve their employment prospects), or whether light drinking is simply a proxy for good health, remains to be established. Similarly, for the link between alcohol consumption and productivity at work, a recent study concludes that a large body of evidence exists in support of alcohol-related presenteeism, but that this is weakened by low research quality and a lack of longitudinal designs (Thørrisen et al., 2019[40]).

In 2015, the OECD conducted econometric analyses investigating the association between alcohol consumption and employment, wages, sick leave and early retirement, using the longitudinal data from several countries (Devaux and Sassi, 2015[35]), trying to correct for these methodological problems. The study found a negative effect of heavy drinking on employment in men in the United States and Australia, but for the other outcomes – especially when exposure to light/moderate drinking was tested – the evidence was more mixed.

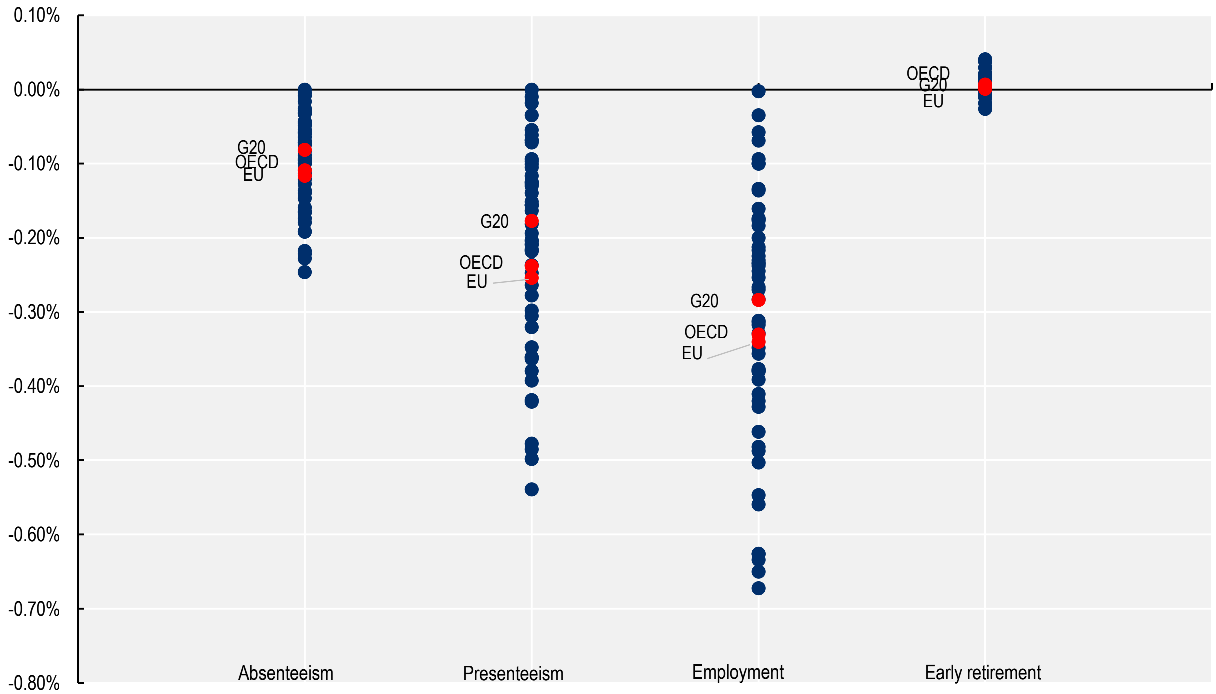
Given the heterogeneity in the evidence linking alcohol consumption and labour market outcomes, analyses in this report only look at the impact of diseases caused by alcohol consumption, omitting any additional effect of alcohol that is not directly mediated by a medical condition. Both positive and negative impacts are considered in the analyses. While this approach is likely to be conservative (for example, in the case of men in the United States and Australia), the resulting findings are based on stronger evidence.

The OECD analysis shows that diseases caused by alcohol consumption above 1 drink per day for women and 1.5 drinks per day for men reduce employment by about 0.33% annually across all OECD countries in the working-age population (ages 18-65) in 2020-50 (Figure 4.9). At the same time, there are significant regional variations in this effect; the labour markets in Central and Eastern Europe suffer the most, with up to 0.67% employment reduction attributable to diseases caused by alcohol consumption in Latvia.

In addition, diseases caused by alcohol consumption above the 1/1.5 drinks per day cap reduce productivity when employed, as measured by absenteeism and presenteeism. Specifically, across OECD countries, 0.11% of labour force productivity is lost annually because of sickness-related absences, while 0.24% is lost due to reduced productivity at work in the form of presenteeism. The effect on early retirement is generally negligible, mostly due to a weak association of alcohol-related diseases with this outcome (Figure 4.9).

Figure 4.9. The impact of diseases caused by alcohol consumption on employment and productivity

Percentage difference in labour market inputs due to diseases caused by alcohol consumption above 1 drink per day for women and 1.5 drinks per day for men, per capita, average 2020-50



Note: Labour market inputs include employment and productivity when employed. They are expressed in the number of full-time equivalent workers and are calculated for the working-age population.
Source: OECD analyses based on the OECD SPHeP-NCDs model, 2020.

StatLink https://stat.link/25ox9l

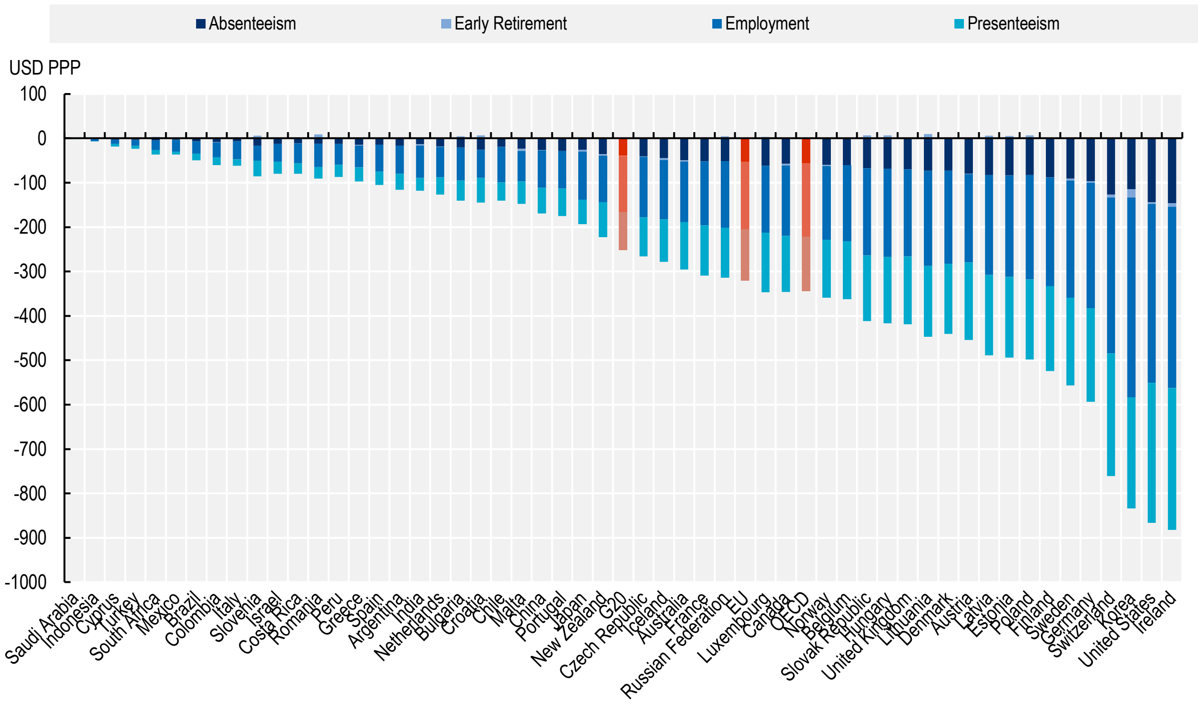
Overall, chronic conditions caused by drinking more than 1 drink per day for women and 1.5 drinks per day for men affect the productivity of the labour force by reducing the workforce by about 32.7 million full-time workers per year across the 52 countries analysed, which is equivalent to 0.62% of the total workforce on average across countries.

When the impact of alcohol consumption above the 1/1.5 drinks per day cap is translated into lost employment and productivity as measured by PPP-adjusted market wages, OECD countries lose on average USD PPP 344 per capita per year (see Figure 4.10), which is about 5.5 times as high as increases in health spending attributable to diseases caused by alcohol consumption. This is equivalent to a labour-related economic loss of about USD PPP 595 billion per year in OECD countries. This roughly corresponds to the annual GDP of Belgium or Sweden. The majority of costs are due to decreases in employment, while the effect on early retirement is small.

The impact on employment and productivity varies considerably across OECD countries: the lost labour market output is highest in Ireland, at almost USD PPP 882 per capita annually, while it is lowest in Turkey, at about USD PPP 23 per capita annually. In other modelled non-OECD countries – Cyprus, Indonesia and Saudi Arabia – the effect is even lower.

Figure 4.10. Economic impact of diseases caused by alcohol consumption on employment and productivity

Per capita employment and productivity losses based on average wages due to alcohol consumption above 1 drink per day for women and 1.5 drinks per day for men, per year, in USD PPP, average 2020-50



Source: OECD analyses based on the OECD SPHeP-NCDs model, 2020.

StatLink https://stat.link/i0398v

Finally, a brief comparison of the labour force productivity burden of alcohol consumption above the 1/1.5 drinks per day cap with the labour force productivity burden of any alcohol consumption is made in Box 4.6 and discussed further in Annex 4.B.

Box 4.6. Effect of diseases caused by any level of alcohol consumption on employment and productivity

The impact of diseases caused by alcohol consumption above the 1/1.5 drinks per day cap and caused by any level of alcohol consumption on changes in employment and productivity expressed in monetary terms was compared for 2020-50. Specifically, across all 52 modelled countries:

- Diseases caused by any alcohol consumption will, on average, contribute to a loss of employment and productivity by about USD PPP 404 per capita annually, which represents an extra annual loss of USD PPP 126 per capita per year compared to diseases caused by drinking above the 1/1.5 drinks per day cap only. In other words, this is about 45% larger in magnitude than the USD PPP 278 economic loss resulting from the diseases attributable to alcohol consumption above the 1/1.5 drinks per day cap.
- Most of this increase in economic loss will occur as a result of further reductions in employment resulting from diseases attributable to any alcohol consumption, rather than changes in absenteeism, presenteeism and early retirement.

These results are discussed further in Annex 4.B.

4.5. At a macroeconomic level, GDP in OECD countries is 1.6% lower due to diseases caused by alcohol consumption above the 1/1.5 drinks per day cap

The impact of diseases caused by alcohol consumption on life expectancy, health expenditure, employment and productivity can be combined into one overall macroeconomic effect.[3] To model this, the outputs of the business-as-usual scenario and the scenario in which alcohol consumption is capped at 1 drink per day for women and 1.5 drinks per day for men from the OECD SPHeP-NCDs model were fed into the OECD long-term economic model (Box 4.7). This model was used to understand the impact of diseases caused by alcohol consumption on GDP and on the overall tax rate.

Box 4.7. Linking the OECD SPHeP-NCDs model with the OECD long-term economic model

The impact of diseases caused by alcohol consumption on the larger economy was evaluated using the OECD long-term economic model (see Box 1 in Guillemette and Turner (2017[41])). This model extends the short-run projections of the twice-yearly OECD Economic Outlook out to 2060 (OECD, 2018[42]). The Economic Outlook includes historical estimates and short-run projections of potential output for each country based on a Cobb-Douglas production function with trend input components – namely trend labour efficiency, trend employment and the productive capital stock. This same production function sits at the core of the long-term model.

The OECD SPHeP-NCDs model was used to model employment, productivity, population dependency ratio (dependency ratio is the ratio of dependents [people younger than 15 or older than 64] to the working-age population), increase in life expectancy and health care costs for the business-as-usual scenario and the scenario in which alcohol consumption is capped at 1 drink per day for women and 1.5 drinks per day for men. These outputs were then used as inputs for the OECD long-term economic model to obtain the overall impact on GDP and fiscal pressure. The framework used is represented in Figure 4.11.

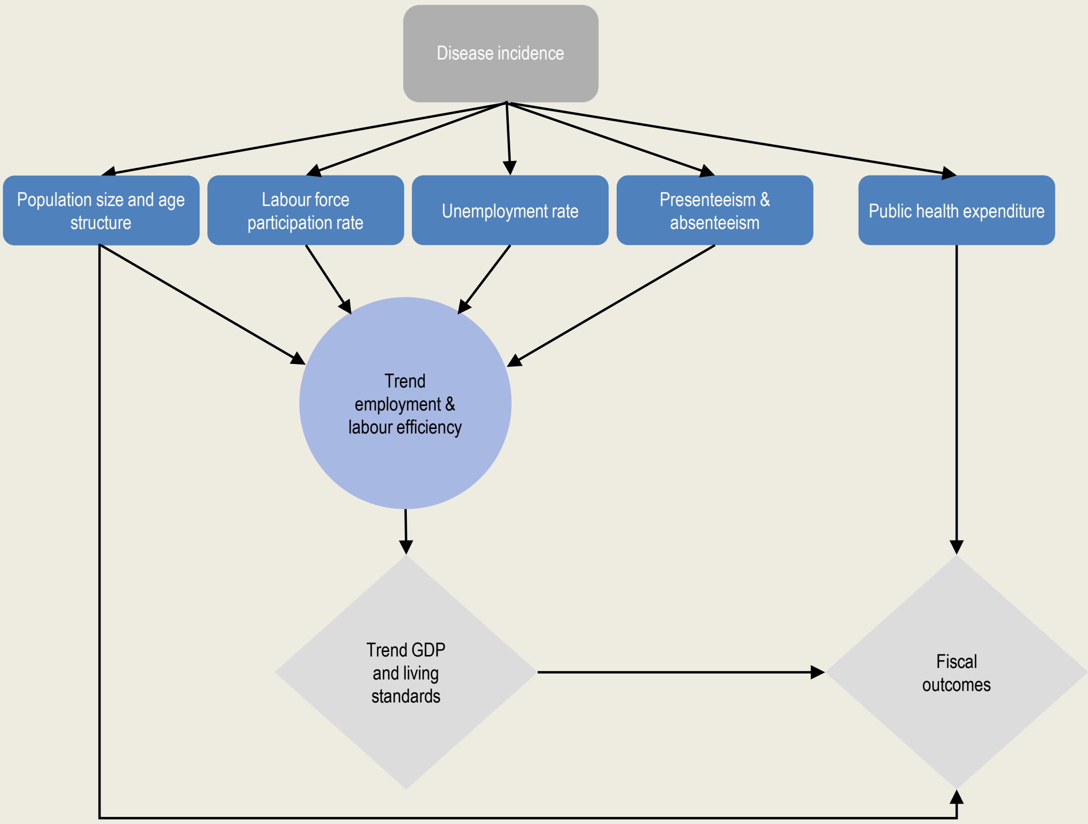
Equation 1 (Eq.1) shows the decomposition of the overall impact on GDP into four elements. Alcohol-related diseases can affect GDP through the effect on each of these elements. The output per capita in the left-hand side is given by the long-term OECD long-term economic model. The first term in the right-hand side is a population structure effect, which is affected by premature mortality, life expectancy and dependency ratio. The second term is the aggregate employment rate, which is affected by alcohol-related diseases and injuries, incarceration, early retirement or any alcohol-related event preventing people of working age from being in the labour force (that is either employed or unemployed but looking for work). The third term is the average hours per employee and captures absenteeism. The last term measures the average productivity and captures the presenteeism effect.

$$\text{(Eq.1)}\ \frac{\textit{Output}}{\textit{Population}} = \frac{\textit{Working-age population}}{\textit{Population}} * \frac{\textit{Employment}}{\textit{Working-age population}} * \frac{\textit{Hours worked}}{\textit{Employment}} * \frac{\textit{Output}}{\textit{Hours worked}}$$

The effect on public finances is calculated separately, and captures both the overall GDP impact and the effect on health expenditure. Fiscal pressure is measured as government primary revenue needed to stabilise the public debt ratio as a percentage of GDP. This is equivalent to an overall tax rate, which is what is reported in this chapter.

Each scenario is run with and without an adjustment for the effective retirement age. In the adjusted scenarios, the impact of alcohol consumption on life expectancy is assumed also to affect the effective retirement age. For the results presented in the report the conservative, non-adjusted scenarios were used. The results with the adjustment can be found in Annex Figure 4.B.8 and Annex Figure 4.B.9.

Figure 4.11. Link between the OECD SPHeP-NCDs and the OECD long-term economic models

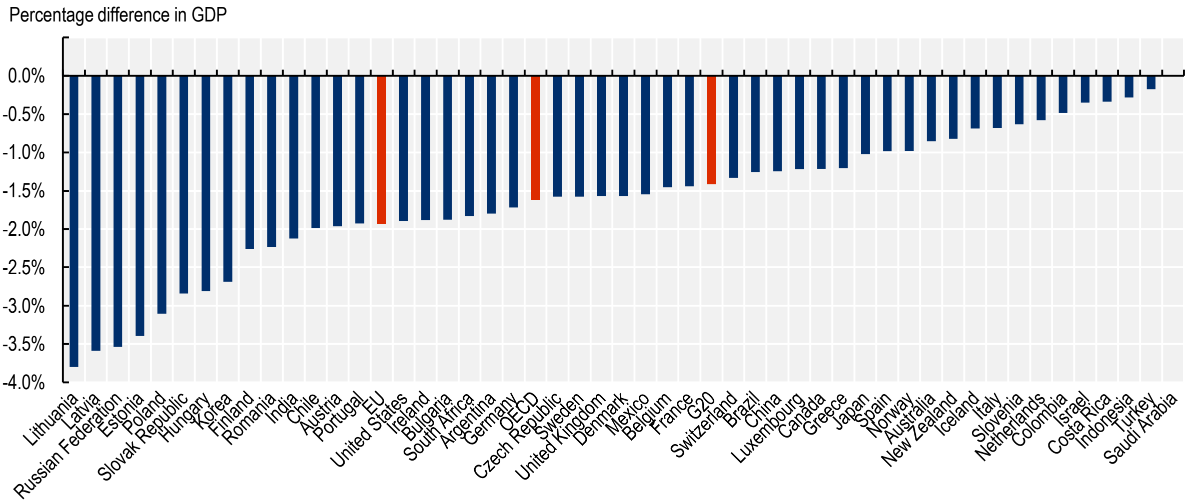


Source: OECD (2019[22]), SPHeP-NCDs Technical Documentation, http://oecdpublichealthexplorer.org/ncd-doc.

On average in OECD countries, GDP will be 1.6% lower each year due to the impact of diseases caused by alcohol consumption above the 1/1.5 drinks per day cap (Figure 4.12). The impact in G20 and 24 EU countries is similar, at 1.4% for G20 and 1.9% for EU countries. The GDP impact varies by country: from 0% in Saudi Arabia and Turkey to nearly 4% in Lithuania. Across all the 48 countries included in the analysis,[4] this equates to a total of USD PPP 1.6 trillion per year in the period 2020-50, which is similar to the average annual GDP of Canada or Spain. Importantly, these results do not take into account the fact that an increase in life expectancy due to drinking above the 1/1.5 drinks per day cap may mean that people will work for longer and retire later. If the retirement age is increased by two-thirds of a year for every year of additional life expectancy, the impact of diseases caused by alcohol consumption above the 1/1.5 drinks per day cap on GDP would double, with the average for OECD countries going from 1.6% to 3.4% (Annex Figure 4.B.8).

Figure 4.12. The impact of diseases caused by alcohol consumption on GDP

Percentage difference in GDP due to diseases caused by alcohol consumption above 1 drink per day for women and 1.5 drinks per day for men, average 2020-50



Source: OECD analyses based on the OECD SPHeP-NCDs model and OECD long-term economic model, 2020.

StatLink https://stat.link/8goumy

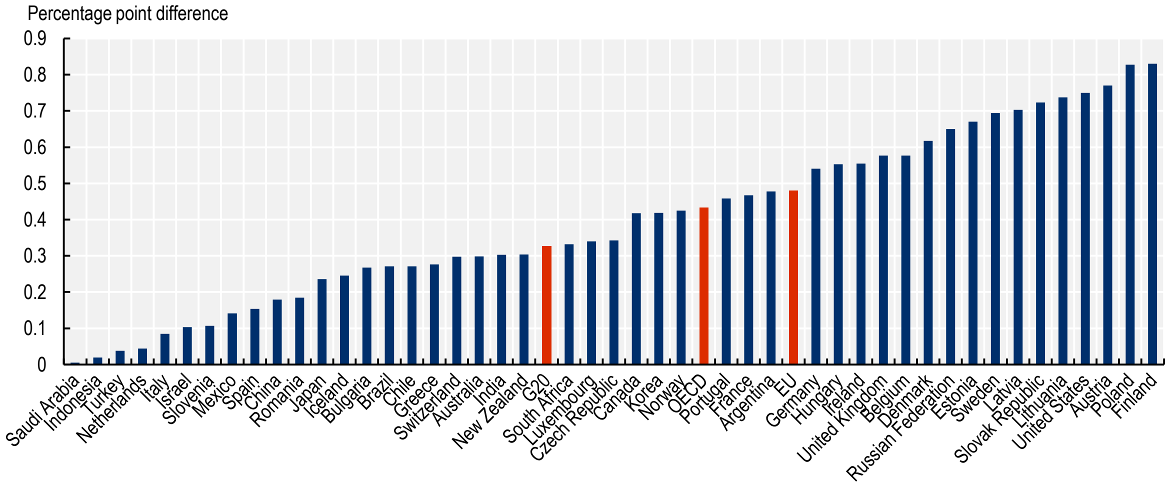
Another measure explored in the analysis of the long-term macroeconomic burden of diseases caused by drinking is fiscal pressure. Fiscal pressure is measured as government primary revenue (as a percentage of GDP) needed to stabilise the public debt ratio, and is equivalent to an overall tax rate (under the assumption that governments respond to rising fiscal pressure by raising additional revenue). Due to diseases caused by alcohol consumption above the 1/1.5 drinks per day cap, the tax rate will be 0.43 percentage points of GDP higher on average across OECD countries (Figure 4.13). The effect in G20 countries is 0.33 and in 24 EU countries is 0.48 percentage points of GDP.

The effect of the burden of alcohol-related diseases on fiscal pressure needs to be interpreted in the light of the potential loss of government tax revenue from a decrease in alcohol consumption. Findings from the model show that any alcohol consumption has a negative effect on fiscal pressure. More precisely, across OECD countries, the overall tax rate will be 0.56 percentage points of GDP higher, on average, owing to the consequences of medical conditions caused by any alcohol consumption (see Annex Figure 4.B.7). In comparison, potential losses in tax revenue from uncollected excise duties on alcohol are estimated at 0.25% of GDP on average across OECD countries (see Annex Figure 4.B.10), with variations from 0.05%

of GDP or less in Austria, Switzerland and the United States, to 0.70% of GDP or more in Iceland, Estonia and Norway. In 36 countries included in this analysis, the burden on tax rate due to medical conditions caused by any alcohol consumption is greater than the potential loss in government revenue from alcohol excise duty. In addition, at lower levels of alcohol consumption, it is likely that government tax revenue from other goods and services would increase, as suggested by the analysis presented in Chapter 8. This could potentially compensate for the loss of revenue raised by value added tax on alcohol.

Figure 4.13. The impact of diseases caused by alcohol consumption on the overall tax rate

Percentage point difference in government primary revenue as percentage of GDP due to diseases caused by alcohol consumption above 1 drink per day for women and 1.5 drinks per day for men, average 2020-50



Note: The impact is expressed in percentage points. For example, an impact of 0.42 in Canada reflects an increase of government primary revenue needed to stabilise the public debt ratio from 39.35% to 38.93% of GDP.
Source: OECD analyses based on the OECD SPHeP-NCDs model and OECD long-term economic model, 2020.

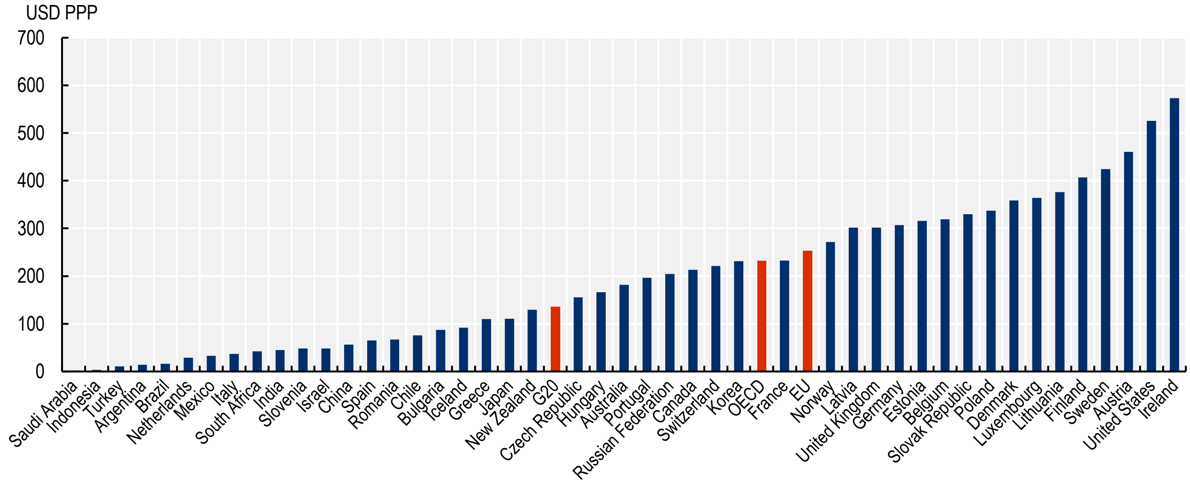
StatLink https://stat.link/7a6lbn

The impact of diseases caused by alcohol consumption on the overall tax rate can be translated into an equivalent impact on per capita taxes for the public. On average across OECD countries, every person will be subject to USD PPP 232 per year in additional taxes due to alcohol consumption above 1 drink per day for women and 1.5 drinks per day for men in 2020-50 (Figure 4.14).

Finally, it was noted in Section 4.2 that the model does not currently take into account the effect of alcohol consumption on a number of diseases. Likewise, the model does not capture such costs as greater spending on policing due to greater alcohol-related crime, the cost of property damage or the cost of the pain and suffering of victims of alcohol-related crimes. For example, in Sweden, crime-related costs of alcohol use were found to be comparable to the health care costs, and represented about 15% of total alcohol-related costs, both direct and indirect (Jarl et al., 2008[7]). In the United Kingdom (England), the crime-related costs of alcohol use represented GBP 11 billion in 2011 (more than USD PPP 15 billion) – about half of the total cost of alcohol use (House of Commons Health Committee, 2012[43]). Thus, the costs to the economy and to society shown in this chapter should be viewed as conservative.

Figure 4.14. Equivalent per capita tax increase due to diseases caused by alcohol consumption

Per capita annual tax needed to cover the increased fiscal pressure due to diseases caused by alcohol consumption above 1 drink per day for women and 1.5 drinks per day for men, in USD PPP, average 2020-50



Source: OECD analyses based on the OECD SPHeP-NCDs model and OECD long-term economic model, 2020.

StatLink https://stat.link/5qxu0w

Finally, a brief comparison of the GDP impact of alcohol consumption above the 1/1.5 drinks per day cap with the GDP impact of any alcohol consumption is made in Box 4.8 and discussed further in Annex 4.B.

Box 4.8. Effect of diseases caused by alcohol consumption on GDP

The impact on GDP of diseases caused by alcohol consumption above the 1/1.5 drinks per day cap and the total – including any alcohol consumption – was compared for 2020-50. Specifically, across all modelled countries:[1]

- Diseases attributable to any alcohol consumption will reduce GDP by 2.1% on average. This is greater than the 1.6% difference resulting from the diseases attributable to alcohol consumption above the 1/1.5 drinks per day cap.
- The tax rate is 0.51 percentage points of GDP higher due to diseases amenable to any alcohol consumption. This is greater than the 0.40 percentage points of GDP found in the scenario looking at alcohol consumption above the 1/1.5 drinks per day cap.

These results are discussed further in Annex Figure 4.B.6 and Annex Figure 4.B.7.

1. The analysis of the impact on GDP includes 48 countries, while the analysis of the impact on fiscal pressure covers 46 countries. Four countries were not included in the OECD long-term economic model and could not be included in the analysis of the impact on GDP (Croatia, Cyprus, Malta and Peru). For the same reason, two additional countries (Colombia and Costa Rica) could not be included in the analysis of the impact on fiscal pressure.

4.6. Conclusion: Alcohol consumption has a considerable health and economic burden for individuals and society

Alcohol-related diseases and their broader societal implications carry considerable costs to both individuals and society over the next 30 years. Alcohol consumption above 1 drink per day for women and 1.5 drinks per day for men is associated with a number of diseases, and will reduce population-wide life expectancy by up to one and a half years in 2020-50. Countries will spend around 2.4% of their health care expenditure on treating alcohol-related diseases or injuries caused by drinking above the 1/1.5 drinks per day cap, and diseases caused by alcohol consumption above the caps will also have an impact on the labour market, effectively reducing the workforce by 33 million people across the 52 countries. In OECD countries, this will cost countries on average USD PPP 344 per capita per year in lost employment and productivity. Combined, the impact of diseases caused by alcohol consumption above the 1/1.5 drinks per day cap on life expectancy, health expenditure and labour market output will result in 1.6% lower GDP on average in OECD countries. As the overall tax rate increases, individuals face an equivalent tax of USD PPP 232 per year.

In addition to these economic costs, drinking has an impact on education – as described in Chapter 5 – which may result in further long-term effects on employment and productivity. It is therefore crucial to invest in prevention and treatment of harmful drinking and to reduce its burden on individuals and society. Countries have implemented a number of policies and interventions to prevent and reduce harmful drinking, which are described in Chapter 6. Chapter 7 uses the OECD SPHeP-NCDs model to assess the cost-effectiveness of a number of these policies to understand their impact on the health and economic burden of harmful drinking.

References

Ahmed, A., A. Karter and J. Liu (2006), "Alcohol consumption is inversely associated with adherence to diabetes self-care behaviours", *Diabetic Medicine*, Vol. 23/7, pp. 795-802, http://dx.doi.org/10.1111/j.1464-5491.2006.01878.x. [30]

Balakrishnan, R. et al. (2009), "The burden of alcohol-related ill health in the United Kingdom", *Journal of Public Health*, Vol. 31/3, pp. 366-373, http://dx.doi.org/10.1093/pubmed/fdp051. [10]

Canadian Substance Use Costs and Harms Scientific Working Group (2020), *Canadian Substance Use Costs and Harms 2015-2017*, Canadian Centre on Substance Use and Addiction, Ottawa, https://www.ccsa.ca/sites/default/files/2020-06/CSUCH-Canadian-Substance-Use-Costs-Harms-Report-2020-en.pdf (accessed on 5 November 2020). [4]

Cecchini, M., M. Devaux and F. Sassi (2015), *Assessing the Impacts of Alcohol Policies: A microsimulation approach*, OECD, Paris, https://doi.org/10.1787/18152015. [20]

Cesur, R. and I. Kelly (2014), "Who pays the bar tab? Beer consumption and economic growth in the United States", *Economic Inquiry*, Vol. 52/1, pp. 477-494, http://dx.doi.org/10.1111/ecin.12048. [12]

Cortez-Pinto, H. et al. (2010), "The burden of disease and the cost of illness attributable to alcohol drinking: Results of a national study", *Alcoholism Clinical and Experimental Research*, Vol. 34/8, pp. 1442-1449, http://dx.doi.org/10.1111/j.1530-0277.2010.01229.x. [11]

Devaux, M. and F. Sassi (2015), "The labour market impacts of obesity, smoking, alcohol use and related chronic diseases", *OECD Health Working Papers*, No. 86, OECD, Paris, https://dx.doi.org/10.1787/5jrqcn5fpv0v-en. [35]

Feng, W. et al. (2001), "The impact of problem drinking on employment", *Health Economics*, Vol. 10/6, pp. 509-521, http://dx.doi.org/10.1002/hec.611. [37]

Fischer, B. et al. (2014), *Alkoholbedingte Kosten in der Schweiz (Alcohol-related Costs in Switzerland)*, Polynomics, https://www.suchtmonitoring.ch/docs/library/fischer_mhrf7rn7ju.pdf. [3]

GBD 2016 Alcohol Collaborators (2018), "Alcohol use and burden for 195 countries and territories, 1990-2016: A systematic analysis for the Global Burden of Disease Study 2016", *Lancet*, Vol. 392/10152, pp. 1015-1035, http://dx.doi.org/10.1016/S0140-6736(18)31310-2. [25]

GBD 2016 Risk Factors Collaborators (2017), "Global, regional, and national comparative risk assessment of 84 behavioural, environmental and occupational, and metabolic risks or clusters of risks, 1990–2016: A systematic analysis for the Global Burden of Disease Study 2016", *Lancet Global Health Metrics*, Vol. 390/10100, pp. 1345-422, http://dx.doi.org/10.1016/S0140-6736(17)32366-8. [19]

Global Burden of Disease Collaborative Network (2016), *Global Burden of Disease Study 2015 (GBD 2015) Risk Factor Results 1990-2015*, Institute for Health Metrics and Evaluation (IHME), Seattle, WA, http://ghdx.healthdata.org/record/ihme-data/gbd-2015-risk-factor-results-1990-2015 (accessed on 9 December 2020). [18]

Guillemette, Y. and D. Turner (2017), "The fiscal projection framework in long-term scenarios", *OECD Economics Department Working Papers*, No. 1440, OECD, Paris, https://dx.doi.org/10.1787/8eddfa18-en. [41]

House of Commons Health Committee (2012), *Government's Alcohol Strategy, Volume I: Report, together with formal minutes and oral and written evidence*, The Stationery Office, London, https://publications.parliament.uk/pa/cm201213/cmselect/cmhealth/132/132.pdf (accessed on 6 November 2020). [43]

IARC (2020), *Global Cancer Observatory*, International Agency for Research on Cancer, Lyon, https://gco.iarc.fr/ (accessed on 9 November 2020). [17]

IHME (2020), *Epi Visualization | IHME Viz Hub*, Institute for Health Metrics and Evaluation, Seattle, WA, https://vizhub.healthdata.org/epi/ (accessed on 21 December 2017). [16]

Jarl, J. and U. Gerdtham (2012), "Does drinking affect long-term sickness absence? A sample selection approach correcting for employment and accounting for drinking history", *Applied Economics*, Vol. 44/22, pp. 2811-2825, http://dx.doi.org/10.1080/00036846.2011.566206. [39]

Jarl, J. et al. (2008), "The societal cost of alcohol consumption: An estimation of the economic and human cost including health effects in Sweden, 2002", *European Journal of Health Economics*, Vol. 9/4, pp. 351-360, http://dx.doi.org/10.1007/s10198-007-0082-1. [7]

Johnston, M., A. Ludbrook and M. Jaffray (2012), "Inequalities in the distribution of the costs of alcohol misuse in Scotland: A cost of illness study", *Alcohol and Alcoholism*, Vol. 47/6, pp. 725-731, http://dx.doi.org/10.1093/alcalc/ags092. [9]

Konnopka, A., M. Bodemann and H. Konig (2011), "Health burden and costs of obesity and overweight in Germany", *European Journal of Health Economics*, Vol. 12/4, pp. 345-352, http://dx.doi.org/10.1007/s10198-010-0242-6. [8]

Konnopka, A. and H. Konig (2007), "Direct and indirect costs attributable to alcohol consumption in Germany", *Pharmacoeconomics*, Vol. 25/7, pp. 605-618, http://dx.doi.org/10.2165/00019053-200725070-00006. [14]

Kopp, P. (2015), *Le Coût Social des Drogues en France*, Observatoire Français des Drogues et des Toxicomanies, Paris, https://www.ofdt.fr/BDD/publications/docs/eisxpkv9.pdf. [5]

Lange, S. et al. (2017), "Global prevalence of fetal alcohol spectrum disorder among children and youth: A systematic review and meta-analysis", *JAMA Pediatrics*, Vol. 171/10, pp. 948-956, http://dx.doi.org/10.1001/jamapediatrics.2017.1919. [31]

Lima, E. and T. Esquerdo (2003), "The economic costs of alcohol misuse in Portugal", *Working Paper Series No. 24*, Núcleo de Investigação em Microeconomia Aplicada Universidade do Minho. [15]

Lupton, C., L. Burd and R. Harwood (2004), "Cost of fetal alcohol spectrum disorders", *American Journal of Medical Genetics*, Vol. 127C/1, pp. 42-50, http://dx.doi.org/10.1002/ajmg.c.30015. [33]

MacDonald, Z. and M. Shields (2004), "Does problem drinking affect employment? Evidence from England", *Health Economics*, Vol. 13/2, pp. 139-155, http://dx.doi.org/10.1002/hec.816. [38]

Marchand, A., A. Parent-Lamarche and M. Blanc (2011), "Work and high-risk alcohol consumption in the Canadian workforce", *International Journal of Environmental Research and Public Health*, Vol. 8/7, pp. 2692-2705, http://dx.doi.org/10.3390/ijerph8072692. [36]

Naimi, T. et al. (2017), "Selection biases in observational studies affect associations between 'moderate' alcohol consumption and mortality", *Addiction*, Vol. 112/2, pp. 207-214, http://dx.doi.org/10.1111/add.13451. [26]

OECD (2019), *SPHeP-NCDs Technical Documentation*, OECD, Paris, http://oecdpublichealthexplorer.org/ncd-doc. [22]

OECD (2018), *OECD Economic Outlook, Volume 2018 Issue 2*, OECD Publishing, Paris, https://dx.doi.org/10.1787/eco_outlook-v2018-2-en. [42]

Popova, S. et al. (2016), "The economic burden of fetal alcohol spectrum disorder in Canada in 2013", *Alcohol and Alcoholism*, Vol. 51/3, pp. 367-375, http://dx.doi.org/10.1093/alcalc/agv117 (accessed on 6 November 2020). [34]

Popova, S. et al. (2017), "Estimation of national, regional, and global prevalence of alcohol use during pregnancy and fetal alcohol syndrome: A systematic review and meta-analysis", *Lancet Global Health*, Vol. 5/3, pp. E290-E299, http://dx.doi.org/10.1016/S2214-109X(17)30021-9. [32]

Rehm, J. et al. (2007), "The costs of alcohol, illegal drugs, and tobacco in Canada, 2002", *Journal of Studies on Alcohol and Drugs*, Vol. 68/6, pp. 886-895, http://dx.doi.org/10.15288/jsad.2007.68.886. [13]

Rehm, J. et al. (2003), "The relationship of average volume of alcohol consumption and patterns of drinking to burden of disease: An overview", *Addiction*, Vol. 98/9, pp. 1209-1228, http://dx.doi.org/10.1046/j.1360-0443.2003.00467.x. [21]

Roerecke, M. and J. Rehm (2010), "Irregular heavy drinking occasions and risk of ischemic heart disease: A systematic review and meta-analysis", *American Journal of Epidemiology*, Vol. 171/6, pp. 633-644, http://dx.doi.org/10.1093/aje/kwp451. [24]

Saar, I. (2008), "The social costs of alcohol misuse in Estonia", *European Addition Research*, Vol. 15/1, pp. 56-62, http://dx.doi.org/10.1159/000173010. [6]

Sassi, F. (ed.) (2015), *Tackling Harmful Alcohol Use: Economics and Public Health Policy*, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264181069-en. [23]

Stockwell, T. et al. (2016), "Do 'moderate' drinkers have reduced mortality risk? A systematic review and meta-analysis of alcohol consumption and all-cause mortality", *Journal of Studies on Alcohol and Drugs*, Vol. 77/2, pp. 185-198, http://dx.doi.org/10.15288/jsad.2016.77.185. [27]

Thørrisen, M. et al. (2019), "Association between alcohol consumption and impaired work performance (presenteeism): A systematic review", *BMJ Open*, Vol. 9/7, p. e029184, http://dx.doi.org/10.1136/bmjopen-2019-029184. [40]

WHO (2018), *European Health Information Gateway: Premature mortality*, World Health Organization, Geneva, https://gateway.euro.who.int/en/indicators/h2020_1-premature-mortality/ (accessed on 16 July 2020). [28]

WHO (2018), *Global Status Report on Alcohol and Health 2018*, World Health Organization, Geneva, https://apps.who.int/iris/bitstream/handle/10665/274603/9789241565639-eng.pdf?ua=1 (accessed on 10 September 2019). [1]

WHO (2014), *Global Status Report on Alcohol and Health 2014*, World Health Organization, Geneva, https://apps.who.int/iris/bitstream/handle/10665/112736/9789240692763_eng.pdf?sequence=1. [2]

World Bank (2020), *DataBank: The World Bank*, World Bank Open Data, https://databank.worldbank.org/. [29]

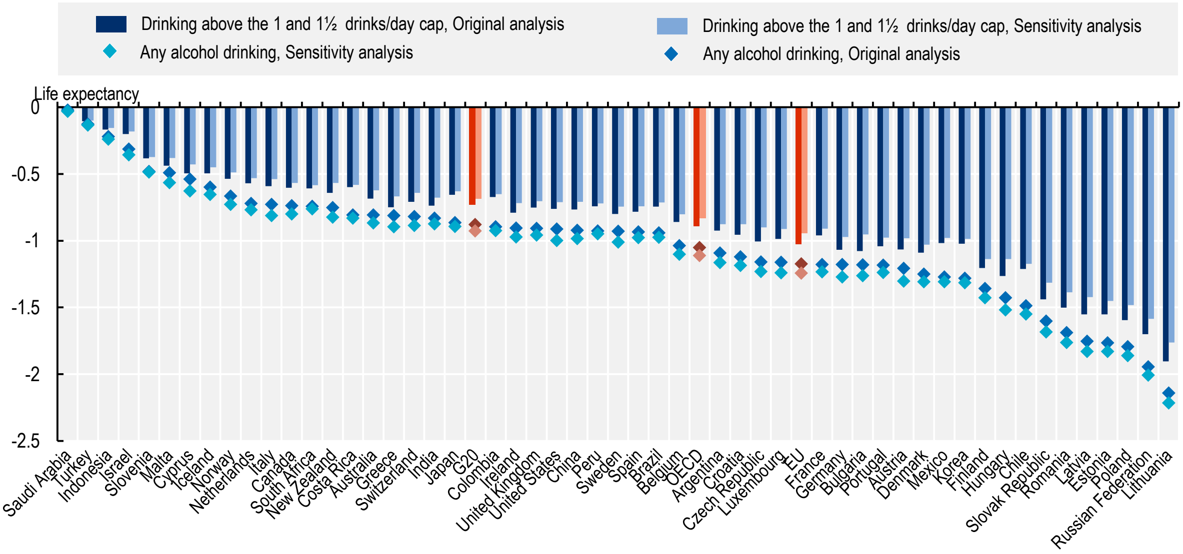
Annex 4.A. Sensitivity analysis to take out the protective effect of alcohol consumption on ischaemic CVDs and diabetes

Analyses carried out with the OECD model use data from the Global Burden of Disease Study (GBD 2016 Alcohol Collaborators, 2018[25]) and account for a protective effect of alcohol consumption on ischaemic CVDs and diabetes for some age groups. However, these effects are debated: some studies conclude that there is no protective cardiovascular effect once lifetime abstainers are separated from those who quit and do not drink for health reasons (Naimi et al., 2017[26]; Stockwell et al., 2016[27]). To account for this uncertainty around relative risks, a sensitivity analysis was carried out to take out any protective effect. Results from the modified version of the model conclude that under the assumption of no protective effect of alcohol consumption:

- Any alcohol consumption continues causing greater population health harms than drinking above the 1/1.5 drinks per day cap. For instance, any alcohol consumption contributes to lowering life expectancy by 1.1 years, compared to 0.8 years for the burden of drinking above the 1/1.5 drinks per day cap (Annex Figure 4.A.1).
- Medical conditions caused by drinking any alcohol lead to higher medical spending (USD PPP 58 per capita per year, in OECD countries) than only drinking above the 1/1.5 drinks per day cap (USD PPP 52 per capita per year, in OECD countries) (Annex Figure 4.A.2).
- Medical conditions caused by any alcohol drinking contribute to a loss of employment and productivity (USD PPP 506 per capita per year); this is higher than drinking above the 1/1.5 drinks per day cap (USD PPP 334 per capita per year).
- Estimations of the burden of any alcohol drinking obtained in the sensitivity analysis are higher than those from the analysis assuming some protective effects.

Annex Figure 4.A.1. Impact of alcohol consumption on life expectancy, original and sensitivity analysis

Life expectancy lost due to alcohol consumption above 1 drink per day for women and 1.5 drinks per day for men, average 2020-50

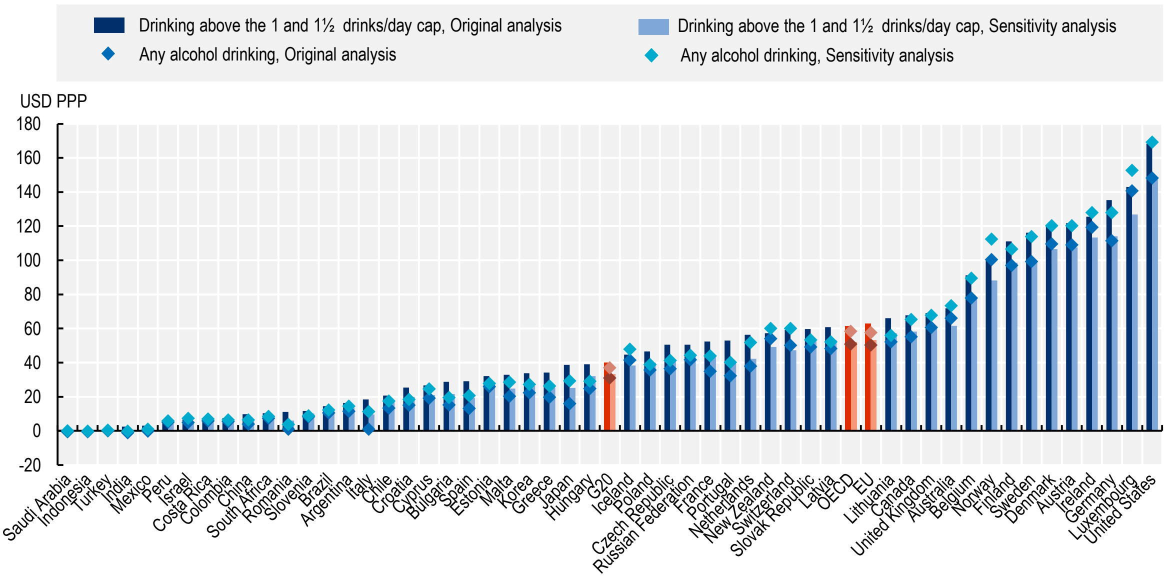


Source: OECD analyses based on the OECD SPHeP-NCDs model, 2020.

StatLink https://stat.link/bejdty

Annex Figure 4.A.2. Health expenditure associated with diseases caused by alcohol consumption

Annual health expenditure associated with diseases caused by alcohol consumption above 1 drink per day for women and 1.5 drinks per day for men, USD PPP per capita and as a percentage of total health expenditure, average 2020-50



Source: OECD analyses based on the OECD SPHeP-NCDs model, 2020.

StatLink https://stat.link/8kewhj

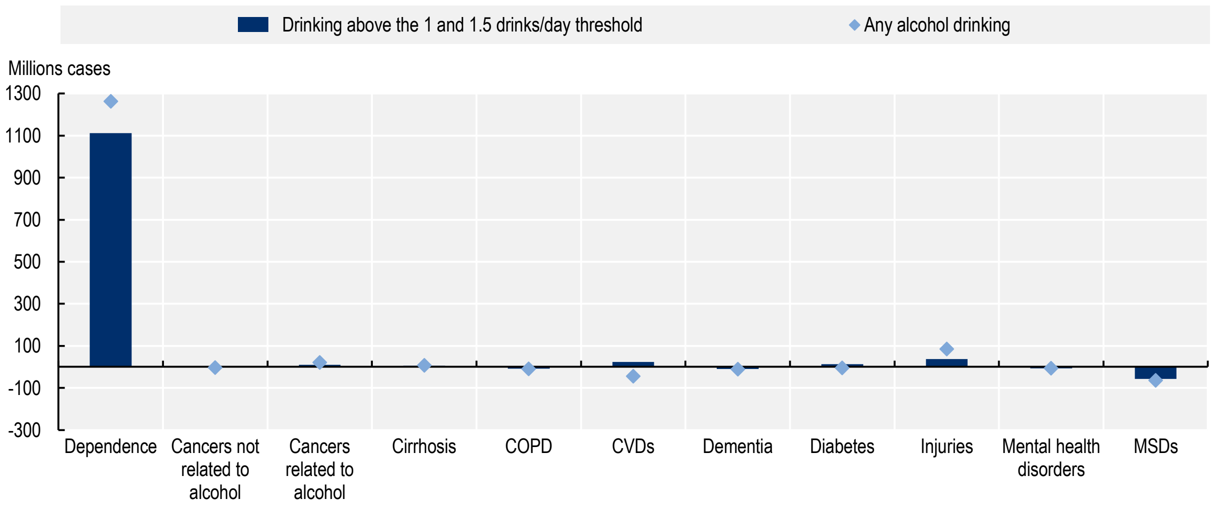
Annex 4.B. The burden of any alcohol consumption

This annex presents results comparing the burden of disease caused by any alcohol consumption to the burden caused by consumption above 1 drink per day for women and 1.5 drinks per day for men (discussed in the main part of this chapter).

Annex Figure 4.B.1 shows the impact on disease incidence caused by any alcohol consumption, compared to consumption above the 1/1.5 drinks per day cap. The burden caused by any alcohol consumption includes an additional 152 million cases of dependence, 48 million cases of injury and 10 million cases of cancers related to alcohol over the next 30 years in all 52 countries, compared to alcohol consumption above the 1/1.5 drinks per day cap. At the same time, the OECD SPHeP-NCDs model also predicts, in the same scenario, 69 million extra cases of CVDs and 17 million extra cases of diabetes. The incidence of cases of MSDs, which are currently assumed to be unrelated to alcohol consumption, is also predicted to increase, mainly owing to people living longer.

Annex Figure 4.B.1. The impact of alcohol consumption on disease incidence

New cases of diseases due to any alcohol consumption compared to consumption above 1 drink per day for women and 1.5 drinks per day for men, total 2020-50



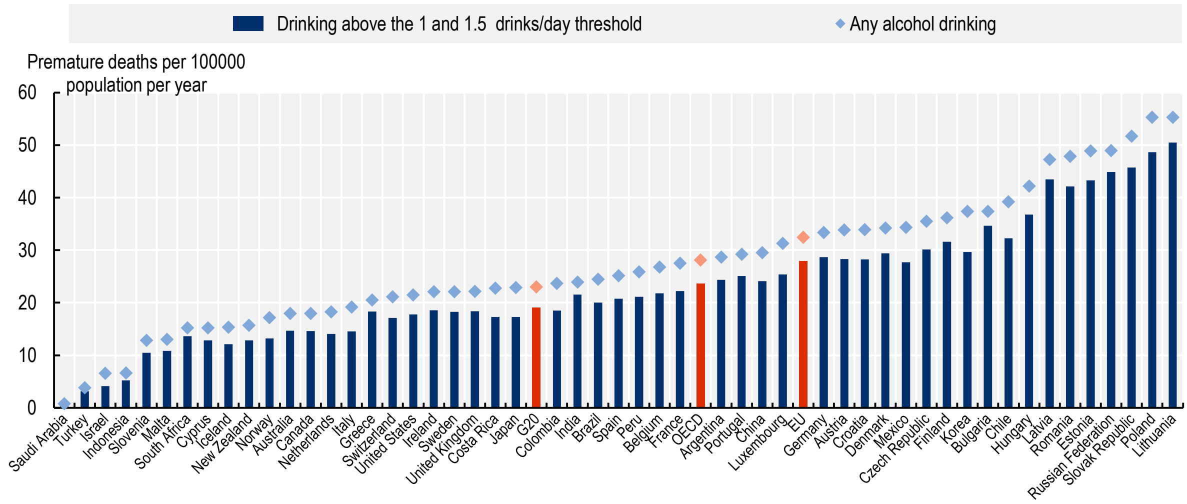
Source: OECD SPHeP-NCDs model, 2020.

StatLink https://stat.link/huot6a

Compared to alcohol consumption above the 1/1.5 drinks per day cap, the impact of any alcohol consumption on the rate of premature death is greater, with an additional 4.2 people per 100 000 population dying prematurely each ear across all 52 countries (Annex Figure 4.B.2). Thus, despite some protective effect that alcohol consumed at lower levels might have on the incidence of certain diseases, findings show that alcohol consumed at any level will contribute to the risk of dying early.

Annex Figure 4.B.2. The impact of alcohol consumption on premature mortality

Annual number of premature deaths per 100 000 population due to any alcohol consumption compared to consumption above 1 drink per day for women and 1.5 drinks per day for men, average 2020-50



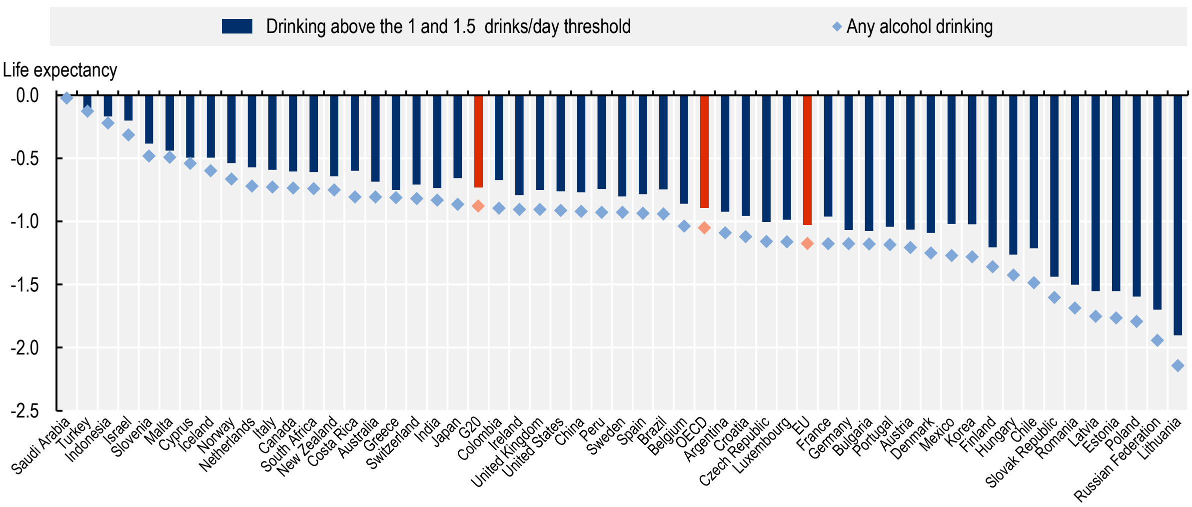
Source: OECD SPHeP-NCDs model, 2020.

StatLink https://stat.link/d6iwfs

In addition, any alcohol consumption leads to an extra two-month drop in life expectancy across the 52 countries modelled in this study compared to alcohol consumption above the 1/1.5 drinks per day cap (Annex Figure 4.B.3). It should be noted that life expectancy estimates apply to all people, and not just those who consume alcohol. For alcohol drinkers only, the effect on life expectancy is stronger.

Annex Figure 4.B.3. The impact of alcohol consumption on life expectancy

Annual impact of any alcohol consumption compared to consumption above 1 drink per day for women and 1.5 drinks per day for men, on life expectancy in years, average 2020-50



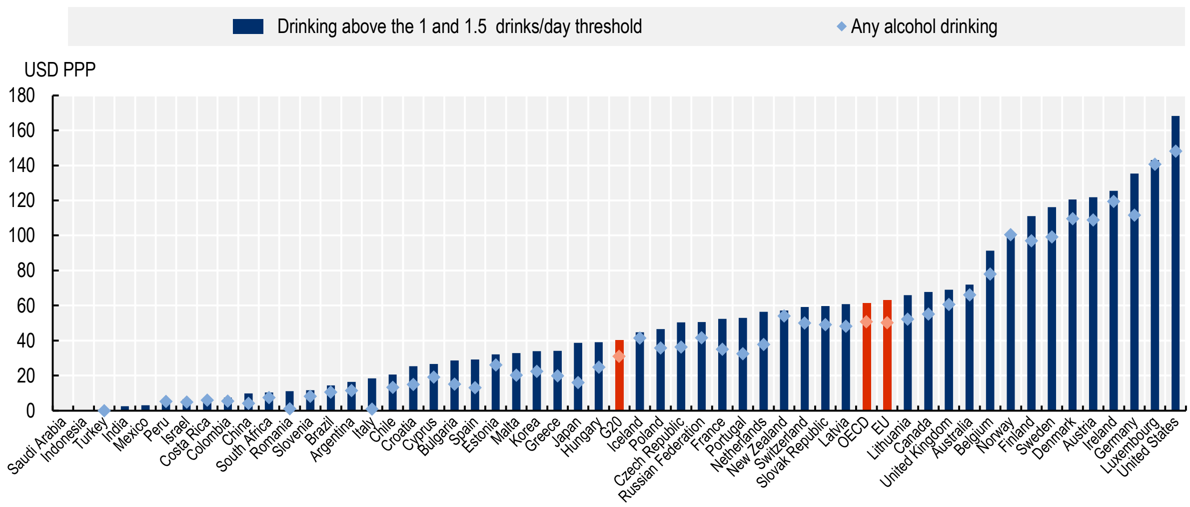
Source: OECD SPHeP-NCDs model, 2020.

StatLink https://stat.link/k2x5za

The burden on health expenditure from any alcohol consumption is smaller than that found in the scenario capping alcohol consumption at 1 drink per day for women and 1.5 drinks per day for men. On a per capita basis, the average annual medical costs caused by drinking above the 1/1.5 drinks per day cap would be about USD PPP 49, while the costs caused by any alcohol consumption would be about USD PPP 40 (i.e. 19% lower) in 2020-50 (Annex Figure 4.B.4). The main reason for this difference is that in the scenario assessing the burden of any alcohol consumption, any potential protective effects of alcohol consumption at lower levels are eliminated. In addition, decreases in life expectancy are greater in the scenario assessing the burden of any alcohol consumption compared to the scenario assessing the burden of consumption above the 1/1.5 drinks per day cap (see Annex Figure 4.B.3). This further contributes to lower medical expenditure.

Annex Figure 4.B.4. Health care expenditure associated with diseases caused by alcohol consumption

Annual health care expenditure due to diseases caused by any alcohol consumption compared to consumption above 1 drink per day for women and 1.5 drinks per day for men, USD PPP per capita, average 2020-50



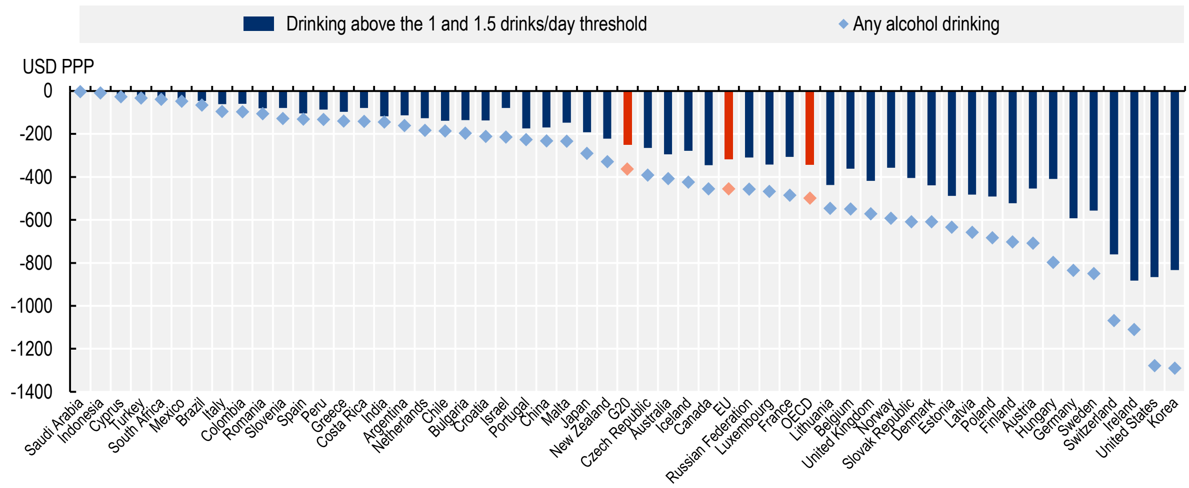
Source: OECD SPHeP-NCDs model, 2020.

StatLink https://stat.link/z6plxc

Finally, of interest is a comparison between the impact on employment and productivity of diseases caused by any alcohol consumption compared to consumption above the 1/1.5 drinks per day cap. USD PPP 125 extra annual per capita PPP-adjusted market wages can be attributed to any alcohol consumption compared to consumption above the 1/1.5 drinks per day cap, which is approximately equivalent to 45% extra damage (see Annex Figure 4.B.5). The main reason for the difference in results between the labour market and health expenditure outcomes is that labour market outputs are more highly correlated with productivity in the prime years, when people are still employed.

Annex Figure 4.B.5. Economic impact of diseases caused by alcohol consumption on employment and productivity

Annual impact of diseases caused by any alcohol consumption, compared to consumption above 1 drink per day for women and 1.5 drinks per day for men, on employment and productivity, USD PPP, average 2020-50

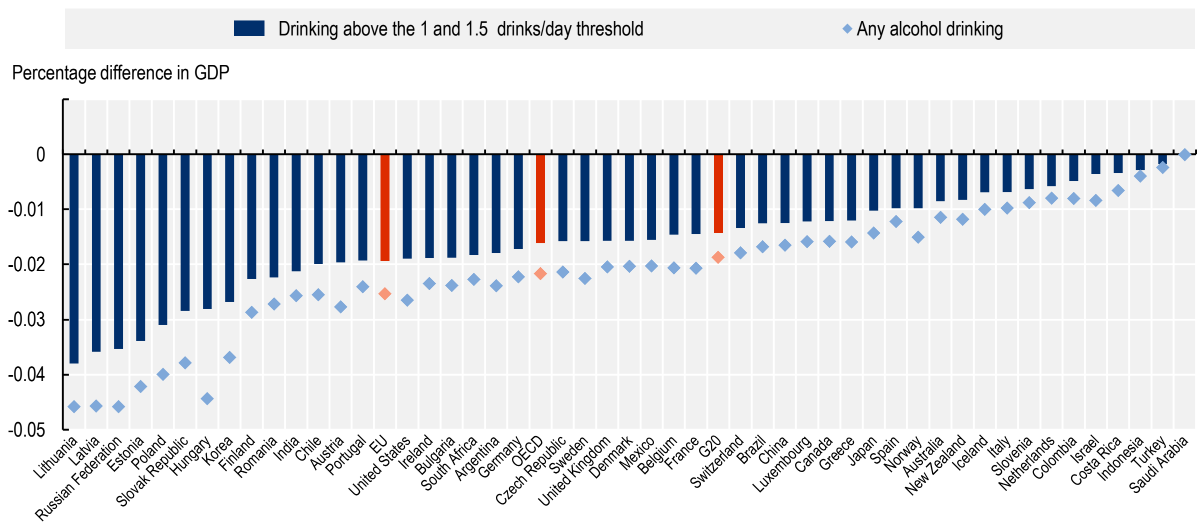


Source: OECD SPHeP-NCDs model, 2020.

StatLink https://stat.link/u25fwi

Annex Figure 4.B.6. The impact of diseases caused by alcohol consumption on GDP

Percentage difference in GDP due to diseases caused by any alcohol consumption compared to consumption above 1 drink per day for women and 1.5 drinks per day for men, average 2020-50

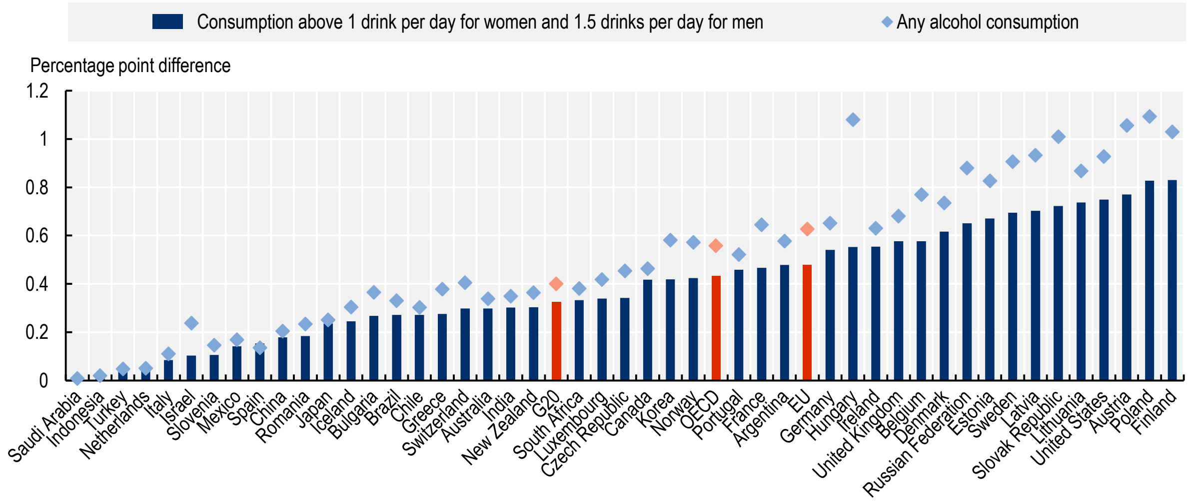


Source: OECD analyses based on the OECD SPHeP-NCDs model and OECD long-term economic model, 2020.

StatLink https://stat.link/k5i9wx

Annex Figure 4.B.7. The impact of diseases caused by alcohol consumption on the overall tax rate

Percentage point difference in government primary revenue as percentage of GDP due to diseases caused by any alcohol consumption compared to consumption above 1 drink per day for women and 1.5 drinks per day for men, average 2020-50

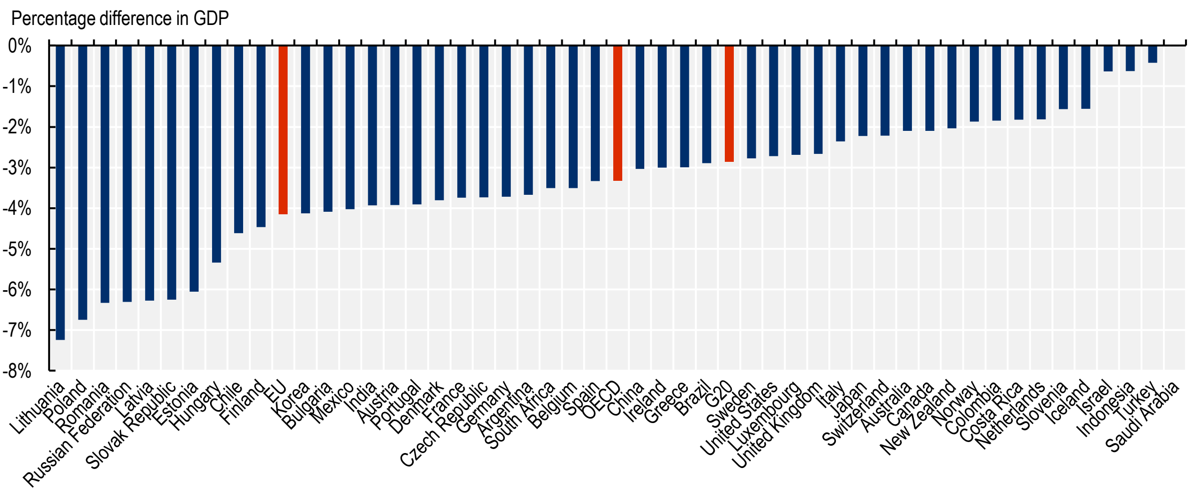


Source: OECD analyses based on the OECD SPHeP-NCDs model and OECD long-term economic model, 2020.

StatLink https://stat.link/j0zt53

Annex Figure 4.B.8. The impact of diseases caused by alcohol consumption on GDP, adjusted for higher retirement age

Percentage difference in GDP due to diseases caused by alcohol consumption above 1 drink per day for women and 1.5 drinks per day for men, average 2020-50

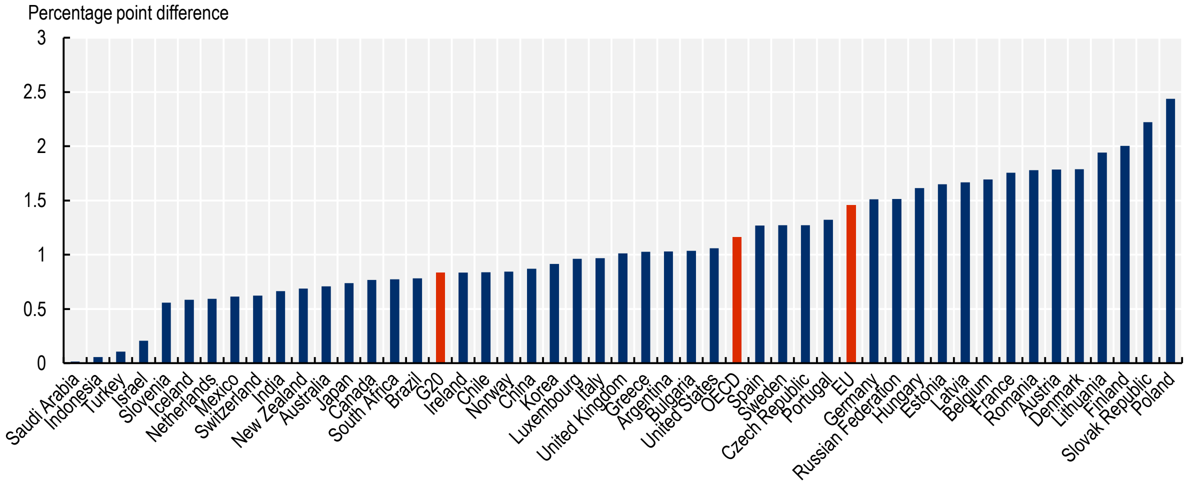


Source: OECD analyses based on the OECD SPHeP-NCDs model and OECD long-term economic model, 2020.

StatLink https://stat.link/3n6029

Annex Figure 4.B.9. The impact of diseases caused by alcohol consumption on the overall tax rate, adjusted for higher retirement age

Percentage point difference in government primary revenue as percentage of GDP due to diseases caused by alcohol consumption above 1 drink per day for women and 1.5 drinks per day for men, average 2020-50

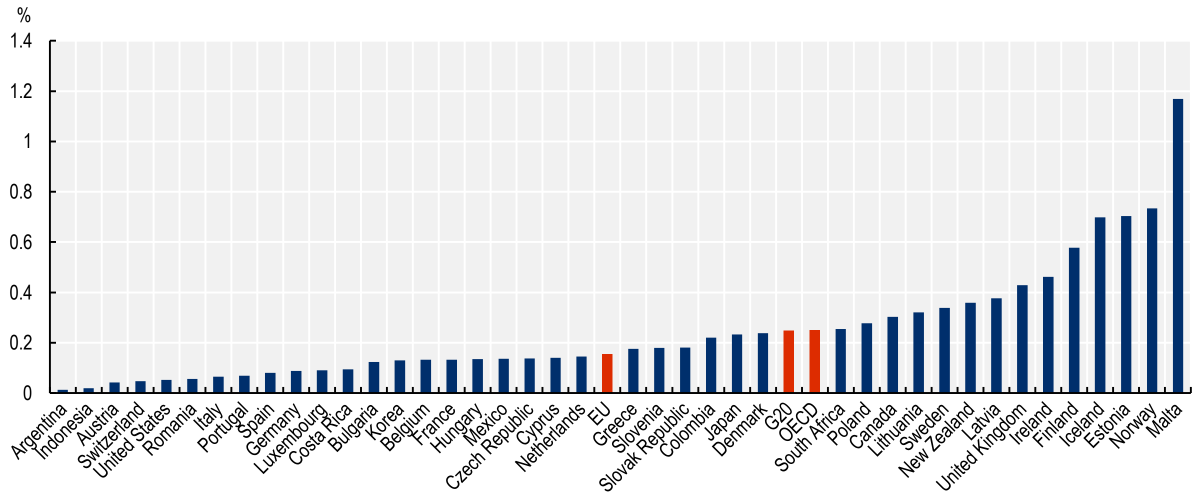


Source: OECD analyses based on the OECD SPHeP-NCDs model and OECD long-term economic model, 2020.

StatLink https://stat.link/fwt0cm

Annex Figure 4.B.10. Government revenue from alcohol excise duty

Revenue from alcohol excise duty as a percentage of GDP, 2016 or latest year available



Source: WHO Global Information System on Alcohol and Health (GISAH) database, 2020, https://apps.who.int/gho/data/node.gisah.GISAH?lang=en&showonly=GISAH.

StatLink https://stat.link/6zrkw8

Notes

[1] One drink in this report refers to the equivalent of 12 grammes of pure alcohol.

[2] Health expenditure measures the final consumption of health care goods and services for personal health care, including curative care, rehabilitative care, preventative care, ancillary services and medical goods but not long-term care.

[3] The calculation of the cost presented in this report does not take into account some dimensions. For example, the analysis does not include the following costs: i) the cost of justice (e.g. alcohol-related violence and injuries); ii) expenditure on lobbying and litigation to avoid the implementation of policies incurred by the industry; iii) the cost to counter industry-led actions incurred by the government and civil society organisations; iv) the social burden of alcohol use related to, for example, unwanted teenage pregnancies and the long-term consequences of foetal alcohol syndrome; and v) broader factors related to social bonding and pleasure of drinking in moderation, maintenance of the landscape and vineyards, tourism, and potential population resistance to stringent policy decisions.

[4] The analysis of the impact on GDP includes 48 countries, while the analysis of the impact on fiscal pressure covers 46 countries. Four countries were not included in the OECD long-term economic model and could not be included in the analysis of the impact on GDP (Croatia, Cyprus, Malta and Peru). For the same reason, two additional countries (Colombia and Costa Rica) could not be included in the analysis of the impact on fiscal pressure.

5 The relationship between alcohol consumption and educational outcomes in children

Marion Devaux and Sabine Vuik

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.

