

FINAL REPORT ON THE INTERNATIONAL ALCOHOL POLICY MODEL

RESULTS FOR SWITZERLAND



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Final Report on the International Alcohol Policy Model

Results for Switzerland

Acknowledgements

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The opinions expressed and arguments employed herein do not necessarily reflect the official views of OECD member countries.

This document, as well as any data and any map included herein, are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

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Key findings

- The analysis presented in this report shows that, in Switzerland, life expectancy is 8.5 months lower over the next 30 years due to diseases caused by drinking above 1 drink per day for women and 1.5 drinks per day for men.
- According to the simulations, diseases caused by drinking above the 1/1.5 drinks per day cap increase health expenditure by CHF 73 per capita per year in Switzerland. This is equal to about 1.9% of the total health budget in Switzerland.
- Diseases caused by drinking above the 1/1.5 drinks per day cap decrease the number of people in employment, and make a significant negative impact on productivity, as well as increasing absenteeism due to sickness. On average, alcohol-related diseases reduce labour market cost among the working-age population by CHF 940 per capita per year. The majority of such cost would come from reductions in employment. The effect on early retirement is very small.
- This report incorporates newly published evidence on the effectiveness of five alcohol policies used to assess the implementation and upscaling of these interventions in Switzerland. These interventions include alcohol taxation, minimum unit pricing, tightening regulations on drink-driving, counselling in primary care, and personalised treatment of alcohol dependence.
- All the five policies examined produced significant gains in life years and disability-adjusted life years compared to a business-as-usual scenario where no new policy is put in place. By reducing the occurrence of diseases and injuries, alcohol policies show a bigger positive effect on the number of years lived in good health, than on life expectancy.
- The top-three most effective policies at improving health outcomes are: (a) sobriety checkpoints to reduce drink-driving, (b) increased taxation, and (c) minimum unit pricing. These interventions affect the whole population. The annual number of healthy life years gained by upscaling implementation of these interventions ranges between 3 700 and 5 100, representing between 50% and 70% of the healthy life years lost due to liver cancer among the 50-69 years olds in Switzerland in 2017. Counselling in primary care and treatment of dependence are also effective, but their impact is smaller because they target smaller population groups.
- On the one hand, taxation, minimum unit pricing, sobriety checkpoints, and counselling in primary care produce savings in health expenditures alone that exceed the cost of implementing the intervention. For instance, sobriety checkpoints save on average each year CHF 2.9 per capita per year for a cost of CHF 0.9 per capita per year in Switzerland. On the other hand, the implementation cost of treatment of dependence is usually higher than the resulting healthcare savings in the first year of implementation. However, even this intervention becomes cost-effective one year after their implementation.
- The analysis presented in this report shows that all five policy interventions studied reduce the negative effect of alcohol-related diseases on labour force participation and productivity, by increasing the number of people in work, reducing absenteeism and presenteeism and by

decreasing early retirement. The implementation of each of the five modelled policies can increase labour force participation and productivity by between 200 and 2 200 additional full time equivalent workers per year, which corresponds to between CHF 2 and 34 per capita each year when converting into monetary values using national average wages.

- Policies reinforce each other. A comprehensive set of policies, combining a population-based approach (e.g., taxation, minimum unit pricing) together with interventions targeting high-risk people (e.g., treatment of dependence, counselling) produces better results than single interventions.

1. Introduction

1. Harmful use of alcohol causes important direct and indirect human and financial cost for societies. Previous OECD work on alcohol shed light on the cost-effectiveness assessment of a range of alcohol policies (OECD, 2015^[2]). This new report evaluates the burden of alcohol consumption and presents an improved evaluation of a range of alcohol policies on both direct and indirect costs. It also takes into account new evidence on the effectiveness of policies.
2. The OECD assessed the health, social and economic impacts of alternative alcohol policies within and across national jurisdictions, by developing an integrated decision-support platform. The specific aims of this project were to:
 - Develop, test and validate a dynamic micro-simulation modelling platform, capturing both individual and social dynamics of alcohol use for a selection of OECD countries including Switzerland;
 - Use the platform to project the health, social and economic consequences associated with current alcohol-use patterns; and
 - Assess the outcomes and costs of three alcohol control policies (pricing policies, drink-drive, and treatment) at reducing the social harms associated with alcohol misuse.
3. This report provides a summary of the main results for Switzerland. The main messages are summarised in the Key Findings section.
4. Section 2 presents first the methodology used and then the results of the burden of alcohol consumption. Section 3 describes the five policies examined and presents the quantitative assessment of the impact of these policies on health and economic outcomes. A concluding section summarises and comments on the findings.

2. The burden of alcohol consumption

5. This section presents the methodology used (section 2.1), the health-related burden of alcohol consumption (section 2.2), and the economic burden (section 2.3). Additional findings on the evaluation of the burden of diseases caused by any level of alcohol consumption are presented in section 2.4.

2.1. Methodology: the OECD SPHeP-NCD model

6. The OECD Strategic Public Health Planning for (SPHeP-NCD) model is used to assess the impact of policy interventions on a national representative population compared to a 'business-as-usual' baseline for the period 2020-2050. The OECD SPHeP-NCD model is an advanced systems modelling tool for public health policy and strategic planning. The model 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. alcohol consumption) and their associated NCDs.

7. The conditions included in the model are: alcohol use disorders (AUD) and alcohol dependence, cirrhosis, cancers, road injuries, interpersonal violence, and self-harm, stroke, myocardial infarction, diabetes, chronic obstructive pulmonary disease (COPD), chronic kidney disease, depression, dementia, rheumatoid arthritis, low back pain, lower respiratory infections, and atrial fibrillation.

8. The model uses demographic and risk factor characteristics by age and gender-specific population groups from international databases (see Figure 1). 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. These relative risks are based on the Global Burden of Disease study (Institute for Health Metrics and Evaluation (IHME), 2016^[3]).

9. For each year, the model produces a cross-sectional representation of the population which can be used to calculate health status indicators such as life expectancy, disease prevalence and disability-adjusted life years (DALYs) using disability weights, as well as health costs of disease treatment and labour market outputs under alternative scenarios. The model can be used both to estimate the health and economic burden of harmful alcohol consumption, and to evaluate the expected long-term gains of innovative public health actions in terms of health and economic outcomes.

10. Health care costs of disease treatment are estimated based on a per-case annual cost, which is extrapolated from national health-related expenditure data (Box 1). The additional cost of multi-morbidity is also calculated and applied.

11. The labour market module uses relative risks to relate disease status to the risk of work-related absenteeism, presenteeism, early retirement and employment (the term 'labour force participation and productivity' herein refers to these four dimensions). These relative risks were estimated from the Survey on Health and Retirement in Europe (SHARE) harmonised data across European countries, and the

English Longitudinal Study of Ageing (ELSA). The changes in productivity and labour market participation are costed based on a human capital approach, using national average wages to calculate lost labour market outputs.

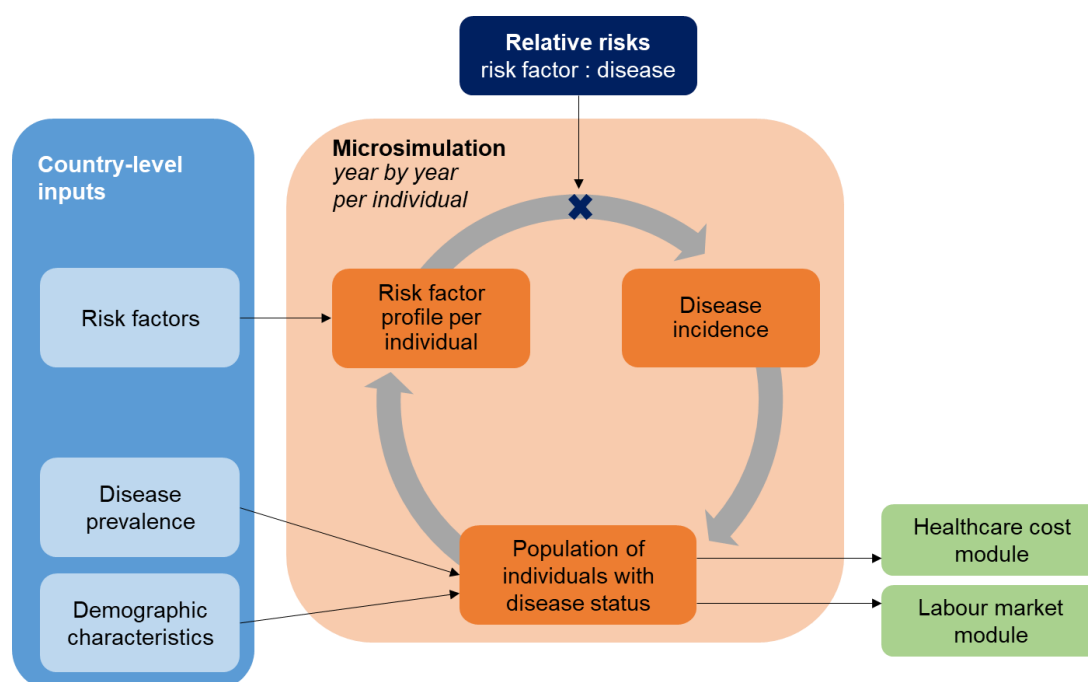
12. The OECD SPHeP-NCD model was used to simulate a scenario in which alcohol consumption is capped at about 1 drink per day for women and 1.5 drinks per day for men (assuming that a drink contains 12 grammes of alcohol). The 1/1.5 drinks per day cap corresponds to a lower-risk threshold and was chosen 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^[4]). In addition, this scenario assumes no binge drinking. Binge drinking (defined in the model as consuming 60 grams of alcohol (equivalent to about 4 medium glasses of wine) in a single occasion for males and 48 grams of alcohol (or about 3 medium glasses of wine) for females in the past year) has been shown to be a risk factor for disease even when overall alcohol consumption is light to moderate (Roerecke and Rehm, 2010^[5]).

13. Additional information about the OECD SPHeP-NCDs model can be found online, on the website describing all the technicalities of the model (OECD, 2019^[6]).

14. For comparison purposes, some additional results are presented for the burden of diseases caused by all alcohol consumption (i.e. assuming complete elimination of any alcohol drinking).

15. All results are based on projections from 2020 to 2050. Results of the difference in burden between the 'Business-as-usual' and the 'elimination of drinking above 1/1.5 rinks per day cap' scenario represent the de facto the burden of diseases caused drinking above 1/1.5 rinks per day cap.

