

# THE HEALTH AND ECONOMIC IMPACTS OF ALCOHOL CONTROL IN SRI LANKA

*The case for investment*

# Investment Case for Alcohol Control in Sri Lanka

## Executive summary

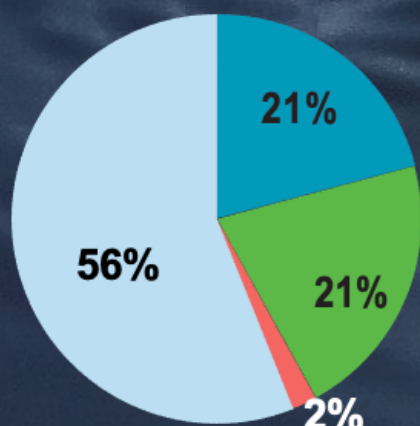
Every year, **alcohol kills**  
more than

**20,000**

people in Sri Lanka.

Alcohol consumption causes around **335 billion**  
Sri Lankan Rupee (LKR) in economic losses every  
year in Sri Lanka, equivalent to

**2.18% of its GDP.**



### *Breakdown of the economic cost*

- Health-care expenditure (direct costs)
- Absenteeism (indirect costs)
- Presenteeism (indirect costs)
- Decreased labour force (indirect costs)



The investment case demonstrates that strengthening five key alcohol control policy actions would, over 20 years (2024-2044) save around

**104,000 lives**

and reduce the incidence of alcohol-related disease.  
It would also avert

**LKR 643 billion**

in economic losses

and provide a return on investment (ROI) of

**12.2 : 1**

## Recommendations

- 1 Take action to strengthen and enforce the five key alcohol control policy actions modelled in the investment case.**
- 2 Strengthen multisectoral coordination for alcohol control in Sri Lanka, promote a whole-of-society approach and take action to protect against industry interference.**
- 3 Raise public awareness of the far-reaching harms of alcohol including harm to others.**
- 4 Implement measures to combat illicit trade and the associated health harms of illicit and informally produced alcohol.**
- 5 Identify opportunities to integrate alcohol control with wider sustainable development strategies, programmes and activities in Sri Lanka.**

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# EXECUTIVE SUMMARY

Alcohol is a significant threat to health and sustainable development. Alcohol consumption causes premature death, preventable disease and injuries that result in high health spending costs and economic losses, widen socioeconomic and gender inequalities, and impede progress towards the achievement of the Sustainable Development Goals (SDGs).

This report summarizes the economic and health costs of alcohol consumption in Sri Lanka, as well as the return on investment and health benefits of implementing five WHO-recommended alcohol control policy actions. The five actions are:

1. Strengthen restrictions on alcohol availability.
2. Advance and enforce drink driving counter-measures.
3. Facilitate access to screening, brief interventions and treatment.
4. Enforce bans or comprehensive restrictions on alcohol advertising, sponsorship, and promotion.
5. Raise excise taxes on alcoholic beverages.

## MAIN FINDINGS

- Alcohol consumption causes around **LKR 335 billion** Sri Lankan Rupee (LKR) in economic losses every year, in Sri Lanka, equivalent to **2.18 percent** of its GDP in 2018.
- Every year, alcohol kills more than **20,000** people in Sri Lanka.
- By acting now, the Government of Sri Lanka can reduce the national health, economic and social burden of alcohol. The investment case demonstrates that strengthening five key alcohol control policy actions would, over 20 years (2024-2044):
  - Save around **104,000** lives and reduce the incidence of disease.
  - Avert **LKR 643 billion** in economic losses.
  - Provide a return on investment (ROI) of **12.2:1**. This means that the economic benefits (**LKR 643 billion**) significantly outweigh the costs of implementing the five key policy actions (**LKR 53 billion**).





# RECOMMENDATIONS

This report provides comprehensive recommendations that the Government of Sri Lanka can take to protect public health and realize the benefits of alcohol control as an accelerator for sustainable development. Based on the findings of this investment case, these key actions for Sri Lanka are recommended to be pursued simultaneously:

1. Take action to strengthen and enforce the five key alcohol control policy actions modeled in this investment case:
2. Strengthen multisectoral coordination for alcohol control in Sri Lanka, promote a whole-of-society approach and take action to protect against industry interference.
3. Raise awareness of the far-reaching harms of alcohol including harm to others.
4. Implement measures to combat illicit trade and the associated health harms of illicit and informally produced alcohol.
5. Identify opportunities to integrate alcohol control into wider sustainable development strategies, programmes and activities in Sri Lanka.

**The burden of alcohol goes beyond health, as the economy is greatly affected as well.**



Photo: © World Bank via Flickr



# 1. INTRODUCTION

Alcohol consumption contributes to three million deaths globally each year, accounting for 5.3 percent of all deaths. Alcohol is the third leading risk factor for poor health worldwide, accounting for 5.1 percent of the global burden of disease and injury. Alcohol consumption causes more than 200 diseases, injuries and other health conditions [1].

Despite having lower levels of consumption of alcohol, the alcohol-attributable disease burden is highest in low- and lower-middle- income countries, compared to upper-middle- and high-income countries. Individuals of low socioeconomic status bear a disproportionate share of this burden, with the 'harm per litre' also greater amongst drinkers of a lower- income status and their families than their higher-income counterparts in any given society [2].

The burden of alcohol goes beyond health, as the economy is greatly affected as well. There are large alcohol-attributable costs to societies that extend outside health- care costs, such as social harm. The global economic costs of alcohol consumption are estimated to be 2.6 percent of GDP, with the majority of costs incurred through productivity losses (80 percent), where just 20 percent are direct costs, or health spending [3]. In some countries, the economic burden is as high as 5.4 percent of GDP [4].

Indeed, alcohol production and consumption impede progress towards many SDGs including ending poverty (SDG 1), achieving sustainable economic growth (SDG 8), reducing inequalities between and within countries (SDG 10) and achieving gender equality (SDG 5) [2]. Alcohol use has a direct negative impact on many health-related targets in the SDGs, including infectious diseases, maternal and child health, non-communicable diseases (NCDs) and mental health and injuries. In addition, the use of alcohol has wider indirect effects, adversely impacting 14 SDGs and 54 targets of the Agenda 2030, including broader indicators relating to economic and social development, environment and equality [5].

UN member states have recognized the need to invest in alcohol control and have made several commitments to reduce the harmful use of alcohol. The Global strategy to reduce the harmful use of alcohol [6], adopted by the World Health Assembly in 2010, recognizes the relationship between the harmful use of alcohol and socio-economic development and provides guidance on reducing harmful use of alcohol at all levels. Tackling alcohol harms is a priority within the 2030 Agenda for Sustainable Development, particularly SDG Target

3.5 that calls for strengthening the prevention and treatment of substance abuse, including narcotic drug abuse and harmful use of alcohol. In addition, reducing harmful alcohol use is one of the nine targets of the World Health Organization (WHO) Global action plan for the prevention and control of NCDs 2013-2030 [7].

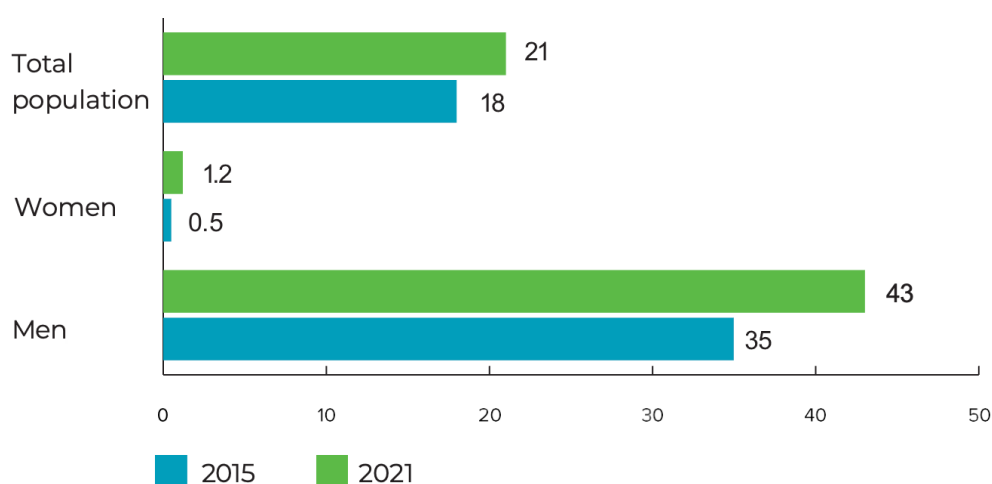
## 2. ALCOHOL IN SRI LANKA: STATUS AND CONTEXT

### 2.1 ALCOHOL CONSUMPTION AND HARMS

#### Alcohol consumption

According to the WHO STEPwise approach to NCD risk factor surveillance (STEPS) survey conducted in Sri Lanka in 2021, around 21 percent of adults in Sri Lanka are current alcohol drinkers, with a much higher percentage of men (43 percent) than women (1.2 percent). The majority of adults were lifetime abstainers (65 percent), with women nearly three times as likely to be lifetime abstainers than their male counterparts (92 percent and 34 percent respectively) [8]. However, alcohol consumption has increased across the population since 2015 (see Figure 1), while the percentage of lifetime abstainers has also decreased, particularly among women. In 2015, 97 percent of women were lifetime abstainers compared to 92 percent in 2021 [8],[9].

Figure 1: Prevalence of current alcohol drinkers in Sri Lanka in 2015 and 2021

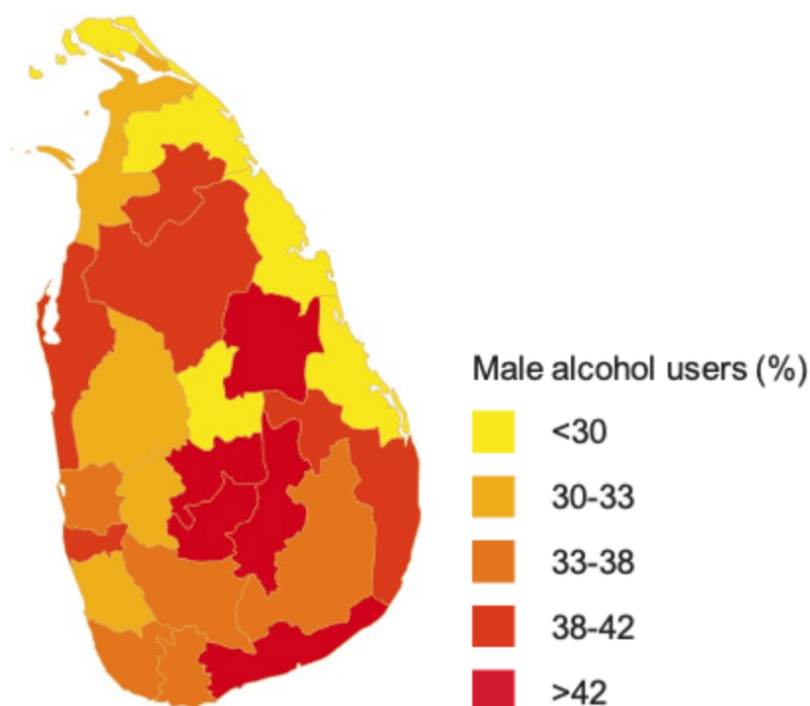


Source: Sri Lanka STEPS survey 2021 and 2015 [8], [9]

In Sri Lanka, annual alcohol consumption per capita (aged 15 and over) among drinkers is 14.9 litres of pure alcohol. The majority of recorded alcohol consumption is spirits (85 percent), followed by beer (13 percent) and other (2 percent). Arrack – a spirit made from the fermented sap of coconut flowers and sugar cane – accounts for the majority of alcohol sales in Sri Lanka despite declining as a proportion of overall sales. Annual per capita Arrack consumption has gradually increased – rising from 1.27 litres in 1998 to 1.64 litres in 2013 [10].



Figure 2: Distribution of male alcohol users across regions in Sri Lanka<sup>1</sup>



Source: Ministry of Health Quarterly NCD Report [13]

Alcohol consumption among males varies significantly across regions in Sri Lanka, as shown in **Figure 2**. The regions with the lowest rate of male alcohol users – namely Kalmunei and Mullativu with 13.3 and 15.6 percent of male alcohol users, respectively – have four times less alcohol users than Nuwara Eliya and Badula, in which more than half of the male population consumes alcohol [13]. There is no available data on female alcohol use in Sri Lanka and is thus unclear if the geography of female alcohol consumption mirrors that of male's in Sri Lanka.

Among current male drinkers, there is a high prevalence of heavy episodic drinking<sup>2</sup> – reported in nearly half (48 percent) of male adolescent drinkers (15-19 years) and in over 40 percent of all male drinkers (aged 15 and over) in 2016 [11].