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

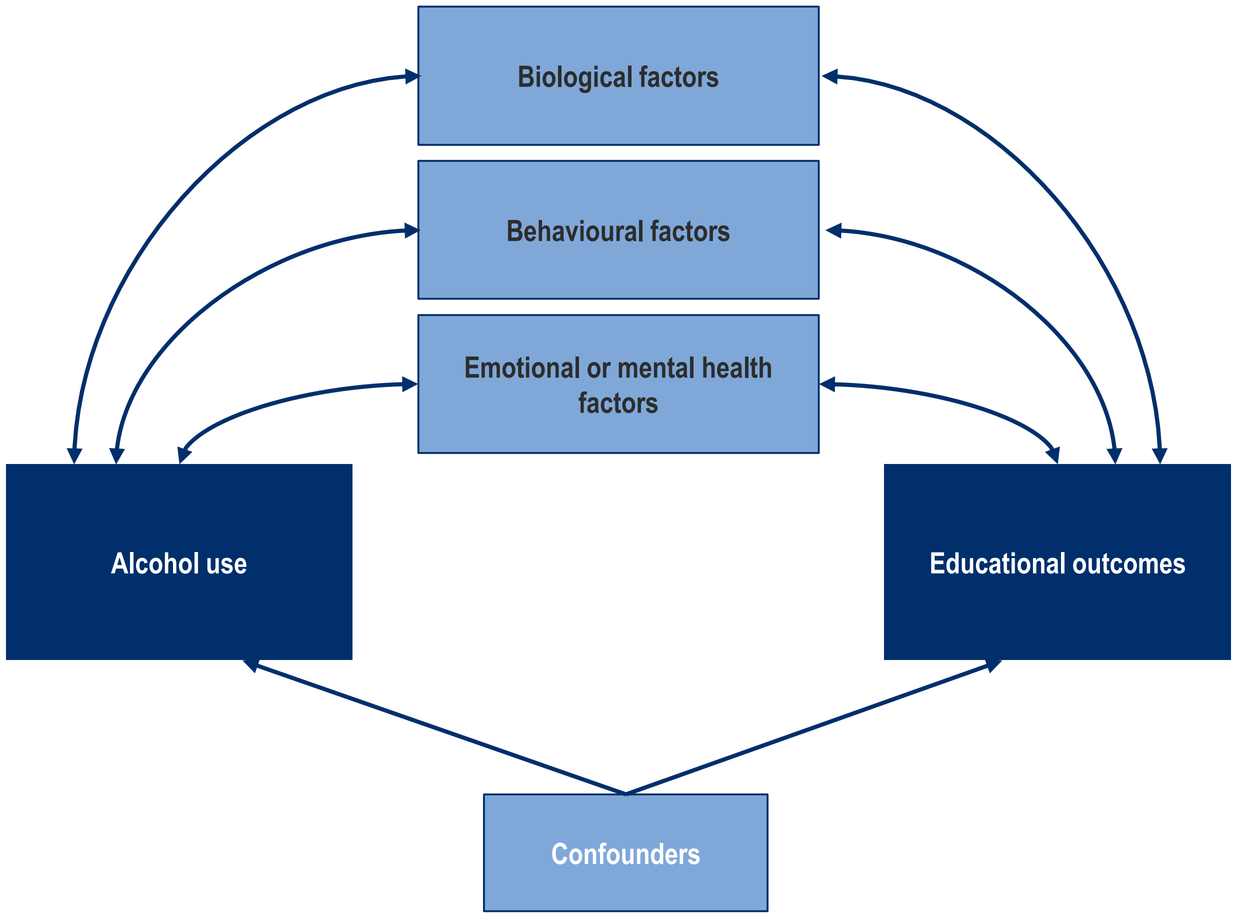
Data and trends in alcohol consumption among adolescents are presented in Section 2.3 in Chapter 2, while the drivers of alcohol consumption and initiation are reviewed in Section 3.4 in Chapter 3. This chapter aims to explore the relationship between adolescents' alcohol consumption and educational 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[1]), and can create learning and recognition problems (Brown et al., 2000[2]). 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[3]), less time spent on studying and lower school attendance (Wolaver, 2002[4]). 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[5]). 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[6]). 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[7]) 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[7]). 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[8]). 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.

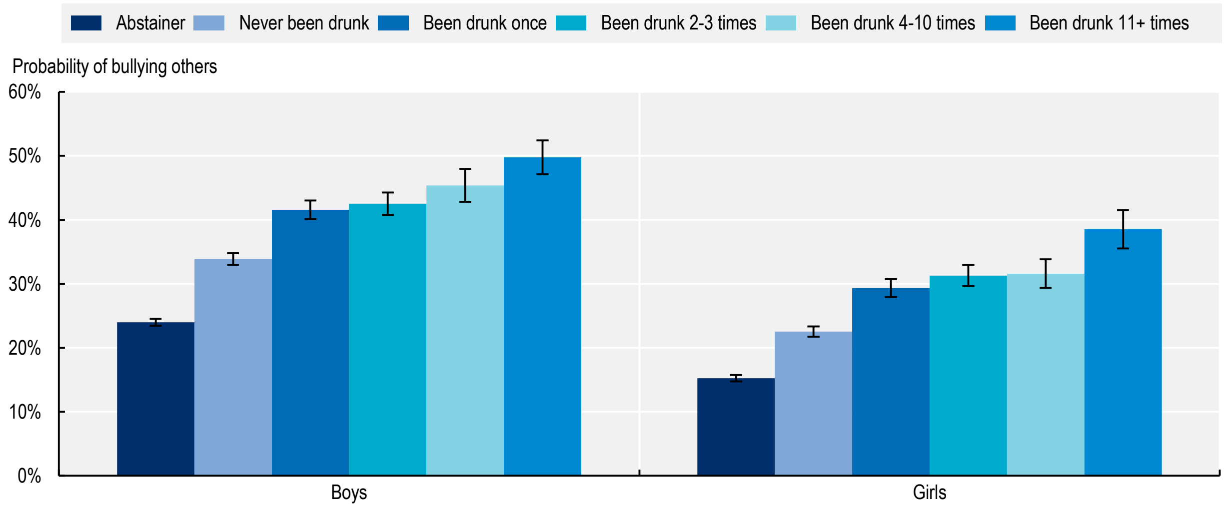
Time-trend analysis

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.

StatLink https://stat.link/s301vu

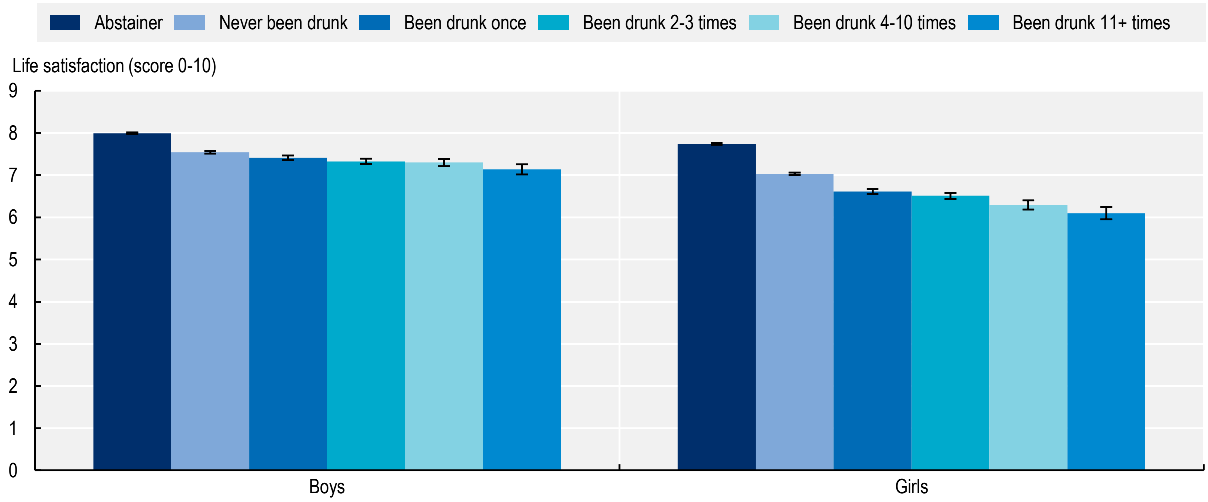
5.1.3. Life satisfaction is negatively associated with alcohol use

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.

StatLink https://stat.link/l70ev8

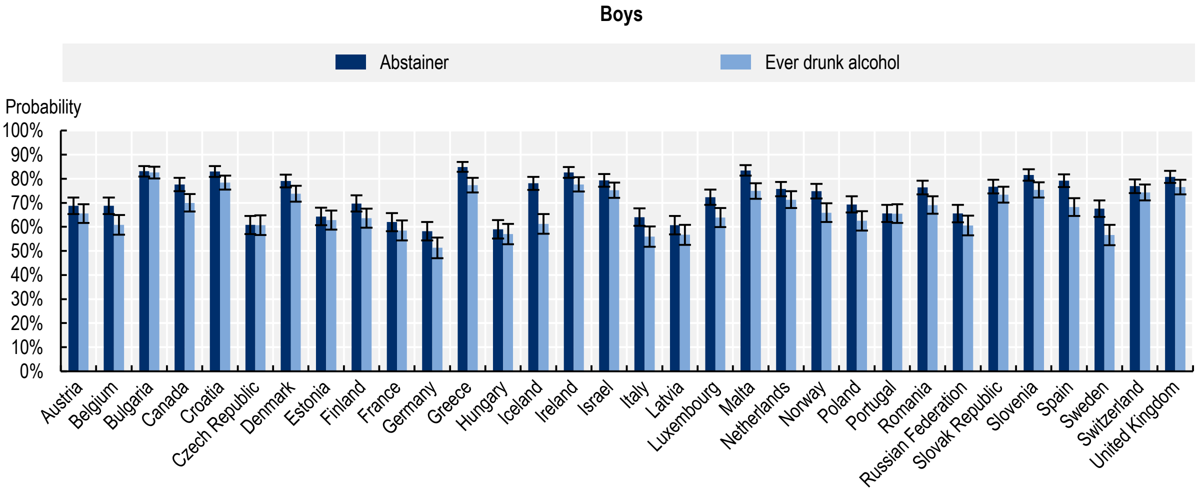
5.2. There is a clear association between school performance and alcohol use in OECD countries

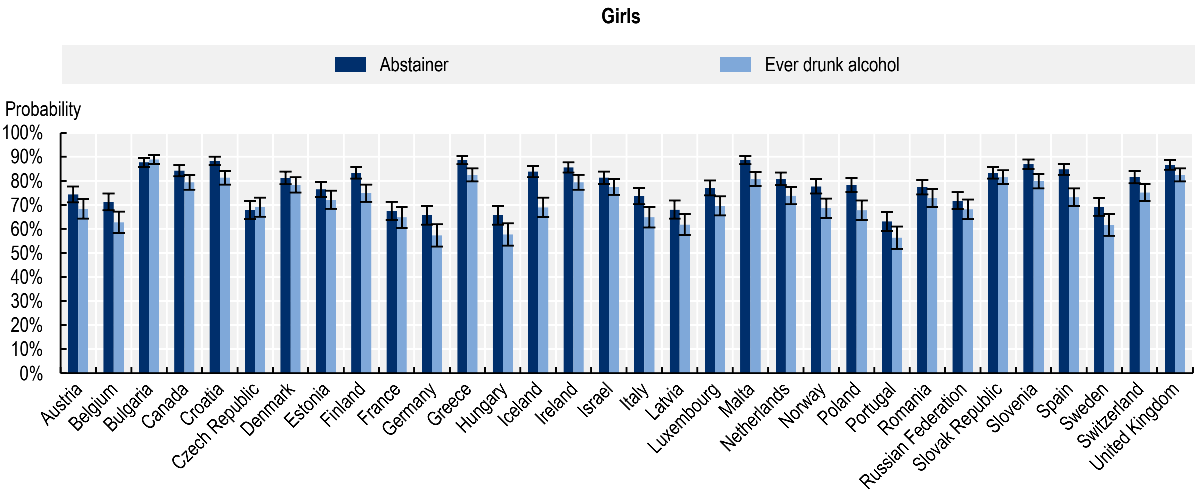
5.2.1. Drinking initiation is negatively associated with performance at school

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.

StatLink https://stat.link/nckhdz

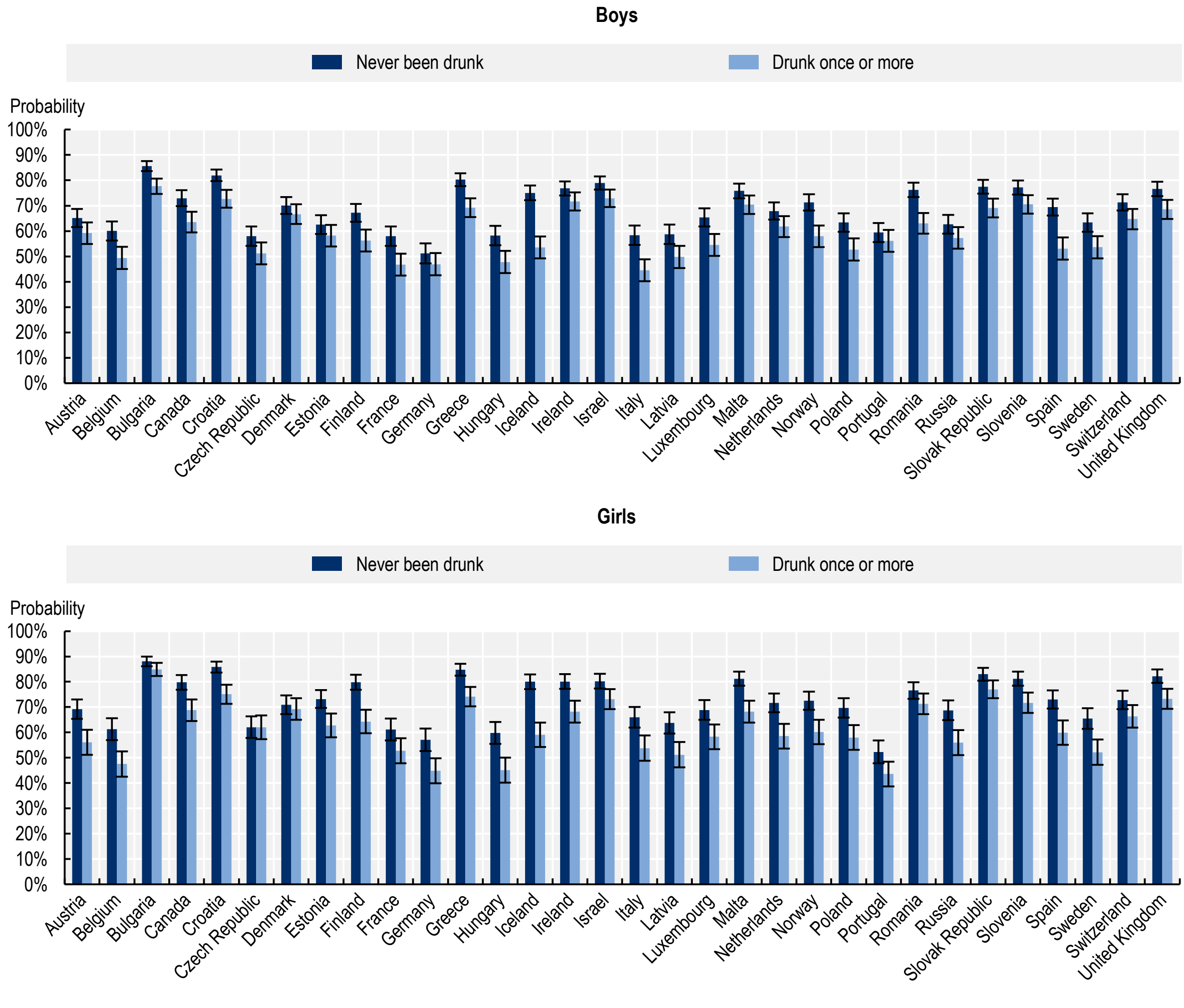
5.2.2. Drunkenness is negatively associated with performance at school

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

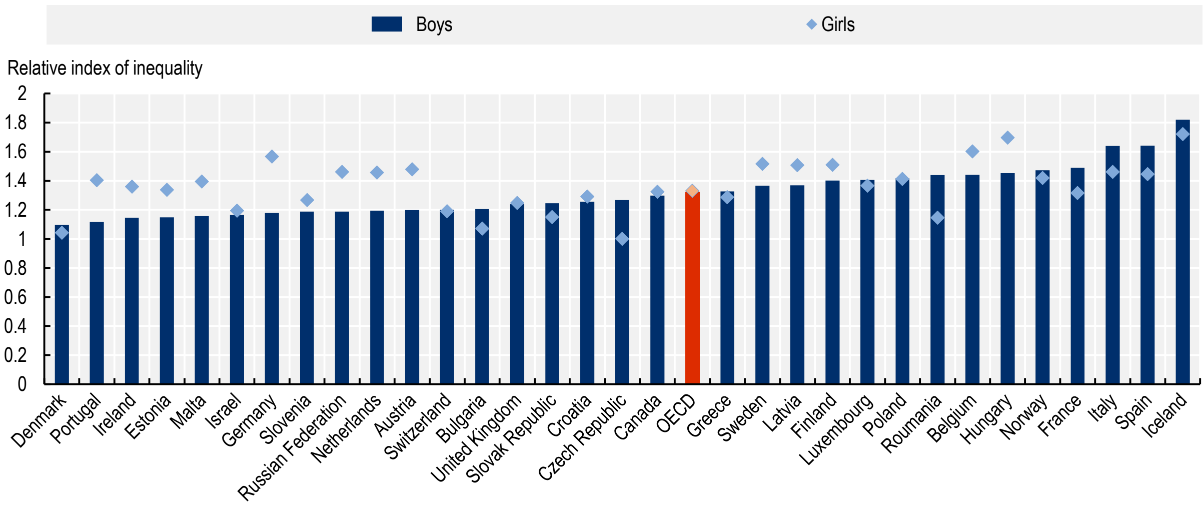


Note: Mixed model with random slope. Adjusted for age, family affluence, smoking and BMI categories. Covariates are set at fixed values (age 13, middle family affluence, never smoked, healthy weight).
Source: OECD estimates based on 2013-14 HBSC survey data.

StatLink https://stat.link/cejufo

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



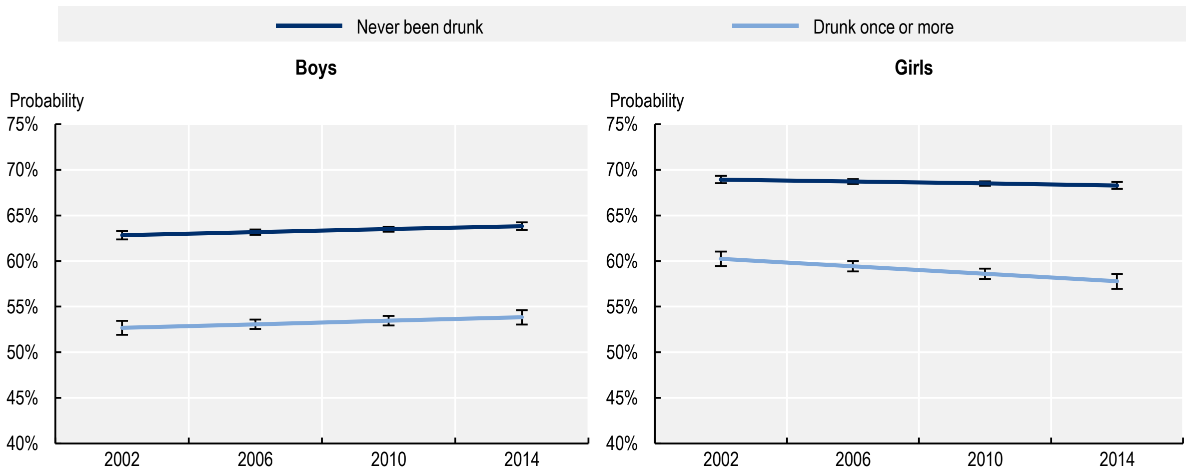
Note: The relative index of inequality (RII) is calculated as the ratio between the probability of people who have never been drunk divided by the probability of those who have ever experienced drunkenness, usually for positive outcomes (here, school performance). An RII greater than 1 means that the 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.

StatLink https://stat.link/m4oe6t

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.

StatLink https://stat.link/5xmgp1

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[9]; DeSimone and Wolaver, 2005[10]; Holtes et al., 2015[3]). 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[5]). 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[11]). 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[12]). 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[13]). 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[14]). 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[1]). 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[15]). 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[16]).

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[17]; Livingston and Callinan, 2015[18]). 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[19]).

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[1]; Chatterji, 2006[14]; Meda et al., 2017[11]; Sabia, 2010[12]; Silins et al., 2015[13]). 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[16]).

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[20]). 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	**Risk ratio: 0.79****
			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*	**Risk ratio: 0.68****
Russian Federation	Any higher education	Lagged log-binomial regression	Monthly drinking (vs. rarely or never drinking)	Risk ratio: 1.54*	**Risk ratio: 1.56*****
			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	**Coefficient: -0.35*****
			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)	**Coefficient: -0.60*****	**Coefficient: -0.56*****
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)	**Coefficient: -0.56****	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[21]). 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[21]).

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[22]). 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[23]).

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.

Data acknowledgements

The authors would like to thank the following organisations and institutions for providing the data used in the analyses presented in this chapter. These organisations and institutions do not bear any responsibility for the analysis or interpretation of the data.

- The Health Behaviour in School-aged Children (HBSC) survey (2001-02, 2005-06, 2009-10, and 2013-14) produced by the HBSC international network co-ordinated by the HBSC International Co-ordinating Centre based at the Child and Adolescent Health Research Unit in the University of St Andrews, Scotland. The HBSC data are managed by the HBSC Data Management Centre based at the Department of Health Promotion and Development of the University of Bergen, Norway.
- The 1970 British Cohort Study, managed by the Centre for Longitudinal Studies at University College London, funded by the Economic and Social Research Council, and accessed through the UK Data Service.
- The National Longitudinal Study of Adolescent to Adult Health (Add Health), managed by the Carolina Population Center, University of North Carolina at Chapel Hill, and accessed through the CPC Dataverse.
- The Russia Longitudinal Monitoring Survey (RLMS), conducted by the Higher School of Economics and ZAO “Demoscope”, together with the Carolina Population Center, University of North Carolina at Chapel Hill, and the Institute of Sociology of the Russian Academy of Sciences, accessed through the CPC Dataverse.
- The Christchurch Health and Development Study (CHDS), run by the University of Otago, made available for this study upon request.

References

Balsa, A., L. Giuliano and M. French (2011), “The effects of alcohol use on academic achievement in high school”, *Economics of Education Review*, Vol. 30/1, pp. 1-15, http://dx.doi.org/10.1016/j.econedurev.2010.06.015. [1]

Boniface, S., J. Kneale and N. Shelton (2014), “Drinking pattern is more strongly associated with under-reporting of alcohol consumption than socio-demographic factors: Evidence from a mixed-methods study”, *BMC Public Health*, Vol. 14/1, p. 1297, http://dx.doi.org/10.1186/1471-2458-14-1297. [17]

Brown, S. et al. (2000), “Neurocognitive functioning of adolescents: Effects of protracted alcohol use”, *Alcoholism: Clinical and Experimental Research*, Vol. 24/2, pp. 164-171, http://dx.doi.org/10.1111/j.1530-0277.2000.tb04586.x. [2]

Chatterji, P. (2006), “Does alcohol use during high school affect educational attainment? Evidence from the National Education Longitudinal Study”, *Economics of Education Review*, Vol. 25, pp. 482-497, http://dx.doi.org/10.1016/j.econedurev.2005.05.005 (accessed on 4 January 2018). [14]

Cole, T. et al. (2000), “Establishing a standard definition for child overweight and obesity worldwide: international survey.”, *BMJ (Clinical Research Ed.)*, Vol. 320/7244, pp. 1240-1243, http://dx.doi.org/10.1136/bmj.320.7244.1240 (accessed on 14 December 2017). [8]

DeSimone, J. and A. Wolaver (2005), *Drinking and Academic Performance in High School*, National Bureau of Economic Research, Cambridge, MA, http://dx.doi.org/10.3386/w11035 (accessed on 26 May 2017). [10]

Donath, C. et al. (2012), “Predictors of binge drinking in adolescents: Ultimate and distal factors – a representative study”, *BMC Public Health*, Vol. 12/1, p. 263, http://dx.doi.org/10.1186/1471-2458-12-263. [6]

El Ansari, W., C. Stock and C. Mills (2013), “Is alcohol consumption associated with poor academic achievement in university students?”, *International Journal of Preventive Medicine*, Vol. 4/10, pp. 1175-1188, http://www.ncbi.nlm.nih.gov/pubmed/24319558 (accessed on 26 May 2017). [9]

European Commission Secretariat-General (2018), *European Pillar of Social Rights*, http://dx.doi.org/10.2792/95934 (accessed on 13 December 2017). [23]

Gilmore, A., C. Croft and N. Reid (1981), *Burt Word Reading Test: New Zealand revision. Teacher’s Manual*, New Zealand Council for Educational Research, Wellington. [20]

HBSC (2020), *Health Behaviour in School-aged Children: World Health Organization collaborative cross-national survey*, University of St Andrews, St Andrews, http://www.hbsc.org/ (accessed on 16 November 2020). [7]

Hemphill, S. et al. (2014), “Effects of early adolescent alcohol use on mid-adolescent school performance and connection: a longitudinal study of students in Victoria, Australia and Washington State, United States”, *Journal of School Health*, Vol. 84/11, pp. 706-715, http://dx.doi.org/10.1111/josh.12201. [5]

Holtes, M. et al. (2015), “Associations of truancy, perceived school performance, and mental health with alcohol consumption among adolescents”, *Journal of School Health*, Vol. 85/12, pp. 852-860, http://dx.doi.org/10.1111/josh.12341. [3]

Livingston, M. and S. Callinan (2015), “Underreporting in alcohol surveys: Whose drinking is underestimated?”, *Journal of Studies on Alcohol and Drugs*, Vol. 76/1, pp. 158-164, http://dx.doi.org/10.15288/jsad.2015.76.158. [18]

Marmot, M. et al. (2010), *Fair Society, Healthy Lives (The Marmot Review)*, University College London, London, http://www.instituteofhealthequity.org/resources-reports/fair-society-healthy-lives-the-marmot-review/fair-society-healthy-lives-full-report-pdf.pdf (accessed on 3 September 2018). [22]

Meda, S. et al. (2017), “Longitudinal influence of alcohol and marijuana use on academic performance in college students”, *PLoS One*, Vol. 12/3, p. e0172213, http://dx.doi.org/10.1371/journal.pone.0172213. [11]

Nemtsov, A. (2004), “Alcohol consumption in Russia: Is monitoring health conditions in the Russian Federation (RLMS) trustworthy?”, *Addiction*, Vol. 99/3, pp. 386-387, http://dx.doi.org/10.1111/j.1360-0443.2004.00651.x. [19]

OECD (2010), *The High Cost of Low Educational Performance: The long-run economic impact of improving PISA outcomes*, PISA, OECD Publishing, Paris, https://dx.doi.org/10.1787/9789264077485-en. [21]

Oppewal, H. (2010), “Concept of causality and conditions for causality”, in *Wiley International Encyclopedia of Marketing*, John Wiley & Sons, Hoboken, NJ, http://dx.doi.org/10.1002/9781444316568.wiem02059. [15]

Sabia, J. (2010), “Wastin’ away in Margaritaville? New evidence on the academic effects of teenage binge drinking”, *Contemporary Economic Policy*, Vol. 28/1, pp. 1-22, http://dx.doi.org/10.1111/j.1465-7287.2008.00120.x. [12]

Silins, E. et al. (2015), “Adolescent substance use and educational attainment: An integrative data analysis comparing cannabis and alcohol from three Australasian cohorts”, *Drug and Alcohol Dependence*, Vol. 156, pp. 90-96, http://dx.doi.org/10.1016/j.drugalcdep.2015.08.034. [13]

Vuik, S., M. Devaux and M. Cecchini (2019), “Exploring the causal relation between obesity and alcohol use, and educational outcomes”*, OECD Health Working Papers*, No. 109, OECD, Paris, https://dx.doi.org/10.1787/7bcd4669-en. [16]

Wolaver, A. (2002), “Effects of heavy drinking in college on study effort, grade point average, and major choice”, *Contemporary Economic Policy*, Vol. 20/4, pp. 415-428, http://dx.doi.org/10.1093/cep/20.4.415. [4]

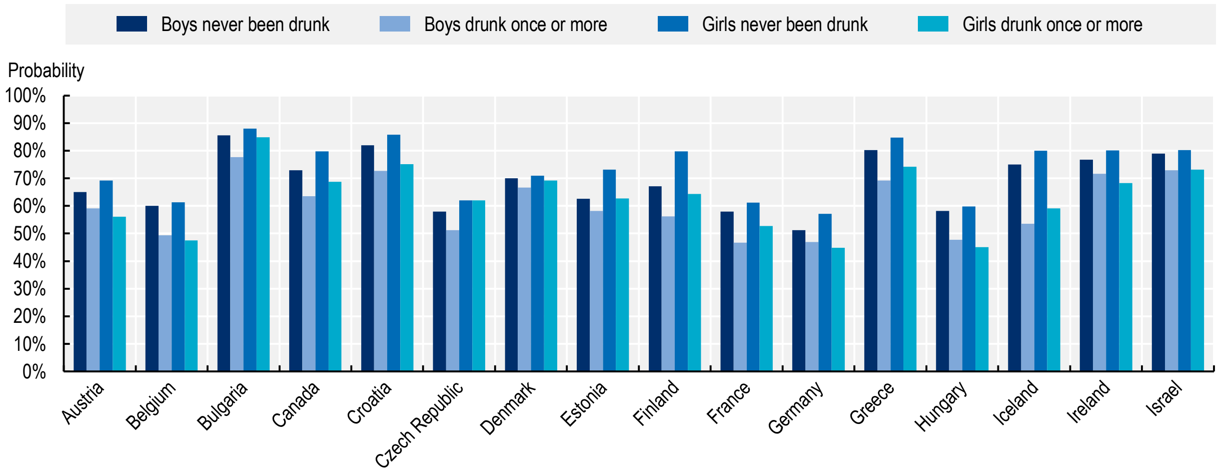
Annex 5.A. Additional graphs

School performance by drunkenness: Comparison between boys and girls

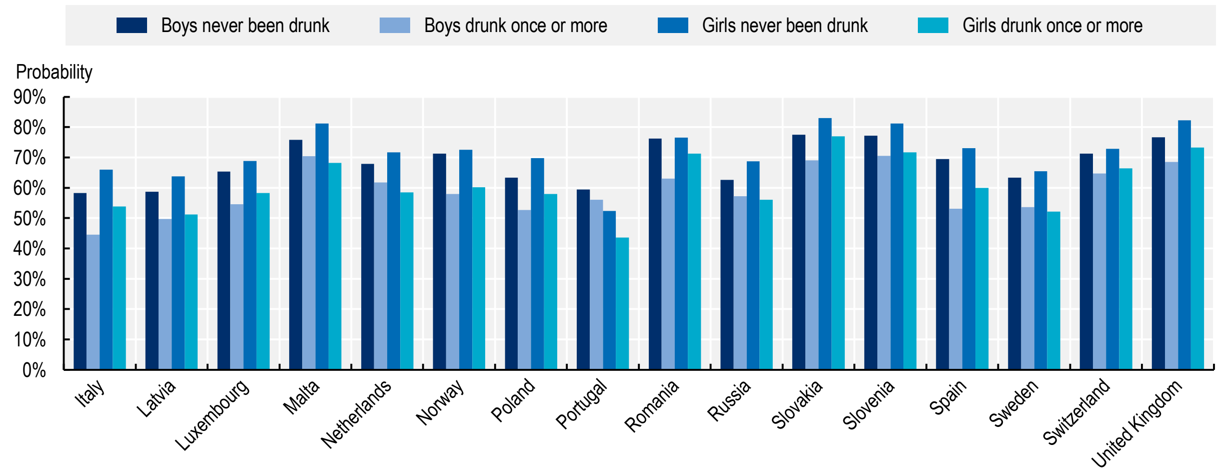
Annex Figure 5.A.1. Probability of good performance at school by gender and by drunkenness

Probability of good performance at school

First set of countries



Second set of countries



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/od8ykc

6 Policies and best practices for reducing the harmful consumption of alcohol

Jane Cheatley, Marta Bertanzetti, Sabine Vuik and Michele Cecchini

This chapter describes policy interventions designed to reduce harmful alcohol use among OECD, European Union (EU27), Group of 20 (G20) and a number of partnering non-OECD countries. It contains a special focus on the interventions outlined in the World Health Organization's *Global Strategy to Reduce the Harmful Use of Alcohol* – in particular, those with a strong evidence base. Policy interventions are grouped into six domains covering pricing, availability, marketing, drink-driving, screening and brief interventions, and consumer information. The discussions include a description of the policy intervention, evidence of its effectiveness and/or cost-effectiveness, mapping across analysed countries and best practice case studies.

Key findings

- **International and national policy response**: the World Health Organization (WHO), in its *Global Strategy to Reduce the Harmful Use of Alcohol* (2010) and *Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2013-2020*, outlines best practice policy responses to assist countries in reducing harmful alcohol use. As of 2016, nearly all OECD, G20 and non-OECD European countries have adopted a national written policy on alcohol (80%). However, just over one-third of these countries have an aligning action plan to implement the national policy on alcohol.
- **Common policy interventions**: alcohol taxes, age restrictions, blood alcohol concentration limits for drivers and penalties for drink-driving are applied across all OECD countries. These policies are implemented at differing levels of strength – for example, 72% of OECD countries set the minimum drinking age at 18-19 years, compared to 28% who set it at 16-17 years (14%) or 20-21 years (14%).
- **Implementation of WHO "best buy" policy interventions**: across OECD countries, 84% apply an alcohol excise tax to all alcoholic beverages, while the remaining countries tax beer and spirits only. Approximately a quarter of countries adjust taxes for inflation. In addition, 43% restrict on- and off-premise sales depending on the time of day, with a further 14% restricting either on- or off-premise sales only. All OECD countries employ some form of advertising restriction on multiple media channels; however, the strength of the restriction varies (from voluntary to legally mandated restrictions).
- **Emerging policy interventions**: policy-makers' responses to harmful alcohol use can also include policy interventions with a developing body of literature on their effectiveness. Examples include minimum unit pricing to better target harmful drinkers, labelling methods to communicate the nutritional content of alcohol, and mass media campaigns encouraging people to abstain from alcohol for a period of time (i.e. "dry months"). To date, only a small number of OECD countries have formally adopted these policies at the national level.
- **Impact of technology**: advances in technology represent both an opportunity and a challenge for policy-makers. For example, technology provides people living in regional/remote areas with access to support through mobile phone applications and allows anonymity, which can break down barriers for seeking help. Conversely, digital media pose a significant regulatory challenge.
- **Importance of policy packages**: policies to reduce the harmful consumption of alcohol and associated harms cannot be addressed through one policy intervention – rather, a suite of interventions is needed within a comprehensive strategy. Design and enforcement of policy interventions require a multi-sectoral approach – including health, law enforcement and social services sectors – since policies do not operate in silos.
- **Role of the alcohol industry**: private stakeholders in the alcohol industry implement various initiatives, such as self-regulation of advertising standards, the promotion of no- or low-alcohol content drinks and road safety campaigns. However, reviews of industry involvement in reducing harmful alcohol consumption indicate that substantial improvements could be made.

6.1. Consumption of alcohol is associated with negative health, social and economic consequences

The consumption of alcohol contributes to various negative health outcomes related to disability and mortality. These include chronic health conditions such as liver cirrhosis, cancer and injuries. In addition, alcohol consumption is associated with disabling mental disorders such as depression (Rehm, 2011[1]; Griswold et al., 2018[2]).

Given the widespread health, social and economic consequences associated with alcohol, it consistently ranks as the drug with the greatest overall harm (Bonomo et al., 2019[3]; Nutt, King and Phillips, 2010[4]). For example, over the next 30 years, it is estimated that harmful alcohol consumption will lead to an additional 37 million injury cases, 24 million cases of cardiovascular disease and 12 million cases of diabetes across the 52 countries analysed in this report (see Chapter 3 for further details).

To reduce the societal burden of alcohol, various policy interventions are employed that involve stakeholders across the whole of society. This chapter discusses these interventions, including their effectiveness and cost-effectiveness, and highlights best practice case studies from across the world.

6.2. Reducing the harmful consumption of alcohol: Which polices work?

6.2.1. What is the international policy context?

In 2010, Member States of the World Health Organization (WHO) agreed to the *Global Strategy to Reduce the Harmful Use of Alcohol*, thereby recognising the issue as a key public health priority. As part of the strategy, ten target areas were identified to assist national policy-makers in developing an effective, holistic policy response (Box 6.1) (WHO, 2010[5]).[1]

Box 6.1. WHO's *Global Strategy to Reduce the Harmful Use of Alcohol*

The Global Strategy highlights ten target policy domains:

1. leadership, awareness and commitment
2. health services' response
3. community action
4. drink-driving policies and counter-measures
5. alcohol availability
6. pricing policies
7. reducing the negative consequences of drinking and alcohol intoxication
8. reducing the public health impact of illicit alcohol and informally produced alcohol
9. monitoring and surveillance.

Source: WHO (2010[5]), *Global Strategy to Reduce the Harmful Use of Alcohol*, https://www.who.int/publications/i/item/9789241599931.

Since harmful alcohol use is a key risk factor for non-communicable disease (NCDs), the Global Strategy played an important role in shaping the WHO *Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2013-2020*. This outlines nine high-level global voluntary targets and aligning policy options, which together aim to reduce premature deaths from the four main NCDs (cardiovascular diseases, cancers, chronic respiratory diseases and diabetes) by 25% by 2025. Regarding alcohol, the action plan aims to achieve a relative reduction of harmful use by 10% (Target 2) (WHO, 2013[6]).

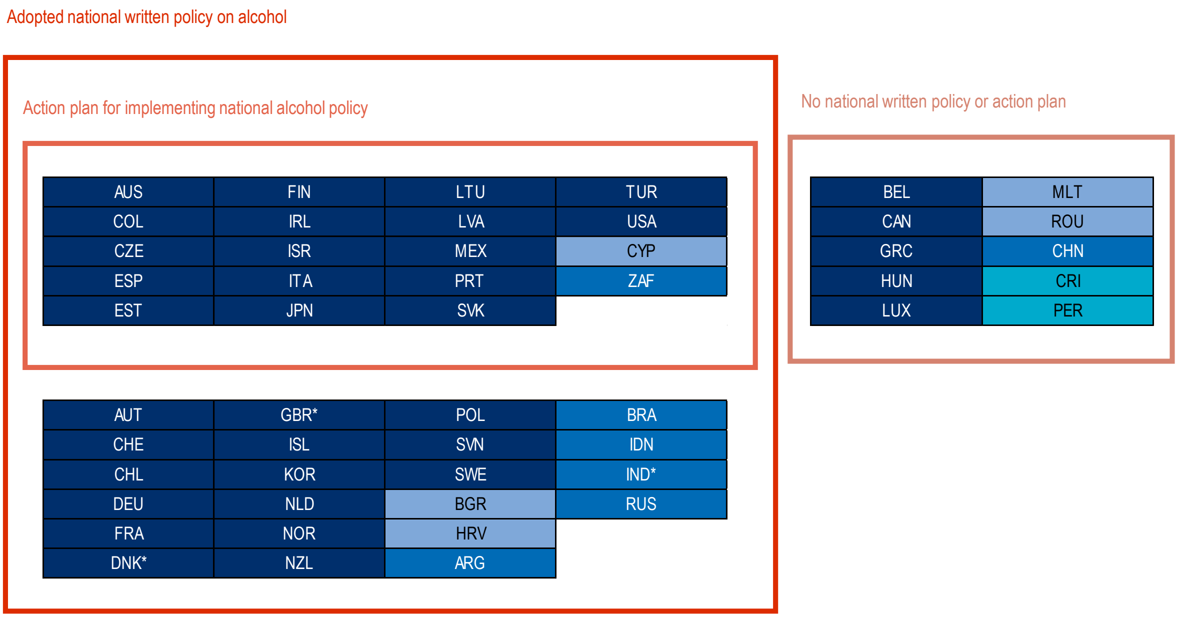
To reduce harmful alcohol use, the WHO has endorsed several high-impact interventions policy-makers can adopt. In 2017, the WHO released *Tackling NCDs: "Best Buys" and Other Recommended Interventions for the Prevention and Control of Noncommunicable Diseases*, which outlined 11 interventions considered the best use of resources based on an assessment of their cost-effectiveness and feasibility to implement. Of these, taxation, restrictions on the availability of alcohol and bans on alcohol advertising were identified as best buys for alcohol policy (WHO, 2017[7]). These interventions are reflected in WHO's SAFER initiative which, in addition to the best buys, promotes the importance of drink-driving counter-measures and screening and brief intervention treatments (WHO, 2018[8]).

The United Nations Sustainable Development Goals (SDGs) also specify a target to reduce harmful alcohol use in line with the Global Strategy, as part of Goal 3 to ensure healthy lives and promote well-being. Specifically, SDG target 3.5 relates to strengthening the prevention and treatment of substance abuse, including alcohol (United Nations, 2019[9]).

6.2.2. What is the national policy context?

As outlined above, WHO's Global Strategy and NCD action plan are designed to assist policy-makers at all levels in implementing effective policies to reduce the harmful use of alcohol. As of 2016, nearly all OECD, G20 and non-OECD European countries have adopted a national written policy on alcohol. However, not all these countries have an action plan outlining implementation of the national policy (Figure 6.1).

Figure 6.1. Countries with a national written alcohol policy and action plan

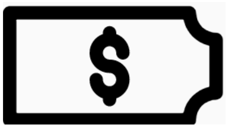


Note: Dark blue = OECD countries; light blue = European Union (EU27); non-OECD countries; medium blue = non-OECD G20 countries; green = countries partnering with the OECD. *No data regarding a national action plan. No data for the Kingdom of Saudi Arabia.
Country abbreviations: AUS = Australia; AUT = Austria; BEL = Belgium; CAN = Canada; CHE = Switzerland; CHL = Chile; COL = Colombia; CZE = Czech Republic; DEU = Germany; DNK = Denmark; ESP = Spain; EST = Estonia; FIN = Finland; FRA = France; GBR = the United Kingdom; GRC = Greece; HUN = Hungary; IRL = Ireland; ISL = Iceland; ISR = Israel; ITA = Italy; JPN = Japan; KOR= Korea; LTU = Lithuania; LVA = Latvia; LUX = Luxembourg; MEX = Mexico; NLD = the Netherlands; NZL = New Zealand; POL = Poland; PRT = Portugal; SVK = the Slovak Republic; SVN = Slovenia; SWE = Sweden; TUR = Turkey; USA = the United States; BGR = Bulgaria; CYP = Cyprus; HRV = Croatia; MLT = Malta; ROU = Romania; ARG = Argentina; BRA = Brazil; CHN = People's Republic of China; IDN = Indonesia; IND = India; RUS = Russian Federation; ZAF = South Africa; CRI = Costa Rica; PER = Peru.
Source: WHO (2020[10]), GISAH, https://www.who.int/data/gho/data/themes/global-information-system-on-alcohol-and-health.

Policies outlined within national written policy documents and action plans have been grouped into six policy domains; these include the domains within WHO's SAFER framework (WHO, 2018[8]) and consumer information (Figure 6.2):

- alcohol pricing
- alcohol availability
- drink-driving
- alcohol marketing
- screening and brief interventions
- consumer information.

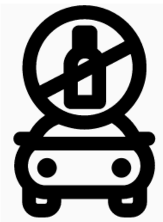
Figure 6.2. Policy domains to reduce harmful alcohol consumption



Alcohol pricing
Taxes
Minimum unit pricing

Alcohol availability
Times of sale and outlet restrictions
Legal minimum age

Alcohol marketing
Restrictions on advertising
Sport sponsorship



Drink-driving
BAC limits, sobriety checkpoints, penalties, ignition interlocks

Screening and brief interventions
Screening
Brief interventions
Psychosocial and pharmacotherapy

Consumer information
Warning labels
Mass media campaigns
Preventative school programs

6.3. Alcohol pricing is a key method used to reduce consumption

Policy interventions

- Taxes based on size, alcohol content and value
- Minimum unit pricing
- Other minimum alcohol pricing tools, such as bans on below-cost selling

Key findings

- Most OECD countries tax alcoholic beverages – in particular beer and spirits.
- In OECD countries, minimum unit pricing has been implemented at the state/province/territory level in countries such as Australia, Canada and the United Kingdom, and has been approved for implementation in Ireland.
- Relatively few countries periodically adjust tax rates to reflect rising prices; this may have contributed to increasing alcohol affordability (see Chapter 2 for further details).

6.3.1. Several countries use taxation to target alcohol prices

Alcohol excise taxes can be grouped into one of three categories:

- **Unitary tax**: tax based on the volume (size) of the alcoholic beverage
- **Specific (volumetric) tax**: tax based on the ethanol content of the alcoholic beverage
- **Ad valorem tax**: tax based on the value of the alcoholic beverage (Sornpaisarn et al., 2017[11]).

It has been suggested that specific taxes are desirable, since they target the ingredient that causes harm (i.e. ethanol) (Chaloupka, Powell and Warner, 2019[12]; Blecher, 2015[13]). Consequently, individuals and manufacturers are incentivised to consume and produce low-alcohol beverages. In South Africa, for example, following the introduction of a specific tax for beers (which replaced the previous unitary tax), there has been a significant shift in advertising from high- to low-alcohol beers, since the latter are now more profitable to produce (Blecher, 2015[13]).

There is strong evidence to support the inverse relationship between prices of alcoholic drinks and consumption. A systematic review by Elder et al. (2010[14]) found that nearly all studies (95%) calculating price elasticities were negative, with this figure ranging from -0.5 to -0.79 (i.e. a 10% increase in the price of alcohol corresponds with a decrease in consumption ranging from -5% to -7.9%), depending on the type of alcohol. These findings are supported by an earlier meta-analysis by Wagenaar et al. (2009[15]) which concluded that a 10% increase in alcohol prices decreases consumption by approximately 5%. Higher prices were also found to reduce alcohol-related mortality and morbidity (e.g. cirrhosis, road traffic deaths, assault and suicide) and are considered highly cost-effective (Wagenaar, Tobler and Komro, 2010[16]; Elder et al., 2010[14]; Cobiac, Mizdrak and Wilson, 2019[17]).

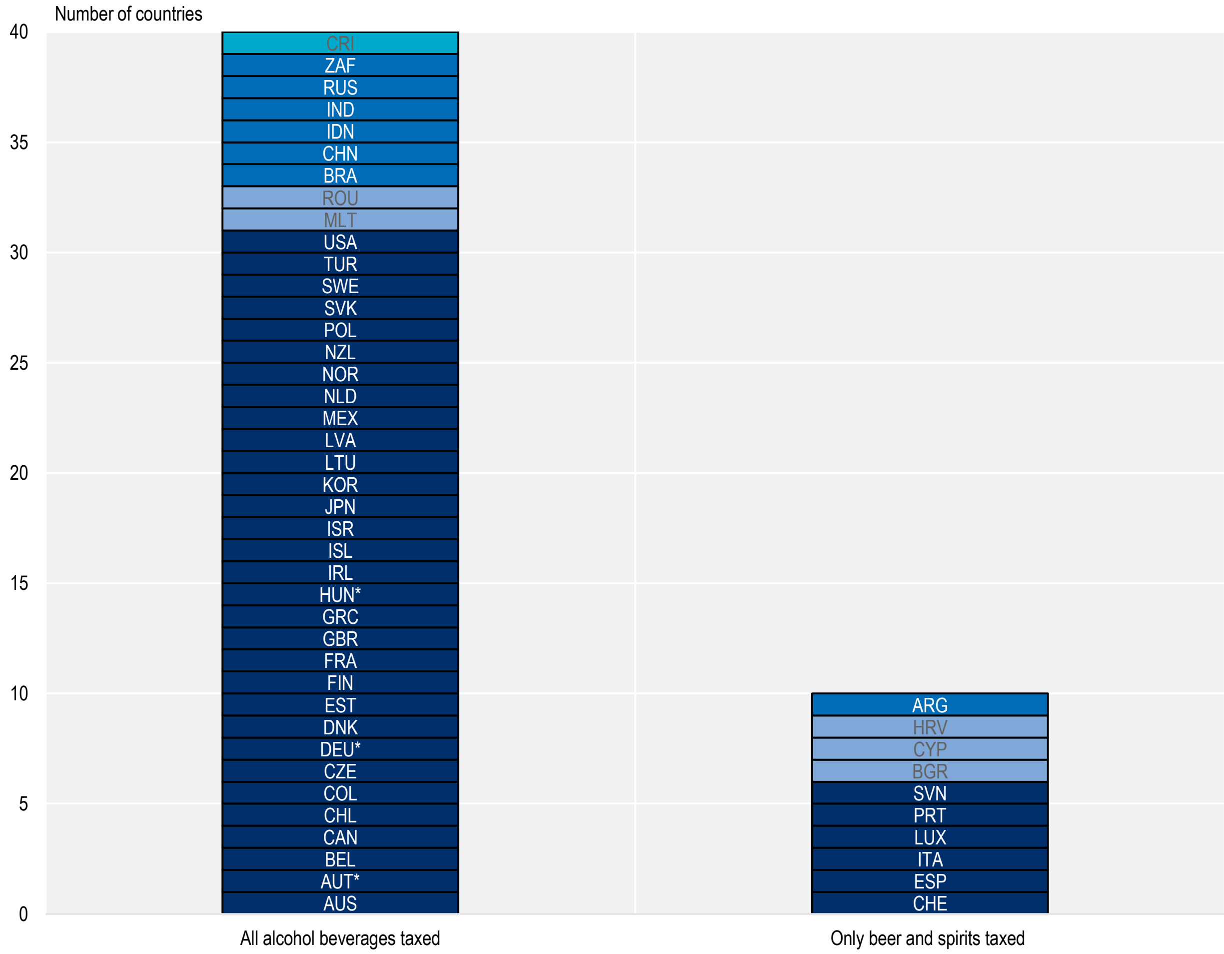
It is important to note that the impact of an alcohol tax increase differs across population groups and types of drinker. For example, Meier et al. (2016[18]) estimated that an increase in specific (volumetric) taxes leads to greater declines in consumption among low-income than high-income groups, particularly for people who drink heavily. The same relationship exists with ad valorem taxes, albeit to a lesser degree and with minimal differences across types of drinker.

Across OECD countries, 84% tax all beverage types; the remainder tax only beer and spirits (Figure 6.3). Countries may also choose to combine taxes, as in Australia, where beer and spirits are subject to a specific tax (based on alcohol content) and wine is subject to an ad valorem tax (based on wholesale price)

(Sornpaisarn et al., 2017[11]; Australian Taxation Office, 2019[19]). Further analysis of taxation rates by type of alcohol can be found in OECD (2018[21]), *Consumption Tax Trends,* https://www.oecd-ilibrary.org/taxation/consumption-tax-trends_19990979.

In addition to excise taxes, alcohol products in all OECD countries are subject to a value-added tax (VAT), ranging between 7.7% (Switzerland) and 27% (Hungary) (WHO, 2018[20]; OECD, 2018[21]).

Figure 6.3. Alcohol excise tax by beverage type



Note: Dark blue = OECD countries; light blue = EU27 non-OECD countries; medium blue = non-OECD G20 countries; green = countries partnering with the OECD. No data for the Kingdom of Saudi Arabia. *No tax on still or low-alcohol wine – only on sparkling wine for these countries.
Source: OECD (2018[21]), *Consumption Tax Trends*, https://www.oecd-ilibrary.org/taxation/consumption-tax-trends_19990979; WHO (2020[10]), GISAH, https://www.who.int/data/gho/data/themes/global-information-system-on-alcohol-and-health

StatLink https://stat.link/r50acp

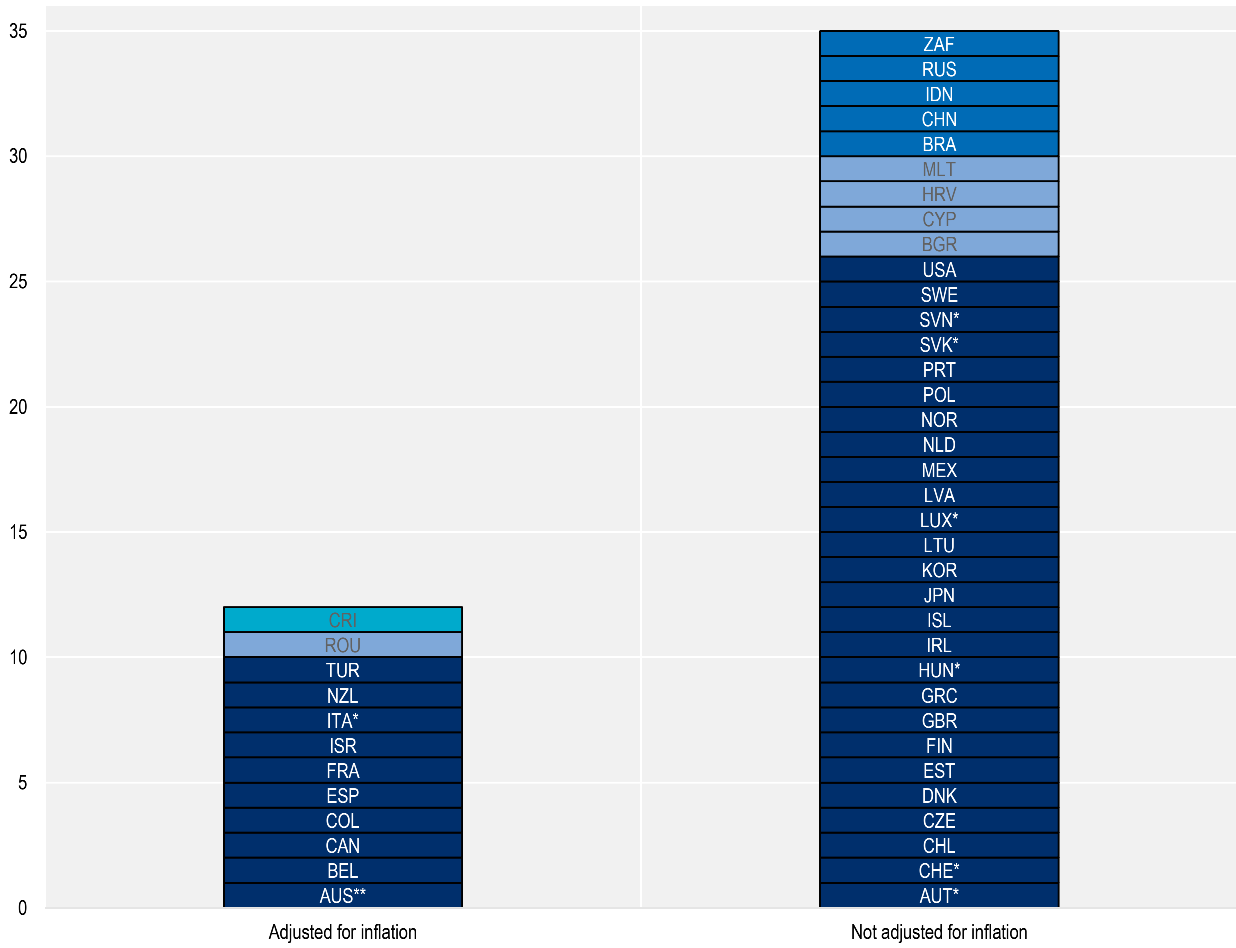
The impact of an alcohol excise tax decreases over time if it is not adjusted for inflation. This is particularly important for unitary and specific taxes as opposed to ad valorem taxes, which already incorporate changes in price. For example, in the United States, the average inflation-adjusted state-specific tax rate fell by 27-30% (depending on alcohol type) between 1991 and 2015 because it did not change to reflect higher prices (Naimi et al., 2018[22]).

Failing to adjust for inflation can exacerbate existing health inequalities, since specific taxes are more likely to change the behaviour of people who drink heavily (Meier et al., 2016[18]). Specifically, high-strength alcohol is more likely to be sold in the off-premise sector (e.g. supermarkets), where the majority of heavy drinkers purchase alcohol (around 74-80% compared to 47-65% of moderate drinkers).

Approximately one-fifth of all OECD countries periodically adjust alcohol taxes for inflation for all beverage types (n = 8), while two additional countries adjust for beer and spirits only (Australia and Italy, which do not tax wine) (Figure 6.4). For example:

- In Australia, excise taxes for beer and spirits are indexed to inflation and therefore adjusted twice a year (February and August).
- In Israel, taxes on alcohol are updated annually to reflect changes in the consumer price index (OECD, 2018[21]).

Figure 6.4. Alcohol taxes adjusted for inflation



Note: Dark blue = OECD countries; light blue = EU27 non-OECD countries; medium blue = non-OECD G20 countries; green = countries partnering with the OECD. No data available for Germany, Argentina, India, Peru and the Kingdom of Saudi Arabia. *No data for wine. **Not adjusted for taxes on wine.
Source: WHO (2020[10]), GISAH, https://www.who.int/data/gho/data/themes/global-information-system-on-alcohol-and-health

StatLink https://stat.link/m6ft1s

When designing or reforming an alcohol taxation policy, it is important that policy-makers take into account potential negative side effects, such as:

- **Product substitution**: disproportionate price increases among alcoholic beverages could lead individuals to substitute one drink for another. This may have a positive or neutral effect, depending on whether individuals switch to lower-strength beverages or to other forms of alcohol. The evidence suggests that substitution generally occurs within beverages (e.g. red to white wine), as opposed to across beverages (e.g. from beer to wine) (Chaloupka, Powell and Warner, 2019[12]). Product substitution may also occur across drugs – for example, a review of the literature found that young people in "liberal cannabis environments" may substitute alcohol for this drug (Subbaraman, 2016[23]).
- **Declines in consumption of necessary goods**: people who drink heavily are less responsive to price changes (Wagenaar, Salois and Komro, 2009[15]), so increasing the price of alcohol may have the undesired effect of reducing spending on essential items such as food and rent (Falkner et al., 2015[24]). Nevertheless, a small proportional decrease in consumption due to higher taxes among people who drink heavily may represent a large absolute reduction in consumption (this is important because a small change in consumption among people who drink heavily can have significant health benefits) (WHO Regional Office for Europe, 2020[25]).
- **Cross-border trade**: for geographical reasons, alcohol taxation policies are not solely a domestic issue for certain countries. Specifically, a decrease in tax encourages residents in neighbouring countries to purchase alcohol across the border. It may also encourage neighbouring countries to lower their tax levels to protect the alcohol industry, as seen in the Baltic region, where Latvia announced a 15% reduction in alcohol duty on strong liquor in response to a similar policy implemented by Estonia (Laizans, 2019[26]).
- **Illegal trading**: steep increases in the price of alcohol can encourage illegal trade. It is estimated that 25% of all alcohol consumed is illegally sourced (OECD, 2016[27]).

6.3.2. Minimum unit pricing is increasingly used as a policy tool

In addition to the three tax types mentioned above, some governments have become increasingly interested in minimum unit pricing (MUP). MUP is a policy tool that sets a mandatory floor price per unit of alcohol or standard drink,[2] thereby targeting cheap alcoholic beverages. Unlike taxes, it prevents retailers from absorbing the additional cost of production. Further, it has been argued that MUP is more effective, since problem drinkers and/or young people are more likely to consume cheap forms of alcohol (O'Donnell et al., 2019[28]). Other minimum pricing tools are detailed in Box 6.2.

Box 6.2. Minimum alcohol pricing policies

In addition to MUP, other policy tools to minimise the price of alcohol include:

- **Bans on below-cost selling**: to restrict the sale of heavily discounted alcohol, several countries have banned the sale of alcohol below the cost of production. In the United Kingdom, for example, it is illegal to sell alcohol at a price less than the amount of duty plus VAT (UK Home Office, 2017[29]).
- **Bans on volume discounts**: under this policy it is illegal to offer customers discounts based on the volume of alcohol bought, such as two drinks for the price of one. This policy is used, for example, in Iceland in off-premise settings and in Sweden (WHO Regional Office for Europe, 2014[30]).

- **Minimum mark-ups and profit margins**: by capping minimum profit margins for wholesalers and retailers of alcohol, policy-makers are effectively setting a minimum price (Sassi, 2015[31]). For example, in the United States, seven states require wholesalers to establish a minimum mark-up/maximum discount on beer, wine and spirits (Alcohol Policy Information System, 2019[32]).

Several countries have implemented MUP, including Canada (certain provinces) (see Box 6.3), one territory in Australia, the United Kingdom (Scotland and Wales) and the Russian Federation (Box 6.3) (Boniface, Scannell and Marlow, 2017[33]; Coomber et al., 2020[34]). Empirical research evaluating MUP, to date, has found promising results. In the United Kingdom (Scotland), O'Donnell et al. (2019[28]) found that MUP led to a 7.6% reduction in alcohol purchases, which is equivalent to 41 alcohol units per person, per household every year. The impact on price was greatest in households that consumed the most alcohol, indicating that the policy was successful at targeting people who drink heavily. Findings from this research is supported by more recent analysis undertaken by Public Health Scotland and the University of Glasgow, which found that alcohol sales in supermarkets and off-licence outlets fell by 4.5% one year after the introduction of MUP (with the impact greatest for cheap products) (Christie, 2020[35]; Public Health Scotland, 2020[36]). In Australia, an investigation into the introduction of MUP in the Northern Territory (AUS 1.30 per standard drink) found that the policy led to a reduction in the wholesale supply of alcohol per capita (by 0.22 litres of pure alcohol), a reduction in alcohol-related assaults and a fall in alcohol-related ambulance and emergency admissions (Coomber et al., 2020[34]).

Box 6.3. MUP in practice

MUP has been implemented in various forms in countries such as Canada (at the subnational level) and the United Kingdom (Scotland and Wales). Examples from outside OECD countries include the Russian Federation, Ukraine, the Republic of Moldova and Uzbekistan (Boniface, Scannell and Marlow, 2017[33]). Specific case studies for three of these countries are summarised below, with a comparison of MUP rates provided in Figure 6.5 (methodological details are provided at the end of this chapter).[1]

Canada

Several Canadian provinces and territories have implemented minimum unit prices on alcohol, including New Brunswick, Newfoundland and Labrador, British Columbia, Manitoba, Saskatchewan, Quebec and Nova Scotia. Provinces/territories either set the minimum unit price by standard serving of alcohol (as specified by law) or apply minimum unit price rates per ounce of alcohol, which differs according to alcohol type (e.g. spirits are typically subject to a higher minimum price). Minimum unit price rates are reviewed annually and indexed to inflation in a few provinces and territories, including Nova Scotia, Quebec, Ontario and Manitoba (Canadian Partnership Against Cancer, 2018[37]). Several examples are provided below.

- **British Columbia:** the minimum unit price is USD 2.28 (CAD 3.02) for a standard drink of beer and wine and USD 3.42 (CAD 4.54) for spirits (excluding sales tax) (Government of British Columbia, 2020[38]).
- **Manitoba**: a standard drink cannot be sold for less than USD 1.71 (CAD 2.27) for beer and wine (inclusive of tax) and USD 2.56 (CAD 3.40) for spirits (Government of Manitoba, 2020[39]).
- **Newfoundland and Labrador**: a standard drink cannot be sold for less than USD 1.25 (CAD 1.66) for beer, USD 1.52 (CAD 2.02) for wine and USD 1.80 (CAD 2.39) for spirits (regulations in this case refer to standard serving sizes, which differ from a standard drink; inclusive of sales tax) (Government of Newfoundland and Labrador, 2020[40]).

- **Nova Scotia**: beer and wine cannot be sold below USD 1.90 (CAD 2.52) per standard drink, with this figure increasing to USD 2.82 (CAD 3.74) for spirits (inclusive of tax) (Government of Nova Scotia, 2020[41]).
- **Quebec:** minimum unit prices are only applied to beer, and differ according to alcohol content – specifically, from USD 2.36 (CAD 3.13) for a litre of beer containing less than 4.1% alcohol by volume (ABV) to USD 2.67 (CAD 3.54) for a litre of beer containing over 6.2% ABV (Government of Quebec, 2020[42]).

Russian Federation

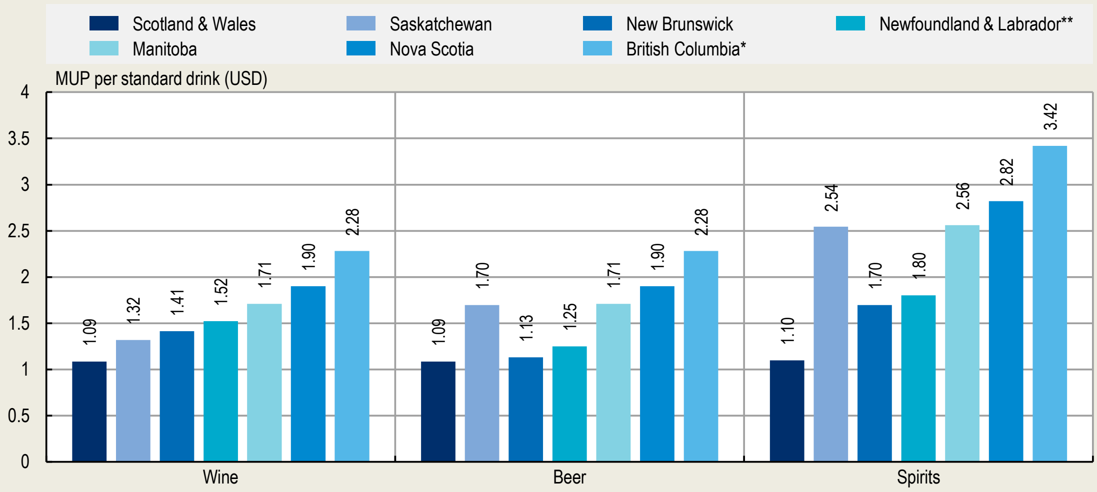
In 1996, the Government of the Russian Federation introduced a minimum unit price for vodka, but this was not enforced until 2003 and was subsequently increased in 2010. In 2011, a strategy for gradually increasing the minimum unit price for spirits (beverages with an ABV above 28%) was instated. However, in 2015, the minimum unit price was frozen and the price of vodka decreased due to a cut in excise tax. It has been suggested that this action was taken to stop people consuming illegally distilled spirits with a higher alcohol content (BBC News, 2015[43]). The strategy to raise the minimum unit price on spirits was reinstated in 2016, alongside the introduction of a minimum unit price for sparkling wine (WHO Regional Office for Europe, 2019[44]).

United Kingdom (Scotland and Wales)

In May 2018, Scotland introduced a nationwide MUP scheme, which links the price of alcoholic beverages to their alcohol content. Under the scheme, each unit of alcohol is subject to a GBP 0.50 (USD 0.63) minimum price per unit (10 mL or 8 g), which no licence holder (i.e. retailers and drinking venues) can sell under (Scottish Government, 2018[45]).

In March 2020, Wales introduced an act enforcing minimum prices for alcohol. As part of this, businesses, organisations and people with an alcohol licence cannot sell alcohol at a price lower than GBP 0.50 (USD 0.63) per unit (Welsh Government, 2020[46]).

Figure 6.5. Minimum unit price per standard drink (USD)



Note: *Minimum unit prices for alcoholic beverages in British Columbia are not inclusive of taxes. **Regulations in Newfoundland and Labrador refer to standard serving sizes, which differ from a standard drink. Only countries/regions whose data could be compared are included in the analysis.
Source: See country descriptions above.

StatLink https://stat.link/k1mbdu

1. Exchange rates were taken from https://data.oecd.org/conversion/exchange-rates.htm (USD to CAD = 1.327 and USD to GBP = 0.783). The analysis assumed the following standard drink sizes in ounces (oz): beer 12 oz (341 mL) (5% ABV); wine 5 oz (142 mL) (12% ABV) and spirits 1.5 oz (43 mL) (40% ABV). In Canadian provinces, the minimum unit price applies to alcohol sold in on-premise outlets only. (The price of off-premise alcohol is controlled by a liquor board in almost every province. The liquor board is responsible for implementing minimum prices for selling alcohol. In many cases, this is referred to as social reference pricing.) Data for Quebec and Australia (Northern Territory) rates could not be compared. Rates are standardised to USD; they do not reflect purchasing power parity. Rates for beer relate to canned or bottled beer (rates can differ for draught beer).

6.4. Alcohol availability can be restricted to affect intake

Policy interventions

- Restrictions on hours and days of alcohol sales
- Restrictions on the density of alcohol outlets
- Minimum legal purchasing age

Key findings

- Restricting alcohol sales according to time of day is a policy tool employed by many OECD countries. Restrictions by day, however, are less common.
- Restrictions on outlet density are effective at reducing social disorder, but their impact on consumption is less clear.
- Despite minimum legal ages for purchasing alcohol, consumption by minors is common.

6.4.1. Restrictions can be placed on physical availability

Hours and days of sale

To restrict alcohol availability and thereby limit the opportunity for people to purchase and consume alcohol, policy-makers may restrict the hours or even full days within a week during which alcohol can be sold. These restrictions may apply to on-premise (e.g. restaurants and bars) and/or off-premise establishments (e.g. liquor stores), and typically target late-night drinking in order to reduce alcohol-related violence and injury (Hahn et al., 2010[47]).

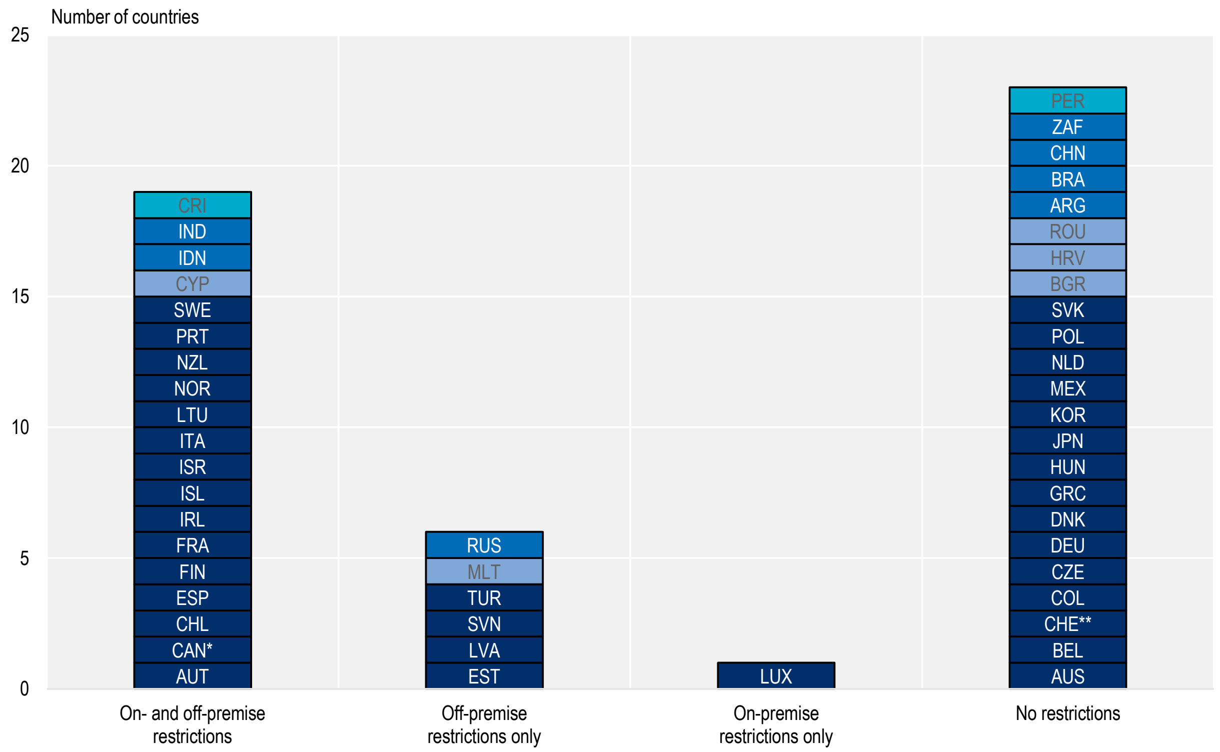
The literature evaluating the impact of this policy focuses on alcohol-related harm. A systematic review by Wilkinson et al. (2016[48]), which largely concentrated on studies undertaken in Australia, demonstrated that reducing hours of sale (at night) for on-premise outlets substantially reduces rates of violence. This conclusion was drawn from 21 studies including:

- Kypri et al. (2011[49]), who found that a mandatory closing time of 03:30 and a lockout of 01:30 (meaning no entry for anyone not already in a venue) for pubs in Newcastle, Australia, led to a 37% reduction in assaults between 22:00 and 06:00. These were sustained for five years following the study (Kypri, Mcelduff and Miller, 2014[50])
- Rossow and Noström (2012[51]) who, based on data from 18 cities in Norway, estimated that extending opening times by one hour leads to a 16% increase in recorded assaults.

Regarding days of sale, a recent meta-analysis by Sherk et al. (2018[52]) found that one additional day of sale leads to a 3.4% increase in total per capita consumption of alcohol.

Forty-three percent of OECD countries with available data restrict alcohol sales by hour in both on- and off-premise outlets; however, the same proportion apply no restrictions at all (Figure 6.6). Restrictions by days of sale are less common, with just 11% of OECD countries applying this restriction to both premise types and 73% applying no restrictions (the remainder of countries either have no data or apply restrictions to off-premises only).

Figure 6.6. Restrictions on alcohol sales by hour



Note: Dark blue = OECD countries; light blue = EU27 non-OECD countries; medium blue = non-OECD G20 countries; green = countries partnering with the OECD. No data for the Kingdom of Saudi Arabia, the United Kingdom and the United States. *In Canada, hours for selling alcohol are regulated at the provincial level and differ from one province to another. **In Switzerland, restrictions apply in five of 26 cantons.
Source: WHO (2020[10]), GISAH, https://www.who.int/data/gho/data/themes/global-information-system-on-alcohol-and-health

StatLink https://stat.link/hm7853

Outlet density

In addition to restricting hours and days of sale, policy-makers may also limit the number and concentration (e.g. by population size) of outlets in a given area with a permit to sell alcohol (for consumption on site or elsewhere).

Evidence for this policy indicates that reducing outlet density results in lower consumption and alcohol-related harm (Campbell et al., 2009[53]), and that the effects may be felt more strongly by target groups such as socially marginalised drinkers (Livingston, Chikritzhs and Room, 2007[54]; Gruenewald, 2011[55]). For example, in the United States:

- Gruenewald et al. (2006[56]) found that a 10% increase in the number of off-premise outlets led to a 2.06% increase in violence rates resulting in one additional overnight stay in hospital.

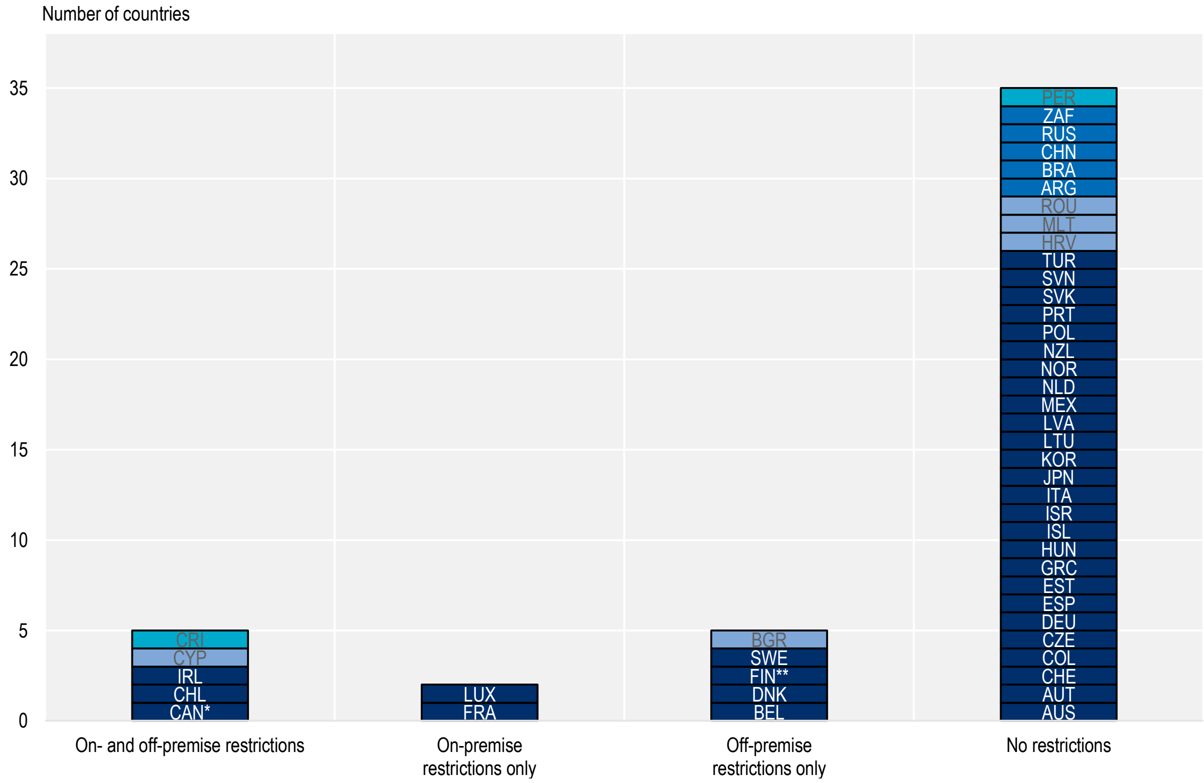
- A longitudinal analysis by Brenner et al. (2015[57]) concluded that a one standard deviation increase in outlet density resulted in a 7% rise in alcohol consumption for men, with this figure rising to 11% for women.

Designing and implementing a policy to restrict outlet density requires careful design, as outlet types (e.g. bars, restaurants, liquor stores and supermarkets) cannot be treated as homogeneous. To date, most of the literature combines the impact of on- and off-premise outlets, which is a key limitation (Wilkinson, Livingston and Room, 2016[48]; Gmel, Holmes and Studer, 2016[58]; Sherk et al., 2018[52]).