Figure 1. Schematic overview of the modules in the OECD SPHeP-NCD 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. SPHeP-NCDs Technical Documentation. Available at: <http://oecdpublichealthexplorer.org/ncd-doc>

2.2. Diseases caused by drinking above the 1/1.5 drinks per day cap lead to higher premature mortality and lower life expectancy

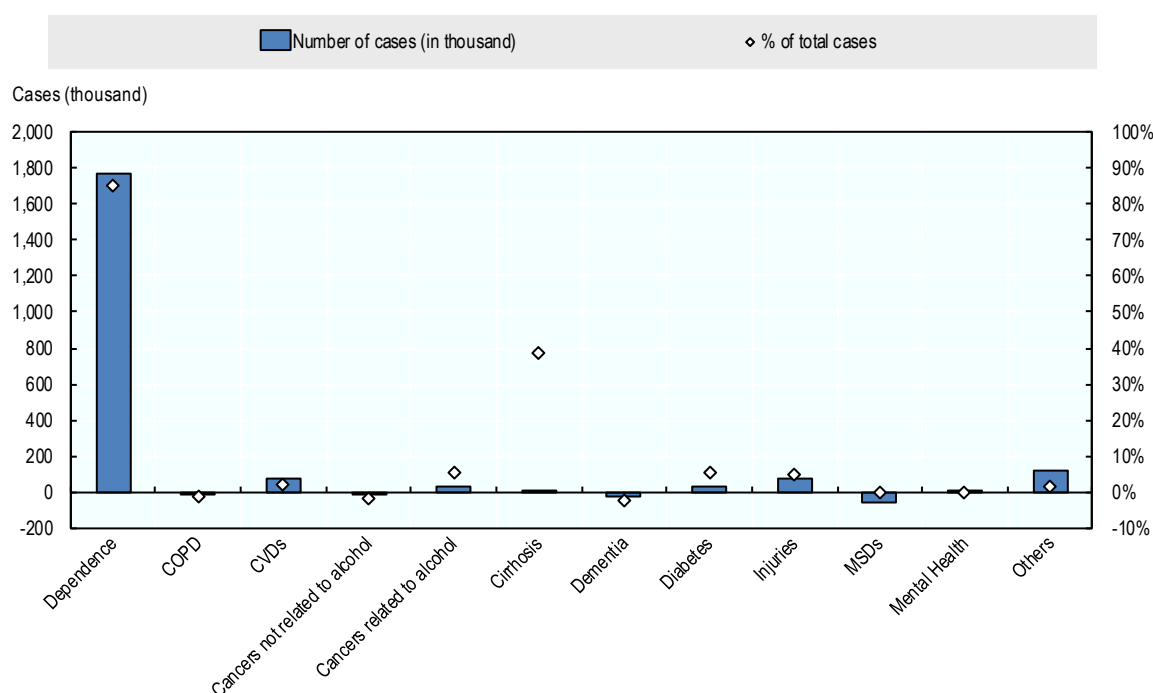
2.2.1. Effects on diseases and injuries

16. Harmful alcohol use makes a considerable impact on population health. Compared to the business-as-usual scenario, elimination of drinking above the 1/1.5 drinks per day cap could result in about 1.8 million averted cases of alcohol dependence, over the next 30 years in Switzerland, accounting for 85% of all cases. Also, the elimination of drinking above the 1/1.5 drinks per day cap could result in a decrease by 39% of all cirrhosis incident cases (Figure 2).

17. Although the potential elimination of drinking above the 1/1.5 drinks per day cap will result in a large decrease of the incidence of several diseases, it will also lead to an increase in the incidence of health conditions that are not directly linked to drinking alcohol, mostly due to people living longer and being at risk for other conditions (particularly if they have other risk factors such as tobacco smoking or overweight). For example, the model predicts an increase in the number of musculoskeletal disorders (MSDs), COPD, dementia, and non-alcohol-related cancer cases (Figure 2).

Figure 2. The impact of drinking above the 1/1.5 drinks per day cap on disease incidence

New cases due to drinking above the 1/1.5 drinks per day cap, number and as a percentage of all new cases of disease, total over 2020-2050



Note: alcohol-related cancers include liver, breast, colorectal, oesophageal, nasopharynx, lip and oral cavity. Non-alcohol-related cancers include lung and stomach. CVDs Cardiovascular diseases, COPD Chronic Obstructive Pulmonary Disease, MSDs Musculoskeletal diseases.
Source: OECD SPHeP-NCD model, 2020.

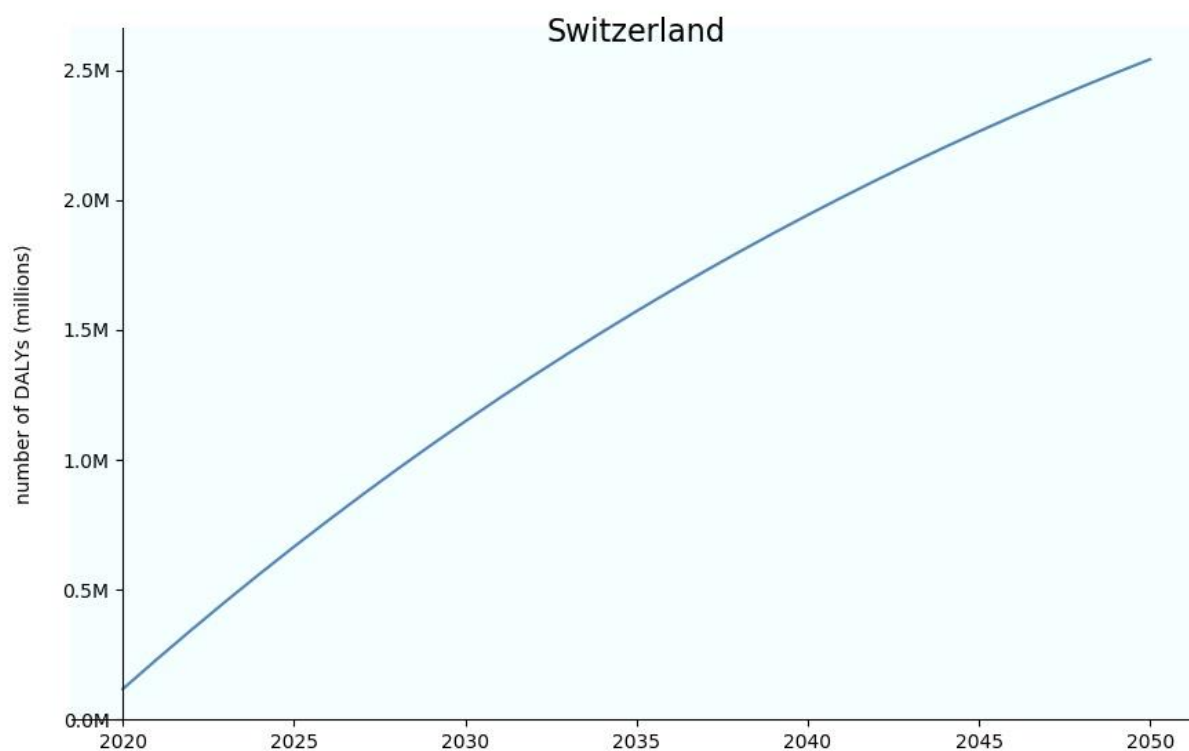
2.2.2. Premature deaths

18. Harmful alcohol use can also lead to people dying prematurely, i.e. between ages 30 and 70, as per WHO definition (World Health Organization, n.d.^[7]). Specifically, the model predicts that about 1 600 people would die early due to diseases caused by drinking above the 1/1.5 drinks per day cap, in Switzerland each year in the period 2020-2050. In other words, Switzerland could avoid 1 600 premature deaths each year by eliminating alcohol consumption above the 1/1.5 drinks per day cap, this corresponds to a rate of 17 people dying prematurely per 100 000 population. For comparison, the premature mortality rate from preventable causes is estimated at 85 per 100 000 in Switzerland (OECD, 2019^[8]), meaning that eliminating alcohol consumption above the 1/1.5 drinks per day cap would eliminate around 20% of all the mortality due to preventable causes.

19. Drinking above the 1/1.5 drinks per day cap would cost Switzerland 92 200 life years every year (that is about 990 per 100 000 population). The impact on life years in good health would be even greater, at 123 800 disability-adjusted life-years (DALYs) every year (1 300 per 100 000 population). This is approximately equivalent to the combined impact on DALYs from colorectal, liver and lung cancer in Switzerland (Institute for Health Metrics and Evaluation, 2018^[9]). Eliminating alcohol consumption above the 1/1.5 drinks per day cap could save nearly 2.5 million life-years in good health over the next 30 years in Switzerland (Figure 3).

Figure 3. The impact of alcohol consumption above the 1/1.5 drinks per day cap on DALYs over time

Cumulative impact on DALYs



Source: OECD SPHeP-NCD model, 2020.

2.2.3. Life expectancy

20. The model predicts that life expectancy is 8.5 months lower over the period 2020-2050 in Switzerland due to diseases caused by drinking above the 1/1.5 drinks per day cap. For comparison, over the last 30 years, life expectancy in the OECD countries has increased by about 6.7 years (OECD, 2019^[8]), driven by changes in a large number of both medical and social factors. Harmful alcohol consumption is only one determinant of population health, but the elimination of alcohol consumption above the 1/1.5 drinks per day cap could potentially contribute to about 10% of the total life expectancy gain recorded over a similar period in the past.