The Global School-Based Student Health Survey conducted in 2016 found that 3.2 percent of students (aged 13-17 years old) reported current use of alcohol. Consumption was higher among males (5.5 percent) than females (1 percent) and among those 16-17 years old (5.8 percent). Among current alcohol users (ages 13-17 years old), 27 percent typically obtained alcohol from their friends and 27 percent consumed two or more drinks per day. A large proportion of these students (43 percent) first drank before the age of 14 [15].

- 
1. Due to lack of data on alcohol use among females, only male consumption is represented in this map [13].
  2. Defined here as the proportion of adults (15+ years) who have had at least 60 grams or more of pure alcohol on at least one occasion in the past 30 days [14].

## Alcohol-associated harms

Alcohol consumption in Sri Lanka imposes significant health, social and economic harms on the population.

There are significant health consequences associated with alcohol consumption. In Sri Lanka, the alcohol-attributable fraction for liver cirrhosis is 57 percent for males and 28 percent for females and for road traffic injuries, 21 percent among males and 11.7 percent among females [2].

Alcohol and tobacco consumption are comorbid and consumption of both can exacerbate health risks [16]. For example, using both tobacco and alcohol is associated with a five-fold increase of developing cancers<sup>3</sup> compared to those who use just one. For heavy users, this risk increases up to 30-fold [17]. In Sri Lanka, 14 percent of the population smoke (including 30 percent of men and 0.2 percent of women) [8]. Tobacco use is more common in Sri Lankans who consume alcohol [18]. Using both alcohol and tobacco also has a significant financial impact on households, diverting resources from human development investment such as education, housing, health, and nutrition. A study of men in Sri Lanka found that those in the two lowest income groups (US\$76-143 each month) spent around 40 percent of their income on alcohol and tobacco [19].

Alcohol use is strongly associated with violence against women. A study in Sri Lanka found that 76 percent of the perpetrators of intimate partner violence against women were regular alcohol consumers [20]. The Women's Wellbeing Survey conducted in Sri Lanka in 2019 found that women whose partners consumed alcohol were at significantly higher risk of violence as compared with women whose partners did not use alcohol [21].

Alcohol consumption in Sri Lanka is also associated with worse mental health outcomes. Research has shown a strong association between alcohol consumption in Sri Lanka and suicide and deliberate self-harm [22], while a study of male patients receiving hospital care in Galle found that those with drinking problems were three times more likely to suffer from depression in comparison to the general population [23].

## 2.2 MULTISECTORAL COORDINATION FOR ALCOHOL CONTROL

Sri Lanka's primary legislation on alcohol and tobacco control, the National Authority on Tobacco and Alcohol (NATA) Act of Sri Lanka, includes comprehensive restrictions on tobacco and alcohol, and also establishes a coordination mechanism, NATA, to facilitate implementation. NATA is multisectoral in nature and includes senior representatives from key sectors across government as well as other national institutions such as the National Dangerous Drugs Control Board (NDDCB), the Commissioner-General of Excise, and the Inspector General of Police. NATA has key responsibilities pertaining to alcohol control including advising the Government of Sri Lanka on the implementation of alcohol policy in the country [25]. The NDDCB is also multisectoral and works closely with both the Ministry of Health and Ministry of Defense on alcohol and illicit drug law enforcement [30]. The NDDCB has a Preventive Education and Training Unit, which conducts prevention

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3 Cancers of the oral cavity, oropharynx, larynx and oesophagus



programmes for children and adolescents in schools, vocational training centers, and tertiary education institutions [31].

Civil society organizations play a key role in alcohol control in Sri Lanka. The Alcohol and Drug Information Centre (ADIC) is central to policy development for alcohol, tobacco and other drugs in Sri Lanka and across the region [25] [32]. ADIC has campaigned for increased alcohol taxation to tackle alcohol harms [33]. Foundation for Innovative Social Development (FISD) Sri Lanka conducts capacity building programmes with youth groups to strengthen alcohol control policy implementation and reduce supply and demand, while also advocating for national organisations to mainstream alcohol prevention and management into existing programme activities [34].



Photo: © Unsplash



## 2.3 NATIONAL ALCOHOL LEGISLATION AND POLICY LANDSCAPE

The current level of implementation of each intervention was assessed during institutional context analysis (ICA) interviews with key stakeholders in Sri Lanka, as well as through a landscape review of alcohol control laws in Sri Lanka and their implementation. Based on this information, we then adjusted the level of implementation of these interventions to match with the OneHealth Tool(OHT)'s categorization of policy implementation level, which ranges from 1 to 4, where a score of 1 is associated with the intervention not being in place, and a score of 4 signifying that the intervention meets WHO standards. Consultation with experts enabled us to set the baseline level of each intervention. Each intervention was then scaled-up to level 4, except for the intervention on raising excise taxes, which was scaled-up to yield a 50 percent increase in current alcohol excise tax.

Table 1. Summary of baseline implementation level of policy interventions

| Intervention                                | Status                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Latest value (year) |
|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| <b>Restrictions on alcohol availability</b> | The minimum legal age for sale of alcoholic beverages is 21 [24], [25].                                                                                                                                                                                                                                                                                                                                                                                                    | 2                   |
| <b>Drink driving counter measures</b>       | Sri Lanka has a Blood Alcohol Concentration (BAC) limit of 0.08 for all drivers, including young or professional drivers. Breath testing for drink driving is most commonly determined by police officers rather than using a breathalyser kit. In addition, Sri Lanka has also implemented random-breath testing [25]. Sri Lanka is one of few countries in the region, along with India and Thailand, that have implemented short-term detention for BAC offenders [25]. | 3                   |

| Intervention                                           | Status                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Latest value (year) |
|--------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| Access to screening, brief interventions and treatment | <p>Alcohol screening/brief intervention has not been implemented into primary care. Of those receiving treatment for alcohol use disorders, 68 percent are treated in the public sector, 25 percent in the private sector, 5 percent joint public/private and 2 percent by non-governmental organizations (NGOs). The most commonly used treatment setting is mental health services [25].</p> <p>As of 2017, there were four treatment and rehabilitation centres for drug and alcohol dependence. The state body, National Dangerous Drug Control Board, is responsible for drug abuse management and supports the rehabilitation centres [25].</p> <p>Sri Lanka has comparatively high availability of detoxification compared to other countries in the region. The coverage rate for inpatient and outpatient medical detoxification is 50 to 90 percent. There are 464 beds for alcohol and drug use disorders. However, the treatment coverage for long-term residential rehabilitation is less than 10 percent [25]. Research suggests that a lack of awareness of alcohol use disorders and lack of knowledge about the prevalence in the community results in the underdiagnosis by physicians [26].</p> | 2                   |



| Intervention                                                                                 | Status                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Latest value (year) |
|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| <b>Bans or comprehensive restrictions on alcohol advertising, sponsorship, and promotion</b> | <p>The National Alcohol and Tobacco Act prohibits any form of advertising, promotion and sponsorship of tobacco and alcohol products. However, policy fragmentation and lack of enforcement has resulted in advertisements and product placement still occurring in the country.</p> <p>Despite existing bans, Sri Lankan youth remain exposed to alcohol advertisements regularly. In the 2016 Global School-based Student Health Survey, 10.8 percent of students (13-17 years old) reported seeing alcohol advertisements almost daily. More than one in four (28 percent) reported seeing alcohol advertisements either “sometimes” or “more frequent” at sports events, fairs, concerts, community events or social gatherings [15].</p> <p>Moreover, according to the Public Opinion Survey on Alcohol Regulations conducted in 2021, 54 percent of respondents observed direct alcohol promotions through digital media in the previous 3 months and 77 percent observed indirect alcohol promotions through digital media during the same period [27].</p> | 2                   |

| Intervention                                                     | Status                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Latest value (year)                                                                                                                                                                                                                        |
|------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Excise taxes and pricing policies to raise alcohol prices</b> | <p>Taxes account for approximately 75 percent of the price of alcoholic beverages [28].</p> <p>In 2023, the Ministry of Finance increased the excise duties on liquor. This sets excise duty at the following [29]:</p> <ul style="list-style-type: none"> <li>● Special Arrack from licensed manufacturers in Sri Lanka –6,000 LKR per litre of alcohol</li> <li>● Molasses, Palmyrah, Coconut and Processed Arrak manufactured in Sri Lanka – LKR 6,420 per litre of alcohol</li> <li>● Spirits manufactured in Sri Lanka – LKR 6,600 per litre of alcohol</li> <li>● Malt Liquor (5 percent and less) manufactured in Sri Lanka – LKR 4,750 per litre of alcohol</li> <li>● Malt Liquor (5 percent and more) manufactured in Sri Lanka – LKR 4,980 per litre of alcohol</li> </ul> | <p>A 50 percent uniform increase in the specific excise tax effective as of July 2023 for the most consumed type of arrack, beer and wine, over 5 years so that by 2028 the excise tax will be 50 percent higher than it currently is.</p> |

### 3. METHODOLOGY

The purpose of the investment case for alcohol control is to quantify the current health and economic burden of alcohol use in Sri Lanka and to estimate the benefits of scaled up action. Investment cases are a good tool for governments to better understand the economic impact of alcohol and return on investment of investing in alcohol control for meeting development goals. It can help in cabinet level discussions and mobilize different sectors and create political space for increased investments in alcohol control. Within the health sector, it can help to reconsider aligning existing health budgets towards more investments in health promotion and disease prevention rather than spending money on treating illnesses and their consequences. The role of non-health sectors in contributing to the alcohol control agenda is emphasized throughout the process. Overall, it can justify the need for development partners to start, or increase, their investments in alcohol control.

The investment case team worked with the Ministry of Health and other stakeholders in Sri Lanka to collect national data inputs for the model. Where data were unavailable from government or other in-country sources, the team utilized publicly available national and regional data from sources such as the WHO, the World Bank database, the Global Burden of Disease study by the Institute for Health Metrics and Evaluation (IHME), and academic literature. Within the investment case, costs and monetized benefits are reported in constant Sri Lankan Rupees (LKR) and discounted at an annual rate of three percent.<sup>4</sup>

The analysis looks at the relative resource needs and respective health, and economic benefits, of investing in five policy interventions, using the WHO OneHealth Tool (OHT), an epidemiology-based population model developed by United Nations partners to enable strategic planning and costing of interventions and projection of the health benefits expected from their implementation. Health benefits are generated in terms of natural units (deaths averted and healthy life years gained) but also monetized using the human capital approach, to enable benefit–cost ratios (the primary return-on-investment metric) to be evaluated and reported for the package of interventions. The human capital approach assumes that forgone economic output is equivalent to the total output that would have been generated by workers through the course of their life until reaching retirement age. A detailed step by step guidance of the tools and methods used to perform the economic analysis are described in this report's appendix.

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<sup>4</sup> Future benefits are discounted since a unit of currency in the future is worth less than a unit today owing to the time value of money.



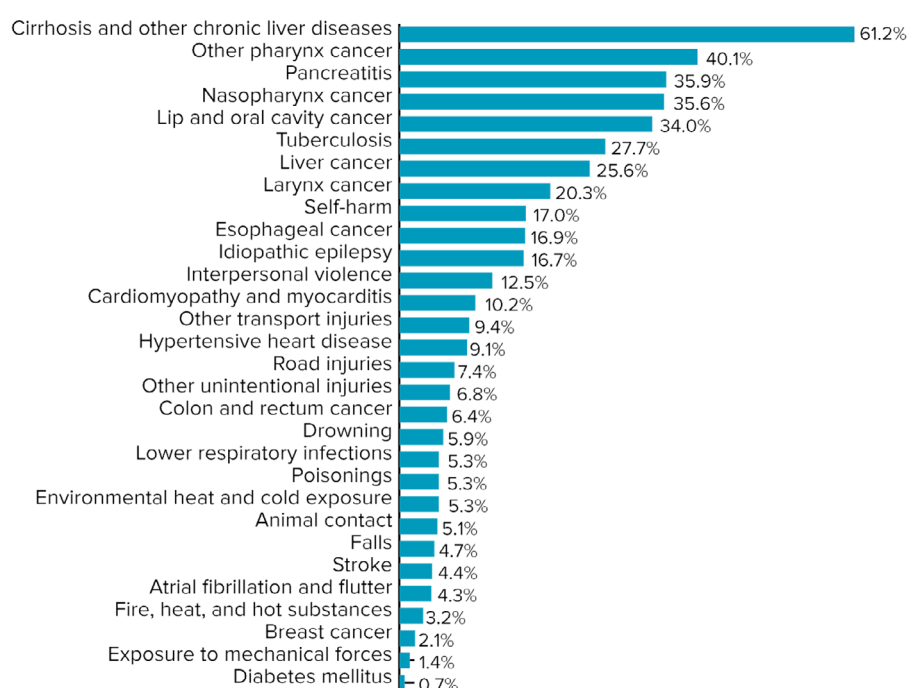
## 4. RESULTS

### 4.1 THE CURRENT BURDEN OF ALCOHOL USE: HEALTH AND ECONOMIC COSTS

#### 4.1.1 Health burden

Alcohol causes more than 20,000 deaths in Sri Lanka every year [35]. **Figure 3** illustrates the numerous diseases through which alcohol use causes death in Sri Lanka. More than 60 percent of cirrhosis and other chronic liver disease deaths are caused by alcohol use, followed by 40 percent of pharynx cancer deaths and 36 percent of pancreatitis deaths.

