4 The health and economic burden of alcohol consumption

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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

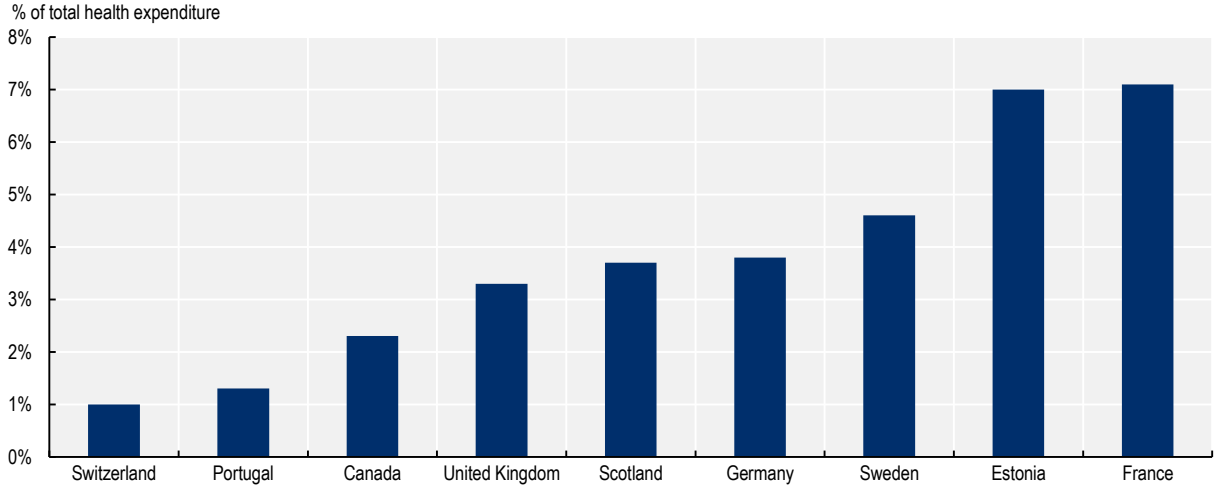
wide variation in the data sources underlying each study, in the methods used, and in the alcohol-related conditions and health care settings that are included to calculate health care costs.

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.

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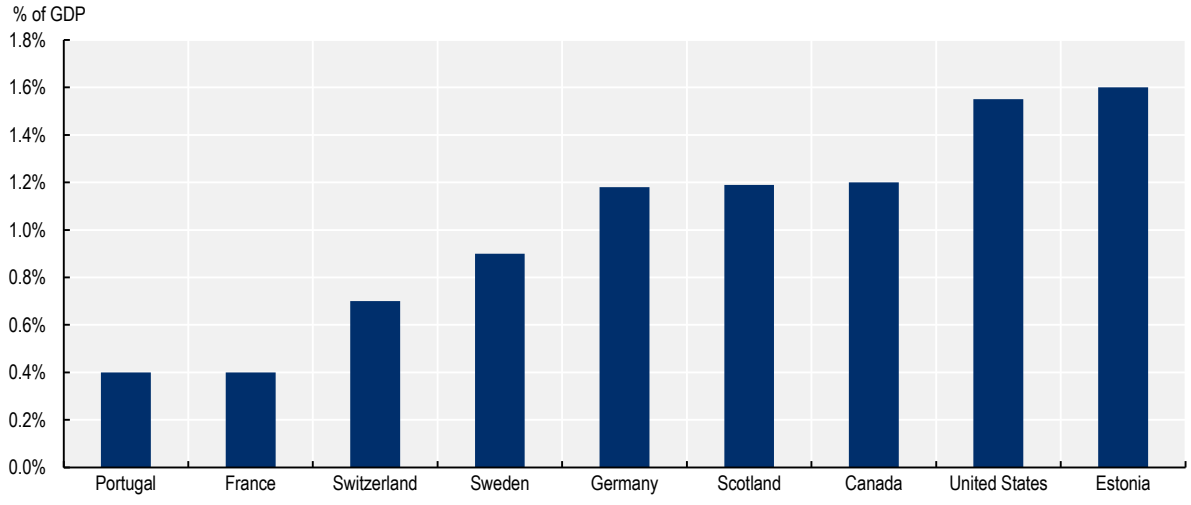
4.1.2. Existing studies suggest that the impact of alcohol consumption on the wider economy is between 0.4% and 1.6% of GDP

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.

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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]).

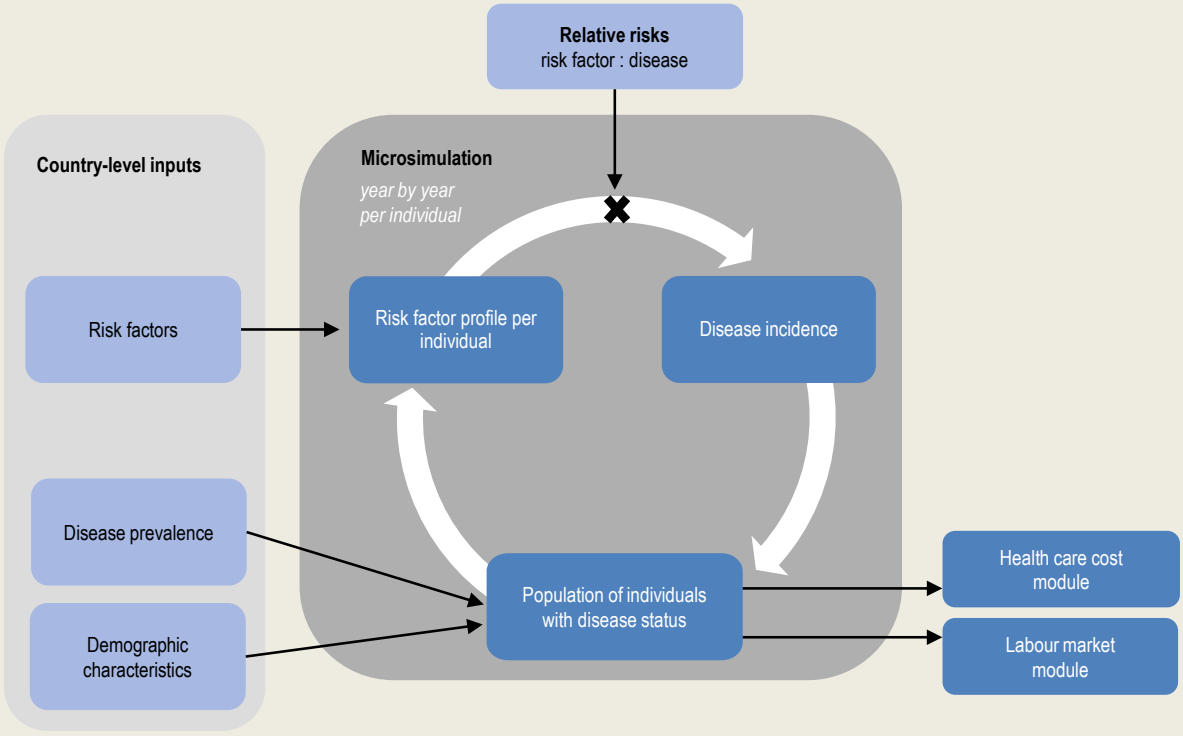
The links between alcohol consumption and diseases are modelled through age- and sex-specific relative risks retrieved from the literature (Global Burden of Disease Collaborative Network, 2016[18]; GBD 2016 Risk Factors Collaborators, 2017[19]; Cecchini, Devaux and Sassi, 2015[20]) and depend on both 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.