2.3. The health and economic burden of diseases caused by drinking above the 1/1.5 drinks per day cap is large

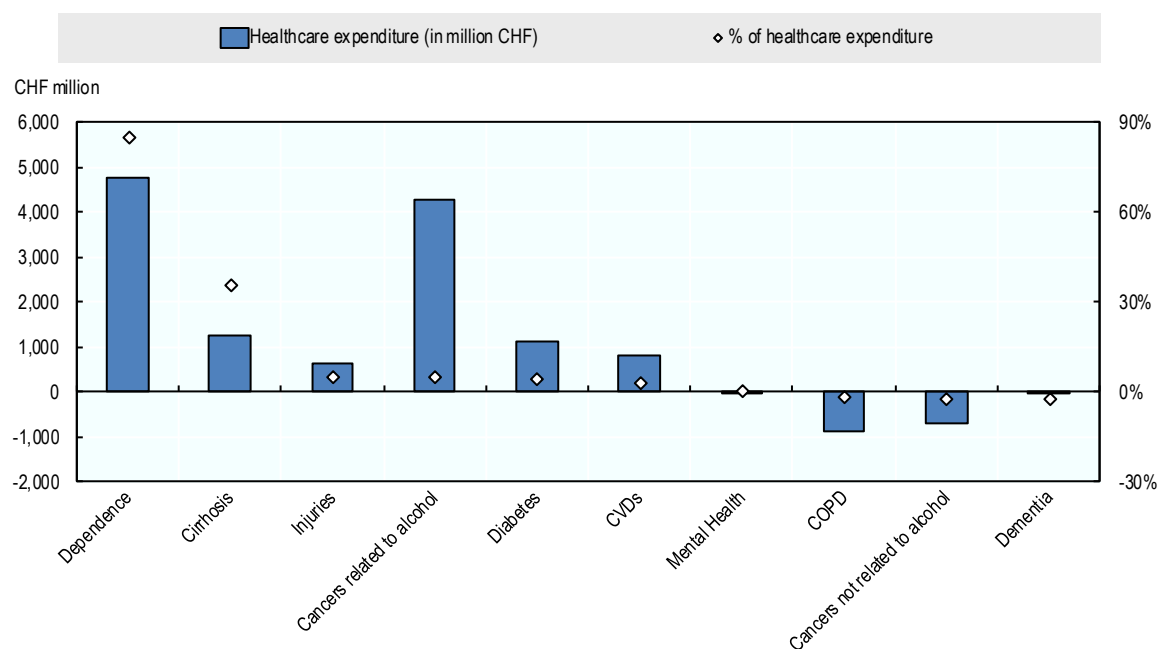
2.3.1. Health expenditure

21. According to the simulation, diseases caused by drinking above the 1/1.5 drinks per day cap would cost CHF 73 per capita per year in health expenditure that is about 1.9% of the overall annual health budget in Switzerland. This would correspond to about CHF 628 million in health spending per year, on average for the period 2020-2050, assuming constant population. For comparison, the publicly financed expenditure on health in Switzerland is estimated at CHF 52 billion in 2017 (BFS, 2019^[10]).

22. On a disease-specific basis, the analysis shows that drinking above the 1/1.5 drinks per day cap contributes to a large increase in the costs of treating several diseases, most notably dependence and cirrhosis. In the former case, drinking above the 1/1.5 drinks per day cap accounts for 87% of all dependence-related costs, while in the latter, it accounts for 36% of all costs related to treating cirrhosis (Figure 4). On the other hand, the analysis points to a very small increase in the cost of treating some chronic diseases such as COPD and dementia, mostly because people have a shorter life expectancy. For cancer, the effect differs by type of cancer. While drinking above the 1/1.5 drinks per day cap increases the cost of treating cancers of liver, breast, colorectal, oesophagus, nasopharynx, lip and oral cavity, it decreases the cost of treating not alcohol-related cancers (e.g., lung and stomach).

Figure 4. The impact of drinking above the 1/1.5 drinks per day cap on disease-related health expenditure

Annual health expenditure (HE) due to drinking above the 1/1.5 drinks per day cap, in CHF million and as a percentage of total health expenditure for the disease, total over the period 2020-2050



Note: alcohol-related cancers include liver, breast, colorectal, oesophageal, nasopharynx, lip and oral cavity. Non-alcohol-related cancers include lung and stomach.

Source: OECD SPHeP-NCD model, 2020.

Box 1. Assessing healthcare cost

The OECD SPHeP-model is able to generate the occurrence of alcohol-related diseases and injuries in the future and estimate the attached medical costs of treatment. This Box briefly presents the cost data that serve as an input in the OECD SPHeP-NCD model.

The cost by disease for Switzerland was estimated by researchers from the Winterthur Institute of Health Economics, School of Management and Law, ZHAW (Stucki, Schmidt and Wieser, 2019^[11]). Two different approaches have been used for the cost for inpatient care and the one for outpatient care. Cost for inpatient care (including acute care, rehabilitation, and psychiatry) was estimated based on the 2016 hospital inpatient registry (Medizinische Statistik der Krankenhäuser, published by the Federal Office of Statistics FSO). The registry contains complete and detailed information about each inpatient stay at a Swiss hospital or clinic. Total inpatient spending per disease category (and for a relevant gender and age group) was obtained using a bottom-up estimation approach with individual-level inpatient registry data, covering acute, rehabilitation, and psychiatric inpatient care. Diseases were identified according to the ICD-10 code of the primary diagnosis of each hospital stay. While the acute sector is reimbursed based on a DRG system, the rehabilitation and psychiatric sector are reimbursed based on a per diem tariff. Thus, spending was estimated differently for the acute sector and for the rehabilitation and psychiatric sectors.

For the outpatient setting and nursing homes, the data came from the study on alcohol-related cost in Switzerland by Fischer et al. (2014_[12]), adjusting for inflation.

The cost of injuries was estimated from individual-level data in four countries (Hungary, Estonia, Greece and Sweden) and extrapolated to other countries –including Switzerland- using a regression-based approach, while adjusting for the (dis)similarities in country' characteristics. The methodology is described in the section “Healthcare cost” of the OECD SPHeP-NCD model documentation published online: <http://oecdpublichealthexplorer.org/ncd-doc/>

2.3.2. Number of workers

23. The analysis shows that diseases caused by drinking above the 1/1.5 drinks per day cap affect the number of people in employment, and increases work-related absence and presenteeism. In Switzerland, diseases caused by drinking above the 1/1.5 drinks per day cap would decrease employment by about 41 700 full-time equivalent (FTE) workers per year in the working-age populations, i.e. between the ages 18-65. The effect on work-related absence and presenteeism would be much smaller (between 7 500 and 16 300 FTE workers per year). The effect on early retirement is not significant.

2.3.3. Labour force participation and productivity

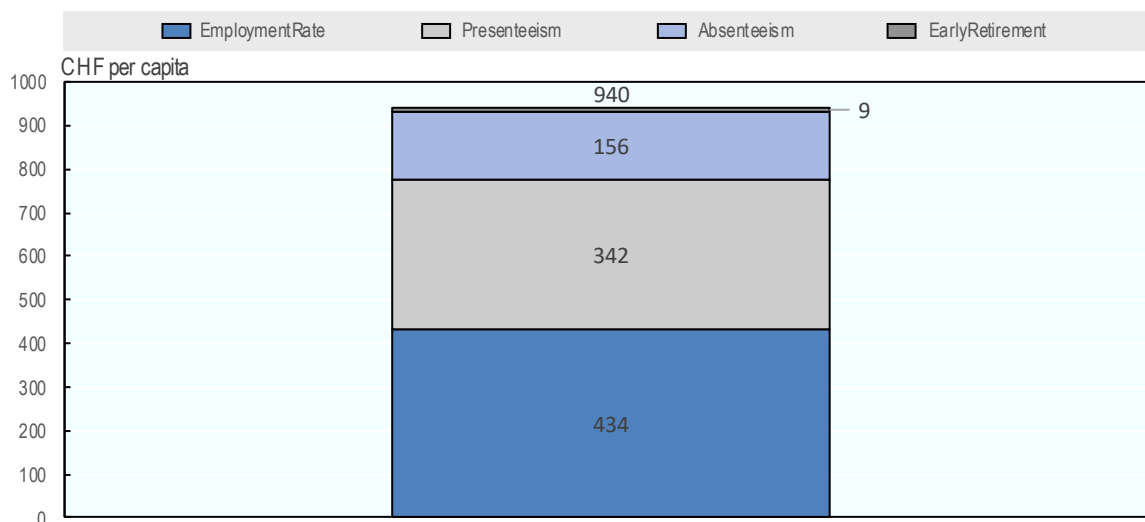
24. When translating the labour-related outputs into monetary values, diseases caused by drinking above the 1/1.5 drinks per day cap would reduce labour market cost among the working-age population by CHF 940 per capita per year on average. This is much higher than the effect on health spending attributable to diseases caused by drinking above the 1/1.5 drinks per day cap. The majority of effects would be due to effects on employment, while the effect on early retirement would be very small. With a 5.6 million population in the working age, diseases caused by drinking above the 1/1.5 drinks per day cap reduce labour force participation and productivity by CHF 5.3 billion per year.

25. This analysis shows that diseases caused by drinking above the 1/1.5 drinks per day cap would reduce employment by 0.38% in the working-age population. This represents about CHF 434 per capita per year (Figure 5) or CHF 2.5 billion per year.

26. In addition, diseases caused by drinking above the 1/1.5 drinks per day cap would have a significant impact on productivity, as measured by the presenteeism rates, as well as on the proportion of days that the employed people are absent from work because of sickness. Specifically, the simulation shows that in Switzerland sickness-related absences due to diseases caused by drinking above the 1/1.5 drinks per day cap represent 0.14% of labour market inputs, while presenteeism represents 0.30% of labour market inputs. The effect on early retirement is mostly negligible. Converted in monetary values, the effects on absenteeism and presenteeism associated with diseases caused by drinking above the 1/1.5 drinks per day cap would translate into losses of CHF 156 and CHF 342 per capita per year (Figure 5), that represent at the population level CHF 883 million and CHF 2.5 billion per year respectively.

Figure 5. The impact of diseases caused by drinking above the 1/1.5 drinks per day cap on the labour market in the working age population

Difference in labour market outputs due to diseases caused by drinking above the 1/1.5 drinks per day cap, CHF per capita, average per year over 2020-2050



Note: Labour market outputs include workforce participation, absenteeism due to sickness, productivity when employed, early retirement and are calculated for the working age population.

Source: OECD SPHeP-NCD model, 2020.

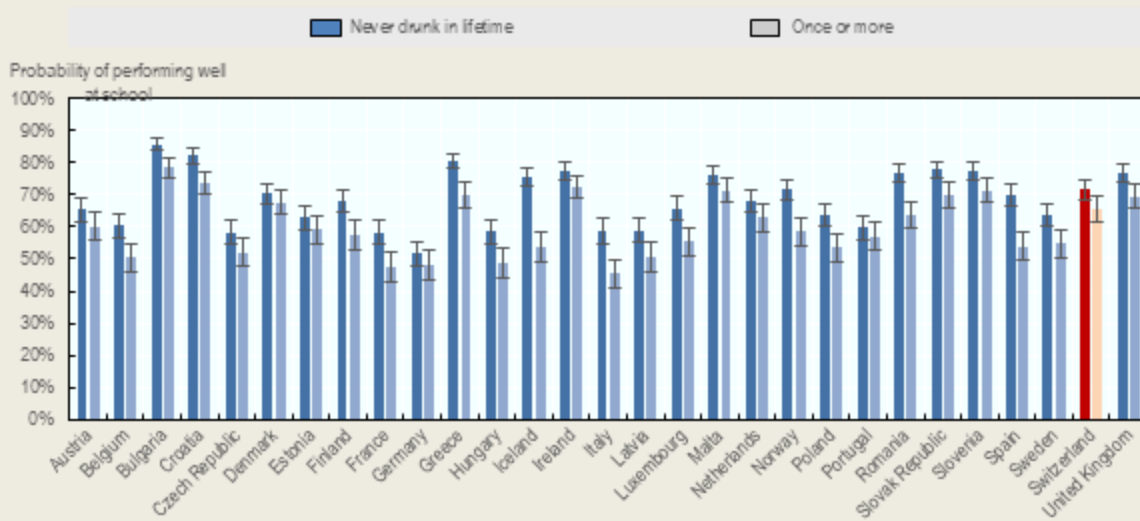
27. In addition to labour market outcomes, alcohol-related diseases and injuries may have effects on the education and competencies. Analyses conducted by the OECD showed that alcohol use at a young age, in particular drunkenness, is associated with lower educational outcomes (Box 2) - though whether this relationship is causal or not could not be confirmed. As education is associated with the formation of human capital, future individual socio-economic status and national income, this relationship can multiply the impact of alcohol on society and the economy.