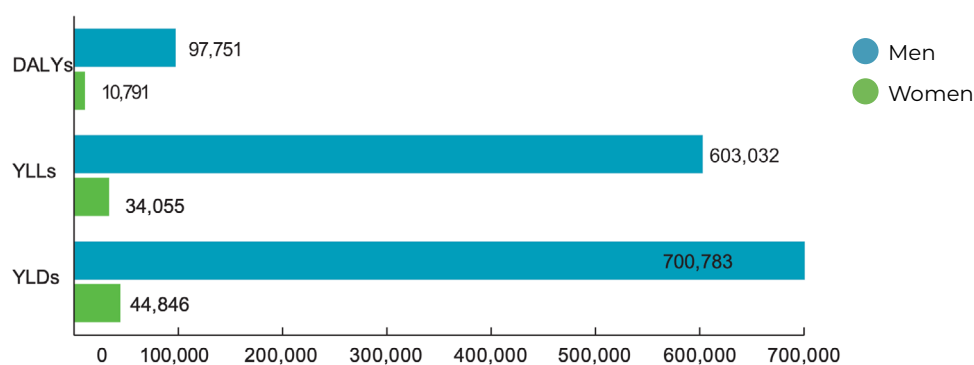
**Figure 3: Share of alcohol-attributable mortality by cause of death in Sri Lanka, 2019 (%)**



Source: IHME GBD, 2019 [36]

Alcohol-attributable deaths in Sri Lanka amount to approximately 637,000 years of life lost (YLLs), 109,00 years lived with disability (YLD) and 746,000 daily-adjusted life years (DALYs) (**Figure 4**).<sup>5</sup>

**Figure 4: Alcohol-attributable YLDs, YLLs and DALYs in Sri Lanka, by gender, 2019**



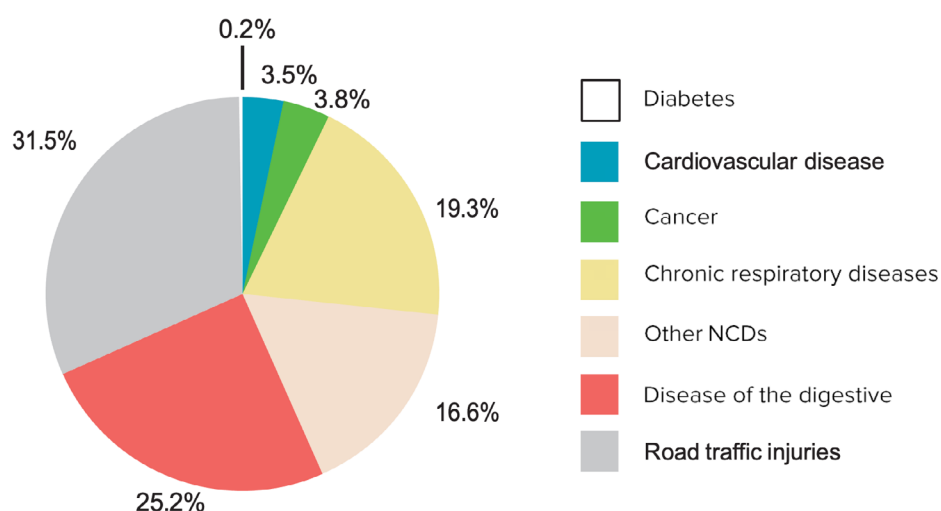
Source: Based on data from GBD, data for 2019

5 YLDs (Years Lived with Disability) are calculated by multiplying the prevalence of a condition by a disability weight that reflects the severity of the condition. YLLs (Years of Life Lost) are calculated by subtracting the age at death from the standard life expectancy at that age. Disability-Adjusted Life Years (DALYs) are the sum of YLLs and YLDs. One DALY represents one lost year of healthy life. Source: IHME. (2018). Frequently asked questions. Accessible at <http://www.healthdata.org/gbd/faq#What%20is%20a%20DALY>

### 4.1.2 Economic burden

Alcohol-related disease costs the Sri Lankan economy an estimated LKR 335 billion every year, equivalent to about 2.18 percent of its GDP in 2018. While the costs of alcohol-attributable mortality are high, the economic consequences of alcohol use begin long before death. First, as individuals suffer from alcohol-attributable diseases, expensive medical care is required to treat them. The direct cost, or health-care expenditure associated with treating alcohol-related diseases in Sri Lanka are substantial. This amounts to LKR 69 billion every year.

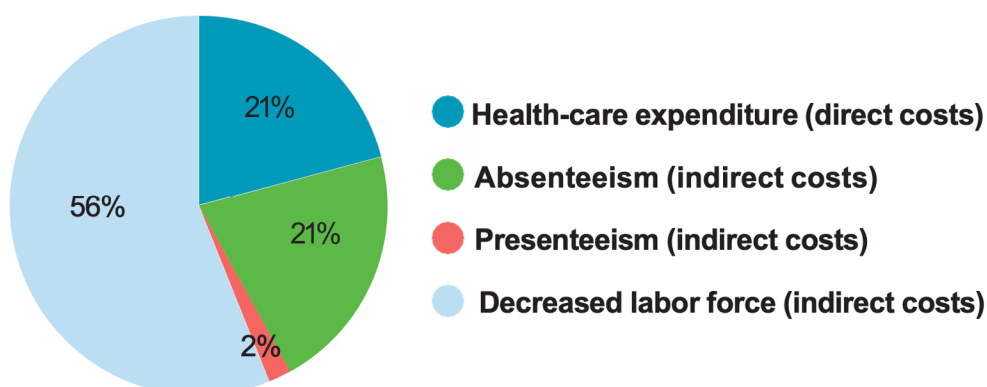
**Figure 5: Health-care costs (direct costs) of alcohol related diseases**



As **Figure 5** illustrates, road injuries are the main driver of the direct costs caused by alcohol (LKR 21.7 billion). These are followed by diseases of the digestive (LKR 17 billion), chronic respiratory diseases (LKR 13 billion), “other NCD” categorization based on the latest National Health Accounts (NHA) records [41] available in Sri Lanka (LKR 11.5 billion), cancer (LKR 2.6 billion), CVD (LKR 2.4 billion) and diabetes (LKR 116 million).

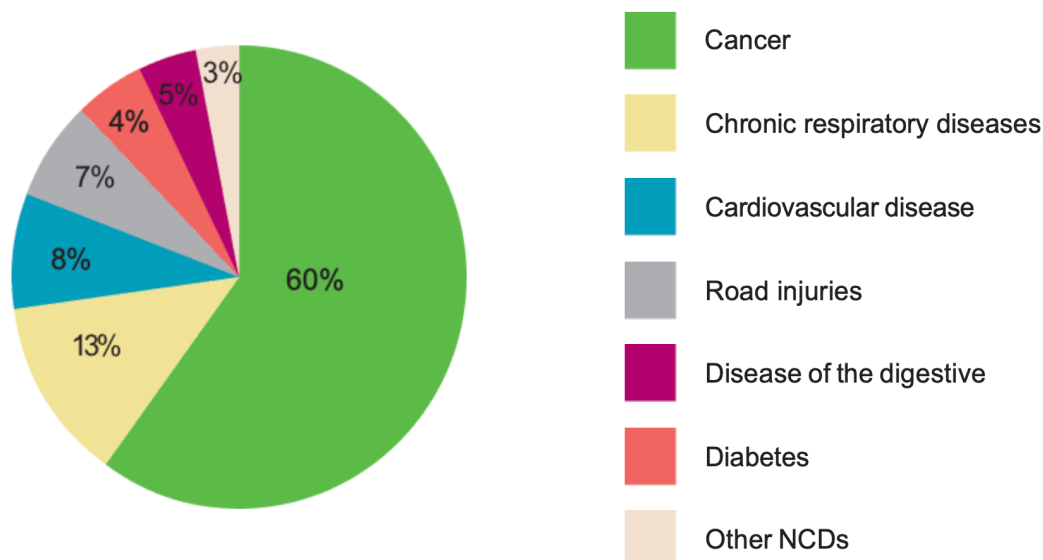
In addition to health-care costs, there are economic productivity losses (or indirect costs) associated with missing days of work (absenteeism) or being less productive at work (presenteeism) as individuals become sick. In Sri Lanka, the cost of excess absenteeism due to alcohol-related illness is around LKR 70 billion, and the cost of presenteeism due to drinking alcohol is LKR 6.7 billion. The highest economic productivity loss arises from labor force decrease – as individuals drop out of the labour force due to alcohol-related illness or death – costing Sri Lanka around LKR 189 billion every year (**Figure 6**).

**Figure 6: Breakdown of the total cost (percentage)**



**Figure 7** summarizes the total cost (both direct and indirect) of the main alcohol-attributable diseases in Sri Lanka. Alcohol-attributable cancer is the main driver, with 60 percent of total costs coming from cancer, followed by chronic respiratory diseases, responsible for 13 percent of total costs.

**Figure 7: Total cost (direct and indirect) disaggregated by disease**



## 4.2 IMPLEMENTING POLICY MEASURES THAT REDUCE THE BURDEN OF ALCOHOL USE

Through the full implementation of recommended alcohol control measures, Sri Lanka can secure significant health and economic returns, and begin to reduce the LKR 335 billion in annual economic losses from alcohol use.

The next two subsections present the health and economic benefits that result from scaling- up five key alcohol control policy actions, namely: 1) enforcing restrictions on availability of retailed alcohol; 2) enforcing restrictions on alcohol advertising; 3) raising taxes on alcoholic beverages; 4) screening and brief intervention for hazardous and harmful alcohol use; and 5) strengthening drink driving laws.

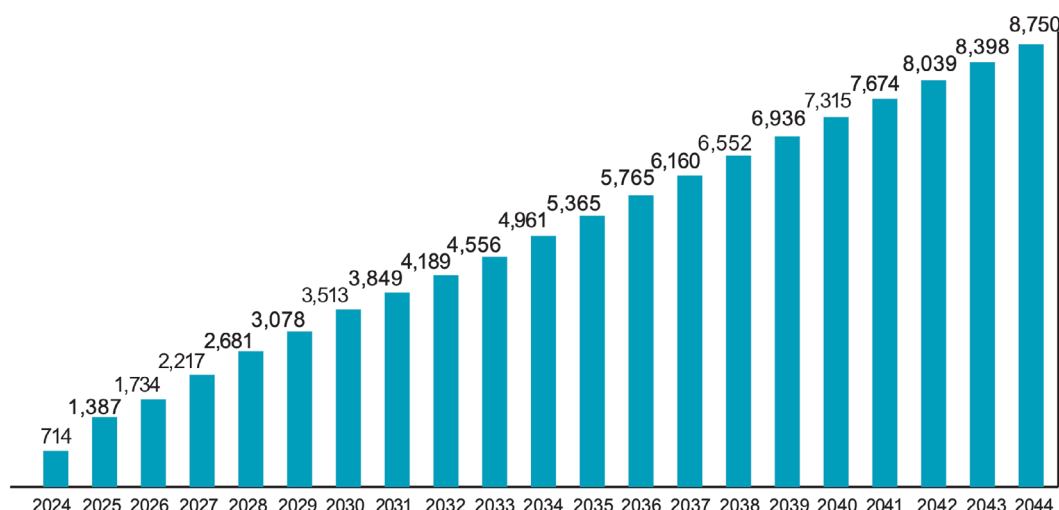
### 4.2.1 Health benefits

The full implementation of the package of alcohol interventions would lead to substantial health gains for Sri Lanka. Implementing the package of five alcohol policy actions that are the focus of this investment case would save an estimated 104,000 lives and an additional 987,400 healthy life years (HLY)<sup>6</sup> gained over 20 years (2024-2044). The health impacts of scaled-up action on alcohol control are incremental, as illustrated in **Figure 8**, showing that over time, an increasing number of lives are saved, and healthy life years are gained.

<sup>6</sup> HLYG are the additional healthy years of life individuals get through averted illness.



Figure 8: Annual deaths averted from 2024-2044 (non-cumulative)



#### 4.2.2 Economic benefits

Implementing the package of five key alcohol interventions would result in Sri Lanka averting LKR 643 billion in economic losses due to alcohol, over 20 years (2024-2044).