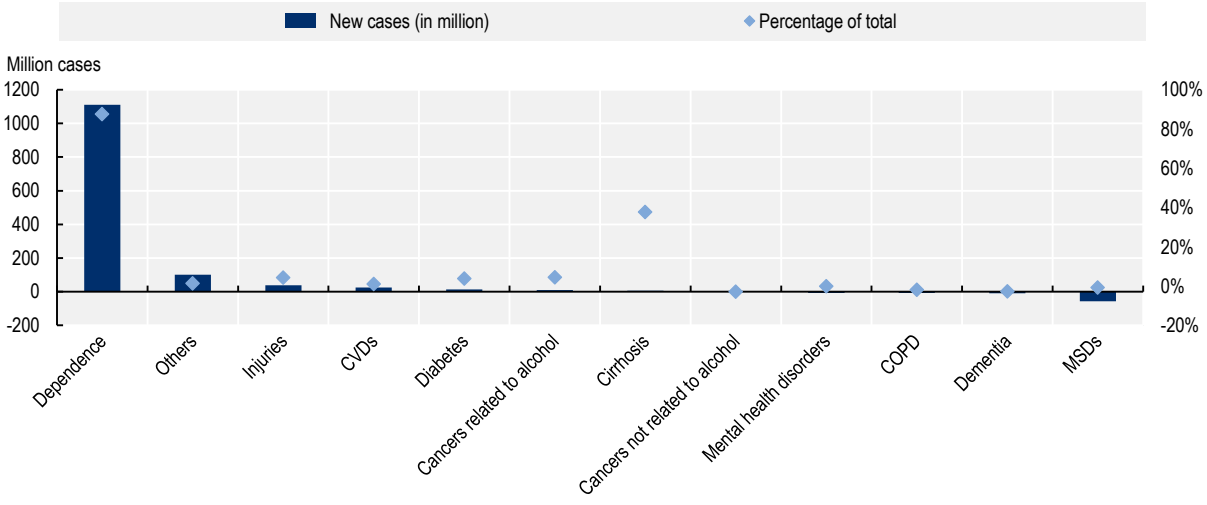
4.2. Alcohol consumption above the 1/1.5 drinks per day cap and its related diseases reduce life expectancy in OECD countries by 0.9 years

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.

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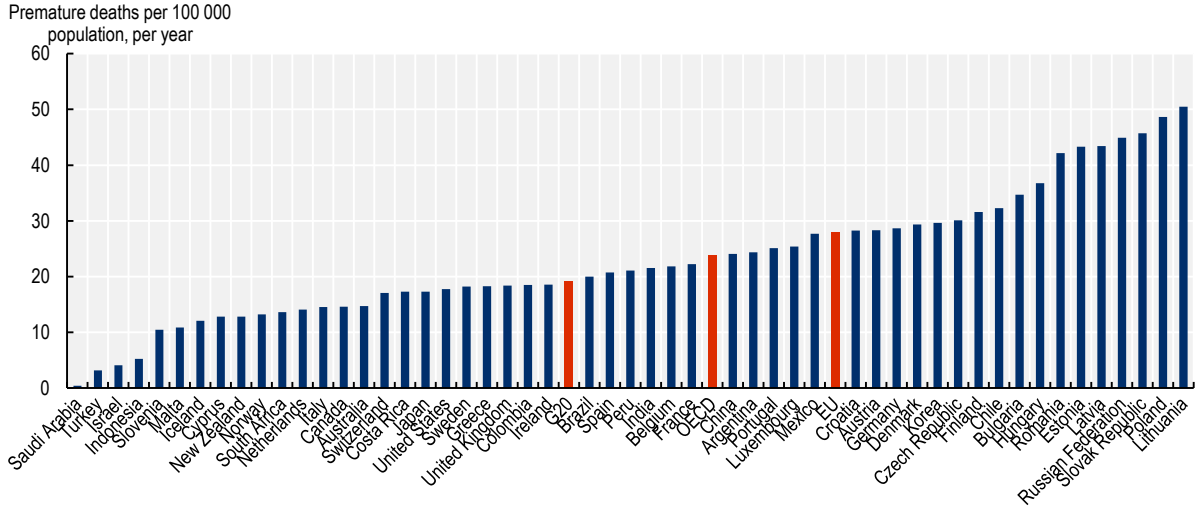
Alcohol consumption above 1 drink per day for women and 1.5 drinks per day for men can also lead to people dying prematurely – between ages 30 and 70, according to the WHO definition (WHO, 2018[28]). Specifically, the model predicts that, compared to the business-as-usual scenario, an additional 1.1 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.

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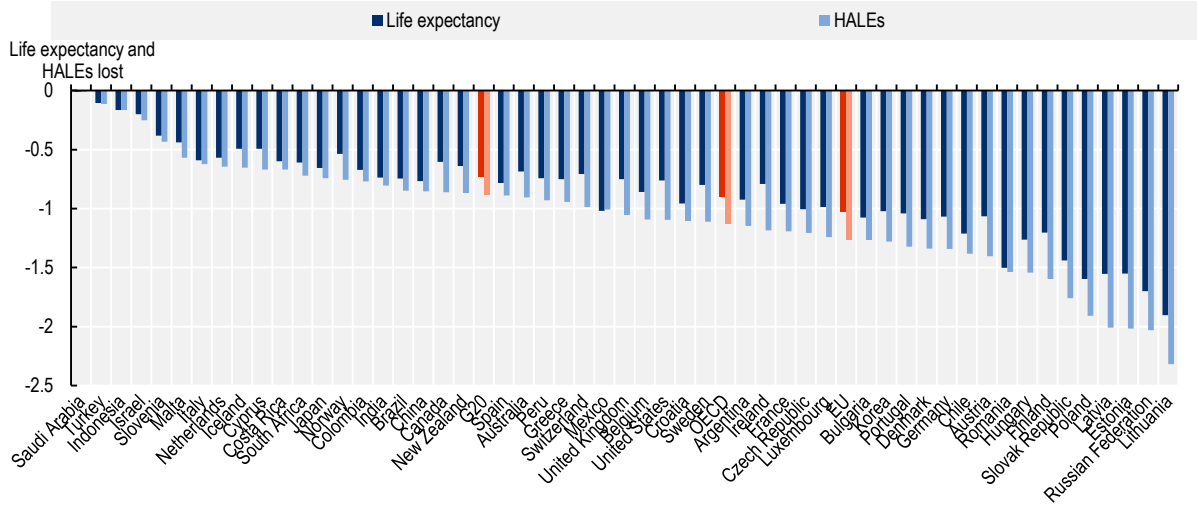
The impact of alcohol consumption above the 1/1.5 drinks per day cap on population health can also manifest itself in shorter life expectancy (Figure 4.6). On average across all OECD countries, life expectancy is 0.9 years lower over 2020-50 due to drinking above the 1/1.5 drinks per day cap. For comparison, 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.

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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]).