The sale of alcohol can also be restricted by the location and type of outlet (such as petrol stations). Lithuania, as of January 2020, has banned alcohol sales on beaches and pavilions, as well as during public events for drinks with an alcohol content above 7.5% (Rehm, Štelemėkas and Badaras, 2018[59]). Latvia plans to stop the sale of alcohol at service stations as part of its action plan to reduce alcohol consumption and related harms (Ministry of Health of the Republic of Latvia, 2019[60]).

Restricting the number of outlets, although recommended by the WHO (2017[7]), is only applied to on-premise outlets in five OECD countries, with this figure increasing to seven for off-premise outlets (see Figure 6.7and Box 6.4 for a country example).

Figure 6.7. Restrictions on the density of alcohol outlets



Note: Dark blue = OECD countries; light blue = EU27 non-OECD countries; medium blue = non-OECD G20 countries; green = countries partnering with the OECD. *Provinces and territories delegate responsibility for regulating on-premise outlet density to municipalities, and all but two jurisdictions (New Brunswick and Prince Edward Island) grant the same power to municipalities for off-premise outlets. Jurisdictions with the greatest restrictions on outlet density are Quebec, Alberta, British Columbia, Manitoba and Yukon.
**There are no restrictions for beer in Finland. Restrictions in the United States differ widely across jurisdictions and is therefore not included in the figure above. No data for the Kingdom of Saudi Arabia or the United Kingdom.
Source: WHO (2020[10]), GISAH, https://www.who.int/data/gho/data/themes/global-information-system-on-alcohol-and-health

StatLink https://stat.link/lo8epk

Box 6.4. Changes to alcohol availability in Finland

In January 2018, Finland introduced changes to its Alcohol Act 1994 (1143/1994), which relaxed availability restrictions. Most importantly, under the amendments, grocery stores, kiosks and similar were permitted to sell alcohol with a higher ABV (rising from 4.7% to 5.5%) (Karlsson et al., 2020[61]). Previously, sales of beverages with an ABV over 4.7% were allowed only in state-run alcohol outlets. Other changes included increased hours of operation for state-run alcohol outlets and permission for independent microbreweries to sell their products with an ABV up to 12%. Alongside amendments to the Act, policy-makers raised the excise tax by approximately 10% (with this figure marginally lower for spirits than for wine and beer).

The impact of changes to alcohol availability and price were recently summarised by Karlsson et al. (2020[61]), who found that one year after implementation the changes had led to a 0.1% increase in off-premise sales. At the beverage level, sales data indicated a marked increase in demand for stronger alcoholic drinks. For example, off-premise outlet sales of pre-mixed drinks with an ABV over 4.7% increased by 380%, strong beer by 260% and strong cider by 120%. The authors also found that after one year of the new policy, total alcohol consumption had increased by 0.4%, ending a long-term declining trend.

6.4.2. Age restrictions target underage and early onset of drinking

Many risks are associated with early onset of drinking, such as violence and injury, as well as a greater likelihood of developing alcohol dependence in adulthood (Grant et al., 2006[62]). Given that the availability of alcoholic drinks is a significant predictor of drinking behaviour among young people (Wagenaar, Salois and Komro, 2009[15]; Kypri et al., 2008[63]) most countries have set a minimum age at which people can purchase or consume alcohol legally. Despite legally mandated age limits for purchasing alcohol, however, a high proportion of minors have consumed or regularly consume alcohol (see Chapter 2, Section 2.3).

For minimum age restrictions to reduce underage drinking significantly, they must be strictly enforced by the law. In the Netherlands, alcohol vendors took part in an experiment to test new forms of technology to increase compliance with legal age limits, specifically through a remote age verification system. This system links the cash register to a live video connection, where a remote agent approves or declines purchases. An evaluation of the remote age verification system found that 87% of purchases were conducted without any mistakes compared to 34% for traditional identity document readers (Van Hoof, 2017[64]).

The legally mandated minimum age for purchasing alcohol in OECD countries ranges from 16 to 21 years, with most setting the threshold at 18 years (Figure 6.8). The vast majority of OECD countries (84%) apply the same threshold across all alcohol types; those who do not typically increase the minimum age by two years for spirits (e.g. in Norway and Finland (off-premise), the minimum age is 18 for beer and wine but 20 for spirits).

Given the damage caused by early onset of drinking, several countries have raised the minimum legal drinking age. For example, Lithuania raised the age limit from 18 to 20 years in 2018 (Nordic Alcohol and Drug Policy Network, 2017[65]), while in the Netherlands, the age limit rose from 16 to 18 back in 2014 (Schelleman-Offermans, Roodbeen and Lemmens, 2017[66]).

Figure 6.8. Legal minimum age for purchasing alcohol

Note: Dark blue = OECD countries; light blue = EU27 non-OECD countries; medium blue = non-OECD G20 countries; green = countries partnering with the OECD. *18 for spirits. **20 for spirits (for Finland, this applies to off-premise only). ***18 for beer (both on- and off-premise) and 20 for wine and spirits (off-premise only). ****In Sweden the legal age is 20 for beer, wine and spirits when purchasing from Systembolaget (government-owned liquor stores – off-premise), with the exception of light beer, which can be purchased at 18 years. The legal purchasing age in restaurants and bars, however, is 18. For India, the age varies between 18 and 25. †Age limits are set at the subnational level. The Kingdom of Saudi Arabia has a total ban on alcohol purchases.

Source: IARD (2019[67]), *Minimum Legal Age Limits*, https://iard.org/science-resources/detail/Minimum-Legal-Age-Limits; WHO (2020[10]), GISAH, https://www.who.int/data/gho/data/themes/global-information-system-on-alcohol-and-health

StatLink https://stat.link/t52msq

6.5. Drink-driving policies seek to reduce road accident injuries and deaths

Policy interventions

- Blood alcohol concentration limits
- Sobriety checkpoints (breath tests)
- Penalties (e.g. licence suspension, fines, impoundment, community service)
- Ignition interlock schemes

Key findings

- Blood alcohol concentration limits are a common policy tool across OECD countries, with the limit typically set at 0.05% for the general population (countries may lower this limit for young people and professional drivers).
- Other policy tools commonly employed by countries include sobriety checkpoints and penalties for drink-driving, and – to a lesser extent – ignition interlock systems.
- The effectiveness and cost-effectiveness of drink-driving policies differ, with evidence strongest for sobriety checkpoints.

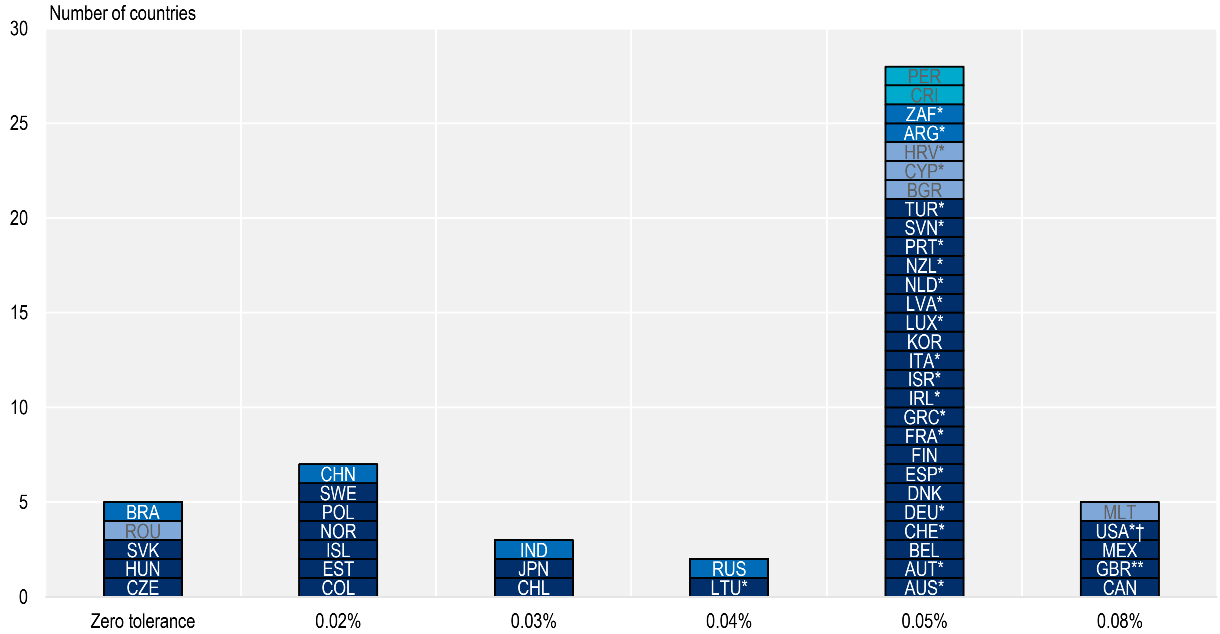
6.5.1. Many countries set blood alcohol concentration limits

Drivers with alcohol in their system are at greater risk of being involved in a road traffic crash. A study undertaken by Taylor and Rehm (2012[68]) estimated that for every 0.02% increase in an individual's blood alcohol content – the percentage of alcohol in a person's blood stream – the probability of being in a fatal motor vehicle crash increases by approximately 70% (odds ratio recorded was 1.74).

Given the higher risk of accidents when driving under the influence of alcohol, it is common for countries to employ blood alcohol concentration (BAC) limits for drivers, which may differ according to the type of driver. Specifically, novice or young drivers and professional drivers are often subject to lower BAC limits than the general population (WHO, 2020[10]).

The majority of OECD countries (57%) set the BAC limit at 0.05% for the general population. The highest BAC limit in OECD countries is 0.08% and is enforced in four OECD countries: Mexico, the United States (with the exception of Utah), Canada and the United Kingdom (with the exception of Scotland, where the limit is set at 0.05%) (Figure 6.9). Over half of OECD countries (n = 21) enforce lower BAC limits for professional and novice/young drivers. In these countries, BAC limits range between zero tolerance to 0.03% for professional and novice/young drivers and between 0.04% and 0.05% for the general population (WHO, 2020[10]).

Figure 6.9. BAC limits for the general population



Note: Dark blue = OECD countries; light blue = EU27 non-OECD countries; medium blue = non-OECD G20 countries; green = countries partnering with the OECD. *Lower limit set for novice and/or professional drivers. **The limit is 0.05% for Scotland. † In the United States, the limit in the state of Utah is 0.05%. No limit is set in Indonesia. There is a total ban in the Kingdom of Saudi Arabia.
Source: WHO (2020[10]), GISAH, https://www.who.int/data/gho/data/themes/global-information-system-on-alcohol-and-health

StatLink https://stat.link/763sjq

In recent years, several countries have reduced – or plan to reduce – BAC limits in an effort to cut road traffic crashes caused by alcohol. For example:

- In 2019, Iceland lowered its BAC limit from 0.05% to 0.02%.
- In 2019, Korea lowered its BAC limit from 0.05% to 0.03% (Japan implemented the same change in 2002).
- In 2015, Lithuania lowered its BAC limit for novice and professional drivers from 0.02% to 0%.
- In 2014, Scotland lowered its BAC limit from 0.08% to 0.05%.
- In 2017, Spain announced that it would cut the BAC limit from 0.03% for novice and professionals drivers to 0% (as of January 2020, this change had not been implemented) (European Transport Safety Council, 2018[69]; Scottish Government, 2018[70]; OECD, 2020[71]).

Studies analysing the impact of these cuts differ across countries. In Japan, lowering the BAC limit was associated with a reduction in crashes for 16-19 year-olds by 64%, for adult females by 50% and for adult males by 52% (Desapriya et al., 2007[72]). In a similar study, Nagata et al. (2008[73]) found a reduction in alcohol-related road traffic fatalities and injuries. An analysis of the Scottish experience found a reduction in alcohol consumption from on-premise outlet sales but no change in road traffic crashes. Authors suggest this may be due to the new limit not being properly enforced (Haghpanahan et al., 2019[74]).

6.5.2. Sobriety checkpoints play a role in reducing road traffic crashes

BAC limits alone are not sufficient to alter behaviour and therefore reduce alcohol-related crashes. Drivers must also believe they are at risk of encountering a sobriety checkpoint. There are two types of sobriety checkpoints:

- **selective breath tests**: pre-determined check points where police officers must have reason to believe the driver is under the influence of alcohol to test blood alcohol levels
- **random breath tests**: for which drivers are selected at a random to have their blood alcohol level tested (Bergen et al., 2014[75]).

Evidence on the effectiveness of sobriety checkpoints largely comes from the United States. Ecola et al. (2018[76]) summarised findings from five meta-analyses, which indicate that selective and random breath tests play a significant role in reducing road traffic crashes. As an example, Bergen et al. (2014[75]) estimated that sobriety checkpoints led to, on average, an 8.9% decrease in fatalities related to drink-driving. Similarly, Erke et al. (2009[77]) found that checkpoints resulted in a reduction in crash injuries by 16% and fatalities by 6%. Regarding cost-effectiveness, a 2014 systematic review concluded that the benefits associated with sobriety checkpoints exceed the associated costs, with cost-benefit ratios ranging from 2:1 to 57:1 (Bergen et al., 2014[75]). To maximise the potential of sobriety checkpoints, it is important they are widely publicised, highly visible and conducted frequently (US Department of Transportation, 2017[78]).

With the exception of Mexico, all OECD countries implement one or both sobriety checkpoints (WHO, 2020[10]).

6.5.3. Penalties for drink-driving vary widely

Drivers caught driving over the legal BAC limit are subject to penalties, which vary in intensity. Common penalties include community service, detention, vehicle impoundment, fines, licence suspension and ignition interlock requirements (discussed later in this section).

An analysis of penalties across OECD countries revealed that the majority (n = 34) penalise drink-drivers by suspending or revoking their licence and/or imposing a fine (n = 28). Long- or short-term detention is another common tool to punish drink-drivers (n = 27); vehicle impoundment, mandatory treatment and community service are used to a lesser extent (WHO, 2020[10]). For example, Slovenia has introduced stricter legislations for drink-drivers, which includes mandatory rehabilitation for severe drink-driving offenders (i.e. education and psychosocial workshops). A further example from Korea is provided in Box 6.5.

Box 6.5. Drink-driving penalties in Korea

Since 2011, Korea has been tightening sanctions on drink-drivers. An overview of penalties from before 2011 to after 2018 are provided in Table 6.1.

Table 6.1. Timeline of drink-driving policies: Korea

Before 2011	After 2011	After 2018
Blood alcohol level in excess of 0.05%: up to three years' imprisonment or up to KRW 10 million fine	Blood alcohol level between 0.05% and 0.1%: up to six months' imprisonment or up to KRW 3 million fine	Blood alcohol level between 0.03% and 0.08%: up to one year's imprisonment or up to KRW 5 million fine*
	Blood alcohol level between 0.1% and 0.2%: six months to one year's imprisonment or KRW 3 million to 5 million fine	Blood alcohol level between 0.08% and 0.2%: up to two years' imprisonment or up to KRW 10 million fine
	Blood alcohol level in excess of 0.2%: one to three years' imprisonment or KRW 5 million to 10 million fine	Blood alcohol level in excess of 0.2%: up to five years' imprisonment or up to KRW 20 million fine

Note: *KRW 5 million is approximately equal to USD 4 200.
Source: OECD (2020[71]), *OECD Reviews of Public Health: Korea: A Healthier Tomorrow*, https://doi.org/10.1787/be2b7063-en.

6.5.4. Ignition interlock schemes can be used to reduce drink-driving

Ignition interlocks require drivers to take a breath test to assess their blood alcohol reading in order to start their vehicle. Ignition interlocks can also be installed voluntarily – for example, in commercial vehicles transporting goods (Vanlaar, Mainegra Hing and Robertson, 2017[79]; European Transport Safety Council, 2018[69]).

An evaluation of an ignition interlock programme in Canada (Nova Scotia) concluded that the scheme was successful in reducing recidivism rates (Vanlaar, Mainegra Hing and Robertson, 2017[79]). Specifically, the study compared recidivism rates between three groups of offenders: 1) those who voluntarily agreed to use the ignition interlock; 2) those who were mandated to use the ignition interlock; and 3) those who made up the control group, who were not enrolled in the ignition interlock programme. The offenders who agreed to use the ignition interlock had a lower recidivism rate while the device was installed (0.9% for voluntary and 0.3% for mandatory participants) compared to those not enrolled (8.9%). Although recidivism rates rose once the device was removed (1.9% for voluntary and 3.7% for mandatory enrolees), the rates were still significantly below those who did not enrol, suggesting that the scheme had an ongoing impact. These findings echo previous research by Elder et al. (2011[80]), which largely focused on the United States.

Five OECD countries currently penalise first-time drink-drivers with ignition interlocks, and one further country imposes this penalty for repeat offenders (National Conference of State Legislatures, 2018[81]; WHO, 2020[10]):

- **first-time offenders**: Belgium, Canada, Denmark, France and certain states in the United States
- **repeat offenders**: New Zealand and certain states in the United States.

6.6. Policies to curb alcohol marketing help to reduce encouragement to drink

Policy interventions

- Advertising on traditional (e.g. television, radio and print media) and new digital media platforms (e.g. social media)
- Sport sponsorship

Key findings

- Advertising channels are increasingly focused on digital forms of media – in particular, social media.
- Most OECD countries implement regulatory or voluntary restrictions on alcohol advertising, albeit to a lesser extent for social media.
- Regulators have not kept pace with industry innovation in the area of digital media; therefore, vulnerable populations – such as children – are frequently exposed to alcohol content.
- Self-regulatory advertising restrictions have not prevented exposure of alcohol content to minors.
- Alcohol brands play a significant role in sport sponsorship, despite partial or voluntary restrictions in 17 OECD countries (just five countries legally enforce a ban).

Marketing techniques are used to associate alcohol products with positive sentiments (e.g. fun, excitement, social status, success) in order to promote favourable attitudes to alcohol. Marketing therefore plays a role in supporting an “alcogenic environment” (Hill, Foxcroft and Pilling, 2017[82]). Further, recent research suggests that there is a causal relationship between marketing and subsequent drinking (Sargent, Cukier and Babor, 2020[83]; Sargent and Babor, 2020[84]).

Restrictions on marketing efforts – how, when and where they can be used and who they can target – are widely applied, although only very few countries have comprehensive bans in place. Marketing restrictions, specifically advertising, are strongly encouraged at the international level: the WHO classifies this as one of three best buys to combat the harmful use of alcohol (WHO, 2017[7]).

The remainder of this section discusses alcohol marketing on traditional and new media platforms, with a focus on advertising and sport sponsorship.

6.6.1. Traditional media platforms have been the main channels for alcohol marketing

Alcohol brands have previously focused on traditional media channels such as television, radio and print media. Research suggests that there is an association between alcohol advertising through traditional media channels and alcohol consumption, with young people particularly vulnerable (Smith and Foxcroft, 2009[85]). Most recently, Jernigan et al. (2017[86]) concluded from their systematic review that there is a positive association between exposure to alcohol marketing and initiation of alcohol consumption, as well as binge and hazardous drinking. For example, one of the studies in the review, which included adolescents from Germany, Italy, Poland and the United Kingdom (Scotland), found that those who reported having a favourite alcohol advertisement at baseline were 1.45 times more likely to report binge drinking on follow-up (12 months later) compared to those who did not have a favourite advertisement (Morgenstern et al., 2014[87]).

Across analysed countries, most countries employ some form of statutory restriction on alcohol advertisements (see Box 6.6 for a description of different forms of restrictions). For example, regarding beer and wine, over 60% of countries apply partial restrictions on national television advertisement, while a further 16% employ a full statutory ban (Figure 6.10). Only two countries extend full advertising bans across all media channels: Norway (see Box 6.7) and Turkey.

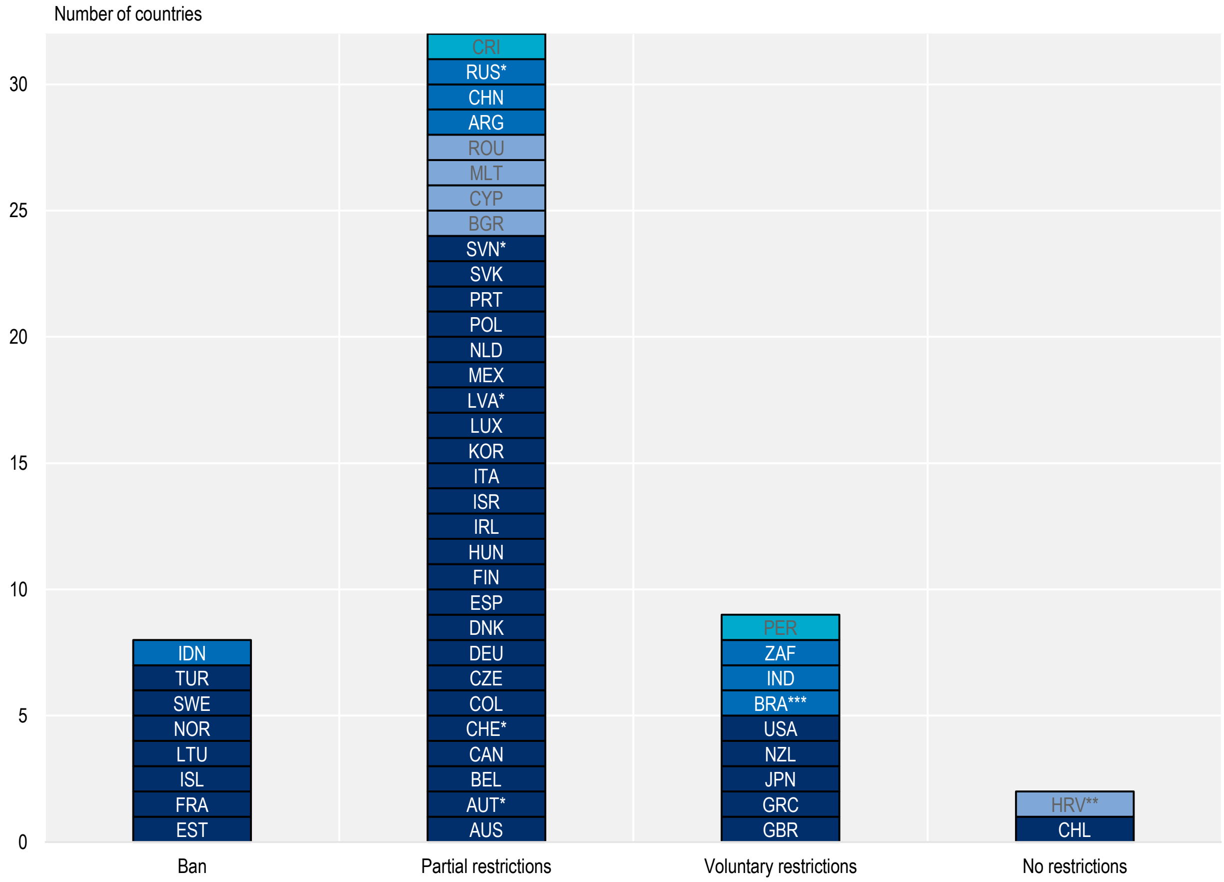
Box 6.6. Types of advertising restrictions

Data on alcohol advertising restrictions were obtained from WHO's Global Information System on Alcohol and Health (GISAH) database. The data are broken down by media type (e.g. national television, social media and the internet) and by strength of restriction, which includes four categories:

- **Statutory bans**: these are legally binding restrictions banning any form of advertising.
- **Statutory partial restriction**: this means that the restriction applies during a certain time of day or for a certain place, or to the content of events. For example, in France, the Loi Évin only allows the brand's name and product characteristics to be included in advertisements across certain media types such as radio and billboard (Gallopel-Morvan et al., 2017[88]). Regarding timing, in Australia, alcohol advertisements can only be shown on television between 12:00 and 15:00 (Monday to Friday) and from 20:30 to 05:00 any day of the week (Australian Communications and Media Authority, 2020[89]).
- **Voluntary or self-imposed restrictions**: the alcoholic beverage industry follows its internal voluntary rules.
- **No restrictions**: advertising restrictions do not exist.

Source: WHO Regional Office for the Americas (2018[90]), *Alcohol Policy Scoring: Assessing the Level of Implementation of the WHO Global Strategy to Reduce the Harmful Use of Alcohol in the Region of the Americas*, https://iris.paho.org/bitstream/handle/10665.2/49679/9789275120453_eng.pdf?sequence=2&isAllowed=y

Figure 6.10. National television advertising restrictions for beer and wine



Note: Dark blue = OECD countries; light blue = EU27 non-OECD countries; medium blue = non-OECD G20 countries; green = countries partnering with the OECD. *Ban for spirits. **No restriction for beer only (total ban for wine). Partial restrictions may refer to time and/or place and/or content. ***Brazil applies stricter restrictions for spirits – that is, partial as opposed to voluntary restrictions. No data for the Kingdom of Saudi Arabia.

Source: WHO (2020[10]), GISAH, https://www.who.int/data/gho/data/themes/global-information-system-on-alcohol-and-health

StatLink https://stat.link/bz8sde

Box 6.7. Norway's statutory regulations on alcohol advertising

Chapter 9 of Norway's Alcohol Act bans advertisements of alcoholic beverages with an ABV >2.5%. This covers all media channels including printed text, film, radio, television, internet, posters, signs, images and exhibits. Further, alcoholic beverages cannot be included in advertisements for other goods and services. The statutory ban, however, may not cover editorial material (e.g. in magazines and newspapers), since it does not always promote the sale of alcohol; further, it is more strongly justified under freedom of speech laws. In order to be classified as an editorial piece, the content must be produced by an independent editorial team – that is, one not under the influence of alcohol brands or other companies with an interest in increasing alcohol sales.

Regarding internet/digital media, the ban applies to websites open to the public. If, however, the website is restricted via a password, advertising material can be published. The Act also forbids alcohol producers from using their branding to promote no- or low-alcohol content beverages, as well as other items such as food and clothing (VBF, 2018[91]).

The statutory law, which applies to beverages with an ABV over 2.5%, is administered by the Ministry of Health and Care Services, with the Directorate of the ministry responsible for supervising compliance with the law and imposing sanctions when it is violated. The Directorate is also responsible for setting fines, although this penalty is not brought into effect until the violation is repeated.

Source: STAP (2007[92]), *Appendix: Regulations of alcohol marketing in 24 European Countries*, https://ec.europa.eu/health/ph_projects/2004/action3/docs/2004_3_16_frep_a2b_en.pdf; EUCAM (2009[93]), *Inventory Alcohol Marketing Regulations*, http://eucam.info/wp-content/uploads/2016/09/alcohol-marketing-regulations_norway.pdf.

Active surveillance schemes to monitor adherence to alcohol advertising regulations also exist and are implemented by 35 of the 37 OECD countries. In Australia, alcohol marketing is characterised as a "quasi-regulatory" system, with guidelines (the Alcohol Beverages Advertising Code (ABAC) Scheme) set by industry, advertising and government representatives (see Box 6.8 for further details) (ABAC Scheme, 2019[94]). Similar arrangements exist in the United Kingdom, New Zealand and Japan (Noel, Babor and Robaina, 2016[95]).

A systematic review of industry self-regulation concluded that alcohol advertisements continually violate self-regulatory codes, meaning that young people are frequently exposed to alcohol advertising material (Noel, Babor and Robaina, 2016[95]).

Box 6.8. Australia's self-regulatory system for alcohol advertising

The Australian Association of National Advertisers is the country's national body for advertisers and exists to promote responsible, innovative and respected marketing via industry collaboration. It is also responsible for implementing comprehensive self-regulatory schemes, which include the ABAC Scheme (Reeve, 2018[96]).

In 1998 the ABAC Scheme was established by four alcohol industry bodies, using input from advertising, media, consumer bodies and federal government representatives. For this reason, it refers to Australia's alcohol marketing sector as a "quasi-regulatory system", but it is generally accepted that it is self-regulatory (ABAC Scheme, 2019[94]; Jones and Gordon, 2013[97]; Reeve, 2018[96]).

Under the ABAC Scheme, standards for alcohol marketing are set out under the organisation's Responsible Alcohol Marketing Code, which applies to print, billboard, digital, cinema, television, point of sale, radio and packaging (ABAC Scheme, 2019[94]). The following three-stage process is then followed to ensure that advertisements meet the Code's standards:

1. Company and advertising agency staff should check to ensure their advertisement complies with the Code.
2. Alcohol companies can pay for a pre-vetting service, run by the ABAC Scheme, to minimise the possibility of the advertisement being pulled once released.
3. Once an advertisement is released, members of the public have an opportunity to lodge a complaint, which is then referred to the independent ABAC Adjudication Panel. This includes a representative from the Department of Health and a public health expert.

The scheme is governed by a management committee, which includes members from three industry groups, as well as communication and government representatives (ABAC Scheme, 2019[94]). The Australian Government does not regulate the scope or breadth of the ABAC Scheme.

Studies on the impact of the ABAC Scheme indicate that it does not prevent exposure of alcohol advertisement to vulnerable groups. Pierce et al. (2019[98]) concluded that the current system permits advertising that appeals to young people, and that decisions made by the Advertising Standards Board (also self-regulated) and ABAC panel regarding breaches of the Code frequently conflict with community expectations. Further, an analysis of "placement rules" in the ABAC Scheme, which were added in 2017, concluded they were not clearly defined and narrow in scope, resulting in nearly all complaints being dismissed. Example rules include: banning marketing communication to minors via electronic direct email and ensuring that 75% of the expected audience of the marketing material are adults in cases where it is not possible to exclude minors (e.g. radio).

Alongside the ABAC Scheme, Australia implements a wider governmental regulatory framework for advertising, which also includes the Broadcasting Services Act, the Commercial Television Industry Code of Practice and the Australian Subscription Television and Radio Association (ASTRA) Code of Practice covering pay television (Australian Government, 2020[99]; Australian Communications and Media Authority, 2015[100]; ASTRA, 2020[101]). Regulation of these Acts and Codes is the responsibility of the Minister for Communications, Cyber Safety and the Arts.

6.6.2. Alcohol brands are increasingly targeting new media platforms

Adults and children spend an increasing amount of time on their mobile devices, with data showing that phone use is more prevalent than time spent watching television (Ofcom, 2018[102]; He, 2019[103]; OECD, 2020[104]). Consequently, the advertising landscape has significantly altered, with brands shifting their focus from traditional forms of media to digital media platforms, including social media.

Unlike traditional media platforms, digital advertising strategies are less concerned about exposure to content. Rather, the focus is on maximising engagement with content (Carah and Meurk, 2017[105]) – for example, the amount of time spent viewing, interacting and/or recommending content, which together reflects the quality of user-brand engagement. Digital media platforms encourage user engagement by employing algorithms that create unique content for individual users based on previous search activity. Further, these algorithms allow alcohol brands to target individuals who are more likely to consume their products, including children (OECD, 2020[104]; Carah and Meurk, 2017[105]).

Advertising strategies by alcohol brands have adapted proficiently to the digital age, allowing them to capitalise on its many benefits (such as lower costs and greater reach, as detailed in Box 6.9). This is reflected in advertising expenditure; for example, in the United Kingdom, online advertising expenditure grew by 189% between 2007 and 2016 (from GBP 3 562 to GBP 10 304), while television experienced a 2% decline (from GBP 5 167 to GBP 5 080) (Ofcom, 2017[106]). The increasing role of digital media platforms to advertise alcohol products highlights the importance of expanding media regulatory frameworks – for example, considering digital media platforms when designing regulatory frameworks to curb harmful alcohol consumption (Carah and Meurk, 2017[105]).

Box 6.9. Benefits of digital media marketing

Digital media advertising is growing in popularity among alcohol brands, since it has many benefits over traditional forms of media advertising.

- **Lower costs:** advertising via digital media is less expensive than traditional forms of advertising such as television (WHO Regional Office for Europe, 2018[107]; Simons and van Dalen, 2017[108]).
- **Greater reach:** digital media allow brands to extend the reach of their advertisements by encouraging user-generated marketing. Through digital media platforms – predominantly social media – individuals co-create content with alcohol brands by "liking", sharing and/or commenting on a brand's product. For example, alcohol content that a user has "liked" may be shown in their friend's feed, who otherwise did not engage with the brand. Social media channels have also led to a rise in user-generated promotion, whereby individuals indirectly promote brands by, more broadly, encouraging alcohol consumption, such as posting pictures with friends while consuming alcohol (Critchlow et al., 2017[109]; EUCAM, 2018[110]). Advertising on digital media also improves user access to alcohol content, since it can be accessed at any time, anywhere in the world, with the right device (e.g. smartphone) (Griffin, Gavin and Szmigin, 2018[111]).
- **More targeted content**: digital media allow brands to target and personalise advertisements to specific audiences, thereby improving traction (Critchlow et al., 2019[112]). For example, if media platforms are able to understand the real ages of users, then age gates could be used to restrict alcohol advertisement to underage users.
- **More engaging advertising**: digital media are interactive and constantly changing, and therefore more exciting and engaging for users (Simons and van Dalen, 2017[108]). Further, alcohol brands have used digital media to widen their approach to advertising, which may now include interviews with celebrities; competitions for user-generated videos, cocktail recipes, apps and games; and notice of events such as those related to sport or music festivals, for example (Lobstein et al., 2017[113]).

Advertising via digital media channels can lead to greater increases in alcohol consumption, particularly when audiences participate (e.g. co-create, share or engage in the content) (Critchlow et al., 2017[109]). For example, a study by Critchlow and colleagues (2019[112]) found that young people (aged 11-19) who currently drink are twice as likely to be high-risk drinkers if they participate in two or more forms of alcohol marketing via social media. This figure increased to over three times for those who participated in user-created promotion. A meta-analysis by Curtis et al. (2018[114]) concluded that there is a statistically significant positive correlation between alcohol-related social media engagement and alcohol consumption among young adults. Finally, a 2017 narrative review established that digital marketing was associated with higher levels of intention to purchase alcohol, as well as consumption (Lobstein et al., 2017[115]). For example, one of the studies included from the United States estimated that advertising on the internet reduced the impact (measured by intent to purchase alcohol) of a ban on traditional media platforms by 62% (Goldfarb and Tucker, 2011[116]).

Alcohol advertising via digital media is proving difficult to regulate for multiple reasons. First, the line distinguishing commercial advertising and user-generated content is blurred, making regulation difficult to implement, monitor and enforce (e.g. user-generated content falls outside a brand's online space (such as their social media account) and is therefore not subject to regulatory control) (Simons and van Dalen, 2017[108]). Second, alcohol advertising reach is often global, thereby making regulations difficult to enforce at the national level. Third, the ever-changing nature of digital media to optimise user experience means that best practice regulatory approaches change and require updating continually (Kauppila et al., 2019[117]) (Kauppila et al., 2019[117]). It is therefore not surprising that children are frequently exposed to alcohol messages via digital channels (Lobstein et al., 2017[113]). For example, a study on digital media usage in four European countries found that 33% of children aged 13-14 had received promotion emails involving alcohol brands; 18% had downloaded a screensaver that included an alcohol brand; and 66% had come across an internet page including an alcohol brand (de Bruijn, 2013[118]).

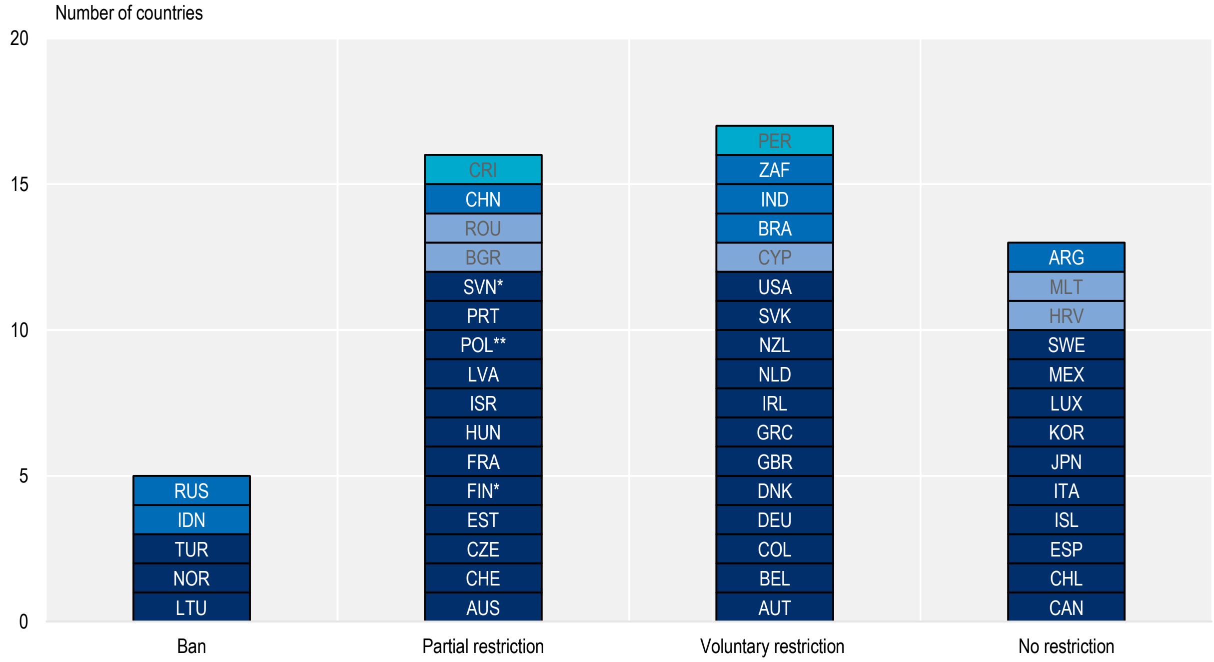
Several strategies are available to policy-makers to improve regulation of online advertising. These include reviewing, updating and broadening the scope of marketing regulatory frameworks to ensure that they meet the unique challenges posed by digital media; enhancing stakeholder collaboration – for example, through public-private partnerships; regular evaluation of policy measures to ensure that they remain relevant (using consistent indicators where possible); and regional and international collaboration, since online advertising material crosses borders (OECD, 2012[119]; Carah and Meurk, 2017[105]; WHO Regional Office for Europe, 2018[107]).

To assist countries on a more practical level, in 2019 the EU27 released an online toolkit to help countries update their marketing-related policies (i.e. code of conduct), including those related to alcoholic beverages. The toolkit is designed to cover digital forms of media and consists of three key parts (European Commission, 2019[120]):

1. **Code structure**: an overview of sections that should be considered when developing a code of conduct (general information of a code, marketing restrictions and monitoring and evaluation)
2. **Code checklist**: a list of key aspects that a marketing code should include
3. **Practical guidance**: an inventory of specific actions (in line with key aspects from the code checklist) that are currently included in existing marketing codes.

Relative to traditional forms of media, fewer OECD countries have regulatory arrangements in place to limit alcohol advertising via social media (see Figure 6.11). Further, where regulatory arrangements do exist, they are partial restrictions. For example, in Estonia regulations forbid alcohol advertising on social media networks, except on the website of the account handle of the alcohol brand. As part of this ban, alcohol brands cannot share user-generated content or content that is intended to be shared (e.g. competitions and prizes, production of videos intended to go viral) (WHO, 2018[121]; EUCAM, 2018[110]). Another key example is that of Finland, which in 2015 introduced new restrictions targeted at social media (see Box 6.10 for further details). Following an inquiry by the Australian Competition and Consumer Commission, the Australian Government started a two-phase process that will review the advertising rules and restrictions across all delivery platforms and will monitor and enforce the regulatory framework across all platforms (Australian Government, 2019[122]).

Figure 6.11. Social media advertising restrictions



Note: Dark blue = OECD countries; light blue = EU27 non-OECD countries; medium blue = non-OECD G20 countries; green = countries partnering with the OECD. *Ban on spirits. **Ban on spirits and wine. Partial restrictions may refer to time and/or place and/or content. No data for the Kingdom of Saudi Arabia.
Source: WHO (2020[10]), GISAH, https://www.who.int/data/gho/data/themes/global-information-system-on-alcohol-and-health

StatLink https://stat.link/4n159d

Box 6.10. Finland's statutory regulation of alcohol advertising targeted at social media

The Finnish Alcohol Act 1994 regulates alcohol advertising. In January 2015, an amendment to the Act was introduced targeting advertising on social networking sites. The amendment is designed to protect children and young people, as they are more susceptible to advertising messages and are frequent users of social media.

A high-level description of the amendments is summarised below:

- forbid brands from sharing content generated by users for advertising purposes (e.g. consumer comments, pictures or videos that use the brand's product), and state that they must remove any consumer-generated content from their social media platforms
- require brands to de-activate social media services that allow users to share their content, when possible
- require brands to not encourage consumers to share their alcohol-related content
- forbid the use of interactive games, competitions and lotteries
- forbid content that is designed to be shared by consumers
- only allow targeted advertisements when the target audience is of legal drinking age.

In 2019, Kauppila and colleagues released a report describing the impact of the legislative change in Finland. The report looked at the accounts of 38 alcoholic beverages across four major social media platforms. By comparing social media content and user engagement in 2014 and 2017, the authors concluded that amendments to the Act did not significantly curtail the ability of alcohol brands to engage consumers. For example, over the study period, brand activity grew by 300%, while the number of likes/shares/comments per post rose by 178% (rises between 2014 and 2016 and a small reduction between 2016 and 2017). However, the authors noted that although activity grew, user engagement was low in all years.

The authors noted ultimately that it is extremely difficult to regulate alcohol-related messages on a platform designed to share content, particularly in an environment where users operate globally. In addition, due to the limited resources of Finnish's National Supervisory Authority for Welfare and Health, monitoring adherence to the new amendments was limited.

In response to the difficulty associated with regulating social media, it has been suggested by several scholars that alcohol advertising should be banned from social media platforms. However, there are concerns as to whether this is viable, given the complicated monitoring arrangements required. Further, Kauppila et al. note that the issue cannot be solved at the national level, since algorithms are developed by social media companies that operate in countries across the world.

Source: Kauppila et al. (2019[117]), *Alcohol Marketing on Social Media Sites in Finland and Sweden: A comparative audit study of brands' presence and content, and the impact of a legislative change*, https://blogs.helsinki.fi/hu-ceacg/files/2019/04/Alcohol-marketing-on-social-media-sites-in-Finland-and-Sweden-2019.pdf.

Efforts by the alcohol industry to self-regulate digital advertising content have, to date, had little impact. A prominent example of digital self-regulation is the Digital Guiding Principles developed by the International Alliance for Responsible Drinking (IARD) (Box 6.11). A systematic review by Noel et al. (2020[123]) found that the Principles have not prevented alcohol advertising exposure to young people and other vulnerable populations.

Box 6.11.Self-regulation of digital marketing communications

The IARD is comprised of 11 leading beer, wine and spirits companies. Among its various activities, it created a set of Digital Guiding Principles for alcoholic beverage marketing in digital media. In short, it claims that the guidelines have been developed to ensure that the "high standards" set for traditional forms of marketing are also applied to digital marketing (ICAP, 2011[124]).

The Digital Guiding Principles cover four areas: minors, responsible consumption, transparency and privacy. Examples from the guidelines are summarised below.

Minors

- When actively engaging users, alcohol companies must ensure that an age-affirmation mechanism is used to ensure the person is over the legal purchasing age.
- Whenever not actively engaging a user, alcohol marketing communications should only be placed in media where it is reasonable to assume that 70% of the audience is over the legal purchasing age.

Responsible consumption

- User-generated content posted on digital platforms run by alcohol companies should be moderated on a regular basis.

Transparency

- Alcohol companies should not misrepresent their commercial purpose.

Privacy

- Alcohol companies should respect user privacy by, for example, requiring consumer consent prior to sending direct digital marketing communications.

6.6.3. Sport sponsorship is a key method of alcohol marketing and promotion

Sport sponsorship allows alcohol producers to "promote their product and create a positive, emotional relationship between the brand and consumers" (Babor, Robaina and Noel, 2018[125]). The sporting industry is vast, covering a range of demographic groups, thereby providing high levels of exposure (The Business Research Company, 2019[126]). For this reason, the alcohol industry is a key sponsor of sporting events, sporting teams and individual athletes across the world (Jones, 2010[127]).

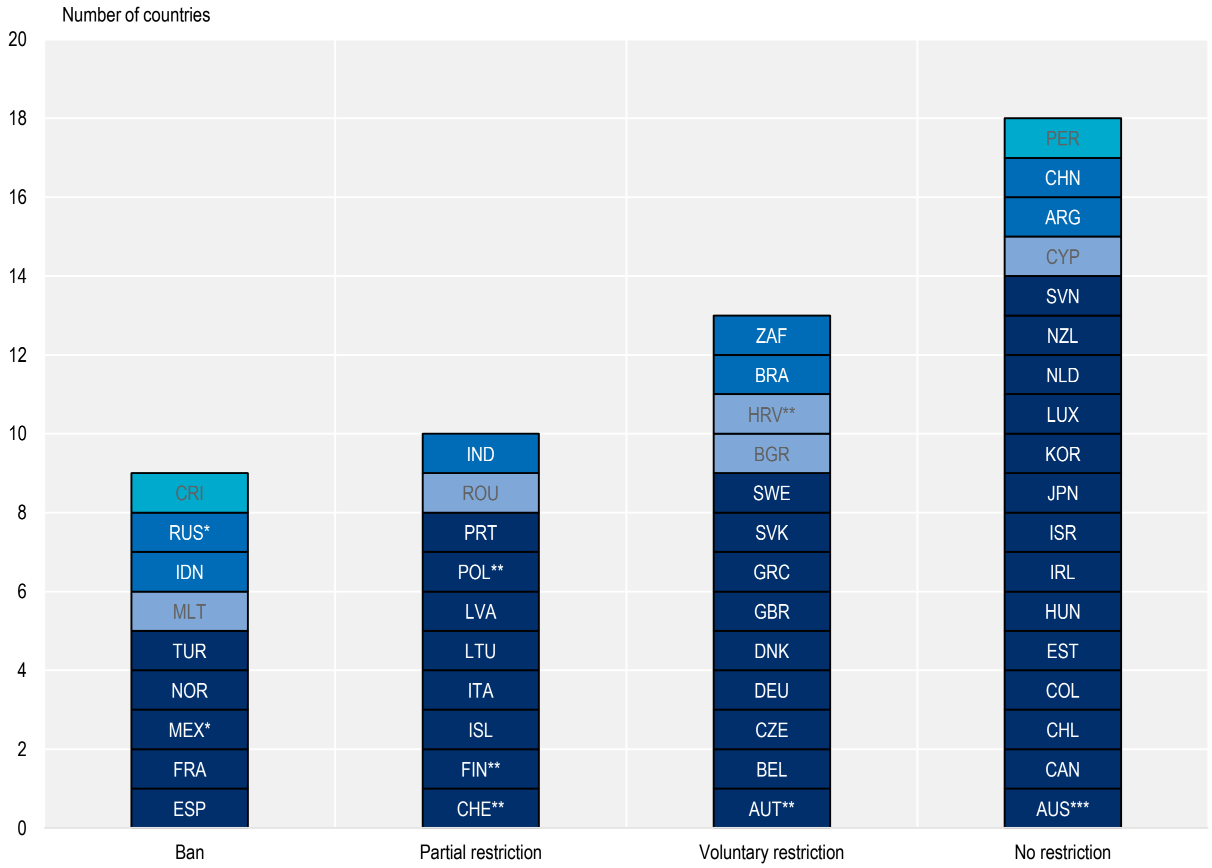
Sport sponsorship by the alcohol industry comes in many different forms, including logos on players' uniforms and replica items bought by spectators; on-field/court signage; and interactive food, drink, music and game events hosted at sporting tournaments. Such sponsorship deals are not confined to major sporting events, with brands also sponsoring clubs at the local level (Brown, 2016[128]).

Several studies analysing the level of exposure alcohol brands receive during sporting events highlight the prevalence of the alcohol industry in this sector. For example, Chambers et al. (2017[129]) examined five key sporting events – including football, tennis, rugby and cricket – and found that alcohol brands were visible between 24.1% and 47.1% of the time, with the exception of cricket (9%). This equated to between 1.6 and 3.8 brand exposures per minute. In Australia, a study by Monash University in 2015 discovered that nearly 90% of alcohol advertisements aired in the daytime were played during sports broadcasts, compared to 14% in the evening (O'Brien et al., 2015[130]). These results suggest that children are highly exposed to alcohol brands.

There are public health concerns regarding alcohol industry's sponsorship of sport, since alcohol advertising is associated with initiation of drinking for previous non-drinkers and higher levels of consumption among current drinkers (Smith and Foxcroft, 2009[85]; Houghton et al., 2014[131]). Studies have also examined the impact sponsorship has on athletes and sporting club members – specifically, its impact on consumption (Brown, 2016[128]). For example, O'Brien et al. (2014[132]) found that university students in the United Kingdom whose team and club are sponsored by the alcohol industry are approximately twice as likely to report hazardous levels of drinking (measured using the Alcohol Use Disorders Identification Test questionnaire – a method to screen for excessive drinking and to assist in brief assessment; see Section 6.7.1 for further details) as those with no sponsorship.

In response to public health concerns, most OECD countries have implemented some form of ban to restrict the alcohol industry's influence in sport (Figure 6.12). Across OECD countries, Spain, France, Norway and Turkey have implemented legally binding bans on sport sponsorship across all beverages (WHO, 2018[133]). A further 17 countries apply partial or voluntary restrictions (e.g. restrictions on sponsoring sporting teams and/or sporting events), while 14 countries apply no restrictions.

Figure 6.12. Restrictions on sport sponsorship for alcohol brands



Note: Dark blue = OECD countries; light blue = EU27 non-OECD countries; medium blue = non-OECD; G20 countries; green = countries partnering with the OECD. *No restrictions for beer. **Stricter requirements for spirits. ***Alcohol-related sponsorship agreements are managed by subnational jurisdictions and individual sporting codes and teams. No data for the United States or the Kingdom of Saudi Arabia.
Source: WHO (2020[10]), GISAH, https://www.who.int/data/gho/data/themes/global-information-system-on-alcohol-and-health

StatLink https://stat.link/w7l3fh

6.7. Screening, brief interventions and treatment target harmful drinking

Policy interventions

- Excessive drinkers are identified through various screening tools. Following screening:
  - excessive drinkers receive brief interventions, which typically last between 5 and 30 minutes over 1-5 sessions
  - dependent drinkers may be referred to specialised psychosocial and pharmacotherapy treatment.

Key findings

- The majority of OECD countries implement guidelines for screening and brief interventions in primary care for harmful alcohol use.
- These are primarily provided in primary care and emergency department settings, and may therefore overlook certain groups such as younger people, who access health care less frequently.
- Face-to-face and digital screening and brief interventions are an effective approach to reduce alcohol consumption. Nevertheless, only 5% of individuals who consume harmful amounts of alcohol are identified by screening and offered brief advice.

6.7.1. Screening and brief interventions for hazardous and harmful drinkers aim to reduce prevalence of alcohol-related diseases

Increasingly, policy-makers are investing in preventive measures to help people stay healthy for longer. Preventing the escalation of alcohol-related diseases through screening and brief interventions (SBIs) is an example of this.

SBIs are designed to identify, at an early stage, individuals with a "real or potential" problem with alcohol and to motivate them to address the issue (Babor and Higgins-Biddle, 2001[134]). The process begins by screening individuals, which involves a series of questions related to their level of alcohol consumption. Many tools are available to screen for alcohol-related problems, including:

- **Alcohol Use Disorders Identification Test (AUDIT):** a 10-item screening tool developed by the WHO, with separate identification tests for those administered by health professionals and by individuals (self-reported). Test outcomes (low risk; risky or hazardous drinking; high risk; or dependence) are used to inform advice/interventions provided by a health professional. A shorter test also exists, AUDIT-C, which involves just three questions. Both tests are intended to be used in a primary care setting (Babor et al., 2001[135]).
- **CAGE questionnaire**: a four-item questionnaire to identify alcohol problems over an individual's lifetime (including question such as: Have people annoyed you by criticising your drinking?). Similar to AUDIT, it is designed for use in primary care.
- **Fast Alcohol Screening Test (FAST)**: a four-item questionnaire, which was developed based on AUDIT. It was developed for use in emergency care settings, but it can be used in various other health and social care environments.

Those identified as being at risk receive further assistance via a brief intervention (of between 5 and 30 minutes depending on the health professional, delivered over 1-5 sessions). If, however, the person is a dependent drinker, they will be referred to more specialised treatment. Brief interventions therefore target hazardous and harmful drinkers (see Box 2.3 for details on definitions) as opposed to dependent drinkers, who require greater levels of support (Kaner et al., 2018[136]).

The brief intervention manual for hazardous and harmful substance use in primary care developed by the WHO outlines the following steps (referred to as the Alcohol Smoking and Substance Involvement Screening Test (ASSIST) manual) (WHO, 2010[137]):

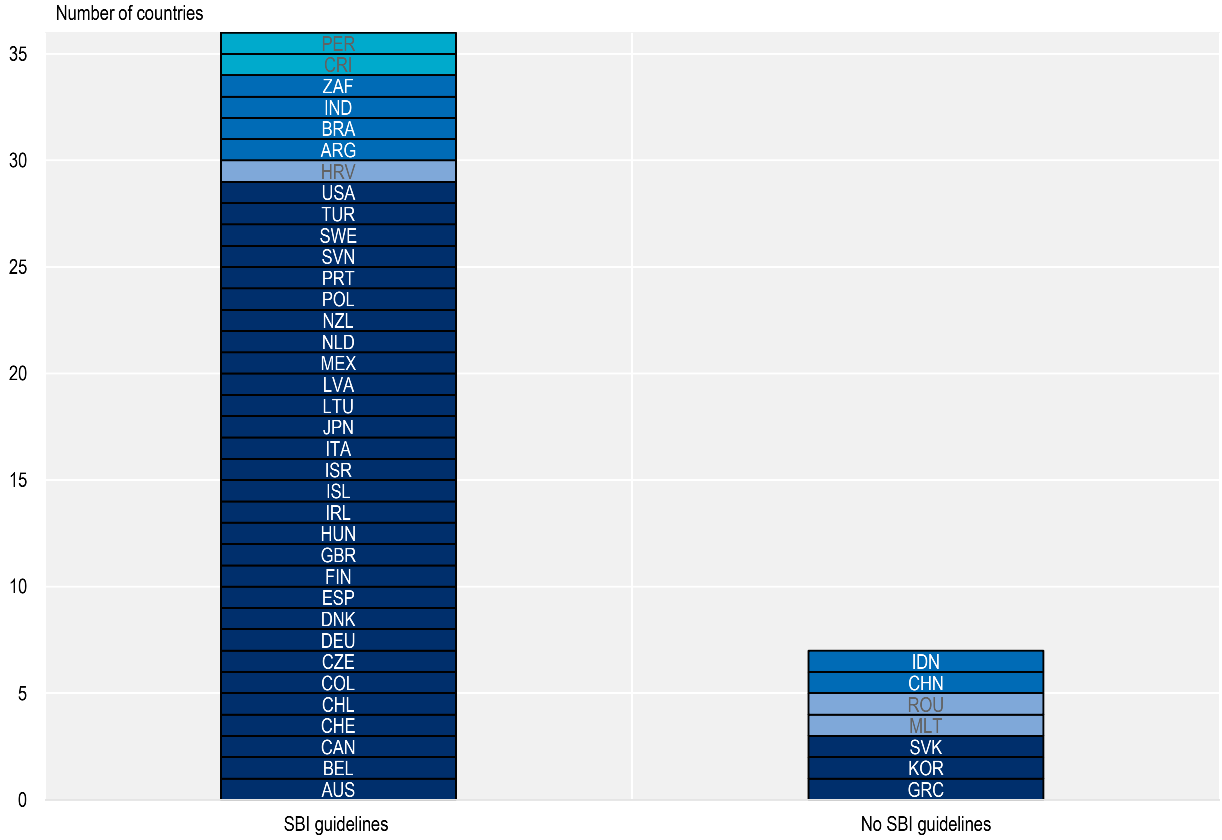
- **Asking:** asking clients whether they would like to see their questionnaire scores.
- **Feedback:** offering personalised feedback on scores using the ASSIST feedback report card.
- **Advice**: providing advice on how to reduce the risks associated with substance use.
- **Responsibility**: allowing clients to take responsibility for their choices.
- **Concerned**: getting feedback from clients on how concerned they are about their scores.
- **"Good" and "less good" things:** weighing what is good about using the substance against what is less good.
- **Summarise and reflect:** going over clients' feedback on substance use emphasising the "less good things" and how clients feel about these.
- **Take-home materials**: providing clients with materials they can use to complement the brief intervention.

Evidence on the effectiveness of SBIs largely relates to primary care interventions and is positive. Kaner et al. (2018[136]) in their systematic review estimated that after one year, brief interventions reduced individuals' alcohol consumption by 20 g a week compared to those who received no or minimal interventions. SBIs are also estimated to be cost-effective. For example, Angus et al. (2016[138]) modelled the impact of a national SBI programme across Europe and found it would be cost-effective in 24 of 28 EU countries and dominate in 14 countries ("dominate" indicates that brief interventions are more effective and cheaper than no or minimal interventions).

Given that individuals who drink to excess are not as likely to seek help for alcohol-related issues, primary care is an ideal setting for SBIs, as it provides health professionals with an opportunity to screen individuals who are visiting for alternative reasons. Further, patients may be more willing to act on advice provided by primary health care professionals with whom they have an ongoing relationship (Henry-Edwards et al., 2003[139]). Screening in a primary care setting is particularly important for women of reproductive age, since past drinking habits are a strong predictor of prenatal consumption (Barry et al., 2009[140]). Thus, screening can play an important role in reducing drinking during pregnancy and therefore the prevalence of adverse pregnancy and birth outcomes (Denny et al., 2019[141]).

Among OECD countries, 90% with available data have developed and implemented national guidelines and standards of care for SBIs in primary care related to hazardous and harmful alcohol use (Figure 6.13). For example, in the United Kingdom (England), an SBI is undertaken as part of a normal health check (Box 6.12).

Figure 6.13. SBI guidelines for alcohol use in primary care



Note: Dark blue = OECD countries; light blue = EU27 non-OECD countries; medium blue = non-OECD G20 countries; green = countries partnering with the OECD. No data for Austria, Estonia, France, Luxembourg, Kingdom of Saudi Arabia, Norway, Bulgaria, Cyprus or the Russian Federation.
Source: WHO (2020[10]), GISAH, https://www.who.int/data/gho/data/themes/global-information-system-on-alcohol-and-health

StatLink https://stat.link/rbgj14

Box 6.12. SBIs in the United Kingdom (England)

In 2008/09, National Health Service (NHS) employers and general practitioners agreed on five new clinical areas where services should be enhanced (i.e. clinical directed enhanced services). One of these areas was alcohol, which encouraged general practitioners to deliver simple brief interventions in order to identify adults who drink at harmful and hazardous levels (NHS Employers, 2008[142]).

As part of the enhanced services, general practices were required to engage in the following steps:

- screen newly registered individuals aged 16 and over, using either the AUDIT-C or FAST test
- if positive, the remaining AUDIT questions must be asked to determine the level of hazardous, harmful or dependency drinking
- provide a brief intervention to hazardous and harmful drinkers using the five-minute tool developed by the WHO, which was adapted for the United Kingdom
- refer dependent drinkers to a specialist service.

Data at each step were collected in order to reimburse general practices financially. Specifically, practices received GBP 2.33 for each newly registered patient who was screened.

The enhanced services ended in 2015; however, since then, SBI protocols have been integrated into the main GP contract. Today, SBIs form part of the NHS Health Check (NHS, 2016[143]).

Within the health care sector, SBIs are also used in emergency departments and in settings that treat patients for whom alcohol is particularly harmful (e.g. pregnant women during obstetric visits) (Moyer and Finney, 2015[144]). This approach is common in countries such as Spain, Finland, the United Kingdom, Hungary, Latvia, the Netherlands, Portugal and Sweden (WHO, 2014[145]). A weakness with this approach is that it overlooks key groups, such as younger people, who access health care less frequently. For this demographic, SBIs in community settings (e.g. local government and social services) may be more useful (Derges et al., 2017[146]).

Outside the health care sector, SBIs may also be used by workplaces, particularly in fields where harmful alcohol use is dangerous to others (e.g. drivers, and public safety and national security roles) (Eurofound, 2012[147]). Workplaces are viewed as an opportune setting, since they are where employed adults spend a large proportion of their day (see Box 6.13 for further details on workplace-based interventions) (Wolfenden et al., 2018[148]).

Box 6.13. Alcohol interventions in the workplace

Workplaces play a unique role in providing preventive health care interventions to support employees and the wider public, for example, given it is where people spend a large proportion of their time (Wolfenden et al., 2018[148]). Further, evidence suggests that adults who regularly consume alcohol account for a significant share of those employed (Midorikawa et al., 2019[149]; KHNANES, 2019[150]; ONS, 2011[151]; Schulte et al., 2014[152]).

Implementing workplace interventions to reduce hazardous drinking levels can also have a positive economic impact by reducing absenteeism, presenteeism, accidents and lost earnings from premature mortality. For example, an OECD analysis of several studies found that non-health-related costs associated with alcohol consumption ranged between 0.19% (Portugal) and 1.6% (Estonia) of gross domestic product in the year the costs were incurred (see Figure 4.2 in Chapter 4 for further details) (Saar, 2009[153]; Cortez-Pinto et al., 2010[154]).

As with SBIs in health care settings, workers at risk of hazardous drinking are often identified through short surveys (e.g. AUDIT-C). In addition, employers may require employees to undergo biomarker tests such as blood or carbohydrate-deficient-transferrin tests (as of 2016, 34% of OECD countries have in place legislation requiring alcohol tests in workplaces) (Schulte et al., 2014[152]; WHO, 2018[155]). Those who are identified as at-risk drinkers are then referred to additional services, such as normative feedback information, education, skill-building, practical advice and/or treatment from a health care professional (Osilla et al., 2010[156]).

A randomised controlled trial (RCT) among six companies in Japan found that workplace brief interventions targeted at people who drink heavily increased the number of alcohol-free days in the past 28 days by 93% (from 4.63 to 8.95 days) (Ito et al., 2015[157]). Further, the intervention group reduced their total number of standard drinks in the past seven days by 11.1 drinks compared to 7 standard drinks in the control group. In the United Kingdom, an RCT analysing the impact of brief interventions for hazardous drinkers in a local authority council region concluded that the intervention had led to a statistically significant reduction in AUDIT-C scores (from 8.88 to 7.44) (Watson et al., 2015[158]).

Thanks to advances in technology, people are increasingly complementing or replacing traditional face-to-face interventions with digital interventions. Digital interventions are delivered via a computer or mobile device (e.g. laptop, mobile phone or tablet) and include examples such as mobile apps to assess and monitor alcohol consumption; text message interventions; online chat rooms and fora; and online access to health professional counselling.

Digital interventions have a number of advantages over traditional face-to-face interventions, such as:

- **Greater reach**: digital interventions have the potential to reach a larger number of people as services can be accessed anywhere at any time. This is important for hard-to-reach groups such as those living in rural/remote areas and younger people, who access health care less frequently. However, it may also lead to uneven access, since those with a lower socio-economic status are less likely to own a smartphone, which is an increasingly common platform for such interventions (Nesvåg and McKay, 2018[159]). Further, evidence from O'Connor et al. (2016[160]) and Hardiker and Grant (2011[161]) found that those with lower levels of education and literacy, as well as older people and certain ethnic groups, were less likely to use digital health technologies.
- **Lower barriers to access**: problem drinking is often associated with shame and embarrassment, which prevents people from seeking help. The anonymity of receiving support online can help break down this barrier.

- **Lower cost**: digital interventions can be cheaper and therefore relieve financial pressure on health providers, including governments, as well as on patients. For example, the Australian Government funds an online intervention service free of charge, which provides one-on-one assistance with qualified health coaches. A similar service provided face to face would typically cost a patient AUD 180/hour (approximately USD 120) through the country's universal health insurance scheme (Medicare) or private health insurance (see Box 6.14).
- **Continuity**: the impact of SBIs on alcohol consumption reduces over time (Wutzke et al., 2002[162]). Digital interventions allow individuals ongoing access to support and therefore have the potential to change long-term behaviours. However, evidence on rates of sustained use vary considerably, and for simple interventions drops quickly (Nesvåg and McKay, 2018[159]).

Research into the effectiveness of digital alcohol interventions is growing at a rapid rate, which aligns with the changing health care landscape. A Cochrane Review in 2017 found "medium-quality evidence" indicating that compared to no or minimal intervention, personalised digital interventions reduce average alcohol consumption by up to three standards drinks a week (Kaner et al., 2017[163]).

Box 6.14. Mobile phone app in Australia

Hello Sunday Morning (HSM) is an Australian social media health promotion "movement", which encourages people to rethink their attitude towards drinking. Specifically, HSM "challenges" people to reduce their consumption of alcohol or to abstain from drinking for a set time period, and to document their experience on a personal blog (which is uploaded to HSM's website) (Carah, Meurk and Hall, 2015[164]). Since 2009, over 2.1 million stories from more than 100 000 participants have been shared online.

In 2018, HSM was superseded by the organisation's programme Daybreak, which is available through a mobile app and desktop. Daybreak is designed to help people change their relationship with alcohol using the following three features (Hello Sunday Morning, 2019[165]):

- **Community feed**: made up of likeminded people who share their experience of cutting down alcohol consumption, which is designed to make people feel supported
- **Experiments**: access to a library of experiments to help participants self-manage urges, focus on triggers, handle peer pressure and build self-esteem
- **Health coaches**: allowing participants to send private messages to a qualified health coach (e.g. psychologists) to receive personalised assistance.

Daybreak is funded by the Australian Government Department of Health and is free to all Australians who use the mobile app. The desktop-based service, however, involves a fee (AUD 10 a month (USD 7)).

An evaluation of the programme in 2019 found that, three months after starting the programme, participants had (Tait et al., 2019[166]):

- reduced the number of standards drinks they consumed in a week (seven days) from 37.10 to 17.49
- reduced the number of missed days of work in the past month (30 day) due to alcohol from 1.59 to 0.48
- seen their quality of life increase using an internationally recognised instrument (EUROHIS-QOL).

6.7.2. Specialised treatment is designed to assist dependent drinkers

People with alcohol use disorders, particularly in the most severe forms, may have trouble controlling consumption, neglect other interests in order to drink and persist with drinking despite clear evidence of its harmful effect.

Compared to other excessive drinkers, dependent drinkers require more intense, specialised treatment. The objective of treatment for dependent drinkers can be either total abstinence or a significant reduction in consumption. The former is necessary for patients with psychiatric or physical comorbidities (e.g. depression, alcohol-related cirrhosis), while the latter is only appropriate for mildly to moderately dependent drinkers (NIAAA, 2005[167]; Moyer and Finney, 2015[144]).

Treatment for dependent drinkers can be broken into two complementary components: psychosocial treatment and pharmacotherapy. Individuals diagnosed with alcohol dependence typically receive psychosocial treatment including cognitive behavioural treatment, contingency management (where individuals are rewarded for evidence of positive behaviours), motivation enhancement therapy (designed for patients to internally motivate change), coping skills training and support groups (e.g. Alcoholic Anonymous) (Witkiewitz, Saville and Hamreus, 2012[168]). Psychosocial treatment has been shown to be effective for alcohol dependence, but relapse within the first year is common. It is therefore often partnered with pharmacological treatments such as naltrexone, which are administered after the detoxification process in order to minimise the euphoria associated with alcohol consumption (Rösner et al., 2010[169]).

6.8. Consumer information can improve awareness of the health risks associated with alcohol

Policy interventions

- Nutritional and health warning labels
- Mass media campaigns
- School-based education programmes

Key findings

- Mass media campaigns are prominent across OECD countries, but labelling policies are modest, with most countries implementing voluntary as opposed to mandatory schemes.
- Mass media campaigns and labels can improve awareness of the health risks associated with alcohol; however, they have limited impact on alcohol consumption.
- School-based prevention programmes can successfully reduce alcohol-related problems, but their effectiveness is hindered by poor implementation.

6.8.1. Labelling is used to enhance consumer knowledge

Alcohol labels are designed to enhance consumer knowledge to ensure that individuals have the necessary information to decide whether and how much they drink. Labelling is provided at the point of sale and in advertisements; however, it is most prominent on alcohol containers, which is the focus of this section (Siggins Miller, 2017[170]).

Labelling is considered a key policy for tackling harmful use of alcohol. For example, in 2017, the WHO listed labels to inform consumers of alcohol-related harm among its recommended alcohol policies (WHO, 2017[7]).

Information provided by labels differs across OECD countries, with no uniform approach applied. Nevertheless, a review of current labelling arrangements highlighted two commonly implemented approaches:

1. **Nutritional information**: to educate consumers on relevant nutritional aspects of the specific alcoholic product.
2. **Health warnings**: to inform consumers of the potential health risks associated with consuming alcohol.

Nutritional information

Alcohol consumption is a significant contributor to total calorie intake for both men and women. In Australia, results from the latest nutrition survey (2018) found that over one-third of all energy intake comes from discretionary foods (food high in energy and low in nutrients), of which alcohol is the largest contributor (AIHW, 2018[171]). For example, 5% of all calories consumed by those aged 19-30 comes from alcohol, and this figure rises to 7% for adults aged 51-70 years. Similar results were found in the United Kingdom, Canada and the United States (Box 6.15).

Box 6.15. Alcohol's contribution to calorie intake

Alcohol has a significant impact on total calorie intake, as evidenced by several nutrition and health surveys carried out in OECD countries.

Australia

Alcohol is the leading contributor to discretionary food intake surpassing chocolate, cakes and muffins (e.g. for adults aged 31-50, alcohol comprises 17% of discretionary intake compared to 9.1% for cakes and muffins and 5.7% for soft drinks) (AIHW, 2018[171]).

Canada

Researchers in Canada estimated alcohol's contribution to estimated energy requirements at 11.2% or 250 calories a day. Beer was the largest contributor to energy from alcohol, followed by wine, spirits and ciders (Sherk et al., 2019[172]).

United Kingdom

In the United Kingdom, alcohol provides adults aged 19-64 years with 8.4% of their total energy intake (Bates et al., 2017[173]). This figure increases significantly on their heaviest drinking day, specifically to 27% for men and 19% for women (Shelton and Knott, 2014[174]).

United States

An analysis of the adult population (20 years and over) found that the average individual consumes 100 calories of alcohol per day (i.e. around 5% of total calorie intake based on recommended daily intake), with figures higher for men (150 calories) than women (53 calories) (Nielsen et al., 2012[175]; U.S. Department of Health and Human Services, 2015[176]).

Despite the growing obesity epidemic in many countries (OECD.Stat, 2019[177]), the contribution of alcohol to calorie intake has received little attention. This is reflected in low levels of consumer knowledge about the link between alcohol and calorie content. For example, a 2014 study by the UK Royal Society of Public Health found that 80% of adults surveyed did not know the calorie content of common alcoholic drinks

(Sim, 2015[178]). Similar results were found in a selection of European countries, where the vast majority of respondents either incorrectly estimated the number of calories in a regular drink or did not know (GfK Belgium, 2014[179]; Vecchio, Annunziata and Mariani, 2018[180]).

Among OECD countries, only five have a national legal requirement to provide consumers with calorie information on all alcohol containers: Greece, Ireland, Israel, Mexico and Turkey (WHO, 2018[181]).[3] Several other countries have engaged, or plan to engage, in voluntary agreements with industry to provide this information. For example, in the United Kingdom, England's Department of Health in 2011 launched a Public Health Responsibility Deal with businesses and public bodies, which pledged to raise awareness of the calorie content within alcohol drinks (pledge A3) (Knai et al., 2015[182]). However, a review of the Responsibility Deal in 2017 revealed that little progress had been made, with less than 2% of all alcohol products containing calorie information on their labels (Petticrew et al., 2017[183]). More recently in Slovenia (2020), the Nutrition Institute in co-operation with the Slovenian Consumers' Association, the Jožef Stefan Institute and the National Institute of Public Health launched a new research programme to inform people on the composition and nutritional value of alcoholic beverages ("You know what you drink: employing mobile application for reducing alcohol related harm") (Nutrition Institute, 2020[184]).

At the EU27 level, in response to calls for mandatory measures, the alcohol industry submitted a self-regulatory proposal (in March 2018) to include nutrition information and ingredients on labels or an online link/bar code/QR code that can be used to access this information. In June 2019, representatives of the spirits industry signed a memorandum of understanding committing them to provide energy labels on 66% of all containers by the end of 2022. Later that year, Brewers of Europe and its member signed a memorandum of understanding to provide ingredient and energy values on all beer bottles and cans, also by 2022 (European Commission, 2019[185]).

Given the limited number of countries with sufficient nutritional labelling arrangements (on alcohol containers) in place, evidence of the policy's impact is poor (Walker et al., 2019[186]). The research that is available is typically qualitative, and focuses on how participants respond to different labelling schemes (Box 6.16).

Box 6.16. Impact of alcohol nutritional labelling on consumption

Two studies from Italy and New Zealand analysing the impact of alcohol nutrition labels on consumption patterns are summarised below.

Italy

In a small study (n = 103) undertaken by Vecchio et al. (2018[180]), participants were shown a range of nutrition alcohol labels (Figure 6.14) and asked which they preferred (measured by willingness to pay). Results from the study suggest that more informative labels (such as a nutrition panel label – image 2) are preferred to those with less information (such as a link to a website for further information – image 3): participants recorded higher willingness to pay for alcoholic beverages with image 2 than image 3.

Figure 6.14. Example nutritional labels

Source: adapted from Vecchio, Annunziata and Mariani (2018[180]), "Is more better? Insights on consumers' preferences for nutritional information on wine labelling", https://doi.org/10.3390/nu10111667.

New Zealand

Findings from focus groups found that energy labelling would have a greater impact on alcohol purchases than health warnings and low-risk drinking advice. Energy labels with the greatest impact are those that display energy intake (e.g. calories or percentage daily intake), alcohol content and amount of standard drinks contained at the front of the bottle. This label option was preferred over back-of-label nutritional information; kJ and calories only; and kJ, calories and percentage daily intake only (Walker et al., 2019[187]).

Health warnings

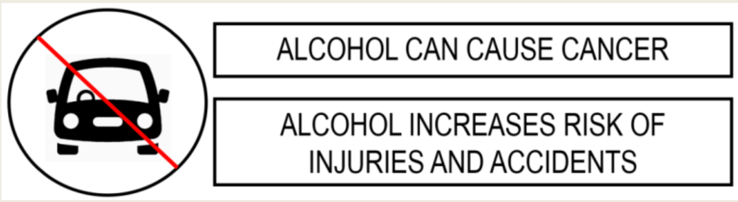
Health warning labels come in several different forms across OECD countries (Box 6.17).

Box 6.17. Types of health warning labels

Several health warning labels are present in OECD countries (Figure 6.15). These can be broadly grouped as relating to disease, injury or alcohol content:

- **Disease risks**: disease labels typically warn consumers of the link between alcohol consumption and cancer and cirrhosis, as well as the impact on congenital abnormalities (birth defects) caused by drinking while pregnant.
- **Injury risks**: injury-related labels warn consumers against consuming alcohol and operating machinery or driving a vehicle, and warn of the increased likelihood of violence.
- **Alcohol content and consumption**: alcohol content labels aim to inform consumers about the number of standard drinks they consume and give advice on how to consume.

Figure 6.15. Example health warning labels



Source: Adapted from Eurocare (2012[188]), *Eurocare Library of Alcohol Health Warning Labels* https://webgate.ec.europa.eu/chafea_pdb/assets/files/pdb/20113208/20113208_d04-00_en_ps.pdf; Australian Alcoholic Beverage Industries (2011[189]), *Submission to the Labelling Review Response Secretariat on Alcoholic Beverages*, https://www.aph.gov.au/Parliamentary_Business/Committees/House_of_Representatives_Committees?url=/spla/fasd/subs/sub%20018%20attachment%20a.pdf.

Evidence on the impact of alcohol health warning labels suggests that they increase consumer knowledge and awareness of the risks associated with drinking. Using a real-world quasi-experimental study, Hobin et al. (2020[190]) found that recall of a cancer warning label increased at a greater rate for those exposed to the warning label on alcohol containers than for those who were not exposed (when both prompted and unprompted). A study by Schoueri-Mychasiw et al. (2020[191]) found similar results for recall of a drinking guideline message.