With better health that would arise from the strengthening of alcohol interventions, fewer individuals would need access to health-care services due to alcohol-related diseases, resulting in direct cost savings to the government and citizens. Better health also leads to increased productivity and economic output, with fewer working-age individuals leaving the workforce prematurely and permanently due to death and disability. At the same time, workers miss fewer days of work (absenteeism) and are less hindered by health complications while at work (presenteeism).

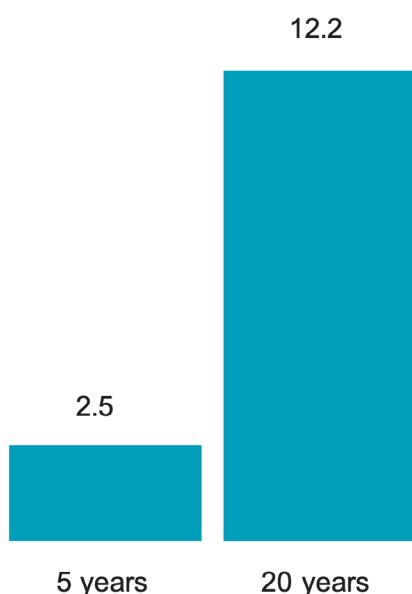
#### 4.2.3 The return on investment

While the health gains from strengthening alcohol control in Sri Lanka are by themselves enough to justify the cost of the interventions, the economic gains that will also accrue make the case for increased alcohol control even stronger.

An investment is considered worthwhile from an economic perspective if the gains from making it outweigh the costs. A return on investment (ROI) analysis measures the worthiness of investing in the alcohol control policies by dividing the economic benefits that are gained from implementing the package of interventions by the costs of implementing them.

For this investment case, the ROI for each policy intervention was evaluated in the short-term (five years), to align with planning and political cycles, and in the medium-term (20 years), to reflect the larger benefits that accrue over time. Given the long-term nature of many alcohol-related illnesses, with disease often only developing after years of alcohol use, the ROIs for each intervention grow over time, reflecting the compounding gains from going from the planning and development stages to full implementation.

As **Figure 9** illustrates, the economic benefits of strengthening alcohol control in Sri Lanka over five years (LKR 36 billion) and 20 years (LKR 643 billion) greatly outweigh costs of implementation (LKR 14 billion over five years and LKR 53 billion over 20 years).



Over the next five years, for every **LKR 1** invested in alcohol control, Sri Lanka will receive **LKR 2.5**.

Over the next 20 years, for every **LKR 1** invested in alcohol control, Sri Lanka will receive **LKR 12.2**.

## 5. CONCLUSION AND RECOMMENDATIONS

Each year, alcohol use costs Sri Lanka LKR 335 billion in economic losses and causes substantial human development losses. Fortunately, as the investment case shows, there is an opportunity to reduce the health, social and economic burden of alcohol in Sri Lanka. Enacting the package of five policy actions would save on average 5,200 lives each year and reduce the incidence of alcohol-related disease, leading to averted productivity losses and savings from averted medical costs.

In economic terms, these benefits are substantial, adding up to LKR 643 billion over the next 20 years. Importantly, the economic benefits of strengthening alcohol control in Sri Lanka greatly outweigh the costs of implementation (LKR 53 billion).

By investing now in the package of five alcohol policy actions modeled in this investment case, Sri Lanka would not only reduce alcohol consumption, improve health, reduce government health expenditures, and grow the economy, it would also reduce the hardships faced by many Sri Lankans. The country can also reinvest the savings from government health-care expenditures and revenue from increased alcohol taxes into national development priorities such as universal health coverage and other social protection measures, as well as COVID-19 recovery efforts and pandemic preparedness. Based on the findings of this investment case, these key actions for Sri Lanka are recommended to be pursued simultaneously:

# 1 **Take action to strengthen and enforce the five key alcohol control policy actions modeled in this investment case:**

- Strengthening restrictions on alcohol availability. Sri Lanka has made good progress with its comprehensive ban on alcohol use in most public places and minimum legal age of sale [24], [25]. However, the country would benefit from further strengthening restrictions on alcohol availability. It is recommended that Sri Lanka strengthens restrictions on the sale of alcohol near educational institutions and strictly enforces the ban on the sale to minors to prevent and minimise alcohol consumption among youth. Almost all (94 percent) of Sri Lankans support banning alcohol sales within 500 meters from schools [37].
- Advancing and enforcing drink-driving countermeasures. Sri Lanka has a legal BAC limit and has implemented random breath testing [25]. However, the use of breathalysers is not widespread. Sri Lanka would benefit from investing in advancing and enforcing drink-driving countermeasures including the widespread use of breathalysers.
- Facilitating access to screening, brief interventions and treatment. Sri Lanka can also consider increasing access to screening, brief interventions and treatment. Sri Lanka would benefit from raising awareness of alcohol use disorders and their prevalence in the community at the population level and among medical professionals including physicians. Alcohol screening and brief interventions should also be implemented into primary care to facilitate access and availability.
- Enforcing bans or comprehensive restrictions on alcohol advertising, sponsorship and promotion. Despite existing restrictions, the population of Sri Lanka including youth remain frequently exposed to alcohol advertising, sponsorship and promotion. Sri Lanka would benefit from strengthening enforcement of restrictions to protect the population from exposure to advertising, with an emphasis on protecting the youth.
- Raising prices on alcohol through excise taxes and pricing policies. Raising prices on alcohol is the single most cost-effective strategy to reduce and prevent alcohol related harm. Pricing strategies such as minimum pricing policies, adjusting taxes according to inflation and income levels, and banning the sale of products below cost or volume discounts, can further reduce and prevent alcohol related harm [38].



## **2 Strengthen multisectoral coordination for alcohol control in Sri Lanka, promote a whole-of-society approach and take action to protect against industry interference.**

The cause and effects of alcohol use are not limited to health alone. A whole-of-government and whole-of-society approach is required for effective action to reduce alcohol consumption and its multifaceted harms. Sri Lanka has made commendable progress in advancing multisectoral coordination on alcohol through the establishment of the National Authority on Tobacco and Alcohol (NATA) and the National Dangerous Drugs Control Board (NDDCB), which are both multisectoral in nature.

Sri Lanka can advance multisectoral coordination further by developing, publishing and routinely updating a national multisectoral alcohol control strategy. This can, amongst other things, outline key roles and responsibilities for key stakeholders, serve to guide NATA and the NDDCB, as well as set out plans to strengthen alcohol control policies and legislation.

Sri Lanka can leverage the existing network of civil society organizations working on alcohol control and ensure they are included in national policymaking, strategies, plans and activities. Sri Lanka can also ensure communities are supported and empowered, given the vital role communities can play in fostering local initiatives.

Sri Lanka would also benefit from taking action to protect public health policy from alcohol industry interference. Efforts to raise awareness among all public officials of the need to avoid conflicts of interest are encouraged and can be undertaken in collaboration with alcohol control civil society groups. Sri Lanka can also consider implementing a code of conduct prescribing expected standards for all public officials, service providers, contractors and consultants involved in setting or implementing policies surrounding alcohol control.

## **3 Raise awareness of the far-reaching harms of alcohol including harm to others.**

Raising public awareness about the significant harms of alcohol is vital to reduce alcohol consumption and its harms, and to garner public support for alcohol control measures. As such, Sri Lanka can ensure all levels of society have access to reliable information and public awareness programmes focused on the wide range of alcohol-related harm in Sri Lanka and the need for effective prevention measures [6]. Sri Lanka has made commendable efforts in raising awareness particularly among the youth through the interventions carried out by ADIC and NDDCB [31]. However, integrating alcohol and its harms in addition to other substances into the school curriculum for all students could garner additional benefits. According to the public opinion survey in 2021, just 36 percent thought that Sri Lankan education provided the necessary

information to refrain from alcohol consumption [37].

Efforts should include raising awareness of the harm to others caused by alcohol, particularly among vulnerable groups, including women, girls and low-income individuals. Initiatives must ensure to avoid stigmatization and discourage discrimination against people who consume or are addicted to alcohol.

Sri Lanka can also implement campaigns specific to drink driving to lessen the burden of alcohol-attributable road traffic accidents and garner public support of policy. It is recommended to run high-intensity campaigns targeted at specific situations and audiences such as young people, holiday seasons and at driving schools [6]. Campaigns should be monitored and evaluated for effectiveness.

Sri Lanka can also consider awareness efforts specifically aimed at government officials. This should include sensitizing ministries across government how alcohol impedes their sector's goals, in addition to key actions they can take to avert avoidable harms and economic losses.

## **4 Strengthen the enforcement of existing laws to combat illicit and informally produced alcohol.**

Existing legal provisions regulating the production, distribution, and sale of alcohol in Sri Lanka should be strengthened through improved enforcement and inter-agency coordination. Regulatory authorities, including the Department of Excise and the Sri Lanka Police, should enhance monitoring, inspection, and intelligence-sharing mechanisms to identify and disrupt illicit production and distribution networks. Strengthening penalties, improving surveillance systems, and building enforcement capacity will help reduce the availability of illicit alcohol and mitigate associated health risks.

To reduce the health risk of illicit and informally produced alcohol, Sri Lanka can consider the following:

- Developing and implementing an efficient control and enforcement system including tax stamps
- Developing and strengthening tracking and tracing system to counteract illicit alcohol
- Regulating the sale of informally produced alcohol and bringing it into the taxation system

## **5 Identify opportunities to integrate alcohol control into wider sustainable development strategies, programmes and activities in Sri Lanka.**

With the vast health, social, economic, development and environmental costs of alcohol, strengthening alcohol control measures is a powerful means for Sri Lanka to improve the lives of its citizens, achieve the SDGs, and improve the conditions and future of the country. All sectors have a role to play in the alcohol response and the benefits of scaled up action will enrich all aspects of life in Sri Lanka.

Efforts should be made to address the nexus between alcohol and key issues in Sri Lanka such as domestic, gender-based and interpersonal violence. Evidence from Sri Lanka and globally demonstrates the link between alcohol and gender based violence, with the majority of perpetrators of intimate partner violence against women being regular alcohol consumers [20].

The Government of Sri Lanka should prioritize alcohol control measures in sustainable development strategies, realizing the potential of such measures to advance sustainable development. Strengthening alcohol control can help Sri Lanka achieve its goals set out in Vision 2030 including priorities on gender, health poverty and inequality and education [39].



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# APPENDIX: STEP-BY-STEP

## METHODOLOGY

### **Step 1: First component of the economic burden analysis: identify the mortality and morbidity of alcohol-related diseases in the country.**

The estimate of the economic burden of alcohol provides a snapshot of the value of the disease burden of alcohol use in a country, in the most recent year for which data are available. The investment case model is populated with country-specific data on alcohol-attributable mortality and morbidity from the Global Burden of Disease Study (GBD). The morbidity and mortality values are adjusted by the ratio of the official population data to the population data used by the GBD. Population data is obtained from official sources, which for Sri Lanka was from the Sri Lankan Department of Census and Statistics. The population data used by our model is disaggregated by gender and five-year age cohorts.

The GBD study only estimates mortality and overall morbidity for diseases by risk factor, and since the economic burden model needs values for incidence and prevalence of disease, the values of these estimated by the GBD have to be adjusted by attributable fractions for harmful alcohol consumption. To align with official population estimates, and more accurately reflect the morbidity values in the country, GBD estimates are adjusted by the ratio of the size of the population for each gender-age cohort in the official population data (drawn from the Labour Force Survey) to the corresponding population data used by the GBD. The relevant cohorts are in five-year age groups.

The diseases included in the analysis are the following: diabetes type 2, cardiovascular diseases (including stroke, ischemic heart disease and hypertension), neoplasms (all cancers), chronic respiratory disease (COPD), digestive diseases (such as liver disease and gastritis) and road traffic injuries (RTI).

The diseases highlighted above were methodically selected after a thorough evaluation of epidemiological data availability and their corresponding healthcare expenditure from national sources. Moreover, this specific list has been consistently incorporated into UNDP's NCD investment cases, establishing recognition as the most pertinent NCDs.

To further refine the model and address the burden of alcohol-attributable road injuries observed in Sri Lanka, RTI were thoughtfully included, leveraging readily accessible data to augment the standard model. This addition not only amplifies the comprehensiveness of the analysis but also aligns with the prevailing healthcare landscape, enhancing the model's applicability and relevance to the Sri Lankan context. The epidemiological data for each disease was disaggregated by five-year age cohorts and gender.