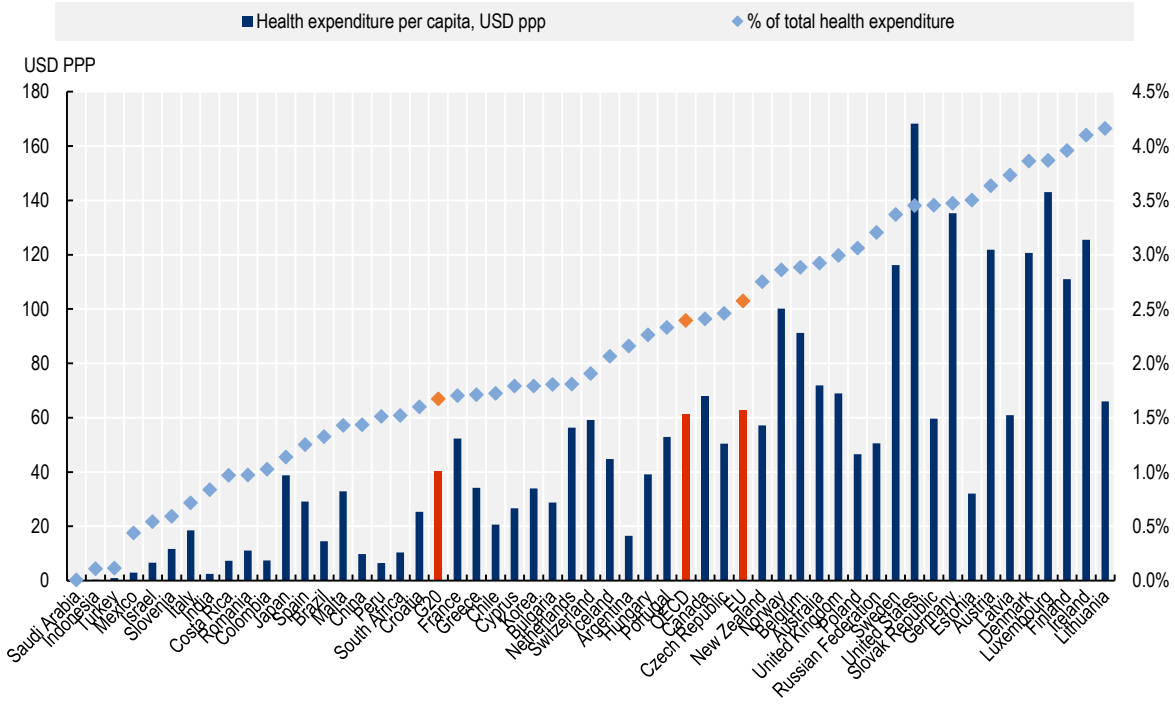
4.3. Diseases caused by alcohol consumption above 1 drink per day for women and 1.5 drinks per day for men account for over 2.4% of total health expenditure in OECD countries

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.

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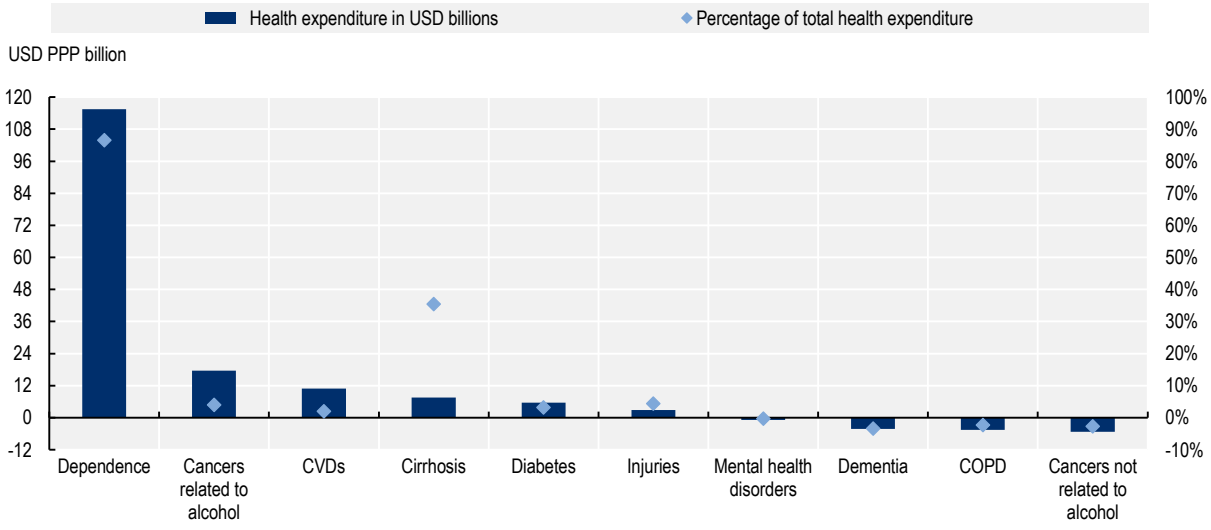
On a disease-specific basis, alcohol consumption above 1 drink per day for women and 1.5 drinks per day for men contributes to a large increase in the costs of treating several diseases – most notably dependence, cirrhosis and certain cancers. It accounts for 87% of all dependence-related expenditure (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.

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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.

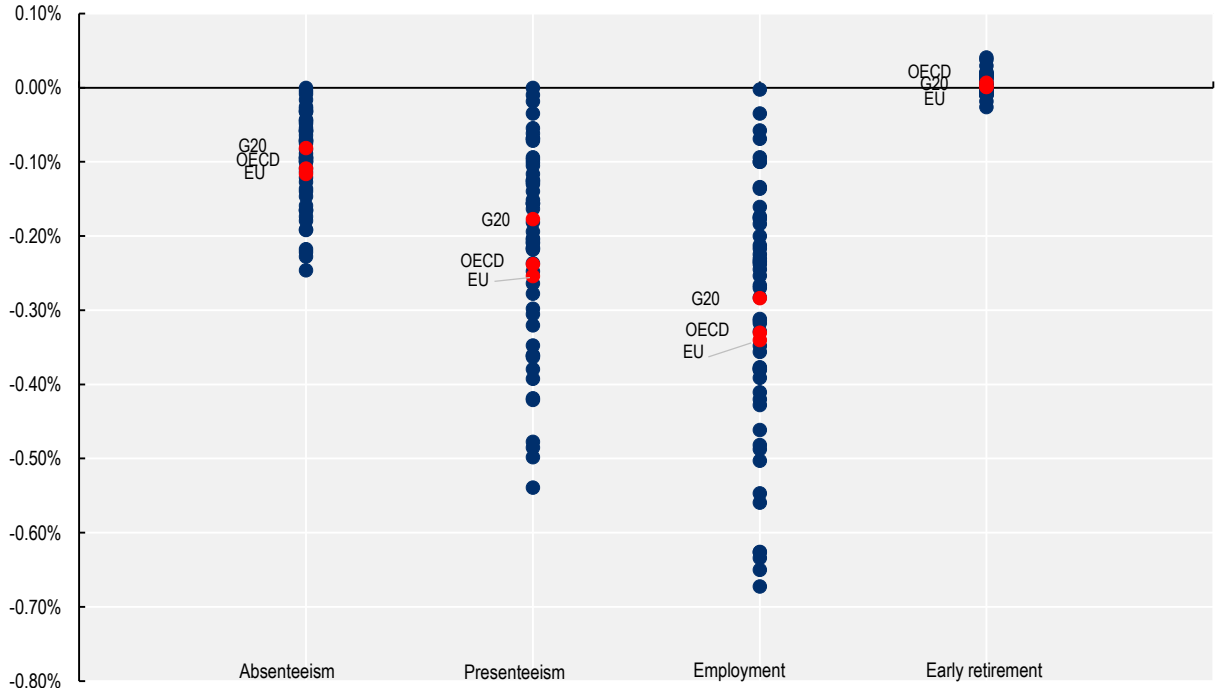
The OECD analysis shows that diseases caused by alcohol consumption above 1 drink per day for women and 1.5 drinks per day for men reduce employment by about 0.33% annually across all OECD countries in the working-age population (ages 18-65) in 2020-50 (Figure 4.9). At the same time, there are significant

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.

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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.