Box 2. Alcohol and Educational outcomes

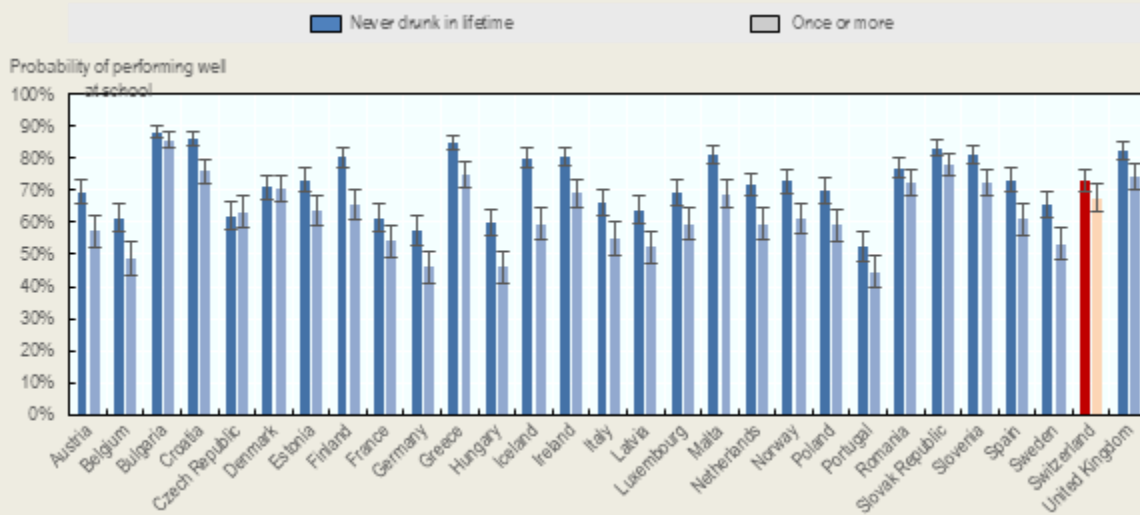
The data from the Health Behaviours in School-based Children (HBSC) was used to study the relationship between drunkenness and a variety of school outcomes (school performance, bullying and life satisfaction). Results show that children who experienced drunkenness at least once, have lower school performance, they are more likely to be bullied by others, and have a poorer life satisfaction compared to children who never experienced drunkenness (Figure 6).

Figure 6. School performance and drunkenness, children aged 11-15, pooled countries, 2013-14

Boys, age 13-15



Girls, age 13-15



Source: OECD estimates based on 29 countries from HBSC 2013-14. Mixed model with random slope. Adjusted for age, family affluence, smoking and body mass index. Predicted probabilities with fixed covariates at age 13, normal body mass index, not smoking, and medium family affluence. 95% confidence intervals.

2.4. The burden of diseases caused by any alcohol consumption compared to the burden of diseases caused by drinking above the 1/1.5 drinks per day cap

28. This section presents the results of the health-related and the economic burden of diseases caused by any alcohol drinking, compared to diseases caused by drinking above the 1/1.5 drinks per day cap.

29. The “eliminating all alcohol consumption” scenario brings greater population health benefits than “eliminating alcohol consumption above the 1/1.5 drinks per day cap”. Although the main goal of this document is to demonstrate the health and economic burden of diseases caused by alcohol consumption above the 1/1.5 drinks per day cap, in fact the risk of some diseases is elevated even at very low levels of consumption, including AUD, cancers, cirrhosis and injuries. This means that eliminating all alcohol consumption may bring additional population health benefits, compared to eliminating only alcohol consumption above the 1/1.5 drinks per day cap. Specifically, the OECD SPHeP-NCDs model calculates that compared to eliminating alcohol consumption above the 1/1.5 drinks per day cap, complete elimination of alcohol use in Switzerland could:

- Reduce annual premature mortality rate by an extra 4 people per 100 000 population (21 compared to 17 per 100 000 in the burden of disease caused by drinking above the 1/1.5 drinks per day cap);
- Increase life expectancy by an additional 1.3 month (9.8 months compared to 8.5 months in the burden of disease caused by drinking above the 1/1.5 drinks per day cap).

30. Diseases caused by both any drinking and drinking above the 1/1.5 drinks per day cap increase medical spending, although the burden of diseases caused by drinking above the 1/1.5 drinks per day cap has stronger effect. On the one hand, eliminating all alcohol consumption can help eliminate more diseases with the associated costs of treatment –compared to eliminating drinking above the 1/1.5 drinks per day cap . On the other hand, people who live longer will continue consuming healthcare, for conditions that are both related and unrelated to drinking alcohol. The OECD SPHeP-NCDs model found that, overall, the latter effect mostly dominates the former. Specifically in Switzerland:

- Diseases caused by all alcohol consumption would increase annual per capita medical expenditures by CHF 62, which is lower compared to the burden of diseases caused by drinking above the 1/1.5 drinks per day cap (CHF 73 per capita per year).
- This lower effect of all alcohol consumption on health expenditures is mostly due to the existence of a small protective effect on cardiovascular diseases (CVDs) at low levels of alcohol consumption, as well as longer life expectancy which further contributes to more use of care and larger medical expenditures for people in later years of life.

31. Eliminating all alcohol consumption would eliminate more diseases, and thus increase greater the labour force participation and productivity than eliminating only alcohol consumption above the 1/1.5 drinks per day cap. Specifically, the OECD SPHeP-NCDs model calculates that complete elimination of alcohol use in Switzerland could:

- Contribute to about CHF 1 320 per capita per year economic benefit, which is about 40% higher than the estimate of CHF 940 per capita per year associated with the burden of diseases caused by drinking above the 1/1.5 drinks per day cap.
- Most of this greater benefit would be due to increased employment, rather than changes in absenteeism, presenteeism and early retirement.

3. The impacts of alcohol policies

32. This section first describes the five policies studied (section 3.1). Then, it presents the impacts of the five policies on health outcomes (section 3.2) and on economic outcomes (section 3.3).

3.1. A selection of five alcohol policies is examined

33. This report focusses on five policy interventions, namely: taxation, minimum unit pricing, sobriety checkpoints, counselling in primary care and treatment of dependence. The selection of the policies examined in this document is in line with the key areas for national actions listed in the 2010 WHO Global Strategy to reduce harmful use of alcohol (World Health Organization., 2010_[13]). The selected interventions offer a variety of policy options. Some are population-wide interventions (price policy and regulation on drink-driving), while others target specifically high-risk people (e.g. dependence treatment, counselling in primary care).

34. For policy actions included in this analysis, the most recent evidence was used to design and to simulate the impact of policies on alcohol-related outcomes. Assumptions about the implementation and the effectiveness of the interventions are updated based on the latest evidence published in the literature for the five policies studied. A summary table of the policy inputs to the model is available in Table 4. The costs of the interventions are broadly based on the WHO-CHOICE approach (Tan-Torres Edejer et al., 2003_[14]) and extrapolated to Switzerland using the consumer price indices (see Box 3).

35. The policy impact on health and economic outcomes is measured with the OECD SPHeP-NCD model where the effects of the modelled policy interventions over the period 2020-2050 are compared to a 'business-as-usual' baseline where no new policy is implemented. Further details on the model are provided in Section 2.1.

Box 3. Calculating the return of investment of policies to tackle overweight with the OECD SPHeP-NCDs model

Whether a particular policy will work in a given context depends on a number of factors, some of which can be location-specific. For example, the return of investment of a policy 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, policies are modelled with respect to 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 much as possible, this evidence is borrowed from peer-reviewed meta-analyses, preferably of randomized control trials.
- **Time to the maximum effectiveness achieved and effectiveness over time.** The effects of an intervention can be time-limited and/or time-dependant, with the relationship generally at

first becoming stronger, and then fading out. This parameter describes changes in the effectiveness of interventions over time.

- **Intervention coverage, including description of eligible populations, as well as their exposure.** For example, some interventions may only affect a subset of a population (e.g., 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 and are willing to participate.
- **Implementation cost.** The implementation of a public health action 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, or stand-up desks). The intervention costs are estimated based on the WHO-Choice methodology (Tan-Torres Edejer et al., 2003^[14]) taking into account differentials in relative prices (as measured by differences in PPPs and exchange rates). The costs are expressed in constant 2015 Euros in the model, and converted into CHF using the exchange rate in 2015.

To gauge the population-level effectiveness and the return of investment of public health policies designed to tackle harmful use of alcohol, actions are evaluated against a 'business-as-usual' scenario for the period 2020-2050 in which no new policy is put in place and provision of preventive and healthcare services is implemented at the current levels, specific to a country. The comparison between the 'business-as-usual' and the policy scenario corresponds to the impact of a policy, and it is carried out by considering all the relevant dimensions including, for instance, differences in health, healthcare costs, labour market productivity and so on, which provides all the needed information to carry out a return of investment analysis.

3.1.1. Alcohol taxation

36. 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. The intervention does not entail any specific assumption on how the above price increases would be achieved, e.g. whether by increasing excise duty rates, by modifying other existing taxes, or by introducing new fiscal measures. The data used to model the intervention comes from a meta-analysis which also includes studies measuring how changes in price affect consumption, rather than changes in sales, and therefore takes into account, at least to some extent, potential increases in consumption of alcohol from illicit sources (which is lower in Switzerland, compared to other countries (WHO, 2018^[15])).

