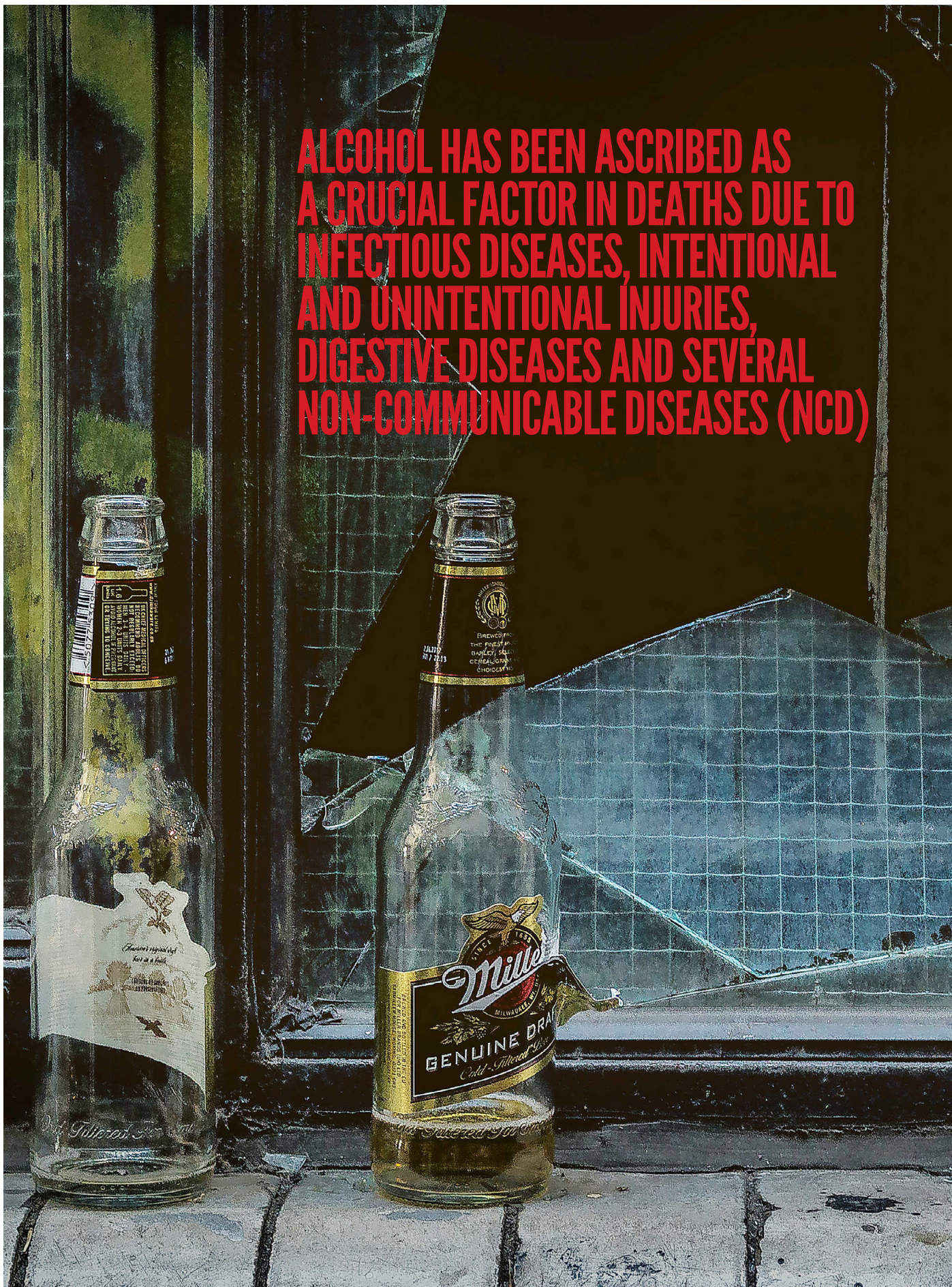


THE IMPACT OF ALCOHOL CONSUMPTION ON CARDIOVASCULAR HEALTH: MYTHS AND MEASURES



**A WORLD HEART
FEDERATION
POLICY BRIEF**

ALCOHOL HAS BEEN ASCRIBED AS A CRUCIAL FACTOR IN DEATHS DUE TO INFECTIOUS DISEASES, INTENTIONAL AND UNINTENTIONAL INJURIES, DIGESTIVE DISEASES AND SEVERAL NON-COMMUNICABLE DISEASES (NCD)