The impact of health warning labels on behaviour, however, is less clear, with insufficient evidence to conclude that they reduce consumption (Scholes-Balog, Heerde and Hemphill, 2012[192]; Jones and Gordon, 2013[193]; Stockwell, 2006[194]; Thomas et al., 2014[195]; Knai et al., 2015[182]; Hassan and Shiu, 2018[196]). This does not suggest that health warning labels should be abandoned, however, given that studies to date suffer from several methodological issues such as small sample sizes, lack of control groups and limited longitudinal data (Siggins Miller, 2017[170]; Hassan and Shiu, 2018[196]). Further, labelling is often not implemented as intended, so researchers are not evaluating “best practice” (Al-hamdani, 2014[197]; Stockwell, 2006[194]). For example, a study undertaken by Kersbergen and Field (2017[198]) in the United Kingdom concluded that current warning labels are insufficient to capture consumer attention, and have therefore had limited impact on drinking behaviour.

Based on the literature, including key lessons from the use of labels to tackle other major risk factors such as unhealthy diets, a list of best practice labelling principles is provided in Table 6.2. These can assist countries in designing more effective labels and thereby – as part of a broader alcohol strategy – reducing harms related to alcohol.

Table 6.2. Alcohol labelling best practices

Best practice principle	Details
Interpretable	Warning messages should be clear and able to be interpreted unambiguously (WHO, 2003[199]). Further, they should be easy for members of the public to understand (Jané-Llopis et al., 2020[200]).
Visible	Warning messages should be easily noticed by consumers. Therefore, the message should be written in sufficiently large font, be proportional to the size of the container, and be placed against a contrasting background and at the front of the container (Jané-Llopis et al., 2020[200]). Picture images are also effective in gaining consumer attention (Laughery et al., 1993[201]).
Tailored	Warning messages should be tailored to the consumer of the product (e.g. by age or gender) (Thomson, Vandenberg and Fitzgerald, 2012[202]).
Varied	Health warning messages should be rotated to avoid overexposure (Hammond, 2009[203]). For example, Zhao et al. (2020[204]) found that changing the alcohol health warning labels led to a reduction in total per capital retail alcohol sales of 6.31%.
Negatively framed	Research suggests consumers are more responsive to negatively framed health warning messages (Blackwell et al., 2018[205]).

Source: OECD analysis based on cited literature.

Health warning labels on alcohol containers are currently mandatory in 12 OECD countries (Colombia, France, Greece, Israel, Japan, Lithuania, Mexico, Norway, Korea, Portugal, Turkey and the United States) and in the process of implementation in three (Ireland, and also Australia and New Zealand, where the introduction of pregnancy warning labels was agreed in 2020, with a three-year implementation period) (for further details see Box 6.18 and Box 6.19) (WHO, 2020[10]). However, several other countries have voluntary arrangements in place (Siggins Miller, 2017[170]).

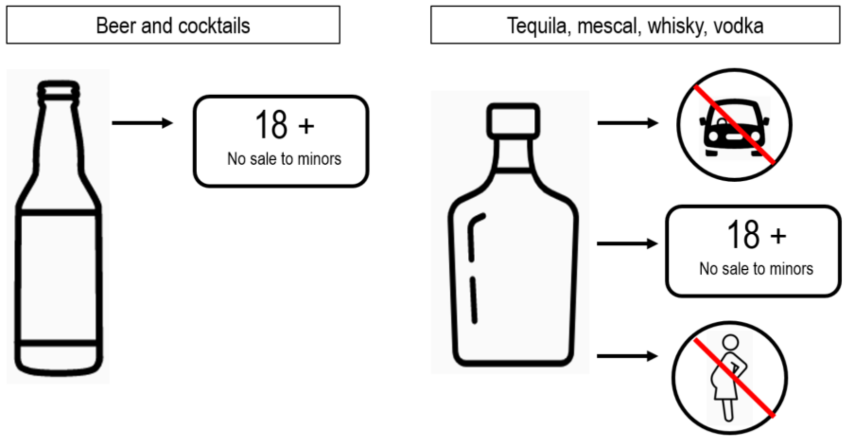
Box 6.18. Alcohol health warning labels in Mexico

In 2015, Mexico introduced an Official Standard Rule, Normas Oficiales Mexicanas-142, related to alcoholic beverages imported, manufactured and sold in the country. Under the Rule, all alcoholic beverages must include a cautionary note (Figure 6.16). Specifically, drinks with an ABV between 2% and 55.5% must state that “the abuse of consumption of this product is harmful to health”. The way in which this message is displayed is also regulated; it must be in uppercase letters and in a contrasting colour (with the size of text varying depending on ABV level) (Diario Oficial De la Federación, 2015[206]).

Alcoholic drinks with an ABV above 6% must also include one of several warning symbols, which relate to underage drinking, drinking while pregnant or driving under the influence. If only one symbol is used, it must be rotated every four months. For drinks with an ABV between 2% and 6%, only one symbol warning against underage drinking is required (i.e. no sale to those under 18 years) (Siggins Miller, 2017[170]).

Beer is the most common alcoholic beverage in Mexico, at 88% of total alcohol consumed (see Figure 2.5 in Chapter 2), so the majority of beverage containers only include a warning against underage drinking (i.e. no health warning label).

Figure 6.16. Cautionary note and pictograms on alcoholic drinks in Mexico



Source: Adapted from IAS (2016[207]), *International evidence and best practice on alcohol labelling*, http://www.ias.org.uk/uploads/pdf/IAS%20summary%20briefings/sb09032016.pdf.

Box 6.19. Alcohol health warning labels in Korea

Regulatory requirements for health warnings labels on alcoholic beverages containing more than 1% of alcohol were changed in Korea in 2016. Since then, producers must display one of the following three health warning labels, which pertain to the risks associated with drinking while pregnant and excessive consumption:

- "Drinking during pregnancy increases the risk for congenital anomaly. Alcohol is [a] carcinogen, so excessive drinking causes liver cancer, gastric adenocarcinoma and so on."
- "Drinking during pregnancy, underage drinking and excessive drinking cause congenital anomaly, brain development disruptions and cancer, respectively."
- "Drinking during pregnancy increases the risk for congenital anomaly. Excessive drinking causes stroke, memory loss and dementia."

There are specific requirements related to the design and placement of the warning statement. Text should be printed in a size at least one-tenth of the size of the brand label, and in at least seven point font for containers less than 300 mL or nine point font for those over 300 mL. Further, the warning label is subject to colour and placement requirements to ensure visibility.

Despite regulatory labelling requirements, a review by the Korea Public Health Association in 2014 found that over 80% of products evaluated failed to meet the design guidelines (e.g. 34% breached the minimum font size regulation). As outlined in a recent review of Korea's public health system, although there is a legal penalty for evading labelling rules (National 82), the Ministry of Health can do little to enforce design requirements.

Source: OECD (2020[71]), *OECD Reviews of Public Health: Korea: A Healthier Tomorrow*, https://doi.org/10.1787/be2b7063-en.

6.8.2. Mass media campaigns communicate messages about the harmful effects of alcohol consumption to change behaviour

Mass media campaigns are a commonly implemented tool used to communicate messages regarding the harmful effects of alcohol consumption. They can have either a direct or an indirect influence on consumer behaviour:

- Directly, mass media campaigns can affect individual-level decisions to drink less by invoking an emotional or cognitive response (e.g. by alerting people to the health risks associated with drinking, such as cancer).
- Indirectly, mass media campaigns can alter social norms regarding drinking behaviour; this affects individuals who were not directly exposed to the campaign (Wakefield, Loken and Hornik, 2010[208]). Further, they may enhance population support for the introduction of additional alcohol policies (Christensen et al., 2019[209]).

A systematic review of the effectiveness of mass media campaigns to reduce alcohol consumption and related harm was undertaken by Young et al. (2018[210]). Based on an analysis of 29 studies covering campaigns in Australia, Denmark, Finland, Italy, the Netherlands, New Zealand, the United Kingdom and the United States, the authors concluded that although campaigns can enhance knowledge regarding the impact of alcohol consumption and treatment-seeking behaviour, there is little evidence to suggest they reduce alcohol consumption. Despite this, mass media campaigns are a commonly implemented policy tool among OECD countries. Areas that campaigns typically target in OECD countries are described below.

Drink-driving

Drink-driving campaigns aim to reduce road deaths and injuries caused by drivers under the influence of alcohol. These typically target younger drivers and therefore increasingly rely on social media channels such as Facebook and Instagram.

A systematic review of the impact of mass media campaigns found that they reduce instances of drink-driving by around 15% (Yadav and Kobayashi, 2015[211]). The authors did not find an improvement in the number of alcohol-related injuries and crashes; however, this does not mean that mass media campaigns are ineffective. Rather, heterogeneity in study design meant that it was not possible to draw overall conclusions from the studies included.

In the United Kingdom, THINK!, a dedicated campaign body established by the government to run road safety campaigns, has existed for the past 75 years. An evaluation of THINK! between 2013 and 2015 found that campaigns led to a decrease in the social acceptability and perceived safety of driving after two drinks, and that risky drivers were more likely to recognise the campaign and accept that it is possible to be over the BAC limit after two drinks (TNS BMRB, 2016[212]). THINK! frequently targets young drivers; for example, in 2018 it ran a campaign to encourage young men to stop their friends from drink-driving. Portugal too has run a campaign targeted at young drivers since 2002, which aims to encourage friends to choose a designated driver (Box 6.20). Finally, as part of their corporate social responsibilities, a number of alcohol producers are also involved in promoting safe drinking.

Box 6.20. Portugal's 100% Cool campaign

In 2002, the National Association of Companies Producing Liquor and Spirits (Associação Nacional de Empresas de Bebidas Espirituosas) created the 100% Cool campaign, a public-private partnership, which aims to enhance the profile of designated drivers (i.e. to create the image of designated drivers as "cool" – "100% Cool is 0% alcohol behind the wheel"). The campaign is run on traditional forms of media – television, radio, cinema, posters – and social media. In addition, the campaign hosts regular street events – for example, at musical festivals, which are attended by 100% Cool teams. Members of the team provide designated drivers with rewards such as EUR 20 fuel vouchers and restaurant coupons.

In 2015, research undertaken by the Association found that 85% of the target population were aware of the campaign.

Source: Drinks Initiatives (2019[213]), *100% Cool,* https://drinksinitiatives.eu/initiative/100-cool.

Long-term harms of alcohol abuse

Mass media campaigns are commonly employed to improve awareness and knowledge of the long-term risks associated with alcohol consumption. They are important because a low proportion of the population are aware of these risks (Christensen et al., 2019[209]; Gulland, 2016[214]). As an example, a survey conducted by Cancer Research UK found that only 13% of respondents identified alcohol as risk factor for cancer (Sinclair et al., 2019[215]).

Previous studies indicated that mass media campaigns improve awareness of the health risks associated with alcohol consumption. In Denmark, a campaign run by the Danish Cancer Society (Box 6.21) found that awareness of alcohol as a risk factor for cancer rose by 5 percentage points (from 45% to 50% when prompted and from 22% to 27% when not prompted) (Christensen et al., 2019[209]). The campaign also led to increased support for other alcohol policies such as MUP and mandatory nutrition labelling. A similar campaign is run in the Czech Republic (Klinika Adiktologie, 2020[216]).

Mass media campaigns can target either the whole population or a specific subset, such as women of childbearing age. Campaigns targeting this group aim to educate women about the impact drinking can have on pregnancy and birth outcomes. Across Europe, the proportion of women who "totally agree" that alcohol can cause birth defects ranges from approximately 30% to 75%, indicating that campaigns are more relevant in certain countries (Schölin, 2016[217]).

Box 6.21. Denmark's "Alcohol does something to us" campaign

For two weeks in November 2017, the Danish Cancer Society, in collaboration with TrygFonden (a philanthropic foundation), ran the "Alcohol does something to us" campaign. This involved a series of short clips showing that, although the immediate effects of alcohol may differ by person (e.g. they may become talkative/loud or sleepy), everyone has one thing in common: alcohol increases the risk of cancer.

The campaign was run on various media channels including social media (Facebook and Instagram) and news media (digital/print/radio).

Source: Christensen et al. (2019[209]), "Can a mass media campaign raise awareness of alcohol as a risk factor for cancer and public support for alcohol related policies?", https://doi.org/10.1016/j.ypmed.2019.05.010.

"Dry" months

Various organisations across OECD countries are "challenging" people to abstain from alcohol for one month. These campaigns typically run in countries where alcohol plays a significant role in social life (e.g. Australia, New Zealand and the United Kingdom). Unlike campaigns targeted at smokers (e.g. Stoptober in the United Kingdom), the goal is not permanent abstinence. Rather, they are designed to encourage people to think differently about their drinking habits.

A study undertaken by de Visser et al. (2016[218]) found that Dry January participants in Britain reduced their consumption of alcohol six months after completing the challenge. For example, drinking days per week fell from 4.78 to 3.73, while the number of drunk episodes in the last month fell from 2.55 to 1.21. Participants also noted that they felt more able to refuse alcohol in social settings immediately after completing the challenge.

Several other campaigns also exist, including those targeted at short-term consequences (e.g. financial, "hangovers") and parental behaviour (e.g. educating parents on how their actions influence a child's attitude towards alcohol).

6.8.3. School-based education programmes target underage drinking

Despite being illegal, it is common for underage school children/young people to consume alcohol. For example, the Health Behaviour in School-aged Children (HBSC) Survey found that 16% of children aged 11-15 have been drunk at least once (OECD Analysis of HBSC data 2013-14).

Drinking initiation and drinking behaviours among school-aged children are a cause of concern for many reasons, including poorer performance at school and lower life satisfaction (see Chapter 5 for further details). For these reasons, school-based drug prevention programmes are common. Historically, alcohol prevention programmes have focused on addressing alcohol knowledge gaps (e.g. the size of a standard drink); however, interventions have since evolved and are now more interactive. Further, they may consider the interaction between students, alcohol and the social and cultural environment (Lee et al., 2016[219]).

A recent systematic review of school-based alcohol prevention programmes in Australia found programmes typically followed one of two approaches: a social influence approach or cognitive behavioural therapy. The former is based on the idea that young people use drugs, such as alcohol, due to social and psychological pressure from peers, family and the media. Therefore, these programmes aim to teach young people skills to resist pressure to drink. The latter aims to assist individuals with analysis of irrational or negative "patterns of thinking, emotion, reactions and behaviours" (Teesson, Newton and Barrett, 2012[220]).

Several evaluations of school-based alcohol prevention programmes have been undertaken. Recently, MacArthur et al. (2018[221]) found that school-based interventions targeting multiple risk behaviours compared to "usual practice" reduced alcohol use from 163 per 1 000 students to 123 per 1 000 students 12 months after implementation (odds ratio = 0.72, which equates to a 28% reduction in alcohol use). However, the evidence suggests no long-term effects after the end of the period of exposure. These results support earlier studies – for example, a systematic review of the effectiveness of universal school-based programmes (i.e. delivered to all students, not just those at risk) concluded that they can be effective in reducing drunkenness and binge drinking (Foxcroft and Tsertsvadze, 2011[222]). In addition, Lee et al. (2016[219]) analysed 40 studies, of which three were considered to have evidence of a positive effect. Example school-based interventions from either of these studies are summarised in Box 6.22.

Box 6.22. Effectiveness of school-based alcohol interventions

Climate Schools – Australia: an online-based private programme available to schools in Australia. The company offers several modules, including two related to alcohol: the alcohol module and the alcohol and cannabis module (Climate Schools, 2020[223]). The module is targeted at children aged 13-16 years and is delivered over several lessons divided into two components (Vogl et al., 2012[224]). The first component requires students to complete an interactive computer-based programme, while the second involves several individual, group and class-based activities. The cost of registering a school with the Climate Schools programme ranges from AUD 250 to AUD 950, depending on the number of students accessing it (Climate Schools, 2020[223])

Several academic studies have evaluated the alcohol-related modules and found they are successful in reducing alcohol consumption in the short term, and in improving knowledge and attitudes towards school. Teesson et al. (2020[225]) found that 12 months after implementation, students in schools assigned to the combined programme – which focused on prevention of substance abuse, depression and anxiety – were less likely to have consumed alcohol than the control group. In the past six months, those in the combined group were 48% less likely to have had a standard drink and 74% less likely to have engaged in heavy episodic drinking (after 30 months, these figures increased to 75% and 85%, respectively). These results support earlier findings; for example, Newton et al. (2009[226]) found that the average number of standard drinks fell by nearly two between the beginning and six months following the intervention (from 3.55 to 1.61). Further, the number of binge episodes in the past three months fell from 1.01 to 0.72 over the same period.

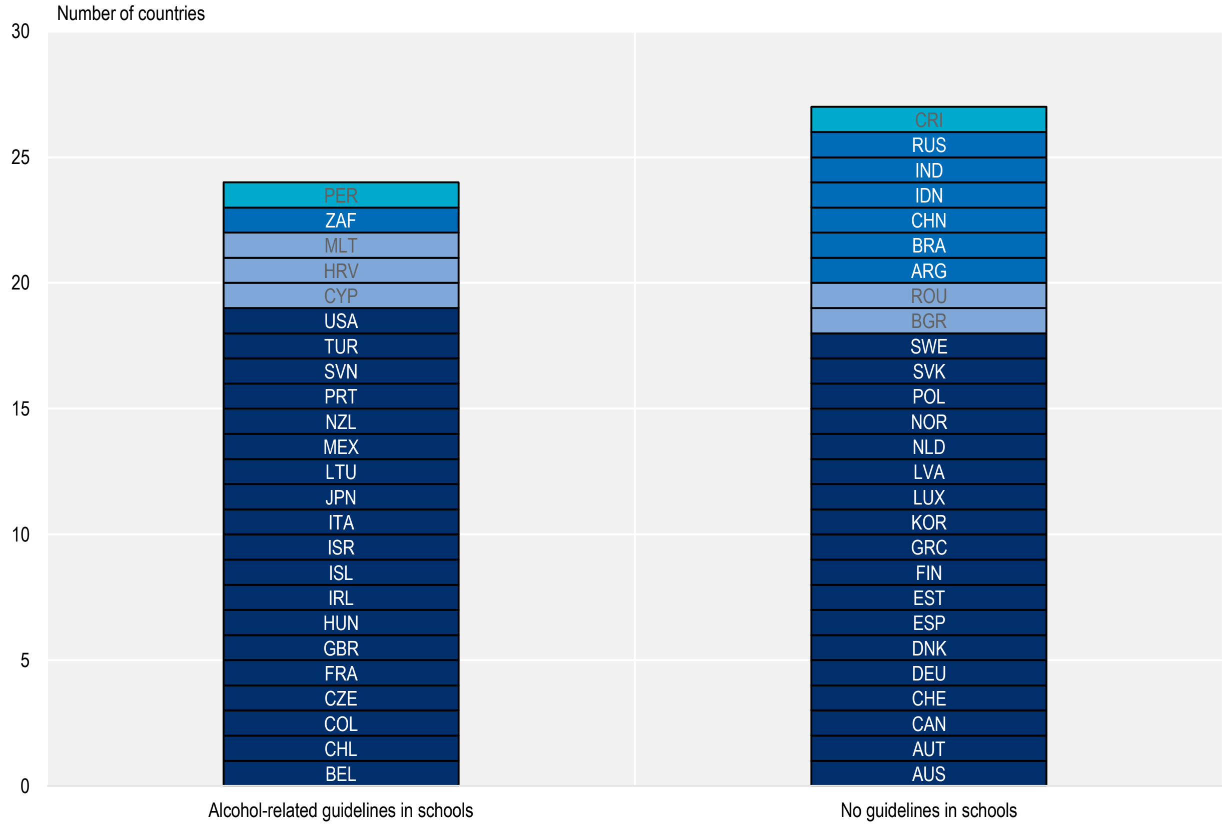
Unplugged: EU Drug Abuse Prevention – EU27: designed for schoolchildren aged 12-14 years and their parents (EMCDDA, 2012[227]). The programme was developed using a life skills education and social influences approach, and includes critical thinking, decision-making, problem-solving, creative thinking, self-awareness, stress and normative beliefs, as well as addressing drug-related knowledge gaps (EMCDDA, 2012[227]; Lee et al., 2016[219]). The programme is delivered by specially trained teachers over 12 one-hour sessions in one of three formats: basic; with peers; or with parents. Findings from two RCTs show the programme may reduce alcohol-related behaviour issues, particularly for those who had already begun drinking at the onset of the programme (Lee et al., 2016[219]). For example, an evaluation by Caria et al. (2011[228]) found that participation in Unplugged reduced the risk of reporting alcohol-related problems in the past 12 months by 22% compared to a control group (odds ratio = 0.78), although this was not statistically significant.

All Stars – United States: a high-school curriculum focusing on three areas including alcohol, tobacco and other drugs. The drug component includes 24 activities (ranging from 15 to 30 minutes) covering topics such as developing resistance and decision-making skills; reinforcing appropriate beliefs and consequences regarding alcohol; and stress management (All Stars, 2020[229]). Sessions are delivered by teachers or trained professionals and may include interactive lessons, small-group peer support, debates, games and further discussions. Parents can also play an active role in the programme.

RCTs of the All Stars programme were undertaken in 2004 and 2007. As summarised by Lee et al. (2016[219]), the 2004 RCT found that the programme reduced substance abuse when teachers participated in delivering the programme and were able to respond to the mediators of substance abuse (McNeal et al., 2004[230]). Additional coaching for teachers, however, was found to have no effect on key alcohol measures (Ringwalt et al., 2009[231]).

Across analysed countries, 47% have in place national guidelines regarding the prevention and reduction of alcohol-related harm in schools. This figure increases to 51% when analysing OECD countries only (Figure 6.17). A country with no national school guidelines does not necessarily mean that students are not accessing alcohol prevention programmes. For example, in Australia, where they are no national guidelines, students may access the Climate programme (Lee et al., 2016[219]).

Figure 6.17. National guidelines for the prevention and reduction of alcohol-related harm in schools



Note: Dark blue = OECD countries; light blue = EU27 non-OECD countries; medium blue = non-OECD G20 countries; green = countries partnering with the OECD. No data for the Kingdom of Saudi Arabia.
Source: WHO (2020[10]), GISAH, https://www.who.int/data/gho/data/themes/global-information-system-on-alcohol-and-health

StatLink https://stat.link/yp8w04

6.9. Comprehensive policy packages combine various approaches for greater impact

The harmful consumption of alcohol is a complex, multi-layered issue facing many countries. For this reason, one single policy tool to tackle the issue does not exist; rather, a suite of complementary policies is needed to create an environment that supports no harmful drinking. The Russian Federation, for example, experienced a significant drop in alcohol consumption and mortality following years of reform, which included policies targeting pricing, production, drink-driving, availability and advertising (Box 6.23). In 2016, Lithuania introduced a range of policies including advertising bans, an increase in the minimum legal age, shorter retail hours and price increases, which has aligned with a decrease in alcohol consumption (see Figure 2.6) in Chapter 2, which shows that Lithuania recorded the second largest decline in alcohol consumption among OECD countries between 2010 and 2018). The extent to which policy changes were responsible for the decline in consumption will be estimated in a future study (Rehm, Štelemėkas and Badaras, 2018[232]).

Other countries are in the process of reforming their alcohol strategies, such as Ireland, which in 2018 approved the Public Health (Alcohol) Act to reduce annual alcohol consumption by two litres per person by 2020 (from 11 to 9.1 litres for those aged over 15). Example policies in the Act include MUP; restrictions/bans on alcohol sponsorship during certain events; restrictions on alcohol advertising across different media and locations and on advertisement content; restrictions on promotions such as "buy one get one free"; and health labelling on alcohol products including energy value, alcohol content and health risks (Department of Health, 2019[233]).

Box 6.23. Alcohol reforms in the Russian Federation

The dissolution of the Soviet Union and the liberalisation of the alcohol market led to a sharp increase in alcohol consumption in the Russian Federation during the 1990s. By 2003, annual alcohol consumption per capita peaked at 20.4 litres, which played a significant role in rising mortality rates (WHO Regional Office for Europe, 2019[44]). For example, a study by Leon et al. (2007[234]) concluded that between 2003 and 2005 nearly half of all deaths among working-age men were attributable to alcohol.

From the mid-1990s, significant policy reforms were introduced to reduce alcohol consumption and its related harms (WHO Regional Office for Europe, 2019[44]), including:

- stricter penalties for those caught drink-driving
- a 50% increase in excise taxes on alcohol
- minimum prices for spirits and sparkling wine
- advertising restrictions for spirits and beer
- zero BAC measures for drivers (however, the limit was subsequently increased)
- a federal ban on alcohol sales for off-premise outlets between 23:00 and 08:00
- an increase in the minimum share of capital needed to be licensed as an alcohol producer, which caused many small-scale producers to shut down or be taken over, for example, by larger state-owned producers
- establishment of the Unified State Automated Information System, a surveillance system tracking volume of alcohol produced and imported in order to curtail illicit production of alcohol
- greater penalties for producers of counterfeit alcohol (e.g. imprisonment).

Following the introduction of these policies, the Russian Federation experienced significant declines in alcohol consumption and related harms. Between 2003 and 2016, alcohol consumption fell by 43%. Further, heavy episodic drinking decreased from 75% to 48% among men and from 52% to 24% for women. Alcohol dependence and mortality also fell markedly over this period; rates of death attributable to suicide dropped by approximately 60%, homicides by approximately 80% and transport accidents by over 50%. The causal link between the Russian Federation's alcohol policies and improved outcomes are outlined in a recent report by the WHO (WHO Regional Office for Europe, 2019[44]).

Comprehensive policy packages are needed to reduce hazardous and harmful alcohol consumption. Substantial evidence on the effectiveness and cost-effectiveness of alcohol policies exists. This should guide the development of policy packages that cover a range of interventions, while also taking account of specific contextual issues.

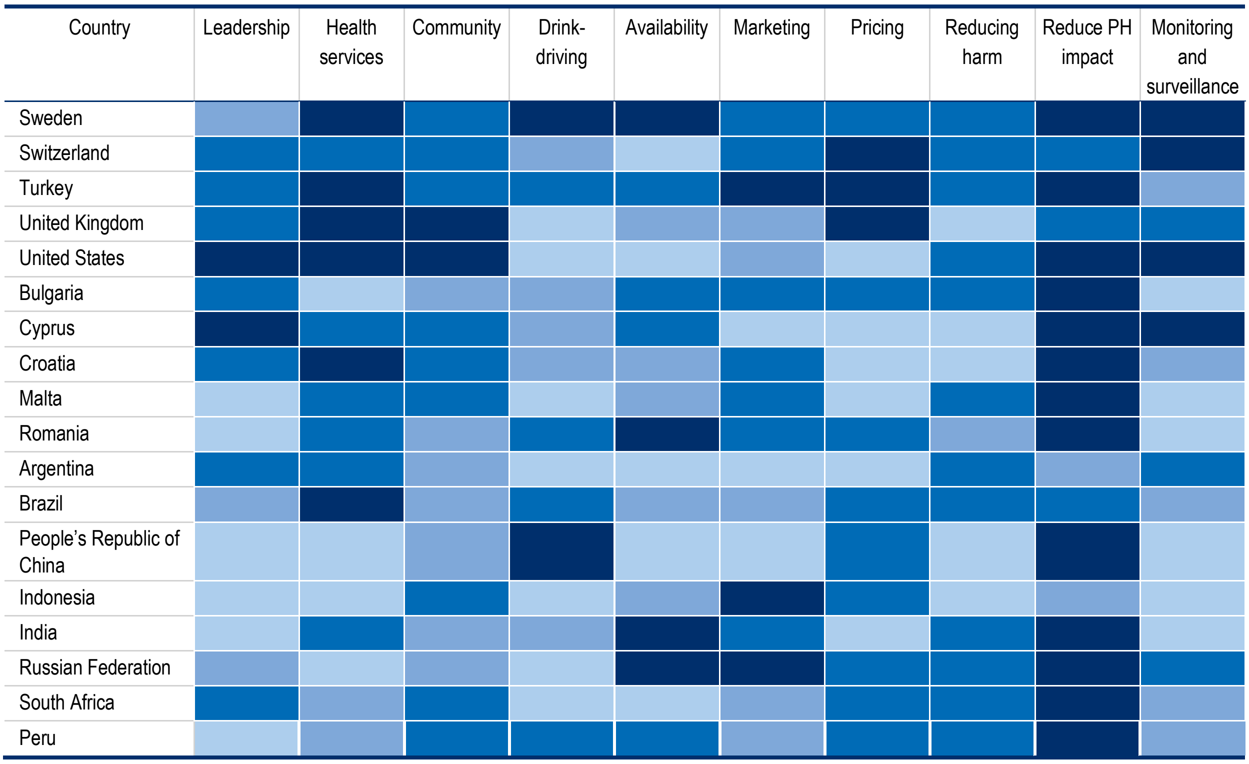
The development of policy packages should include all relevant stakeholders, including law enforcement, schools, social services, local governments and public health experts. A whole-of-society approach to policy development is essential because interventions do not work in silos. For example, changes to the BAC threshold will have a limited effect if enforcement is inadequate (Haghpanahan et al., 2019[74]), further, significant increases in the price of alcohol should go hand in hand with proper support for dependent drinkers on low income to avoid further social harms such as forgoing essential items (Erickson et al., 2018[235]).

Table 6.3 provides an alcohol policy dashboard, which reflects the implementation status of interventions across the ten policy areas within WHO's *Global Strategy to Reduce the Harmful Use of Alcohol* (see Box 6.1). The alcohol policy dashboard was developed using a framework developed by the WHO and has been used to assess implementation for countries in the Region of Americas (WHO Regional Office for the Americas, 2018[90]) and Europe (WHO Regional Office for Europe, 2017[236]).[4]

Table 6.3. Alcohol policy dashboard

A higher quartile (darker shade) indicates a country has implemented a greater number of interventions in line with WHO's *Global Strategy to Reduce the Harmful Use of Alcohol*.

Country	Leadership	Health services	Community	Drink-driving	Availability	Marketing	Pricing	Reducing harm	Reduce PH impact	Monitoring and surveillance
Australia										
Austria										
Belgium										
Canada										
Chile										
Colombia										
Costa Rica										
Czech Republic										
Denmark										
Estonia										
Finland										
France										
Germany										
Greece										
Hungary										
Iceland										
Ireland										
Israel										
Italy										
Japan										
Latvia										
Lithuania										
Luxembourg										
Mexico										
Netherlands										
New Zealand										
Norway										
Poland										
Portugal										
Republic of Korea										
Slovak Republic										
Slovenia										
Spain										



Note: *PH = public health. Country implementation scores have been divided into quartiles, with different shades indicating the extent to which a country has implemented interventions in line with WHO's Global Strategy. Details on the methodology can be found at the end of this chapter.
First quartile
Second quartile
Third quartile
Fourth quartile
Source: WHO (2020[10]), GISAH, https://www.who.int/data/gho/data/themes/global-information-system-on-alcohol-and-health.

6.10. Conclusion: A combination of policy interventions is needed

Alcohol consistently ranks as the drug with the greatest overall harm, since it is associated with several negative health, social and economic outcomes, and is readily available. In 2010, the WHO recognised hazardous and harmful alcohol consumption as a severe public health problem by issuing the *Global Strategy to Reduce the Harmful Use of Alcohol*, outlining ten domains to assist policy-makers in developing an effective, holistic policy response. These policy domains were used to identify specific policy recommendations within the WHO *Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2013-2020*, which included a target to reduce harmful use of alcohol by 10%.

This chapter analysed policy interventions designed to reduce hazardous and harmful alcohol use, with a specific focus on those included in WHO's Global Strategy and NCD action plan. Alcohol excise taxes were the most commonly employed intervention, with 84% of OECD countries taxing all beverages (wine, beer and spirits) and the remaining 16% taxing beer and spirits only. However, far fewer OECD countries periodically adjust taxes for inflation (27%), which may have contributed to rising alcohol affordability (see Chapter 2, Section 2.6 for further details).

Restricting the availability of alcohol is another NCD best buy policy intervention. Nevertheless, less than half (43%) of all OECD countries regulate the hours alcohol can be sold, and a similar number apply no restrictions at all. Other policy interventions to restrict availability, such as days of sale and outlet density, are even less common.

The final best buy policy intervention relates to advertising restrictions covering several media types. A policy mapping exercise revealed that OECD countries typically apply some form of restriction on traditional media, including television, print media and radio. However, forms of digital media, including social media, are increasingly replacing traditional media; these represent a major challenge to policy-makers because of their ubiquitous reach and continual creation of user-generated content.

The list of policy interventions outlined above is not exhaustive, with policy-makers implementing various other interventions such as age restrictions, drink-driving limits and regulations on alcohol labels as part of their national alcohol policies.

Harmful alcohol consumption is a complex issue experienced by countries across the world. Therefore, it cannot be addressed through one single policy intervention. Instead, a range of interventions covering pricing, availability, marketing, drink-driving, health treatment and consumer information are needed. Similarly, responsibility for reducing harmful alcohol consumption should not fall solely on governments. Rather, a multi-sectoral approach is needed, which includes law enforcement, schools, health providers, social and community services, local governments and public health experts. Finally, efforts to ensure that policy interventions are enforced are necessary, as a comprehensive policy approach in itself cannot reduce harmful alcohol consumption.

References

ABAC Scheme (2019), *About the ABAC Scheme*, ABAC Scheme, Stirling, https://www.abac.org.au/about/ (accessed on 21 October 2019). [94]

AIHW (2018), *Nutrition Across the Life Stages*, Australian Institute of Health and Welfare, Canberra, https://www.aihw.gov.au/getmedia/fc5ad42e-08f5-4f9a-9ca4-723cacaa510d/aihw-phe-227.pdf.aspx?inline=true. [171]

Alcohol Policy Information System (2019), *Wholesale Pricing Practices and Restrictions*, National Institute on Alcohol Abuse and Alcoholism, Bethesda, MD, https://alcoholpolicy.niaaa.nih.gov/apis-policy-topics/wholesale-pricing-practices-and-restrictions/3/maps-and-charts (accessed on 7 April 2020). [32]

Al-hamdani, M. (2014), "The case for stringent alcohol warning labels: Lessons from the tobacco control experience", *Journal of Public Health Policy*, Vol. 35/1, pp. 65-74, http://dx.doi.org/10.1057/jphp.2013.47. [197]

All Stars (2020), *High School*, All Stars, Greensboro, NC, https://www.allstarsprevention.com/high-school.html (accessed on 14 April 2020). [229]

Angus, C. et al. (2016), "Estimating the cost-effectiveness of brief interventions for heavy drinking in primary health care across Europe", *European Journal of Public Health*, Vol. 27/2, p. ckw122, http://dx.doi.org/10.1093/eurpub/ckw122. [138]

ASTRA (2020), *Codes of Practice*, Australian Subscription Television and Radio Association, Artarmon, https://www.astra.org.au/advocacy/codes-of-practice. [101]

Australian Alcoholic Beverage Industries (2011), *Submission to the Labelling Review Response Secretariat on Alcoholic Beverages*. [189]

Australian Communications and Media Authority (2020), *Ads for Alcohol, Tobacco or Therapeutic Goods*, Australian Communications and Media Authority, Canberra, https://www.acma.gov.au/ads-alcohol-tobacco-or-therapeutic-goods (accessed on 7 April 2020). [89]

Australian Communications and Media Authority (2015), *Commercial Television Industry Code of Practice*, Australian Communications and Media Authority, Canberra, https://www.freetv.com.au/wp-content/uploads/2019/07/Free_TV_Commercial_Television_Industry_Code_of_Practice_2018.pdf. [100]

Australian Government (2020), *Broadcasting Services Act 1992 (No. 110, 1992)*, Australian Government, Canberra, https://www.legislation.gov.au/Details/C2020C00236. [99]

Australian Government (2019), *Regulating in the Digital Age: Government response and implementation roadmap for the digital platforms inquiry*, Australian Government, Canberra, https://treasury.gov.au/sites/default/files/2019-12/Government-Response-p2019-41708.pdf. [122]

Australian Government Department of Health (2019), *Standard Drinks Guide*, Australian Government Department of Health, Canberra, https://www.health.gov.au/health-topics/alcohol/about-alcohol/standard-drinks-guide (accessed on 10 April 2020). [237]

Australian Taxation Office (2019), *Wine Equalisation Tax*, Australian Taxation Office, Sydney, https://www.ato.gov.au/business/wine-equalisation-tax/ (accessed on 24 October 2019). [19]

Babor, T. and J. Higgins-Biddle (2001), *Brief Intervention for Hazardous and Harmful Drinking: A manual for use in primary care*, World Health Organization, Geneva, https://apps.who.int/iris/bitstream/handle/10665/67210/WHO_MSD_MSB_01.6b-eng.pdf?sequence=1&isAllowed=y. [134]

Babor, T. et al. (2001), *AUDIT: the Alcohol Use Disorders Identification Test – guidelines for use in primary health care*, World Health Organization, Geneva, https://apps.who.int/iris/handle/10665/67205. [135]

Babor, T., K. Robaina and J. Noel (2018), "The role of the alcohol industry in policy interventions for alcohol-impaired driving", in *Getting to Zero Alcohol-Impaired Driving Fatalities: A Comprehensive Approach to a Persistent Problem*, National Academies Press, Washington DC, http://dx.doi.org/10.17226/24951. [125]

Barry, K. et al. (2009), *Reducing Alcohol-Exposed Pregnancies: A report of the National Task Force on Fetal Alcohol Syndrome and Fetal Alcohol Effect*, Centers for Disease Control and Prevention, Atlanta, GA, https://www.cdc.gov/ncbddd/fasd/modules/RedAlcohPreg-textonly-P.pdf. [140]

Bates, B. et al. (2017), *National Diet and Nutrition Survey: Results from Years 1, 2, 3 and 4 (combined) of the Rolling Programme (2008/2009-2011/2012)*, Public Health England, London, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/594361/NDNS_Y1_to_4_UK_report_full_text_revised_February_2017.pdf (accessed on 14 October 2019). [173]

BBC News (2015), *Russia: Vodka minimum price cut over economic woes*, BBC, London, https://www.bbc.com/news/blogs-news-from-elsewhere-31109471. [43]

Bergen, G. et al. (2014), "Publicized sobriety checkpoint programs", *American Journal of Preventive Medicine*, Vol. 46/5, pp. 529-539, http://dx.doi.org/10.1016/j.amepre.2014.01.018. [75]

Blackwell, A. et al. (2018), "Informing drinkers: Can current UK alcohol labels be improved?", *Drug and Alcohol Dependence*, Vol. 192, pp. 163-170, http://dx.doi.org/10.1016/j.drugalcdep.2018.07.032. [205]

Blecher, E. (2015), "Taxes on tobacco, alcohol and sugar sweetened beverages: Linkages and lessons learned", *Social Science and Medicine*, Vol. 136-137, pp. 175-179, http://dx.doi.org/10.1016/j.socscimed.2015.05.022. [13]

Boniface, S., J. Scannell and S. Marlow (2017), "Evidence for the effectiveness of minimum pricing of alcohol: A systematic review and assessment using the Bradford Hill criteria for causality.", *BMJ Open*, Vol. 7/5, p. e013497, http://dx.doi.org/10.1136/bmjopen-2016-013497. [33]

Bonomo, Y. et al. (2019), "The Australian drug harms ranking study", *Journal of Psychopharmacology*, Vol. 33/7, pp. 759-768, http://dx.doi.org/10.1177/0269881119841569. [3]

Brenner, A. et al. (2015), "Longitudinal associations of neighborhood socioeconomic characteristics and alcohol availability on drinking: Results from the Multi-Ethnic Study of Atherosclerosis (MESA)", *Social Science and Medicine*, Vol. 145, pp. 17-25, http://dx.doi.org/10.1016/j.socscimed.2015.09.030. [57]

Brown, K. (2016), “Association between alcohol sports sponsorship and consumption: A systematic review”, *Alcohol and Alcoholism*, Vol. 51/6, pp. 747-755, http://dx.doi.org/10.1093/alcalc/agw006. [128]

Campbell, C. et al. (2009), “The effectiveness of limiting alcohol outlet density as a means of reducing excessive alcohol consumption and alcohol-related harms”, *American Journal of Preventive Medicine*, Vol. 37/6, pp. 556-569, http://dx.doi.org/10.1016/j.amepre.2009.09.028. [53]

Canadian Partnership Against Cancer (2018), *Minimum Pricing on Alcohol: Provincial and territorial pricing policies*, Canadian Partnership Against Cancer, Toronto, https://www.partnershipagainstcancer.ca/topics/alcohol-minimum-pricing-provincial-territorial/. [37]

Carah, N. and C. Meurk (2017), “We need a media platform perspective on alcohol marketing: A reply to Lobstein et al”, *Addiction*, Vol. 112/2, p. 370, http://dx.doi.org/10.1111/add.13599. [105]

Carah, N., C. Meurk and W. Hall (2015), “Profiling Hello Sunday Morning: Who are the participants?”, *International Journal of Drug Policy*, Vol. 26/2, pp. 214-216, http://dx.doi.org/10.1016/j.drugpo.2014.07.019. [164]

Caria, M. et al. (2011), “Effects of a school-based prevention program on European adolescents’ patterns of alcohol use”, *Journal of Adolescent Health*, Vol. 48/2, pp. 182-188, http://dx.doi.org/10.1016/j.jadohealth.2010.06.003. [228]

Chaloupka, F., L. Powell and K. Warner (2019), “The use of excise taxes to reduce tobacco, alcohol, and sugary beverage consumption”, *Annual Review of Public Health*, Vol. 40/1, pp. 187-201, http://dx.doi.org/10.1146/annurev-publhealth-040218-043816. [12]

Chambers, T. et al. (2017), “Alcohol sponsorship of a summer of sport: A frequency analysis of alcohol marketing during major sports events on New Zealand television”, *The New Zealand Medical Journal*, Vol. 130/1448, pp. 27-33, https://pubmed.ncbi.nlm.nih.gov/28081554/. [129]

Christensen, A. et al. (2019), “Can a mass media campaign raise awareness of alcohol as a risk factor for cancer and public support for alcohol related policies?”, *Preventive Medicine*, Vol. 126, p. 105722, http://dx.doi.org/10.1016/j.ypmed.2019.05.010. [209]

Christie, B. (2020), “Minimum pricing in Scotland leads to fall in alcohol sales”, *BMJ*, Vol. 369, p. m2324, http://dx.doi.org/10.1136/bmj.m2324. [35]

Climate Schools (2020), *Our Research*, Climate Schools, Sydney, https://www.climateschools.com.au/our-research (accessed on 14 April 2020). [223]

Cobiac, L., A. Mizdrak and N. Wilson (2019), “Cost-effectiveness of raising alcohol excise taxes to reduce the injury burden of road traffic crashes”, *Injury Prevention*, Vol. 25/5, pp. 421-427, http://dx.doi.org/10.1136/injuryprev-2018-042914. [17]

Coomber, K. et al. (2020), *Investigating the Introduction of the Alcohol Minimum Unit Price in the Northern Territory*, Deakin University, Geelong, https://alcoholreform.nt.gov.au/__data/assets/pdf_file/0007/818278/investigating-introduction-of-alcohol-minimum-unit-price-nt-final-report.pdf. [34]

Cortez-Pinto, H. et al. (2010), “The burden of disease and the cost of illness attributable to alcohol drinking: Results of a national study”, *Alcoholism: Clinical and Experimental Research*, Vol. 34/8, pp. 1442-1449, http://dx.doi.org/10.1111/j.1530-0277.2010.01229.x. [154]

Critchlow, N. et al. (2019), "Participation with alcohol marketing and user-created promotion on social media, and the association with higher-risk alcohol consumption and brand identification among adolescents in the UK", *Addiction Research and Theory*, Vol. 27/6, pp. 515-526, http://dx.doi.org/10.1080/16066359.2019.1567715. [112]

Critchlow, N. et al. (2017), "Awareness of, and participation with, user-created alcohol promotion, and the association with higher-risk drinking in young adults", *Cyberpsychology*, Vol. 11/2, http://dx.doi.org/10.5817/CP2017-2-4. [109]

Curtis, B. et al. (2018), "Meta-analysis of the association of alcohol-related social media use with alcohol consumption and alcohol-related problems in adolescents and young adults", *Alcoholism: Clinical and Experimental Research*, Vol. 42/6, pp. 978-986, http://dx.doi.org/10.1111/acer.13642. [114]

de Bruijn, A. (2013), *Report on the Volume of Youth Exposure to Alcohol Advertisements in European Countries. Technical Report of the AMPHORA project to the European Commission*, Alcohol Measures for Public Health Research Alliance, Barcelona, http://www.drugsandalcohol.ie/19712/1/AMPHORA_WP4_D1.4.pdf (accessed on 8 April 2020). [118]

de Visser, R., E. Robinson and R. Bond (2016), "Voluntary temporary abstinence from alcohol during 'Dry January' and subsequent alcohol use", *Health Psychology*, Vol. 35/3, pp. 281-289, http://dx.doi.org/10.1037/hea0000297. [218]

Denny, C. et al. (2019), "Consumption of alcohol beverages and binge drinking among pregnant women aged 18–44 years: United States, 2015–2017", *MMWR. Morbidity and Mortality Weekly Report*, Vol. 68/16, pp. 365-368, http://dx.doi.org/10.15585/mmwr.mm6816a1. [141]

Department of Health (2019), *Public Health (Alcohol) Act 2018 (Number 24 of 2018): Guidance for industry section 22*, Department of Health, Dublin, https://assets.gov.ie/34508/f07a44a819dc410682eb8dbb377b89cc.pdf. [233]

Derges, J. et al. (2017), "Alcohol screening and brief interventions for adults and young people in health and community-based settings: A qualitative systematic literature review", *BMC Public Health*, Vol. 17, p. 562, http://dx.doi.org/10.1186/s12889-017-4476-4. [146]

Desapriya, E. et al. (2007), "Impact of lowering the legal blood alcohol concentration limit to 0.03 on male, female and teenage drivers involved alcohol-related crashes in Japan", *International Journal of Injury Control and Safety Promotion*, Vol. 14/3, pp. 181-187, http://dx.doi.org/10.1080/17457300701440634. [72]

Diario Oficial De la Federación (2015), *NORMA Oficial Mexicana NOM-142-SSA1/SCFI-2014, Bebidas Alcohólicas. Especificaciones Sanitarias. Etiquetado Sanitario y Comercial (Alcoholic Beverages. Sanitary Specifications Sanitary and Commercial Labeling)*, Diario Oficial De la Federación, Mexico City, http://www.dof.gob.mx/nota_detalle.php?codigo=5386313&fecha=23/03/2015. [206]

Drinks Initiatives (2019), *100% Cool*, spiritsEUROPE, Brussels, https://drinksinitiatives.eu/initiative/100-cool (accessed on 18 October 2019). [213]

Ecola, L. et al. (2018), *Costs and Effectiveness of Interventions to Reduce Motor Vehicle-related Injuries and Deaths: Supplement to Tool Documentation*, RAND Corporation, Santa Monica, CA, http://dx.doi.org/10.7249/TL144.2. [76]

Elder, R. et al. (2010), "The effectiveness of tax policy interventions for reducing excessive alcohol consumption and related harms", *American Journal of Preventive Medicine*, Vol. 38/2, pp. 217-229, http://dx.doi.org/10.1016/j.amepre.2009.11.005. [14]

Elder, R. et al. (2011), "Effectiveness of ignition interlocks for preventing alcohol-impaired driving and alcohol-related crashes: A community guide systematic review", *American Journal of Preventive Medicine*, Vol. 40/3, pp. 362-376, http://dx.doi.org/10.1016/j.amepre.2010.11.012. [80]

EMCDDA (2012), *Unplugged: European Union Drug Abuse Prevention (EU-DAP)*, European Monitoring Centre for Drugs and Drug Addiction, Lisbon, http://www.emcdda.europa.eu/html.cfm/index52035EN.html?project_id=HR-04&tab=overview (accessed on 14 April 2020). [227]

Erickson, R. et al. (2018), "How do people with homelessness and alcohol dependence cope when alcohol is unaffordable? A comparison of residents of Canadian managed alcohol programs and locally recruited controls", *Drug and Alcohol Review*, Vol. 37, pp. S174-S183, http://dx.doi.org/10.1111/dar.12649. [235]

Erke, A., C. Goldenbeld and T. Vaa (2009), "The effects of drink-driving checkpoints on crashes: A meta-analysis", *Accident Analysis and Prevention*, Vol. 41/5, pp. 914-923, http://dx.doi.org/10.1016/j.aap.2009.05.005. [77]

EUCAM (2018), *Estonia*, European Centre for Monitoring Alcohol Marketing, Utrecht, https://eucam.info/regulations-on-alcohol-marketing/estonia/. [110]

EUCAM (2009), *Inventory Alcohol Marketing Regulations*, European Centre for Monitoring Alcohol Marketing, Utrecht, http://eucam.info/wp-content/uploads/2016/09/alcohol-marketing-regulations_norway.pdf (accessed on 21 October 2019). [93]

Eurocare (2012), *Eurocare Library of Alcohol Health Warning Labels*, European Alcohol Policy Alliance, Brussels, https://webgate.ec.europa.eu/chafea_pdb/assets/files/pdb/20113208/20113208_d04-00_en_ps.pdf. [188]

Eurofound (2012), *Use of Alcohol and Drugs at the Workplace*, European Foundation for the Improvement of Living and Working Conditions, Dublin, https://www.eurofound.europa.eu/sites/default/files/ef_files/docs/ewco/tn1111013s/tn1111013s.pdf. [147]

European Commission (2019), *Alcohol Labelling*, European Commission, Brussels, https://ec.europa.eu/food/safety/labelling_nutrition/labelling_legislation/alcohol_en. [185]

European Commission (2019), *Marketing of Food, Non-alcoholic, and Alcoholic Beverages: A toolkit to support the development and update of codes of conduct*, European Commission, Brussels, https://ec.europa.eu/jrc/en/publication/marketing-food-non-alcoholic-and-alcoholic-beverages-toolkit-support-development-and-update-codes. [120]

European Transport Safety Council (2018), *Progress in Reducing Drink Driving in Europe*, European Transport Safety Council, Brussels, https://etsc.eu/wp-content/uploads/report_reducing_drink_driving_final.pdf. [69]

Falkner, C. et al. (2015), "The effect of alcohol price on dependent drinkers' alcohol consumption", *New Zealand Medical Journal*, Vol. 128/1427, pp. 9-17. [24]

Foxcroft, D. and A. Tsertsvadze (2011), “Universal school-based prevention programs for alcohol misuse in young people”, *Cochrane Database of Systematic Reviews* 5, p. CD009113, http://dx.doi.org/10.1002/14651858.cd009113. [222]

Gallopel-Morvan, K. et al. (2017), “France’s Évin Law on the control of alcohol advertising: content, effectiveness and limitations”, *Addiction*, Vol. 112/Suppl 1, pp. 86-93, http://dx.doi.org/10.1111/add.13431. [88]

GfK Belgium (2014), *Consumer Insights: Knowledge of ingredient and nutrition information on alcohol beverages - off-label information and its use*, Brewers of Europe, Brussels, https://brewersofeurope.org/uploads/mycms-files/documents/publications/2015/GfK report - CONSUMER INSIGHTS - FINAL.pdf. [179]

Gmel, G., J. Holmes and J. Studer (2016), “Are alcohol outlet densities strongly associated with alcohol-related outcomes? A critical review of recent evidence”, *Drug and Alcohol Review*, Vol. 35/1, pp. 40-54, http://dx.doi.org/10.1111/dar.12304. [58]

Goldfarb, A. and C. Tucker (2011), “Advertising bans and the substitutability of online and offline advertising”, *Journal of Marketing Research*, Vol. 48/2, pp. 207-227, http://dx.doi.org/10.1509/jmkr.48.2.207. [116]

Government of British Columbia (2020), *Liquor Control and Licensing Regulation, BC Reg 241/2016*, Queen’s Printer, Victoria, https://www.canlii.org/en/bc/laws/regu/bc-reg-241-2016/latest/bc-reg-241-2016.html. [38]

Government of Manitoba (2020), *Liquor Licensing Regulation, Man Reg 61/2014*, Queen’s Printer, Victoria, http://canlii.ca/t/5359n. [39]

Government of Newfoundland and Labrador (2020), *Liquor Licensing Regulations, CNLR 1162/96*, Queen’s Printer, Victoria, http://canlii.ca/t/53j84. [40]

Government of Nova Scotia (2020), *Liquor Licensing Regulations, NS Reg 365/2007*, Queen’s Printer, Victoria, http://canlii.ca/t/52w86. [41]

Government of Quebec (2020), *Regulation Respecting Promotion, Advertising and Educational Programs Relating to Alcoholic Beverages: CQLR c P-9.1*, Queen’s Printer, Victoria, http://canlii.ca/t/53m2c. [42]

Grant, J. et al. (2006), “Adolescent alcohol use is a risk factor for adult alcohol and drug dependence: Evidence from a twin design”, *Psychological Medicine*, Vol. 36/1, pp. 109-118, http://dx.doi.org/10.1017/S0033291705006045. [62]

Griffin, C., J. Gavin and I. Szmigin (2018), *All Night Long: Social media marketing to young people by alcohol brands and venues*, Alcohol Research UK, London, https://s3.eu-west-2.amazonaws.com/files.alcoholchange.org.uk/documents/FinalReport_0153.pdf?mtime=20181128162019. [111]

Griswold, M. et al. (2018), “Alcohol use and burden for 195 countries and territories, 1990–2016: A systematic analysis for the Global Burden of Disease Study 2016”, *Lancet*, Vol. 392/10152, pp. 1015-1035, http://dx.doi.org/10.1016/s0140-6736(18)31310-2. [2]

Gruenewald, P. (2011), “Regulating availability: How access to alcohol affects drinking and problems in youth and adults”, *Alcohol Research and Health*, Vol. 34/2, pp. 248-256. [55]

Gruenewald, P. and L. Remer (2006), "Changes in outlet densities affect violence rates", *Alcoholism: Clinical and Experimental Research*, Vol. 30/7, pp. 1184-1193, http://dx.doi.org/10.1111/j.1530-0277.2006.00141.x. [56]

Gulland, A. (2016), "People lack awareness of link between alcohol and cancer, survey finds", *BMJ (Clinical Research Ed.)*, Vol. 353, p. i1881, http://dx.doi.org/10.1136/bmj.i1881. [214]

Haghpanahan, H. et al. (2019), "An evaluation of the effects of lowering blood alcohol concentration limits for drivers on the rates of road traffic accidents and alcohol consumption: a natural experiment", *Lancet*, Vol. 393/10169, pp. 321-329, http://dx.doi.org/10.1016/S0140-6736(18)32850-2. [74]

Hahn, R. et al. (2010), "Effectiveness of policies restricting hours of alcohol sales in preventing excessive alcohol consumption and related harms", *American Journal of Preventive Medicine*, Vol. 39/6, pp. 590-604, http://dx.doi.org/10.1016/j.amepre.2010.09.016. [47]

Hammond, D. (2009), *Tobacco Labelling and Packaging Toolkit: A Guide to FCTC Article 11*, Tobacco Labelling Resource Centre, Waterloo, https://tobaccolabels.s3.ca-central-1.amazonaws.com/uploads/2013/12/IUATLD-Tookit-Complete-Mar-3-2009.pdf (accessed on 15 October 2019). [203]

Hardiker, N. and M. Grant (2011), "Factors that influence public engagement with eHealth: A literature review", *International Journal of Medical Informatics*, Vol. 80/1, pp. 1-12, http://dx.doi.org/10.1016/j.ijmedinf.2010.10.017. [161]

Hassan, L. and E. Shiu (2018), "A systematic review of the efficacy of alcohol warning labels: Insights from qualitative and quantitative research in the new millennium", *Journal of Social Marketing*, Vol. 8/3, pp. 333-352, http://dx.doi.org/10.1108/JSOCM-03-2017-0020. [196]

He, A. (2019), *Average US Time Spent With Mobile in 2019 Has Increased*, eMarketer, New York, https://www.emarketer.com/content/average-us-time-spent-with-mobile-in-2019-has-increased. [103]

Hello Sunday Morning (2019), *Daybreak: An alcohol support app*, Hello Sunday Morning, Surry Hills, https://www.hellosundaymorning.org/daybreak/ (accessed on 30 October 2019). [165]

Henry-Edwards, S. et al. (2003), *Brief Interventions for Substance Use: A manual for use in primary care (draft version 1.1 for field testing)*, World Health Organization, Geneva, https://www.who.int/substance_abuse/activities/en/Draft_Brief_Intervention_for_Substance_Use.pdf. [139]

Hill, K., D. Foxcroft and M. Pilling (2017), ""Everything is telling you to drink": Understanding the functional significance of alcogenic environments for young adult drinkers", *Addiction Research & Theory*, Vol. 26/6, pp. 457-464, http://dx.doi.org/10.1080/16066359.2017.1395022. [82]

Hobin, E. et al. (2020), "Testing alcohol labels as a tool to communicate cancer risk to drinkers: A real-world quasi-experimental study", *Journal of Studies on Alcohol and Drugs*, Vol. 81/2, pp. 249-261, http://dx.doi.org/10.15288/jsad.2020.81.249. [190]

Houghton, F. et al. (2014), "Children's awareness of alcohol sponsorship of sport in Ireland: Munster Rugby and the 2008 European Rugby Cup", *International Journal of Public Health*, Vol. 59/5, pp. 829-832, http://dx.doi.org/10.1007/s00038-014-0568-4. [131]

IARD (2019), *Minimum Legal Age Limits*, International Alliance for Responsible Drinking, London, https://iard.org/science-resources/detail/Minimum-Legal-Age-Limits. [67]

IAS (2016), *International Evidence and Best Practice on Alcohol Labelling*, Institute of Alcohol Studies, London, http://www.ias.org.uk/uploads/pdf/IAS summary briefings/sb09032016.pdf. [207]

ICAP (2011), *Digital Guiding Principles: Self-regulation of marketing communications for beverage alcohol*, International Center for Alcohol Policies, Washington DC, https://www.iard.org/getattachment/72ca6517-8b3d-431f-b82f-e3e9e7a3f9b2/digitalguidingprinciples2014.pdf. [124]

Ito, C. et al. (2015), "Brief intervention in the workplace for heavy drinkers: A randomized clinical trial in Japan", *Alcohol and Alcoholism*, Vol. 50/2, pp. 157-163, http://dx.doi.org/10.1093/alcalc/agu090. [157]

Jané-Llopis, E. et al. (2020), *What is the Current Alcohol Labelling Practice in the WHO European Region and What Are Barriers and Facilitators to Development and Implementation of Alcohol Labelling Policy?*, WHO Regional Office for Europe, Copenhagen, https://apps.who.int/iris/bitstream/handle/10665/332129/9789289054898-eng.pdf. [200]

Jernigan, D. et al. (2017), "Alcohol marketing and youth alcohol consumption: A systematic review of longitudinal studies published since 2008", *Addiction*, Vol. 112, pp. 7-20, http://dx.doi.org/10.1111/add.13591. [86]

Jones, S. (2010), "When does alcohol sponsorship of sport become sports sponsorship of alcohol? A case study of developments in sport in Australia", *International Journal of Sports Marketing and Sponsorship*, Vol. 11/3, pp. 250-261, http://dx.doi.org/10.1108/IJSMS-11-03-2010-B007. [127]

Jones, S. and R. Gordon (2013), *Alcohol Warning Labels: Are they effective?*, Deeble Institute, Deakin, https://ahha.asn.au/system/files/docs/publications/20130118_deeble_institute_evidence_brief_alcohol_warning_labels.pdf. [193]

Jones, S. and R. Gordon (2013), "Regulation of alcohol advertising: Policy options for Australia", *Evidence Base*, Vol. 2013/2, pp. 1-37, http://dx.doi.org/10.21307/eb-2013-001. [97]

Kaner, E. et al. (2017), "Personalised digital interventions for reducing hazardous and harmful alcohol consumption in community-dwelling populations", *Cochrane Database of Systematic Reviews*, Vol. 9/9, p. CD011479, http://dx.doi.org/10.1002/14651858.CD011479.pub2. [163]

Kaner, E. et al. (2018), "Effectiveness of brief alcohol interventions in primary care populations", *Cochrane Database of Systematic Reviews*, Vol. 2/2, p. CD004148, http://dx.doi.org/10.1002/14651858.CD004148.pub4. [136]

Karlsson, T. et al. (2020), "The road to the Alcohol Act 2018 in Finland: A conflict between public health objectives and neoliberal goals", *Health Policy*, Vol. 124/1, pp. 1-6, http://dx.doi.org/10.1016/j.healthpol.2019.10.009. [61]

Kauppila, E. et al. (2019), *Alcohol Marketing on Social Media Sites in Finland and Sweden: A comparative audit study of brands' presence and content, and the impact of a legislative change*, University of Helsinki Centre for Research on Addiction, Control and Governance (CEACG), Helsinki, https://blogs.helsinki.fi/hu-ceacg/files/2019/04/Alcohol-marketing-on-social-media-sites-in-Finland-and-Sweden-2019.pdf (accessed on 22 October 2019). [117]

Kersbergen, I. and M. Field (2017), “Alcohol consumers’ attention to warning labels and brand information on alcohol packaging: Findings from cross-sectional and experimental studies”, *BMC Public Health*, Vol. 17/1, p. 123, http://dx.doi.org/10.1186/s12889-017-4055-8. [198]

KHNANES (2019), *Korea National Health and Nutrition Examination Survey*, Korea Disease Control and Prevention Agency, Cheongju-si, https://knhanes.cdc.go.kr/knhanes/sub01/sub01_02.do (accessed on 10 April 2020). [150]

Klinika Adiktologie (2020), *Alkohol Pod Kontrolou (Alcohol Under Control)*, Klinika Adiktologie, Prague, https://www.alkoholpodkontrolou.cz/. [216]

Knai, C. et al. (2015), “Are the Public Health Responsibility Deal alcohol pledges likely to improve public health? An evidence synthesis”, *Addiction*, Vol. 110/8, pp. 1232-1246, http://dx.doi.org/10.1111/add.12855. [182]

Kypri, K. et al. (2008), “Alcohol outlet density and university student drinking: A national study”, *Addiction*, Vol. 103/7, pp. 1131-1138, http://dx.doi.org/10.1111/j.1360-0443.2008.02239.x. [63]

Kypri, K. et al. (2011), “Effects of restricting pub closing times on night-time assaults in an Australian city”, *Addiction*, Vol. 106/2, pp. 303-310, http://dx.doi.org/10.1111/j.1360-0443.2010.03125.x. [49]

Kypri, K., P. Mcelduff and P. Miller (2014), “Restrictions in pub closing times and lockouts in Newcastle, Australia, five years on”, *Drug and Alcohol Review*, Vol. 33/3, pp. 323-326, http://dx.doi.org/10.1111/dar.12123. [50]

Laizans, J. (2019), “Latvia fires next salvo in Baltic booze battle”, *Reuters*, https://www.reuters.com/article/us-estonia-latvia-alcohol/latvia-fires-next-salvo-in-baltic-booze-battle-idUSKCN1U321V. [26]

Laughery, K. et al. (1993), “The noticeability of warnings on alcoholic beverage containers”, *Journal of Public Policy & Marketing*, Vol. 12/1, pp. 38-56, http://dx.doi.org/10.1177/074391569501200105. [201]

Lee, N. et al. (2016), “What works in school-based alcohol education: A systematic review”, *Health Education Journal*, Vol. 75/7, pp. 780-798, http://dx.doi.org/10.1177/0017896915612227. [219]

Leon, D. et al. (2007), “Hazardous alcohol drinking and premature mortality in Russia: A population based case-control study”, *Lancet*, Vol. 369/9578, pp. 2001-2009, http://dx.doi.org/10.1016/S0140-6736(07)60941-6. [234]

Livingston, M., T. Chikritzhs and R. Room (2007), “Changing the density of alcohol outlets to reduce alcohol-related problems”, *Drug and Alcohol Review*, Vol. 26/5, pp. 557-566, http://dx.doi.org/10.1080/09595230701499191. [54]

Lobstein, T. et al. (2017), “The commercial use of digital media to market alcohol products: a narrative review”, *Addiction*, Vol. 112, pp. 21-27, http://dx.doi.org/10.1111/add.13493. [115]

Lobstein, T. et al. (2017), “The commercial use of digital media to market alcohol products: A narrative review”, *Addiction*, Vol. 112, pp. 21-27, http://dx.doi.org/10.1111/add.13493. [113]

MacArthur, G. et al. (2018), “Individual-, family-, and school-level interventions targeting multiple risk behaviours in young people”, *Cochrane Database of Systematic Reviews*, Vol. 2018/10, p. CD009927, http://dx.doi.org/10.1002/14651858.CD009927.pub2. [221]

McNeal, R. et al. (2004), “How All Stars works: An examination of program effects on mediating variables”, *Health Education and Behavior*, Vol. 31/2, pp. 165-178, http://dx.doi.org/10.1177/1090198103259852. [230]

Meier, P. et al. (2016), “Estimated effects of different alcohol taxation and price policies on health inequalities: A mathematical modelling study”, *PLoS Medicine*, Vol. 13/2, p. e1001963, http://dx.doi.org/10.1371/journal.pmed.1001963. [18]

Midorikawa, H. et al. (2019), “Factors associated with high-risk drinking in older adults: Evidence from a national survey in Japan”, *Geriatrics & Gerontology International*, Vol. 19/12, pp. 1260-1267, http://dx.doi.org/10.1111/ggi.13808. [149]

Ministry of Health of the Republic of Latvia (2019), *The Ministry of Health is Calling for Stricter Restrictions on the Advertising and Availability of Alcoholic Beverages*, Ministry of Health of the Republic of Latvia, Riga, http://www.vm.gov.lv/lv/aktualitates/preses_relizes/6044_veselibas_ministrija_rosina_stingrak_ierobezot_alkoholisko_d/?utm_source=POLITICO.EU&utm_campaign=3dce6b1edd-EMAIL_CAMPAIGN_2019_07_05_02_37&utm_medium=email&utm_term=0_10959edeb5-3dce6b1edd-1891098. [60]

Morgenstern, M. et al. (2014), “Favourite alcohol advertisements and binge drinking among adolescents: A cross-cultural cohort study”, *Addiction*, Vol. 109/12, pp. 2005-2015, http://dx.doi.org/10.1111/add.12667. [87]

Moyer, A. and J. Finney (2015), “Brief interventions for alcohol misuse”, *Canadian Medical Association Journal*, Vol. 187/7, pp. 502-506, http://dx.doi.org/10.1503/cmaj.140254. [144]

Nagata, T. et al. (2008), “Effectiveness of a law to reduce alcohol-impaired driving in Japan”, *Injury Prevention*, Vol. 14/1, pp. 19-23, http://dx.doi.org/10.1136/ip.2007.015719. [73]

Naimi, T. et al. (2018), “Erosion of state alcohol excise taxes in the United States”, *Journal of Studies on Alcohol and Drugs*, Vol. 79/1, pp. 43-48, http://dx.doi.org/10.15288/jsad.2018.79.43. [22]

National Conference of State Legislatures (2018), *State Ignition Interlock Laws*, National Conference of State Legislatures, Denver, CO, https://www.ncsl.org/research/transportation/state-ignition-interlock-laws.aspx (accessed on 26 October 2020). [81]

Nesvåg, S. and J. McKay (2018), “Feasibility and effects of digital interventions to support people in recovery from substance use disorders: Systematic review”, *Journal of Medical Internet Research*, Vol. 20/8, p. e255, http://dx.doi.org/10.2196/jmir.9873. [159]

Newton, N. et al. (2009), “Climate Schools alcohol module: Cross-validation of a school-based prevention programme for alcohol misuse”, *The Australian and New Zealand Journal of Psychiatry*, Vol. 43/3, pp. 201-207, http://dx.doi.org/10.1080/00048670802653364. [226]

NHS (2016), *What Happens at an NHS Health Check?*, National Health Service, London, https://www.nhs.uk/conditions/nhs-health-check/what-happens-at-an-nhs-health-check-new/ (accessed on 30 October 2019). [143]

NHS Employers (2008), *Clinical Directed Enhanced Services (DES) Guidance for GMS Contract 2008/09: Delivering investment in general practice*, NHS Employers, London, https://www.lmc.org.uk/visageimages/guidance/2008/clinicaldesguidance.pdf. [142]

NIAAA (2005), *Alcohol Alert: Brief interventions*, National Institute on Alcohol Abuse and Alcoholism, Rockville, MD, https://pubs.niaaa.nih.gov/publications/aa66/aa66.htm. [167]

Nielsen, S. et al. (2012), *Calories Consumed from Alcoholic Beverages by US Adults, 2007-2010*, National Center for Health Statistics, Hyattsville, MD, http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.252.3551&rep=rep1&type=pdf (accessed on 14 October 2019). [175]

Noel, J., T. Babor and K. Robaina (2016), "Industry self-regulation of alcohol marketing: a systematic review of content and exposure research", *Addiction*, Vol. 112, pp. 28-50, http://dx.doi.org/10.1111/add.13410. [95]

Noel, J., C. Sammartino and S. Rosenthal (2020), "Exposure to digital alcohol marketing and alcohol use: A systematic review", *Journal of Studies on Alcohol and Drugs, Supplement* s19, pp. 57-67, http://dx.doi.org/10.15288/jsads.2020.s19.57. [123]

Nordic Alcohol and Drug Policy Network (2017), *Lithuania to raise legal drinking age, shorten alcohol selling hours*, Nordic Alcohol and Drug Policy Network, Türi, https://nordan.org/lithuania-to-raise-legal-drinking-age-shorten-alcohol-selling-hours/. [65]

Nutrition Institute (2020), *You Know What You Drink: Employing mobile application for reducing alcohol related harm*, Nutrition Institute, Ljubljana, https://www.nutris.org/en/programmes/you-know-what-you-drink-employing-mobile-application-for-reducing-alcohol-related-harm (accessed on 8 December 2020). [184]

Nutt, D., L. King and L. Phillips (2010), "Drug harms in the UK: A multicriteria decision analysis", *Lancet*, Vol. 376/9752, pp. 1558-1565, http://dx.doi.org/10.1016/S0140-6736(10)61462-6. [4]

O'Brien, K. et al. (2015), "Alcohol advertising in sport and non-sport TV in Australia, during children's viewing times", *PLoS One*, Vol. 10/8, p. e0134889, http://dx.doi.org/10.1371/journal.pone.0134889. [130]

O'Connor, S. et al. (2016), "Understanding factors affecting patient and public engagement and recruitment to digital health interventions: A systematic review of qualitative studies", *BMC Medical Informatics and Decision Making*, Vol. 16/1, p. 120, http://dx.doi.org/10.1186/s12911-016-0359-3. [160]

O'Donnell, A. et al. (2019), "Immediate impact of minimum unit pricing on alcohol purchases in Scotland: Controlled interrupted time series analysis for 2015-18", *BMJ*, Vol. 366, p. l5274, http://dx.doi.org/10.1136/bmj.l5274. [28]

O'Brien, K. et al. (2014), "Alcohol industry sponsorship and hazardous drinking in UK university students who play sport", *Addiction*, Vol. 109/10, pp. 1647-1654, http://dx.doi.org/10.1111/add.12604. [132]

OECD (2020), *Growing Up Online: Addressing the Needs of Children in the Digital Environment*, OECD, Paris, https://www.oecd.org/sti/ieconomy/growing-up-online.pdf. [104]

OECD (2020), *OECD Reviews of Public Health: Korea: A Healthier Tomorrow*, OECD Reviews of Public Health, OECD Publishing, Paris, https://doi.org/10.1787/be2b7063-en. [71]

OECD (2018), *Consumption Tax Trends 2018: VAT/GST and Excise Rates, Trends and Policy Issues*, OECD, Paris, https://doi.org/10.1787/19990979. [21]

OECD (2016), *Illicit Trade: Converging Criminal Networks*, OECD, Paris, https://doi.org/10.1787/19934106. [27]

OECD (2012), *The Protection of Children Online: Risks Faced by Children Online and Policies to Protect Them*, OECD, Paris, https://doi.org/10.1787/20716826. [119]

OECD.Stat (2019), *Non-medical determinants of health: overweight or obese population, measured*, OECD, Paris, https://stats.oecd.org/index.aspx?queryid=30128#. [177]

Ofcom (2018), *A Decade of Digital Dependency*, Ofcom, London, https://www.ofcom.org.uk/about-ofcom/latest/media/media-releases/2018/decade-of-digital-dependency. [102]

Ofcom (2017), *Communications Market Report*, Ofcom, London, https://www.ofcom.org.uk/__data/assets/pdf_file/0017/105074/cmr-2017-uk.pdf. [106]

ONS (2011), *General Lifestyle Survey: 2011*, Office for National Statistics, London, https://www.ons.gov.uk/peoplepopulationandcommunity/personalandhouseholdfinances/incomeandwealth/compendium/generallifestylesurvey/2013-03-07 (accessed on 10 April 2020). [151]

Osilla, K. et al. (2010), "Exploring productivity outcomes from a brief intervention for at-risk drinking in an employee assistance program", *Addictive Behaviors*, Vol. 35/3, pp. 194-200, http://dx.doi.org/10.1016/j.addbeh.2009.10.001. [156]

Petticrew, M. et al. (2017), "Provision of information to consumers about the calorie content of alcoholic drinks: did the Responsibility Deal pledge by alcohol retailers and producers increase the availability of calorie information?", *Public Health*, Vol. 149, pp. 159-166, http://dx.doi.org/10.1016/j.puhe.2017.04.020. [183]

Pierce, H. et al. (2019), "Regulation of alcohol marketing in Australia: A critical review of the Alcohol Beverages Advertising Code Scheme's new Placement Rules", *Drug and Alcohol Review*, Vol. 38/1, pp. 16-24, http://dx.doi.org/10.1111/dar.12872. [98]

Public Health Scotland (2020), *Statistical Analysis of Off-Trade Alcohol Sales in the Year Following MUP Published*, Public Health Scotland, Edinburgh, https://www.publichealthscotland.scot/news/2020/june/statistical-analysis-of-off-trade-alcohol-sales-in-the-year-following-mup-published/ (accessed on 26 June 2020). [36]

Reeve, B. (2018), "Regulation of alcohol advertising in Australia: Does the ABAC scheme adequately protect young people from marketing of alcoholic beverages", *QUT Law Review*, Vol. 18/1, pp. 96-123, https://doi.org/10.5204/qutlr.v18i1.738. [96]

Rehm, J. (2011), "The risks associated with alcohol use and alcoholism", *Alcohol Research and Health*, Vol. 34/2, pp. 135-143. [1]

Rehm, J., M. Štelemėkas and R. Badaras (2018), "Research protocol to evaluate the effects of alcohol policy changes in Lithuania", *Alcohol and Alcoholism*, Vol. 54/1, pp. 112-118, http://dx.doi.org/10.1093/alcalc/agy068. [59]

Rehm, J., M. Štelemėkas and R. Badaras (2018), "Research protocol to evaluate the effects of alcohol policy changes in Lithuania", *Alcohol and Alcoholism*, Vol. 54/1, pp. 112-118, http://dx.doi.org/10.1093/alcalc/agy068. [232]

Ringwalt, C. et al. (2009), "The potential of coaching as a strategy to improve the effectiveness of school-based substance use prevention curricula", *Health Education and Behavior*, Vol. 36/4, pp. 696-710, http://dx.doi.org/10.1177/1090198107303311. [231]

Rösner, S. et al. (2010), "Acamprosate for alcohol dependence", *Cochrane Database of Systematic Reviews* 9, p. CD004332, http://dx.doi.org/10.1002/14651858.CD004332.pub2. [169]

Rossow, I. and T. Norström (2012), "The impact of small changes in bar closing hours on violence: The Norwegian experience from 18 cities", *Addiction*, Vol. 107/3, pp. 530-537, http://dx.doi.org/10.1111/j.1360-0443.2011.03643.x. [51]

Saar, I. (2009), "The social costs of alcohol misuse in Estonia", *European Addiction Research*, Vol. 15/1, pp. 56-62, http://dx.doi.org/10.1159/000173010. [153]

Sargent, J. and T. Babor (2020), "The relationship between exposure to alcohol marketing and underage drinking is causal", *Journal of Studies on Alcohol and Drugs, Supplement* s19, pp. 113-124, http://dx.doi.org/10.15288/jsads.2020.s19.113. [84]