We estimated the alcohol attributable fractions (AAF) for each disease, using mortality of disease (equation 1) to estimate the incidence, prevalence and mortality of diseases caused by alcohol as well as the AAF based on morbidity (equation 2), using Years Lived with a Disability (YLDs), to estimate the healthcare expenditures spent on alcohol related NCDs.



$$\text{Alcohol Attributable Fraction}_{\text{Mortality}} = \frac{\text{Deaths from disease caused by alcohol use}}{\text{Deaths from disease caused by all risk factors}} \quad [1]$$

$$\text{Alcohol Attributable Fraction}_{\text{Morbidity}} = \frac{\text{Years Lived with Disability caused by alcohol use}}{\text{Years Lived with Disability caused by all risk factors}} \quad [2]$$

The GBD has information for each country related to NCD risk factors, but while it does estimate risk-factor related mortality, it does not estimate risk-factor disease-specific outcomes, such as incidence or prevalence. The GBD has data on YLD caused by alcohol as well as YLD from all risk factors. We use this ratio as the AAF for morbidity for each disease. This is used to then compute the share of spending for each disease caused by alcohol, as explained below. The data to compute the AAF was principally sourced from GBD. Where data from GBD was unavailable, we supplemented with proxy AAF sources from peer reviewed journals (refer to **Table 2** below for detailed sources).

## Step 2: Second component of the economic burden analysis: estimate the economic costs or impacts of alcohol-related diseases.

UNDP had previously developed a model for calculating the economic burden of NCDs, which provides estimates of the current direct and indirect costs of NCDs. This model was adapted to focus on alcohol attributable NCDs in Sri Lanka. The model estimates the economic costs of disease and death caused by alcohol use. These economic costs include 'direct costs', namely alcohol-attributable healthcare expenditures, and 'indirect costs', or the value of alcohol-attributable premature labour-force withdrawal due to mortality and early retirement, and workplace productivity losses of absenteeism and presenteeism.

### Direct cost

To compute the 'direct' costs of alcohol use, or the health expenditure on alcohol-related diseases in Sri Lanka, data on NCD expenditure was collected from the most recent National Health Accounts (NHA) records (Ministry of Health Sri Lanka, 2021), providing data for the year 2018 (see **Table 1** below), making 2018 our reference year for conducting the burden analysis. This data was then multiplied by the AAF for morbidity, as derived in equation 2 above. Healthcare expenditures within the NHA are disaggregated by disease category, where our focus was on NCDs. The overall healthcare expenditure is disaggregated by public (government paid), private (insurance, individual out-of-pocket), and other healthcare expenditures.

**Table 1: Healthcare expenditure by NCDs, according to National Health Accounts (2018), in LKR**

| All NCDs                                     | 175,111,300,000 |
|----------------------------------------------|-----------------|
| Cardiovascular Diseases                      | 24,251,600,000  |
| Neoplasms                                    | 8,174,500,000   |
| Diabetes                                     | 6,519,900,000   |
| Respiratory Disease                          | 47,506,900,000  |
| Disease of the Digestive                     | 19,966,800,000  |
| Total NCDs listed in this table              | 106,419,700,000 |
| Other NCDs (all NCDs - disease listed above) | 68,691,600,000  |

Table 2: Alcohol Attributable Fractions (AAFs)

| Disease                        | AAF Morbidity | Source                      | AAF Mortality | Source                      |
|--------------------------------|---------------|-----------------------------|---------------|-----------------------------|
| Diabetes type 2                | 3.22%         | Own computation<br>GBD data | 1.06%         | Own computation<br>GBD data |
| Cardiovascular diseases        | 2.71%         | Own computation<br>GBD data | 1.07%         | Own computation<br>GBD data |
| Stroke                         | 5.37%         | Own computation<br>GBD data | 5.13%         | Own computation<br>GBD data |
| IHD                            | 8%            | Leong et al.<br>2014        | 8%            | Leong et al.<br>2014        |
| Neoplasms                      | 10.12%        | Own computation<br>GBD data | 12.97%        | Own computation<br>GBD data |
| Road injuries                  | 9.49%         | Own computation<br>GBD data | 13.42%        | Own computation<br>GBD data |
| Digestive diseases             | 13.46%        | Own computation<br>GBD data | 58.09%        | Own computation<br>GBD data |
| Respiratory diseases           | 13.38%        | Own computation<br>GBD data | 42.5%         | Ranaweera et al. (2018)     |
| Other NCDs as per NHA category | 10%           | Own computation<br>GBD data | 10%           | Own computation<br>GBD data |

By employing the AAF derived from morbidity (as outlined in equation 2 from Step 1 and described in Table 2 above), we proceeded to multiply this fraction with the NCD health expenditure obtained from the NHA, as shown in equation 3 below.

$$\text{Direct cost}_i = \text{Healthcare expenditure}_i * \text{AAF\_morbidity}_i \quad [3]$$

Where **Direct cost** represents the total healthcare expenditure of the alcohol-related disease, **Healthcare expenditure** is the amount of healthcare expenditure derived from the NHA accounts; **AAF\_morbidity** is the alcohol attributable fraction using YLDs, and *i* is the disease. This calculation enabled us to compute the direct costs attributed to NCDs specifically linked to alcohol use in Sri Lanka.

Since healthcare expenditure on road injuries was not available in the NHA and given the decision to include RTI in the model, we decided to use available national data to compute the direct cost of RTI. To do so, we used the data provided by Ranaweera et al (2018), on road injuries, which provides disaggregated epidemiological data on live discharges and costs of RTIs. Using the data from this source and adapting it to our 2018 burden analysis (adapting the cost to inflation and population), we estimate the cost of alcohol attributable RTI in Sri Lanka. It must be noted that our estimation did not encompass the outpatient costs utilized by Ranaweera et al. This decision aligns with UNDP's investment case methodology, which focuses on the public sector perspective and typically excludes such costs.

## Indirect cost

Building upon the insights gathered in Step 1 and leveraging data from the Labour Force Survey of 2018, we conducted an assessment to estimate the number of individuals affected by alcohol-attributable diseases who are actively employed within Sri Lanka's workforce. This analysis aimed to precisely quantify the impact of alcohol-related diseases on the labour force, providing valuable insights into the health-related challenges encountered by individuals actively engaged in the country's workforce.

Workplace costs and the cost of alcohol-attributable labour-force withdrawal represent the monetized value of lost time or productive capacity, as a result of alcohol-attributable diseases. The cost of alcohol attributable to mortality and disability accrues when alcohol use causes mortality or disability, eliminating the unique economic and social contributions that an individual would have provided in their remaining years of life. Moreover, compared to non-alcohol users, individuals who consume alcohol are more likely to miss days of work (absenteeism), and to be less productive at work due to alcohol-related factors (presenteeism).

To estimate the years of active labour lost to alcohol-attributable diseases (or the benefits of averting the incidence or mortality of these diseases), we estimated the remaining average years of working life for each age cohort by combining the remaining expected years of active labour with the probability of dying in each 5-year period, for which there is a specific projected mortality risk, as represented in the United Nations life tables for Sri Lanka.

To estimate the 'indirect' costs of alcohol-related diseases, another key input is the annual value (in terms of economic output) of each full-time worker in Sri Lanka. This is estimated as the GDP per employed person, defined as the country's GDP divided by its total employed labour force. National data on the total labour force aged 15 years and older, the unemployment rate and the labour force participation rate, as indicated in Table 3 below, were drawn from the Sri Lanka Labour Force Survey Annual Report (2018).

Using the rates of labour force participation, unemployment and mortality, the model identified the number of people of working age with alcohol-attributable diseases; subtracted those who chose not to participate in the labour force or were unemployed; subtracted those who, over the course of the latest year had to withdraw from the labour force specifically because of their alcohol-attributable diseases; and, finally, subtracted those who died from alcohol-attributable diseases in the latest year. This yielded the number of active workers with alcohol-attributable diseases.

## Labour Force Withdrawal

For reductions in the labour force due to illness (and not mortality), we look at the share of active workers who, as a result of an alcohol related NCD, become too ill or disabled to keep working, and have to withdraw from the labour force. This combines the number of active workers with a specific alcohol attributable NCD with a disease-specific labour force-withdrawal coefficient, sourced from Barnay and Debrand (2006) for all but diabetes, which come from Bommer et al. (2017). Furthermore, the likelihood of having to withdraw from the labour force is markedly different for those above or below 40 for those with diabetes, and as such has two such coefficients.

$$\text{Labour force withdrawal} = \frac{\text{Number of active workers with and alcohol attributable NCD}}{\text{Labour force withdrawal coefficient from that NCD}} \quad [4]$$

Where labour force withdrawal is the number of workers who are forced to quit work due to illness from an alcohol-related NCD, **Number of active workers with and alcohol attributable NCD** is derived as explained in the paragraphs above, **Labour force withdrawal coefficient from that NCD** is derived from the international estimates listed in Table 3 below.

In the absence of locally available data essential for estimating labour force withdrawal and presenteeism costs in Sri Lanka, we relied on established international estimates sourced from academic literature (referenced in **Table 3 and Table 4**) that have been consistently utilized in prior UNDP health investment cases. These recognized estimates serve as a valuable proxy, ensuring continuity and consistency in our methodology, albeit reflecting a global and outdated perspective rather than specific national data.

**Table 3: International estimates for labour force withdrawal**

| Indicator                                                    | Estimate | Source                           |
|--------------------------------------------------------------|----------|----------------------------------|
| Labour force participation rate reduction (hypertension)     | 0.0150   | Barnay, T., & Debrand, T. (2006) |
| Labour force participation rate reduction (stroke)           | 0.1800   | Barnay, T., & Debrand, T. (2006) |
| Labour force participation rate reduction (acute MI)         | 0.1000   | Barnay, T., & Debrand, T. (2006) |
| Labour force participation rate reduction (diabetes under40) | 0.0000   | Barnay, T., & Debrand, T. (2006) |

<sup>1</sup> Throughout its investment cases, UNDP has used GDP per worker as its variable for a proxy to the value of full-time workers, as the model is set in a way that looks at the impact of diseases on people of working age only, that are actively engaged in the labour force. We acknowledge that while using GDP per worker provides a standardized measure, it might overstate the income earned, disregarding the lower earnings prevalent in the informal sector.



| Indicator                                                    | Estimate | Source                           |
|--------------------------------------------------------------|----------|----------------------------------|
| Labour force participation rate reduction (diabetes over40)  | 0.0000   | Bommer, C. et al. (2017)         |
| Labour force participation rate reduction (cancer)           | 0.1000   | Barnay, T., & Debrand, T. (2006) |
| Labour force participation rate reduction (COPDlung disease) | 0.0800   | Barnay, T., & Debrand, T. (2006) |

## Presenteeism

Each disease has an expected factor of presenteeism related to it, which is then multiplied by the estimated number of active workers with each disease, which when multiplied by the average contribution of each worker to the economy produces a value of lost economic outcome due to presenteeism for each alcohol attributable disease. Following this, the indirect costs of presenteeism are computed. This is estimated as a share of the labour force with an NCD that is working and therefore has not passed away due to illness in the last year or been forced into early retirement from illness and disability.

$$\text{Presenteeism}_i = \text{prevalence}_i \text{ among active workers} * \text{reduction in fulltime hours due to presenteeism}_i * \text{GDP per worker} \quad [4]$$

Where **Presenteeism<sub>i</sub>** is the cost of reduced productivity at work from disease *i*, **prevalence among active workers** is the prevalence of disease *i* among the population actively engaged in the labour force, which is computed by multiplying the Alcohol Attributable Fraction<sub>Mortality</sub> (derived in Step 1) of the disease by its prevalence, **reduction in fulltime hours due to presenteeism from disease** is derived from **Table 4** below using international estimates, and GDP per worker is the total GDP divided by active workers.

Presenteeism coefficients drawn from academic literature are used to describe (a) the permanent reduction in labour force participation as a result of morbidity related to cardiovascular diseases, diabetes, cancer and COPD-lung disease; (b) the reduction in productivity due to presenteeism. Table 4 below describes the rates found in the literature.

**Table 4: International estimates for presenteeism**

|                                                               |        |                          |
|---------------------------------------------------------------|--------|--------------------------|
| Reduction in full-time hours due to presenteeism (CVD/stroke) | 0.0370 | Wang, P., et al., (2003) |
| Reduction in full-time hours due to presenteeism (diabetes)   | 0.0080 | Bommer, C. et al. (2017) |
| Reduction in full-time hours due to presenteeism (cancer)     | 0.0521 | Wang, P., et al., (2003) |
| Reduction in full-time hours due to presenteeism (COPD)       | 0.1165 | Wang, P., et al., (2003) |

## Absenteeism

For absenteeism, we combine numbers of average days out of work due to a disease and the previously mentioned average GDP per worker. The number of average days sick due to illness were sourced from Ranaweera et al (2018), which were Sri Lanka specific values. Within this component, we examined economic losses associated with missing days of work for seven conditions related to the risk factor alcohol use —hypertension, stroke, IHD, diabetes, cancer, COPD and RTI. Absenteeism costs due to alcohol-related conditions are derived from the following equation:

$$Absenteeism_i = (prevalence_i \times AAF \text{ Mortality}_i) \times missed\_days_i \times GDP\_worker \quad [6]$$

where **Absenteeism** are absenteeism costs,  $(prevalence_i \times AAF \text{ Mortality}_i)$  is the prevalence attributable to alcohol related diseases, **missed\_days** are the number of missed or lost workdays due to alcohol related diseases, **GDP\_worker** is GDP per worker, and **i** is the alcohol related condition.