37. A systematic review and meta-analysis was carried out to estimate the price elasticities on alcohol consumption. 665 estimates from the 133 studies were extracted from the literature, including 181 estimates for beer, 182 for wine and 168 for spirits and liquor. Price elasticities (Table 1) were estimated along three dimensions: by type of beverage, by age of drinker and by category of drinking, and were combined with the level of per capita alcohol consumption in each country. This choice is supported by evidence in the literature suggesting that:

- Young drinkers are less responsive¹ to price changes than adults (Gallet, 2007^[16]);
- Moderate drinkers are more price sensitive than heavy drinkers (Fogarty, 2008^[17]; Fogarty, 2006^[18]; Dave and Saffer, 2008^[19]; Meier, Purshouse and Brennan, 2010^[20]; An and Sturm, 2011^[21]).

- Alcohol own-price elasticities vary by type of beverages (Gallet, 2007^[16]) (Sornpaisarn et al., 2013^[22]) (Wagenaar, Salois and Komro, 2009^[23]) (Fogarty, 2008^[17]) (Nelson, 2013^[24]) (Fogarty, 2006^[18]) and the relative market share of different types of alcohol is an important factor in explaining changes in consumers' demand at the national level (Fogarty, 2006^[18]).

38. Results presented in Table 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^[16]) (Sornpaisarn et al., 2013^[22]) (Wagenaar, Salois and Komro, 2009^[23]) (Fogarty, 2008^[17]) (Nelson, 2013^[24]) ..

Table 1. Own-price elasticities

Type of beverages	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.

39. The intervention in the model is assumed to impact all the population (100% coverage), and to last as long as the policy is in place.

40. The per capita cost for this intervention is estimated at CHF 0.08 per year in Switzerland. The estimated cost of an increase in taxation includes basic administration, planning, monitoring and enforcement at the national level, with the latter accounting for most of the total cost. Additional tax revenues are not accounted for in the analysis as they represent transfers rather than costs.

3.1.2. Minimum Unit Pricing (MUP)

41. 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 until a pre-defined threshold. For example, in the United Kingdom (Scotland) the threshold was set at GBP 0.50 per unit of alcohol², while in Canada, the threshold was set at CAD 1.15 per unit of alcohol³ (Stockwell and Thomas, 2013^[25]).

42. The intervention is modelled on three key dimensions: i) the share of alcohol sold below the price set as minimum threshold; ii) the price increase needed to ensure that the price per unit of alcohol meets the pre-defined threshold; and iii) the consumers' change in consumption, following the price increase. Two analyses using consumer's scanner data report information, by type of alcohol products and by category of drinker, for the first two dimensions, namely the share of alcohol units affected by the increase and the average price increase (in percentage) per unit of alcohol in this group (Griffith, O'connell and

Smith, 2017^[26]) (Angus et al., 2015^[27]). Inputs reported in Table 2, if applied in Switzerland, would broadly correspond to the effects of the MUP as if implemented in the United Kingdom (Griffith, O'connell and Smith, 2017^[26]) (Angus et al., 2015^[27]). The third dimension, specifically the change in consumption following the introduction of the MUP, is instead modelled using the same parameters used to model an increase in taxation (Table 1).

Table 2. Characteristics to model low-priced alcohol

Type of beverages	Age of the drinker	Category of drinking	Share of alcohol units sold below the MUP threshold (%)	Average % 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^[26]) and (Angus et al., 2015^[27]).

43. The roll-out of this intervention is assumed to start in 2020 and to last until the end of the simulation period, with constant effects starting immediately after the implementation of the policy and lasting as long as the policy is in place.

44. The per capita cost for this intervention is estimated at CHF 0.11 per year in Switzerland. The main drivers of the cost are basic administration, planning, monitoring and enforcement at the national level, which accounts for most of the total cost.

3.1.3. Sobriety checkpoints to reduce Driving Under Influence (DUI)

45. Interventions aimed to specifically reduce driving under the influence of alcohol include enforcement of Blood Alcohol Content (BAC) laws, sobriety checkpoints, alternative transportation as well as ongoing innovative programmes such as the Driver Alcohol Detection System for Safety, an in-vehicle technology that prevents the driver from driving if the BAC level exceeds the limit set by law (See Box 6). The policy scenario modelled in the analysis focuses on a *tightening of the enforcement of sobriety checkpoints* to restrain DUI.

46. 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, United States), thoroughly described and evaluated in a published study (Voas, 2008^[28]). The programme involved five-officer checkpoint teams working four hours per night to stop and test drivers' sobriety on weekend nights (Friday and Saturday) 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 1880 hours of work for the officers concerned. Around 24000 vehicles were stopped and 290 drivers were arrested.

47. Sobriety checkpoints were found to be most effective in the first half year (Erke, Goldenbeld and Vaa, 2009^[29]). The decline in (fatal and non-fatal) traffic accidents over time, as estimated in the above meta-analysis, 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 the above 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, 15% in the second year, and 16% thereafter.

48. 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. There is no restriction by age of the drinker or by level of drinking since all people –who can be involved in traffic-accident independently from whether they had drunk or not- can be benefit from the policy. The policy roll-out starts from 2020 and the intervention is continuously implemented until the end of the simulation period. In subsequent years, the 80% probability will only apply to new-borns/immigrants. If a person was not exposed in 2020, it is assumed s/he will not be in future years (e.g. because this person lives in areas not covered by the intervention).

49. The cost of this intervention includes the manning of checkpoints –the most expensive item- and a media campaign. The per capita cost intervention is estimated at CHF 0.87 per year in Switzerland.

50. The policy evaluation assumes that the effectiveness of a policy –that is taken from the literature- is transferable from one country to another. This is a limitation of the analysis. Evidence from the literature was selected based on the criteria of strong evidence, that is meta-analysis and systematic reviews are preferred over single studies. Most often, evidence come from the north-American literature. In particular, the effectiveness of “sobriety checkpoints” comes from the US literature, which may not directly compare to the Swiss case. Although the effectiveness is assumed to be similar in all countries studied, the global effect of the policy vary across countries depending on the exposure to risk factors, demographics, epidemiology, and country characteristics.

Box 4. Driver Alcohol Detection System for Safety

Among the suite of policies developed to counter drink-driving, breath alcohol ignition interlock programs have gained a great deal of attention. This safety system aim at curbing impaired driving by preventing a driver with a measurable Blood Alcohol Concentration (BAC) from starting the car. Specifically, a fuel-cell breath-testing incorporated in the vehicle records the driver’s BAC and sends the signal to not start the engine in case the BAC results higher than the predetermined limit. Moreover, random re-tests are required while the car is running as a measure to prevent circumvention of the device.

Overall, alcohol ignition interlock system seems to be effective tools as long as it is installed in the vehicle. However, its potential is currently limited by the small participation rates and the lack of a persistent beneficial effect beyond the installation period.

In the United States, and lately also in some European countries (more precisely Austria, Belgium, Denmark, Finland, France, Poland and Sweden), alcohol interlock laws have been introduced for drink-driving offenders and/or professional drivers (ETSC, 2018^[30]). Nevertheless, the installation rate of such devices is still quite low. In the United States, only 20% of those arrested for impaired driving actually installed interlocks in the vehicles in 2012 (Roth, 2012^[31]; GAO, 2014^[32]).

The evidence for the effectiveness of interlock on recidivism is strong, however, the effect vanishes as soon as the interlock system is removed. The installation of interlock decreases the probability of being

re-arrested (with a relative risk of 0.36 (Willis, Lybrand and Bellamy, 2004^[33]) and a median relative risk of 0.25 (Elder et al., 2011^[34])).

The evidence on alcohol-related crashes relies in single studies only and is much weaker. Three recent studies show evidence for the effectiveness of interlocks to reduced alcohol-related fatal crashes, with a reduction varying between 0.20% and 15% (McGinty et al., 2017^[35]; Vanlaar, Mainegra Hing and Robertson, 2017^[36]; Kaufman and Wiebe, 2016^[37]). While the in-vehicle interlocks decrease alcohol-related crashes, the overall crash risk resulting from the installation of interlocks is higher when compared to the risk associated with having a suspended license (Vézina, 2002^[38]; DeYoung, Tashima and Masten, 2005^[39]).

3.1.4. Alcohol counselling in primary care

51. The intervention consists of detecting patients at risk for heavy drinking when they are visiting a general practitioner, and of delivering brief counselling about the alcohol-related harms and ways to reduce alcohol consumption. The intervention is modelled after the “brief lifestyle counselling” option in the English Screening and Intervention Programme for Sensible drinking trial (Kaner et al., 2013^[40]). During an initial five-minute session, a general practitioner explains the potential harm caused by drinking and suggests practical strategies to reduce alcohol consumption highlighting the benefits of the recommended behaviour change. Printed material, including a self-help leaflet, a booklet to report consumption and a visual to compare own consumption with the average, is handed to participants. Structured lifestyle counselling is also delivered during a 20-minute follow-up appointment with a trained health professional.

52. The effectiveness of the intervention is modelled based on findings from a recent Cochrane review by Kaner and colleagues (2018^[41]). During the course of a brief intervention, male drinkers are assumed to reduce their alcohol consumption by 42.21 grams/week (i.e. about 4 standard drinks per week) and female drinkers by 30.27 grams/week.

53. The programme is assumed to target hazardous and harmful drinkers (regular or episodic), excluding individuals dependent to alcohol, aged 18-70 (Kaner et al., 2018^[41]). The recruitment of participants occurs opportunistically by screening patients who visit a health care facility for a non-alcohol-related problem (Kaner et al., 2018^[41]). The screening is carried out with the use of a questionnaire (AUDIT 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^[42]) found that up to 5% of patients - increased to 10% for modelling purposes - were screened for excessive alcohol consumption, when almost half were diagnosed positive and received brief intervention. In other words, between 1% and 3% of the population received brief intervention. In the OECD SPHeP-NCD model, it is assumed that each year, 20% of heavy drinkers, non-alcohol-dependent, benefit from the intervention (about 2% of the population).

54. There is evidence that similar interventions can have lasting effectiveness, for at least four (Fleming et al., 2002^[43]) and up to seven years (Angus et al., 2014^[44]). Therefore, the effectiveness of the modelled intervention is assumed to last for five years, linearly declining 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 20%.

55. 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 brief intervention is provided by facilities already in place and delivered by specialized 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 only on a relatively small population subgroup. The per treated cost is estimated at CHF 33 for Switzerland, while the fixed cost is estimated at CHF 0.24 per capita per year.

3.1.5. Personalised pharmacological treatment

56. This intervention is a pharmacological treatment based on precision medicine, which customizes 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 AUD, while Naltrexone is prescribed to drinkers diagnosed with alcohol dependence.