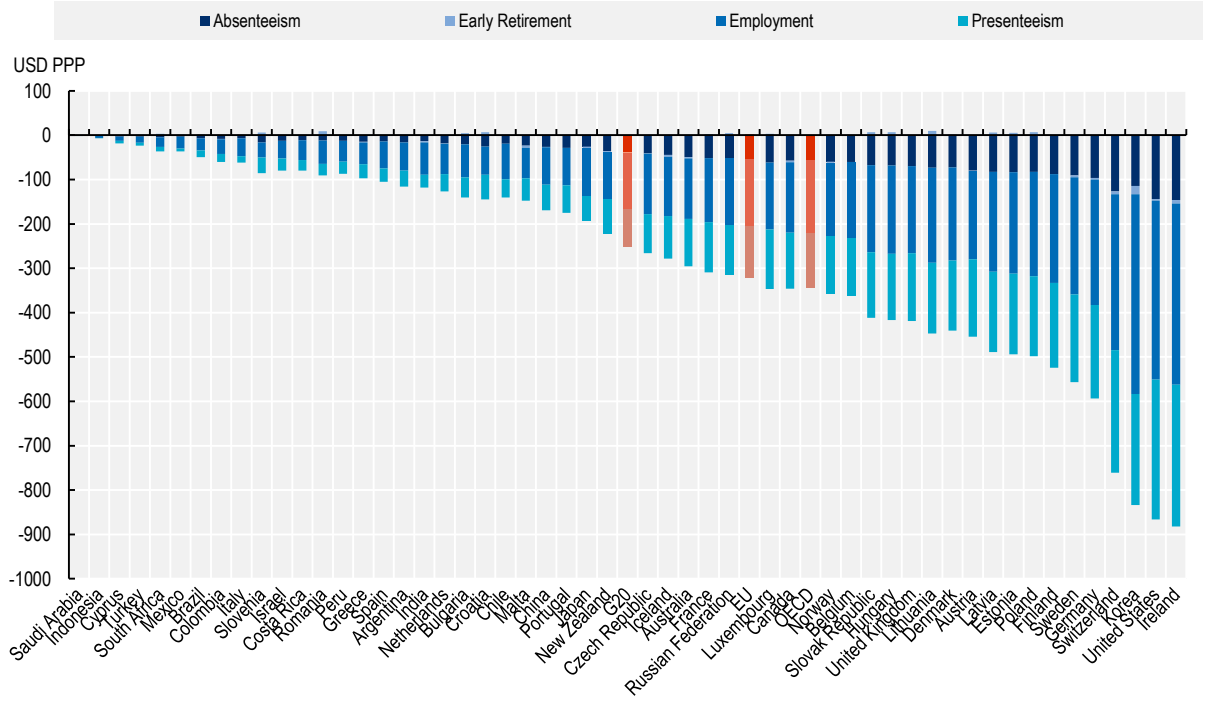
When the impact of alcohol consumption above the 1/1.5 drinks per day cap is translated into lost employment and productivity as measured by PPP-adjusted market wages, OECD countries lose on average USD PPP 344 per capita per year (see Figure 4.10), which is about 5.5 times as high as increases in health 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.

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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.

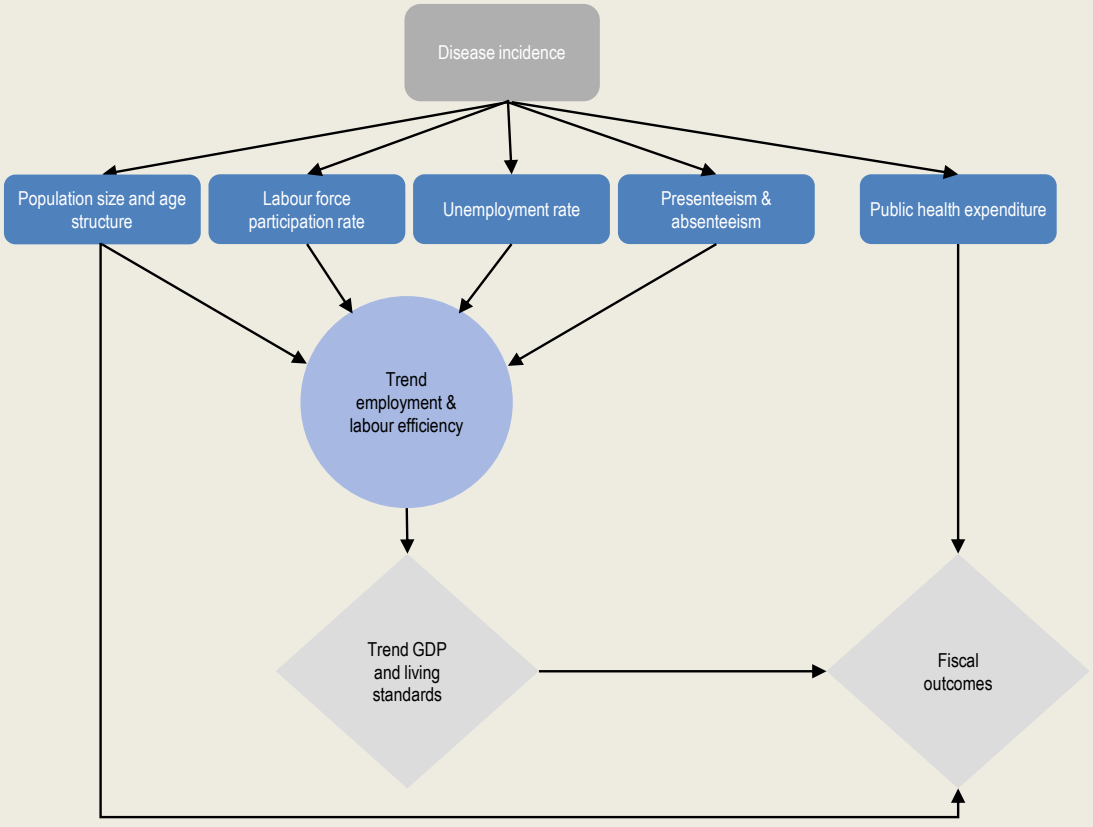
Equation 1 (Eq.1) shows the decomposition of the overall impact on GDP into four elements. Alcohol-related diseases can affect GDP through the effect on each of these elements. The output per capita in the left-hand side is given by the long-term OECD long-term economic model. The first term in the right-hand 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.

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

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

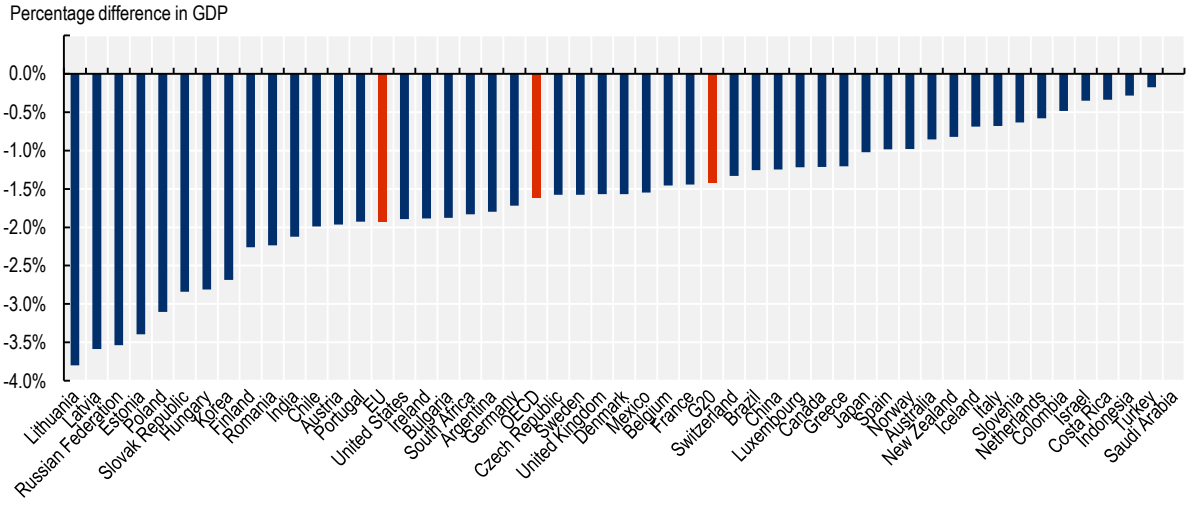


Source: OECD (2019[22]), SPHeP-NCDs Technical Documentation, http://oecdpublichealthexplorer.org/ncd-doc.