According to Ranaweera et al (2018), absenteeism happens both in the context of inpatient and outpatient treatment, as well as recovery at home after hospitalization, and includes caregivers. Acknowledging UNDP's standard methodology, which does not incorporate caregiver costs, we opted to exclude this component from our analysis. This deliberate omission aligns our approach with the established framework, ensuring consistency with UNDP's methodology across various analyses and investment cases.

The authors take a slightly different approach to estimate absenteeism for “NCDs other than cancer” and “cancer” in terms of the nature of missed workdays they account for in each case. For “NCDs other than cancer”, they account for the average number of days of hospitalization, clinic visits and recuperation at home following consultation. For “cancer” they account for the average number of days of hospital stay, clinic visits and ICU days. In order to standardize both approaches, we opted for developing the methodology used for “NCDs other than cancer” and somewhat adapting the data used to estimate cancer absenteeism —not accounting for ICU days. The following equation depicts the number of average days out of work or missed days due to a disease as considered in the study:

$$missed\_days = n^{\circ}days\_hosp + n^{\circ}days\_rec + n^{\circ}days\_clinic \quad [7]$$

where  $n^{\circ}days\_hosp$ ,  $n^{\circ}days\_rec$  and  $n^{\circ}days\_clinic$  are the number of days of hospitalization, of recovery at home after hospitalization and of clinic visits of patients respectively.

To standardize, we follow the general rules explained in their article:

- i. determine the duration of hospital stay for each disease based on the literature and expert opinions.
- ii. estimate the duration of recovery at home after hospital stay as 60 percent of the hospital stay.
- iii. presume that NCD patients visit clinics once a month.

As explained above, GDP per worker is the key variable used for estimating the foregone income of workers with alcohol-attributable diseases. While Ranaweera et al (2018) measure average earnings using receivers' mean income, we decided not to follow this approach, to align with our standard methodology, which only accounts for the income received by people of working age.

The labour presenteeism and absenteeism cost was put together with the economic value of lost labour output, based on the numbers of workers who had died from alcohol-attributable diseases and workers who were forced to withdraw from the labour force because of an alcohol-attributable disease. This calculation resulted in the total indirect costs of each alcohol-attributable disease, for the latest year available.

The table below provides the key data used in Step 2 of the modelling. Detailed data on the healthcare expenditure and labour force can be found in the NHA 2018 and Labour Force Survey 2018.

**Table 5: Key indicators for economic burden**

| Indicator                                   | Value                                                                                                                                            | Source                                                                             |
|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| Exchange Rate (local currency/USD) 2018     | 0.006148                                                                                                                                         | <a href="http://Exchange-rates.org">Exchange-rates.org</a>                         |
| GDP (local currency)                        | 15,351,933,460,600                                                                                                                               | <a href="http://World Bank">World Bank</a>                                         |
| GDP (USD)                                   | 94,383,686,916                                                                                                                                   | $GDP\ LCU * exchange\ rate$                                                        |
| GDP per capita (local currency)             | 670,191                                                                                                                                          | Calculation                                                                        |
| GDP per capita (US\$)                       | 4,120                                                                                                                                            | Calculation                                                                        |
| Population (15 years & over)                | 16,196,232                                                                                                                                       | Labour Force Survey (2018)                                                         |
| Working pop who are working or seeking work | 8,387,759                                                                                                                                        | Labour Force Survey (2018)                                                         |
| Working Age Pop who are working             | 8,015,166                                                                                                                                        | Labour Force Survey (2018)                                                         |
| Retirement age (years)                      | 60                                                                                                                                               | International Labour Organisation                                                  |
| Labour force participation rate             | 51.8                                                                                                                                             | Labour Force Survey (2018)                                                         |
| Average number of days worked per year      | Average of 236 working days replacement holidays for those falling on weekends, 243 working days if people do not take the replacement holidays. | Excel Notes                                                                        |
| Total health expenditure (THE)              | 559,100,000,000                                                                                                                                  | NHA (2018)                                                                         |
| Government health expenditure as a % of THE | 45%                                                                                                                                              | NHA (2018)                                                                         |
| Government health expenditure               | 251,595,000,000                                                                                                                                  | Own computation ( $government\ health\ expenditure * total\ health\ expenditure$ ) |
| Healthcare expenditure on NCDs              | 175,111,300,000                                                                                                                                  | NHA (2018)                                                                         |
| CVD                                         | 24,251,600,000                                                                                                                                   | NHA (2018)                                                                         |
| Neoplasms                                   | 8,174,500,000                                                                                                                                    | NHA (2018)                                                                         |
| Diabetes                                    | 6,519,900,000                                                                                                                                    | NHA (2018)                                                                         |
| Respiratory disease                         | 47,506,900,000                                                                                                                                   | NHA (2018)                                                                         |
| Disease of the digestive                    | 19,966,800,000                                                                                                                                   | NHA (2018)                                                                         |
| Total NCDs listed here                      | 106,419,700,000                                                                                                                                  | Own computation ( $all\ NCDs\ added\ up$ )                                         |
| Other NCDs (all NCD-disease listed above)   | 68,691,600,000                                                                                                                                   | Own computation ( $all\ NCDs - diseases\ listed\ above$ )                          |

### Step 3: Identify alcohol control interventions

A set of five key alcohol control interventions was selected for the investment case, based on empirical evidence of their cost-effectiveness and WHO recommendations (WHO, 2019).

The current level of implementation of each intervention was assessed during institutional context analysis (ICA) interviews with key stakeholders in Sri Lanka, as well as through a landscape review of alcohol control laws in Sri Lanka and their implementation. Based on this information, we then adjusted the level of implementation of these interventions to match with the OneHealth Tool's (OHT) categorization of policy implementation level, which ranges from 1 to 4, where a score of 1 is associated with the intervention not being in place, and a score of 4 signifies that the intervention meets WHO standards. Consultation with experts enabled us to set the baseline level of each intervention. Each intervention was then scaled-up to level 4, except for the intervention on raising excise taxes, which was scaled-up to yield a 50 percent increase in current alcohol excise tax (more details in section 4.1).

Table 6: Status of alcohol-control interventions

| Intervention                         | Status                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Baseline |
|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| Restrictions on alcohol availability | The minimum legal age for sale of alcoholic beverages is 21. Sri Lanka has a comprehensive ban on alcohol use in most public places, with a partial statutory restriction of alcohol at leisure events (WHO, 2017)                                                                                                                                                                                                                                                                       | 2        |
| Drink driving counter measures       | Sri Lanka has a Blood Alcohol Concentration (BAC) limit of 0.08 for all drivers, including young or professional drivers. Breath testing for drink driving is most commonly determined by police officers rather than using a breathalyser kit. In addition, Sri Lanka has also implemented random-breath testing (WHO, 2017). Sri Lanka is one of few countries in the region, along with India and Thailand, that have implemented short-term detention for BAC offenders (WHO, 2017). | 3        |



| Intervention                                           | Status                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Baseline |
|--------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| Access to screening, brief interventions and treatment | <p>Alcohol screening/brief intervention has not been implemented into primary care. Of those receiving treatment for alcohol use disorders, 68 percent are treated in the public sector, 25 percent in the private sector, 5 percent joint public/private and 2 percent by non-governmental organizations (NGOs). The most commonly used treatment setting is mental health services (WHO,2017). As of 2017, there were four treatment and rehabilitation centres for drug and alcohol dependence. The state body, National Dangerous Drug Control Board, is responsible for drug abuse management and supports the rehabilitation centres (WHO, 2017). Sri Lanka has comparatively high availability of detoxification compared to other countries in the region. The coverage rate for inpatient and outpatient medical detoxification is 50 to 90 percent. There are 464 beds for alcohol and drug use disorders. However, the treatment coverage for long-term residential rehabilitation is less than 10 percent (WHO. Research suggests that a lack of awareness of alcohol use disorders and lack of knowledge about the prevalence in the community results in the underdiagnosis by physicians (Perera, C., 2016).</p> | 2        |

| Intervention                                                                          | Status                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Baseline |
|---------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| Bans or comprehensive restrictions on alcohol advertising, sponsorship, and promotion | <p>The National Alcohol and Tobacco Act prohibits any form of advertising, promotion and sponsorship of tobacco and alcohol products. However, policy fragmentation and lack of enforcement has resulted in advertisements and product placement still occurring in the country. Despite existing bans, Sri Lankan youth remain exposed to alcohol advertisements regularly. In the 2016 Global School-based Student Health Survey, 10.8 percent of students (13-17 years old) reported seeing alcohol advertisements almost daily. More than one in four (28 percent) reported seeing alcohol advertisements either “sometimes” or “more frequent” at sports events, fairs, concerts, community events or social gatherings (Ministry of Health, Nutrition and Indigenous Medicine and Ministry of Education, 2017).</p> <p>Moreover, according to the Public Opinion Survey on Alcohol Regulations conducted in 2021, 54 percent of respondents observed direct alcohol promotions through digital media in the previous 3 months and 77 percent observed indirect alcohol promotions through digital media during the same period (National Authority on Tobacco &amp; Alcohol, 2021).</p> | 2        |

| Intervention                         | Status                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Baseline                                                                                                                                                                                                                                  |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Excise taxes to raise alcohol prices | <p>Taxes account for approximately 75 percent of the price of alcoholic beverages (Economy Next, 2022).</p> <p>In 2023, the Ministry of Finance increased the excise duties on liquor. This sets excise duty at the following (Government notifications, 2023):</p> <ul style="list-style-type: none"> <li>o Special Arrack from licensed manufacturers in Sri Lanka –6,000 LKR per litre of alcohol.</li> <li>● Molasses, Palmyrah, Coconut and Processed Arrak manufactured in Sri Lanka – LKR 6,420 per litre of alcohol.</li> <li>● Spirits manufactured in Sri Lanka – LKR 6,600 per litre of alcohol.</li> <li>● Malt Liquor (5 percent and less) manufactured in Sri Lanka – LKR 4,750 per litre of alcohol.</li> <li>o Malt Liquor (5 percent and more) manufactured in Sri Lanka – LKR 4,980 per litre of alcohol.</li> </ul> | <p>A 50 percent uniform increase in the specific excise tax effective as of July 2023 for the most consumed type of arrack, beer and wine, over 5 years so that by 2028 the excise tax will be 50 percent higher than it currently is</p> |

#### Step 4: Estimate the financial costs of implementing the alcohol control policies and interventions modeled

The financial costs to the government of scaling-up or intensifying the existing policy alcohol interventions identified above are estimated using the WHO NCD Costing tool, as well as a separate tool from WHO for costing the clinical intervention ‘Access to screening, brief interventions and treatment’.

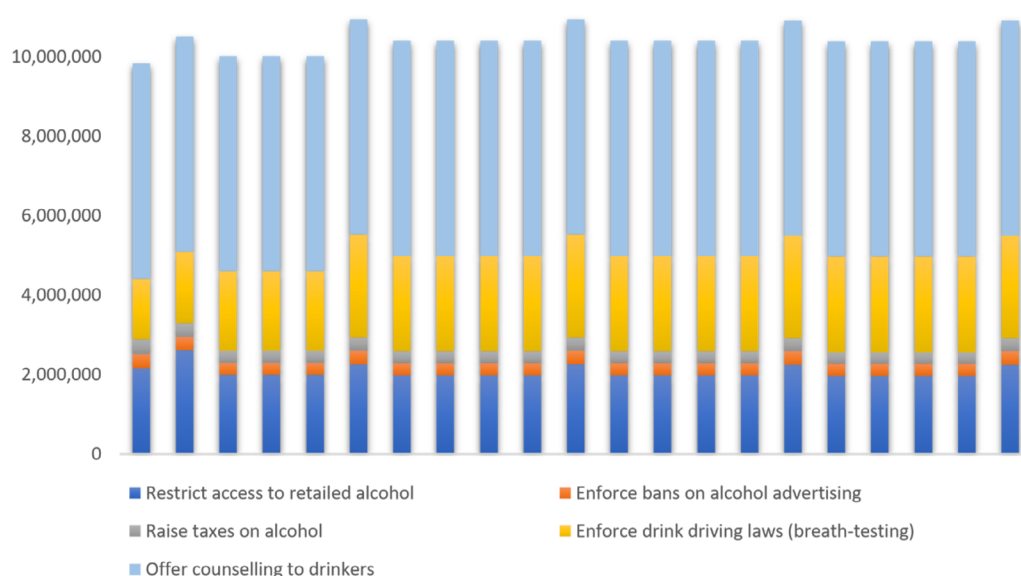
The NCD costing tool was developed by WHO to estimate the cost for all NCD policy interventions and has been applied to alcohol policies using the same quantity assumptions and scale-up patterns in 26 UNDP NCD investment cases to this day. Full explanations of the price and assumptions embedded in the WHO NCD Costing tool are available online (Chisholm et al., 2011). Two key components in determining the cost of the policy interventions are the current, or baseline level of implementation of these, and the policy implementation targets to be set for the 20-year modelling period, from 2024 to 2044. This modelling period was chosen to provide both short run (5 years) and medium run (20 years) estimations of the impact of scaled-up action on alcohol control.