57. For the patients treated with Acamprosate, the therapy entails six months of daily administration of the medicine (without a psychotherapy support), with a dosage adjusted for the patient's body weight. For a higher effectiveness, patients need to be first detoxified and must avoid alcohol intake in the week prior to treatment initiation (Kampman et al., 2009^[45]). The eligible population consists of individuals aged between 18 and 65 who fulfil the diagnostic criteria of AUD 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 and colleagues (2013^[46]) combined with results from Poldrugo (1997^[47]), the intervention is assumed to reduce alcohol consumption by 31 % (corresponding to 55.5 more days of cumulative abstinence over 6 months). The pattern of effectiveness is modelled as a linear reduction in alcohol consumption during the six months of medication administration period, reaching its maximum level at the sixth month. The effectiveness remains constant throughout the six months following the cessation of the treatment (Poldrugo, 1997^[47]). The effectiveness is then modelled to linearly vanish in the following 12 months. The fixed cost for the treatment is estimated at CHF 0.28 per capita per year, while the per treated cost for the Acamprosate medication is estimated at CHF 496 per year in Switzerland. Since the recommended dosage consists of 2 pills of 333mg each for 3 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 lower available price on an online price comparator, i.e. \$0.43 per unit). The cost of treatment is calculated for a 6-month period of daily medication.

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 (i.e. taken on a 'demand' basis, only when craving is high) in adjunction to coping cognitive-behavioural sessions (Heinälä et al., 2001^[48]). This psychological therapy involves a total of four visits of 90 minutes each (Stein and Lebeau-Craven, 2002^[49]) 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^[50]). The eligible population is made of people diagnosed with alcohol dependence. Currently, only 10% of the diagnosed population receive a pharmaceutical treatment for alcohol dependence (VisionGain, 2008^[51]). The modelled intervention assumes to double this proportion, reaching 20% of the people diagnosed with AUD. Based on the results of the meta-analysis by Maisel and colleagues (2013^[46]) combined with results from Heinälä and colleagues (2001^[52]), the intervention is associated with a decline in alcohol intake equal to 122 grams per week (that is 17.4 grams 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 hereafter until the end of treatment (8th month) (Heinälä et al., 2001^[52]). This is followed by a linearly declining effectiveness, completely fading two months after the end of the therapy. The fixed cost for treatment is estimated at CHF 0.28 per capita per year, while the per treated cost for the Naltrexone medication together with a psychological therapy is about CHF 239 per year in Switzerland. Since the recommended dosage consists of one 50mg pill per day, the monthly cost of Naltrexone is around USD 31 (using the lower available price on an online price comparator, i.e. \$1.04 per unit). The cost of treatment is calculated for a 3-month period of daily medication, plus a 5-month 'on-demand' medication (thus, we assume an average period of 3 months + 2.5 months). A large proportion of the cost (approximately 30%) is represented by the drug itself (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.

3.2. Alcohol policies prevent diseases and injuries, and they save lives

3.2.1. All the five policies produce significant health gains, with price policies and sobriety checkpoints the most effective

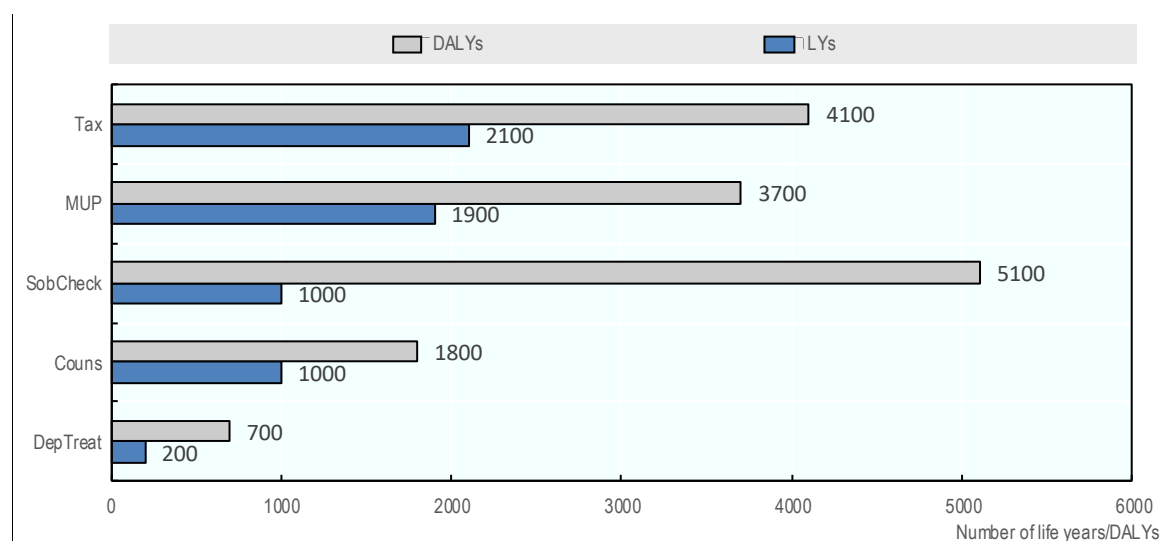
58. All the five policies examined produce significant gains in life years (LYs) and disability-adjusted life years (DALYs) compared to a business-as-usual scenario where no new policy is put in place, as reported in Figure 7. Price policies and sobriety checkpoints are the most effective interventions. The analysis shows that:

- Alcohol taxation -modelled as a 10% price increase in all alcohol types- leads to an annual gain of 2 100 LYs and 4 100 DALYs in Switzerland.
- The minimum unit price intervention is associated with an annual gain of 1 900 LYs and 3 700 DALYs in Switzerland.
- The sobriety checkpoints intervention aimed to reduce drink-driving, leads to 1 000 LYs and 5 100 DALYs gained annually in Switzerland.
- Counselling in primary care is associated with an increase of 1 000 LYs and 1 800 DALYs in Switzerland.
- Treatment of alcohol dependence is associated with an increase of 200 LYs and 700 DALYs in Switzerland.

59. For comparison, 7 100 DALYs were lost due to liver cancer among people aged 50-69 in Switzerland in 2017 (Institute for Health Metrics and Evaluation, 2018^[9]).

Figure 7. Policy impact on life years and life years in good health

Gains in life years and life years in good health, average per year over 2020-2050



Note: Tax Alcohol Taxation, MUP Minimum Unit Pricing, SobCheck Sobriety Checkpoints, Couns Counselling, DepTreat Treatment of Dependence.

Source: OECD SPHeP-NCD model, 2020.

3.2.2. Individual alcohol policies increase healthy life expectancy by about one to two weeks

60. All the five interventions produce gains in life expectancy and healthy life expectancy⁴, with the greatest effects from price policies and sobriety checkpoints. This finding is in line with the result on LYs and DALYs presented above.

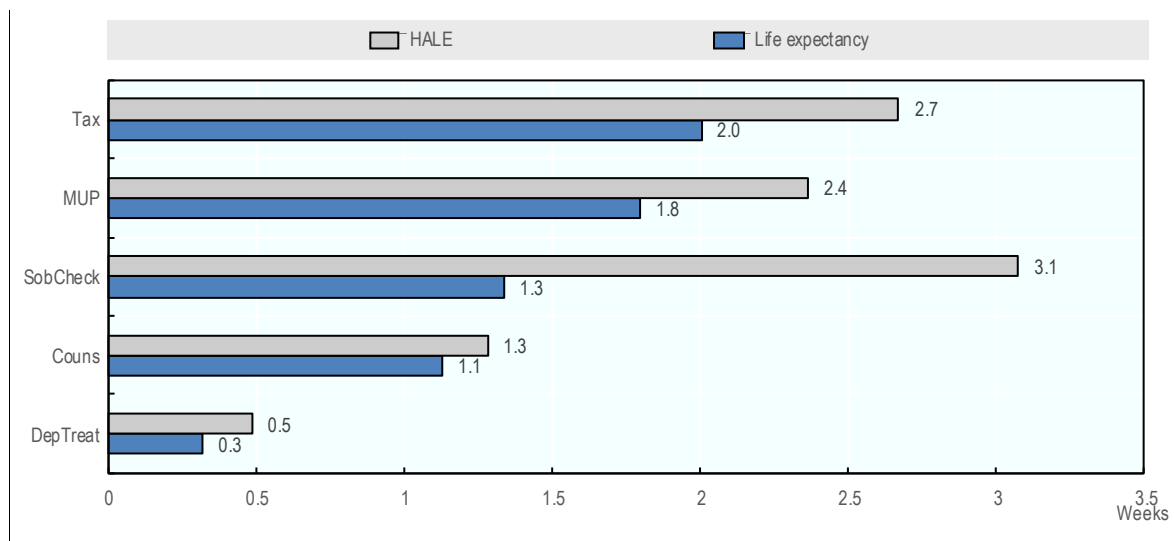
61. Most of the alcohol policies examined can increase healthy life expectancy by about one to two weeks (Figure 8). For comparison, life expectancy has increased by 9.6 months in the last five years in Switzerland (OECD, 2019^[53]). Thus, any single alcohol policy contributes between 1% and 5% of what achieved during the last five years in Switzerland.

62. The effect on healthy life expectancy is greater than on life expectancy. In other words, by reducing the occurrence of diseases and injuries, alcohol policies show a bigger positive effect on the number of years lived in good health, than on life expectancy.

63. The gains in life expectancy and healthy life expectancy resulting from the policy interventions appear small because they are spread over the entire population (including people who do not drink and children). The gains are greater for alcohol drinkers who benefit from the interventions.

Figure 8. Policy impact on life expectancy and healthy life expectancy

Change in life expectancy and healthy life expectancy (HALE), in weeks



Note: Tax Alcohol Taxation, MUP Minimum Unit Pricing, SobCheck Sobriety Checkpoints, Couns Counselling, DepTreat Treatment of Dependence. HALE Health-Adjusted Life Expectancy.

Source: OECD SPHeP-NCD model, 2020.

3.2.3. The incidence of dependence and injuries is significantly reduced by alcohol policies

64. Price policies and healthcare policies have a substantial impact on the number of cases of dependence, while the sobriety checkpoints intervention has a stronger effect on the incidence of injuries (e.g. car accident, violence) (Table 3). All the five interventions, put together, can reduce the incidence of dependence by up to 9 600 new cases and the incidence of injuries⁵ by 3 100 new cases per year in Switzerland.

65. While these interventions save lives, they also increase the likelihood that people develop other non-alcohol related diseases as they age (e.g. dementia and musculoskeletal diseases). But, overall, the total number of incident cases of chronic diseases is greatly reduced as a result of the policy interventions, compared to a business-as-usual scenario.