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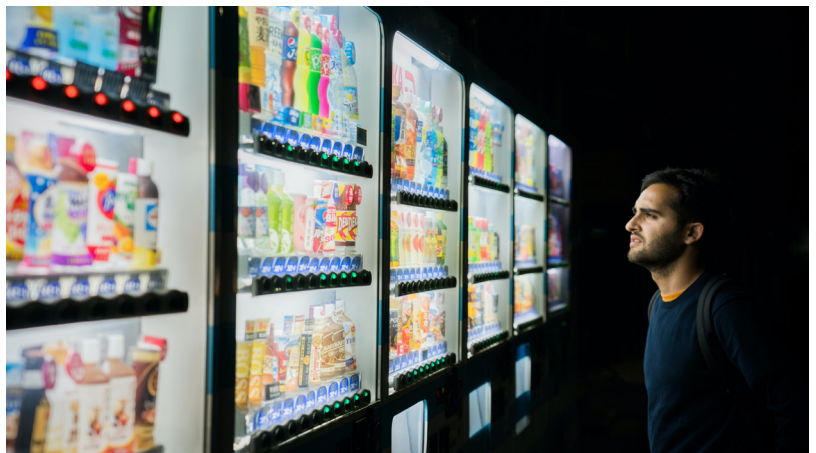
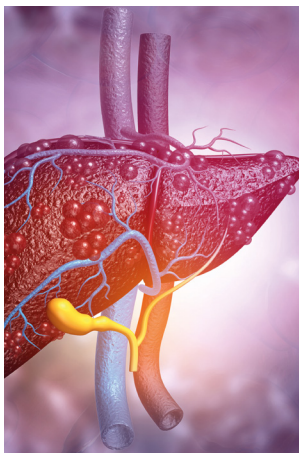
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EXECUTIVE SUMMARY



Over the past several decades, the prevalence of cardiovascular diseases (CVD) has nearly doubled, and alcohol has played a major role in the incidence of much of it. Alcohol has also been attributed in deaths due to infectious diseases, intentional and unintentional injuries, digestive diseases, and several other non-communicable diseases, including cancer.

The economic costs of alcohol-associated health outcomes are significant at the individual as well as the country level. Risks due to alcohol consumption increase for all the major cardiovascular diseases,

including hypertensive heart disease, cardiomyopathy, atrial fibrillation and flutter, and stroke. The widespread message for **over 30 years** from some researchers, the alcohol industry, and the media has been to promote the myth that alcohol prolongs life, chiefly by reducing the risk of CVD. Lack of universal advice and stringent policy measures have contributed towards increased uptake and easy availability of alcohol. The WHO has called for a **10% relative reduction** in the per capita use of alcohol between 2013-2030. However, lack of investment in proven alcohol control strategies, as well as persistence of misinformation and industry interference, have hindered the efforts of public health professionals' to make sufficient progress in reducing alcohol related harms and death.

INTRODUCTION

INTRODUCTION

The prevalence of cardiovascular diseases (CVD) has nearly doubled in the last two decades, with more than **500 million cases** being reported in 2019 alone⁽¹⁾.

More than 18.5 million individuals have died of CVD, making it the leading cause of global mortality and disability. Preventable behavioural risk factors play a major role in incidence of CVD, including unhealthy diet, tobacco use, alcohol consumption, and low physical activity⁽¹⁾.

Alcohol is a psychoactive and harmful substance that has become a common accompaniment of social events in many parts of the world. In addition to being commonly interspersed with the social lifestyles of individuals, the use of alcohol exhibits a socio-economic inequity.

Individuals with low socio-economic status experience a disproportionately greater alcohol-associated harm than individuals with high socio-economic status from similar or lower amounts of alcohol consumption. Furthermore, when compared by income groups, a higher overall burden of death was observed in lower and middle income countries compared to high-income countries⁽²⁾.



Alcohol was targeted in the Sustainable Development Goals (SDGs) under SDG 3.5, which calls on countries to “strengthen prevention and treatment of substance abuse, including narcotic drug abuse and harmful use of alcohol”⁽³⁾. This inclusion highlighted the role of alcohol as a development obstacle and its close association with many other SDGs and their targets. Alcohol adversely affects **14 out of 17 SDGs** and **54** of the targets that make up the 2030 agenda⁽⁴⁾.

With the unprecedented rise in the death and disability from alcohol-attributed CVD and other illnesses, it is imperative for countries and organizations to come together to impart a uniform, evidence-based message and policy agenda for alcohol control. In a brief survey of Members of the World Heart Federation, **44.4%** of respondents ‘strongly agreed’ and **51.9%** of the respondents ‘agreed’ that national cardiology foundations/societies should publish guidelines and advocate for domestic policies to address the impact of alcohol on cardiovascular health. This policy brief summarizes the:

- Epidemiology and pathophysiology of alcohol use
- Abridges the alcohol “harm versus benefit” debate
- Presents recommendations for strengthening alcohol control globally.