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.

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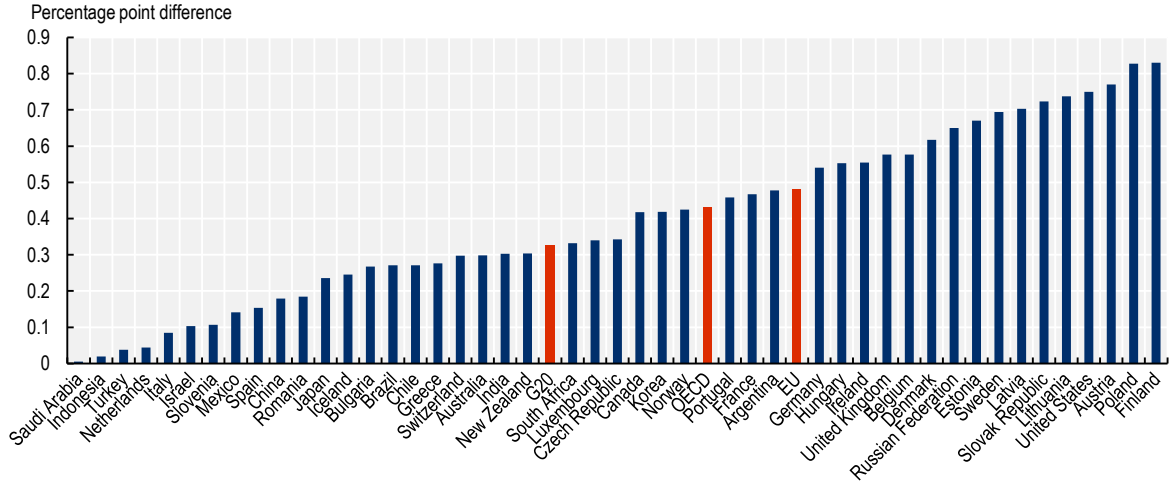
Another measure explored in the analysis of the long-term macroeconomic burden of diseases caused by drinking is fiscal pressure. Fiscal pressure is measured as government primary revenue (as a percentage of GDP) needed to stabilise the public debt ratio, and is equivalent to an overall tax rate (under 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.

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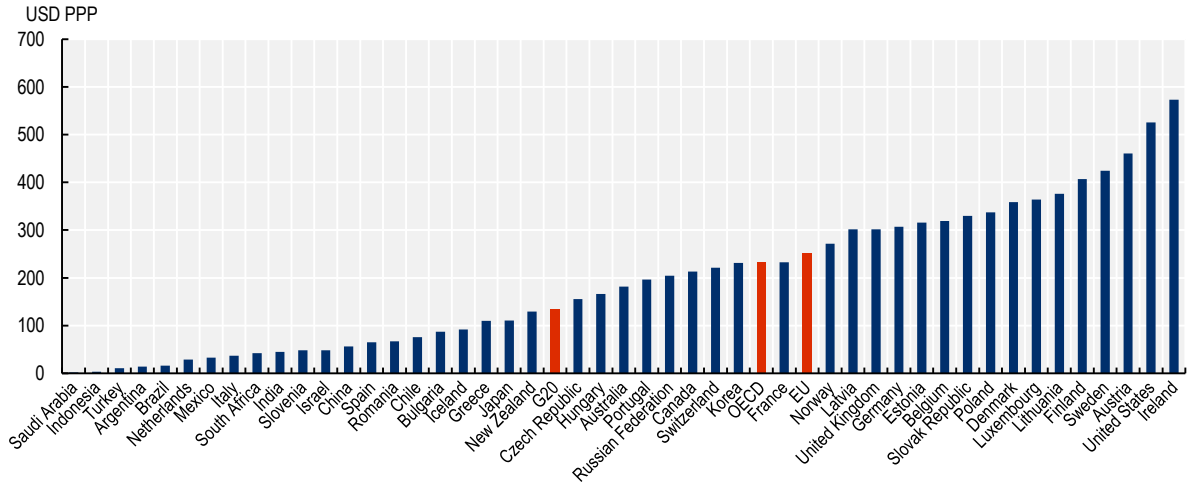
The impact of diseases caused by alcohol consumption on the overall tax rate can be translated into an equivalent impact on per capita taxes for the public. On average across OECD countries, every person will be subject to USD PPP 232 per year in additional taxes due to alcohol consumption above 1 drink 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.

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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.

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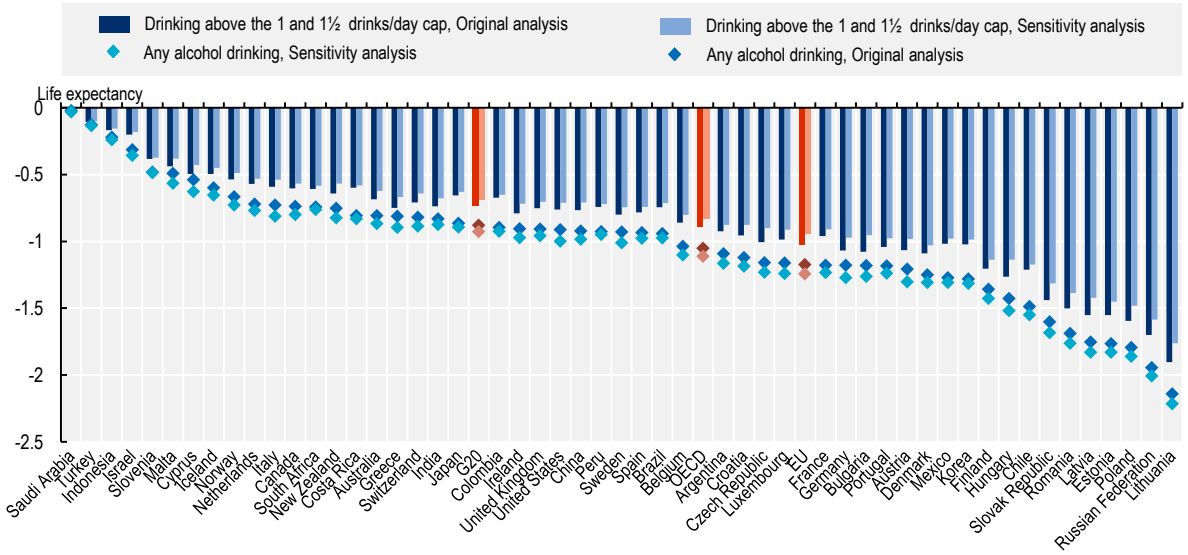
Annex 4.A. Sensitivity analysis to take out the protective effect of alcohol consumption on ischaemic CVDs and diabetes