For the clinical intervention screening, brief interventions and treatment, a specific tool was used, developed by WHO. The rationale behind using two different costing tools is to account for the differences in the nature of the interventions. Following discussion with costing experts we decided to use the NCD costing tool for the policy interventions and the WHO alcohol tool for the clinical intervention. Figure 1 below provides a summary of the cost of each intervention over the period modelled.

The costs are discounted at a rate of 3 percent, as a unit of currency in the future is worth less than that unit today owing to the time-value of money. This rate was selected to align with the standard discount rate used throughout UNDP's investment cases. However, we welcome expert opinion on a higher rate to better reflect Sri Lanka's inflation.

The figure below provides a summary of the yearly costs of each intervention, illustrating that the clinical intervention makes up for the largest share of total cost.

**Figure 1: Intervention costs (USD)**



The costing tool uses a “bottom up” or “ingredients-based” approach. In this method, each resource that is required to implement an alcohol control measure is identified, quantified, and priced. The Costing tool estimates the cost of several ‘building blocks’ used in many different policies, such as surveillance, human resources—for programme management, transportation, advocacy, and enacting and enforcing legislation— training and meetings, mass media, supplies and equipment, and other components. Within the Costing tool, costs accrue differently during four distinct implementation phases: planning (year 1); development (year 2); partial implementation (years 3-5); and full implementation (years 6 and onward). The tool was adjusted to best reflect the current situation in Sri Lanka, replacing readily available data with our own findings where relevant and feasible. The “Set Up” sheet of the tool is where most of the changes were made, with core inputs such as inflation, baseline level of each implementation, population and epidemiological data were inserted.

Since the WHO costing tool is available and known by most of our readers, and in the interest of space, we do not include each cost component used in the tool. However, for the clinical intervention tool, which is not available to the wider public, we provide a table with the costs making the majority of the intervention, the human resource cost. The full costing of this intervention is also available as a separate Excel sheet, upon request.

In the clinical intervention costing tool - which is currently a stand-alone tool



that will be adapted into the Integrated Health Tool (an improved and online version of the OHT) - the data used was either readily available data in the tool or estimated based on consultation with the developer of the tool. The data categories include human resources, training, meetings, mass media, supplies and equipment, other programme costs and healthcare. Table 7 below provides the details of the human resource costing.

**Table 7: Snapshot of ingredients used to cost the clinical intervention.**

| <b>HUMAN RESOURCES</b>                 |                                  |                                    |                 |
|----------------------------------------|----------------------------------|------------------------------------|-----------------|
| <b>Staff Category</b>                  | <b>Roles / responsibilities</b>  | <b>Gross salary per year (USD)</b> | <b>HR level</b> |
| <b>Administration</b>                  |                                  |                                    |                 |
| Programme Director                     | Oversight; Monitoring; Reporting | \$ 8,863                           | 4               |
| Programme Manager                      | Oversight; Monitoring; Reporting | \$ 5,474                           | 3               |
| Administration Officer                 | Data collection; Monitoring      | \$ 4,146                           | 2               |
| Clerical Officer/Administrative Asst.  | Data collection; Monitoring      | \$ 4,146                           | 2               |
| Personnel Secretary/Asst./Receptionist | Office support                   | \$ 3,180                           | 1               |
| Typist                                 | Office support                   | \$ 3,180                           | 1               |
| Epidemiologist                         | Monitoring and evaluation        | \$ 5,474                           | 3               |
| Data Entry Clerk                       | Data entry                       | \$ 3,180                           | 1               |
| Other (Porter, Messenger, etc.)        | General office maintenance       | \$ 3,180                           | 1               |
| <b>Finance</b>                         |                                  |                                    |                 |
| Finance Director                       | Financial management             | \$ 5,474                           | 3               |
| Accountant                             | Financial data entry/analysis    | \$ 4,146                           | 2               |
| Finance Officer                        | Financial data entry/analysis    | \$ 4,146                           | 2               |
| <b>Personal</b>                        |                                  |                                    |                 |
| Medical Specialist                     |                                  | \$ 8,863                           | 4               |
| Medical Officer                        |                                  | \$ 5,474                           | 3               |
| Nursing Director/Manager               |                                  | \$ 5,474                           | 3               |
| Registered Nurse                       |                                  | \$ 4,146                           | 2               |
| Health Worker                          |                                  | \$ 4,146                           | 2               |
| <b>Non-Personal</b>                    |                                  |                                    |                 |
| Director of Public Health              | Advocacy; Dissemination          | \$ 8,863                           | 4               |
| Public Health Specialist               | Admin / research support         | \$ 8,863                           | 4               |
| Public Health Officer/Assistant        | Advocacy; Dissemination          | \$ 5,474                           | 3               |
| Health Educator/Trainer                |                                  | \$ 5,474                           | 3               |

|                             |                                        |             |   |
|-----------------------------|----------------------------------------|-------------|---|
| Social/Welfare worker       |                                        | \$<br>4,146 | 2 |
| <b>Law</b>                  |                                        |             |   |
| Superintendent              | Supervision of new laws                | \$<br>5,474 | 3 |
| Police Officer              | Enforcement of new laws;<br>inspection | \$<br>4,146 | 2 |
| Lawyer                      | Development of new laws                | \$<br>8,863 | 4 |
| Legal Officer               | Development of new laws                | \$<br>4,146 | 2 |
| <b>Computing</b>            |                                        |             |   |
| I.S./I.T./Computing Manager | I.T. support                           | \$<br>5,474 | 3 |
| I.T./Computing Officer      | I.T. support                           | \$<br>4,146 | 2 |
| <b>Transport</b>            |                                        |             |   |
| Transport Manager           | Transport support                      | \$<br>5,474 | 3 |
| Transport Driver            | Transport support                      | \$<br>4,146 | 2 |
| <b>Logistics</b>            |                                        |             |   |
| Supplies Manager            | (local planning /<br>implementation)   | \$<br>5,474 | 3 |
| Storekeeper                 |                                        | \$<br>3,180 | 1 |
| <b>Media</b>                |                                        |             |   |
| Public Relations Manager    | PR                                     | \$<br>5,474 | 3 |
| Public Relations Officer    | PR                                     | \$<br>4,146 | 2 |
| <b>Maintenance</b>          |                                        |             |   |
| Cleaner                     | General office<br>maintenance          | \$<br>3,180 | 1 |
| <b>Buildings</b>            |                                        |             |   |
| Estate Manager              | For new buildings only                 | \$<br>5,474 | 3 |
| Security Officer            | For new buildings only                 | \$<br>4,146 | 2 |
| Construction Worker         | For new buildings only                 | \$<br>3,180 | 1 |
| <b>Other</b>                |                                        |             |   |
| Epidemiologist              |                                        | \$<br>5,474 | 3 |
| Excise Analyst              |                                        | \$<br>5,474 | 3 |
| Tax Enforcement Officer     |                                        | \$<br>5,474 | 3 |

## Step 5. Estimate the health impacts of strengthened alcohol control

The aim of step 4 is to estimate the impact of policy measures on reducing the health burden of diseases attributable to alcohol. The OHT, developed by the UN-Inter Agency Working Group on Costing, was used. The health impact analysis is carried out through the OHT's Spectrum software and uses the NCD impact module. The approach used is to assess different alcohol control policies' current level of implementation and then model these being scaled-up to the maximum level of implementation after a year.

The policy related to alcohol tax is different, as the excise tax rates on alcoholic beverages are modelled as increasing by 50 percent of a five-year period, to allow for gradual increase (see section 4.1 for further details). The current level of implementation of the NCD policy interventions were identified during ICA interviews with key national stakeholders such as NATA, as explained previously. It must be noted that for alcohol, the OHT uses an attributable fraction approach for mortality, unlike the other NCD risk factors. Detailed information on the methodology of the NCD impact module of the OHT is available online (Avenir Health, 2018).

### 5.1 Tax simulation methodology

The focus of this modelling is on the specific excise tax. Tax rates of specific excise on alcoholic drinks and VAT in Sri Lanka have been subject to several changes in recent years, which are shown in **Tables 5 and 6**.

For the analysis, we determine the average value of the content of alcohol per alcoholic beverage of standard size, identify the shares of current excise taxes in the retail prices of each beverage. This is done by converting tax rates per absolute liter of alcohol into tax rates per liter of drink (arrack, beer and wine).

As it is the specific content of pure alcohol in the alcoholic beverage that is subject to the excise tax, we approximate an average value of the content of pure alcohol for each type of beverage considered. These average values are shown in **Table 8**.

Table 8: Content of alcohol (l pure alcohol/l alcoholic beverage)

| Alcoholic beverage | Content of alcohol<br>(l pure alcohol/l alcoholic beverage) |
|--------------------|-------------------------------------------------------------|
| Arrack (Spirits)   | 0.40                                                        |
| Beer               | 0.045                                                       |
| Wine               | 0.12                                                        |

Table 9: Latest revisions of specific excise tax rates on different alcoholic beverages, per absolute liter (LKR)

| Alcoholic beverage                                                                                                         | Before Jan 03, 2023 | Jan 03, 2023 – June 30, 2023 | As of July 01, 2023 |
|----------------------------------------------------------------------------------------------------------------------------|---------------------|------------------------------|---------------------|
| <b>Special Arrack</b>                                                                                                      | 4,180               | 5,000                        | 6,000               |
| <b>Molasses/Palmyra/Coconut Arrack</b>                                                                                     | 4,460               | 5,350                        | 6,420               |
| <b>Country made foreign spirits</b>                                                                                        | 4,570               | 5,500                        | 6,600               |
| <b>Malt liquor (5% and less) (Beer)</b>                                                                                    | 3,300               | 3,960                        | 4,750               |
| <b>Malt liquor (above 5%) (Beer)</b>                                                                                       | 3,450               | 4,150                        | 4,980               |
| <b>Liquors manufactured by process other than distillation of natural products of palm tree or any other plant (wine?)</b> | 3,300               | 3,960                        | 4,750               |
| <b>Cider</b>                                                                                                               | -                   | 3,000                        | 3,600               |

Source: Department of Excise, Sri Lanka (2021, 2022, 2023)

Then, in order to estimate the final price from an increase in the current share of excise tax in the retail price, we needed to identify pre-VAT retail prices, pre-tax prices excluding the excise tax, and then estimate what the increased excise tax would be, estimate the new amount of VAT, and add this to the pre-VAT and tax retail price. For reporting purposes, we also break down the final retail prices into its tax and non-tax components.

Table 10: Latest revisions of the value-added tax (VAT)

| Nov 01, 2016 – Nov 30, 2019 | Dec 01, 2019 – May 31, 2022 | June 01, 2022 – Aug 31, 2022 | As of Sept 01, 2022 |
|-----------------------------|-----------------------------|------------------------------|---------------------|
| 15%                         | 8%                          | 12%                          | 15%                 |

Source: Department of Excise, Sri Lanka (2016, 2019, 2022a, 2022b)

We modeled a 50 percent uniform increase over 5 years in the specific excise tax for the most consumed type of arrack, beer and wine, so that by 2028 the excise tax will be 50 percent higher than it currently is. Taking 2023 as the base year, which corresponds to the latest revision of the excise rates, we model a constant rate of growth in the tax such that by 2023 it is 50 percent larger than it is in 2023. We estimate the final retail price for each product, which includes the simulated increased excise tax plus VAT, which is based on the total share of tax as percent of retail price, gives an estimate of the expected health impact of this measure.

We sourced retail prices from Euromonitor International (2023), which reports total value of sales and total volume sold and allowed us to estimate the retail price of standard sized products for the most sold brand among each category of alcoholic beverage. We use data from 2022 for prices of spirits, beer and wine, as they are the latest available data in the Euromonitor International Document. These retail prices include taxes—excise tax plus VAT—in force in 2022.

As the excise taxes and VAT have increased in recent years, we first needed to compute a pre-VAT price and then remove the excise tax for 2022. Once we isolated the retail prices net of taxes—excise and VAT—we proceeded to estimate the retail price for 2023 with the tax changes reflected in tables 6 and 7, and the retail prices for the 2024–2028 period with higher modelled taxes. For

2023, we first add the net of tax price to the corresponding excise tax for 2023, and then apply the VAT. For the period 2024-2028 we add to the net-of-tax retail price the simulated alcohol tax, which corresponds to the excise tax in force as of July 2023 with an annual increase, and then apply the VAT.