IN 2019 NEARLY

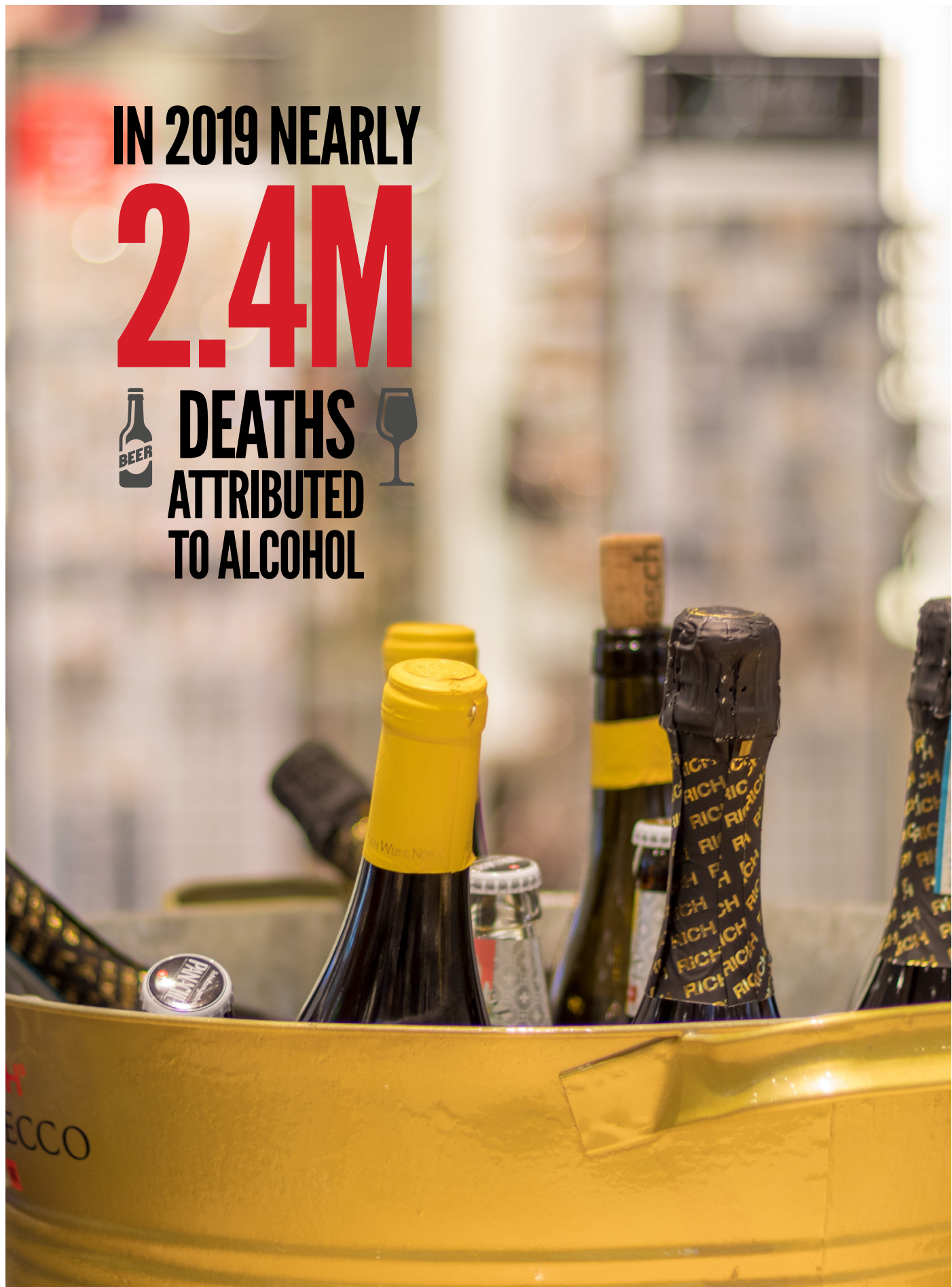
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**DEATHS
ATTRIBUTED
TO ALCOHOL**



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EPIDEMIOLOGY AND BURDEN OF ALCOHOL USE

Alcohol affects human physiology either through years of consumption, acute intoxication, or dependence⁽⁵⁾. It has been linked with approximately **230 ICD-10** (International Classification of Diseases, 10th edition) diseases, including **40 diseases** that would not prevail without alcohol⁽⁶⁾. **Alcohol has been ascribed as a crucial factor in deaths due to infectious diseases, intentional and unintentional injuries, digestive diseases and several non-communicable diseases (NCD)**⁽⁷⁾.

In 2016, high incidence of alcohol consumption was reported from high socio-demographic index (SDI) countries, where prevalence was **72% in females** and **83% in males**. In comparison, **8.9% of females** and **20% of males** were alcohol consumers in low and middle-income countries (LMICs)⁽⁸⁾. **In 2019, nearly 2.4 million deaths were attributed to alcohol, accounting for 4.3% of all deaths globally.**

Also, **more than 92 million DALYs** (Disability-adjusted life years) **were caused due to alcohol in the same year**⁽¹⁾. Alcohol has been attributed in cancers of the oral cavity and pharynx, larynx, oesophagus, liver, stomach, breast, colon and rectum⁽⁹⁾. Even a small amount of alcohol has

been linked with an increase in risk of breast cancer⁽⁹⁾. Women are less likely to consume alcohol than men; however, the use of alcohol may have more implications for women than men with respect to physical illnesses and more severe cognitive and motor impairment with a much lower alcohol exposure as compared to men⁽¹⁰⁾.

Some countries have also found a four time increased risk of multimorbidity in individuals who drink alcohol.⁽¹⁵⁾

Heavy drinkers have an increased risk of dying from liver cirrhosis⁽¹¹⁾ and there are a range of psychiatric disorders, particularly mood and anxiety disorders, associated with alcohol use⁽¹²⁾. Alcohol use has also been implicated in infectious diseases and poor health outcomes from such diseases. For example, heavy alcohol use causes a threefold increase in risk of active tuberculosis⁽¹³⁾. It is also known to exacerbate worse outcomes in HIV and tuberculosis patients due to decreased adherence to medicines, decreased health care utilisation,

and increased HIV risk behaviours due to lack of sobriety⁽¹⁴⁾. Some countries have also found a four time increased risk of multimorbidity in individuals who drink alcohol⁽¹⁵⁾.