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

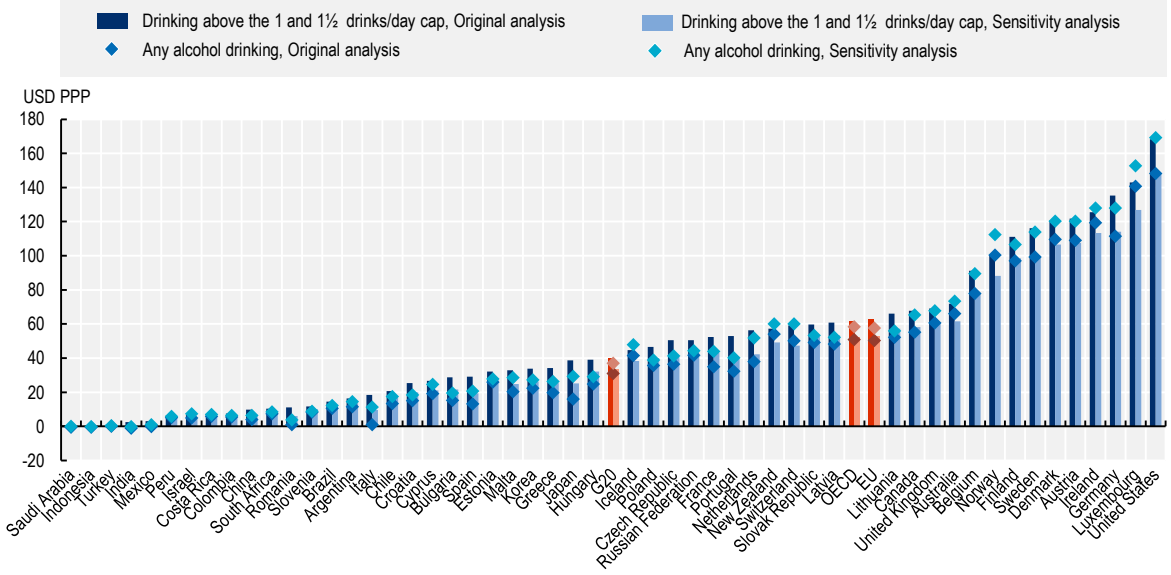


Source: OECD analyses based on the OECD SPHeP-NCDs model, 2020.

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

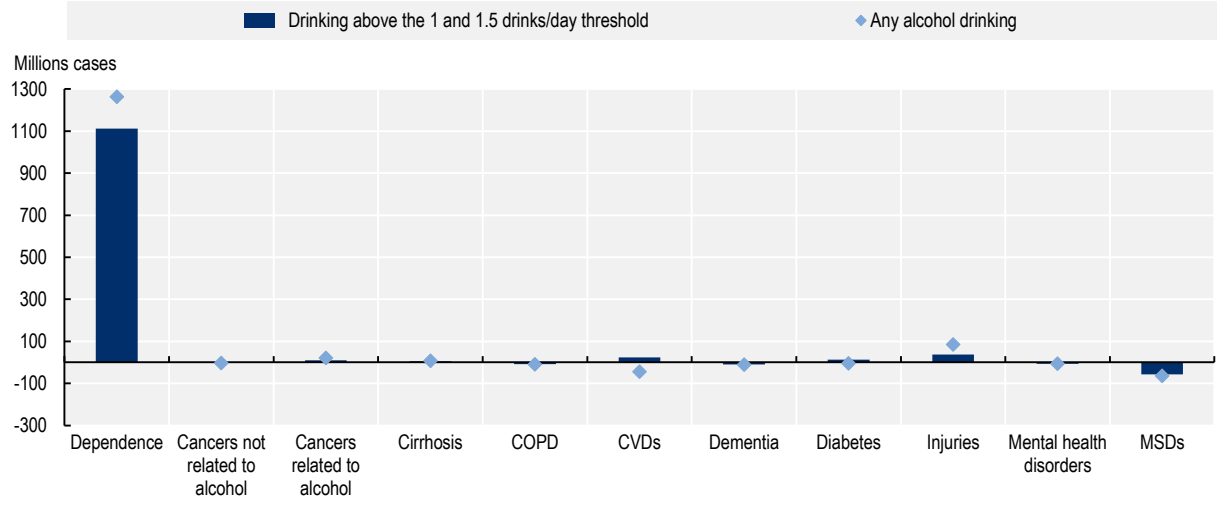
Annex 4.B. The burden of any alcohol consumption

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



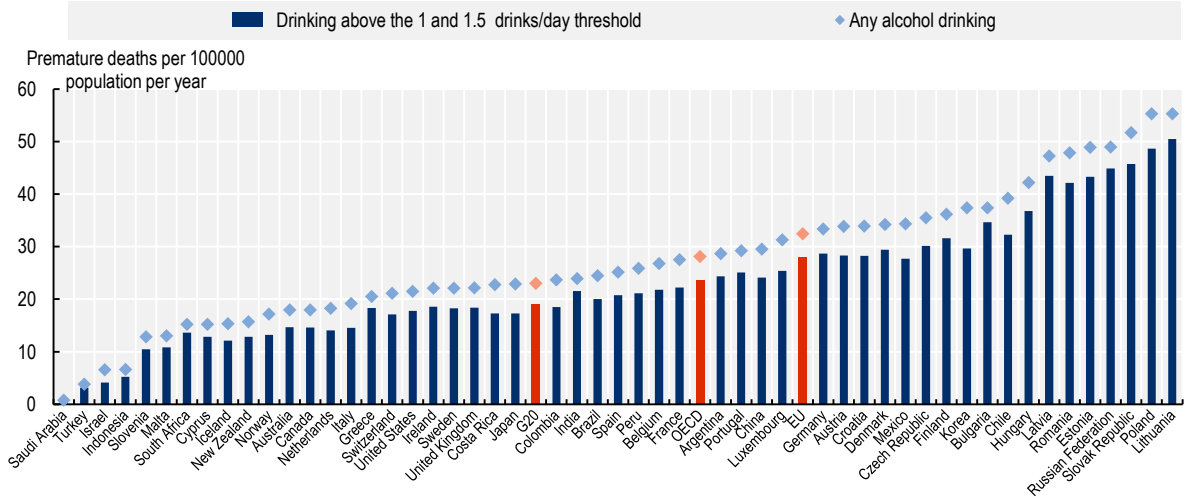
Source: OECD SPHeP-NCDs model, 2020.

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



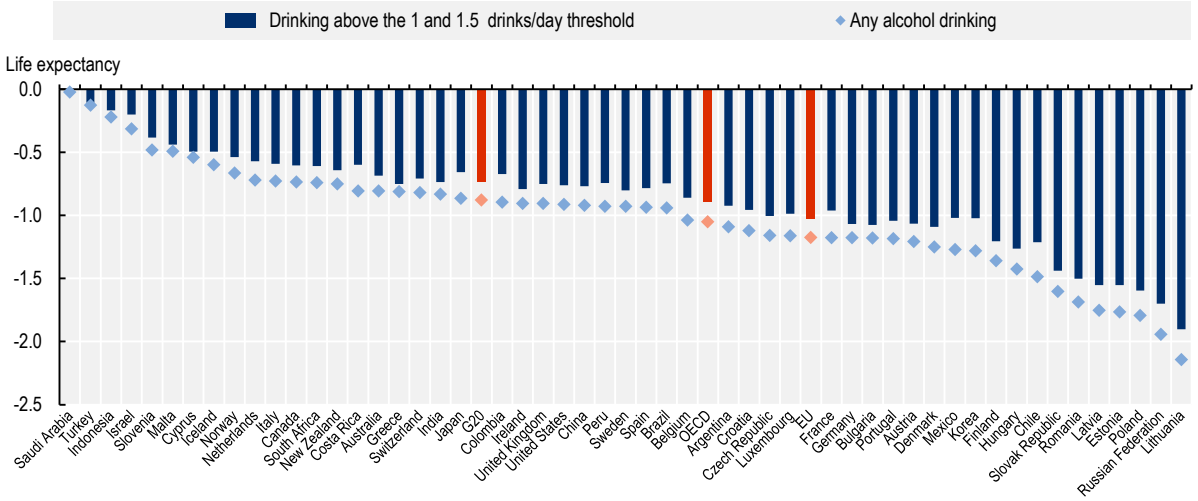
Source: OECD SPHeP-NCDs model, 2020.