Sargent, J., S. Cukier and T. Babor (2020), "Alcohol marketing and youth drinking: Is there a causal relationship, and why does it matter?", *Journal of Studies on Alcohol and Drugs, Supplement* s19, pp. 5-12, http://dx.doi.org/10.15288/jsads.2020.s19.5. [83]

Sassi, F. (2015), *Tackling Harmful Alcohol Use: Economics and public health policy*, OECD, Paris, http://www.oecd-ilibrary.org/docserver/download/8113021e.pdf?expires=1501487870&id=id&accname=ocid84004878&checksum=5F1850A0940BBA80AE2AF16341FB4658. [31]

Schelleman-Offermans, K., R. Roodbeen and P. Lemmens (2017), "Increased minimum legal age for the sale of alcohol in the Netherlands as of 2014: The effect on alcohol sellers' compliance after one and two years", *International Journal of Drug Policy*, Vol. 49, pp. 8-14, http://dx.doi.org/10.1016/J.DRUGPO.2017.07.016. [66]

Scholes-Balog, K., J. Heerde and S. Hemphill (2012), "Alcohol warning labels: Unlikely to affect alcohol-related beliefs and behaviours in adolescents", *Australian and New Zealand Journal of Public Health*, Vol. 36/6, pp. 524-529, http://dx.doi.org/10.1111/j.1753-6405.2012.00934.x. [192]

Schölin, L. (2016), *Prevention of Harm Caused by Alcohol Exposure in Pregnancy: Rapid review and case studies from Member States*, WHO Regional Office for Europe, Copenhagen, https://www.euro.who.int/__data/assets/pdf_file/0005/318074/Prevention-harm-caused-alcohol-exposure-pregnancy.pdf. [217]

Schoueri-Mychasiw, N. et al. (2020), "Examining the impact of alcohol labels on awareness and knowledge of national drinking guidelines: A real-world study in Yukon, Canada", *Journal of Studies on Alcohol and Drugs*, Vol. 81/2, pp. 262-272, http://dx.doi.org/10.15288/jsad.2020.81.262. [191]

Schulte, B. et al. (2014), "Alcohol screening and brief intervention in workplace settings and social services: A comparison of literature", *Frontiers in Psychiatry*, Vol. 5/SEP, http://dx.doi.org/10.3389/fpsyt.2014.00131. [152]

Scottish Government (2018), *Drink-drive Limit: Policy*, Scottish Government, Edinburgh, https://www.gov.scot/publications/drink-drive-limit-policy/ (accessed on 18 October 2019). [70]

Scottish Government (2018), *Implementation of Minimum Pricing for Alcohol: Guidance*, Scottish Government, Edinburgh, https://www.gov.scot/publications/guidance-implementation-minimum-pricing-alcohol/. [45]

Shelton, N. and C. Knott (2014), "Association between alcohol calorie intake and overweight and obesity in English adults", *American Journal of Public Health*, Vol. 104/4, pp. 629-631, http://dx.doi.org/10.2105/AJPH.2013.301643. [174]

Sherk, A. et al. (2019), "Calorie intake from alcohol in Canada: Why new labelling requirements are necessary", *Canadian Journal of Dietetic Practice and Research*, Vol. 80/3, pp. 111-115, http://dx.doi.org/10.3148/cjdpr-2018-046. [172]

Sherk, A. et al. (2018), "Alcohol consumption and the physical availability of take-away alcohol: Systematic reviews and meta-analyses of the days and hours of sale and outlet density", *Journal of Studies on Alcohol and Drugs*, Vol. 79/1, pp. 58-67, http://dx.doi.org/10.15288/jsad.2018.79.58. [52]

Siggins Miller (2017), *Appendices*, Siggins Miller, Kenmore, https://www1.health.gov.au/internet/fr/publishing.nsf/Content/C35B5AC81AED240FCA2581EE001B80B0/$File/AU 2nd Evaluation 2017 Appendices.pdf. [170]

Sim, F. (2015), "Alcoholic drinks contribute to obesity and should come with mandatory calorie counts", *BMJ*, Vol. 350, pp. h2047-h2047, http://dx.doi.org/10.1136/bmj.h2047. [178]

Simons, A. and W. van Dalen (2017), *Alcohol Marketing on Social Media: The impact of alcohol marketing via social media on young people*, European Centre for Monitoring Alcohol Marketing, Utrecht, http://eucam.info/wp-content/uploads/2018/02/lit-rev-online-alcohol-marketing-2017-2.pdf. [108]

Sinclair, J. et al. (2019), "The acceptability of addressing alcohol consumption as a modifiable risk factor for breast cancer: A mixed method study within breast screening services and symptomatic breast clinics.", *BMJ Open*, Vol. 9/6, p. e027371, http://dx.doi.org/10.1136/bmjopen-2018-027371. [215]

Smith, L. and D. Foxcroft (2009), "The effect of alcohol advertising, marketing and portrayal on drinking behaviour in young people: Systematic review of prospective cohort studies", *BMC Public Health*, Vol. 9, p. 51, http://dx.doi.org/10.1186/1471-2458-9-51. [85]

Sornpaisarn, B. et al. (2017), *Resource Tool on Alcohol Taxation and Pricing Policies*, World Health Organization, Geneva, https://www.who.int/substance_abuse/publications/tax_book/en/. [11]

STAP (2007), *Appendix: Regulations of alcohol marketing in 24 European Countries*, National Foundation for Alcohol Prevention, Utrecht, https://ec.europa.eu/health/ph_projects/2004/action3/docs/2004_3_16_frep_a2b_en.pdf. [92]

Stockwell, T. (2006), *A Review of Research into the Impacts of Alcohol Warning Labels on Attitudes and Behaviour*, Centre for Addictions Research of BC, Victoria, https://dspace.library.uvic.ca/bitstream/handle/1828/4785/Alcohol%20Warning%20Labels%202006.pdf?s (accessed on 15 October 2019). [194]

Subbaraman, M. (2016), “Substitution and complementarity of alcohol and cannabis: A review of the literature”, *Substance Use and Misuse*, Vol. 51/11, pp. 1399-1414, http://dx.doi.org/10.3109/10826084.2016.1170145. [23]

Tait, R. et al. (2019), “A digital intervention addressing alcohol use problems (the “Daybreak” program): Quasi-experimental randomized controlled trial”, *Journal of Medical Internet Research*, Vol. 21/9, p. e14967, http://dx.doi.org/10.2196/14967. [166]

Taylor, B. and J. Rehm (2012), “The relationship between alcohol consumption and fatal motor vehicle injury: High risk at low alcohol levels”, *Alcoholism: Clinical and Experimental Research*, Vol. 36/10, pp. 1827-1834, http://dx.doi.org/10.1111/j.1530-0277.2012.01785.x. [68]

Teesson, M., N. Newton and E. Barrett (2012), “Australian school-based prevention programs for alcohol and other drugs: A systematic review”, *Drug and Alcohol Review*, Vol. 31/6, pp. 731-736, http://dx.doi.org/10.1111/j.1465-3362.2012.00420.x. [220]

Teesson, M. et al. (2020), “Combined prevention for substance use, depression, and anxiety in adolescence: a cluster-randomised controlled trial of a digital online intervention”, *Lancet Digital Health*, Vol. 2/2, pp. e74-e84, http://dx.doi.org/10.1016/S2589-7500(19)30213-4. [225]

The Business Research Company (2019), *Sports Global Market Opportunities And Strategies To 2022*, The Business Research Company, Bangalore, https://www.thebusinessresearchcompany.com/report/sports-market. [126]

Thomas, G. et al. (2014), “The effectiveness of alcohol warning labels in the prevention of fetal alcohol spectrum disorder: A brief review”, *International Journal of Alcohol and Drug Research*, Vol. 3/1, p. 91, http://dx.doi.org/10.7895/ijadr.v3i1.126. [195]

Thomson, L., B. Vandenberg and J. Fitzgerald (2012), “An exploratory study of drinkers views of health information and warning labels on alcohol containers”, *Drug and Alcohol Review*, Vol. 31/2, pp. 240-247, http://dx.doi.org/10.1111/j.1465-3362.2011.00343.x. [202]

TNS BMRB (2016), *THINK! Drink Drive Presentation*, Department for Transport, London, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/525880/drink-drive-2015-16-evaluation-full-results.pdf. [212]

U.S. Department of Health and Human Services (2015), *Dietary Guidelines for Americans 2015-2020, 8th edition*, U.S. Department of Health and Human Services, Washington DC, https://health.gov/dietaryguidelines/2015/resources/2015-2020_Dietary_Guidelines.pdf. [176]

UK Home Office (2017), *Guidance on Banning the Sale of Alcohol Below the Cost of Duty Plus VAT: For suppliers of alcohol and enforcement authorities in England and Wales*, UK Home Office, London, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/619234/2017-03-13_HO_Guidance_on_BBCS__1_.pdf. [29]

United Nations (2019), *SDG Indicators: Metadata repository*, United Nations, New York, https://unstats.un.org/sdgs/metadata/. [9]

US Department of Transportation (2017), *Countermeasures that Work: A highway safety countermeasure guide for state highway safety offices*, US Department of Transportation, Washington DC, https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/812478_countermeasures-that-work-a-highway-safety-countermeasures-guide-.pdf. [78]

Van Hoof, J. (2017), “The effectiveness of ID readers and remote age verification in enhancing compliance with the legal age limit for alcohol”, *European Journal of Public Health*, Vol. 27/2, pp. 357-359, http://dx.doi.org/10.1093/eurpub/ckw183. [64]

Vanlaar, W., M. Mainegra Hing and R. Robertson (2017), “An evaluation of Nova Scotia’s alcohol ignition interlock program”, *Accident Analysis and Prevention*, Vol. 100, pp. 44-52, http://dx.doi.org/10.1016/j.aap.2016.12.017. [79]

VBF (2018), *Prohibition of Alcohol Advertising in Norway*, Association of Norwegian Wine and Spirits Suppliers, Oslo, https://www.nhomd.no/contentassets/2903e65252854beda11b61c0e8d41a2d/prohibition-of-alcohol-advertising-in-norway--0918.pdf. [91]

Vecchio, R., A. Annunziata and A. Mariani (2018), “Is more better? Insights on consumers’ preferences for nutritional information on wine labelling”, *Nutrients*, Vol. 10/11, p. 1667, http://dx.doi.org/10.3390/nu10111667. [180]

Vogl, L. et al. (2012), “Developing a school-based drug prevention program to overcome barriers to effective program implementation: The Climate Schools alcohol module”, *Open Journal of Preventive Medicine*, Vol. 2/3, pp. 410-422, http://dx.doi.org/10.4236/ojpm.2012.23059. [224]

Wagenaar, A., M. Salois and K. Komro (2009), “Effects of beverage alcohol price and tax levels on drinking: A meta-analysis of 1003 estimates from 112 studies”, *Addiction*, Vol. 104/2, pp. 179-190, http://dx.doi.org/10.1111/j.1360-0443.2008.02438.x. [15]

Wagenaar, A., A. Tobler and K. Komro (2010), “Effects of alcohol tax and price policies on morbidity and mortality: A systematic review”, *American Journal of Public Health*, Vol. 100/11, pp. 2270-2278, http://dx.doi.org/10.2105/AJPH.2009.186007. [16]

Wakefield, M., B. Loken and R. Hornik (2010), “Use of mass media campaigns to change health behaviour”, *Lancet*, Vol. 376/9748, pp. 1261-1271, http://dx.doi.org/10.1016/S0140-6736(10)60809-4. [208]

Walker, N. et al. (2019), *Energy Labelling for Alcoholic Beverages in New Zealand: Consumer perceptions. Phase 1 report: Focus groups*, Health Promotion Agency, Wellington, https://www.hpa.org.nz/sites/default/files/documents/Energy labelling for alcoholic beverages in New Zealand research report Phase 1 March 2019.pdf. [186]

Walker, N. et al. (2019), *Energy Labelling for Alcoholic Beverages in New Zealand: Impact on consumer purchase and consumption. Phase 2 report: Randomised trial*, Health Promotion Agency, Wellington, https://www.hpa.org.nz/sites/default/files/documents/Energy_labelling_for_alcoholic_beverages_in_New_Zealand_Phase_2_research_report_March_2019.pdf. [187]

Watson, H. et al. (2015), “Screening and brief intervention delivery in the workplace to reduce alcohol-related harm: A pilot randomized controlled trial”, *International Journal of Nursing Studies*, Vol. 52/1, pp. 39-48, http://dx.doi.org/10.1016/j.ijnurstu.2014.06.013. [158]

Welsh Government (2020), *Minimum Pricing for Alcohol: Guidance for Retailers*, Welsh Government, Cardiff, https://gov.wales/minimum-pricing-alcohol-guidance-retailers (accessed on 18 October 2020). [46]

WHO (2020), *Accelerating Action to Reduce the Harmful Use of Alcohol: Draft decision proposed by Bangladesh, Bhutan, India, Indonesia, Islamic Republic of Iran, Russian Federation, Sri Lanka, Thailand and Viet Nam*, World Health Organization, Geneva, http://apps.who.int/gb/ebwha/pdf_files/EB146/B146_CONF1-en.pdf. [238]

WHO (2020), *Global Information System on Alcohol and Health (GISAH)*, World Health Organization, Geneva, https://www.who.int/data/gho/data/themes/global-information-system-on-alcohol-and-health (accessed on 28 October 2020). [10]

WHO (2018), *Global Information System on Alcohol and Health (GISAH): Consumer information by country*, World Health Organization, Geneva, https://apps.who.int/gho/data/node.gisah.A1290?lang=en&showonly=GISAH. [181]

WHO (2018), *Global Information System on Alcohol and Health (GISAH): Legislation on alcohol testing at workplaces*, World Health Organization, Geneva, https://apps.who.int/gho/data/node.gisah.A1250?lang=en&showonly=GISAH. [155]

WHO (2018), *Global Information System on Alcohol and Health (GISAH): Sporting events by country*, World Health Organization, Geneva, https://apps.who.int/gho/data/node.gisah.A1168?lang=en&showonly=GISAH. [133]

WHO (2018), *Global Information System on Alcohol and Health (GISAH): Value-added tax (VAT) on alcohol by country*, World Health Organization, Geneva, https://apps.who.int/gho/data/node.gisah-searo.A1187?lang=en&showonly=GISAH. [20]

WHO (2018), *Global Status Report on Alcohol and Health 2018*, World Health Organization, Geneva, https://apps.who.int/iris/bitstream/handle/10665/274603/9789241565639-eng.pdf?ua=1 (accessed on 10 September 2019). [121]

WHO (2018), *SAFER: A World Free from Alcohol Related Harms*, World Health Organization, Geneva, https://www.who.int/substance_abuse/safer/msb_safer_brochure.pdf. [8]

WHO (2017), *Tackling NCDs: "Best Buys" and Other Recommended Interventions for the Prevention and Control of Noncommunicable Diseases*, World Health Organization, Geneva, https://apps.who.int/iris/bitstream/handle/10665/259232/WHO-NMH-NVI-17.9-eng.pdf;jsessionid=3E76AC01272E9377F8382B8BC19545AF?sequence=1 (accessed on 10 September 2019). [7]

WHO (2014), *Global Health Observatory: Screening and brief intervention for substance use in antenatal services*, World Health Organization, Geneva, https://www.who.int/data/gho/data/indicators/indicator-details/GHO/recommendations-for-screening-and-brief-interventions-for-substance-use-in-antenatal-services. [145]

WHO (2013), *Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2013-2020*, World Health Organization, Geneva, https://apps.who.int/iris/bitstream/handle/10665/94384/9789241506236_eng.pdf. [6]

WHO (2010), *Brief Intervention: The ASSIST-linked brief intervention for hazardous and harmful substance use – manual for use in primary care*, World Health Organization, Geneva, https://apps.who.int/iris/bitstream/handle/10665/44321/9789241599399_eng.pdf?sequence=1&isAllowed=y. [137]

WHO (2010), *Global Strategy to Reduce the Harmful Use of Alcohol*, World Health Organization, Geneva, https://www.who.int/publications/i/item/9789241599931. [5]

WHO (2003), *Article 11 of the WHO Framework Convention on Tobacco Control: Packaging and labelling of tobacco products*, World Health Organization, Geneva, https://www.who.int/tobacco/industry/product_regulation/art_11_fctc/en/. [199]

WHO Regional Office for Europe (2020), *Alcohol Pricing in the WHO European Region: Update report on the evidence and recommended policy action*, WHO Regional Office for Europe, Copenhagen, https://apps.who.int/iris/bitstream/handle/10665/336159/WHO-EURO-2020-1239-40989-55614-eng.pdf?sequence=1&isAllowed=y. [25]

WHO Regional Office for Europe (2019), *Alcohol Policy Impact Study: The effects of alcohol control measures on mortality and life expectancy in the Russian Federation*, WHO Regional Office for Europe, Copenhagen, https://apps.who.int/iris/bitstream/handle/10665/328167/9789289054379-eng.pdf?sequence=1&isAllowed=y. [44]

WHO Regional Office for Europe (2018), *Monitoring and Restricting Digital Marketing of Unhealthy Products to Children and Adolescents*, WHO Regional Office for Europe, Copenhagen, http://www.euro.who.int/__data/assets/pdf_file/0008/396764/Online-version_Digital-Mktg_March2019.pdf. [107]

WHO Regional Office for Europe (2017), *Policy in Action: A tool for measuring alcohol policy implementation*, WHO Regional Office for Europe, Copenhagen, https://www.euro.who.int/en/health-topics/disease-prevention/alcohol-use/publications/2017/policy-in-action-a-tool-for-measuring-alcohol-policy-implementation-2017 (accessed on 23 July 2020). [236]

WHO Regional Office for Europe (2014), *European Status Report on Alcohol and Health: Pricing policies*, WHO Regional Office for Europe, Copenhagen, http://www.euro.who.int/__data/assets/pdf_file/0003/244902/Pricing-policies.pdf. [30]

WHO Regional Office for the Americas (2018), *Alcohol Policy Scoring: Assessing the level of implementation of the WHO global strategy to reduce the harmful use of alcohol in the Region of the Americas*, WHO Regional Office for the Americas, Washington DC, https://iris.paho.org/bitstream/handle/10665.2/49679/9789275120453_eng.pdf?sequence=2&isAllowed=y. [90]

Wilkinson, C., M. Livingston and R. Room (2016), "Impacts of changes to trading hours of liquor licences on alcohol-related harm: a systematic review 2005–2015", *Public Health Research & Practice*, Vol. 26/4, p. 2641644, http://dx.doi.org/10.17061/phrp2641644. [48]

Witkiewitz, K., K. Saville and K. Hamreus (2012), "Acamprosate for treatment of alcohol dependence: Mechanisms, efficacy, and clinical utility", *Therapeutics and Clinical Risk Management*, Vol. 8, pp. 45-53, http://dx.doi.org/10.2147/TCRM.S23184. [168]

Wolfenden, L. et al. (2018), "Strategies to improve the implementation of workplace-based policies or practices targeting tobacco, alcohol, diet, physical activity and obesity", *Cochrane Database of Systematic Reviews*, Vol. 11/11, p. CD012439, http://dx.doi.org/10.1002/14651858.CD012439.pub2. [148]

Wutzke, S. et al. (2002), "The long-term effectiveness of brief interventions for unsafe alcohol consumption: A 10-year follow-up", *Addiction*, Vol. 97/6, pp. 665-675, http://dx.doi.org/10.1046/j.1360-0443.2002.00080.x. [162]

Yadav, R. and M. Kobayashi (2015), "A systematic review: Effectiveness of mass media campaigns for reducing alcohol-impaired driving and alcohol-related crashes.", *BMC Public Health*, Vol. 15/1, p. 857, http://dx.doi.org/10.1186/s12889-015-2088-4. [211]

Young, B. et al. (2018), "Effectiveness of mass media campaigns to reduce alcohol consumption and harm: A systematic review", *Alcohol and Alcoholism*, Vol. 53/3, pp. 302-316, http://dx.doi.org/10.1093/alcalc/agx094. [210]

Zhao, J. et al. (2020), "The effects of alcohol warning labels on population alcohol consumption: An interrupted time series analysis of alcohol sales In Yukon, Canada", *Journal of Studies on Alcohol and Drugs*, Vol. 81/2, pp. 225-237, http://dx.doi.org/10.15288/jsad.2020.81.225. [204]

Notes

[1] On 7 February 2020, the WHO announced plans to replace the 2010 Global Strategy with a new action plan, spanning 2022-2030 (WHO, 2020[238]).

[2] A standard drink is a measure of alcohol consumption in a drink and differs across beverage types and countries. In Australia, for example, one standard drink includes 10 g of alcohol, so a 750 mL bottle of wine (13.5% ABV) contains eight standard drinks (Australian Government Department of Health, 2019[237]).

[3] In Portugal, there is a national legal requirement to display consumer information on calories, additives, vitamins and microelements for wine; however, this requirement applies to neither beer nor spirits. In Norway, legislation has been passed to introduce nutritional value labelling, but at the time of writing the legislation had not yet been implemented (WHO, 2018[181]).

[4] A range of indicators were used to assess implementation status across the ten alcohol policy areas. An overview is provided here; for further details on the methodology, please see *Alcohol Policy Scoring* (WHO Regional Office for the Americas, 2018[90]). The following indicators were used to score each alcohol policy dimension:

- **Leadership** – national policy document on alcohol; definition of an alcoholic beverage; definition of a standard drink; awareness activities.
- **Health services** – SBIs; special treatment programmes; pharmacological treatment.
- **Community** – school-based prevention and reduction; work-place alcohol problem prevention and counselling.
- **Drink-driving** – BAC limit; sobriety checkpoints; randomised breath testing; penalties.
- **Availability** – minimum age; control of retail sales; restrictions on time of sale; restrictions on place of sale, alcohol free environments and restrictions of alcohol sales at specific events
- **Marketing** – legally binding restrictions on: advertising; product placement; sport sponsorship and youth events; promotions by producers, retailers and owners of pubs and bars.
- **Pricing** – tax adjusted for inflation; affordability; other price measures.
- **Reducing harm** – server training; health warning labels.
- **Public health impact** – estimate of unrecorded alcohol consumption; legislation to prevent illegal production and sale of alcohol.
- **Monitoring and surveillance** – national monitoring system.

Due to data availability, the Kingdom of Saudi Arabia was omitted from the analysis.

Limitations: the following sub-policies were excluded due to data availability: 1.1, 1.4, 3.2, 3.3, 7.2, 9.1 and 10.2. For certain indicators, due to the clustering of scores (i.e. countries with the same score), dividing countries into four quartiles was not possible (e.g. for “Reduce PH impact” and “Community”). Because the number of countries is not divisible by four, and given the minimal variation in scores across countries, an equal number of countries in quartiles was not possible.

7 Impact of alcohol policies on health and the economy

Marion Devaux, Alexandra Aldea, Yvan Guillemette, Jane Cheatley, Laura Suhlrie, Aliénor Lerouge and Michele Cecchini

This chapter presents results from modelling the implementation of ten policy interventions, including workplace and school-based programmes; increased alcohol taxation and minimum unit pricing; restrictions on outlet opening hours and drink-driving; regulation of alcohol advertising and statutory bans on advertising to children; counselling in primary care; and personalised pharmacological treatment of alcohol dependence. In addition, the impact of four policy packages is shown, including a mixed package of mostly existing policies; a modified version of the mixed package, boosted by innovative policies; a package of alcohol availability restriction measures; and a package of policies promoting individual responsibility. Results are presented for 48 countries, including OECD countries, other non-OECD European Union (EU27) member states and Brazil, the People's Republic of China, Costa Rica, India, the Russian Federation and South Africa. A particularly innovative aspect of this analysis is its focus not only on health outcomes but also on economic outcomes, including the policy impacts on health spending, employment and productivity of workers and gross domestic product (GDP) of countries.

Key findings

Policies to tackle harmful alcohol consumption reduce the burden of diseases and save lives

- According to the simulation, population-wide interventions such as increased taxation, minimum unit pricing (MUP) and sobriety checkpoints will produce the largest health gains, resulting in between 1.1 million and 1.5 million life years (LYs) gained annually in the 48 countries included in the analysis.
- MUP will help avoid the largest number of alcohol dependence cases annually in all the modelled countries (2.4 million), and sobriety checkpoints the largest number of injuries annually (1.5 million). Advertising regulation and workplace and school-based programmes will generally have the weakest effect on disease incidence.
- The effect of interventions is larger on disability-adjusted life years (DALYs) than on LYs. This is especially true for measures to counter drink-driving and restrictions on outlet opening hours, as these interventions largely affect lethal and non-lethal injuries.

Policies to tackle harmful alcohol consumption generate savings in health expenditure

- All interventions will have a significant impact on health expenditure. After adjusting for purchasing power parity (PPP), cumulatively savings range from USD PPP 6 billion (for workplace programmes) to USD PPP 207 billion (for MUP) between 2020 and 2050 in the 48 countries studied.
- The medical expenditure savings resulting from taxation, MUP and sales hours restrictions are greater than the cost of running the interventions. In a few cases, the cost of running the intervention is higher than the health expenditure savings, as in the cases of advertising regulation and bans, counselling in primary care and sobriety checkpoints in Colombia, Mexico, non-OECD European Union (EU27) and Group of 20 (G20) countries. For three interventions (workplace programmes, school-based programmes and treatment of dependence), the cost of running the interventions is higher than the health expenditure savings in virtually all countries studied.

By reducing the burden of diseases caused by harmful alcohol consumption, policies improve employment and productivity, and have high returns on investment

- Most interventions are predicted to have a significant impact on employment and productivity. For example, taxation will help add 1 180 000 workers to the workforce each year in all countries. Most of this effect will come from an increase in employment rates (809 000 workers), followed by reductions in presenteeism (267 000 workers) and absenteeism (122 000 workers). The effect on early retirement is small.
- Investing in interventions to tackle harmful alcohol use is very profitable for countries. For every USD PPP 1 invested in seven out of ten interventions, countries will see a return between USD PPP 2 and USD PPP 183 in the form of economic benefit each year.
- There are regional differences in policy intervention effect, but they are outcome-dependent. For example, the interventions that performed the best overall – taxation, MUP and sobriety checkpoints – will have a larger impact on the population-standardised health burden in the Russian Federation, the Baltic countries, Hungary and Poland, mainly owing to higher alcohol consumption there. On the other hand, their effect on population-standardised health expenditure will be stronger in the United States, Luxembourg, Austria, Germany and Denmark (even after adjusting for PPP), primarily owing to the higher medical costs in these countries.

Policy packages to tackle harmful alcohol consumption produce greater results

- Combining interventions in prevention packages will return higher benefits. Investing in a mixed package to upscale policies already in place in many OECD countries will result in a gain of 3.5 million LYs per year across all the 48 countries included in the analysis and will save about USD PPP 16 billion annually in health expenditure.
- A mixed package complemented by innovative, promising interventions (MUP and statutory bans on alcohol advertising targeting children) shows the best results. The “mixed package plus” will result in a gain of 4.6 million LYs per year across all countries and in health expenditure savings of USD PPP 28 billion annually.
- The prevention packages also have a significant effect on the labour market and the economy. The mixed package and mixed package plus will save between USD PPP 55 billion and USD PPP 90 billion per year in labour market costs in all countries owing to lower rates of absenteeism, presenteeism and early retirement, and to higher employment. For every USD PPP 1 invested in one of these two packages, countries will see a return of at least USD PPP 13 in the form of economic benefit each year.
- A package to restrict alcohol availability is predicted to produce smaller – but still significant – effects, leading to a gain of 2.6 million LYs each year and saving USD PPP 4 billion in health expenditure and USD PPP 27 billion in labour-related costs per year in the 48 countries.
- A package to promote individual responsibility is predicted to produce a gain of 2.2 million LYs each year and save nearly USD PPP 7 billion in health expenditure and USD PPP 21.5 billion in labour-related costs per year in the 48 countries.

7.1. Many effective policies exist to tackle the health and economic burden of harmful alcohol use

Harmful use of alcohol causes important direct and indirect human and financial costs for societies. The findings presented in Chapter 4 show that consuming more than 1 drink[1] per day for women and 1.5 drinks per day for men is responsible for a reduction in life expectancy of about 0.9 years across OECD countries and that treating alcohol-related diseases costs, on average, about 2.4% of the health expenditure of these countries. The burden of disease caused by consuming more than 1 drink per day for women and 1.5 drinks per day for men also has an impact on the broader economy: a reduction in workforce size and in productivity affects gross domestic product (GDP) and leads to an increase in fiscal pressure.

Many effective policy interventions exist to scale up national policy action to deal with the burden of harmful alcohol use. Policy actions include reinforcing regulation and pricing policy, increasing people’s awareness and empowerment through information and education, and prevention and treatment within the health care sector. As shown in Chapter 6, nearly all OECD, EU27, G20 and OECD accession and selected partner countries have adopted a national written policy on alcohol, while only one-third have an aligning action plan to implement the national policy. Policy gaps remain either because, as the available evidence suggests, some of the policies currently in place would be more effective if they were redesigned or strengthened – for instance, restrictions on sales hours or advertising regulations – or because countries can now choose to implement additional policy interventions such as minimum unit pricing. This chapter reports the findings of an analysis model (Box 7.1) developed to help countries close these policy gaps. This assesses and compares the health and economic impact of a number of policy interventions aligned with the key areas for national action listed in the 2010 World Health Organization (WHO) *Global Strategy to Reduce the Harmful Use of Alcohol* (WHO, 2010[1]), and with the WHO “best buys” to reduce harmful use of alcohol and NCDs (WHO, 2017[2]).

The main objective of the analysis is to evaluate whether the implementation of a selected number of policy interventions, scaled up to national levels, can reduce the health and economic burden of harmful alcohol use; the extent of that reduction; and whether those actions would represent a good investment for governments. The choice of the interventions to be modelled is based on a number of criteria, including the availability of high-quality quantitative evidence to feed the OECD Strategic Public Health Planning for non-communicable diseases (SPHeP-NCDs) model (for more information see Box 4.1 in Chapter 4). The effects of each intervention are presented, along with the possible impact of combining different interventions. Results are presented for 48 countries including OECD countries, non-OECD EU27 member countries as well as Brazil, the People's Republic of China, Costa Rica, India, the Russian Federation and South Africa.[2] All interventions are modelled on the assumption that they were implemented in 2020, and their effectiveness is assessed over the period 2020-50.

Box 7.1. Calculating the return on investment from policy interventions to tackle harmful alcohol use with the OECD SPHeP-NCDs model

The evaluation of policy interventions employs the OECD SPHeP-NCD model described in Box 4.1 in Chapter 4.

Whether a particular policy intervention will work in a given context depends on a number of factors, some of which can be location-specific. For example, the return on investment of an intervention may depend not only on its general efficacy but also on the local medical costs of treating related diseases and complications; demographic structure; epidemiological burden and the cost of intervention implementation. Within the OECD SPHeP-NCDs model, interventions are modelled using the following four key parameters:

- Effectiveness of interventions at the individual level. This parameter captures how individual behaviour changes following exposure to the interventions. As far as possible, this evidence is taken from peer-reviewed meta-analyses – preferably from randomised controlled trials.
- Time to the maximum effectiveness achieved and effectiveness over time. The effects of an intervention can be time-limited and/or time-dependent, with the relationship generally becoming stronger at first and then fading out. This parameter describes changes in the effectiveness of interventions over time.
- Intervention coverage, including descriptions of eligible populations and their exposure. For example, some interventions may only affect a subset of a population (such as individuals in certain age groups or with particular risk factors). In addition, in some cases, only a proportion of the eligible population may be exposed, such as only those who visit primary care providers and are willing to participate.
- Implementation cost. The implementation of an intervention may entail a number of costs including, for example, costs related to its planning, administration, monitoring and evaluation and so on. In addition, interventions may involve providing some form of equipment or material to be delivered to the target population (e.g. brochures). The evaluation of both costs and benefits take a societal perspective. So, for example, the cost category considers spending for running the interventions (e.g. expenditure on pharmaceuticals), while benefits used to calculate the return on investment include health expenditure saved by the government, by the social insurance schemes or by individuals. The intervention costs are estimated based on the WHO CHOosing Interventions that are Cost-Effective (WHO-CHOICE) methodology (WHO, 2003[3]), taking into account differentials in relative prices (as measured by differences in PPPs and exchange rates). All the costs are expressed in 2015 USD PPPs.

Data to model the interventions are retrieved from the literature and are based, as much as possible, on systematic reviews and meta-analyses, which are considered to provide the highest quality of evidence. If multiple systematic reviews and meta-analyses are available, those that are judged of the highest quality are prioritised. However, by its nature, the quality of evidence on the effectiveness of policies – which cannot be tested in randomised controlled trials – is more limited than in other fields of research. For example, a recent quality assessment of systematic reviews in the field of alcohol policy concluded that the majority of reviews are based on observational studies (Siegfried and Parry, 2019[4]).

To gauge the population-level effectiveness and the return on investment of interventions designed to tackle harmful alcohol use, interventions are evaluated against a "business-as-usual" scenario, in which age- and sex-specific exposures to risk factors remain unchanged during 2020-50 and the provision of preventive and health services is implemented at the current levels, specific to a country. The comparison between the business-as-usual and the intervention scenarios corresponds to the impact of an intervention, and it is carried out by considering all the relevant dimensions including, for instance, differences in health, health costs, labour market productivity and so on. In order to assess the uncertainty of the effectiveness of an intervention, a sensitivity analysis was undertaken to look at the variability of the estimates of the impact of the policy interventions. This provides all the information needed to carry out a return on investment analysis.

For more information on the OECD SPHeP-NCDs model, see the SPHeP-NCDs Technical Documentation, available at: http://oecdpublichealthexplorer.org/ncd-doc.

7.2. Policies to tackle harmful alcohol use: Various options are available to upscale efforts

The analysis presented in this chapter considers ten interventions, categorised into four policy domains based on the OECD framework described in Sassi and Hurst (2008[5]):

- policy interventions influencing lifestyles through information and education: specifically workplace programmes and school-based programmes
- policy interventions to increase alcohol prices: raising alcohol taxation and setting a minimum unit price
- policy interventions to regulate or restrict alcohol availability: regulations on alcohol advertising, statutory bans on advertising targeting children, measures to counter drink-driving such as sobriety checkpoints and restrictions of outlet opening hours
- policy interventions within the health care sector: specifically counselling by a general practitioner and pharmacological treatment of dependence.

7.2.1. Policy interventions can influence lifestyles through information and education

Workplace programmes

A policy of screening and brief interventions in the workplace (employing at least 50 people) was simulated, based on the experience of a large Australian postal network (Richmond et al., 2000[6]). Participation is assumed to be voluntary and anonymous for workers reporting excessive levels of alcohol consumption or heavy episodic drinking. The intervention consists of three phases plus a "kick-off" period to promote participation by distributing brochures and posters. The initial screening process is carried out during phase one, which lasts four to five months. Workers are administered a questionnaire about their health and weekly alcohol consumption during the previous three months. Those reporting a high daily intake of alcohol are asked to fill in a more comprehensive questionnaire (phase two), whose results are used to tailor a subsequent brief intervention (one 20-minute visit) delivered by a general practitioner. During the visit, the patient is provided with a booklet and receives information about the health effects of harmful alcohol consumption and advice on how to reduce consumption. Ten months after the start of the programme, a final assessment is carried out, with a procedure similar to phase one.

The proportion of medium or large enterprises is specific to countries, and data are taken from the OECD's *Entrepreneurship at a Glance 2016* (OECD, 2016[7]). Patients with a diagnosis of alcohol dependence are excluded from this intervention but are referred to an appropriate treatment centre. It is furthermore assumed that only 12.3% of the potential targets will agree to participate in the programme (Richmond et al., 2000[6]). It is assumed that 50% of enterprises will agree to participate.

The modelled workplace intervention is assumed to decrease the consumption of alcohol by 41 g per week (5.9 g per day) after 12 months for both men and women (Ito et al., 2015[8]). Evidence of long-term effectiveness is weak. Consistently with the modelling of counselling in primary care, the effectiveness of workplace interventions in changing alcohol consumption is assumed to last for five years, staying constant until year 4 and then declining linearly until year 5. If a person participates in the programme, they can be exposed again in subsequent years, once the effectiveness of the intervention is over for them.

The estimated total cost of this intervention is USD PPP 3.7-5.4 per capita per year across the countries included in the analysis. Although the intervention is delivered in the workplace, it is assumed to take place as part of a government-sponsored programme. However, the time spent in the programme by participating employees is not assumed to be subsidised. The most expensive single component of this intervention is the counselling delivered by a medical doctor. Other cost items include printed materials (booklets, leaflets, posters, questionnaires) and administrative support.

School-based programmes

The intervention modelled in the analysis involves the delivery of a skill-based educational programme for school students aged 10 to 15. The intervention is modelled based on a Cochrane Review of school interventions targeting multiple behavioural risk factors (MacArthur et al., 2018[9]). More precisely, the intervention design broadly reflects the former Michigan Model for Health Study that took place in 52 elementary schools in Michigan and Indiana, the United States (O'Neill, Clark and Jones, 2011[10]), which consisted of 53 lessons (20-50 minutes long) delivered over a two-year period (grades 4 to 5). Over time, the programme has been extended from pre-kindergarten to twelfth grade. Lessons comprise four topics: social and emotional health; alcohol, tobacco, other drugs; safety; and nutrition and physical activity. It is assumed that ten lessons dedicated to alcohol are delivered over a six-year period to children aged 10 to 15. As well as mastery of techniques, skill development and practice are delivered.

Based on a Cochrane Review (MacArthur et al., 2018[9]) that found a 28% reduction in alcohol use, combined with evidence of a reduction in drinking initiation (O'Neill, Clark and Jones, 2011[10]), the model assumes that the probability of drinking initiation among students who have attended the school-based programme is reduced by 20%. The effectiveness is active as long as the students are exposed (from ages 10 to 15); when they turn 16, the effectiveness goes back to zero linearly over 12 months, as the evidence suggest no long-term effect (MacArthur et al., 2018[9]). Moreover, as a result of the intervention, students who initiate drinking at older ages will benefit from a reduced probability of dependence in adulthood. Evidence suggests that early onset of drinking leads to 30% higher probability of dependence; conversely, people who start drinking after the legal drinking age have a lower risk (Hingson, Heeren and Winter, 2006[11]). All students aged 10 to 15 are eligible to be exposed to this intervention, although 90% will actually be exposed.

The cost per child is estimated at USD PPP 10-15 per year across the countries included in the analysis, while the fixed cost is estimated at USD PPP 0.5-0.7 per capita per year. This reflects the cost of scaling up the policy at the national level. The cost includes training costs for teachers and basic materials for children and teachers in digital and print formats. Teachers are assumed to be trained at the beginning of the project and updated with ongoing technical support online.

7.2.2. Pricing policies have a significant impact on alcohol use

Alcohol taxation

The intervention assumes a raise in taxation sufficient to lead to a 10% price increase across all types of alcoholic beverages. It assumes that the increase of the tax almost immediately triggers an increase in the price of the alcoholic drinks, and that the level of taxation is continually revised to maintain constant affordability over the period of the simulation. The intervention does not entail any specific assumptions on how the price increases would be achieved – for example, by increasing excise duty rates, modifying other existing taxes or introducing new fiscal measures. The data used to model the effect of price increase come from a meta-analysis that also includes studies measuring how changes in price affect consumption rather than changes in sales, and therefore take into account – at least to some extent – potential increases in consumption of alcohol from illicit sources (which is relatively low in the majority of studied countries, with higher levels observed in the Russian Federation and Greece (see Figure 8.2 in Chapter 8)).

A systematic review and meta-analysis was carried out to estimate the price elasticities on alcohol consumption, for which 665 estimates from 133 studies were extracted from the literature, including 181 estimates for beer, 182 for wine and 168 for spirits and liquor. Price elasticities (Table 7.1) were estimated along three dimensions: type of beverage, age of drinker and category of drinking. These were combined with the level of per capita alcohol consumption in each country. This approach allows the model to take into account cross-country differences and to produce outputs that reflect national specificities. This choice is supported by evidence in the literature suggesting that:

- Young drinkers are less responsive to price changes than adults (Gallet, 2007[12]).
- Moderate drinkers are more price-sensitive than heavy drinkers (Fogarty, 2006[13]; Dave and Saffer, 2008[14]; Meier, Purshouse and Brennan, 2010[15]; An and Sturm, 2011[16]; Fogarty, 2008[17]).
- Alcohol own-price elasticities[3] vary by type of beverage (Gallet, 2007[12]; Sornpaisarn et al., 2013[18]; Wagenaar, Salois and Komro, 2009[19]; Nelson, 2013[20]; Fogarty, 2006[13]; Fogarty, 2008[17]). The relative market share of different types of alcohol is also an important factor in explaining changes in consumer demand at the national level (Fogarty, 2006[13]).

Results presented in Table 7.1 are broadly aligned with those from six previous meta-analyses that found that beer is the least price-sensitive beverage (with price elasticities ranging from -0.29 to -0.83) compared to wine (-0.46 to -1.11) and spirits (-0.54 to -1.09) (Gallet, 2007[12]; Sornpaisarn et al., 2013[18]; Wagenaar, Salois and Komro, 2009[19]; Fogarty, 2008[17]; Nelson, 2013[20]).

Table 7.1. Own-price elasticities

Type of beverage	Age of the drinker	Category of drinking	Price elasticity
Beer	<25	Below 40 g/day for men and 20 g/day for women	-0.47
Beer	<25	Above 40 g/day for men and 20 g/day for women	-0.41
Beer	≥25	Below 40 g/day for men and 20 g/day for women	-0.62
Beer	≥25	Above 40 g/day for men and 20 g/day for women	-0.56
Spirits	<25	Below 40 g/day for men and 20 g/day for women	-0.55
Spirits	<25	Above 40 g/day for men and 20 g/day for women	-0.49
Spirits	≥25	Below 40 g/day for men and 20 g/day for women	-0.70
Spirits	≥25	Above 40 g/day for men and 20 g/day for women	-0.64
Wine	<25	Below 40 g/day for men and 20 g/day for women	-0.49
Wine	<25	Above 40 g/day for men and 20 g/day for women	-0.43
Wine	≥25	Below 40 g/day for men and 20 g/day for women	-0.65
Wine	≥25	Above 40 g/day for men and 20 g/day for women	-0.59

Note: A price elasticity of -0.47 means that a 10% increase in the price of beer would lead to a reduction by 4.7% in the quantity of beer purchased.
Source: OECD estimates.

The intervention in the model is assumed to affect the whole population (100% coverage), and to last as long as the policy is in place.

The cost of this intervention is estimated as USD PPP 0.05-0.08 per capita per year across the countries included in the analysis. The estimated cost of an increase in taxation includes basic administration, planning, monitoring and enforcement at the national level, with the last of these accounting for most of the total cost. Additional tax revenues are not accounted for in the analysis as they represent transfers rather than costs.

Minimum unit pricing (MUP)

The MUP intervention entails an increase in the alcohol unit cost for alcoholic products in the cheapest segment of the market. Specifically, the cost per unit of alcohol is increased to a pre-defined threshold. For example, in the United Kingdom (Scotland) the threshold was set at GBP 0.50 per unit of alcohol, while in Canada the threshold varies by type of beverage and across provinces, as illustrated in Box 6.3 in Chapter 6.

The intervention is modelled on three key dimensions: the share of alcohol sold below the price set as the minimum threshold; the price increase needed to ensure that the price per unit of alcohol meets the pre-defined threshold; and changes in consumption following the price increase. Two analyses using consumer scanner data reported information by type of alcohol product and category of drinker for the first two dimensions: the share of alcohol units affected by the increase and the average price increase (as a percentage) per unit of alcohol in this group. Inputs reported in Table 7.2 broadly correspond to the effects of the MUP as implemented in the United Kingdom (Griffith, O'Connell and Smith, 2017[21]; Angus et al., 2015[22]). The third dimension – the change in consumption following the introduction of MUP – is modelled using the same parameters used to model an increase in taxation (Table 7.1).

Table 7.2. Characteristics to model low-priced alcohol

Type of beverage	Age of the drinker	Category of drinking	Share of alcohol units sold below the MUP threshold (%)	Average percentage price increase needed to reach the MUP threshold
Beer	<25	Below 40 g/day for men and 20 g/day for women	19.34	36.73
Beer	<25	Above 40 g/day for men and 20 g/day for women	37.94	36.73
Beer	≥25	Below 40 g/day for men and 20 g/day for women	19.34	36.73
Beer	≥25	Above 40 g/day for men and 20 g/day for women	37.94	36.73
Spirits	<25	Below 40 g/day for men and 20 g/day for women	19.34	23.40
Spirits	<25	Above 40 g/day for men and 20 g/day for women	37.94	23.40
Spirits	≥25	Below 40 g/day for men and 20 g/day for women	19.34	23.40
Spirits	≥25	Above 40 g/day for men and 20 g/day for women	37.94	23.40
Wine	<25	Below 40 g/day for men and 20 g/day for women	19.34	23.50
Wine	<25	Above 40 g/day for men and 20 g/day for women	37.94	23.50
Wine	≥25	Below 40 g/day for men and 20 g/day for women	19.34	23.50
Wine	≥25	Above 40 g/day for men and 20 g/day for women	37.94	23.50

Source: Adapted from Griffith, O'Connell and Smith (2017[21]) and Angus et al. (2015[22]).

The rollout of this intervention is assumed to start in 2020 and last until the end of the simulation period, with constant effects starting immediately after implementation of the policy and lasting as long as the policy is in place.

The cost of this intervention is estimated at USD PPP 0.07-0.11 per capita per year across the countries included in the analysis. The main drivers of the cost are basic administration, planning, monitoring and enforcement at the national level, the last of which accounts for most of the total cost.

7.2.3. A variety of policies regulate or restrict alcohol availability

Sobriety checkpoints to reduce driving under the influence of alcohol

Interventions aimed specifically at reducing driving under the influence of alcohol include enforcement of blood alcohol concentration (BAC) laws, sobriety checkpoints, alternative transportation and ongoing innovative programmes such as the Driver Alcohol Detection System for Safety Programme, an in-vehicle technology that prevents the driver from driving if the BAC level exceeds the limit set by law (Box 7.2). The policy scenario modelled in the analysis focuses on a tightening of the enforcement of sobriety checkpoints to reduce drink-driving.

The policy intervention accounts for new published evidence on the effectiveness of sobriety checkpoints. The design of the policy is broadly based on the example of a sobriety checkpoint programme implemented in Charlottesville (Virginia, the United States), thoroughly described and evaluated in a published study (Voas, 2008[23]). The programme involved five-officer checkpoint teams working four hours per night to stop and test drivers' sobriety on weekend (Friday and Saturday) nights each week. Sites were chosen in advance and signs warned drivers of the checkpoints and breath testing. In one year, 94 checkpoints operations were conducted, for a total of 1 880 hours of work for the officers concerned. Around 24 000 vehicles were stopped, and 290 drivers were arrested.

Sobriety checkpoints were found to be most effective in the first half year after implementation. The decline in (fatal and non-fatal) traffic accidents over time, as estimated in the meta-analysis by Erke, Goldenbeld and Vaa (2009[24]), started from 29% after three months, decreasing to 21% at 6 months and becoming almost stable between years 1 and 8 (with estimates ranging from 13% to 11%). Results from this meta-analysis were updated with 15 new studies (published either before 1990 or after 2009) to reflect the most recent evidence. As a result, the implementation of sobriety checkpoints in the present analysis is modelled as a reduction in traffic-related injuries (fatal and non-fatal, in constant proportions) equivalent to 25% in the first year and 15-16% in the following years.

The modelled intervention covers 80% of the population of all ages. This proportion corresponds to the share of people living in urban areas with traffic targeted by the policy (World Bank, 2018[25]). There is no restriction by age of the drinker or by level of drinking, since all people – who can be involved in a traffic accident independently of whether they have had a drink – can benefit from the policy. The policy rollout starts from 2020 and the intervention is implemented continuously until the end of the simulation period.

The cost of this intervention includes the manning of checkpoints – the most expensive item – and a media campaign. It is estimated as USD PPP 0.6-0.8 per capita per year across the countries included in the analysis.

Box 7.2. Driver Alcohol Detection System for Safety Programme

Among the suite of policies developed to counter drink-driving, breath alcohol ignition interlock programmes have gained a great deal of attention. This safety system aims to curb impaired driving by preventing a driver with a measurable BAC from starting the car. Specifically, a fuel-cell breath test incorporated in the vehicle records the driver’s BAC and sends a signal to the engine not to start if the BAC result is higher than the pre-determined limit. Moreover, random retests are required while the car is running, as a measure to prevent circumvention of the device.

Overall, alcohol ignition interlock systems seem to be effective tools as long as they are installed in the vehicle. However, their potential is currently limited by low participation rates and the lack of a persistent beneficial effect beyond the installation period.

As discussed in Chapter 6 (Section 6.2), ignition interlock laws have been introduced for drink-driving offenders and/or professional drivers in the United States, and lately also in a few European countries. Nevertheless, the installation rate of such devices is still low. In the United States, only 20% of those arrested for impaired driving actually installed interlocks in their vehicles in 2012 (Roth, 2012[26]; GAO, 2014[27]).

The evidence for the effectiveness of interlocks on recidivism is strong; however, the effect vanishes as soon as the system is removed. Installation of interlocks decreases the probability of being re-arrested (with a relative risk of 0.36 (Willis, Lybrand and Bellamy, 2004[28]) and a median relative risk of 0.25 (Elder et al., 2011[29])).

The evidence on alcohol-related crashes relies on single studies only and is much weaker. Three recent studies show evidence for the effectiveness of interlocks to reduce alcohol-related fatal crashes, with a reduction varying between 0.20% and 15% (McGinty et al., 2017[30]; Vanlaar, Mainegra Hing and Robertson, 2017[31]; Kaufman and Wiebe, 2016[32]). While the in-vehicle interlocks decrease alcohol-related crashes, the overall crash risk resulting from installation of interlocks is higher than the risk associated with having a suspended licence (Vézina, 2002[33]; DeYoung, Tashima and Masten, 2005[34]).

Restrictions on outlet opening hours

A policy scenario was modelled entailing restrictions in on-premise outlet opening hours, leading to a two-hour reduction, with a view to cutting the incidence of alcohol-related injuries, particularly from assaults and traffic crashes. This policy was assumed to target the most densely populated areas of the countries concerned, corresponding to medium-sized and large cities. The policy scenario also involves increased enforcement efforts by the relevant licensing and law enforcement authorities.

Based on a study by Rossow and Norström (2012[35]), a two-hour reduction in on-trade outlet opening hours was associated with a 34% reduction in assault-related injuries. This is also supported by evidence from Kypri et al. (2011[36]), which found that the impact of a mandatory closing time of 03:30 for on-trade outlets and a lockout at 01:30 (meaning no new customers to be admitted) led to a 37% reduction in assault-related injuries. In addition, a 1.5% reduction in traffic-related injuries was modelled, based on the lower end of the range used by Chisholm et al. (2004[37]).

The policy of restricting on-premise opening hours applies to people of all ages living in urban areas (World Bank, 2018[25]). In subsequent years, those who did not receive the intervention in 2020 will not be exposed (because they live outside the catchment areas of at least medium-sized cities), and the only group that will have a chance to be exposed will be newborns/immigrants. Those who initially received the intervention will continue to be exposed as long as they are drinkers.

The total cost of this intervention is estimated at USD PPP 0.1-0.2 per capita per year across the countries included in the analysis. The intervention involves basic administration at the local level and law enforcement. It is estimated that enforcing the new regulations represents the most expensive component of the intervention.

Regulation of alcohol advertising

The advertising regulation policy scenario is not modelled as a comprehensive ban, but as a series of regulatory measures that would lead to a 25% reduction in advertising expenditure, limiting exposure to alcohol advertising for different types of consumer. This regulatory intervention assumes that restrictions would be applied to traditional and new media, sponsorships, branding and point-of-sale displays. Enforcement would be undertaken by existing regulatory authorities, as the necessary infrastructures are already in place in most OECD countries. This intervention assumes that individuals living in a country are not exposed to a considerable amount of advertising from a neighbouring country that does not implement the same intervention. In other words, the model does not account for any significant cross-border marketing. Policy rollout is assumed to start from 2020.

Based on a meta-analysis of 322 estimates of advertising elasticities by Gallet (2007[12]), a 25% decrease in advertising expenditure is expected to produce a 0.8% decrease in alcohol demand. However, there is evidence that young people are more responsive to changes in alcohol advertising, so their response was modelled on the basis of a study by Saffer and Dave (2006[38]), which reported elasticities of 0.034 for any drinking and 0.065 for binge drinking during the past month. For the modelled intervention, these elasticities translate into a 0.84% reduction of average consumption in young drinkers (aged 18 or under), and a 1.6% reduction in the number of binge drinkers (all ages). In addition, the model assumes that for drinkers older than 18, there will be a reduction of alcohol consumption by 0.8%.

The population coverage for the eligible group is assumed to be 100%. Once exposed, the drinkers (of all ages) will continue to be exposed until the end/until they stop drinking. In subsequent years, all new drinkers will be exposed to the intervention on alcohol advertising regulation.

The intervention cost is estimated at USD PPP 0.3-0.4 per capita per year across the countries included in the analysis. The intervention involves basic administration and planning costs at the national and local levels. In addition, minor training may be required for communication authority staff charged with the task of overseeing implementation of the scheme. Finally, the estimation includes the cost of monitoring and enforcing the new regulation, which represent the most expensive components of the intervention.

Statutory ban on alcohol advertising to children

This intervention is modelled as a comprehensive ban for all forms of media (TV, radio, newspapers, billboard, internet, social media), limiting exposure to alcohol advertising for children and young adults. This regulatory intervention assumes that restrictions would be applied to traditional and new media, sponsorships, branding and point-of-sale displays. Enforcement would be undertaken by existing regulatory authorities, as the necessary infrastructures are already in place in most OECD countries. The population coverage for the eligible group is assumed to be people aged 0-17. This intervention also assumes that individuals living in a country are not exposed to a considerable amount of advertising from a neighbouring country that does not implement the same intervention. In other words, the model does not account for any significant cross-border marketing. Policy rollout is assumed to start from 2020.

This intervention is modelled based on a study by Tanski et al. (2015[39]), which covers any form of marketing and develops a perceptivity score (based on exposure, liking and brand identification). Assuming a 10% failure rate, a total ban on advertising to children would reduce early onset of drinking by 35% in individuals aged 17 years or below. In addition, the model assumes a relationship between early onset of drinking and the probability of dependence, based on evidence that people starting to drink after the legal drinking age have a risk of dependence 30% lower than those who drink while underage (Hingson, Heeren and Winter, 2006[11]).

The intervention cost is estimated at USD PPP 0.3-0.4 per capita per year across the countries included in the analysis. The intervention involves the same costs as the advertising regulation intervention.

7.2.4. Health care policies advise and treat people

Alcohol counselling in primary care

The intervention consists of detecting patients at risk for heavy drinking when they visit a general practitioner, and of delivering brief counselling about the alcohol-related harms and ways to reduce alcohol consumption. The programme targets hazardous and harmful drinkers (regular or episodic), excluding individuals dependent on alcohol, aged 18-70 (Kaner et al., 2018[40]). The recruitment of participants occurs opportunistically by screening patients who visit a health care facility for a non-alcohol-related problem. The screening is carried out with the use of a questionnaire (the Alcohol Use Disorders Identification Test or equivalent) requesting information on health status and alcohol consumption, either delivered on the spot or mailed to the patient's address. Angus et al. (2019[41]) found that up to 5% of patients – increased to 10% for modelling purposes – were screened for excessive alcohol consumption, of whom almost half were diagnosed positive and received a brief intervention. In other words, between 1% and 3% of the population received a brief intervention. In the OECD SPHeP-NCD model, it is assumed that each year 20% of non-alcohol-dependent heavy drinkers benefit from the intervention (about 2% of the population).

The effectiveness of the intervention is modelled based on findings from a recent Cochrane Review by Kaner et al. (2018[40]). During the course of the intervention, male drinkers reduce their alcohol consumption by 42.21 g per week (about four standard drinks per week) and female drinkers by 30.27 g per week (about three drinks per week).

There is evidence that similar interventions can have lasting effectiveness – for at least four years (Fleming et al., 2002[42]) and up to seven years (Angus et al., 2014[43]). Therefore, the effectiveness of the modelled intervention is assumed to last for five years, declining linearly during the final year. The full effect will be achieved after 12 months. Once people have had an intervention, they will be eligible again in the following years (after the effect has completely disappeared), with the same probability of being enrolled in the intervention (i.e. 20%).

The intervention cost accounts for basic expenses for administration, monitoring and training for doctors and nurses delivering the intervention. The main drivers of the cost are the time of doctors and nurses, followed by provision of printed material for patients. Even if counselling is provided by facilities already in place and delivered by specialist health personnel, programme and training costs account for a significant part of the total expenditure per target individual because all the costs of the intervention are spread over a relatively small population subgroup. The cost of delivering the intervention is estimated at USD PPP 24-35 per year per enrolled person across the countries included in the analysis. Organisational and planning costs (i.e. fixed costs) are estimated at USD PPP 0.2-0.3 per capita per year.

Personalised pharmacological treatment

This intervention is a pharmacological treatment based on precision medicine, which customises the therapy according to patients' peculiarities and different needs. The intervention entails two types of treatments assigned to two categories of patients: acamprosate is prescribed to people not diagnosed with alcohol dependence but affected by alcohol use disorders (AUDs), while naltrexone is prescribed to drinkers diagnosed with alcohol dependence.[4]

For the patients treated with acamprosate, the therapy entails six months of daily administration of the medicine (without psychotherapy support), with a dosage adjusted for the patient's body weight. For higher effectiveness, patients first need to be detoxified and must avoid alcohol intake in the week prior to treatment initiation (Kampman et al., 2009[44]). The eligible population consists of individuals aged between 18 and 65 who fulfil the diagnostic criteria of AUDs according to the Diagnostic and Statistical Manual of Mental Disorders, but that are not diagnosed as dependent drinkers. Based on the results of the meta-analysis by Maisel et al. (2013[45]), combined with results from Poldrugo (1997[46]), the intervention is assumed to reduce alcohol consumption by 31% (corresponding to 55.5 more days of cumulative abstinence over six months). The pattern of effectiveness is modelled as a linear reduction in alcohol consumption during the six months of the medication administration period, reaching its maximum level at the sixth month. The effectiveness remains constant throughout the six months following cessation of the treatment (Poldrugo, 1997[46]). The effectiveness is then modelled to vanish linearly in the following 12 months. The cost for the acamprosate medication is estimated at USD PPP 355-521 per year per patient across the countries included in the analysis,[5] while the fixed cost is estimated at USD PPP 0.2-0.3 per capita per year.

For the patients treated with naltrexone, the therapy consists of three months of continuous medication administered on a daily basis (50 mg/day), followed by five months of targeted medication (taken on an "on-demand" basis, only when craving is high) in conjunction with coping cognitive behavioural sessions (Heinälä et al., 2001[47]). This psychological therapy involves a total of four visits of 90 minutes each (Stein and Lebeau-Craven, 2002[48]) carried out by a trained therapist in weeks 1, 2, 5 and 12 in a group setting, based on the Relapse Prevention Model proposed by Marlatt and Gordon (1985[49]).The eligible population is made of people diagnosed with alcohol dependence. Currently, only 10% of the diagnosed population receive pharmaceutical treatment for alcohol dependence (VisionGain, 2008[50]). The modelled intervention assumes double this proportion, reaching 20% of people diagnosed with AUDs. Based on the results of the meta-analysis by Maisel et al. (2013[45]), combined with results from Heinälä et al. (2001[47]), the intervention is associated with a decline in alcohol intake equal to 122 g per week (17.4 g per day). The pattern of effectiveness was assumed to increase linearly throughout the medication period, reaching its peak at the sixth month and remaining constant thereafter until the end of treatment (eighth month) (Heinälä et al., 2001[47]). This is followed by linearly declining effectiveness, fading completely two months after the end of the therapy. The per treatment cost for the naltrexone medication together with the psychological therapy is estimated at USD PPP 171-251 per year across the countries included in the analysis,[6] while the fixed cost is estimated at USD PPP 0.2-0.3 per capita per year. A large proportion of the cost (approximately 30%) is represented by the drug itself (a three-month course). The psychological programme, primary care visit and follow-up visits managed by a nurse account for about 20% of the total cost. The remaining costs are for materials handed to patients and programme organisation.

7.2.5. Various inputs were used to model the effects of policy interventions

Table 7.3 provides a brief summary of the key inputs to model the policy interventions described above.

Table 7.3. Inputs to model: Selected policy interventions targeting harmful alcohol use

	Workplace	School-based	Taxation	MUP	Sobriety checkpoints	Sales hours restriction	Regulation of advertising	Ban on advertising to children	Counselling	Treatment of dependence
Target age	18-65	10-15	all	all	>18	all	all	<18	all	all
Exposure	0.9-2.5%	90%	100%	100%	80%	40-99%	100%	90%	20%	20%
Effectiveness	Alcohol consumption: -41 g/week	Drinking initiation: -20 %; Dependence: -30%	10% price increase reduces alcohol consumption by: 4% to 7%	Alcohol consumption: -0.6% to -3.3%	Traffic injuries: -25% (year 1), 15% (year 2), -16% thereafter	Assault injuries: -34%; Traffic injuries: -1.5%	Alcohol consumption in young people: -0.84%; Number of binge drinkers: -1.6 %	Underage drinking: -35 %; Probability of dependence: -30%	Alcohol consumption: -42 g/week (men), -30 g/week (women)	Alcohol consumption: acamprosate: -31%; naltrexone: -1 22 g/week
Per capita cost, USD PPP	3.7-5.4	0.5-0.7; per child: 10-15	0.05-0.08	0.07-0.11	0.6-0.8	0.1-0.2	0.3-0.4	0.3-0.4	0.2-0.3; per treated patient: 24-35	0.2-0.3; per treated patient: 171-521

Source: OECD analyses of the literature; meta-analyses.

7.2.6. Alcohol policies can contribute to significant health gains

All the interventions are predicted to have a positive effect on population health.[7] The largest absolute reductions are expected to occur for alcohol dependence and injuries: the MUP intervention leads to avoidance of up to 74 million cases of dependence (or 2.4 million annually) and sobriety checkpoints lead to avoidance of up to 48 million cases of injury (or 1.5 million annually) between 2020 and 2050 (Figure 7.1). In general, MUP, taxation and sobriety checkpoints are evaluated as the most effective interventions, while advertising regulation and workplace programmes produce a smaller impact. Restrictions on opening hours have a significant impact on reduced injuries. Counselling in primary care and treatment of dependence notably reduce cases of dependence and cirrhosis. Bans on advertising to children and school-based programmes help to reduce early drinking initiation in young ages and reduce the probability of dependence later in life. The largest impact on the number of new cases avoided – as a share of total new cases – is predicted for dependence, with a reduction of up to 7% in the cases of MUP and taxation.

To put this in context, 74 million new cases of dependence avoided as a result of implementing MUP represent only about 7% of all dependence cases attributable to alcohol (see Figure 4.4 in Chapter 4). Therefore, there is large scope for potential further action to either upscale existing interventions or introduce new ones to make a substantial impact on alcohol-attributable disease incidence.

When considering the policy effect on aggregate measures of the population, population-wide interventions such as taxation, MUP and sobriety checkpoints produce the largest health gains, resulting in between 1.1 million and 1.5 million LYs gained annually in the 48 countries included in the analysis. Sobriety checkpoints are also predicted to perform best in terms of the impact on DALYs (see Annex Figure 7.A.1), with a gain of 57.4 million DALYs cumulatively by 2050 in all 48 countries combined. This category is followed by taxation, saving up to 37.7 million DALYs by 2050, then MUP (34.5 million) and restrictions on outlet opening hours (28.7 million). The largest cumulative effect on DALYs is predicted in China and India, and the lowest in Malta and Iceland. It is also notable that the effect of these interventions on DALYs does not decline over time, even after discounting the value of future outcomes when converting to a present value (Annex Figure 7.A.1), suggesting that it pays off to wait as new cohorts of people are affected in the future.

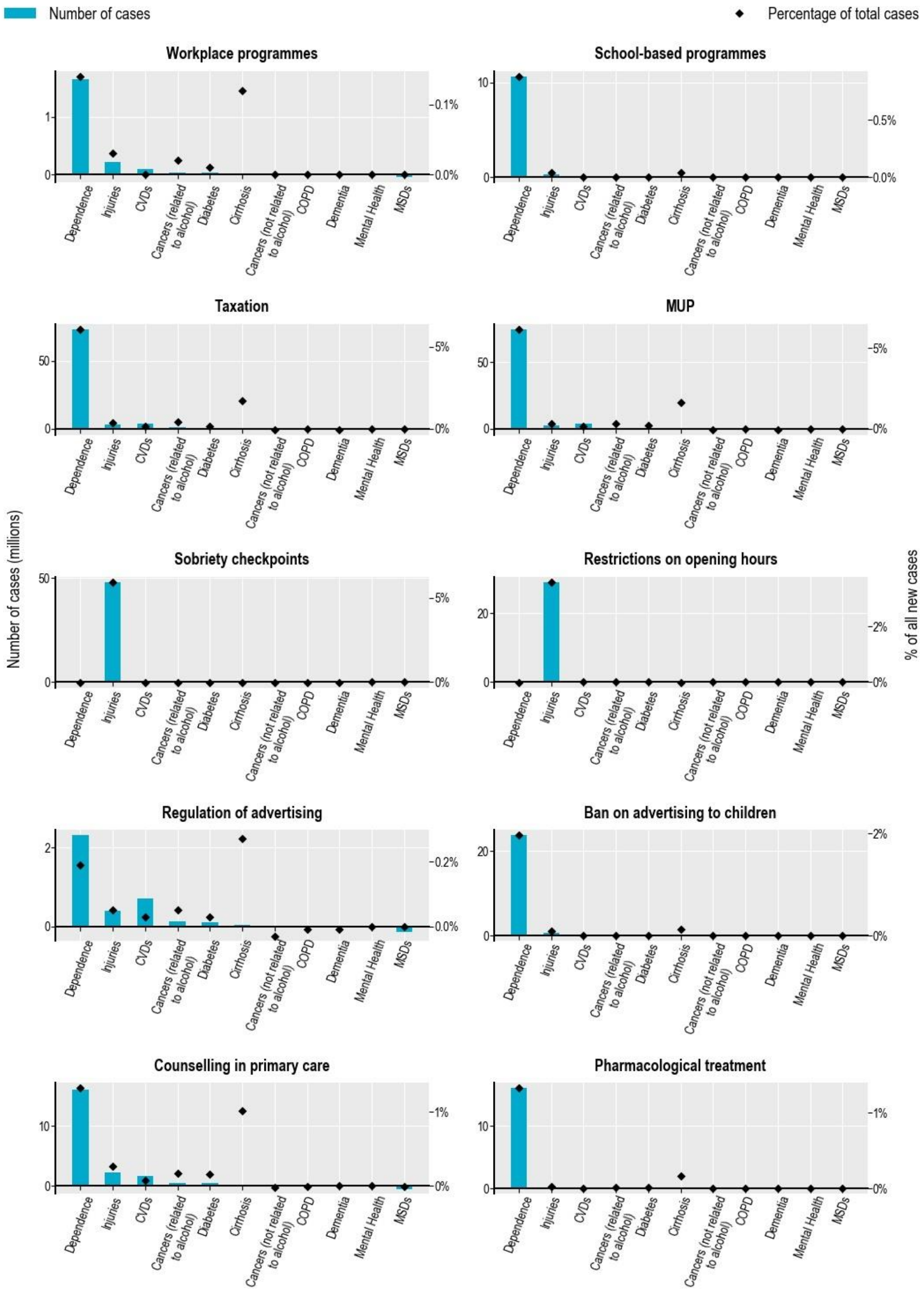
Once results are standardised by population size, all the interventions are predicted to lead to gains in LYs and DALYs, with the effect on DALYs (measuring morbidity) generally larger than that on LYs (measuring life expectancy) (Figure 7.2). This means that by reducing the occurrence of diseases and lethal and non-lethal injuries, the interventions have an effect on quality of life greater than the mortality risk reduction.

As for regional differences, the interventions will have a larger impact on health outcomes in the Russian Federation, the Baltic countries and Poland, with a cumulative effect for the ten interventions higher than 350 DALYs per 100 000 gained annually (Figure 7.2). This is more than twice as large as the cumulative effect for the ten interventions in the countries showing the lowest impact in Figure 7.2. The stronger effect of pricing policies on DALYs in the first set of countries is mostly due to the relatively higher level of alcohol consumption (see Figure 2.1 in Chapter 2), the large burden of premature mortality caused by related chronic diseases and injuries (see Figure 4.5 in Chapter 4) and the greater prevalence of alcohol-related diseases and injuries in these countries.

Finally, pricing policies and health care policies are expected to perform particularly well in the Russian Federation, the Baltic countries, Poland, Hungary and the Slovak Republic, while restrictions on outlet opening hours will do so in South Africa, Colombia, the Russian Federation and Brazil, with more than 90 DALYs per 100 000 gained annually from this policy. The main reason outlet opening hours restriction is predicted to perform so well in emerging countries is because this intervention has an effect on assault-related injuries, whose prevalence is particularly high in these countries.

Figure 7.1. The impact of interventions on disease incidence

Cases avoided, total, 2020-50



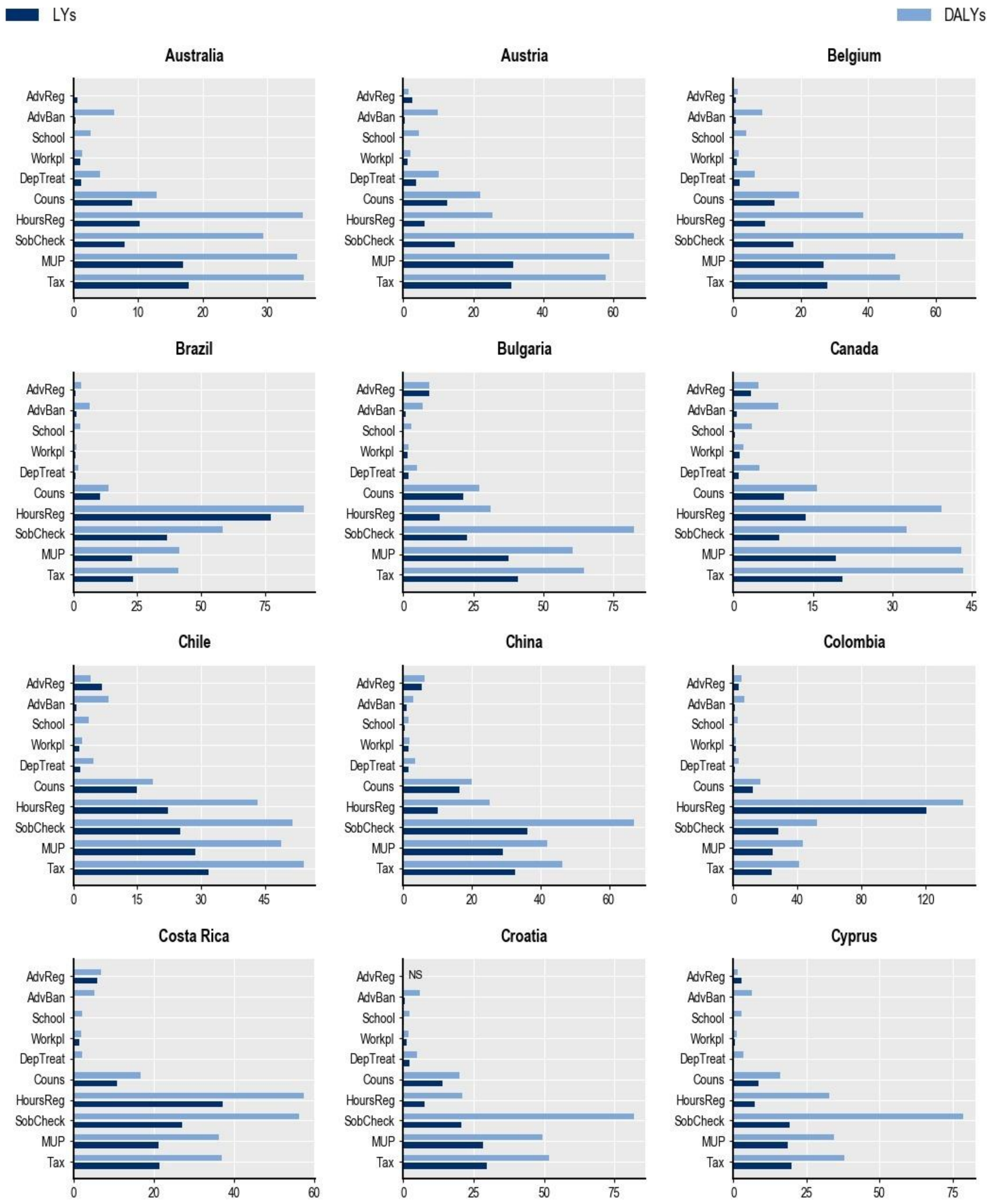
Note: CVDs = Cardiovascular diseases; COPD = Chronic obstructive pulmonary disease; MSDs = Musculoskeletal disorders. Bars represent absolute reduction in the number of new diseases cases; the markers represent percentage reductions in the number of total new cases, as a share of total new cases, between 2020 and 2050.

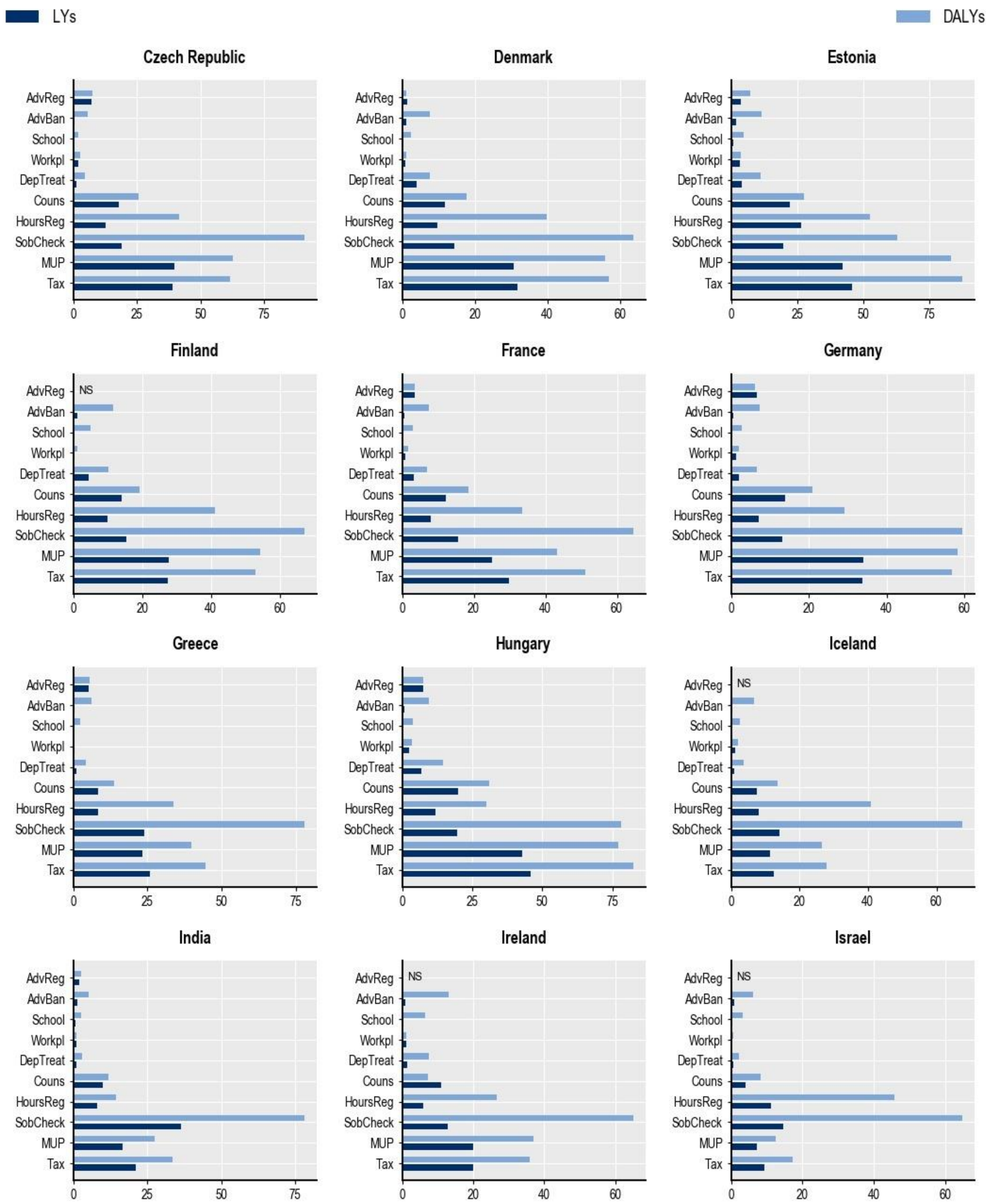
Source: OECD analyses based on the OECD SPHeP-NCDs model, 2020.