Table 3. Impact on the number of cases of chronic diseases, average per year 2020-2050

Change in the number of new cases, in percent

Conditions	Taxation	MUP	Sobriety checkpoints	Counselling	Treatment of dependence
Cancers(non-related to alcohol)	0.04%	0.03%	0.01%	0.00%	0.01%
Cancers(related to alcohol)	-0.44%	-0.34%	0.01%	-0.20%	-0.01%
Cirrhosis	-2.31%	-2.22%	0.01%	-0.57%	-0.13%
COPD	0.04%	0.03%	0.01%	0.01%	0.00%
CVDs	-0.21%	-0.20%	0.01%	-0.09%	-0.01%
Dementia	0.09%	0.09%	0.01%	0.01%	0.00%
Dependence	-6.02%	-5.63%	0.01%	-2.04%	-1.77%
Diabetes	-0.20%	-0.23%	0.00%	-0.19%	-0.01%
Injuries	-0.46%	-0.37%	-5.75%	-0.32%	-0.05%
Mental Health	0.00%	0.00%	0.00%	0.00%	0.00%
MSDs	0.01%	0.01%	0.00%	0.00%	0.00%
Others	-0.29%	-0.27%	0.01%	-0.09%	-0.01%

Note: CVDs Cardiovascular diseases, COPD Chronic Obstructive Pulmonary Disease, MSDs Musculoskeletal diseases.
Source: OECD SPHeP-NCD model, 2020.

3.3. Alcohol policies reduce health spending and increase labour force participation and productivity

3.3.1. Savings in health expenditure become substantial a few years after the policy implementation

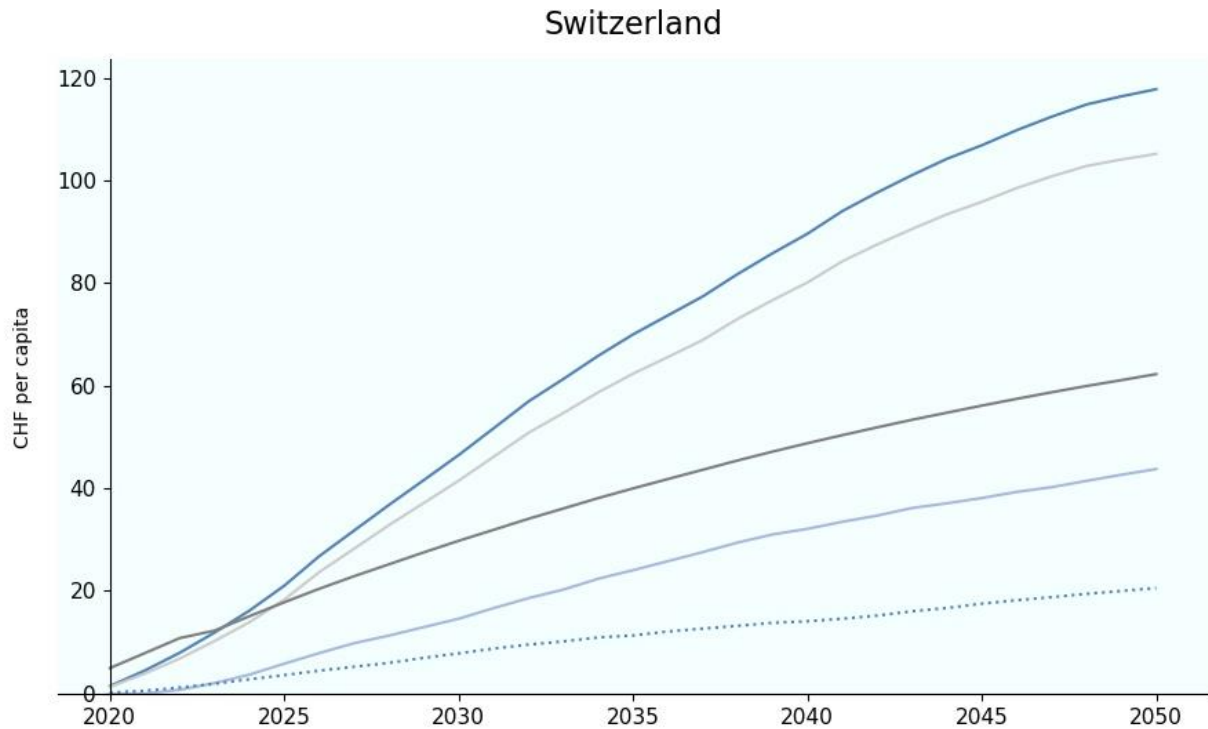
66. All the five interventions studied generate reductions in health expenditure with cumulative effects over time. Taxation and minimum unit pricing have the highest impact on health expenditure (Figure 9). Ten years after its implementation (2030), alcohol taxation produces cumulative savings in health expenditure equal to around CHF 42 per capita in Switzerland.

67. On average in the period 2020-2050, the five interventions would save between CHF 9 million and CHF 48 million per year in health expenditure. Taxation would save CHF 5.6 per capita per year (CHF 48 million per year at the population level) in health expenditure, MUP would save CHF 5.1 per capita (CHF 44 million), sobriety checkpoint CHF 2.9 per capita (CHF 25 million), counselling in primary care CHF 2.6 per capita (CHF 22 million), and treatment of dependence CHF 1.0 per capita (CHF 9 million).

Figure 9. Gains in health expenditure over time

Cumulative health expenditures saved (CHF per capita, discounted, 2020-2050)

— Taxation — Sobriety Checkpoint — Counselling Dependence Treatment
 — Minimum Unit Pricing



Source: OECD SPHeP-NCD model, 2020.

3.3.2. The modelled policies have high and positive impact on labour force participation and productivity

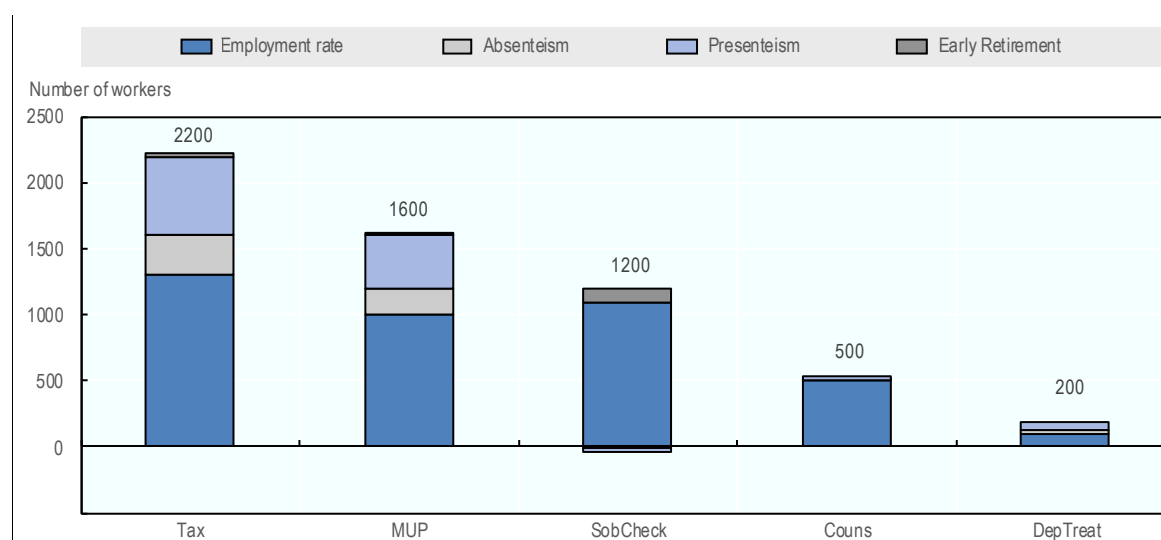
68. Chronic diseases and injuries related to alcohol consumption cause lower employment, more work-related absenteeism and presenteeism, and earlier retirement. Policies aimed to tackle harmful alcohol use have the potential to improve labour market outcomes, save labour productivity costs, and increase the economy of a country.

69. Results from the simulation confirm that the five interventions studied have a positive effect on employment, reduce absenteeism and presenteeism and decrease early retirement. The effect on employment is larger than the effect on absenteeism, presenteeism and early retirement, mainly due to a strong relationship between alcohol-related diseases and the likelihood of unemployment. For instance, the simulation shows that taxation increases labour force participation by 1 300 FTE workers, while it reduces labour productivity losses related to absenteeism by 300 FTE workers, presenteeism by 600 FTE workers and early retirement is negligible.

70. The policies that have the largest effect are taxation followed by MUP and sobriety checkpoints in Switzerland. For instance, taxation can increase labour force participation and productivity by about 2 200 additional FTE workers per year (Figure 10). Details about the estimation of labour force participation and productivity cost are provided in Box 5.

Figure 10. Policy impact on labour market outcomes (working time)

Number of FTE workers gained, average per year over 2020-2050



Note: Tax Alcohol Taxation, MUP Minimum Unit Pricing, SobCheck Sobriety Checkpoints, Couns Counselling, DepTreat Treatment of Dependence. FTE full time equivalent.

Source: OECD SPHeP-NCD model, 2020.

Box 5. Estimating the cost associated with labour force participation and productivity

Labour force participation and productivity components

The analysis aims to estimate the changes in labour force participation and productivity associated with the implementation of policy intervention to tackle harmful alcohol use. Four components are taken into account: unemployment rate, work absence, presenteeism, and early retirement.

Two longitudinal surveys (the European SHARE data and the British ELSA data) were used to estimate the labour market outcomes associated with NCDs (especially, the probability of employment, early retirement, and the number of workdays missed). For presenteeism, a condition-specific presenteeism:absenteeism ratio from a high quality productivity study was used and applied to the econometric absenteeism results (Goetzel et al., 2004^[54]). These four components are translated into missed (or additional) work time (expressed in full time equivalent), and then multiplied by the average wage (obtained from ILO database, 2015 (ILO, 2019^[55])) to give a monetary value of labour force productivity losses (or gains).

Human capital approach versus Friction cost approach

The methodology used for this analysis relies on the human capital approach to place monetary values on changes in all productivity and labour force participation components. The human capital approach tends to over-estimate the economic losses because it does not account for the reserve labour force and the replacement of the sick workers. Since there is no good data available to estimate the replacement cost, the human capital approach was preferred.