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



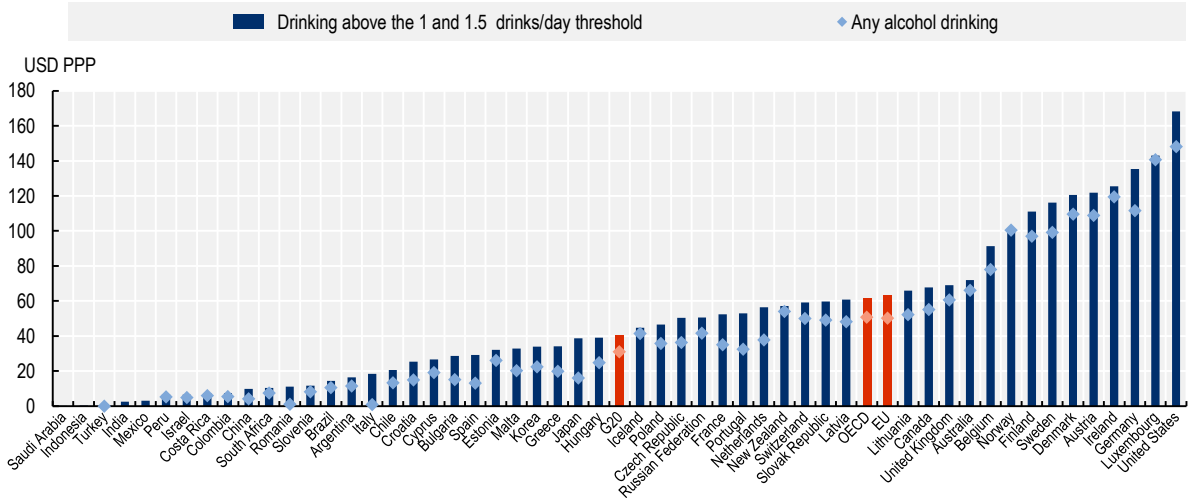
Source: OECD SPHeP-NCDs model, 2020.

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



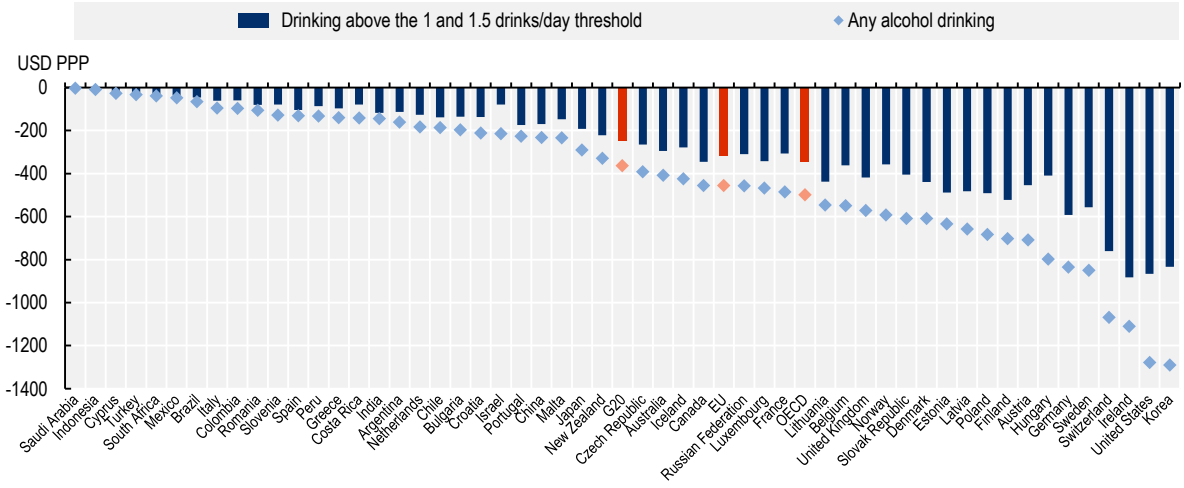
Source: OECD SPHeP-NCDs model, 2020.

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

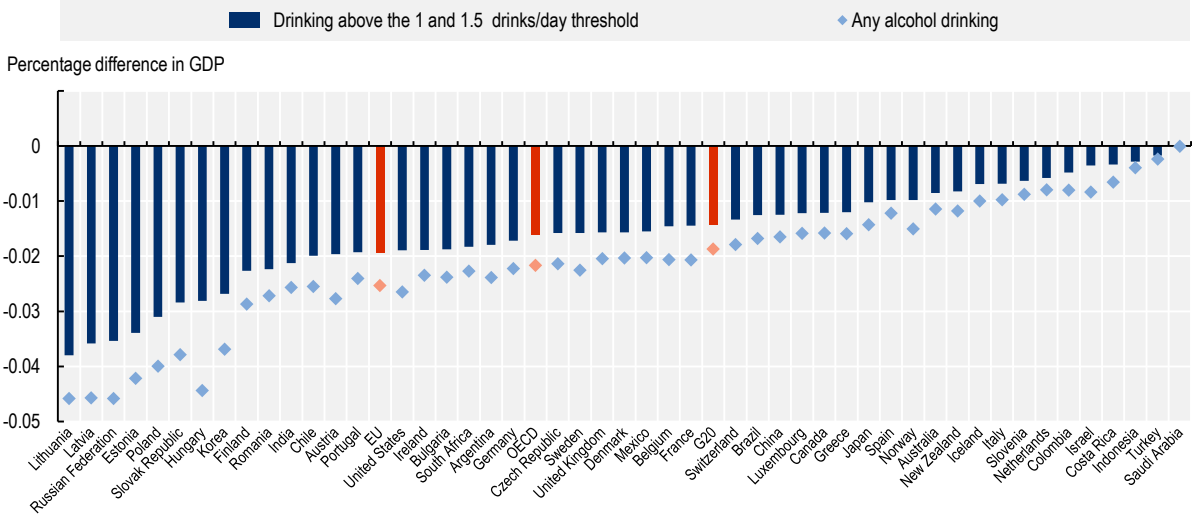


Source: OECD SPHeP-NCDs model, 2020.