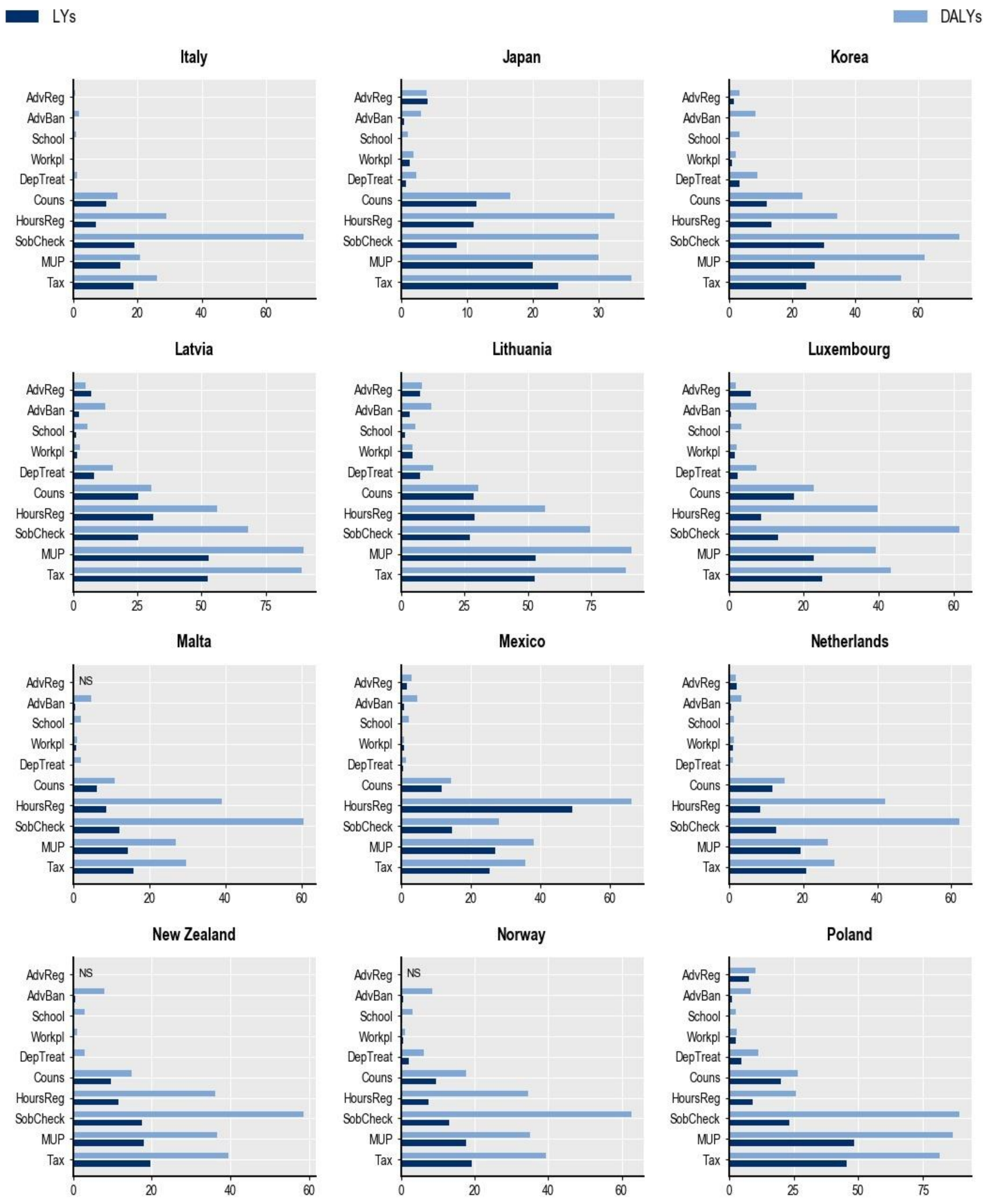
StatLink https://stat.link/f32ypz

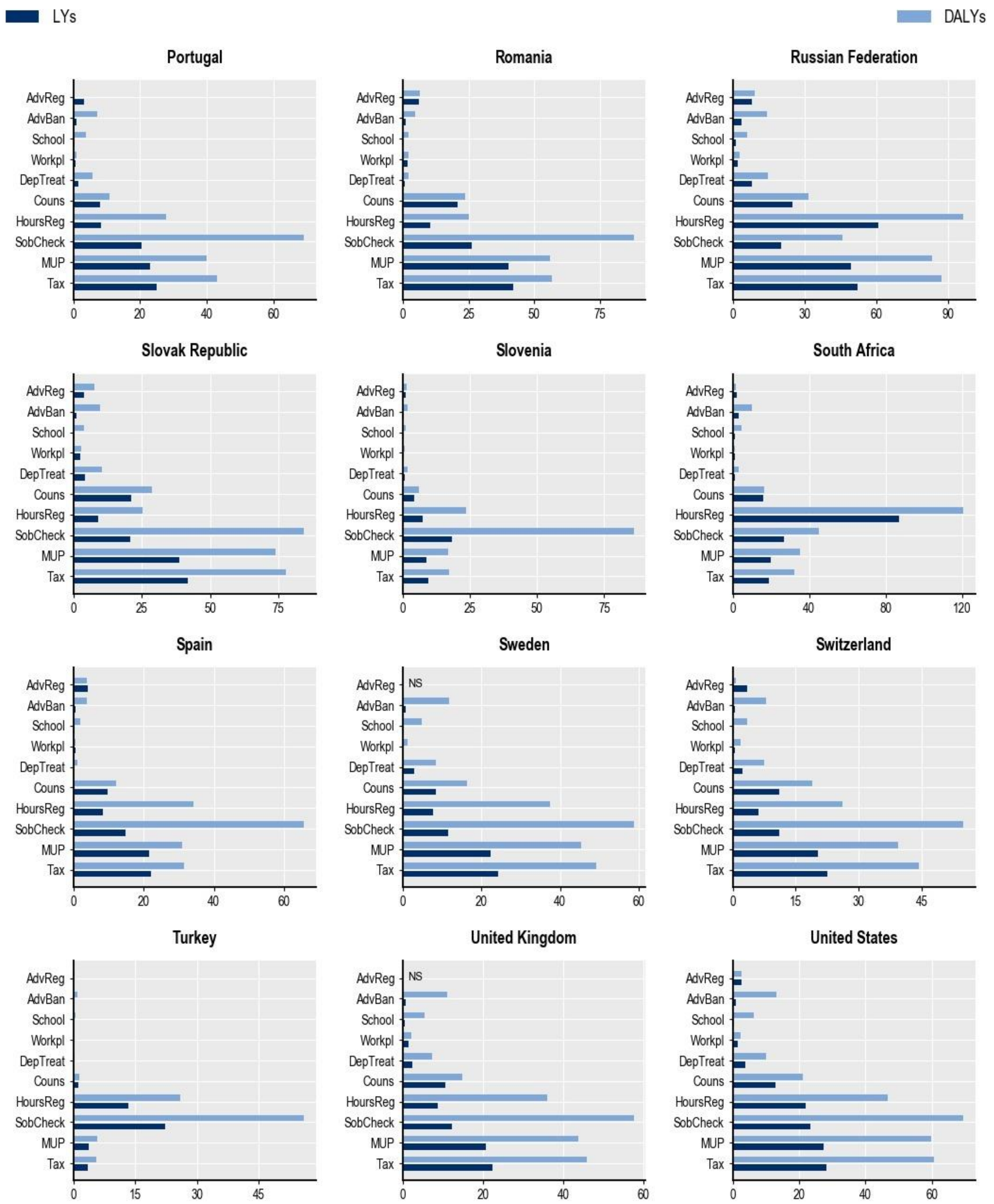
Figure 7.2. Population-standardised effect of interventions on health

LYs and DALYs gained per 100 000 population annually, 2020-50




LYs
DALYs
Czech Republic
Denmark
Estonia
Finland
France
Germany
Greece
Hungary
Iceland
India
Ireland
Israel
AdvReg
AdvBan
School
Workpl
DepTreat
Couns
HoursReg
SobCheck
MUP
Tax
NS


LYs
DALYs
Italy
Japan
Korea
Latvia
Lithuania
Luxembourg
Malta
Mexico
Netherlands
New Zealand
Norway
Poland
AdvReg
AdvBan
School
Workpl
DepTreat
Couns
HoursReg
SobCheck
MUP
Tax
NS



Note: AdvReg = regulation of advertising; AdvBan = ban on advertising to children; School = school-based programmes; Workpl = workplace programmes; DepTreat = pharmacological treatment of dependence; Couns = counselling in primary care; HoursReg = restrictions on opening hours; SobCheck = sobriety checkpoints; MUP = minimum unit pricing; Tax = taxation. NS = not significant.
Source: OECD analyses based on the OECD SPHeP-NCDs model, 2020.

StatLink https://stat.link/7kaupr

7.2.7. Alcohol policies can reduce health expenditure

Although it might seem intuitive to expect that reducing the alcohol burden should lead to health expenditure[8] savings, this is by no means guaranteed. People who avoid alcohol-related conditions as a result of preventive interventions may still suffer from other diseases and/or accumulate health expenditure as a result of living longer (Grootjans-van Kampen, Engelfriet and van Baal, 2014[51]). Nevertheless, findings from the OECD SPHeP-NCDs model suggest that this is not the case for the set of assessed policy interventions: all the interventions are predicted to contribute to reductions in health expenditure. The effects of two interventions in particular stand out: taxation and MUP. On average, MUP can save USD PPP 4 per capita annually across the 48 countries studied – the largest impact compared to the other interventions. The impact of taxation is in the same order of magnitude. The other interventions will produce average savings in health expenditure ranging from USD PPP 0.1 to USD PPP 1.4 per capita per year. Scaled up to the national level, MUP is predicted to save more than USD PPP 207 billion across all 48 countries cumulatively by 2050 (or USD PPP 6.7 billion in undiscounted costs annually), with the largest cumulative savings predicted in the United States (USD PPP 108 billion by 2050), China (USD PPP 17 billion by 2050), Germany (USD PPP 12 billion by 2050), the Russian Federation (USD PPP 7 billion by 2050) and Japan (USD PPP 7 billion by 2050). Counselling in primary care and pharmacological treatment of dependence produce sizeable savings in medical expenditure of about USD PPP 70 billion and USD PPP 40 billion by 2050 across all countries. School-based and workplace programmes and regulation of advertising are predicted to make a smaller impact on health expenditure, mostly due to the short exposure duration for the school-based intervention, the relatively low coverage of the population receiving the workplace intervention and the relatively low effectiveness of advertising regulation. While sobriety checkpoint measures to counter drink-driving and restrictions on outlet opening hours produce moderate savings in health expenditure (USD PPP 24 billion and USD PPP 14 billion by 2050 across all countries), these interventions make a significantly more pronounced impact on employment and productivity, as discussed in the following section.

There are important geographical differences in the impact of the interventions. Taxation and MUP generally perform best in the United States, where up to USD PPP 320 per capita in medical expenditure can be saved cumulatively by 2050. This is followed by Austria, Germany, Denmark and Luxembourg, with health expenditure savings of between USD PPP 160 and USD PPP 180 per capita by 2050 (Annex Figure 7.A.2). On the other hand, the lowest savings per capita for these interventions are predicted in China, Colombia, Costa Rica, India, Israel, Mexico, South Africa and Turkey. This pattern can be explained by the low level of alcohol consumption in Israel and Turkey, and by the low medical costs in Colombia, Mexico and non-OECD G20 countries.

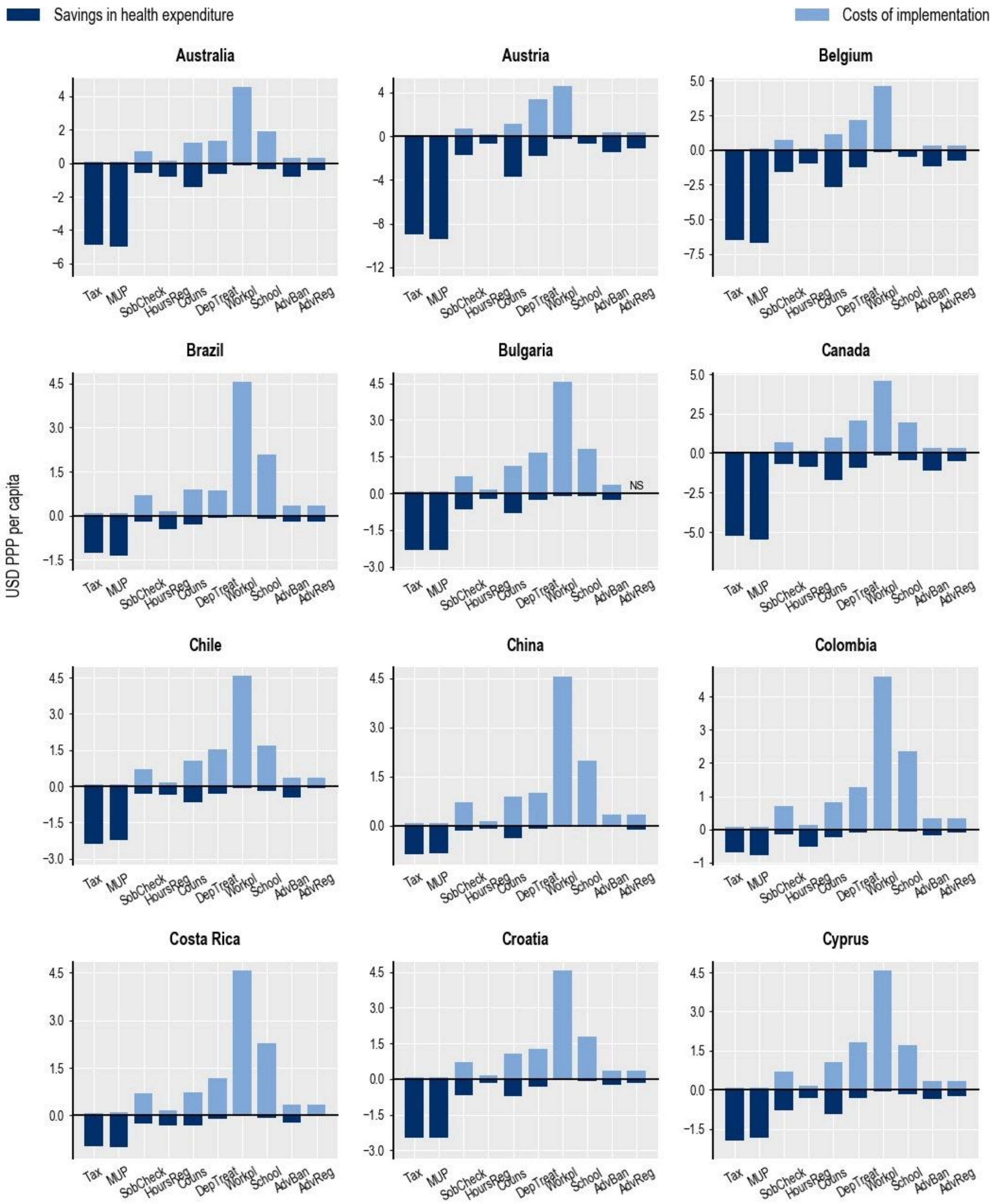
For restrictions on outlet opening hours, while the health gains are particularly high in emerging countries (see Section 7.2.6: in particular South Africa, Colombia, the Russian Federation and Brazil), the per capita savings in health expenditure in these countries are small. Two main reasons can explain this pattern. First, medical treatments in these countries are generally less expensive than in other countries; therefore, a decrease in the number of cases to treat has a lower impact on total savings on health expenditure. Second, the growth in life expectancy caused by preventive interventions, which is particularly pronounced in these countries, increases the probability that individuals will develop other diseases that bring additional expenditure later in life.

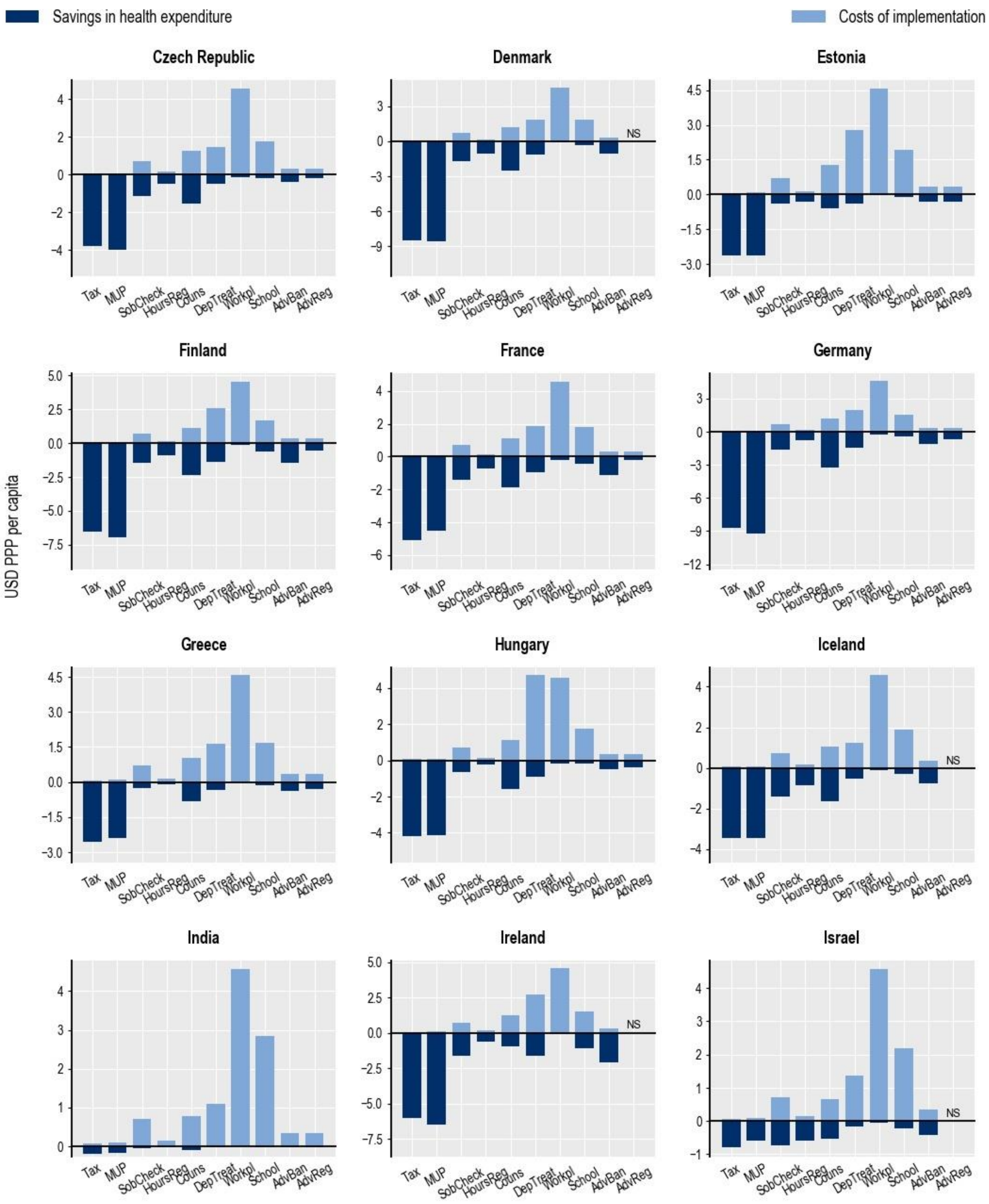
Figure 7.3 compares the per capita annual cost of implementing the interventions and the reductions in associated health expenditure. In the cases of taxation and MUP, the costs of implementing the intervention were assumed to be very small – close to zero. In general, the health expenditure savings resulting from the policy implementation significantly outweigh the intervention costs, meaning that the intervention is cost-saving, as is shown for MUP, taxation and opening hours restriction. However, in some cases, the cost of running the intervention is higher than the health expenditure savings. This is the case for advertising regulation and bans, counselling in primary care and sobriety checkpoints in Colombia, Mexico, non-OECD G20 and non-OECD European countries, and for workplace and school-based programmes and treatment of dependence in virtually all countries studied. Nevertheless, this does not necessarily indicate that these interventions represent poor value for money, as the wider economic impact has to be taken into account.

A sensitivity analysis was carried to test the uncertainty around the effectiveness of the interventions. Results confirm that MUP, taxation and restriction in opening hours produce significant gains in healthy LYs while being cost-saving. Six of the other interventions are cost-effective since they save healthy LYs at a cost below USD 50 000/DALY, while school-based and workplace programmes produce health gains at a cost above or close to this threshold (see Annex Figure 7.A.3).

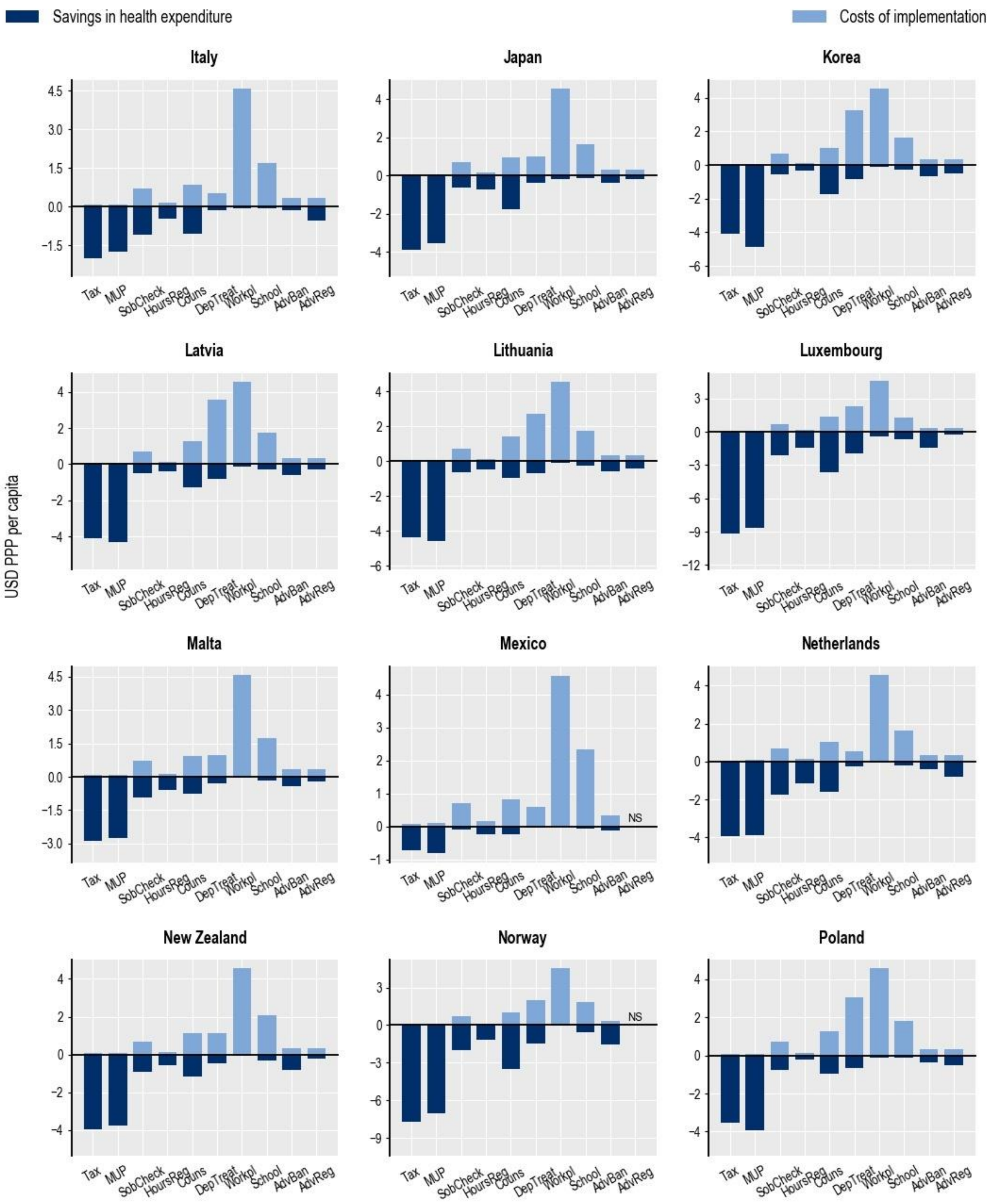
Figure 7.3. Cost of interventions and their impact on health expenditure

USD PPP per capita, annually, 2020-50

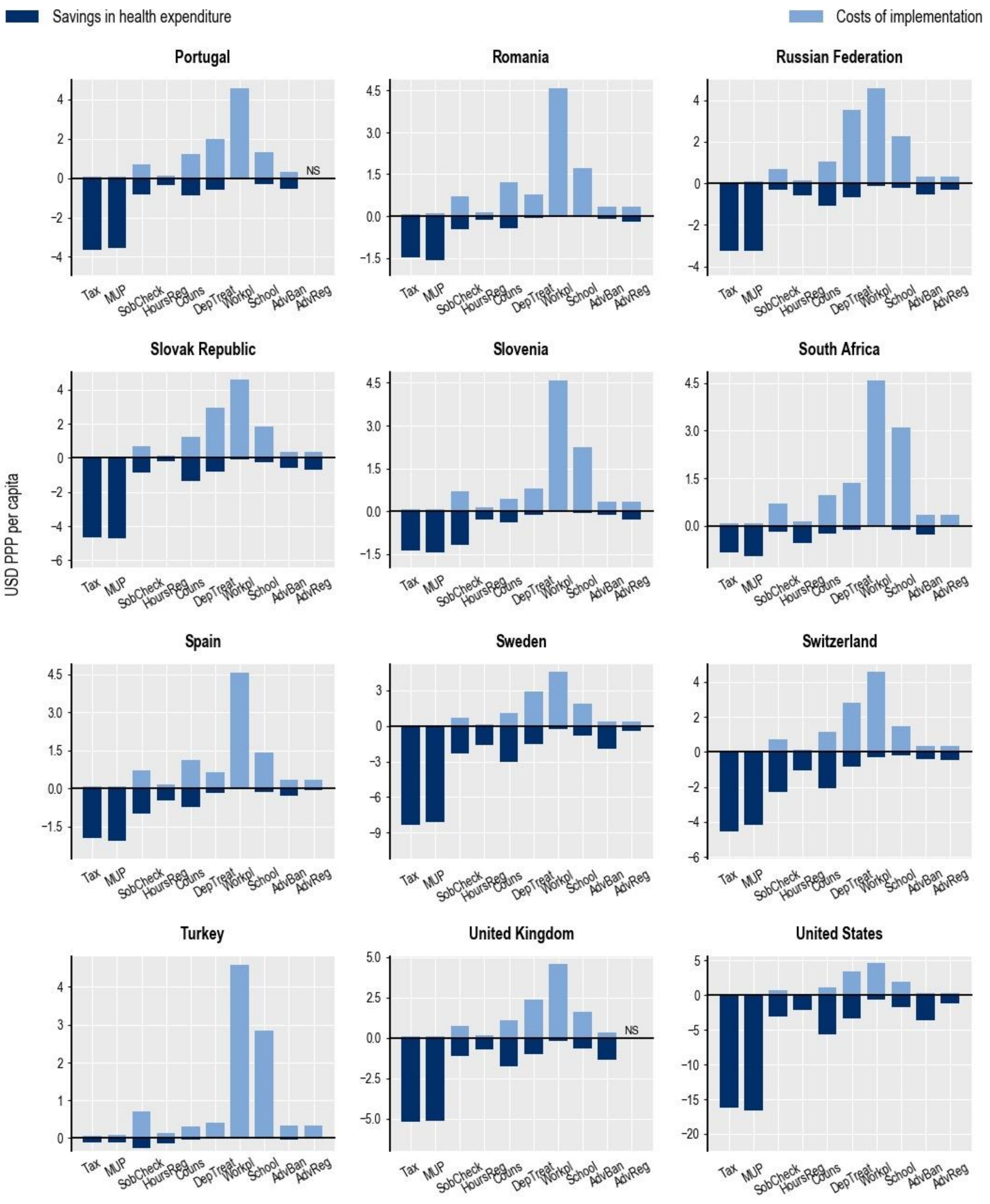




Savings in health expenditure
Costs of implementation
USD PPP per capita
Czech Republic
Denmark
Estonia
Finland
France
Germany
Greece
Hungary
Iceland
India
Ireland
Israel
NS
Tax
MUP
SobCheck
HoursReg
Couns
DepTreat
Workpl
School
AdvBan
AdvReg



Savings in health expenditure
Costs of implementation
USD PPP per capita
Italy
Japan
Korea
Latvia
Lithuania
Luxembourg
Malta
Mexico
Netherlands
New Zealand
Norway
Poland
Tax
MUP
SobCheck
HoursReg
Couns
DepTreat
Workpl
School
AdvBan
AdvReg
NS



Note: AdvReg = regulation of advertising; AdvBan = ban on advertising to children; School = school-based programmes; Workpl = workplace programmes; DepTreat = pharmacological treatment of dependence; Couns = counselling in primary care; HoursReg = restrictions on opening hours; SobCheck = sobriety checkpoints; MUP = minimum unit pricing; Tax = taxation. NS = not significant.
Source: OECD analyses based on the OECD SPHeP-NCDs model, 2020.

StatLink https://stat.link/20qazv

7.2.8. *Alcohol policies have an impact on the labour market and related costs*

Alcohol-related conditions cause lower employment rates, greater absenteeism and presenteeism, and increases in the number of people who retire early. Therefore, implementation of policy interventions designed to reduce the burden of alcohol provides an opportunity to reduce economic costs associated with suboptimal utilisation and productivity of the labour force. This section focuses on the cost borne by the government, while the cost to the industry is examined in a subsequent chapter (see Chapter 8).

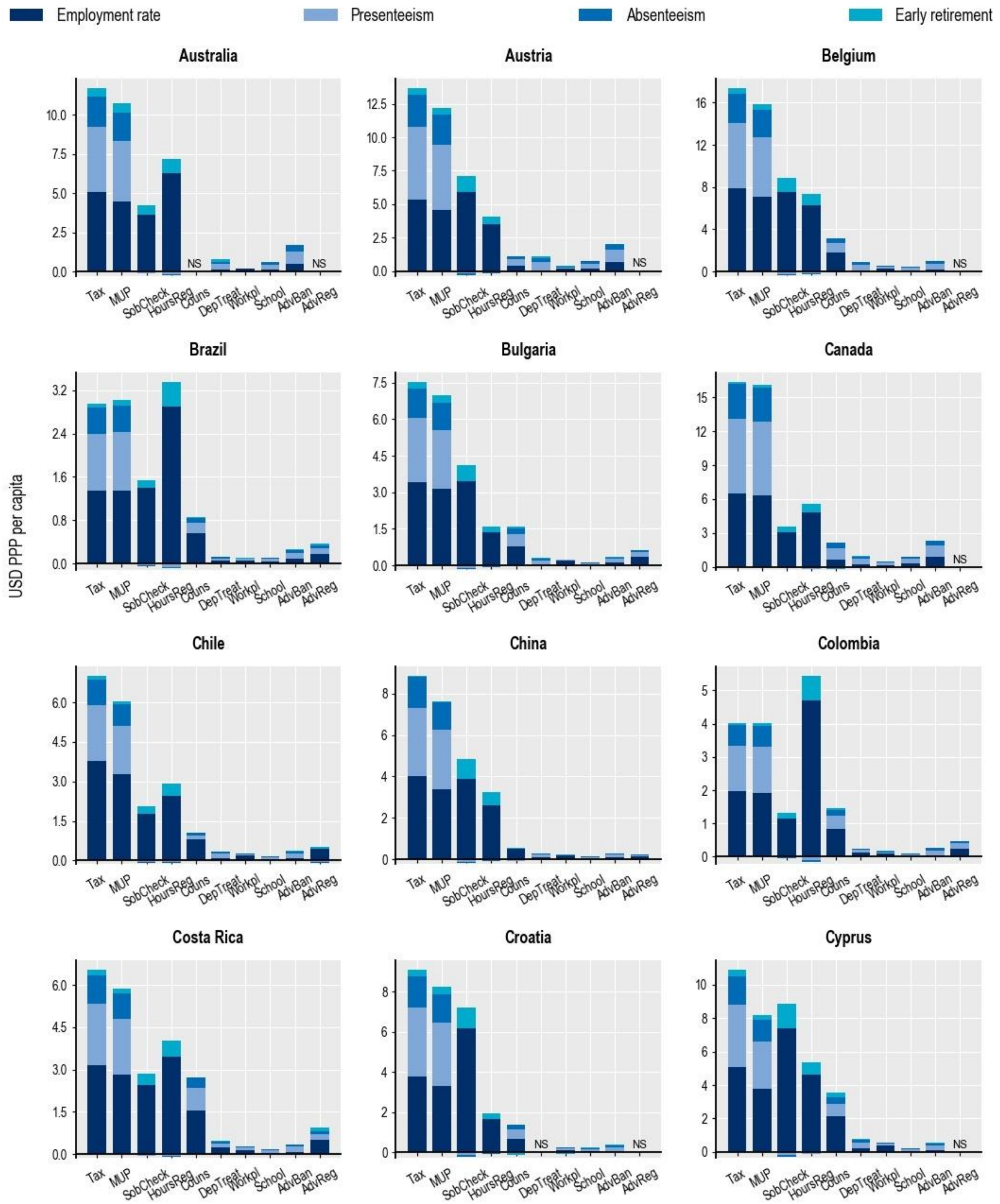
Results confirm that the interventions affect such costs in the expected direction. Thus, across all 48 countries, taxation will add 809 000 more people to the total in employment annually, while MUP will add 706 000 more people and sobriety checkpoints 970 000 more people. When considering the effect on total employment, which also takes into account missed days of work due to illness, being less productive at work and missed work due to early retirement, taxation will help add up to 1 180 000 workers to the workforce each year in all countries, and MUP about 1 040 000 workers. This effect is predicted to be the largest in the United States, Brazil, China, India and the Russian Federation, where 60 000 to 380 000 individuals can be added to the workforce annually as a result of taxation or MUP (Annex Figure 7.A.4), while the lowest effect is predicted to be in Malta and Iceland, where only 40-60 individuals will be added to the workforce annually in the case of taxation or MUP.

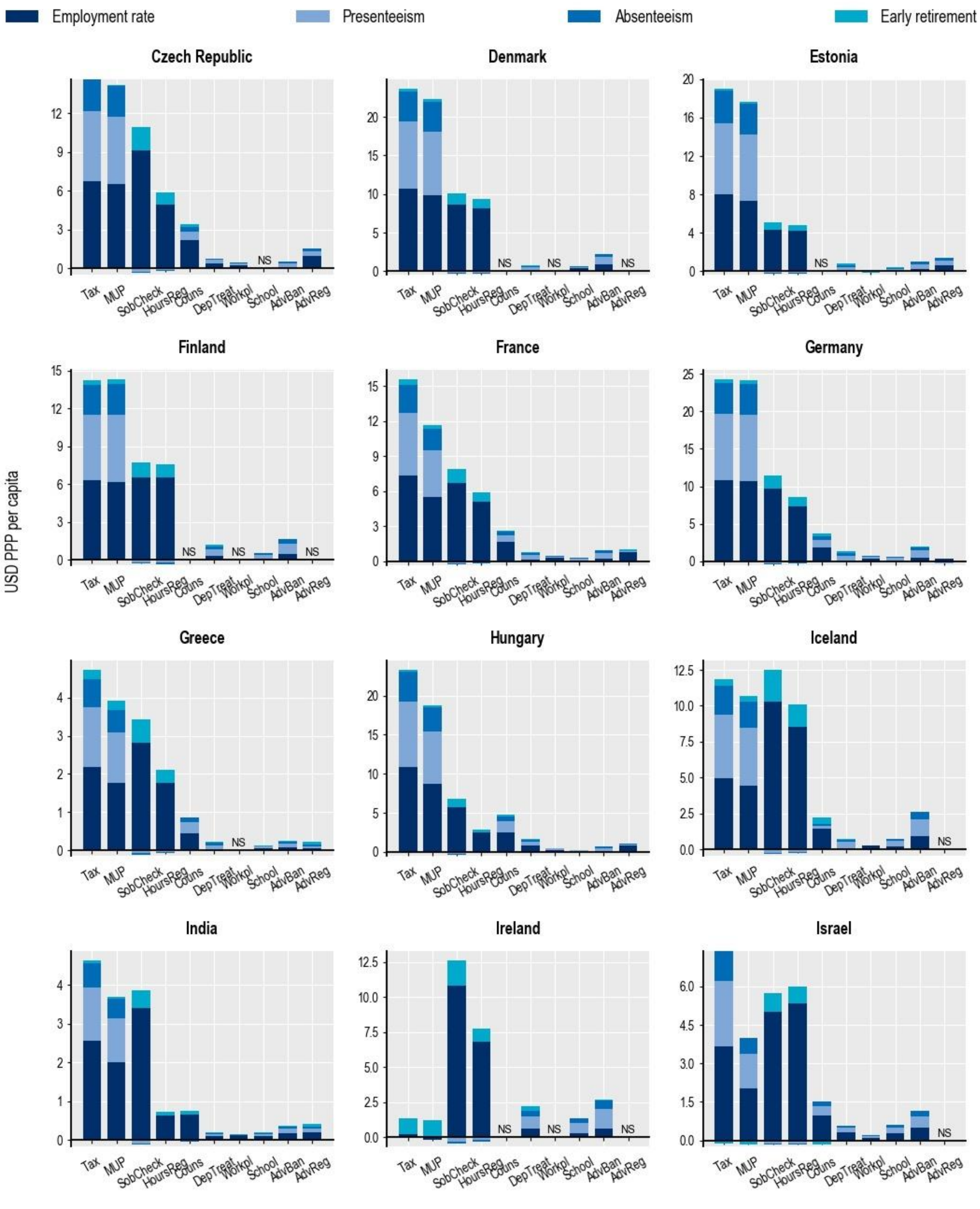
On a per capita basis, taxation will have the strongest impact on employment and productivity, followed by MUP, sobriety checkpoints and restrictions on outlet opening hours. The effect will be lowest for regulation of advertising and for workplace and school-based programmes. Taxation is predicted to make the largest impact on employment and productivity in the Russian Federation, the Baltic countries and Hungary, by increasing the number of people in employment annually by more than 45 per 100 000.

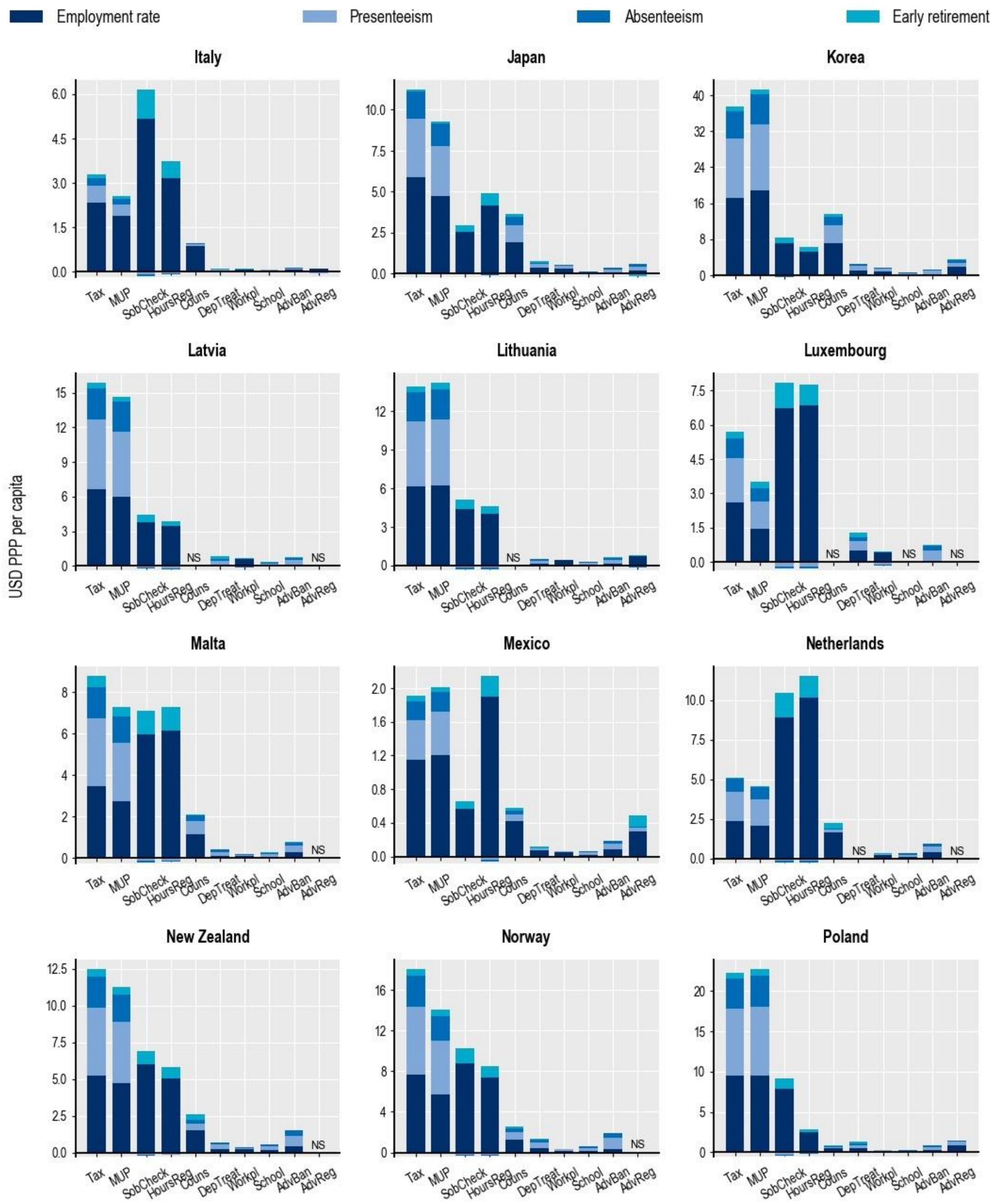
When expressed in monetary terms using average wages, in total each year about USD PPP 93 billion in labour market costs can be saved in all 48 countries combined as a result of implementing the modelled policy interventions. This total comprises the following components: increase in employment rate (53 billion), reduction in presenteeism (24 billion), reduction in absenteeism (11 billion) and reduction in early retirement (5 billion). Among the policy interventions, the largest effect is due to the implementation of taxation and MUP, with corresponding expected savings of USD PPP 31 billion and USD PPP 28 billion in labour market costs in all the countries combined. When standardised by population size (Figure 7.4), the combined employment and productivity costs avoided as a result of taxation will be highest in the United States with up to USD PPP 43 per capita saved, followed by Korea (USD PPP 37 per capita) and Switzerland (USD PPP 27 per capita). This is mainly driven by the fact that the average wage in these countries is higher than in other countries. The lowest reductions in employment and productivity costs are observed in Turkey, South Africa and Ireland. This is due to the low level of alcohol consumption in Turkey, the relatively low employment rate in South Africa and a combination of factors in Ireland.[9]

Figure 7.4. Labour market economic costs avoided

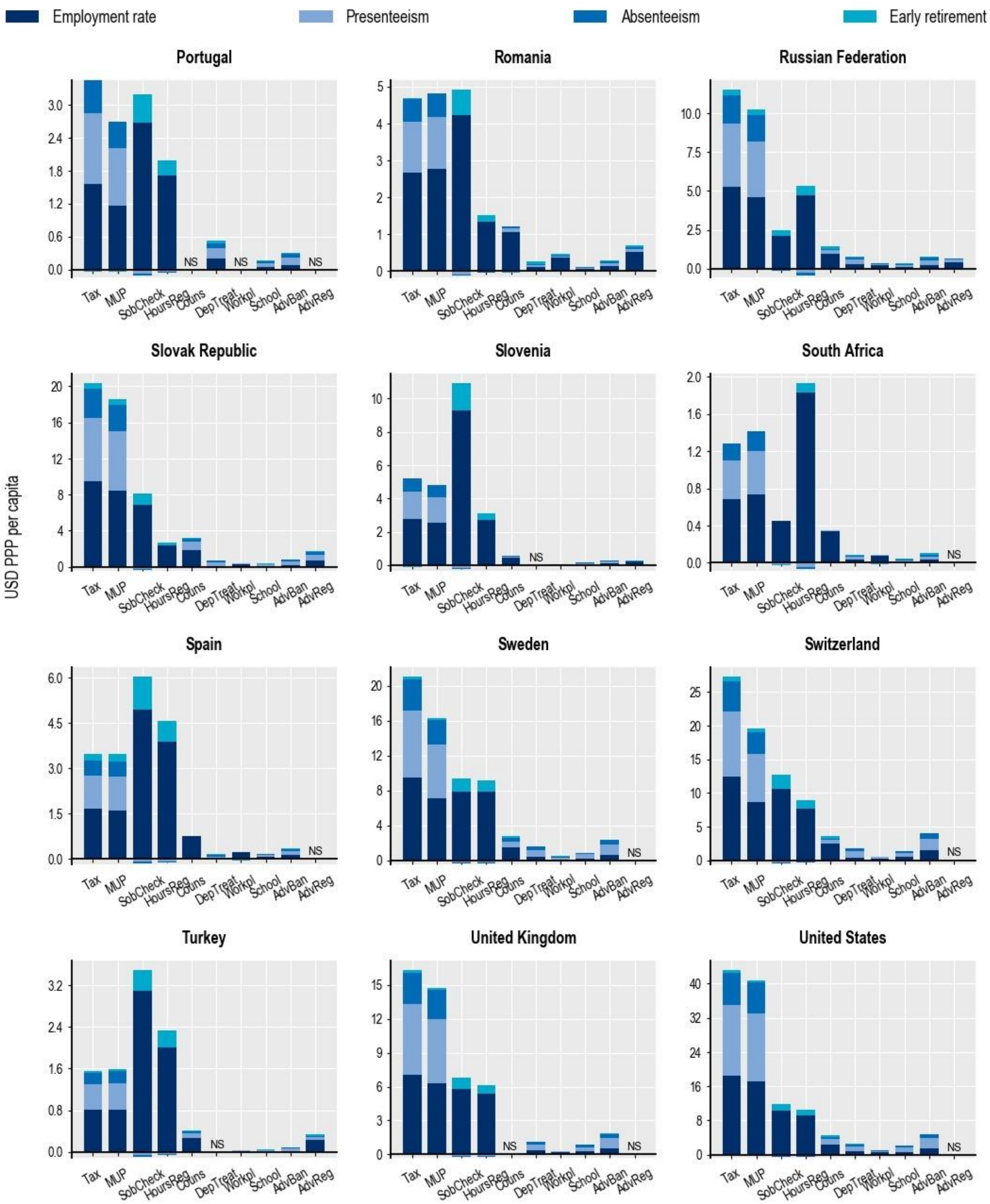
USD PPP per capita, annually, 2020-50




Employment rate
Presenteeism
Absenteeism
Early retirement
Czech Republic
Denmark
Estonia
Finland
France
Germany
Greece
Hungary
Iceland
India
Ireland
Israel
USD PPP per capita
Tax
MUP
SobCheck
HoursReg
Couns
DepTreat
Workpl
School
AdvBan
AdvReg
NS



Employment rate
Presenteeism
Absenteeism
Early retirement
USD PPP per capita
Italy
Japan
Korea
Latvia
Lithuania
Luxembourg
Malta
Mexico
Netherlands
New Zealand
Norway
Poland
Tax
MUP
SobCheck
HoursReg
Couns
DepTreat
Workpl
School
AdvBan
AdvReg
NS



Note: AdvReg = regulation of advertising; AdvBan = ban on advertising to children; School = school-based programmes; Workpl = workplace programmes; DepTreat = pharmacological treatment of dependence; Couns = counselling in primary care; HoursReg = restrictions on opening hours; SobCheck = sobriety checkpoints; MUP = minimum unit pricing; Tax = taxation. NS = not significant.

Source: OECD analyses based on the OECD SPHeP-NCDs model, 2020.

StatLink https://stat.link/gfs8u2

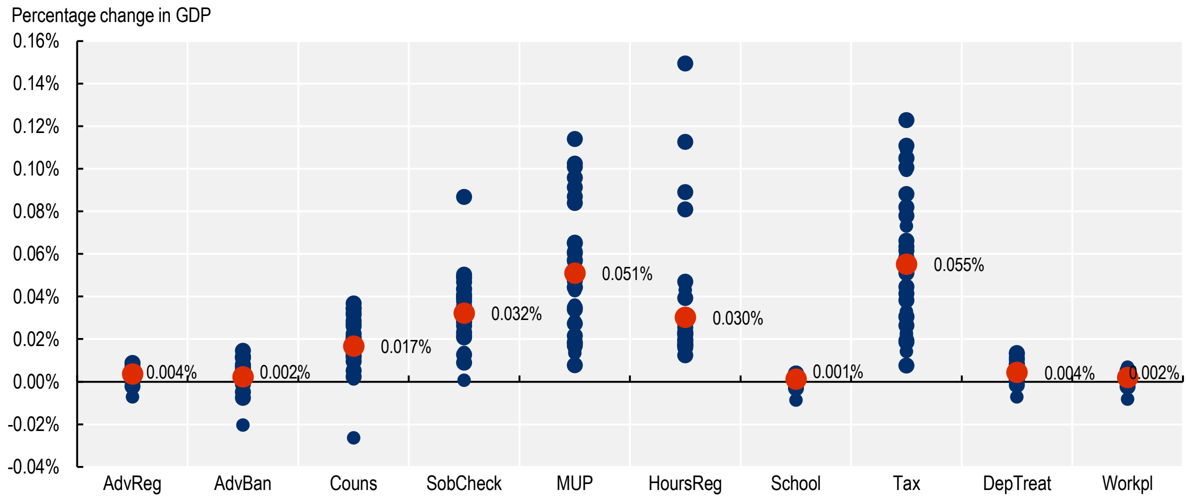
7.2.9. Alcohol policies have an impact on the broader economy

While for some interventions the costs of running the intervention are generally predicted to outweigh health expenditure savings, they may still offer a good return on investment, especially after a number of years. In fact, interventions usually require up-front investment that, in many cases, may be very large relative to the health improvements they produce and to the gains in terms of health expenditure, especially in the early years. However, over time, implemented interventions may represent increasingly good value for the money invested, especially if their effect on employment and productivity is also taken into account.

The analysis in this chapter shows that economic gains from increased employment and productivity will in general considerably exceed the savings from reduced health expenditure. This echoes findings in Chapter 4 (compare Figure 4.8 with Figure 4.10). If such labour market costs are taken into account, the return on investment for some interventions will improve even further, in many cases leading to cost savings.[10] The simulated effect on GDP supports this expectation. In most countries, interventions are expected to contribute to an increase of GDP in the range 0.001-0.055% annually (Figure 7.5). Taking 0.001% as a conservative assumption, this corresponds to an increase of USD PPP 964 million in GDP for the 45 countries included in this analysis.[11] For instance, the two most effective interventions – taxation and MUP – would result in GDP increases of about USD PPP 10-11 per capita per year, followed by sobriety checkpoints and restrictions on outlet opening hours, with GDP increases of about USD PPP 5-6 per capita per year.

Figure 7.5. The impact of interventions on GDP

Percentage change in GDP due to intervention, average 2020-50



Note: AdvReg = regulation of advertising; AdvBan = ban on advertising to children; Couns = counselling in primary care; SobCheck = sobriety checkpoints; MUP = minimum unit pricing; HoursReg = restrictions on opening hours; School = school-based programmes; Tax = taxation; DepTreat = pharmacological treatment of dependence; Workpl = workplace programmes.
Blue dots are countries analysed; red dots are the average across countries.
Source: OECD analyses based on the OECD SPHeP-NCDs model and OECD long-term economic model, 2020.

StatLink https://stat.link/jclgt7

Comparing the increase in GDP to the cost of implementing the interventions in all countries, most of the interventions appear to provide good value for money. The four policies with the highest return on investment (sobriety checkpoints, outlet opening hours restrictions, taxation and MUP) cost between 1% and 9% of the conservatively predicted benefit to the economy. In particular, for taxation and MUP, for each USD PPP 1 invested, around USD PPP 125-183 will be returned in the form of the economic benefit on average each year over 2020-50. The costs of implementing regulation or bans on alcohol advertising and counselling in primary care are about 20-50% of the benefit in terms of GDP. In other words, for each USD PPP 1 invested in one of these three interventions, around USD PPP 2-4 will be returned in the form of the economic benefit on average each year over the next 30 years. For the pharmacological treatment of dependence, the total return in GDP across the 45 countries is roughly equal to the total cost of implementing the intervention in all countries. For more expensive interventions, such as workplace and school-based programmes, the total return in GDP across the 45 countries analysed is USD PPP 0.12 and USD PPP 0.18 for each USD PPP 1 invested. Results of the return on investment are displayed together with the health and economic impacts later in the chapter, in Figure 7.9. All the interventions except regulation of advertising show a higher return on investment when calculated across OECD countries only (Annex Figure 7.A.5).

7.3. Greater impact is achieved by combining policies into coherent prevention strategies

Combining policy interventions into prevention packages provides multiple advantages. The causes of harmful use of alcohol are multifaceted, and packages of interventions can address these multiple causes simultaneously. In addition, packages can target different population groups simultaneously, producing greater results at the population level. Finally, policies within a package can work together and build synergies, sustaining positive behavioural changes in a more than additive fashion. Analyses carried out with the OECD SPHeP-NCDs model take into account these first two components but adopt a conservative assumption on the potential super-additivity of combining policies in packages: no additional effect is considered. The following four policy packages were evaluated:

- The mixed package: focusing primarily on the most effective interventions, scaling up interventions already in place. Interventions include raising alcohol taxation, regulation of alcohol advertising, sobriety checkpoints to counter drink-driving and alcohol counselling in primary care. These are already implemented in many, but not all, OECD countries, with significant variability in terms of implementation and design.
- The mixed package plus: further boosting the mixed package with promising innovative interventions. The package includes, in addition to the four policies in the mixed package, MUP and statutory bans on alcohol advertising targeting children.
- The availability restriction package: focusing primarily on interventions to limit the accessibility to alcoholic beverages. This includes regulation of alcohol advertising, statutory bans on advertising targeting children, sobriety checkpoints to counter drink-driving and restrictions on outlet opening hours. The package entails implementation of the most effective versions of these interventions, scaling up interventions already in place.
- The promoting individual responsibility package: focusing on interventions that are less intrusive for individuals and less politically sensitive to implement. This encompasses sobriety checkpoints to counter drink-driving, workplace and school-based programmes, alcohol counselling in primary care and pharmacological treatment of dependence.

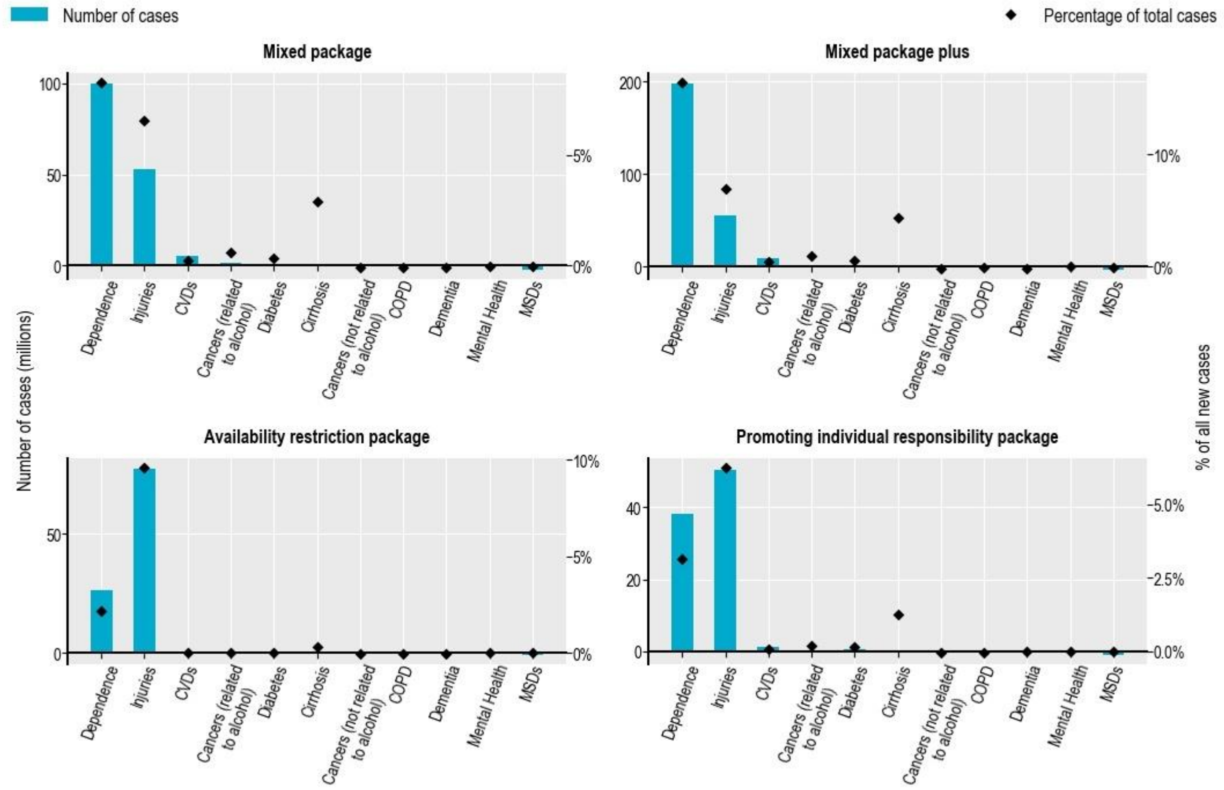
Upscaling the mixed package plus is predicted to have the largest effect on health outcomes, followed by the mixed package, the availability restriction package and then the promoting individual responsibility package. Specifically, by 2050, the mixed package plus is expected to prevent almost 198 million cases of dependence (6 million cases annually); 55.8 million cases of injury (1.8 million cases annually), 9.2 million cases of cardiovascular disease (298 000 cases annually), 2 million cases of alcohol-related cancer (66 000 cases annually), 1.5 million cases of diabetes (49 000 cases annually) and 550 000 cases of cirrhosis (18 000 cases annually) in the 48 analysed countries (Figure 7.6). For the cases of dependence, the impact of the package is more than the sum of the component interventions belonging to the mixed package plus: the six separate interventions, implemented in isolation, are predicted to avoid 189 million cases of dependence. For the other diseases, the impact of the mixed package plus is comparable to or smaller than the sum of the interventions taken in isolation. The share of dependence cases as a proportion of total cases avoided varies notably across packages (from 2% to 16%), while the share of injuries and other diseases is quite similar across packages (about 6-10% for injuries) (Figure 7.6).

The mixed package plus will also have the strongest impact on DALYs and LYs gained compared to the other three packages. For example, investing in the mixed package plus to upscale interventions already in place in many OECD countries and boost the effects with innovative promising interventions can result in a gain of 4.6 million LYs per year across all the 48 countries included in the analysis. The impact of the mixed package plus will be greatest in the Baltic countries, Poland, Romania and the Russian Federation, with up to 170 LYs gained annually per 100 000 people in Lithuania (Figure 7.7). Again, this finding is consistent with the large alcohol-related burden observed in Central and Eastern European countries, and the potential of these interventions to make a difference there.

The mixed package plus is also predicted to have the largest impact on health expenditure and, as a rule, the savings in health expenditure will be higher than the cost of implementing the interventions (Annex Figure 7.A.6). Further, the savings in health expenditure resulting from the package are higher than the sum of the component interventions belonging to this package. The mixed package plus is predicted to save about USD PPP 28 billion annually in the 48 countries studied. The largest annual effect of this will be observed in the United States (USD PPP 46 per capita), followed by Austria, Germany and Luxembourg (USD PPP 25-26 per capita), while the smallest effect will be observed in India and Turkey (USD PPP 0.6). The health expenditure savings will generally be greater in the United States and in Western and Northern Europe.

Figure 7.6. New cases avoided due to implementation of packages

Total number of cases, 2020-50

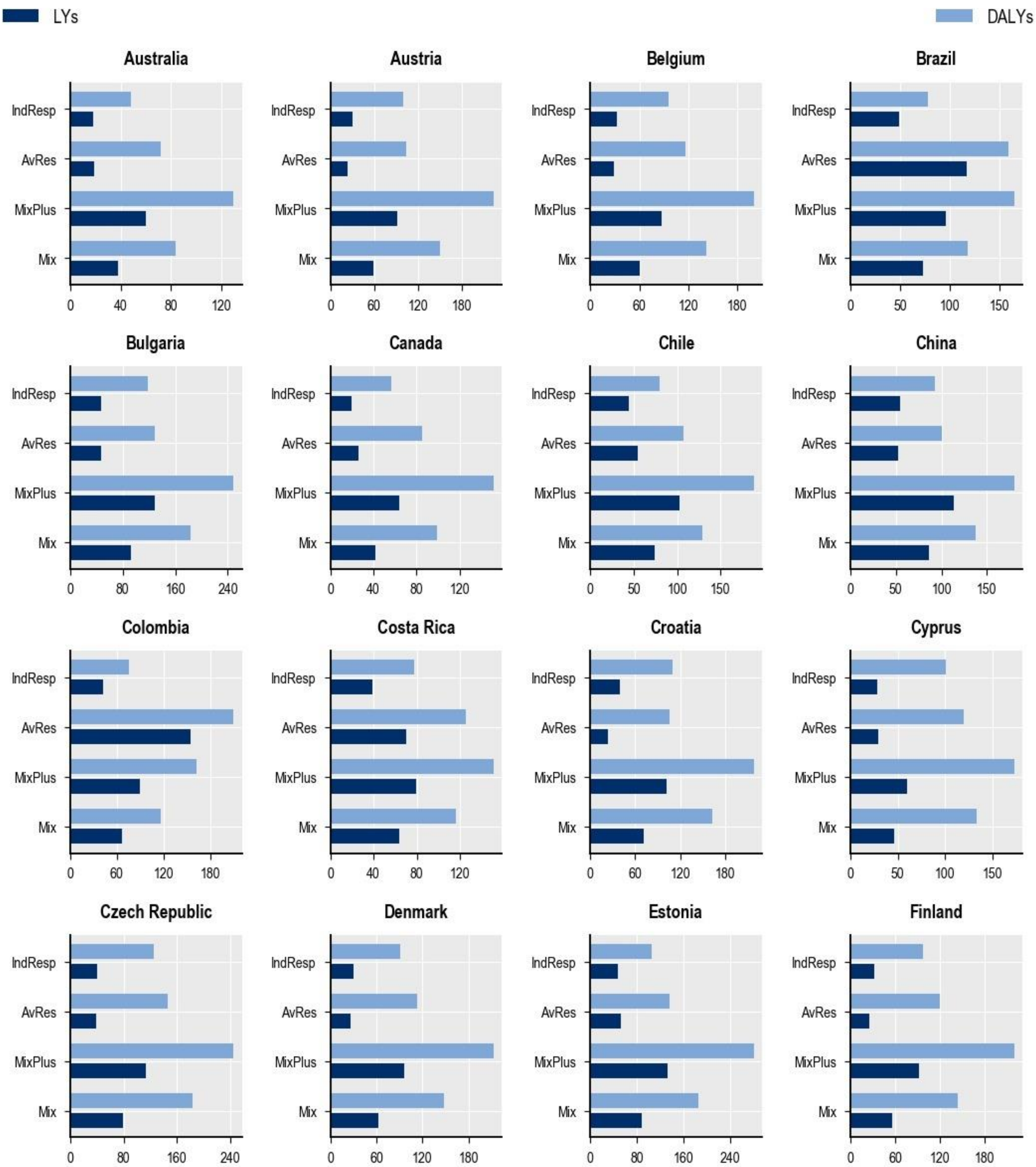


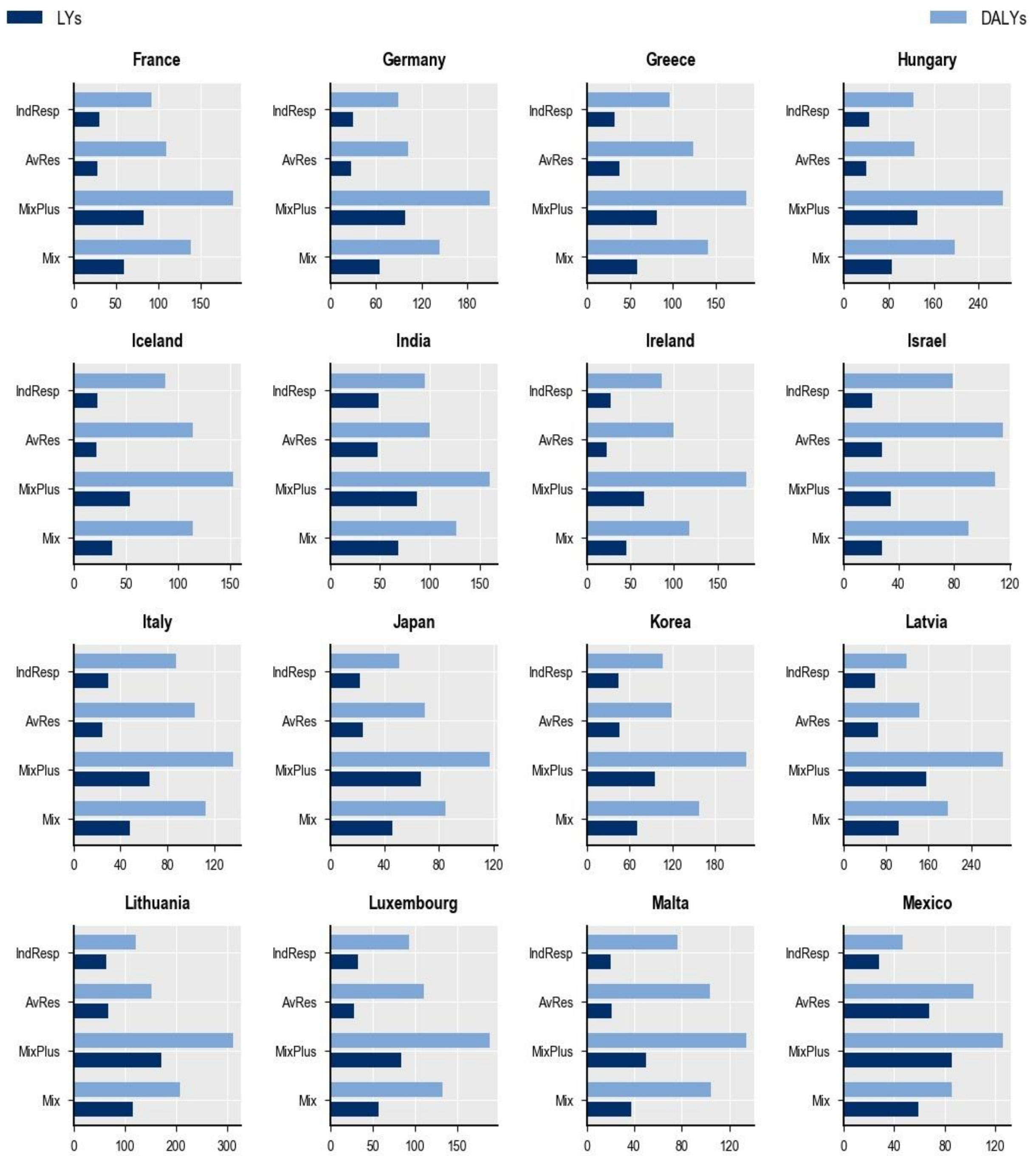
Note: CVDs = Cardiovascular diseases; COPD = Chronic obstructive pulmonary disease; MSDs = Musculoskeletal disorders. Bars represent absolute reductions in the number of new disease cases; the markers represent percentage reductions in the number of total new cases as a share of total new cases, between 2020 and 2050.
Source: OECD analyses based on the OECD SPHeP-NCDs model, 2020.

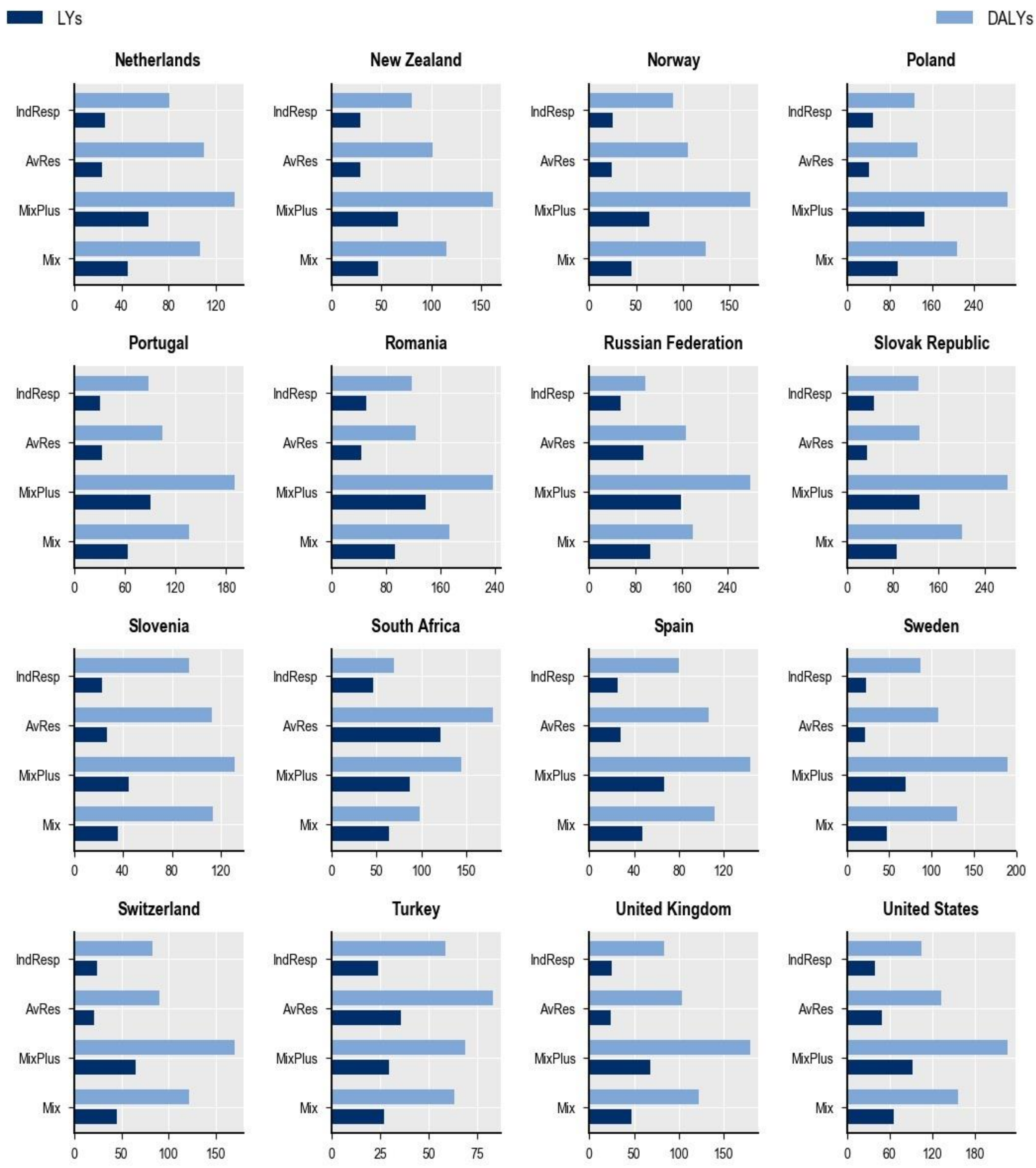
StatLink https://stat.link/3pqexy

Figure 7.7. Population-standardised effect of packages on health

LYs and DALYs gained per 100 000 population annually, 2020-50




LYs
DALYs
France
Germany
Greece
Hungary
Iceland
India
Ireland
Israel
Italy
Japan
Korea
Latvia
Lithuania
Luxembourg
Malta
Mexico
IndResp
AvRes
MixPlus
Mix



Note: Mix = mixed package; MixPlus = mixed package plus; AvRes = availability restriction package; IndResp = promoting individual responsibility package.
Source: OECD analyses based on the OECD SPHeP-NCDs model, 2020.

StatLink https://stat.link/cjgzh9

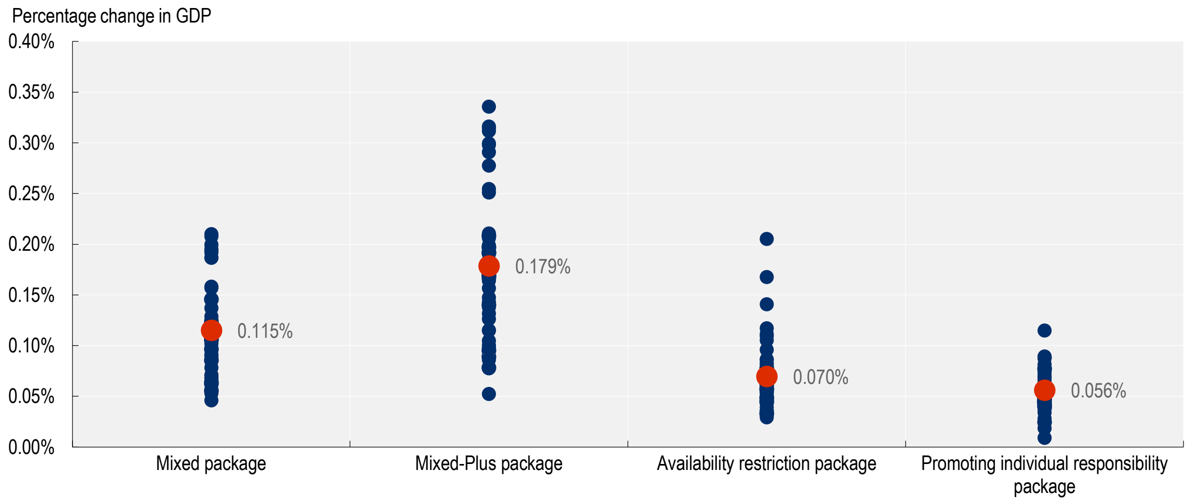
The mixed package plus is predicted to make the largest impact on labour-related costs, with a saving of nearly USD PPP 90 billion per year in all the countries combined. This is due to the following components: USD PPP 12 billion in absenteeism-related costs; USD PPP 26 billion in presenteeism; USD PPP 48 billion due to the employment rate and USD PPP 4 billion in early retirement costs. The economic gains in labour-related costs resulting from the package are higher than the sum of the component interventions in the mixed package plus. When standardised by population size, the largest reductions will be in the United States and Korea, with savings around USD PPP 110 per capita annually, followed by Switzerland (USD PPP 90 per capita), Germany (USD PPP 77 per capita) and Sweden (USD PPP 72 per capita). In addition, each year 3 million more people will be in employment as a result of the mixed package plus; 2.2 million as a result of the mixed package, 1.7 million as a result of the availability restriction package and 1.4 million as a result of the promoting individual responsibility package. On a per capita basis, the largest increase in employment will be in Lithuania (172 per 100 000 annually), followed by the Russian Federation (168 per 100 000 annually) and Estonia, Latvia and Poland (around 150 per 100 000 annually).

The mixed package also shows significant results, with almost 3.5 million LYs gained annually in the 48 countries, health expenditure savings of USD PPP 16 billion annually and gains in labour-related costs of USD PPP 55 billion. The availability restriction package is predicted to produce smaller but still significant effects, leading to a gain of 2.6 million LYs and saving USD PPP 4 billion in health expenditure and USD PPP 27 billion in labour-related costs per year in the 48 countries. The promoting individual responsibility package is predicted to produce a gain of 2.2 million LYs and to save nearly USD PPP 7 billion in health expenditure and USD PPP 21.5 billion in labour-related costs per year in the 48 countries. The four packages would also avoid between 77 million and 152 million DALYs in all 48 countries cumulatively by 2050.