We identified the specific excise tax amounts for the absolute liter of different alcoholic beverages for both 2022 and 2023. We used the 2022 tax amount to isolate retail prices from the specific excise tax and VAT for that year and needed the 2023 tax amount since we use 2023 as the base year for the simulation of a future excise tax increase. For 2022 we use the tax rates in force before Jan 03, 2023, and for 2023 we use the more recent tax rates effective from July 01, 2023 (see **Table 6**). Even if we have two different tax rates for 2023, we choose the one in force as of July 2023, as it is the latest revision. From then, we take the official excise rates for special arrack for spirits, malt liquor (5% and less) for beer and liquors manufactured by process other than distillation of natural products of palm tree or any other plant for wine. For the 2024-2028 period we simulate the linear increase on the excise rate of the latest revision and convert it into the excise rate per liter of beverage using the approximate average value of the content of alcohol for each beverage (see **Table 8**) using the following equation:

$$exc_i = (excab_{2023} + \Delta \times excab_{2023}) \times alcont \quad [8]$$

where **exc<sub>i</sub>** is the excise rate per liter of alcoholic beverage which accounts for the incremental change in the tax rates for year **i**, **i** are years 2024-2028,  $\Delta$  is the incremental change, **excab<sub>2023</sub>** is the excise rate per absolute liter of alcohol corresponding to the latest revision in 2023 and **alcont** is the approximate average content of pure alcohol for each beverage size.

As for the VAT, it is currently 15 percent, but it has been subject to increases in recent years. For this analysis, we used 12 percent for 2022 and 15 percent for the period 2023-2028. We compute the pre-VAT retail price for 2022 as follows:

$$price\_ret(prevat)2022 = (price\_ret2022)/(1 + VAT_1) \quad [9]$$

Where **price<sub>ret</sub>(prevat)2022** are pre-VAT retail prices and **price<sub>ret</sub>2022** are retail prices for 2022. In this case, VAT is 12 percent. We compute pre-VAT retail price excluding excise tax for 2022 using the following formula:

$$price\_ret((prevat) - exc)2022 = price\_ret(prevat)2022 - exc_{2022} \quad [10]$$

where **price<sub>ret</sub>((prevat) - exc)2022** are pre-VAT retail prices excluding the 2022 excise tax and **exc<sub>2022</sub>** is the excise tax for 2022. Once we have the pre-VAT retail price excluding excise tax for 2022, we compute the retail prices for 2023 accounting for the approved excise tax rate in 2023. We then estimate the pre-VAT retail prices of each beverage from 2024-2028 and the simulated increased excise tax for the period 2024-2028.

$$price(ret((prevat) + exc)i) = price\_ret(prevat)2022 + exc_i \quad [11]$$



where **price\_ret((prevat) + exc)i** are pre-VAT retail prices for the period 2023-2028, **price\_(ret(prevat)2022)** is the pre-VAT retail price for 2022 and **exc\_i** is the excise rate per liter of alcoholic beverage. The final retail price accounting for the adjusted excise tax and charged with the VAT for period 2023-2028 is calculated as follows:

$$fprice\_ret(VAT + exc)i = price\_ret((preVAT) + exc)i \times (1 + VAT\_2) \quad [12]$$

where **fprice\_(ret(VAT + exc)i)** are final retail prices and **price\_(ret((prevat) + exc)i)** are pre-VAT retail prices inclusive of excise tax. Here VAT is 15 percent.

Finally, the total tax as a percentage of final retail prices for years 2023 to 2028, which is the key indicator inputted in the OHT for estimating the health impact of this alcohol control intervention, is computed as follows:

$$totaltax\_perc\_i = (fprice\_ret(VAT + exc)i - price\_ret((prevat) + exc)i + exc\_i) / (fprice\_ret(VAT + exc)i) \quad [13]$$

where **totalx. perc\_i** is the excise tax plus VAT as a percentage of retail prices, **fprice\_(ret(exc + VAT)i)** are final retail prices, **price\_(ret((prevat) + exc)i)** are pre-VAT retail prices once the excise tax has been included and **exc\_i** is the excise rate per liter of alcoholic beverage.

While excise tax rate is modelled to increase by 50 percent by 2029 the share of tax as percent of retail price is kept constant from 2029 onwards, throughout the entire modelling period (until 2044) to allow for increases in the nominal tax amounts to keep up with inflation.

## Step 6: Monetize the health impacts of strengthening the policy interventions, and quantify the return on investment (ROI) for the package of alcohol control measures

### Health impact monetization

The results from the health impact analysis estimating how much alcohol-attributable diseases are reduced as a result of implementing alcohol control policies were the principal input in identifying the economic value of implementing the package of alcohol policies.

The projected economic gains from implementing the set of alcohol control interventions were measured through the value of avoided presenteeism, the value of avoided absenteeism and the value of avoided mortality. The impact of an intervention, measured as the total avoided decrease in GDP, was calculated by combining the three types of gain.

To determine the ROI, the costs of investing in alcohol control interventions, as estimated in Step 3, are compared with the economic benefits arising from those investments. The economic benefits are directly proportional to the overall health impact of implementing or scaling up the interventions due to their impact on labour productivity and, eventually, economic output or GDP.

The first component of the economic benefits of investing in alcohol control interventions can be estimated by combining the relative average productivity per worker (GDP per employed person) and the reductions in rates of absenteeism and presenteeism. The second component of the economic

benefits of alcohol control is the increase in labour force participation, driven by avoided alcohol-attributable deaths.

This was calculated by considering the labour force participation rate in Sri Lanka and the projected number of deaths avoided among those of working age, which is projected in the OHT. For the estimated number of avoided deaths by age cohort, these were adjusted downward to yield an estimate of avoided deaths expected only among active workers. Avoided mortality was then monetized by multiplying the annual GDP per worker by the expected additional years of working life, by the number of each avoided death.

It must be noted, however, that the model does not assume that saving a 30-year-old person's life will automatically yield 30 more years of healthy labour. A 30-year-old person has a non-zero chance of dying before turning 60 (age of legal retirement in the formal public sector in Sri Lanka), and as such, the model adjusts down the number of years of expected working life by the gender and age-specific probability of dying, as individuals are projected to progress through their working years.

### Return on investment

An ROI is a performance measure used to evaluate the worthiness of healthcare investment. It compares the magnitude and timing of economic benefits from health interventions directly with the magnitude and timing of investment costs. ROI is the ratio of the discounted (present) value of the benefits to the discounted investment costs. Future costs and benefits are discounted since a unit of currency in the future is worth less than a unit today, owing to the time value of money.

The ROI for the alcohol control package in Sri Lanka was arrived at by comparing the economic impact (expected avoided decrease in GDP) of the interventions with the total costs of setting up and implementing the interventions. This ratio was estimated for the projected short (5 years) and medium run (20 years), which were adjusted with the net present value approach to future costs and economic gains, as explained above, with a three percent annual discounting of future costs and benefits.

$$\text{Return on Investment} = \frac{(\text{NPV economic benefits of scaled up action})}{(\text{NPV cost of package of interventions})} \quad [14]$$

Where **Return in Investment** is the ROI of the package of five alcohol control interventions, **NPV economic benefits of scaled - up action** is the value of monetized health benefits discounted at a 3 percent rate, and **NPV cost of package of interventions** is the total cost of the five alcohol control interventions, discounted at a 3 percent rate.

The ROI analysis was performed using an Excel model that had previously been developed jointly by UNDP and WHO to carry out NCD investment cases.

## Limitations

In several parts of the investment case, complex methods and specific assumptions were used. Many assumptions are for parameters that could be adjusted to make the results more accurate for the local context, such as the estimation of the impact and cost of a certain intervention. Lack of reliable and recent data has been a major barrier to accurately estimating this. Moreover, available tools used in this investment case, such as the OHT, possess several limitations, as listed below.

### 1. Burden analysis

There are a handful of limitations within the estimation of the economic burden of alcohol-attributable disease. To estimate the years of active labour lost to alcohol-attributable diseases (or the benefits of averting the incidence or mortality of these diseases), we estimated the remaining average years of working life for each age cohort by combining the remaining expected years of active labour with the probability of dying in each 5-year period, for which there is a specific projected mortality risk, as represented in the United Nations life tables for Sri Lanka. There is, however, also a clear non-zero probability of withdrawing from the labour force due to factors unrelated to mortality. This was something we were unable to include and correct for and represents a slightly larger number of years of working life lost attributable to alcohol-related diseases.

In addition, we included the inability to continue to participate in the labour force due to NCDs in our estimates but could not account for the impact of other diseases on unexpected early retirement. We therefore overestimate the size of the workforce who has to retire early due to alcohol related NCDs, as a share of these would have to retire early due to other causes. This would then also be an overestimate of presenteeism and absenteeism, as there would be an expected fewer number of workers as a result of early retirement due to other causes, which are not included. Similarly, we did not include in our model other exogenous economic factors, such as economic downturns, that may lead to long-term unemployment.

Several parameters of the estimate of the impact of disease on the inability to work, namely presenteeism and forced early withdrawal from the labour force, are from research in high-income countries, where social safety nets and labour laws exist to cushion the blow of illness and support individuals temporarily leaving the workforce. Application to the context of Sri Lanka is not ideal, and further research would be helpful for using parameters that more accurately represent the realities of people with alcohol-attributable diseases in middle-income countries who are ill but do not benefit from regulations to support them during their illness.

### 2. Costing

The costs to scale up and implement the four alcohol control policy interventions are based on a WHO NCD costing tool. This was developed over a decade ago and has a standardized approach for all countries. Approaches to delivering these policies can have evolved significantly since then, and these have not been taken into account by the tool.

The intervention Access to screening, brief interventions and treatment was costed through the WHO clinical intervention tool, which provides default data. It would be more effective to use national estimates, despite their complexity in estimation and collection, as they can offer a more accurate estimation of costs.

### **3. Health impacts**

The OHT possesses several core limitations in its ability to estimate accurately the health impacts of strengthened alcohol control. Firstly, the tool has a high minimum threshold for harmful alcohol consumption of three drinks a day. Thus, the tool only estimates the health impact of decreased consumption for drinkers that go from consuming three or more drinks a day to consuming less than this amount.

This significantly underestimates the health benefits of scaled-up action, as it ignores the health impacts on people who, for example, may decrease alcohol consumption from 20 to zero drinks a week (i.e., those that consume less than the threshold). Secondly, given that the tool uses an 'all-cause mortality approach', it does not account for changes in alcohol consumption on incidence of RTI and other diseases (detailed list available online at [avenirhealth.org](http://avenirhealth.org)), but only through mortality, and it does not allow for estimation of what changes to alcohol consumption has on these different health states and episodes, which represents a less accurate estimate of alcohol related-mortality avoided by the interventions, as well as the exclusion of key benefits of alcohol-related morbidity avoided by the interventions.

### **4. Economic benefits**

As the value of a year of employed life is best summed by a year's income, the human capital approach has been applied with data on average incomes in the formal and informal sectors to estimate a median yearly income for the entire working population. Given data constraints on the average income in the informal sector, the model uses a measure of GDP per employed individual as a proxy for average income. This is probably an overestimate, as factors such as income inequality make average values higher than median values, and the components that enter into GDP, including asset appreciation, are not reflected in individual incomes. Finally, the model only counts productive years as up to 60, the legal retirement age in Sri Lanka. Thus, the model does not account for people over 60 who continue to work, which represents a majority of the population.

## **C. Tobacco Control versus Alcohol Control Investment Cases**

There have been inquiries regarding the differences between the findings of tobacco investment cases and those of the alcohol investment case, particularly concerning the ROIs. It's essential to emphasize that comparing ROIs across different risk factors or diseases isn't advisable.

To start, the initial level of tobacco policies and interventions differs from that of alcohol interventions, indicating distinct scaling-up scenarios. Consequently, this leads to variations in both the costs of scaling up and the resulting impacts, both of which are critical elements for calculating ROIs.

Furthermore, the methodology outlined in the alcohol investment case indicates that the OHT only factors in the non-mortality related health effects of scaled-up actions for a limited set of NCDs related to alcohol. This results in an underestimation of the health benefits derived from scaling up actions, thus yielding conservative estimates.

Another factor preventing a direct comparison between tobacco and alcohol investment cases is the difference in the modeling years (tobacco investment case uses 2017 or 2018 data to estimate costs, while alcohol investments case uses 2023 data). Given Sri Lanka's substantial inflation over the past few years, comparing intervention costs across these two investment cases that are from different years, without accounting for inflation, would yield inaccurate results. Furthermore, in the years that passed between these two investment cases, Sri Lanka has made significant progress in addressing NCDs and implementing alcohol control policies, while also undergoing other demographic and epidemiological changes.



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