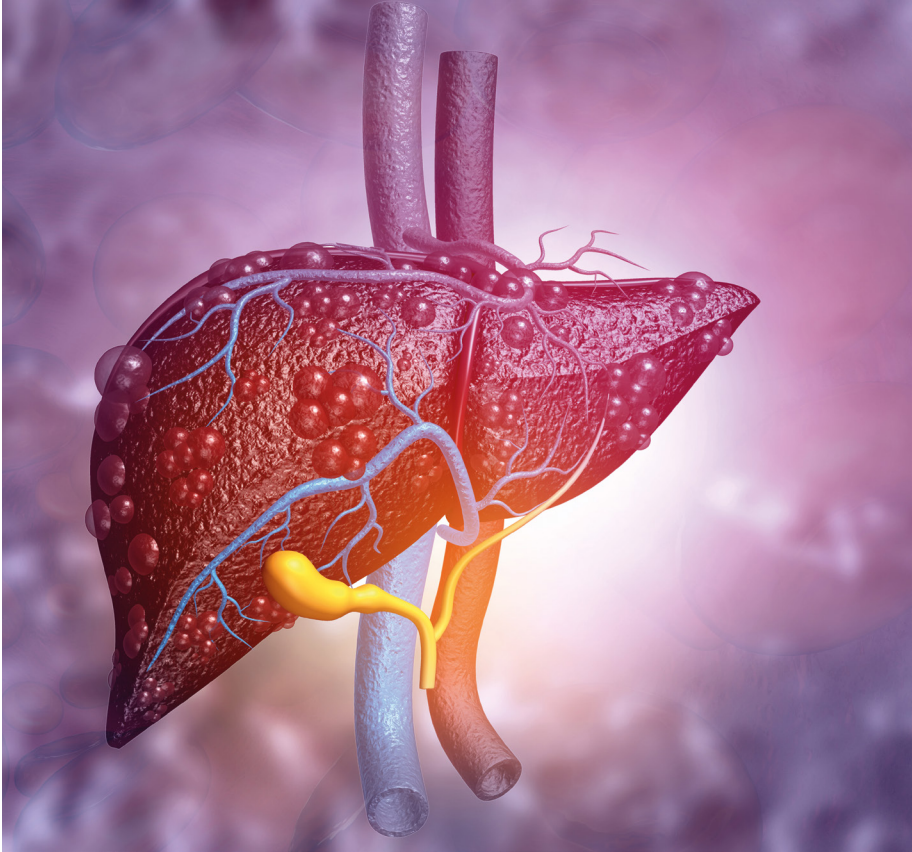
Beyond the direct consequences on health of the drinker, the use of alcohol is responsible for a significant societal impact and is linked with motor vehicle accidents, injuries, familial discord, and burden on a country's criminal justice system, among other negative outcomes⁽¹⁶⁾. Children with parents who suffer from alcohol addiction have also been shown to exhibit higher rates of alcoholism in their life span⁽¹⁷⁾.

Alcohol is also known to have a severe economic burden. Economic estimates from high income and middle income countries have shown that **1% of the gross domestic product (GDP)** of such countries was spent on alcohol associated costs such as criminal justice costs and measures of lost productivity⁽¹⁸⁾.

In a middle-income country such as India, it was estimated that direct and indirect costs from alcohol-related conditions would equate to **USD 1.87 trillion** between the years 2011 and 2050⁽¹⁹⁾, amounting to approximately **1.45% of the GDP per year** of the Indian economy. This significant societal burden of alcohol includes the health system's cost, out of pocket expenditure, and productivity losses.



PATHO-PHYSIOLOGY OF ALCOHOL USE



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In the Global Action Plan for Prevention and Control of NCDs, the World Health Organization (WHO) calls for a **10% relative reduction** in the per capita use of alcohol between 2013-2030.⁽²¹⁾ Based on recent evidence, it has been concluded that there is “no safe level of alcohol consumption.”⁽⁵⁾

Alcohol increases the risk for hypertensive heart disease, cardiomyopathy, atrial fibrillation and flutter, and strokes. In moderate drinkers, the risk of stroke is **1.14 times greater** (95% CI, 1.10-1.17); coronary disease (excluding myocardial infarction) is **1.06** (95% CI, 1.00 – 1.11); heart failure is **1.09** (95% CI, 1.03-1.15); fatal hypertensive disease **1.24** (95% CI, 1.15-1.33) and fatal aortic aneurysm is **1.15 times greater** (95% CI, 1.03-1.28).⁽²⁰⁾ It has been argued that people with moderate consumption and no binge episodes may appear to have a slightly lower risk of ischaemic heart disease (IHD), but the protective effect of moderate alcohol consumption for CVD has been challenged.⁽²²⁾

The myth surrounding the protective behaviour of alcohol has been suggested to be due to their role in increasing high-density lipoprotein (HDL) cholesterol.