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

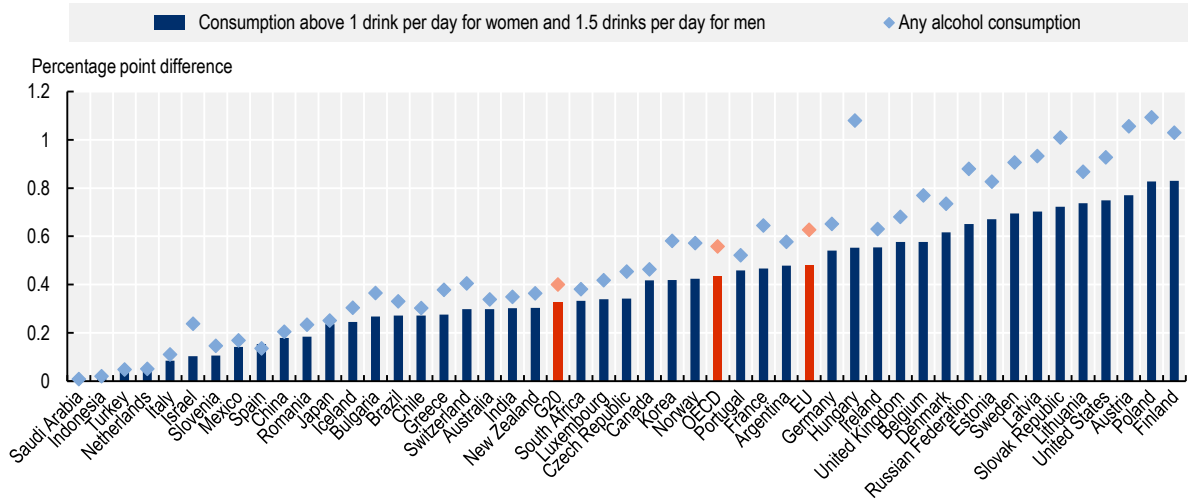


Source: OECD analyses based on the OECD SPHeP-NCDs model and OECD long-term economic model, 2020.

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

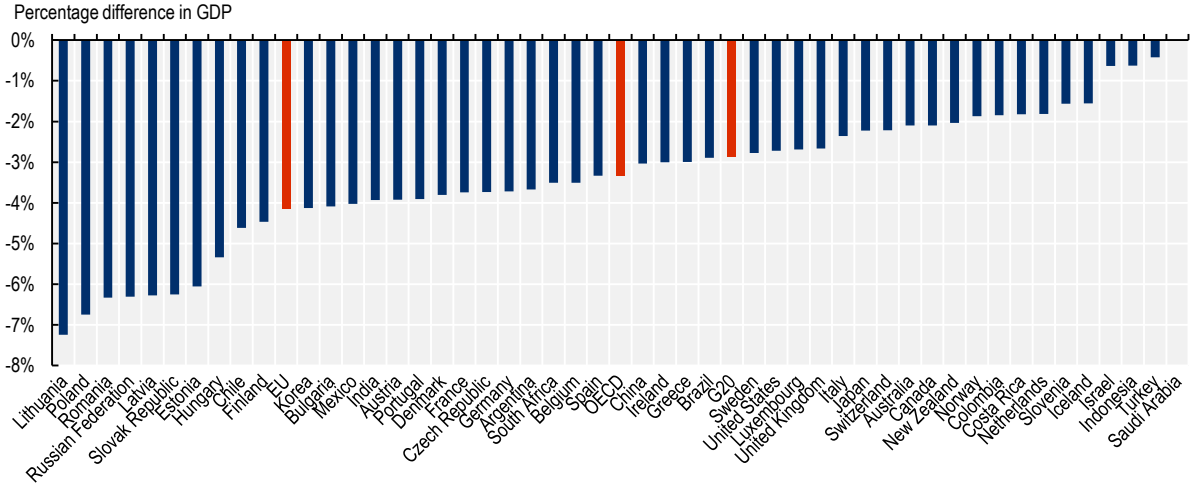


Source: OECD analyses based on the OECD SPHeP-NCDs model and OECD long-term economic model, 2020.

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

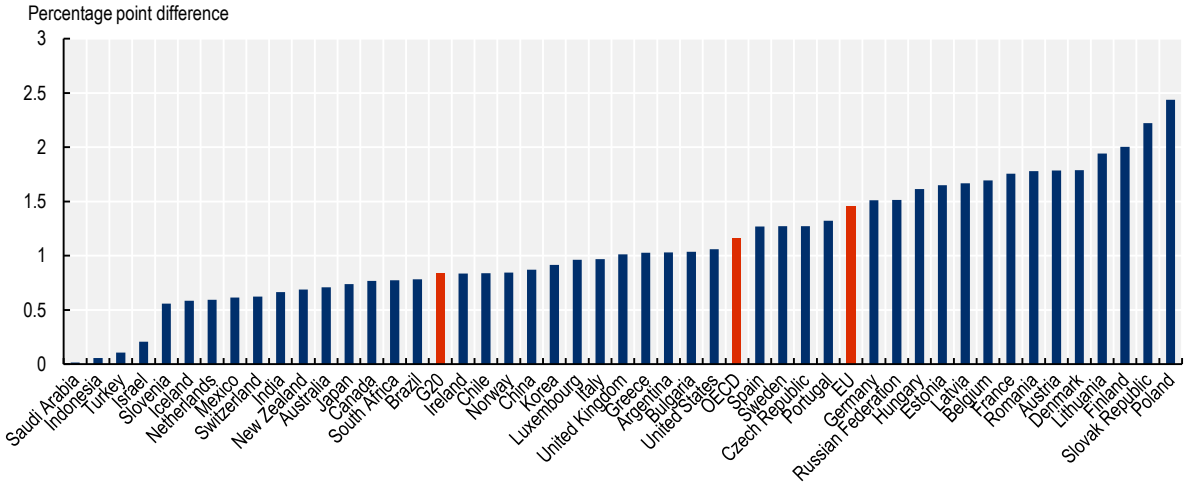


Source: OECD analyses based on the OECD SPHeP-NCDs model and OECD long-term economic model, 2020.

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

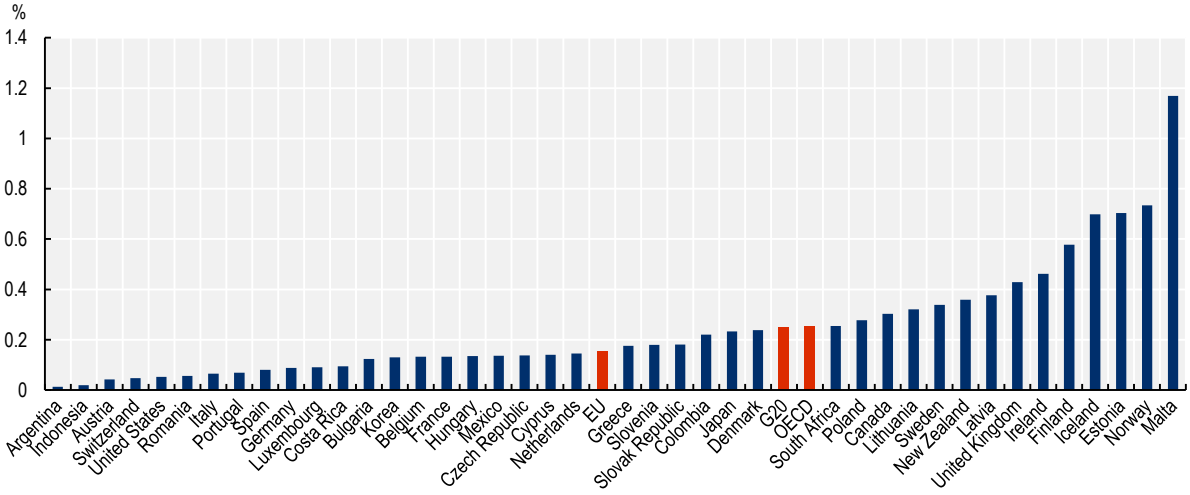


Source: OECD analyses based on the OECD SPHeP-NCDs model and OECD long-term economic model, 2020.

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.