The impact on GDP will be also substantial, with the mixed package and mixed package plus expected to produce an impact on GDP of about 0.12% and 0.18% in all 45 countries included in the analysis, with variation between 0.05% and 0.34% across countries (Figure 7.8). The other two packages will produce a smaller effect on GDP, of about 0.07% for the availability restriction package and 0.06% for the promoting individual responsibility package.

Figure 7.8. Impact of policy packages on GDP

Percentage change in GDP due to intervention, average 2020-50



Note: Blue dots are countries analysed; red dots are the averages across countries.
Source: OECD analyses based on the OECD SPHeP-NCDs model and OECD long-term economic model, 2020.

StatLink https://stat.link/x7wlbt

As described in Box 4.7 in Chapter 4, fiscal pressure is measured as government primary revenue (as a percentage of GDP) needed to stabilise the public debt ratio, and is equivalent to an overall tax rate. Implementing the policy packages will affect fiscal pressure, with the mixed package and the mixed package plus lowering the tax rate by 0.05 and 0.08 percentage points of GDP in all the countries included in the analysis.

Overall, for each USD PPP 1 invested in the mixed package plus, USD PPP 16.4 will be returned in the form of economic benefits each year (Figure 7.9). The return on investment in all countries is estimated, each year in the period 2020-50 for each USD PPP 1 invested, at around USD PPP 13.1 returned for the mixed package, USD PPP 10.4 for the availability restriction package and USD PPP 1.4 for the promoting individual responsibility package. All policy packages show a higher return on investment when calculated across OECD countries only (Annex Figure 7.A.5). The return on investment for policy packages is lower than for some specific interventions. The implementation cost of policy packages is greater than the implementation cost for single interventions – in particular for taxation, MUP, restrictions on opening hours and sobriety checkpoints (Table 7.3). It should be remembered, however, that the return on investment is not the only dimension of select interventions, and policy packages have much greater effectiveness for example, on population health) than single interventions, which is another element to take into account in the policy-making process.

Figure 7.9. Health and economic impacts of interventions to tackle harmful alcohol consumption

Average per year for the period 2020-50

Interventions and packages	DALYs gained per year (per 100 000 population), average across countries	Health expenditure saved per year (per capita USD PPP), average across countries	Additional full-time workers per year (in thousands of workers), total across countries	Return on investment (USD), average across countries
Workplace programmes	1.8	0.1	49	0.1
School-based programmes	3.3	0.3	40	0.2
Pharmacological treatment	6.1	0.7	72	0.7
Regulation of advertising	3.2	0.3	73	2.0
Ban on advertising to children	7.6	0.7	87	2.7
Counselling in primary care	18.4	1.5	339	4.3
Sobriety checkpoints	63.7	1.0	963	11.3
Restriction on opening hours	43.0	0.6	634	43.6
MUP	47.1	4.1	1038	125.6
Taxation	48.7	4.1	1179	183.4
Promoting individual responsibility pack	90.7	3.3	1434	1.4
Availability restriction package	117.8	2.6	1761	10.4
Mixed package	136.5	7.1	2652	13.1
Mixed package plus	192.3	11.9	3851	16.4

Note: Estimates for the return on investment are the result of the total increase in GDP in the 45 countries produced by the policy divided by the total cost of implementing the policy in these countries.
Source: OECD analyses based on the OECD SPHeP-NCDs model and OECD long-term economic model, 2020.

To sum up, the mixed package plus is predicted to perform better than the other packages, while also having a stronger economic impact compared to implementing the six component interventions separately. In particular, this package shows very positive effects on the number of cases of dependence, savings in health expenditure and increases in employment and productivity. The relatively strong performance of the mixed package plus is a result of the inclusion of evidence-based interventions, which were shown to be highly effective in almost all countries where they were analysed (taxation, MUP and sobriety checkpoints). Taxation and measures to counter drink-driving are already implemented in many countries, although they may not reach their full effectiveness because of variation in the design and level of alcohol taxation and lack of enforcement of the sobriety checkpoints to counter drink-driving. Therefore, ensuring the adoption and upscaling of these actions, which already have a good evidence base on their effectiveness, supplemented with innovative promising interventions such as MUP, is a promising avenue for countries to consider.

7.4. Conclusion: Policies to tackle harmful alcohol use have strong individual impacts and an even greater effect when combined

This chapter demonstrates that population-wide interventions such as raising alcohol taxes, MUP and sobriety checkpoints will produce the largest health gains and largest savings in health expenditure. The resulting savings in health expenditure are usually higher than the costs of running the interventions, making these interventions cost-saving overall. The gains in employment and productivity are usually several times larger than the reductions in medical expenditure. When this effect on labour market inputs is taken into account, the policies appear to provide very good value for money: for every USD PPP 1 invested in one of the interventions, the total GDP return is, in most cases, at least equal to their cost; for the best performing interventions it can be up to 180 times greater. Finally, the mixed package plus – including raised taxation, drink-driving measures, advertising regulation and counselling in primary care, boosted by MUP and bans on advertising to children – is predicted to perform better than the other packages, while also demonstrating that it has stronger combined economic impacts compared to implementing the six component interventions independently.

References

Angus, C. et al. (2015), *Modelling the Impact of Minimum Unit Price and Identification and Brief Advice Policies using the Sheffield Alcohol Policy Model Version 3*, School of Health and Related Research, University of Sheffield, https://www.sheffield.ac.uk/polopoly_fs/1.661445!/file/Final_mup_iba_report.pdf (accessed on 21 November 2019). [22]

Angus, C. et al. (2019), "Cost-effectiveness of strategies to improve delivery of brief interventions for heavy drinking in primary care: Results from the ODHIN trial", *European Journal of Public Health*, Vol. 29/2, pp. 219-225, http://dx.doi.org/10.1093/eurpub/cky181. [41]

Angus, C. et al. (2014), "Cost-effectiveness of a programme of screening and brief interventions for alcohol in primary care in Italy", *BMC Family Practice*, Vol. 15, p. 26, http://dx.doi.org/10.1186/1471-2296-15-26. [43]

An, R. and R. Sturm (2011), "Does the response to alcohol taxes differ across racial/ethnic groups? Some evidence from 1984-2009 behavioral risk factor surveillance system", *Journal of Mental Health Policy and Economics*, Vol. 14/1, pp. 13-23. [16]

Chisholm, D. et al. (2004), "Reducing the global burden of hazardous alcohol use: A comparative cost-effectiveness analysis", *Journal of Studies on Alcohol*, Vol. 65/6, pp. 782-793, http://dx.doi.org/10.15288/jsa.2004.65.782. [37]

Dave, D. and H. Saffer (2008), "Alcohol demand and risk preference", *Journal of Economic Psychology*, Vol. 29/6, pp. 810-831, http://dx.doi.org/10.1016/j.joep.2008.03.006. [14]

DeYoung, D., H. Tashima and S. Masten (2005), "An evaluation of the effectiveness of ignition interlock in California", in *Alcohol Ignition Interlock Devices Volume II: Research, Policy, and Program Status*, International Council on Alcohol, Drugs and Traffic Safety, Ottawa, https://www.researchgate.net/publication/260118798_An_Evaluation_of_the_Effectiveness_of_Ignition_Interlock_in_California (accessed on 22 November 2019). [34]

Elder, R. et al. (2011), "Effectiveness of ignition interlocks for preventing alcohol-impaired driving and alcohol-related crashes: A community guide systematic review", *American Journal of Preventive Medicine*, Vol. 40/3, pp. 362-376, http://dx.doi.org/10.1016/j.amepre.2010.11.012. [29]

Erke, A., C. Goldenbeld and T. Vaa (2009), "The effects of drink-driving checkpoints on crashes: A meta-analysis", *Accident Analysis and Prevention*, Vol. 41/5, pp. 914-923, http://dx.doi.org/10.1016/j.aap.2009.05.005. [24]

Fleming, M. et al. (2002), "Brief physician advice for problem drinkers: Long-term efficacy and benefit-cost analysis", *Alcoholism: Clinical and Experimental Research*, Vol. 26/1, pp. 36-43, http://dx.doi.org/10.1111/j.1530-0277.2002.tb02429.x. [42]

Fogarty, J. (2008), "The demand for beer, wine, and spirits: Insights from a meta-analysis approach", *AAWE Working Papers*, No. 31, American Association of Wine Economists, New York, https://www.wine-economics.org/dt_catalog/working-paper-no-31/. [17]

Fogarty, J. (2006), "The nature of the demand for alcohol: Understanding elasticity", *British Food Journal*, Vol. 108/4, pp. 316-332, http://dx.doi.org/10.1108/00070700610657155. [13]

Gallet, C. (2007), "The demand for alcohol: A meta-analysis of elasticities", *Australian Journal of Agricultural and Resource Economics*, Vol. 51/2, pp. 121-135, http://dx.doi.org/10.1111/j.1467-8489.2007.00365.x. [12]

GAO (2014), *Traffic Safety: Alcohol ignition interlocks are effective while installed; less is known about how to increase installation rates*, United States Government Accountability Office, Washington DC, https://www.gao.gov/assets/670/664281.pdf (accessed on 22 November 2019). [27]

Griffith, R., M. O'Connell and K. Smith (2017), "Proposed minimum unit price for alcohol would lead to large price rises", *IFS Briefing Notes*, No. BN222, Institute for Fiscal Studies, London, https://www.ifs.org.uk/uploads/publications/bns/BN222.pdf (accessed on 22 August 2019). [21]

Grootjans-van Kampen, I., P. Engelfriet and P. van Baal (2014), "Disease prevention: Saving lives or reducing health care costs?", *PLoS One*, Vol. 9/8, p. e104469, http://dx.doi.org/10.1371/journal.pone.0104469. [51]

Heinälä, P. et al. (2001), "Targeted use of naltrexone without prior detoxification in the treatment of alcohol dependence: A factorial double-blind, placebo-controlled trial", *Journal of Clinical Psychopharmacology*, Vol. 21/3, pp. 287-292, http://dx.doi.org/10.1097/00004714-200106000-00006. [47]

Hingson, R., T. Heeren and M. Winter (2006), "Age at drinking onset and alcohol dependence: Age at onset, duration, and severity", *Archives of Pediatrics and Adolescent Medicine*, Vol. 160/7, pp. 739-746, http://dx.doi.org/10.1001/archpedi.160.7.739. [11]

Ito, C. et al. (2015), "Brief intervention in the workplace for heavy drinkers: A randomized clinical trial in Japan", *Alcohol and Alcoholism*, Vol. 50/2, pp. 157-163, http://dx.doi.org/10.1093/alcalc/agu090. [8]

Kampman, K. et al. (2009), "Initiating acamprosate within-detoxification versus post-detoxification in the treatment of alcohol dependence", *Addictive Behaviors*, Vol. 34/6-7, pp. 581-586, http://dx.doi.org/10.1016/j.addbeh.2009.03.014. [44]

Kaner, E. et al. (2018), "Effectiveness of brief alcohol interventions in primary care populations", *Cochrane Database of Systematic Reviews* 2, p. CD004148, http://dx.doi.org/10.1002/14651858.CD004148.pub4. [40]

Kaufman, E. and D. Wiebe (2016), "Impact of state ignition interlock laws on alcohol-involved crash deaths in the United States", *American Journal of Public Health*, Vol. 106/5, pp. 865-871, http://dx.doi.org/10.2105/AJPH.2016.303058. [32]

Kypri, K. et al. (2011), "Effects of restricting pub closing times on night-time assaults in an Australian city", *Addiction*, Vol. 106/2, pp. 303-310, http://dx.doi.org/10.1111/j.1360-0443.2010.03125.x. [36]

MacArthur, G. et al. (2018), "Individual-, family-, and school-level interventions targeting multiple risk behaviours in young people", *Cochrane Database of Systematic Reviews*, Vol. 2018/10, p. CD009927, http://dx.doi.org/10.1002/14651858.CD009927.pub2. [9]

Maisel, N. et al. (2013), "Meta-analysis of naltrexone and acamprosate for treating alcohol use disorders: When are these medications most helpful?", *Addiction*, Vol. 108/2, pp. 275-293, http://dx.doi.org/10.1111/j.1360-0443.2012.04054.x. [45]

Marlatt, G. and J. Gordon (1985), *Relapse Prevention: Maintenance strategies in the treatment of addictive behaviors*, Guilford Press, New York. [49]

McGinty, E. et al. (2017), “Ignition interlock laws: Effects on fatal motor vehicle crashes, 1982-2013”, *American Journal of Preventive Medicine*, Vol. 52/4, pp. 417-423, http://dx.doi.org/10.1016/j.amepre.2016.10.043. [30]

Meier, P., R. Purshouse and A. Brennan (2010), “Policy options for alcohol price regulation: The importance of modelling population heterogeneity”, *Addiction*, Vol. 105/3, pp. 383-393, http://dx.doi.org/10.1111/j.1360-0443.2009.02721.x. [15]

Nelson, J. (2013), “Meta-analysis of alcohol price and income elasticities – with corrections for publication bias”, *Health Economics Review*, Vol. 3, p. 17, http://dx.doi.org/10.1186/2191-1991-3-17. [20]

OECD (2016), *Entrepreneurship at a Glance 2016*, OECD Publishing, Paris, https://dx.doi.org/10.1787/entrepreneur_aag-2016-en. [7]

O’Neill, J., J. Clark and J. Jones (2011), “Promoting mental health and preventing substance abuse and violence in elementary students: A randomized control study of the michigan model for health”, *Journal of School Health*, Vol. 81/6, pp. 320-330, http://dx.doi.org/10.1111/j.1746-1561.2011.00597.x. [10]

Poldrugo, F. (1997), “Acamprosate treatment in a long-term community-based alcohol rehabilitation programme”, *Addiction*, Vol. 92/11, pp. 1537-1546, http://dx.doi.org/10.1111/j.1360-0443.1997.tb02873.x. [46]

Richmond, R. et al. (2000), “Evaluation of a workplace brief intervention for excessive alcohol consumption: The Workscreen Project”, *Preventive Medicine*, Vol. 30/1, pp. 51-63, http://dx.doi.org/10.1006/pmed.1999.0587. [6]

Rossow, I. and T. Norström (2012), “The impact of small changes in bar closing hours on violence: The Norwegian experience from 18 cities”, *Addiction*, Vol. 107/3, pp. 530-537, http://dx.doi.org/10.1111/j.1360-0443.2011.03643.x. [35]

Roth, R. (2012), *2012 Survey of Currently Installed Interlocks in the US*, Roth Interlock Research Data, Santa Fe, NM, https://docplayer.net/133936902-2012-survey-of-currently-installed-interlocks-in-the-u-s-richard-roth-phd-august-28.html (accessed on 22 November 2019). [26]

Saffer, H. and D. Dave (2006), “Alcohol advertising and alcohol consumption by adolescents”, *Health Economics*, Vol. 15/6, pp. 617-637, http://dx.doi.org/10.1002/hec.1091. [38]

Sassi, F. and J. Hurst (2008), “The prevention of lifestyle-related chronic diseases: An economic framework”*, OECD Health Working Papers*, No. 32, OECD Publishing, Paris, https://dx.doi.org/10.1787/243180781313. [5]

Siegfried, N. and C. Parry (2019), “Do alcohol control policies work? An umbrella review and quality assessment of systematic reviews of alcohol control interventions (2006 – 2017)”, *PLoS One*, Vol. 14/4, p. e0214865, http://dx.doi.org/10.1371/journal.pone.0214865. [4]

Sornpaisarn, B. et al. (2013), “Elasticity of alcohol consumption, alcohol-related harms, and drinking initiation in low- and middle-income countries: A systematic review and meta-analysis”, *International Journal of Alcohol and Drug Research*, Vol. 2/1, pp. 45-58, http://dx.doi.org/10.7895/ijadr.v2i1.50. [18]

Stein, L. and R. Lebeau-Craven (2002), “Motivational interviewing and relapse prevention for DWI: A pilot study”, *Journal of Drug Issues*, Vol. 32/4, pp. 1051-1070, http://www.ncbi.nlm.nih.gov/pubmed/20485471 (accessed on 23 July 2019). [48]

Tanski, S. et al. (2015), “Cued recall of alcohol advertising on television and underage drinking behavior”, *JAMA Pediatrics*, Vol. 169/3, pp. 264-271, http://dx.doi.org/10.1001/jamapediatrics.2014.3345. [39]

Vanlaar, W., M. Mainegra Hing and R. Robertson (2017), “An evaluation of Nova Scotia’s alcohol ignition interlock program”, *Accident Analysis and Prevention*, Vol. 100, pp. 44-52, http://dx.doi.org/10.1016/j.aap.2016.12.017. [31]

Vézina, L. (2002), “The Québec Alcohol Ignition Interlock Program: Impact on recidivism and crashes”, *Proceedings of the 16th International Conference on Alcohol, Drugs and Traffic Safety*, pp. 97-104. [33]

VisionGain (2008), *The Global Anti-Addiction Market, 2008-2023*, VisionGain, London, https://www.pharmiweb.com/article/the-global-anti-addiction-market-2008-2023 (accessed on 10 September 2019). [50]

Voas, R. (2008), “A new look at NHTSA’s evaluation of the 1984 Charlottesville Sobriety Checkpoint Program: Implications for current checkpoint issues”, *Traffic Injury Prevention*, Vol. 9/1, pp. 22-30, http://dx.doi.org/10.1080/15389580701682114. [23]

Wagenaar, A., M. Salois and K. Komro (2009), “Effects of beverage alcohol price and tax levels on drinking: A meta-analysis of 1003 estimates from 112 studies”, *Addiction*, Vol. 104/2, pp. 179-190, http://dx.doi.org/10.1111/j.1360-0443.2008.02438.x. [19]

WHO (2017), *Tackling NCDs: “Best Buys” and Other Recommended Interventions for the Prevention and Control of Noncommunicable Diseases*, World Health Organization, Geneva, https://apps.who.int/iris/bitstream/handle/10665/259232/WHO-NMH-NVI-17.9-eng.pdf;jsessionid=3E76AC01272E9377F8382B8BC19545AF?sequence=1 (accessed on 10 September 2019). [2]

WHO (2010), *Global Strategy to Reduce the Harmful Use of Alcohol*, World Health Organization, Geneva, https://www.who.int/publications/i/item/9789241599931 (accessed on 30 August 2019). [1]

WHO (2003), *Making Choices in Health: WHO guide to cost-effectiveness analysis*, World Health Organization, Geneva, https://www.who.int/choice/publications/p_2003_generalised_cea.pdf. [3]

Willis, C., S. Lybrand and N. Bellamy (2004), “Alcohol ignition interlock programmes for reducing drink driving recidivism”, *Cochrane Database of Systematic Reviews* 3, p. CD004168, http://dx.doi.org/10.1002/14651858.cd004168.pub2. [28]

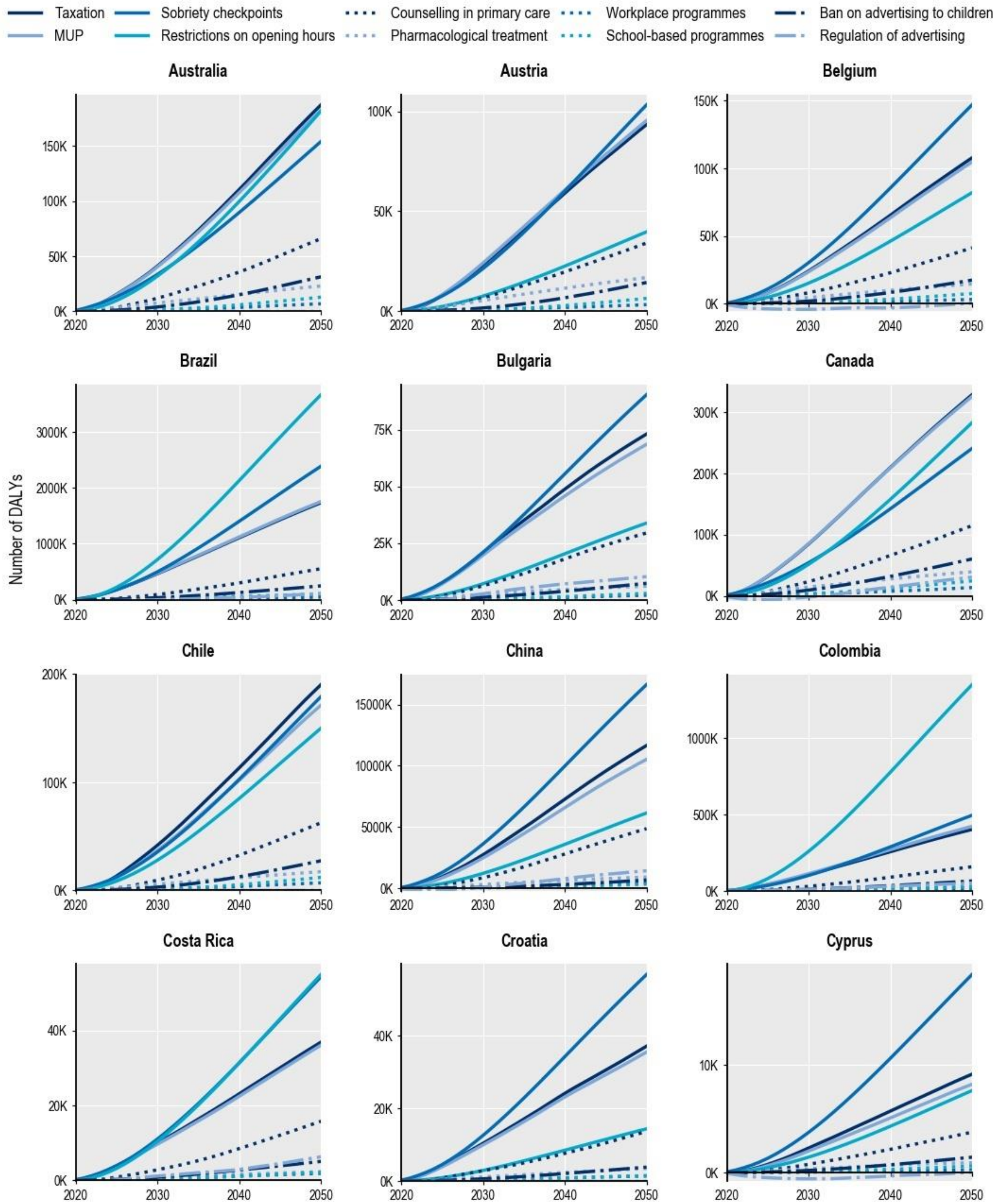
World Bank (2018), *Urban Population (% of total population)*, World Bank, Washington DC, https://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS?name_desc=true (accessed on 20 July 2020). [25]

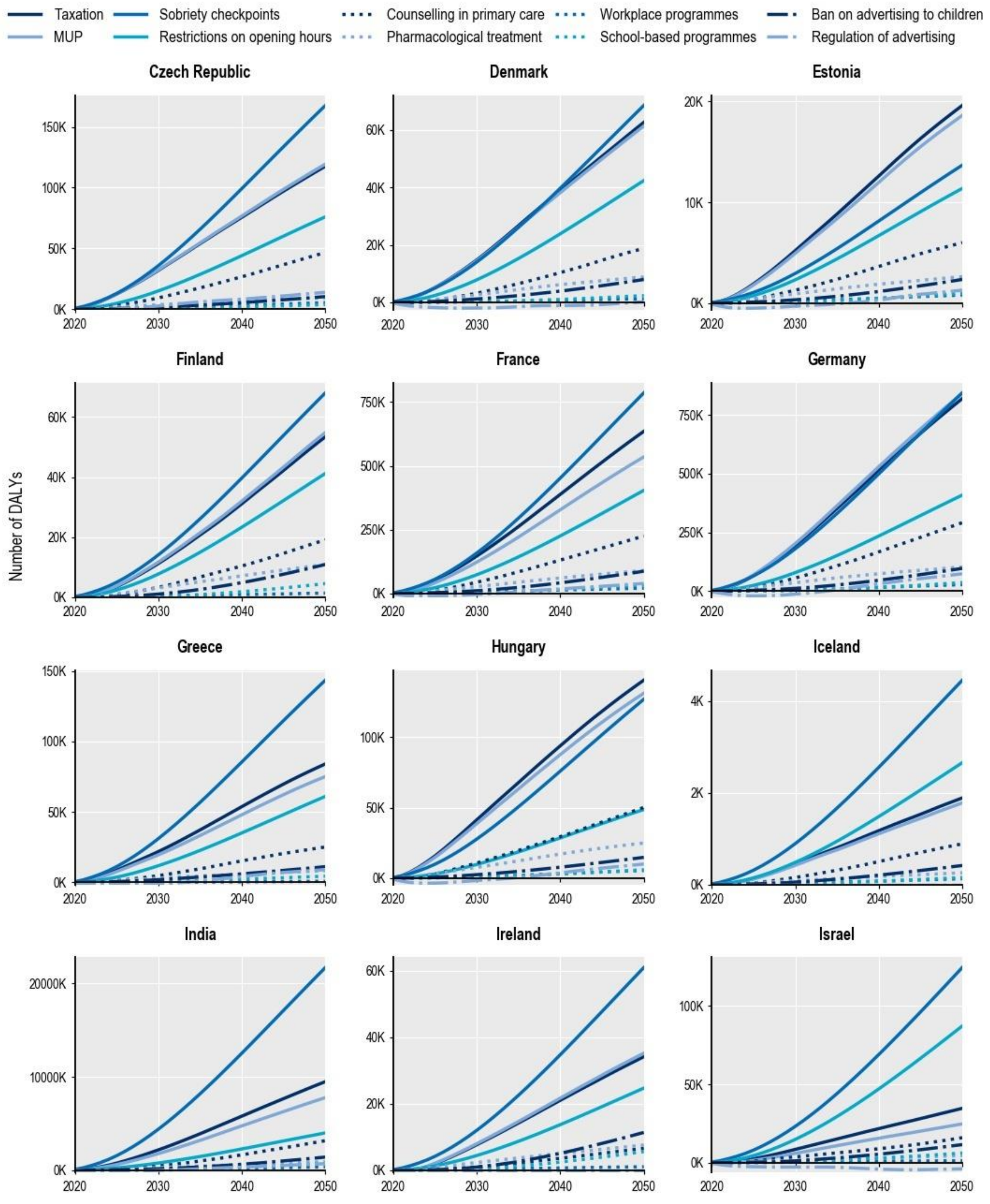
Annex 7.A. Additional analyses

In this section, some additional results are shown demonstrating the potential impact of interventions (and of their packages) on health and economic outcomes, separately for each country. First, Annex Figure 7.A.1 shows the progression of cumulative DALYs gained over time resulting from implementation of the ten modelled interventions. Next, Annex Figure 7.A.2 demonstrates the predicted cumulative savings in medical expenditure and how these change over time. Annex Figure 7.A.3 is a sensitivity analysis to test the variability around the effectiveness of the ten interventions studied. It is run on the country average and average per year effects of the interventions on DALYs and health expenditure. Annex Figure 7.A.4shows how the interventions can contribute to increases in the labour force. Annex Figure 7.A.5 shows the return on investment for OECD countries only. Finally, Annex Figure 7.A.6 compares the costs of implementing the packages with the potential savings in health expenditure resulting from their implementation.

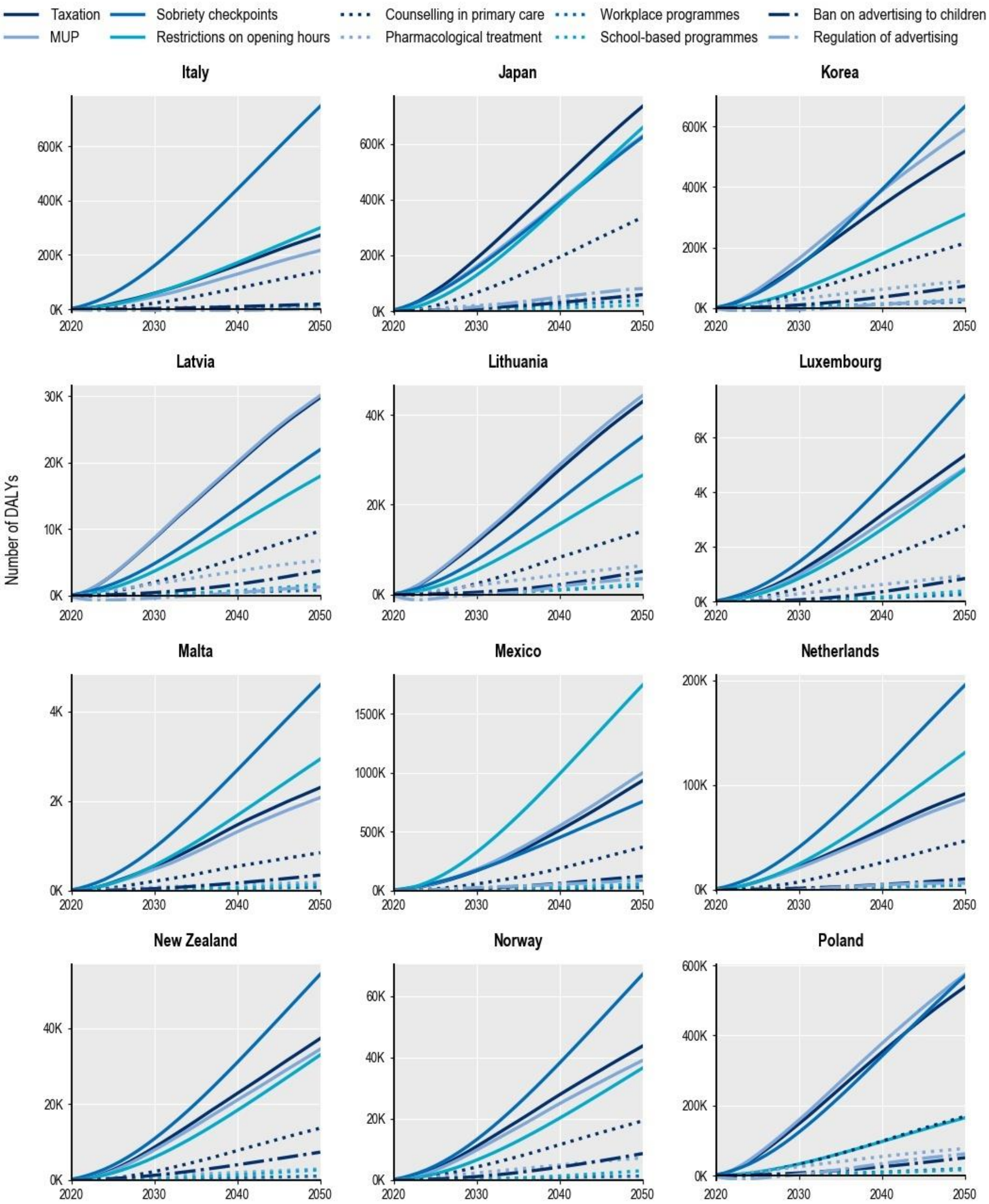
Annex Figure 7.A.1. Cumulative DALYs gained

Cumulative number of DALYs gained, discounted, 2020-50

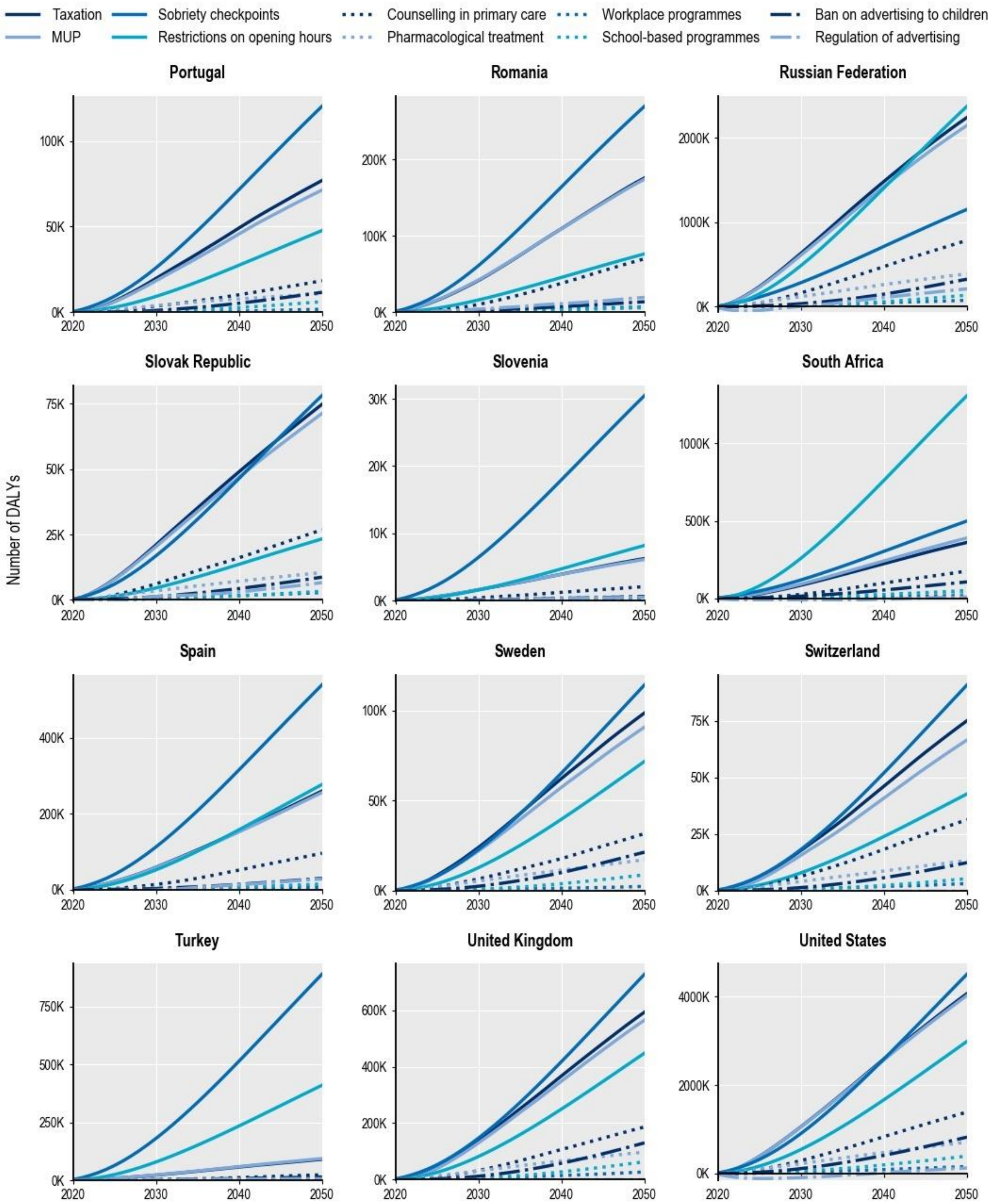




Taxation
MUP
Sobriety checkpoints
Restrictions on opening hours
Counselling in primary care
Pharmacological treatment
Workplace programmes
School-based programmes
Ban on advertising to children
Regulation of advertising
Czech Republic
Denmark
Estonia
Finland
France
Germany
Greece
Hungary
Iceland
India
Ireland
Israel
Number of DALYs



Taxation
MUP
Sobriety checkpoints
Restrictions on opening hours
Counselling in primary care
Pharmacological treatment
Workplace programmes
School-based programmes
Ban on advertising to children
Regulation of advertising
Italy
Japan
Korea
Latvia
Lithuania
Luxembourg
Malta
Mexico
Netherlands
New Zealand
Norway
Poland
Number of DALYs
2020
2030
2040
2050

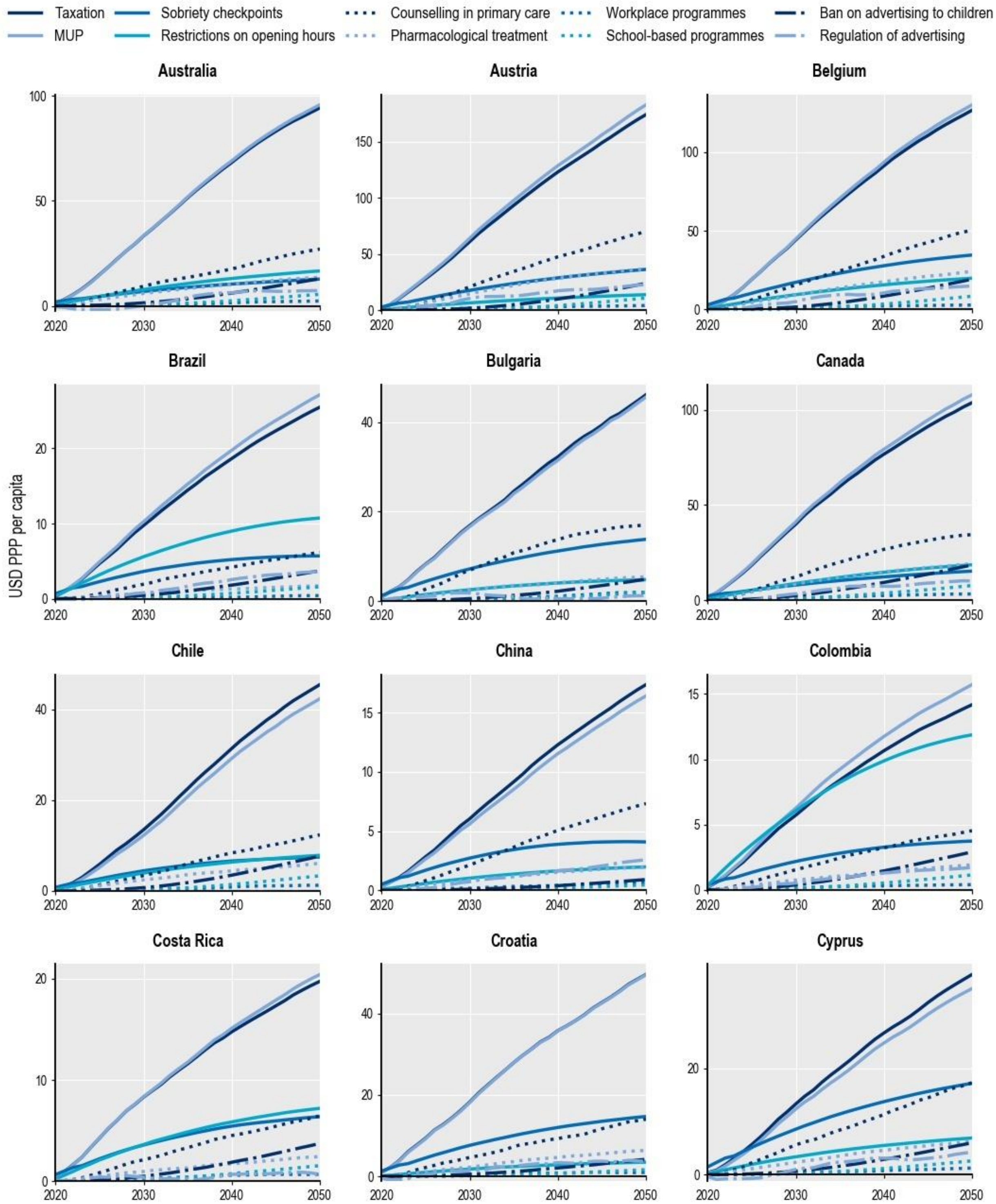


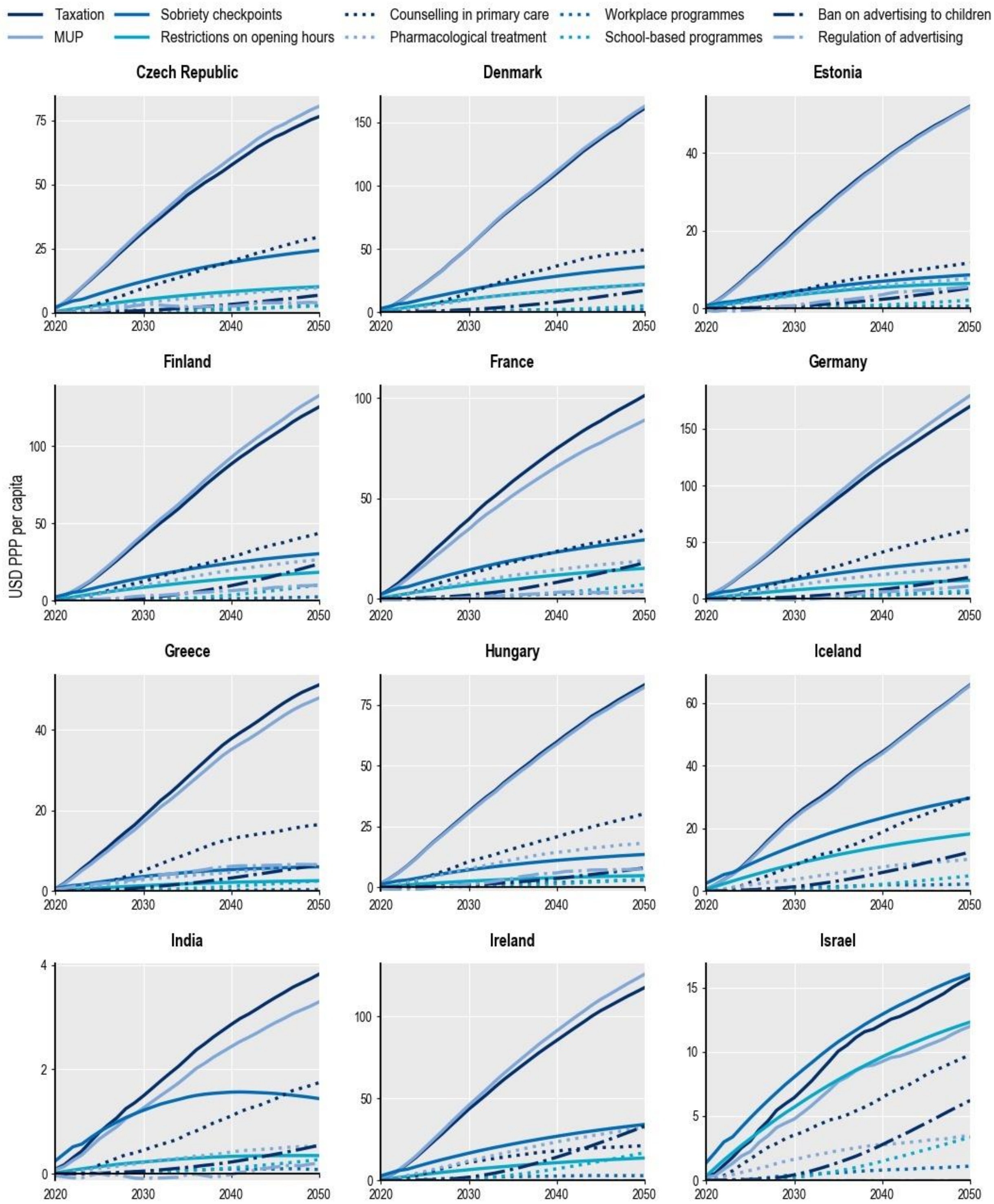
Source: OECD analyses based on the OECD SPHeP-NCDs model, 2020.

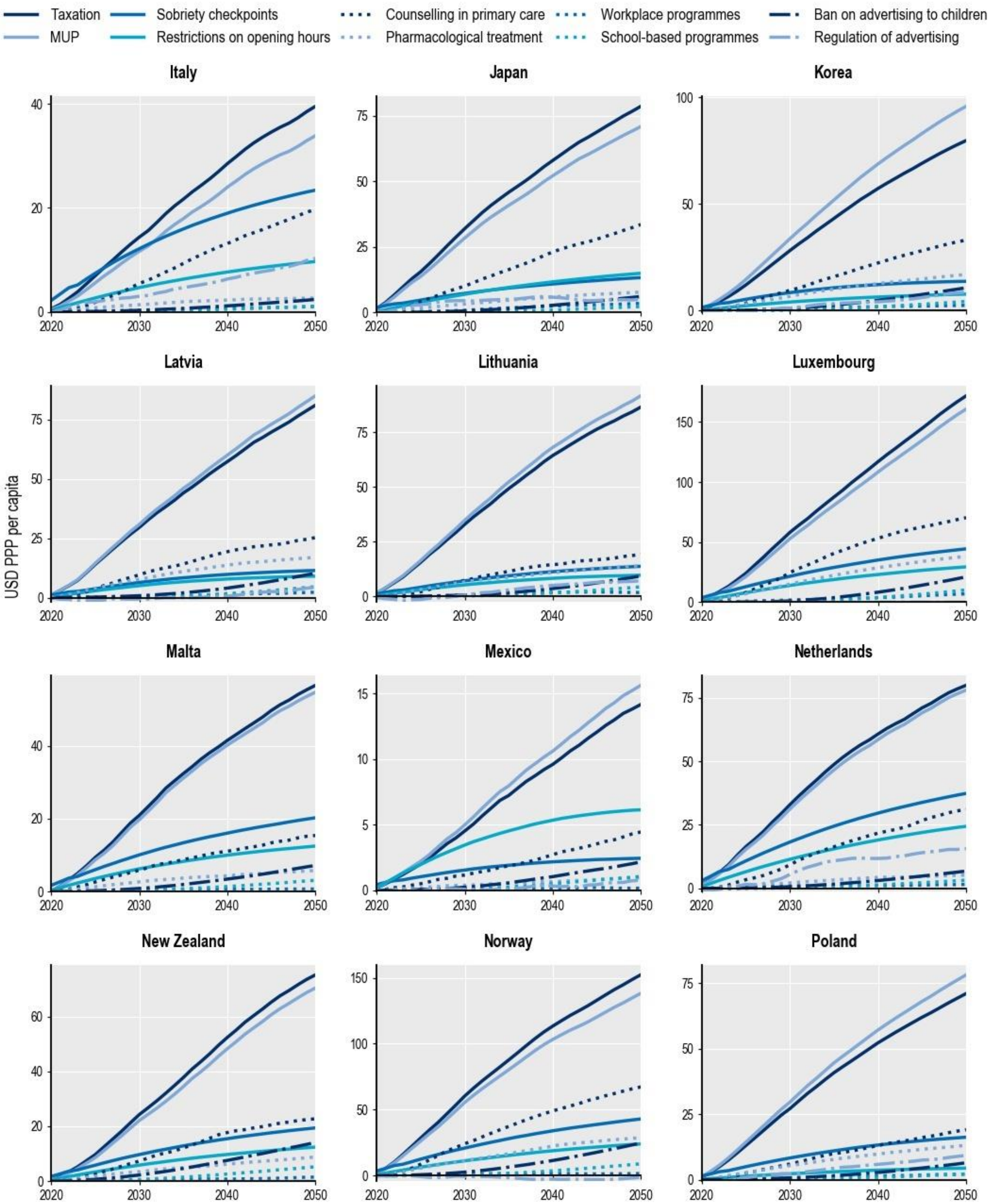
StatLink https://stat.link/7xf3dn

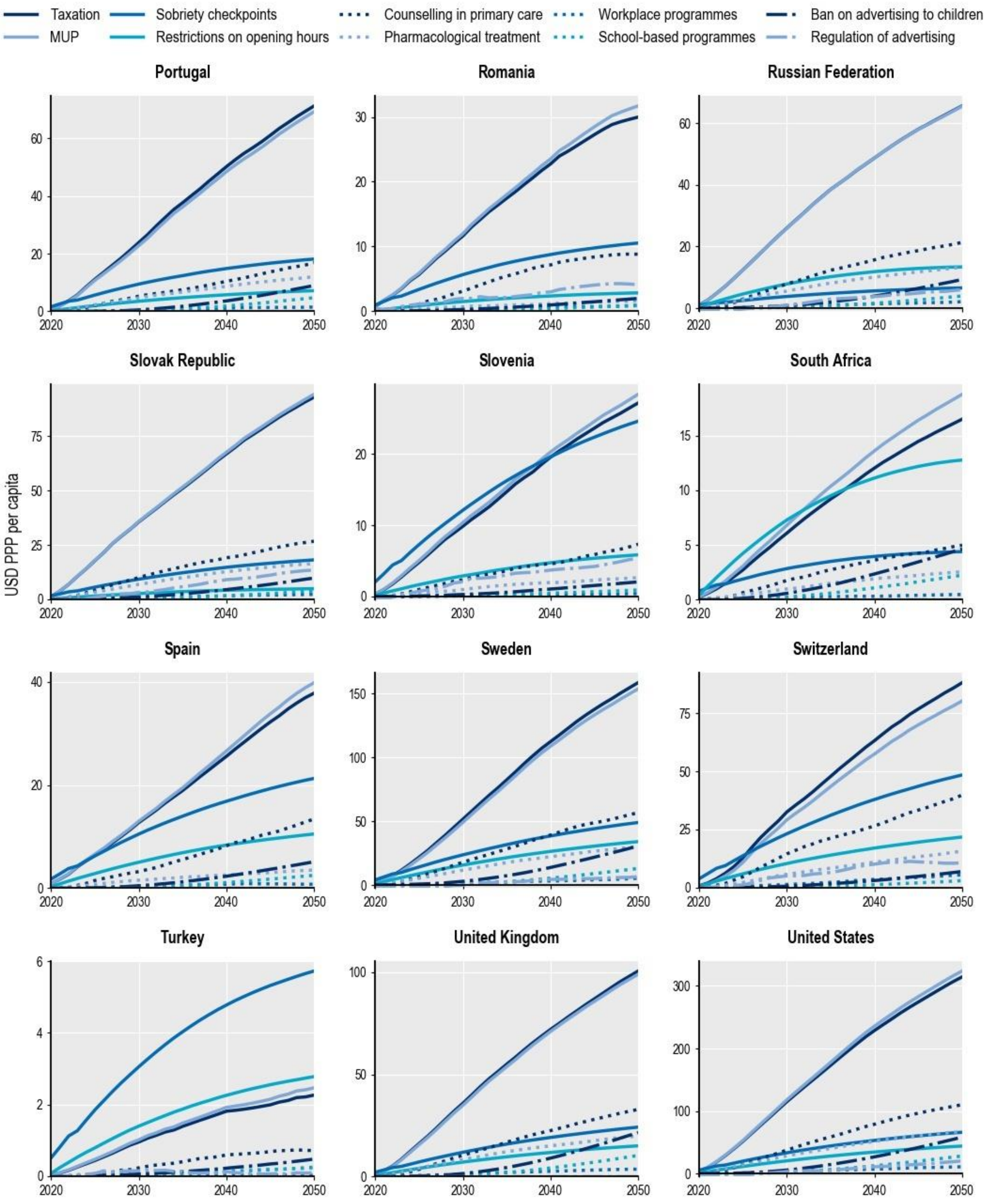
Annex Figure 7.A.2. Cumulative savings in health expenditure

USD PPP per capita, discounted, 2020-50




Taxation
MUP
Sobriety checkpoints
Restrictions on opening hours
Counselling in primary care
Pharmacological treatment
Workplace programmes
School-based programmes
Ban on advertising to children
Regulation of advertising
Czech Republic
Denmark
Estonia
Finland
France
Germany
Greece
Hungary
Iceland
India
Ireland
Israel
USD PPP per capita

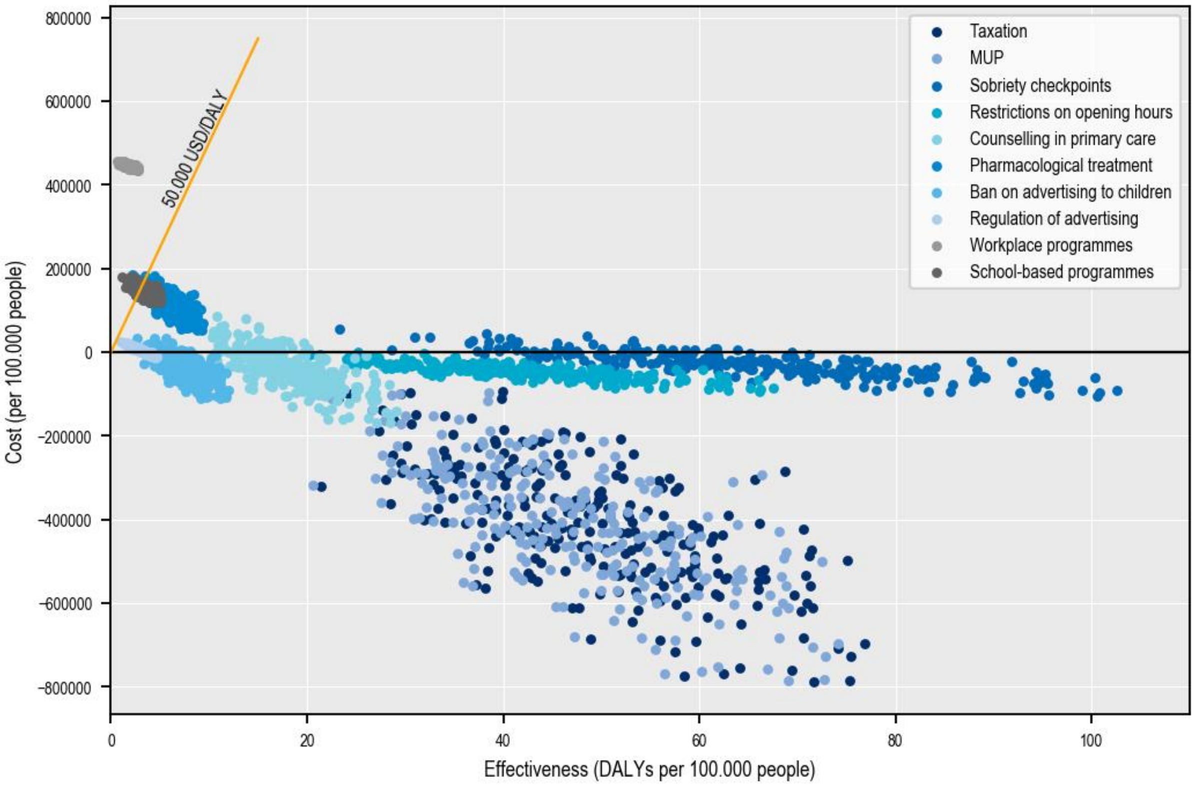

Taxation
MUP
Sobriety checkpoints
Restrictions on opening hours
Counselling in primary care
Pharmacological treatment
Workplace programmes
School-based programmes
Ban on advertising to children
Regulation of advertising
Italy
Japan
Korea
Latvia
Lithuania
Luxembourg
Malta
Mexico
Netherlands
New Zealand
Norway
Poland
USD PPP per capita



Source: OECD analyses based on the OECD SPHeP-NCDs model, 2020.

StatLink https://stat.link/14med8

Annex Figure 7.A.3. Sensitivity analysis of the effectiveness of the ten interventions

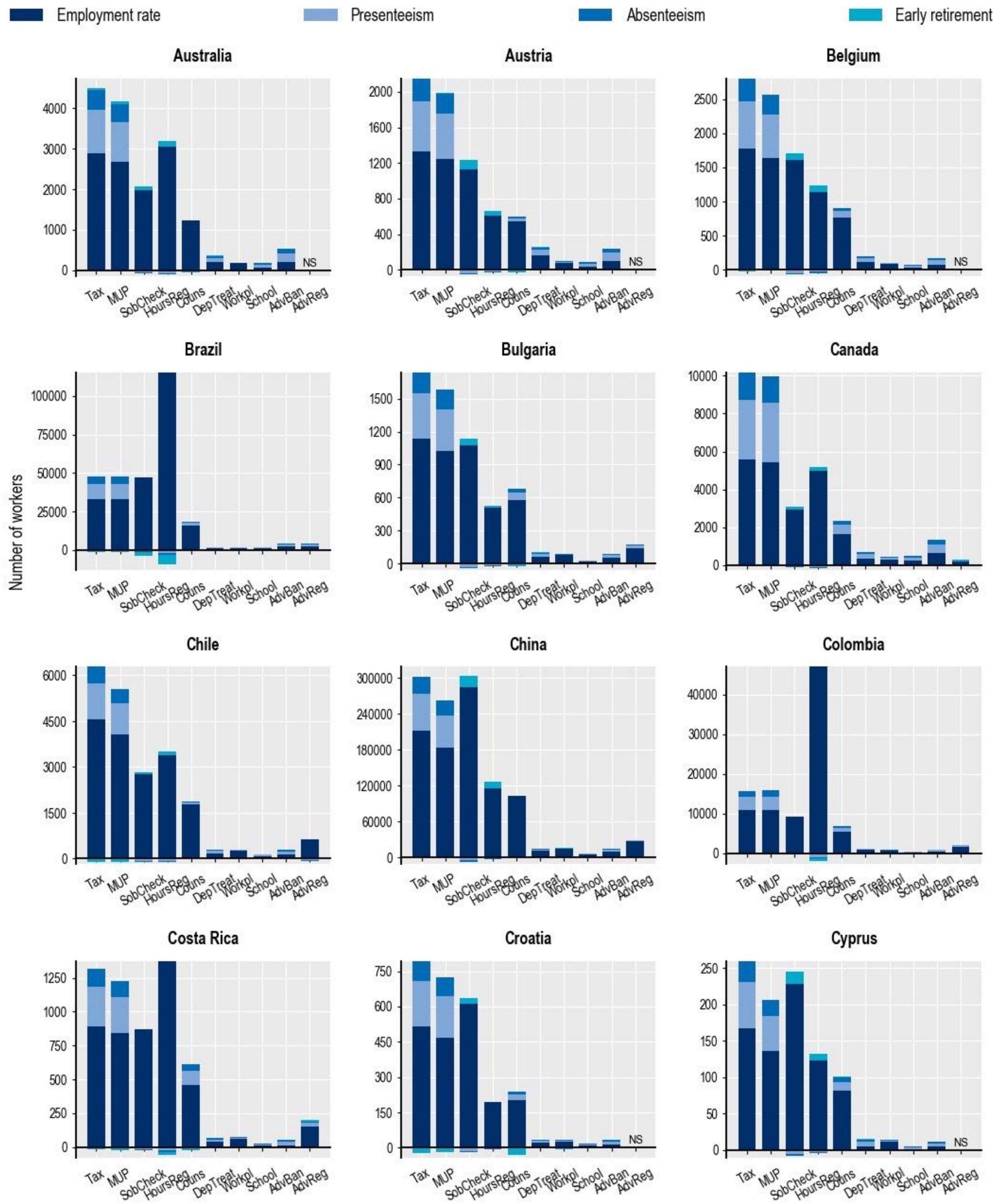


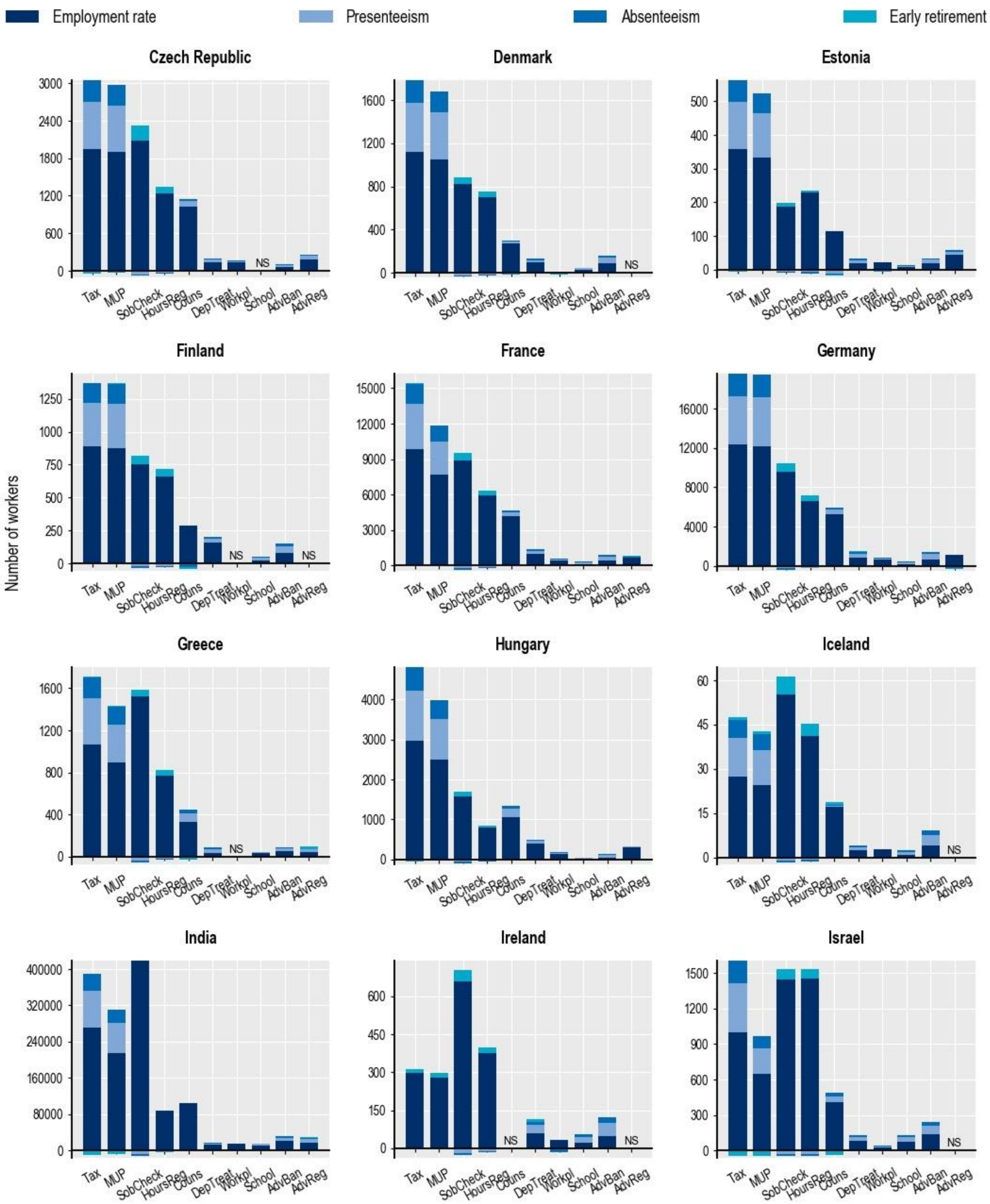
Note: Cost is the difference between gains in health expenditure and cost of running the intervention, measured in USD per 100 000 population.
Source: OECD analyses based on the OECD SPHeP-NCDs model, 2020.

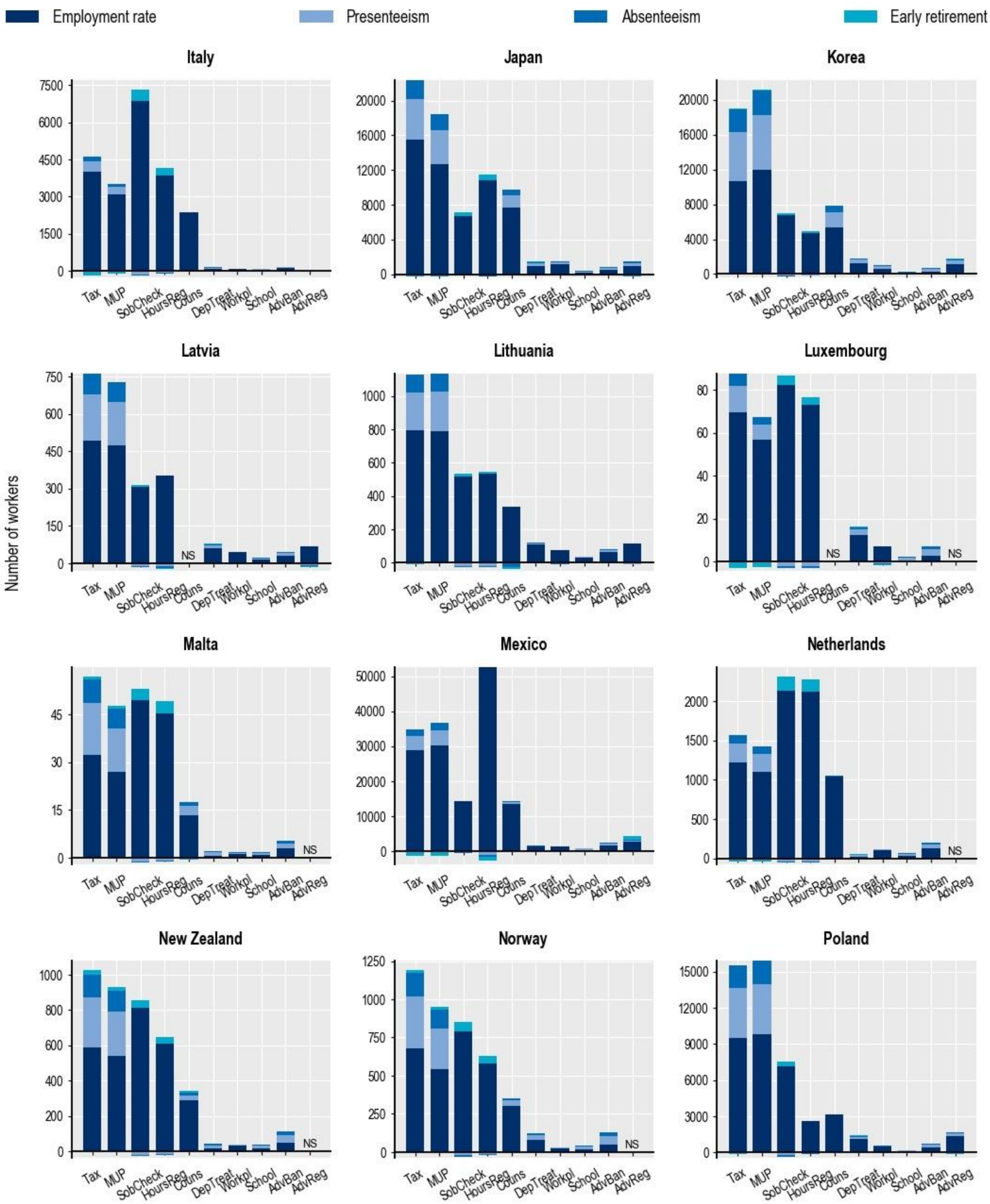
StatLink https://stat.link/m1fk5g

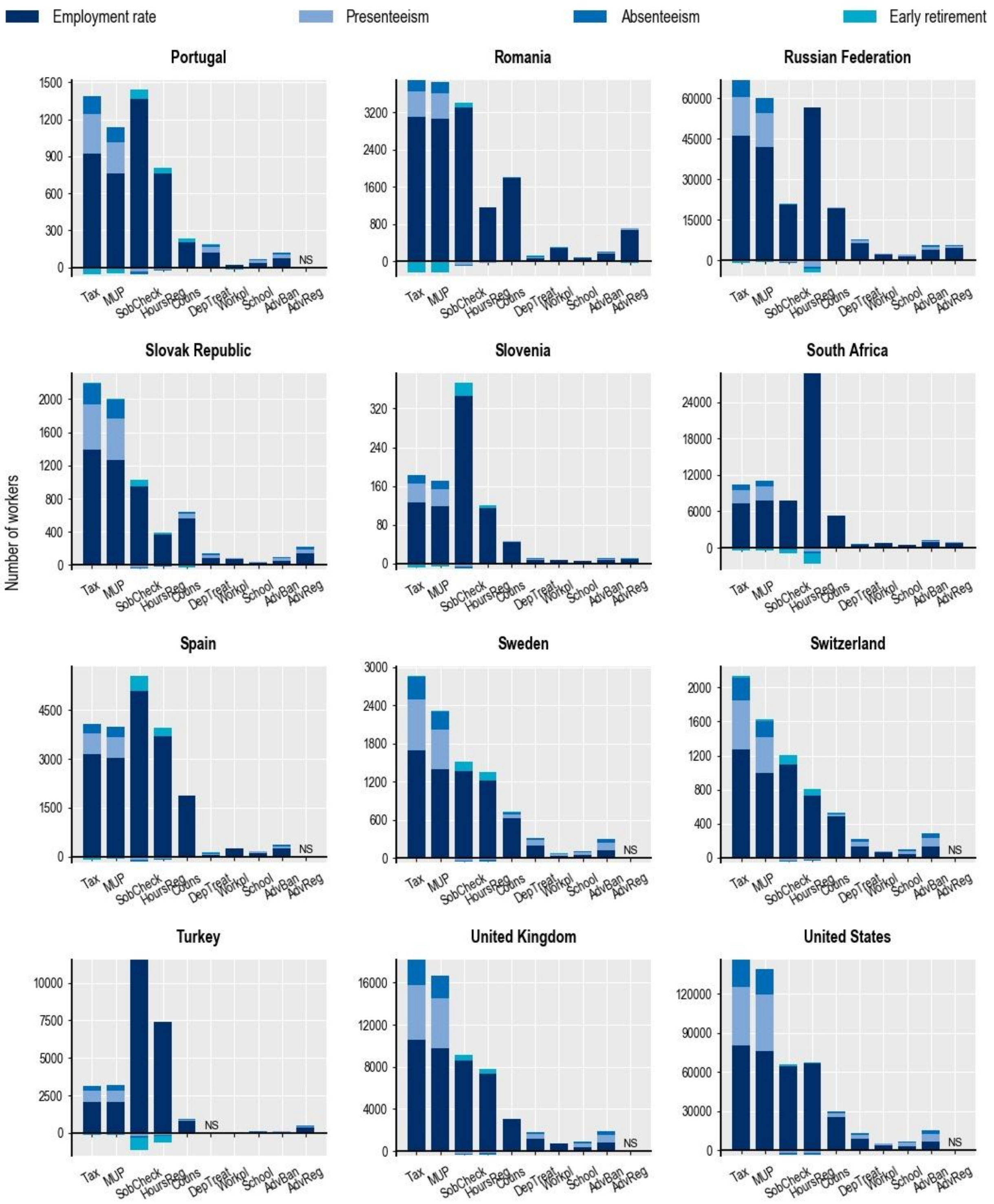
Annex Figure 7.A.4. Increases in workforce

Number of workers added annually, 2020-50




Employment rate
Presenteeism
Absenteeism
Early retirement
Number of workers
Czech Republic
Denmark
Estonia
Finland
France
Germany
Greece
Hungary
Iceland
India
Ireland
Israel
Tax
MUP
SobCheck
HoursReg
Couns
DepTreat
Workpl
School
AdvBan
AdvReg
NS


Employment rate
Presenteeism
Absenteeism
Early retirement
Number of workers
Italy
Japan
Korea
Latvia
Lithuania
Luxembourg
Malta
Mexico
Netherlands
New Zealand
Norway
Poland
Tax
MUP
SobCheck
HoursReg
Couns
DepTreat
Workpl
School
AdvBan
AdvReg
NS



Note: AdvReg = regulation of advertising; AdvBan = ban on advertising to children; School = school-based programmes; Workpl = workplace programmes; DepTreat = pharmacological treatment of dependence; Couns = counselling in primary care; HoursReg = restrictions on opening hours; SobCheck = sobriety checkpoints; MUP = minimum unit pricing; Tax = taxation. NS = not significant.
Source: OECD analyses based on the OECD SPHeP-NCDs model, 2020.

StatLink https://stat.link/j68ogf

Annex Figure 7.A.5. Health and economic impacts of interventions to tackle harmful alcohol consumption, OECD countries only

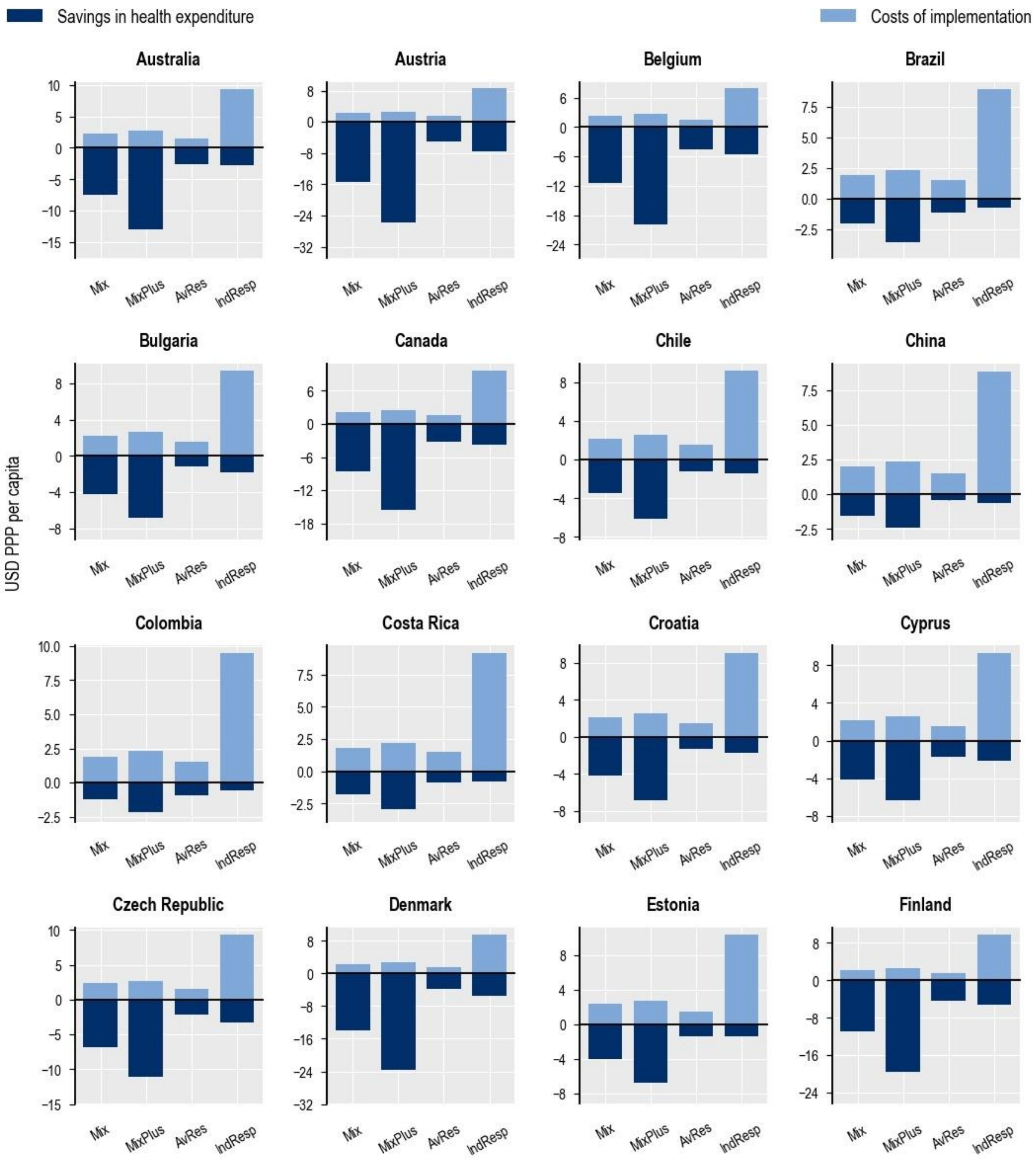
Average per year over the period 2020-50

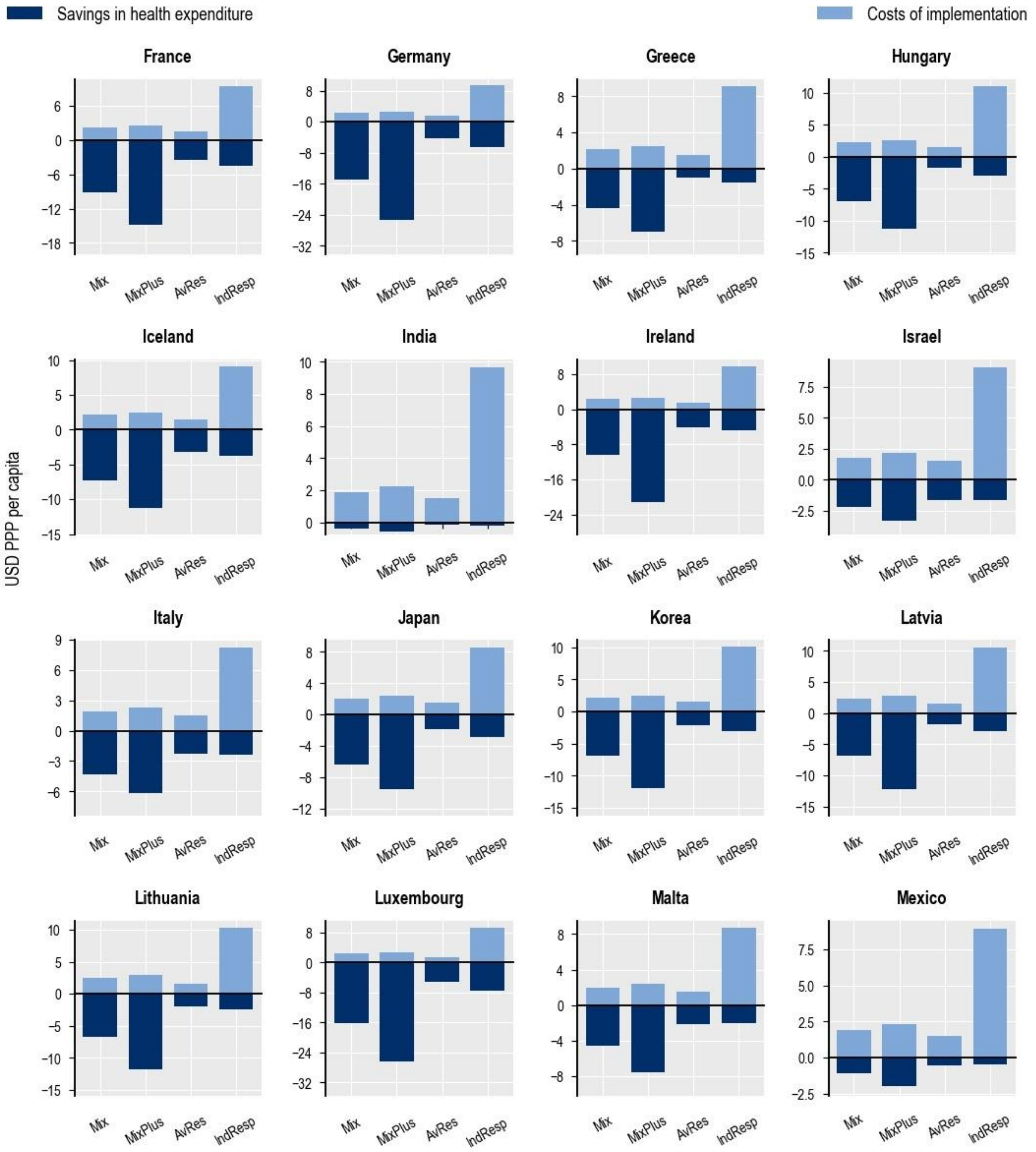
Interventions and packages	DALYs gained per year (per 100 000 population), average across countries	Health expenditure saved per year (per capita USD PPP), average across	Additional full-time workers per year (in thousands of workers), total	Return on investment (USD), average across countries
Workplace programmes	1.8	0.1	15	0.2
School-based programmes	3.3	0.4	13	0.4
Pharmacological treatment	6.3	0.8	30	1.1
Regulation of advertising	2.8	0.3	4	1.0
Ban on advertising to children	7.7	0.8	31	6.0
Counselling in primary care	18.0	1.6	102	7.2
Sobriety checkpoints	63.2	1.1	188	17.2
Restriction on opening hours	40.4	0.7	241	82.0
MUP	46.7	4.6	353	263.6
Taxation	48.1	4.6	372	370.6
Promoting individual responsibility pack	89.9	3.7	340	2.4
Availability restriction package	114.2	2.9	471	17.6
Mixed package	134.9	8.0	723	23.3
Mixed package plus	190.5	13.4	1147	30.9

Note: Estimates for the return on investment are the result of the total increase in GDP in OECD countries produced by the policy divided by the total cost of implementing the policy in these countries.
Source: OECD analyses based on the OECD SPHeP-NCDs model and OECD long-term economic model, 2020.