However, many studies have not found any effect of high HDL in reducing the risk of myocardial infarction.⁽²³⁾⁽²⁴⁾⁽²⁵⁾ Alcohol has been associated with coronary calcification and increased carotid intima-media thickness, which can depreciate vascular health.⁽²⁶⁾⁽²⁷⁾

Contrary to popular opinion, alcohol is not good for the heart. This directly contradicts the common message over the past three decades from some researchers, the alcohol industry, and the media that alcohol prolongs life, chiefly by reducing the risk of CVD. For example, the use of red wine has been promoted through various diets as a “heart-healthy” beverage for the longest time. The presence of resveratrol in wine has been known for its cardioprotective characteristics in light to moderate drinkers. However, there are multiple reasons that the belief that alcohol is good for cardiovascular health is no longer acceptable:

- Such evidence has been mostly based on observational studies
- Few randomized controlled trials (RCTs) have confirmed health benefits of alcohol
- The presence of unaccounted confounding factors further weakens the quality of evidence
- Most evidence is observed only in the Caucasian population
- Some studies that show positive effects are funded by the alcohol industry.*

Research in the latest decade has led to major reversals in the perception of alcohol in relation to health in general and CVD in particular. These developments have prompted health authorities in a number of countries, e.g. the Netherlands⁽²⁸⁾, England⁽²⁹⁾ and Australia⁽³⁰⁾, to lower their recommended amount of alcohol for low-risk drinking.

The alcohol industry has also perpetuated misleading information about the benefits of drinking alcohol. This interference by the alcohol industry closely reflects the universally vilified activities of tobacco companies. Alcohol industries deceptively promote their products under the labels of “healthy” and “safe”. Portrayal of alcohol in print and electronic media as necessary for a vibrant social life has diverted attention from the harms of alcohol use. Youth-targeted advertisement and encouraging alcohol as “heart-healthy” have created a conducive environment for young adults to relate alcohol with ‘having a good time’. Contrary to this belief, evidence from all around the world exists to link alcohol with a range of non-communicable and infectious diseases.

Alcohol consumption increases the risk of CVD



TABLE 1: CAUTION FOR ALCOHOL USE BY TARGET GROUPS

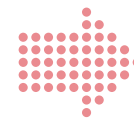
Target Group	What is the recommendation?	Justification for recommendation
People living with cardiovascular diseases and other chronic illnesses	Abstinence	Alcohol increases the risk for hypertensive heart disease, cardiomyopathy, atrial fibrillation and flutter, and strokes. It is attributed in many other infectious and non-infectious diseases as well.
Pregnant women or those who are breastfeeding	Abstinence	Consumption of alcohol during pregnancy has been linked with Foetal Alcohol Syndrome ⁽³¹⁾ , which is a combination of physical, behavioural and learning abnormalities in the new-born child. For mothers who are breastfeeding, no level of alcohol is safe for their babies.
Children and young people	Abstinence	Heavy drinking during adolescence and young adulthood is associated with lower neuro-cognitive functioning during the young adult years and particularly with impairment of attention and visio-spatial skills ⁽³²⁾ . Early onset of alcohol use increases the risk of poor health outcomes, poor academic outcomes, and other problems during adolescence as well as a risk of developing an alcohol use disorder later on in life. The brain of an individual develops until the age of 25 years and alcohol use during this period negatively affects the brain ⁽³²⁾ .
Adults with no underlying health conditions	For abstainers: Not advised to start drinking For drinkers: There are no safe recommended levels of alcohol consumption – those who drink are advised to consult with their doctor on how to make healthy choices.	Recent evidence has found that no level of alcohol consumption is safe for health. Alcohol consumption negatively affects mental and physical health and is also linked with poorer quality of life and poverty. Even in smaller quantities, alcohol consumption can increase the risk of breast cancer. It can cause more severe motor and cognitive dysfunction in women at much lower levels of consumption than men.