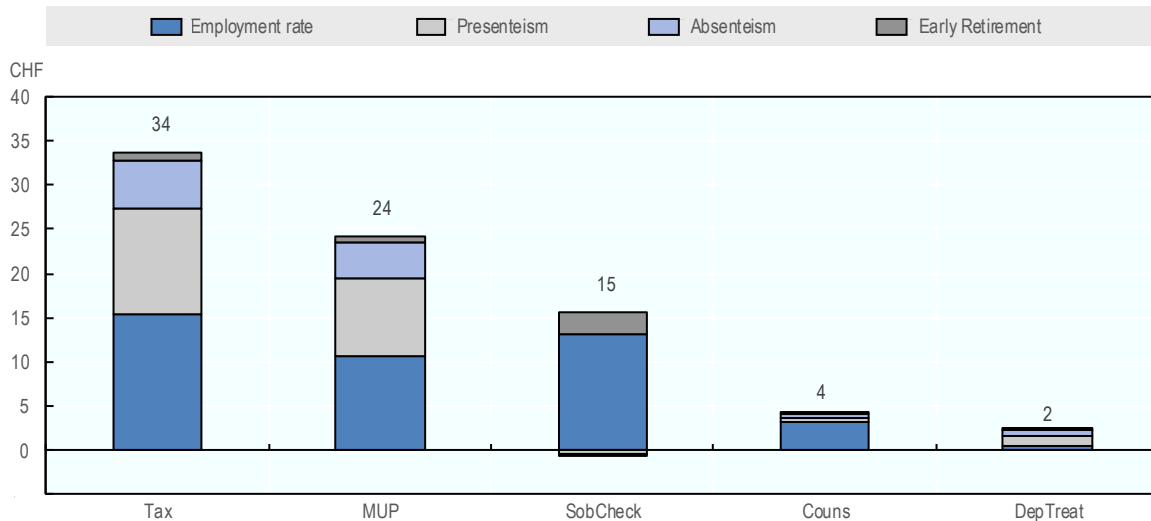
The human capital approach was the most common approach used to model the non-health care costs associated with alcohol consumption in nine studies collected in the literature (Estonia: (Saar, 2009^[56]); United States: (Cesur and Kelly, 2014^[57]); Canada (Rehm et al., 2007^[58]); Scotland (Johnston, Ludbrook and Jaffray, 2012^[59]); Germany (Konopka and Konig, 2007^[60]); Sweden (Jarl et al., 2008^[61]); Switzerland (Fischer et al., 2014^[62]); France (Kopp, 2015^[63]); Portugal (Cortez-Pinto et al., 2010^[64]). Nevertheless, the studies varied both in terms of the scope of the costs considered, and in some other study characteristics.

71. When the labour-related costs are expressed in monetary terms, the implementation of the modelled policies can increase labour force participation and productivity by between CHF 2 and 34 per capita per year in Switzerland (see methods in Box 5). For instance, the simulation shows that alcohol taxation increases labour force participation and productivity by about CHF 34 per capita each year (Figure 11), that corresponds to CHF 190 million per year at the population level. The components of this cost are as follows: increase in employment (CHF 86 million per year), reduction in presenteeism (CHF 68 million per year), reduction in absenteeism (CHF 31 million per year), and reduction in early retirement (CHF 5 million per year).

72. The policies that have the largest effect are taxation followed by MUP and sobriety checkpoints. Counselling in primary care and treatment of dependence have a reduced impact on labour force participation and productivity.

Figure 11. Policy impact on labour market outcomes (economic cost)

Labour market economic costs avoided (CHF per capita, average per year over 2020-2050)



Note: Tax Alcohol Taxation, MUP Minimum Unit Pricing, SobCheck Sobriety Checkpoints, Couns Counselling, DepTreat Treatment of Dependence.

Source: OECD SPHeP-NCD model, 2020.

3.3.3. Price policies, sobriety checkpoints and counselling in primary care are cost-saving while treatment of dependence is cost-effective

73. Savings in health expenditures exceed the cost of implementing the interventions in three out of the five policies studied: taxation, minimum unit pricing, and sobriety checkpoints. For instance, taxation can save CHF 5.6 per capita for a cost of CHF 0.08 per capita in Switzerland on average each year. Similarly, each year, MUP can save CHF 5.1 per capita for a cost of CHF 0.11 per capita, sobriety checkpoints can save CHF 2.9 per capita for a cost of CHF 0.87 per capita, and counselling in primary care can save CHF 2.6 per capita for a cost of CHF 1.44 per capita (Table 4). This makes these four interventions cost-saving.

74. Treatment of dependence are more expensive to implement as they is delivered at the individual-level by medical staff. At the same time, it generates more limited savings in health expenditure. Personalised treatment of dependence produces savings in health expenditure equal to CHF 1.0 per capita per year, while the cost of its implementation is estimated around CHF 3.5 per capita on average at the population level (between CHF 237 and 496 per treated patient).

75. Overall, the savings in labour market cost are sizeable. On the one hand, the three policies with the greatest effects are: taxation which saves CHF 34 per capita per year in labour-related cost, MUP CHF 24 per capita per year, and sobriety checkpoints CHF 15 per capita per year. On the other hand, with smaller effect, counselling in primary care saves CHF 4 per capita per year, and treatment of dependence CHF 2 per capita per year. For all the interventions, savings in labour market cost are generally greater than savings in health expenditure.

76. The annual gains in labour force participation and productivity combined with the annual savings in health expenditures almost offset the annual cost of the implementation of treatment of dependence. However, this policy becomes cost-effective one year after its implementation (i.e. costs below USD PPP 50 000 per DALY gained).

Table 4. Summary table of policy interventions

	Taxation	MUP	Sobriety checkpoints	Counselling	Treatment of dependence
Target age	all	all	>18 y.o.	all	all
Exposure	100%	100%	80%	20%	20%
Effectiveness	10% price increase reduces alc cons by : -4% to -7%	Alc cons: -0.6% to -3.3%	traffic injuries: -25% (year1), 15% (year2), -16% thereafter	Alc cons: -42 g/week (men), -30 g/week (wom).	alc cons: Acamprosate: -31%; Naltrexone: -122 g/week
Per capita cost, CHF	0.08	0.11	0.87	Per capita: 0.24 Per treated: 33 (Population-level average : 1.5 per capita)	Per capita: 0.28 Per treated: 239-496 (Population-level average: 3.5 per capita)
Health benefits	2100 LYs saved, 4100 DALYs saved	1900 LYs saved, 3700 DALYs saved	1000 LYs saved, 5100 DALYs saved	1000 LYs saved, 1800 DALYs saved	200 LYs saved, 700 DALYs saved
Saving in health expenditure, CHF per capita per year	5.6	5.1	2.9	2.6	1.0
Labour productivity and employment cost, CHF per capita per year	34	24	15	4	2

Note: g/week is grams of pure alcohol per week. LYs means life years, DALYS disability-adjusted life years.

Source: Authors.

4. Conclusion

77. This report presents the assessment of the burden of diseases caused by drinking above 1 drink per day for women and 1.5 drinks per day for men, and the evaluation of the health and economic impacts of five alcohol policies in Switzerland. Life expectancy is 8.5 months lower over the period 2020-2050 due to diseases caused by drinking above 1/1.5 drinks per day cap. Diseases caused by drinking above 1/1.5 drinks per day cap cost CHF 73 per capita per year in health expenditures, equivalent to 1.9% of the Swiss total health budget. Diseases caused by drinking above 1/1.5 drinks per day cap reduce the number of working-age people in employment, and make a significant negative impact on presenteeism, as well as increasing work-related absenteeism due to sickness. When converting work time differences into monetary values using national average wages, this cost Switzerland CHF 940 per capita per year in labour force participation and productivity, or CHF 5.3 billion per year.

78. Regarding the policy evaluation, results show that the five policies included in the analysis are effective in reducing alcohol-related diseases and injuries and in improving quality of life. Implementation costs are highest for counselling in primary care and treatment of dependence since medical staff is involved. On the other hand, the implementation costs for price policies (i.e. taxation and MUP) are lowest. Four of the modelled policies (taxation, MUP, sobriety checkpoints, and counselling in primary care) produce savings in health expenditures that exceed the cost of implementing the interventions. For the treatment of dependence, the cost of running the intervention is higher than the resulting health expenditure savings in the first year of the implementation. Results from the simulation confirm that the five policy interventions studied increase the labour force participation and productivity, by increasing the number of people in work, reducing absenteeism and presenteeism and decreasing early retirement. For instance, by increasing alcohol price by 10% through taxation, Switzerland would save CHF 48 million per year in health expenditure and would increase labour force participation and productivity by CHF 190 million per year.

79. A comprehensive set of policies is needed to tackle harmful alcohol use. This report examined five policy interventions one by one, but no single interventions, taken independently, can achieve to reduce harmful alcohol use. OECD analyses on other OECD, EU and G20 countries found that a combination of population-based approach (e.g., taxation) together with interventions targeting high-risk people (e.g., treatment of dependence, counselling) can effectively and efficiently tackle harmful alcohol consumption (OECD, 2021^[11]).

80. The policy implications of this set of analyses are well aligned with the WHO Best Buys to reduce harmful use of alcohol and NCDs (WHO, 2017^[65]). The WHO categorises policy interventions according to their effectiveness, cost-effectiveness and feasibility for implementation. In line with the result presented herein, alcohol taxation is one of the top-three WHO Best Buys. Sobriety checkpoints and counselling in primary care have strong evidence for effectiveness and cost-effectiveness, with higher implementation costs and, consequently, higher cost-effectiveness ratios. Finally, MUP and treatment of dependence are considered in the 'other recommended interventions' group since cost-effectiveness analysis was not available at that time. In the future, findings from the OECD SPHeP-NCD model could contribute to re-evaluate these interventions.

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Notes

¹ Gallet (2007^[66]) found that the young are less responsive to price changes than older drinkers, although a study for Switzerland showed that the young are more responsive to price changes in beer than adults (Gmel and Notari, 2013^[67]). The difference in results is due to the types of alcoholic beverages that are considered, especially because consumption of beer (which is more consumed by the youngsters) is less price sensitive than consumption of wine and spirit (more consumed by adults). As Gallet explains, the result is tied to differences in the consumption bundle across age groups, such that if older drinkers consume a larger share of more price sensitive beverages (i.e. wine and spirits) then the price elasticity of alcohol for older individuals is more elastic.

² Since a unit is 8 grams of pure alcohol in the United Kingdom, it equals to CHF 1.10 for 10 grams of pure alcohol.

³ A unit is 13.6 grams in Canada, so the threshold is around CHF 0.66 per 10 grams of pure alcohol.

⁴ Health Adjusted Life Expectancy (HALE) is a measure of population health expectancy that takes into account mortality and morbidity (assessed with disability weights as described in the Technical Documentation: <http://oecdpublichealthexplorer.org/ncd-doc>)

⁵ Crimes and assaults are included.