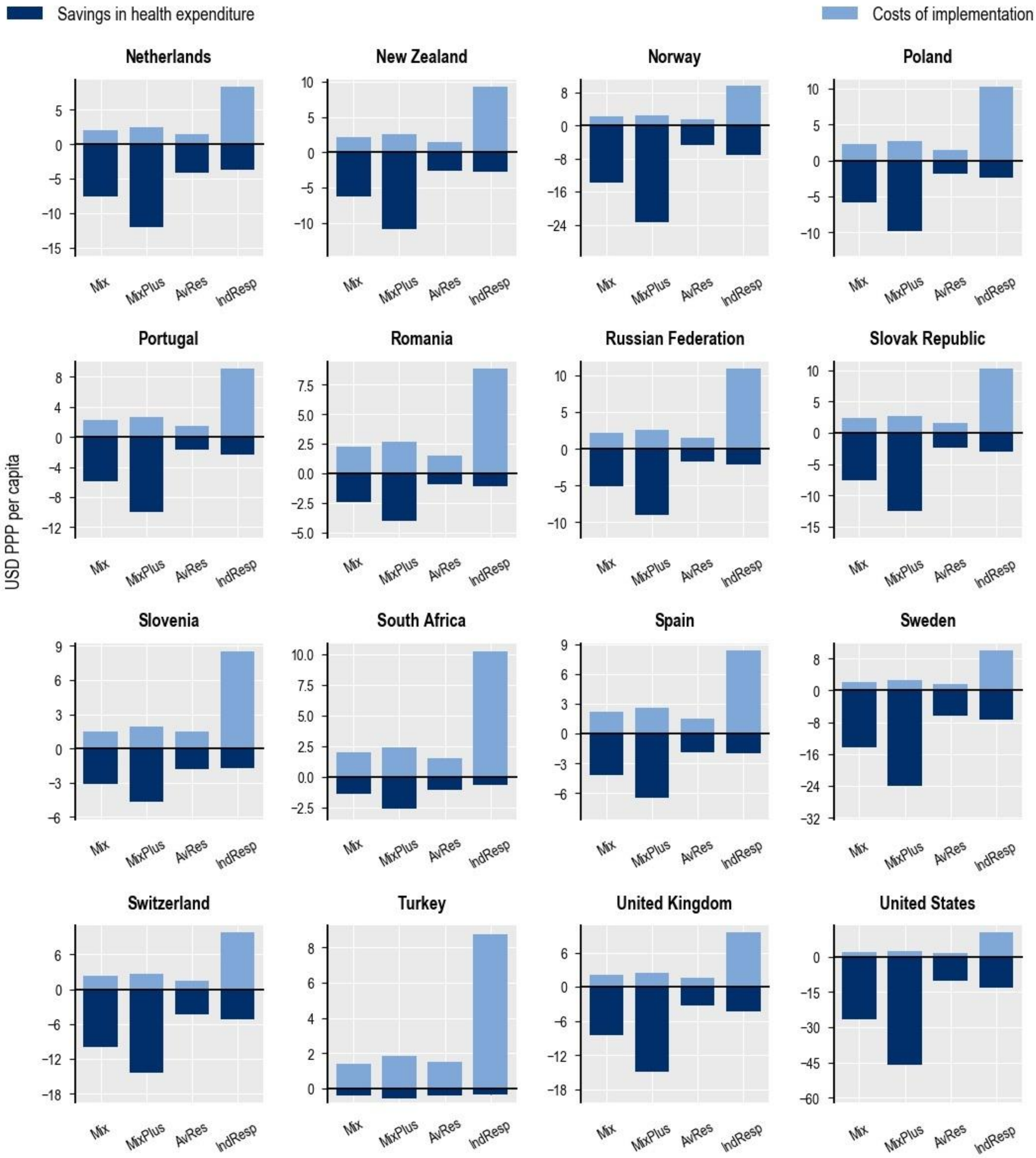
Annex Figure 7.A.6. Cost of packages and their impact on health expenditure

USD PPP per capita, annually, 2020-50





Savings in health expenditure
Costs of implementation
USD PPP per capita
France
Germany
Greece
Hungary
Iceland
India
Ireland
Israel
Italy
Japan
Korea
Latvia
Lithuania
Luxembourg
Malta
Mexico
Mix
MixPlus
AvRes
IndResp



Note: Mix = mixed package; MixPlus = mixed package plus; AvRes = availability restriction package; IndResp = promoting individual responsibility package.
Source: OECD analyses based on the OECD SPHeP-NCDs model, 2020.

StatLink https://stat.link/s6fm2k

Notes

[1] One drink refers in this report to the equivalent of 12 g of pure alcohol.

[2] The full list of countries analysed in this chapter is: Australia, Austria, Belgium, Brazil, Bulgaria, Canada, Chile, China, Colombia, Costa Rica, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, India, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Mexico, Malta, the Netherlands, Norway, New Zealand, Poland, Portugal, Romania, Russian Federation, the Slovak Republic, Slovenia, South Africa, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States.

[3] This corresponds to the responsiveness of quantity demanded to a change in the alcoholic beverage's own price.

[4] The use of these medications is not allowed in some countries. This study assumes that these medications are available and used in the countries included in the analysis.

[5] Since the recommended dosage consists of two 333 mg pills three times per day, this means that one month of therapy requires 180 pills. Therefore, the monthly cost of acamprosate is around USD 77 (using the lowest available price on an online price comparator: USD 0.43 per unit). The cost of treatment is calculated for a six-month period of daily medication.

[6] Since the recommended dosage consists of one 50 mg pill per day, the monthly cost of naltrexone is around USD 31 (using the lowest available price on an online price comparator: USD 1.04 per unit). The cost of treatment is calculated for a three-month period of daily medication, plus a five-month "on-demand" medication period (assuming an average period of 3 + 2.5 months).

[7] Unless otherwise specified, all results presented are undiscounted, meaning they are not calculated by accounting for the present value of future outcomes.

[8] Health expenditure measures the final consumption of health care goods and services for personal health care including curative care, rehabilitative care, preventative care, ancillary services and medical goods, but not long-term care.

[9] Results of the simulation show that in Ireland, the effect of taxation and MUP on labour-related outputs is relatively small, despite a positive, significant impact on health and health expenditure. More specifically, the impact of these two interventions on work absenteeism and presenteeism is almost insignificant. This is due to a combination of factors. First, a large proportion of Irish drinkers consume beer, which is less price sensitive than other beverages. This means that Irish drinkers reduce their alcohol consumption less than in other countries as a result of these interventions; consequently, the impact on disease incidence – and in particular on alcohol dependence cases – is relatively smaller. Since the reduction in work absenteeism and presenteeism is mainly driven by the reduction in dependence cases, this effect on labour-related outputs is smaller in Ireland. Second, the labour force participation rate and the employment rate in Ireland are lower than in other countries and, therefore, even if a person does not develop a disease, they will encounter difficulties in finding a job. As an example, Iceland, which is very similar to Ireland in terms of population size and proportion of beer consumption but has much higher labour force participation, shows a much stronger effect for these two interventions. Finally, demographic projections for Ireland suggest strong growth in the working-age population in the period 2020-50, which outpaces the positive effects of the interventions.

[10] The calculation of the cost presented in this report does not take into account some dimensions. For example, the analysis does not include the cost of justice (e.g. alcohol-related violence and injuries); expenditure on lobbying and litigation to avoid the implementation of policies incurred by the industry; the cost to counter industry-led action incurred by the government and civil society organisations; the social burden of alcohol use related to, for example, unwanted teenage pregnancies and the long-term consequences of foetal alcohol syndrome; and broader factors related to social bonding and pleasure of drinking in moderation, maintenance of the landscape and vineyards, tourism and potential population resistance to stringent policy decision-making.

[11] Of the 48 countries included in this chapter, three were not included in the OECD long-term economic model and could not be included in the analysis of the impact on GDP (Croatia, Cyprus and Malta). For the same reason, Costa Rica could not be included in the analysis of the impact on fiscal pressure.

8 Special focus: An overview of the impact of alcohol policies on alcohol producers and vendors

Sabine Vuik and Jane Cheatley

This special focus chapter looks at the impact public health policies can have on the alcohol industry. It considers implementation costs, such as changes in marketing, research and development, redesign and printing, and production costs, as well as changes in sales or profits for individual companies. At the industry level, it looks at the impact of alcohol policies on illicit and cross-border trade and on employment, as well as the potential impact on other sectors of the economy.

Key messages

- Public health policies to reduce harmful alcohol consumption can have an impact on the alcohol industry – including alcohol producers and both off- and on-trade vendors.
- Alcohol policies may lead to implementation costs for the industry:
    - In response to policies that change regulations around alcohol marketing, the industry may incur costs for developing a new advertising strategy, changing their product portfolio or diverting marketing funding to other channels.
    - Price policies such as taxes or minimum prices may result in printing and labour costs to change menus and price displays. Similarly, the introduction of warning labels may lead to label redesign and printing costs.
    - If producers decide to respond to new policies by reducing the alcohol content of their products, they will have to invest in research and development (R&D).
    - The production costs of lower-alcohol products can be higher or lower than the original versions.
- Alcohol policies can affect the income of the industry, as they can affect sales or profits:
    - Depending on the pass-through rate, taxes can lower sales or profits for the industry.
    - Price policies affect on- and off-trade vendors differently: taxation is likely to have a greater impact on off-licence trade, where price elasticity is generally greater, and minimum prices are less likely to have a major impact on on-licence vendors, whose prices are generally above any minimum threshold.
    - Minimum price policies can increase income for the industry, as the smaller price differential with premium products makes them more attractive, and the higher price charged for lower-end products may partially or completely offset the losses in sales.
    - Through reformulation, the industry can create new revenue streams responding to a growing demand for lower-alcohol products.
    - Alcohol policies that reduce sales of alcohol can also have an impact on ancillary sales, where alcohol is used to entice customers into the store or sold to create a one-stop-shop convenience.
- In addition to affecting the operations of individual alcohol companies, public health policies can also have an impact on the industry as a whole:
    - Price or availability policies can lead to an increase in illicit trade, while differences in policies between neighbouring countries can drive cross-border trade.
    - A reduction in revenue or profits for the alcohol industry could reduce employment in this sector, but this could be partially or fully offset by an increase in employment in other sectors.

8.1. Policies to reduce harmful alcohol use can have an impact on the alcohol industry

To reduce the health and economic impact of harmful alcohol use, many countries have introduced public health policies and initiatives to reduce alcohol consumption. In line with the World Health Organization (WHO) *Global Strategy to Reduce the Harmful Use of Alcohol* (WHO, 2010[1]), these include price policies such as taxation or minimum unit pricing (MUP), marketing regulations and sales restrictions (see Chapter 6 for more details on alcohol policies).

In addition to affecting population health and the economy, these policies also have an impact on the industry. The alcohol industry can be defined as “developers, producers, distributors, marketers and sellers of alcoholic beverages” (WHO, 2010[1]). This chapter primarily focuses on the two largest players who are most affected by alcohol policies: producers and vendors (Box 8.1), and references to the alcohol industry indicate these two groups.

Box 8.1. The alcohol industry

The alcohol industry includes a number of actors, the two largest of which are alcohol producers and vendors.

Alcohol producers

Producers include distillers, brewers and wine makers. The global market is very different across drinks categories. While four international alcohol producers make up nearly half of the global beer production, the wine market is much more fragmented, with the top four producers only accounting for 13% of global sales (IAS, 2018[2]). The major drinks companies usually produce a large range of drinks products, catering for different market segments.

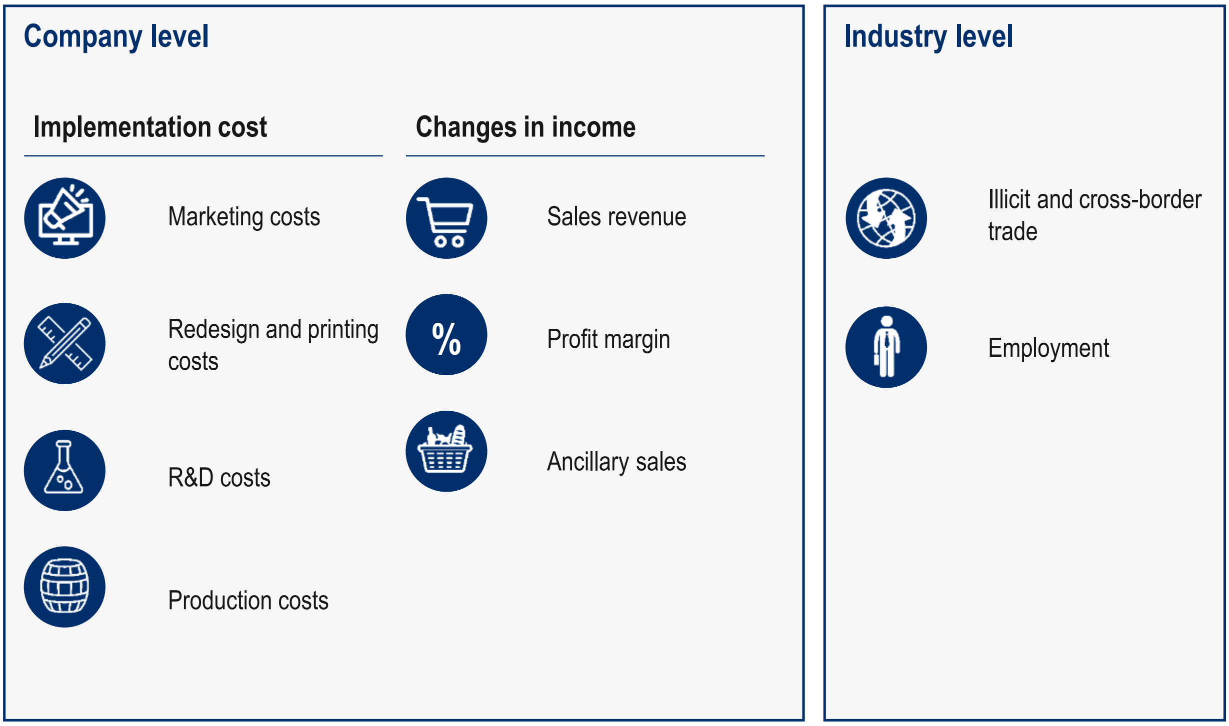
Alcohol vendors

Vendors include both on-licence or on-trade sellers, who sell drinks that are consumed on the premises, and off-licence or off-trade vendors, who sell drinks that are taken away (IAS, 2018[2]). The relative contribution of these two players differs by product and country. For example, in the United Kingdom, nearly 50% of beer is consumed on-trade, while 84% of wine is bought in stores for off-trade consumption (IAS, 2018[2]). In Germany, on-licence sales account for 14% of total alcohol consumption, while in Belgium 48% of alcohol is sold by on-licence vendors (Rabinovich et al., 2012[3]).

On-trade sellers include pubs, cafés, bars, clubs, hotels, restaurants, theatres and sporting stadia. An important difference between these industry players is that only the first three rely on alcohol sales as a primary source of revenue. Off-trade vendors differ by country. While in the United Kingdom supermarkets account for two-thirds of off-trade sales, other countries rely more on liquor stores. In the Canadian province of Ontario, off-trade sales of alcohol are almost entirely restricted to the state-run Liquor Control Board of Ontario outlets. These types of vendor also differ in their reliance on alcohol as a revenue stream: while alcoholic drinks can be used by supermarkets to attract customers to buy other products, liquor stores rely almost entirely on sales of alcohol (OECD, 2015[4]).

Public health interventions to reduce harmful alcohol use can affect the industry in various ways (Figure 8.1). This chapter first discusses the potential impacts of alcohol policies at the company level. For alcohol producers or vendors, policies can result in implementation costs, such as changing a marketing strategy or investing in research and development (R&D). The chapter next examines how policies can also affect companies’ income, as they may change sales revenue, profit margins or ancillary sales. Finally, it investigates the potential effects at the wider industry level, outlining how alcohol policies can have an impact on illicit and cross-border trade and employment.

Figure 8.1. Overview of the impact of public health policies on the alcohol industry



The information in this chapter is based on a review of the academic and grey literature and on input from experts participating in the OECD Expert Group on the Economics of Public Health, including representatives from business and industry. To complement the information gathered from the literature, the OECD conducted a survey among alcohol industry players through the *Business at OECD* network. *Business at OECD* is an international network representing over 7 million companies of all sizes, providing a business voice to the OECD.

Owing to the scarcity of data and other resources, a full assessment of macroeconomic impacts is beyond the objectives of this special focus chapter. Instead, this review aims to give an overview of possible direct and indirect impacts of public health policies on the alcohol industry.

8.2. Alcohol policies can result in implementation costs

Policies to tackle harmful alcohol consumption can result in implementation costs for alcohol companies (Box 8.2). Any policy that affects alcohol products based on the amount of alcohol they contain may lead producers to reformulate their products. Changes in advertising regulations or pricing policies may require companies to modify their packaging and marketing strategies. The most important cost items that result from these policies are changes in marketing and advertising spend; redesign and printing costs; investment in the development of techniques to lower the alcohol content of beverages; and changes in production costs. These implementation costs are discussed below. There may also be additional compliance costs associated with employing staff or consultants to work on regulatory compliance, administration and reporting (OECD, 2020[5]). However, due to data limitations and the wide variety of policy options, policy design and countries, these topics are not addressed in this special focus chapter.

Box 8.2. Implementation costs of alcohol policies reported by the industry

Through the survey among alcohol industry players through the *Business at OECD* network, industry players highlighted the following expected implementation costs for the alcohol industry.

Advertising restrictions: The industry reported that advertising restrictions can result in adjustment and reorganisation costs associated with replanning marketing activities, and that there may be costs or penalties associated with the cancellation of existing advertising and sponsorship contracts, the redundancy of some marketing employees and potential reskilling efforts.

Regulation on sales of alcohol: Industry players noted that reformulation may result in reorganisation costs to explore and adapt to new distribution, restocking and servicing models. Respondents also reported that operating costs may change, but this depends on the type and extent of the restriction.

Reformulation: The industry expected the implementation costs of reformulation to be similar to any new product development, which may involve new production techniques that can be more expensive. If the transition period is short, the industry expected that costs may be incurred to substitute existing stock. To market the reformulated product, the industry noted that investment in branding is needed.

Taxes: According to the industry, tax rate increases reduce profits, owing to a combination of lower sales (from higher prices if the tax increase is passed on), or lower margins (if the tax increase is absorbed by the business to mitigate tax-driven price increases). If sales are reduced, fixed production and operating costs will be higher per unit of product.

MUP: The industry expected some disruption costs associated with changing packages and promotions, and with the potential delisting of certain SKUs (stock-keeping units: particular brands and pack offerings). Delisting was also expected to change the average production cost across the portfolio.

Source: *Business at OECD* response to OECD alcohol industry survey, April 2020.

8.2.1. Changes may occur in marketing and advertising spend

Any policy that changes the regulations around alcohol marketing – such as advertising restrictions but also policies that restrict competition on price – can have an impact on alcohol companies, which may need to develop a new advertising strategy, change their product portfolio or divert marketing funding to other channels. Some practical examples in which alcohol policies may trigger marketing costs include the following:

- Alcohol producers may have to spend money on advertising agency fees (or commit time internally) to review and redesign their marketing strategy in response to changes in advertising regulation. The cost to the alcohol industry of redesigning marketing strategies will depend largely on the complexity of adhering to regulations. It is possible that restrictions on certain channels or types of marketing could force companies to adopt alternative, more expensive advertising options. However, in specific cases, it has been shown that current advertising practices may be adapted to meet new standards (for example, targeting an older audience or airing at a different time), without affecting the cost (Ross, Sparks and Jernigan, 2016[6]). Finally, there may be costs associated with cancelling planned advertising or sponsorships, but sufficient transition time could reduce this impact (Box 8.3).
- Policies affecting a specific type or category of alcohol products could drive the industry to change their stock or portfolio. For example, in the case of MUP, the price increase would apply to only part of the producer's or vendor's portfolio of brands (Leicester, 2011[7]). Supermarkets are likely

to stock both cheap and more expensive versions of each beverage type, and large producers generally have a portfolio of brands at different price points. Changing a portfolio or stock may be associated with marketing and strategy development costs.

- Changes in advertising regulations may force companies to switch to other marketing channels. For example, the introduction of minimum prices would limit competition based on price. As a result, companies may decide to invest in non-price competition, such as media advertising (Leicester, 2011[7]). However, this may simply be a reallocation of existing funds rather than new investment.

  Restrictions in point-of-sale marketing, especially promotional allowances, could have an impact on the marketing budget of alcohol vendors. The 14 major alcohol companies spent USD 159 million per year in the United States on promotional allowances for alcohol vendors (Federal Trade Commission, 2014[8]).

Box 8.3. Potential mitigation strategies reported by the industry

Through the *Business at OECD* survey, industry players highlighted various ways in which policy-makers could reduce the impact of public health policies on the alcohol industry.

Advertising restrictions: To mitigate or reduce the impact of advertising restrictions on business, industry players suggested focusing restrictions on situations when the audience is vulnerable, or restricting certain content. The industry also suggested that consistent and transparent self-regulation to control content can add value. Industry representatives further mentioned that advertising can be a useful tool to promote reformulated products. As outlined in Chapter 6, however, a systematic review of industry self-regulation concluded that alcohol advertisements continually violate self-regulatory codes, meaning that young people are frequently exposed to alcohol advertising material (Noel, Babor and Robaina, 2016[9]).

Reformulation: The industry highlighted that reformulation can be encouraged by creating incentives – for example, through calibrated price policies and support for R&D. Furthermore, respondents to the survey raised the fact that product labelling rules need to be adjusted to enable sales and marketing of lower-alcohol beverages. For instance, European legislation currently requires whisky to have at least 40% alcohol by volume (European Commission, 2019[10]).

Taxes: The industry suggested that incentives to reformulate, through calibrated taxation, would be a better route to achieving the reduction in harmful consumption because these would offer options to producers to combine lower ethanol volume sold with smaller or no loss in financial revenue or jobs. The importance of enforcement against illegal sales replacing lost legal sales was also raised.

MUP: Industry respondents emphasised the need to set the minimum price at the right value to avoid raising the price of "average-priced" products, and to ensure that the price hike generates additional margin for both supplier and retailer. The industry suggested that a period of adjustment would help businesses and – as with tax – it would be important to step up enforcement against illegal sales of products below the minimum price (smuggling, counterfeiting).

Source: *Business at OECD* response to OECD alcohol industry survey, April 2020

8.2.2. Redesign and printing costs to change labels and menus may be incurred

Price policies such as taxes or minimum prices may result in costs to vendors for changing menus and price displays – both printing and labour costs. However, where prices are displayed on shelves, digitally or on single-use paper menus, these costs may be minimal.

Similarly, the introduction of warning labels on alcohol containers can incur redesign and printing costs. In 2020, Food Standards Australia & New Zealand (the statutory authority for developing food standards) undertook a review to estimate the costs the industry would incur for implementing mandatory pregnancy warning labels (FSANZ, 2020[11]). Their analysis estimated that the average cost per SKU for including a pregnancy warning label was AUD 4 924 (USD 3 420) (this could be lowered if companies combined mandatory and voluntary label replacements, which occur approximately once a year or more).

A change in labels may also lead to loss of stock, especially for slow-moving items such as spirits. To minimise the impact on the industry, the Australia and New Zealand Ministerial Forum on Food Regulation specified a three-year transition period (with permission for alcoholic beverages packaged and labelled before the end of the transition period to be sold after the transition period without having to display a pregnancy warning label) (FSANZ, 2020[11]).

8.2.3. Investment in R&D may be needed to develop techniques to produce lower-alcohol drinks

If producers decide to respond to new policies by reducing the alcohol content of their products, they have to invest in R&D. While many techniques for producing lower-alcohol products exist, producers will need to experiment to find the right approach for their product. This includes costs for consumer testing of new products, as taste remains one of the main issues for acceptability of lower-alcohol products. However, limited data are available on the costs of R&D for alcohol companies.

Some governments have supported the research of production methods for lower-alcohol products by investing in research. The Lighter Wines Programme, a research imitative undertaken by the New Zealand wine industry, received NZD 8.13 million (USD 5.18 million) from the government, which was combined with NZD 8.84 million (USD 5.64 million) from the industry, to develop a number of viticulture and winery tools for the production of lower-alcohol wines (Ministry for Primary Industies, 2017[12]). In addition, the alcohol industry argues that, to justify investment in R&D for lower-alcohol products, some regulations may need to be reviewed (for example, product labelling rules need to permit lower-alcohol forms, such as low-alcohol whisky).

8.2.4. Changes in production costs may arise, depending on the methods used to reduce alcohol content

If producers decide to reduce the alcohol content of their products, they may also see changes in their production costs. The type of process used to produce the lower-alcohol beverage is one of the main determinants of changes in production cost – for example:

- **Limited fermentation methods**: the arrested or limited fermentation process can be performed using existing production methods, and therefore requires less up-front investment (Brányik et al., 2012[13]). This process can reduce the production time and raw materials required, making the overall production cost the same or lower than for regular beverages. However, additional costs may be associated with ensuring the shelf life of these low-alcohol products. Beer and wine produced through restricted fermentation may be left with high levels of unfermented sugar, which make them more perishable (Sohrabvandi et al., 2010[14]; Schmidtke, Blackman and Agboola, 2012[15]). While there are methods to improve shelf life, such as pasteurisation, these add cost and can affect the flavour of the product.
- **Alcohol removal methods**: in comparison, the capital costs of alcohol removal methods such as reverse osmosis and high vacuum distillation are high, and the removal of alcohol to below 0.45% consumes a high level of electricity per litre of ethanol removed (Schmidtke, Blackman and Agboola, 2012[15]). These methods therefore require investment in equipment and higher ongoing production costs. However, the quality of the beer and wine may be higher, as the flavour is closer

to the full-alcohol product (Schmidtke, Blackman and Agboola, 2012[15]; Brányik et al., 2012[13]). The cost of buying a reverse osmosis machine – quoted as being between USD 30 000 and more than USD 2 million (Goode, 2009[16]; Goldfarb, 2007[17]) – is significant for many wine producers. Smaller producers who do not have the economies of scale for large capital investments can rent alcohol removal machines and pay per volume of wine treated. For example, in Australia this cost is estimated at AUD 0.10 (USD 0.07) per litre to reduce the alcohol content by 1% (VAF Memstar, 2018[18]).

- **Agricultural methods**: earlier harvesting can reduce the amount of sugar in grapes, and thus reduce the alcohol content of wine (OECD, 2015[4]). However, this also affects the flavour of the wine. Instead, growers can change the leaf area to fruit weight ratio: a high ratio leads to a greater production of sugar in the grapes. By reducing the leaf area, sugar production can be delayed while still allowing time for flavour and phenols to develop. This production of lower-sugar grapes requires manual labour for leaf removal. In addition, the method carries risks, as the optimal leaf to crop ratio needs to be found to prevent excessively delayed ripening (AWRI, 2020[19]; Schmidtke, Blackman and Agboola, 2012[15]).

8.3. Alcohol policies can have an impact on income for the industry

Many alcohol policies are designed to reduce consumption of alcohol, and will therefore affect the earnings of the industry (Box 8.4). However, the impacts of policies on the industry can differ widely. For example, taxes can affect either sales or profits; price policies have different impacts on off-trade and on-trade vendors; minimum prices and reformulation may actually increase income for the industry; and a reduction in sales of alcohol products can lead to a reduction in sales of other products.

Box 8.4. The impact of alcohol policies on income reported by the industry

The survey of the *Business at OECD* network highlighted the following impacts of alcohol policies on sales and profits for the industry.

Advertising restrictions: The industry indicated that the impacts of advertising restrictions on income are unclear and mixed, as they depend on the type of restriction, a partial or total ban, the size of the business and the maturity of the market. Respondents noted that the rise of digital media offers a solution to inadvertent advertising exposure, because it enables detailed audience segmentation. In the short term, the industry expected to see a reduction in market competition as a result of advertising policies, which may make it easier for market leaders to entrench their position relative to small producers and/or market entrants. In the long term, the industry noted that the premiumisation potential may be diminished.

Regulation on sales of alcohol: The wide range of potential restrictions under this umbrella means that the impact on income is variable, although the industry expected reduced profitability. However, respondents noted that for off-trade restrictions on hours, consumers adjust shopping behaviour after about two months, meaning that sales are not affected in the long term, other than a two-month dip. On-trade consumption was deemed harder to substitute, and the industry therefore thought that restrictions on this type of sales may result in consumers switching to drinking at home or reduced sales.

Reformulation: Reformulation was considered a potentially profitable venture by the industry, but respondents emphasised that it would be important to create the conditions that permit and encourage reformulation. While the industry saw a sales potential for new no- or low-alcohol variants, it noted that this depends on consumer acceptance of the products: if a reformulation is rejected, sales will decrease.

Taxes: The industry indicated that alcohol tax rate increases always harm profitability, but the extent to which this happens depends on the pass-through rate (the amount of tax passed on to consumers), the size of the tax rate increase and the relative tax rate increase across categories of alcohol, as well as the change in price and the responsiveness of consumers. It was noted that the impact on any company also depends on its product portfolio and geographical spread.

MUP: According to the industry, if minimum prices target the lowest-priced products, sales of premium products may benefit from the reduction in sales of lower-priced products. It was noted that there may be additional margin to be gained from the higher price, but who benefits depends on where the minimum price is set across different transactional stages (between producer and retailer, or between retailer and consumer). Illicit or cross-border trade may also change the impact that minimum prices have on income for the alcohol industry.

Source: *Business at OECD* response to OECD alcohol industry survey, April 2020.

8.3.1. Taxes may affect sales or profit margins

The impact of taxation on alcohol producers and vendors is strongly dependent on the amount of tax they decide to pass on to consumers through higher prices – the pass-through rate (Box 8.5). If the tax is not passed on to the consumer in the form of a price increase, the producer or vendor will have to cover the cost, reducing their profit margin. However, if the industry passes on the tax in the form of a price increase, it has the effect of lowering sales. Therefore, the pass-through rate can either increase the cost for the industry or reduce sales.

In general, the more consumers reduce their consumption in response to a price increase (i.e. the more price-elastic the product is), the less likely the industry is to pass on taxes (Rabinovich et al., 2012[3]). The competitiveness of the market plays a role as well, as companies operating on small profit margins will be less able to absorb the additional costs. The extent to which the tax is passed through to the customer will also depend on negotiation between the producers and vendors (Leicester, 2011[7]). This in turn will depend on the relative bargaining power of these two players, as well as their assessments of price elasticity.

Box 8.5. Pass-through rates for alcohol taxes

The industry does not automatically respond to a USD 1 alcohol tax with a USD 1 price increase. Instead, producers and vendors can decide to keep the price the same or only pass on a portion of the tax. There are even cases of “over-shifting”, where the price is increased by more than the value of the tax (Ally et al., 2014[20]; Shrestha and Markowitz, 2016[21]). Pricing policies such as MUP (see Section 6.3.2 in Chapter 6) can be used to avoid the industry absorbing tax costs.

Overall, there exists a complex and heterogeneous pattern of pass-through rates for alcohol taxes (OECD, 2015[4]). The rates have been shown to vary by product, country, vendor and price point:

- A study of pass-through rates in Ireland, Finland, Latvia and Slovenia found that, on average, a EUR 1 (USD 1.1) increase in the excise duty on beer resulted in a EUR 0.83 (USD 0.92) increase in the price of beer, but a EUR 0.94 (USD 1.04) increase in the price of vodka (Rabinovich et al., 2012[3]).
- However, these effects were not homogeneous across countries. While only half the off-licence beer taxes in Ireland were passed on to consumers, off-licence beer taxes in Slovenia resulted in a price increase of 2.5 times the original tax (Rabinovich et al., 2012[3]).

- A UK study found that the pass-through ratio was lower for cheaper products than for higher-priced products. For example, only 85% of taxes on the cheapest beers were passed on to the consumer, while the most expensive beers charged 114% of the tax (Ally et al., 2014[20]).
- The same study also found differences across product groups: beers saw the smallest increase in price, possibly reflecting the importance of this product group in promotions and price competition (Ally et al., 2014[20]). A full pass-through of taxes was more common for wine, which the authors suggested was because customers tend to buy wine at different price points and are less loyal to specific brands.

The industry has raised the possibility of policy-makers introducing different tax rates based on the alcohol level of beverages, to encourage reformulation (see Box 8.3). In the case of taxes on sugar-sweetened beverages, there have been examples of tiered tax rates driving reformulation and lowering the sugar content of drinks (Bandy et al., 2020[22]). However, there is currently little evidence on whether the same would work for alcoholic beverages, although one study found that a tax based on the volume of pure alcohol in South Africa led to a significant shift in advertising from higher-alcohol to lower-alcohol beers (Blecher, 2015[23]).

8.3.2. Price policies affect off-trade and on-trade vendors differently

Just as some policies – such as sales restrictions – affect off-trade and on-trade vendors differently depending on their design, so do price policies. For alcohol vendors, taxation is likely to have a greater impact on off-trade than on-trade sales, as price elasticity is generally greater in the off-trade market (Collis, Grayson and Johal, 2010[24]; Leicester, 2011[7]). There are a number of reasons for this: a consumer may have a greater choice between brands in an off-licence vendor, increasing the importance of price; consumers of on-licence alcohol vendors have already accepted paying a higher price for the experience of drinking out; and on-licence traders charge a service mark-up, making the added tax proportionally less.

Minimum prices are unlikely to have a major impact on on-licence vendors. Studies have found that on-licence prices are between two and four times higher than for the off-licence market (Rabinovich et al., 2012[3]). As a result, prices charged in cafés and restaurants will generally be above any minimum threshold (Department of Health, 2016[25]). A study for the Welsh Government showed that only 0.2-3.4% of on-trade sales charged less than GBP 0.50 (USD 0.60) per alcohol unit – depending on the type of drink (Angus et al., 2017[26]).

The impact of minimum prices will therefore be primarily on off-licence trade, where the lowest prices are charged for alcohol. Beer, cider and spirits in particular can be affected. For example, in the United Kingdom (Wales), 61.7%, 73.1% and 60.4% of off-licence sales cost less than GBP 0.50 (USD 0.60) per unit, respectively (Angus et al., 2017[26]). Depending on the level of the minimum price, it may reduce the difference between off- and on-licence prices and encourage consumers to switch to on-licence use (Leicester, 2011[7]).

8.3.3. Minimum prices may affect income for the industry

Minimum prices can be expected to benefit sales of premium brands: the increase in price for products at the low end reduces the price gap with higher-priced, premium products, making them more attractive. However, minimum prices may also have a positive effect on revenues of producers of low-priced products. Unlike taxes, increased income from minimum prices remains with the industry. It has been estimated that, if there is no behavioural response to a minimum price of GBP 0.45 (USD 0.55) per unit, producers and retailers could expect an extra GBP 1.4 billion (USD 1.7 billion) in revenue in the United Kingdom (Leicester, 2011[7]).

Even if consumption of products subject to the minimum price decreases, the higher price charged may partly or completely offset the losses in sales. An impact assessment of minimum alcohol prices in Ireland noted that revenue to retailers is estimated to increase at any minimum unit price (Department of Health, 2016[25]). Another study estimated that a GBP 0.45 (USD 0.55) minimum price per unit of alcohol in the United Kingdom (England) would actually increase revenue for the off-trade sector by 5.6% (Brennan et al., 2014[27]). A study for the Welsh Government looking at a minimum price per unit of GBP 0.50 (USD 0.60) showed a decrease in consumption of 3.6% across the population (with, importantly, the greatest effect among harmful drinkers) but a 1.4% increase in spending (Angus et al., 2017[26]).

8.3.4. Market demand for lower-alcohol products may result in higher sales

Recent years have seen a considerable increase in availability and sales of alcohol-free or lower-alcohol products (de Bruijn, van den Wildenberg and van den Broeck, 2012[28]; Brányik et al., 2012[13]). In Denmark, sales of low-alcohol and non-alcoholic beer increased by 2 100% between a low in 2008 and 2015 (Statista, 2019[29]). In Germany, the number of people consuming alcohol-free beer increased from 5.9 million in 2012 to 9.8 million in 2016 (Statista, 2020[30]).

The market for lower-alcohol products is expected to continue to increase considerably in the next few years: the global market for low-alcohol beer is predicted to grow by 7.9% every year between 2016 and 2021 and for low-alcohol wine by 5.4% each year (Statista, 2016[31]). This growing demand for lower-alcohol products presents an important sales opportunity for producers.

Product sales may be reduced if the lower-alcohol product replaces the original and has lower consumer acceptance. For example, it was argued that lower-alcohol beers might have an immature flavour profile, and foam less (Sohrabvandi et al., 2010[14]). However, if lower-alcohol versions are included in the brand portfolio as a line extension rather than a replacement, this can be avoided.

The lower calorie content of lower-alcohol beverages can be used as a way to market these products to people who are watching their weight (Jones and Bellis, 2012[32]). The New Zealand industry initiative aimed at developing lower-alcohol wines is marketed as “Lighter Wines”, with a focus on the lower calorie content of the wine (Miller, 2017[33]).

The rise in demand for lower-alcohol beverages can create a new revenue stream for vendors as well as producers. As part of the United Kingdom’s Public Health Responsibility Deal, a supermarket chain increased its range, space and marketing of lower-alcohol products, and saw sales grow by 135%, doubling the low-alcohol market share from 12.8% to 24.8% (Department of Health, 2014[34]). The same could apply to on-trade alcohol vendors. Anecdotal evidence suggests that pubs offering a wider range of low- or non-alcoholic drinks turned the tide on the “dry January” slump and had record sales (Walker, 2017[35]).

8.3.5. Policies may also have an impact on ancillary sales

In addition to changing the sales of alcohol products, some alcohol policies can also affect the sales of other, non-alcohol products. A prohibition on the sale of alcohol products for a specific vendor may affect their ancillary sales, where alcohol is used as a loss leader – a product sold at a loss to attract customers – or sold to create a one-stop-shop convenience. A trade-sponsored report describes how allowing wine sales at food stores can increase sales of other products, as consumers who buy wine spend on average USD 20 more in addition to the wine (FMI, 2012[36]).

To capitalise on this effect, some off-licence vendors use cheap alcohol as a loss leader. In fact, the ban on below-cost sales discussed by the UK Government was in part developed to target this practice (IAS, 2019[37]). Supermarkets in the United Kingdom admitted to selling some alcohol products at less than wholesale prices to tempt customers to come into the store (Competition Commission, 2008[38]). The same supermarkets also indicated that they sold alcohol at below cost to be able to compete with other vendors. In this case, minimum pricing may have a positive financial benefit for the industry, as bans on below-cost sales and other minimum pricing policies can prevent unfair competitive practices by large retailers (OECD, 2015[4]).

8.4. Alcohol policies may have an impact at the industry level

In addition to company-level impacts such as implementation costs and changes in sales, alcohol policies can also change the industry as a whole. Stricter regulations on price or availability may lead to an increase in unrecorded alcohol sales, such as illicit sales or cross-border trade. Policies that affect the alcohol industry can have consequences for employment in this sector. These two impacts are further discussed below.

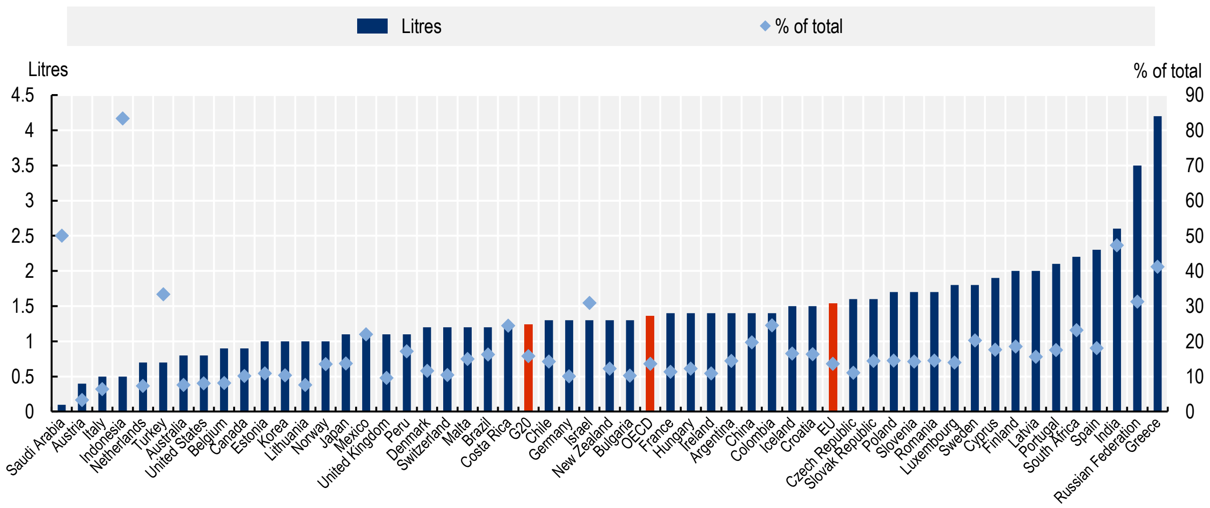
In addition, other alcohol policies such as advertising restrictions may also have an industry-level impact on competition between companies. In particular, smaller companies and new entrants may be affected by this. However, it is difficult to make any generalised statements on this topic, as the impacts will greatly depend on the competitive landscape and alcohol market in each country, as well as the specifics of the policy. Nevertheless, previous OECD work recommends that policy-makers should consider how their regulations affect the competitive process (OECD, 2020[5]).

8.4.1. Illicit and cross-border trade may be affected

Unrecorded alcohol can be defined as all alcohol products that are not taxed and are outside the usual system of governmental control (WHO, 2020[39]). This includes homemade or informally produced alcohol (legal or illegal), smuggled alcohol, surrogate alcohol (which is alcohol not intended for human consumption) and alcohol obtained through cross-border shopping. The total amount of unrecorded alcohol consumption is, by definition, hard to measure, but it is estimated that people in OECD countries consume on average 1.4 litres of unrecorded alcohol per person, per year (Figure 8.2).

Figure 8.2. Unrecorded alcohol consumption

Unrecorded per capita (15+) alcohol consumption (in litres of pure alcohol and as a percentage of total consumption), three-year average, 2016-18



Source: OECD analysis of WHO (2020[40]), Global Information System on Alcohol and Health (GISAH), https://www.who.int/data/gho/data/themes/global-information-system-on-alcohol-and-health.

StatLink https://stat.link/ck8d37

Markets with the highest excise taxes tend to have greater problems with illicit trade. Since taxation raises the price of alcohol products, the financial rewards for those who avoid paying the taxes can be large (OECD, 2016[41]). Other policies, such as those restricting the sale of alcohol products at certain times or places, could make illicit products seem more convenient or more available (Neufeld et al., 2019[42]). Ineffective enforcement of policies – including inadequate penalties for activities related to illicit alcohol and corruption – also play a role in enabling illicit trade of alcohol products (TRACIT, 2020[43]).

In addition to reducing income for the industry, illicit sales avoid tax; this has a negative effect on government revenues (OECD, 2016[41]). In the European Union (EU27), sales of counterfeit wine and spirits were estimated to result in an annual loss of EUR 2.7 billion for the industry and of EUR 2.2 billion in tax revenue and reduced social security contributions for governments (EUIPO, 2018[44]).

Where taxes or regulations are introduced in only one country, or where they are significantly higher or stricter in one than in other countries, this may contribute to an increase in cross-border trade – where people travel to a neighbouring country to buy certain products. Cross-border trade is driven by differences in the type of products on sales, their relative prices, and the time and money required to travel across the border (Karlsson and Österberg, 2009[45]). Policies that restrict the availability or increase the price of alcohol products in only one country can increase cross-border trade with neighbouring countries without such regulation (see Box 8.6).

Box 8.6. The impact of taxation on cross-border alcohol trade in North-Eastern Europe

The impact of high tax rates on cross-border trade can clearly be seen in the EU27, where the single market facilitates cross-border shopping (OECD, 2015[4]). When Estonia – with its low alcohol taxes – joined the EU, several Nordic countries reduced their high tax rates to prevent cross-border shopping. Finland was one of them, reducing the excise duty rate by an average of 33% (Karlsson et al., 2020[46]; Koski et al., 2007[47]). However, the country consequently noted an increase in consumption, as well as a 17% increase in alcohol-positive deaths (mortality cases where a post-mortem revealed a blood alcohol concentration of 0.20 mg/g or higher) (Koski et al., 2007[47]). As a result, Finland increased tax rates by 10% in 2008, and several more times in later years (Karlsson et al., 2020[46]). In 2017, “traveller imports” were estimated to account for 18% of all alcohol consumption in Finland.

In 2015, Estonia adopted a policy that would increase alcohol taxes by 10% each year between 2016 and 2020 – a move welcomed by Finnish health officials (Yle Uutiset, 2015[48]). Subsequently, in 2017, alcohol taxes for all beverages rose by 10%, with an additional 70% increase for beer in July (a further 18% increase was planned for February 2018). The tax increase led to marked differences in alcohol prices between Estonia and Latvia (up to 200% for certain beverages), which fuelled cross-border purchases between these countries. In 2019, the new Estonian Government announced plans to lower the excise tax on alcohol by 25% in an effort to curb cross-border trade with Latvia, where the tax rate is lower (International, 2019[49]; ERR, 2019[50]).

8.4.2. Alcohol policies may have an impact on employment

Changes in alcohol sales may also have consequences for the economy through their impact on employment (Box 8.7). A reduction in revenue or profits for the alcohol industry – as a result of price policies or any other policy aimed at reducing alcohol consumption – could reduce employment in this sector. However, some evidence shows that employment in other sectors may grow.

Box 8.7. The impact of alcohol policies on employment reported by the industry

The survey of the *Business at OECD* network highlighted the following impacts of alcohol policies on employment.

Advertising restrictions: Respondents expected that advertising restrictions would reduce employment of advertisers (either in-house or contracted), although this may vary depending on the type of media and the possibility that alternative advertisers may buy any additional media space in lieu of alcohol companies.

Regulation on sales of alcohol: The industry expected a reduction in employment at retailers whose sales are affected by the restrictions.

Reformulation: The industry felt that reformulation could potentially increase employment, as R&D requires employment and new no-alcohol formulations can create new drinking occasions without adding to harmful use of alcohol.

Taxes: Respondents noted that taxes can reduce sales, which may also affect jobs in distribution and retail. However, it was mentioned that shifts in employment can occur when demand shifts to other categories or other geographies.

Source: *Business at OECD* Response to OECD alcohol industry survey, April 2020.

When considering the impact of alcohol policies on the wider economy, it is important to look at the total net effect on employment. While lower alcohol consumption may result in a loss of employment in the alcohol industry, displacement of demand and jobs could cause employment in other industries to grow (IAS, 2017[51]).

For example, one study suggested that a potential small decrease in jobs in the Australian wine industry as a result of volumetric wine taxes (between 0.5% and 6.8% of total employment, depending on the tax scenario) could be met with an increase in employment in the industries taking over the irrigated regions formerly used for vines (Fogarty and Jakeman, 2011[52]).

In addition to a growth in replacement industries, employment losses in the alcohol industry may also be offset by employment growth in other industries as a result of the reinvestment of excise tax income. One study modelling reinvestment of the additional revenue generated through an alcohol tax showed an increase in overall employment (Wada et al., 2017[53]). The study considered the impact of two hypothetical alcohol tax increases (a USD 0.05 per drink excise tax increase and a 5% sales tax increase on beer, wine, and distilled spirits) on employment in the US states of Arkansas, Florida, Massachusetts, New Mexico and Wisconsin, taking into account changes in alcohol demand, average state income and substitution effects. Results from the analysis found a USD 0.05 per drink tax increase would lead to a net increase of 8 183 jobs across the five states analysed, with this figuring declining to 7 792 when introducing a 5% sales tax. In percentage terms, gains in net employment are relatively small, representing between 0.014% and 0.089% of overall employment, depending on the type of tax and state.

A modelling study looking at the United Kingdom found similar results: if the government proceeds of a theoretical 10% increase in alcohol tax are used to increase spending on public services, there would be over 17 000 more full-time equivalent jobs. In addition, gross value added would increase by GBP 847 million (USD 1 039 million) (Connolly et al., 2019[54]).

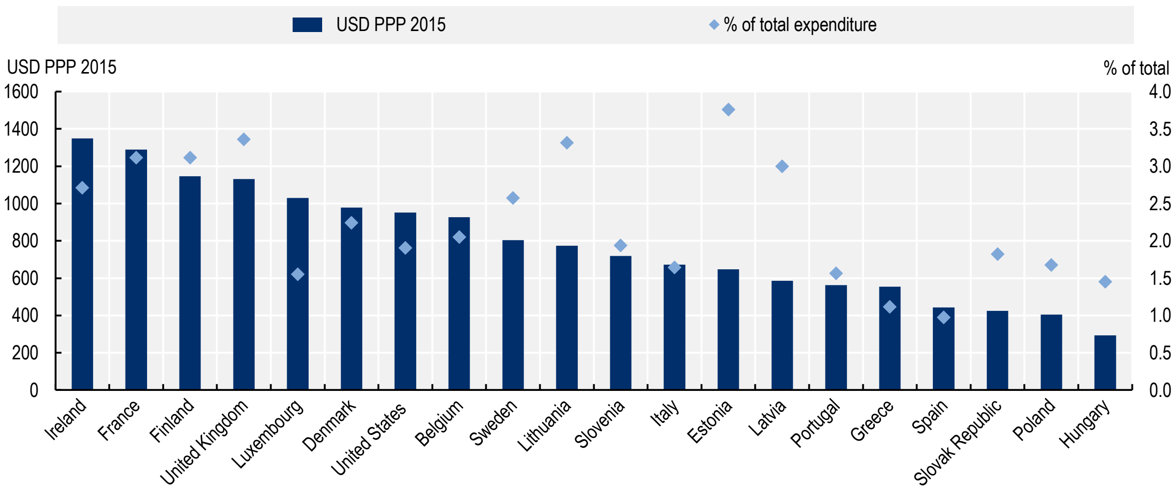
It is important to note that the evidence regarding alcohol policies and employment is mostly limited to modelling studies. Moreover, these studies primarily look at the impact of taxes on trade in various industries, and do not take into account the health impacts of reduced alcohol consumption, which also affect employment. Finally, some studies suggest that there may be friction costs in the short term, which can include time off work between jobs and the costs of hiring and (re)training (Kigozi et al., 2016[55]).

8.5. Alcohol policies may also have an impact on other industries

Implementation of more stringent policies aimed at curbing alcohol consumption may have an impact on other sectors of the economy and associated industries. This section extends the previous analysis in this chapter by examining the potential impact of alcohol policies on other industries, using household expenditure data. Specifically, it analyses the share of household budget that is devoted to purchasing alcohol and compares spending habits between households who do and do not purchase alcohol. This will facilitate better understanding of how households may reallocate expenditure in response to a reduction in alcohol purchases. The analysis is of 19 European countries and the United States (see Annex 8.A for further details).

Figure 8.3 examines alcohol expenditure by country for alcohol-purchasing households only (i.e. households who recorded positive spending on alcohol). The results show that households across 19 European countries and the United States spent USD PPP 294-1 349 on alcohol in 2015, or around 1.0-3.4% of their total budget. A policy-induced reduction in alcohol purchases could encourage alcohol-purchasing households to switch consumption to other goods and services. For example, a reduction in purchases equal to 10% would make available an additional USD PPP 29 per household in Hungary and up to USD PPP 135 per household in Ireland, which could be reallocated to other industries.

Figure 8.3. Alcohol expenditure – alcohol-purchasing households only



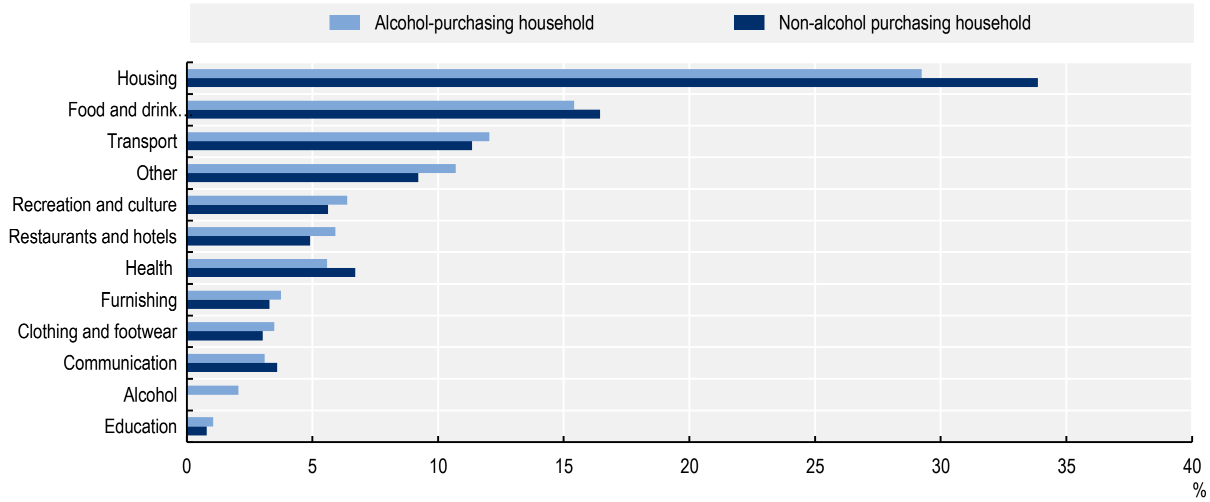
Note: A full list of items in each expenditure category can be found in *Classification of Individual Consumption According to Purpose (COICOP) 2018* (UNSD, 2018[56]). Average expenditure for each category was weighted using provided survey weights so that findings represent the reference population and thereby minimise bias. Data for the figure were prepared by the OECD team in charge of the "Drivers and Trends of Growing Inequalities" Project.
Source: European Household Budget Survey (2010) and Household Consumer Expenditure Survey data collected by the Bureau of Labor Statistics.

StatLink https://stat.link/7dkryc

Figure 8.4 suggests how the additional household budget resulting from reductions in alcohol purchases may be reallocated. The figure shows household expenditure bundles for all countries, according to whether the household purchases or does not purchase alcohol (i.e. whether alcohol expenditure is above zero or not). The results indicate that alcohol-purchasing households spend a higher proportion of total expenditure on discretionary (non-essential) items (ONS, 2017[57]), such as restaurants and hotels (5.9% vs. 4.9%) and recreation and culture (6.4% vs. 5.6%). Since discretionary items are more responsive to changes in income (i.e. they have higher elasticity (Jääskelä and Windsor, 2011[58])), the findings suggest that a decrease in alcohol expenditure could be offset by additional expenditure on other discretionary goods.

Figure 8.4. Expenditure bundles for alcohol-purchasing and non-alcohol-purchasing households

Percentage of total household expenditure



Note: A full list of items in each expenditure category can be found in *Classification of Individual Consumption According to Purpose (COICOP) 2018* (UNSD, 2018[56]). Average expenditure for each category was weighted using provided survey weights so that findings represent the reference population and thereby minimise bias. Data for the figure were prepared by the OECD team in charge of the "Drivers and Trends of Growing Inequalities" Project.
Source: European Household Budget Survey (2010) and Household Consumer Expenditure Survey data collected by the Bureau of Labor Statistics.

StatLink https://stat.link/od5rqh

8.6. Conclusion: Policies to tackle harmful alcohol use may have various impacts on the alcohol industry

Implementation of policies to tackle harmful alcohol use has an impact on the alcohol industry. At the company level, alcohol producers and off- and on-trade vendors may face implementation costs, from those associated with redesigning their marketing strategy to those for developing and using techniques to reduce the alcohol content of their products. Alcohol policies can also have an impact on their income, reducing profit or sales. On the other hand, minimum prices can increase profits for the industry, and sales can be increased by responding to the market demand for lower-alcohol products. At the industry level, alcohol policies in one country can increase cross-border trade with neighbouring countries. Employment in the alcohol industry may be negatively affected by policies aiming to reduce alcohol consumption, but this may be paired with increased employment in other industries.

Overall, costs to the industry are difficult to calculate, given the lack of publicly available data. Based on available information, the review did not find evidence indicating that costs to the industry outweigh costs associated with harmful alcohol consumption (such as disease-related health expenditure and reduced labour productivity – see Chapter 4).

References

Ally, A. et al. (2014), "Alcohol tax pass-through across the product and price range: Do retailers treat cheap alcohol differently?", *Addiction*, Vol. 109/12, pp. 1994-2002, http://dx.doi.org/10.1111/add.12590. [20]

Angus, C. et al. (2017), *Model-based Appraisal of the Comparative Impact of Minimum Unit Pricing and Taxation Policies in Wales: Interim report*, Welsh Government, Cardiff, https://gov.wales/sites/default/files/statistics-and-research/2019-05/model-based-appraisal-of-the-comparative-impact-of-minimum-unit-pricing-and-taxation-policies-in-wales-interim-report-an-update-to-the-50p-mup-example.pdf (accessed on 22 February 2018). [26]

AWRI (2020), *Reducing Ethanol Levels in Wine: Fact sheet*, Australian Wine Research Institute, Adelaide, https://www.awri.com.au/wp-content/uploads/Reducing-ethanol-levels-in-wine.pdf (accessed on 30 October 2017). [19]

Bandy, L. et al. (2020), "Reductions in sugar sales from soft drinks in the UK from 2015 to 2018", *BMC Medicine*, Vol. 18/1, p. 20, http://dx.doi.org/10.1186/s12916-019-1477-4. [22]

Blecher, E. (2015), "Taxes on tobacco, alcohol and sugar sweetened beverages: Linkages and lessons learned", *Social Science and Medicine*, Vol. 136-137, pp. 175-179, http://dx.doi.org/10.1016/j.socscimed.2015.05.022. [23]

Brányik, T. et al. (2012), "A review of methods of low alcohol and alcohol-free beer production", *Journal of Food Engineering*, Vol. 108/4, pp. 493-506, http://dx.doi.org/10.1016/J.JFOODENG.2011.09.020. [13]

Brennan, A. et al. (2014), "Potential benefits of minimum unit pricing for alcohol versus a ban on below cost selling in England 2014: Modelling study", *BMJ*, Vol. 349, p. g5452, http://www.bmj.com/content/349/bmj.g5452 (accessed on 2 August 2017). [27]

Collis, J., A. Grayson and S. Johal (2010), *Econometric Analysis of Alcohol Consumption in the UK*, HM Revenue & Customs, London, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/331614/alcohol-consumption-uk.pdf (accessed on 2 August 2017). [24]

Competition Commission (2008), *The Supply of Groceries in the UK Market Investigation*, The Stationery Office, London, http://www.ias.org.uk/uploads/pdf/Price%20docs/538.pdf (accessed on 25 August 2017). [38]

Connolly, K. et al. (2019), "Can a policy-induced reduction in alcohol consumption improve health outcomes and stimulate the UK economy? A potential 'double dividend'", *Drug and Alcohol Review*, Vol. 38/5, pp. 554-560, http://dx.doi.org/10.1111/dar.12962. [54]

de Bruijn, A., E. van den Wildenberg and A. van den Broeck (2012), *Commercial Promotion of Drinking in Europe*, Dutch Institute for Alcohol Policy (STAP), Utrecht, http://www.drugsandalcohol.ie/17449/1/ammie-eu-rapport_final.pdf (accessed on 23 October 2017). [28]

Department of Health (2016), *Regulatory Impact Analysis (RIA) Public Health (Alcohol) Bill*, Department of Health, Dublin, https://assets.gov.ie/19454/b1990c163eaf454f9f674355eaf4d504.pdf (accessed on 25 October 2017). [25]

Department of Health (2014), *Responsibility Deal Alcohol Network: Pledge to remove 1 billion units of alcohol from the market by end 2015 – First interim monitoring report*, Department of Health, London, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/389573/RDAN_-_Unit_Reduction_Pledge_-_1st_interim_monitoring_report.pdf (accessed on 30 October 2017). [34]

ERR (2019), *Bill Lowering Alcohol Excise Duty Submitted to Riigikogu*, Eesti Rahvusringhääling, Tallinn, https://news.err.ee/946269/bill-lowering-alcohol-excise-duty-submitted-to-riigikogu (accessed on 22 August 2019). [50]

EUIPO (2018), *Synthesis Report on IPR Infringement*, European Union Intellectual Property Office, Alicante, http://dx.doi.org/10.2814/833376. [44]

European Commission (2019), *Regulation (EU) 2019/787 of the European Parliament and of the Council of 17 April 2019 on the definition, description, presentation and labelling of spirit drinks, the use of the names of spirit drinks in the presentation and labelling of other foodstuffs, the protection of geographical indications for spirit drinks, the use of ethyl alcohol and distillates of agricultural origin in alcoholic beverages, and repealing Regulation (EC) No 110/2008*, European Commission, Brussels, https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32019R0787 (accessed on 29 April 2020). [10]

Federal Trade Commission (2014), *Self-Regulation in the Alcohol Industry*, Federal Trade Commission, Washington DC, https://www.ftc.gov/system/files/documents/reports/self-regulation-alcohol-industry-report-federal-trade-commission/140320alcoholreport.pdf (accessed on 16 August 2017). [8]

FMI (2012), *The Economic Impact of Allowing Shoppers to Purchase Wine in Food Stores*, Food Marketing Institute, Arlington, VA, https://www.fmi.org/docs/gr-state/fmi_wine_study.pdf?sfvrsn=2 (accessed on 26 October 2017). [36]

Fogarty, J. and G. Jakeman (2011), "Wine tax reform: The impact of introducing a volumetric excise tax for wine", *Australian Economic Review*, Vol. 44/4, pp. 387-403, http://dx.doi.org/10.1111/j.1467-8462.2011.00653.x. [52]

FSANZ (2020), *Proposal P1050: Pregnancy warning labels on alcoholic beverages*, Food Standards Australia New Zealand, Canberra, https://www.foodstandards.gov.au/code/proposals/Pages/P1050Pregnancywarninglabelsonalcoholicbeverages.aspx. [11]

Goldfarb, A. (2007), *Cutting the Alcohol in Wine: What wineries don't want you to know*, AppellationAmerica.com, Santa Rosa, CA, http://wine.appellationamerica.com/wine-review/305/Alcohol-Reduction-in-Wine.html (accessed on 25 January 2018). [17]

Goode, J. (2009), *Lower Alcohol Wines: A new retail category*, WineAnorak.com, London, http://www.wineanorak.com/loweralcoholwines.htm. [16]

IAS (2019), *Price*, Institute of Alcohol Studies, London, http://www.ias.org.uk/Alcohol-knowledge-centre/Price.aspx (accessed on 1 August 2017). [37]

IAS (2018), *The Alcohol Industry: Factsheet*, Institute of Alcohol Studies, London, http://www.ias.org.uk/uploads/pdf/Factsheets/FS%20industry%20012018.pdf (accessed on 22 August 2019). [2]

IAS (2017), *Splitting the Bill: Alcohol's impact on the economy*, Institute of Alcohol Studies, London, http://www.ias.org.uk/uploads/pdf/IAS%20summary%20briefings/sb15022017.pdf (accessed on 26 February 2018). [51]

International, M. (2019), *Estonia: New Government Plans to Lower Alcohol Tax*, Movendi International, Stockholm, https://iogt.org/news/2019/05/28/estonia-government-plans-to-lower-alcohol-tax/ (accessed on 22 August 2019). [49]

Jääskelä, J. and C. Windsor (2011), "Insights from the household expenditure survey", *Reserve Bank of Australia Bulletin*, pp. 1-12, https://www.rba.gov.au/publications/bulletin/2011/dec/pdf/bu-1211-1.pdf. [58]

Jones, L. and M. Bellis (2012), *Can Promotion of Lower Alcohol Products Help Reduce Alcohol Consumption? A rapid literature review*, North West Public Health Observatory, Liverpool, https://ranzetta.typepad.com/files/can-promotion-of-lower-strength-alcohol-products-help-reduce-alcohol-consumption-jmu-2012.pdf (accessed on 16 August 2017). [32]

Karlsson, T. et al. (2020), "The road to the Alcohol Act 2018 in Finland: A conflict between public health objectives and neoliberal goals", *Health Policy*, Vol. 124/1, pp. 1-6, http://dx.doi.org/10.1016/j.healthpol.2019.10.009. [46]

Karlsson, T. and E. Österberg (2009), *Alcohol Affordability and Cross-border Trade in Alcohol*, Swedish National Institute of Public Health, Östersund. [45]

Kigozi, J. et al. (2016), "Estimating productivity costs using the friction cost approach in practice: A systematic review", *European Journal of Health Economics*, Vol. 17/1, pp. 31-44, http://dx.doi.org/10.1007/s10198-014-0652-y. [55]

Koski, A. et al. (2007), "Alcohol tax cuts and increase in alcohol-positive sudden deaths: A time-series intervention analysis", *Addiction*, Vol. 102/3, pp. 362-368, http://dx.doi.org/10.1111/j.1360-0443.2006.01715.x. [47]

Leicester, A. (2011), *Alcohol Pricing and Taxation Policies*, Institute for Fiscal Studies, London, https://www.ifs.org.uk/bns/bn124.pdf (accessed on 1 August 2017). [7]

Miller, D. (2017), *Lighter Wines: A major industry initiative – A progress review of the Lighter Wines PGP Programme*, MInistry for Primary Industries, Wellington, https://www.mpi.govt.nz/dmsdocument/21904-Lighter-Wines-progress-review-report- (accessed on 23 October 2017). [33]

Ministry for Primary Industies (2017), *Lighter Wines*, Ministry for Primary Industies, Wellington, https://www.mpi.govt.nz/funding-rural-support/primary-growth-partnerships-pgps/current-pgp-programmes/lighter-wines/ (accessed on 5 September 2017). [12]

Neufeld, M. et al. (2019), "Perception of alcohol policies by consumers of unrecorded alcohol: An exploratory qualitative interview study with patients of alcohol treatment facilities in Russia", *Substance Abuse: Treatment, Prevention, and Policy*, Vol. 14/1, p. 53, http://dx.doi.org/10.1186/s13011-019-0234-1. [42]

Noel, J., T. Babor and K. Robaina (2016), "Industry self-regulation of alcohol marketing: a systematic review of content and exposure research", *Addiction*, Vol. 112, pp. 28-50, http://dx.doi.org/10.1111/add.13410. [9]

OECD (2020), *Inflation (CPI)*, OECD, Paris, http://dx.doi.org/10.1787/54a3bf57-en. [59]

OECD (2020), *Purchasing Power Parities (PPP)*, OECD, Paris, http://dx.doi.org/10.1787/1290ee5a-en (accessed on 20 July 2020). [60]

OECD (2020), *Regulatory Impact Assessment*, OECD Best Practice Principles for Regulatory Policy, OECD, Paris, https://dx.doi.org/10.1787/7a9638cb-en. [5]

OECD (2016), *Illicit Trade: Converging Criminal Networks*, OECD, Paris, http://www.oecd.org/corruption-integrity/reports/charting-illicit-trade-9789264251847-en.html. [41]

OECD (2015), *Tackling Harmful Alcohol Use: Economics and Public Health Policy*, OECD, Paris, https://dx.doi.org/10.1787/9789264181069-en (accessed on 26 July 2017). [4]

ONS (2017), *Family Spending in the UK: Financial year ending March 2016*, Office for National Statistics, London, https://www.ons.gov.uk/releases/familyspendingintheuk2016. [57]

Rabinovich, L. et al. (2012), *Further Study on the Affordability of Alcoholic Beverages in the EU*, RAND Corporation, Santa Monica, CA, https://ec.europa.eu/health//sites/health/files/alcohol/docs/alcohol_rand_2012.pdf (accessed on 2 August 2017). [3]

Ross, C., A. Sparks and D. Jernigan (2016), "Assessing the impact of stricter alcohol advertising standards: The case of Beam Global Spirits", *Journal of Public Affairs*, Vol. 16/3, pp. 245-254, http://dx.doi.org/10.1002/pa.1584. [6]

Schmidtke, L., J. Blackman and S. Agboola (2012), "Production technologies for reduced alcoholic wines", *Journal of Food Science*, Vol. 77/1, pp. R25-R41, http://dx.doi.org/10.1111/j.1750-3841.2011.02448.x. [15]

Shrestha, V. and S. Markowitz (2016), "The pass-through of beer taxes to prices: Evidence from state and federal tax changes", *Economic Inquiry*, Vol. 54/4, pp. 1946-1962, https://doi.org/10.1111/ecin.12343. [21]

Sohrabvandi, S. et al. (2010), "Alcohol-free beer: Methods of production, sensorial defects, and healthful effects", *Food Reviews International*, Vol. 26/4, pp. 335-352, http://dx.doi.org/10.1080/87559129.2010.496022. [14]

Statista (2020), *Number of Persons Consuming Alcohol-free Beer in Germany from 2016 to 2020*, Statista, New York, https://www.statista.com/statistics/575433/non-alcoholic-beer-consumption-germany/ (accessed on 30 October 2017). [30]

Statista (2019), *Average Household Consumption Expenditure on Low and Non-alcoholic Beer in Denmark from 2008 to 2018*, Statista, New York, https://www.statista.com/statistics/604681/annual-household-expenditure-on-non-alcoholic-beer-in-denmark/. [29]

Statista (2016), *Compound Annual Growth Rate (CAGR) of Low-alcohol Beverages Worldwide Between 2016 and 2021, by Category*, Statista, New York, https://www.statista.com/statistics/753790/cagr-low-alcohol-drinks-category-worldwide/ (accessed on 30 October 2017). [31]

TRACIT (2020), *Mapping the Impact of Illicit Trade on the Sustainable Development Goals*, Transnational Alliance to Combat Illicit Trade, New York, https://www.tracit.org/publications_illicit-trade-and-the-unsdgs.html (accessed on 28 April 2020). [43]

UNSD (2018), *Classification of Individual Consumption According to Purpose (COICOP) 2018*, United Nations Statistics Division, New York, https://unstats.un.org/unsd/classifications/unsdclassifications/COICOP_2018_-_pre-edited_white_cover_version_-_2018-12-26.pdf. [56]

VAF Memstar (2018), *Winemakers' Questions*, VAF Memstar, Nuriootpa, https://www.vafmemstar.com.au/about/faqs/#toggle-id-3 (accessed on 25 January 2018). [18]

Wada, R. et al. (2017), "Employment impacts of alcohol taxes", *Preventive Medicine*, Vol. 105, pp. S50-S55, http://dx.doi.org/10.1016/J.YPMED.2017.08.013. [53]

Walker, R. (2017), "Forget the hangover, under-25s turn to mindful drinking", *Observer*, https://www.theguardian.com/society/2017/feb/26/under-25s-turn-to-mindful-drinking (accessed on 30 October 2017). [35]

WHO (2020), *Alcohol, Unrecorded Per Capita (15+ years) Consumption (in litres of pure alcohol)*, World Health Organization, Geneva, https://www.who.int/data/gho/indicator-metadata-registry/imr-details/466 (accessed on 10 February 2020). [39]

WHO (2020), *Global Information System on Alcohol and Health (GISAH)*, World Health Organization, Geneva, http://apps.who.int/gho/data/node.main.GISAH?lang=en (accessed on 12 November 2019). [40]

WHO (2010), *Global Strategy to Reduce the Harmful Use of Alcohol*, World Health Organization, Geneva, http://apps.who.int/iris/bitstream/10665/44395/1/9789241599931_eng.pdf?ua=1&ua=1 (accessed on 26 July 2017). [1]

Yle Uutiset (2015), *Finnish Health Officials Laud Estonian Booze Tax Hike Plan*, Yle Uutiset, Helsinki, https://yle.fi/uutiset/osasto/news/finnish_health_officials_laud_estonian_booze_tax_hike_plan/7917415 (accessed on 20 October 2017). [48]

Annex 8.A. Expenditure analysis data

European countries

Expenditure patterns were analysed for 19 European countries, which were chosen based on data availability. Data were retrieved from each country's 2010 household budget survey micro-dataset, which includes expenditure on 12 key items including food and drink, clothing and footwear, health, transport, recreation and culture, and hotels (i.e. the United Nation's classification of individual consumption by purpose (COICOP)).

The following European countries were analysed: Belgium, Denmark, Estonia, Finland, France, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Poland, Portugal, the Slovak Republic, Slovenia, Spain, Sweden and the United Kingdom.

United States

Micro-data for the United States came from the 2015 household Consumer Expenditure Survey collected by the Bureau of Labor Statistics. Expenditure bundles were re-classified to align with the United Nation's COICOP.

Data comparability

To ensure data comparability across countries, expenditure items and household disposable income were inflated to 2015 values using individual consumer price index values (OECD, 2020[59]). Once inflated, they were converted to USD PPP using PPP conversation rates (OECD, 2020[60]). To ensure that the results represented the entire population, as opposed to the surveyed population, they were adjusting using survey weights.