TABLE 2: ALCOHOL POLICY – BEST PRACTICES

	Measure	Why implement it?	Country Best Practice
10 WHO SAFER Best Buys ⁽³³⁾	S trengthen restrictions on alcohol availability	Restrictions on availability of unhealthy substances have proven to be cost-effective best-buy interventions for non-communicable disease prevention.	South Africa’s Liquor Amendment Bill prohibits licensed distributors from selling alcohol to unlicensed establishments ⁽³⁴⁾ .
	A dvance and enforce drink driving countermeasures	Road traffic injuries are a rising and major cause of death and disability, especially among young adults. In high income countries, 20% of fatally injured drivers were found with excess blood alcohol content, and 33%-69% of road traffic fatalities in low-income countries were attributed to alcohol use.	A cluster of best practices were identified in Lithuania, where policies such as increase in excise taxes on alcoholic products, increase in legal minimum purchasing and drinking age, and a full ban of alcohol advertisements led to a decrease in road traffic injuries over time ⁽³⁵⁾ .
	F acilitate access to screening, brief interventions, and treatment	Evidence indicates that imparting brief advice within primary care settings is a successful intervention to reduce alcohol use and prevent or mitigate progression to alcohol use disorder and addiction. Behavioural and pharmacological therapies have shown to be effective treatments for alcohol use disorder.	A randomized control trial conducted in South Africa showed a positive effect of alcohol screening and intervention using health education leaflets at the beginning of anti-tuberculosis treatment in primary care setting ⁽³⁶⁾ . In the Russian Federation, the Federal Law on Healthcare includes the provision of primary specialised care to people at risk of alcohol abuse, as well as those who indulge in harmful use of alcohol. The law was amended to include a focus on both prevention and treatment. With the recent revision of the law in 2019, the country offers “narcology” specialists in primary healthcare facilities and strict anonymity to patient ⁽³⁷⁾ .
	E nforce bans or comprehensive restrictions on alcohol advertising, sponsorship, and promotion	Restricting alcohol advertisement is important to decrease the incidence of alcohol use, considering the impact of these advertisement on adolescents and young people. Advertising bans will prevent adolescents and young adults from being exposed to alcohol and will prevent the alcohol industry from influencing social norms through wrongful depictions in their advertisements.	France’s Loi Evin (Evin’s Law) is a partial ban and includes comprehensive regulation of alcohol advertising, promotion, and sponsorship.* Finland is one of the first countries to ban alcohol advertisements on social media ⁽³⁴⁾ .
	R aise prices on alcohol through excise taxes and other fiscal policies	Increasing taxes on harmful substances increases their selling cost and subsequently decreases the affordability of such substances. Increasing taxes has been shown to be strongly associated with decrease in alcohol consumption and alcohol-related harms.	In South Africa, the taxation structure has changed from unitary taxes (based on the volume of the alcoholic beverage) to specific volumetric taxes (based on the value of the alcoholic beverage). As a result, there has been a shift in advertising to low-alcohol beers as they become more profitable to produce ⁽³⁸⁾ .
Other Good Practices	Establish and enforce a uniform minimum legal drinking age	Increase in legal age to drink alcohol has been found to lead to less drinking in adolescence and subsequently moderate drinking patterns and less frequent harmful drinking patterns as adults	The increase in the minimum legal drinking age in the USA has been associated with reduced suicide mortality and reduced night-time road traffic fatalities among 18-20 year olds by 17% ⁽³⁹⁾ .
	Mandate prominent health warnings on alcohol products	Studies have shown that putting health warnings on alcohol products was associated with an increase in perceptions of health risks of consuming alcohol, as well as greater intentions to reduce and quit alcohol consumption.	The Eurasian Economic Union’s technical regulation mandates provision of an ingredients list, health information, and an additional message of “recommendatory nature” to be put on all types of alcoholic beverages intended for human use. ⁽⁴⁰⁾

COUNTRY CASE STUDY⁽⁴¹⁾



After the dissolution of the Soviet Union and liberalisation in what is now the Russian Federation, alcohol consumption per capita increased to 20.4 litres by 2003, leading to significant alcohol-attributable mortality rates.

Per numerous studies, approximately 50% of all deaths among working-aged men were due to alcohol. In response, policy reforms were introduced to reduce alcohol consumption in Russia. These reforms included stricter penalties for drinking and driving, increases in excise taxes, setting minimum prices for some alcoholic products, restrictions on advertising, and restriction on alcohol availability. Strict alcohol control policies led to a significant reduction in alcohol-attributable morbidity and mortality. Between 2003 and 2016, alcohol consumption fell by 43%, alcohol dependence dropped, and a marked difference was observed in social impacts of alcohol (including suicide, homicide, and motor vehicle accidents) as well.



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RECOMMENDATIONS FOR ADVOCACY



National societies and organizations must play a central role in advocating for stricter alcohol control measures. The voices of public

evidence-based, public health-oriented agents are essential to ensuring the achievement of the Sustainable Development Goals and ultimately health equity.

To begin with, all such actors should uniformly indicate that no level of alcohol is safe, given the current evidence. Ministries should implement strict regulatory measures to dissuade direct and indirect impacts of alcohol use (see Table 2). Finally, national cardiology societies and foundations can play the following roles for ensuring reduction in alcohol use and its related harms:

- Advocate for the adoption of WHO's SAFER Guidelines in their local context⁽³³⁾
- Call for strict regulation of alcohol products
- Advocate for minimum pricing of alcohol products
- Build capacity internally and among peers to promote cessation of alcohol use and abstinence from alcohol

- Promote community, national, and global best practices and materials, such as the PAHO "Live better, drink less" campaign, and advocate for their uptake.
- Communicate evidence on the harms of alcohol use, including the clear messages that no level of alcohol is safe and alcohol consumption increases the risk of CVD
- Prioritise alcohol control in national agendas for health and support policy coherence between health and other sectors
- Facilitate screening for the use of alcohol and other substances as a part of risk mitigation during the health assessment of individuals visiting a health care centre
- Set the example of non-collaboration with the alcohol industry and/or its public relations groups.

*Citation: <https://www.paho.org/en/campaigns/live-better-drink-less>

REFERENCES

1. Global Health Data. GBD Results Tool. Institute for Health Metrics and Evaluation. 2019. Available from: <http://ghdx.healthdata.org/gbd-results-tool>
2. Probst C, Kilian C, Sanchez S, Lange S, Rehm J. The role of alcohol use and drinking patterns in socioeconomic inequalities in mortality: a systematic review. *Lancet Public Heal.* 2020 Jun 1;5(6):e324–32. Available from: www.thelancet.com/
3. United Nations. Sustainable Development Goals. 2015. Available from: <https://www.un.org/sustainabledevelopment/sustainable-development-goals/>
4. Movendi International. How alcohol affects the SDGs. 2019. <https://movendi.ngo/news/2019/12/04/new-resource-how-alcohol-affects-the-sdgs/>
5. Griswold MG, Fullman N, Hawley C, Arian N, Zimsen SRM, Tymeson HD, et al. Alcohol use and burden for 195 countries and territories, 1990–2016: A systematic analysis for the Global Burden of Disease Study 2016. *Lancet.* 2018;392(10152):1015–35.
6. Rehm, Ph.D. J, Borges G, Gmel G, Graham K, Grant B, Parry C, et al. The comparative risk assessment for alcohol as part of the Global Burden of Disease 2010 Study: What changed from the last study? *Int J Alcohol Drug Res.* 2013 May 1;2(1).
7. World Health Organisation. Global Status Report on Alcohol and Health. 2018.
8. Bagnardi V, Blangiardo M, Vecchia C La, Corrao G. Alcohol Consumption and the Risk of Cancer: A Meta-Analysis. *Alcohol Res Heal.* 2001;25(4):263. Available from: [/pmc/articles/PMC6705703/](https://pubmed.ncbi.nlm.nih.gov/12439712/)
9. Hamajima N, Hirose K, Tajima K, Rohan T, Calle E, Heath C, et al. Alcohol, tobacco and breast cancer--collaborative reanalysis of individual data from 53 epidemiological studies, including 58,515 women with breast cancer and 95,067 women without the disease. *Br J Cancer.* 2002 Nov 18;87(11):1234–45. Available from: <https://pubmed.ncbi.nlm.nih.gov/12439712/>
10. Ceylan-Isik AF, McBride SM, Ren J. Sex Difference in Alcoholism: Who is at a Greater Risk for Development of Alcoholic Complication? *Life Sci.* 2010 Jul;87(5–6):133. Available from: [/pmc/articles/PMC2913110/](https://pubmed.ncbi.nlm.nih.gov/12439712/)
11. Thun M, Peto R, Lopez A, Monaco J, Henley S, Heath C, et al. Alcohol consumption and mortality among middle-aged and elderly U.S. adults. *N Engl J Med.* 1997 Dec 11 [cited 2021 Jul 26];337(24):1705–14. Available from: <https://pubmed.ncbi.nlm.nih.gov/9392695/>
12. Cargiulo T. Understanding the health impact of alcohol dependence. *Am J Heal Pharm.* 2007 Mar 1;64(5 SUPPL).
13. Parry C, Rehm J, Poznyak V, Room R. Alcohol and infectious diseases: an overlooked causal linkage? *Addiction.* 2009 Mar 1;104(3):331–2. Available from: <https://onlinelibrary.wiley.com/doi/full/10.1111/j.1360-0443.2008.02500.x>
14. Azar MM, Springer SA, Meyer JP, Altice FL. A systematic review of the impact of alcohol use disorders on HIV treatment outcomes, adherence to antiretroviral therapy and health care utilization. *Drug Alcohol Depend.* 2010 Dec 1;112(3):178–93.
15. Keetile M, Navaneetham K, Letamo G. Prevalence and correlates of multimorbidity among adults in Botswana: A cross-sectional study. *PLoS One.* 2020 Sep 1;15(9):e0239334. Available from: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0239334>
16. Moss H. The impact of alcohol on society: a brief overview. *Soc Work Public Health.* 2013 May 1;28(3–4):175–7. Available from: <https://pubmed.ncbi.nlm.nih.gov/23731412/>
17. Solis JM, Shadur JM, Burns AR, Hussong AM. Understanding the Diverse Needs of Children whose Parents Abuse Substances. *Curr Drug Abuse Rev.* 2012;5(2):135. Available from: [/pmc/articles/PMC3676900/](https://pubmed.ncbi.nlm.nih.gov/23731412/)
18. Casswell S, Thamarangsi T. Reducing harm from alcohol: call to action. Vol. 373, *The Lancet.* Elsevier; 2009. p. 2247–57.
19. Jyani G, Prinja S, Ambekar A, Bahuguna P, Kumar R. Health impact and economic burden of alcohol consumption in India. *Int J Drug Policy.* 2019 Jul 1;69:34–42. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/31055044>
20. World Health Organisation. Global Action Plan for Prevention and Control of Non Communicable Diseases 2013–2020. 2013. Available from: www.who.int
21. Wood AM, Kaptoge S, Butterworth AS, Willeit P, Warnakula S, Bolton T, et al. Risk thresholds for alcohol consumption: combined analysis of individual-participant data for 599 912 current drinkers in 83 prospective studies. Vol. 391, *The Lancet.* 2018. Available from: www.thelancet.com
22. Naimi TS, Brown DW, Brewer RD, Giles WH, Mensah G, Serdula MK, Mokdad AH, Hungerford DW, Lando J, Naimi S, Stroup DF. Cardiovascular risk factors and confounders among nondrinking and moderate-drinking U.S. adults. *Am J Prev Med.* 2005 May;28(4):369–73. doi: 10.1016/j.amepre.2005.01.011. PMID: 15831343.
23. Briel M, Ferreira-Gonzalez I, You JJ, Karanicolas PJ, Akl EA, Wu P, et al. Association between change in high density lipoprotein cholesterol and cardiovascular disease morbidity and mortality: Systematic review and meta-regression analysis. *BMJ.* 2009 Feb 28;338(7693):b92. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/19221140>
24. Schwartz GG, Olsson AG, Abt M, Ballantyne CM, Barter PJ, Brumm J, et al. Effects of dalcetrapib in patients with a recent acute coronary syndrome. *N Engl J Med.* 2012 Nov 29 ;367(22):2089–99. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/23126252>

25. Voight BF, Peloso GM, Orho-Melander M, Frikke-Schmidt R, Barbalic M, Jensen MK, et al. Plasma HDL cholesterol and risk of myocardial infarction: A mendelian randomisation study. *Lancet*. 2012;380(9841):572–80.
26. Pletcher MJ, Varosy P, Kiefe CI, Lewis CE, Sidney S, Hulley SB. Alcohol consumption, binge drinking, and early coronary calcification: findings from the Coronary Artery Risk Development in Young Adults (CARDIA) Study. *Am J Epidemiol*. 2005;161(5):423–33. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/15718478>
27. Juonala M, Viikari JSA, Kähönen M, Laitinen T, Taittonen L, Loo BM, et al. Alcohol consumption is directly associated with carotid intima-media thickness in Finnish young adults. The Cardiovascular Risk in Young Finns Study. *Atherosclerosis*. 2009;204(2):e93-8. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/19124122>
28. Kromhout D, Spaaij CJK, De Goede J, Weggemans RM, Brug J, Geleijnse JM, et al. The 2015 Dutch food-based dietary guidelines. Vol. 70, *European Journal of Clinical Nutrition*. Nature Publishing Group; 2016. p. 869–78.
29. Department of Health. UK Chief Medical Officers' Alcohol Guidelines Review. 2016.
30. Australian Government, National Health and Medical Research Council. Australian Guidelines to Reduce Health Risks from Drinking Alcohol . 2019.
31. Riley EP, Mattson SN, Thomas JD. Fetal alcohol syndrome. In: *Encyclopedia of Neuroscience*. Elsevier Ltd; 2009. p. 213–20.
32. Squeglia LM, Jacobus J, Tapert SF. The effect of alcohol use on human adolescent brain structures and systems. In: *Handbook of Clinical Neurology*. Elsevier B.V.; 2014. p. 501–10.
33. World Health Organization. The SAFER technical package. 2019. Available from: <https://www.who.int/publications/i/item/the-safer-technical-package>
34. Hammer JH, Parent MC, Spiker DA, World Health Organization. Global status report on alcohol and health 2018. Vol. 65, *Global status report on alcohol*. 2018. 74–85 p. Available from: http://www.who.int/substance_abuse/publications/global_alcohol_report/msbgsruprofiles.pdf?0Ahttp://www.ncbi.nlm.nih.gov/pubmed/29355346
35. Rehm J, Manthey J, Lange S, Badaras R, Zurlyte I, Passmore J, et al. Alcohol control policy and changes in alcohol-related traffic harm. *Addiction*. 2020;115(4):655–65. Available from: <https://onlinelibrary.wiley.com/doi/full/10.1111/add.14796>
36. Peltzer K, Naidoo P, Louw J, Matseke G, Zuma K, Mchunu G, et al. Screening and brief interventions for hazardous and harmful alcohol use among patients with active tuberculosis attending primary public care clinics in South Africa: results from a cluster randomized controlled trial. *BMC Public Heal*. 2013;13(1):1–12. Available from: <https://bmcpubhealth.biomedcentral.com/articles/10.1186/1471-2458-13-699>
37. Neufeld M, Bunova A, Gornyi B, Ferreira-Borges C, Gerber A, Khaltourina D, et al. Russia's National Concept to Reduce Alcohol Abuse and Alcohol-Dependence in the Population 2010–2020: Which Policy Targets Have Been Achieved? *Int J Environ Res Public Health*. 2020;17(21):1–53. Available from: [/pmc/articles/PMC7664947/](https://pmc/articles/PMC7664947/)
38. Blecher E. Taxes on tobacco, alcohol and sugar sweetened beverages: Linkages and lessons learned. *Soc Sci Med*. 2015 Jul 1;136–137:175–9.
39. Christopher C, Dobkin C. The minimum legal drinking age and public health. *J Econ Perspect*. 2011;25(2):133–56. Available from: <https://www.aeaweb.org/articles/pdf/doi/10.1257/jep.25.2.133>
40. Neufeld M, Ferreira-Borges C, Rehm J. Implementing health warnings on alcoholic beverages: On the leading role of countries of the commonwealth of independent states. *Int J Environ Res Public Health*. 2020;17(21):1–20. Available from: <https://pubmed.ncbi.nlm.nih.gov/33172090/>
41. World Health Organization Regional Office for Europe. Alcohol Policy Impact Case Study: The effects of alcohol control measures on mortality and life expectancy in the Russian Federation. 2019. Available from: <http://apps.who.int/bookorders>.

IMPACT OF ALCOHOL

THE IMPACT OF ALCOHOL CONSUMPTION ON CARDIOVASCULAR HEALTH: MYTHS AND MEASURES



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