HEALTH AND SOCIAL BENEFITS FROM REDUCED ALCOHOL CONSUMPTION:

When Less is More

ALCOHOL AND SOCIETY 2025

A REVIEW OF INTERNATIONAL AND SWEDISH RESEARCH

by Frida Dangardt, Harold Holder, Tim Naimi, Tim Stockwell, Sven Andréasson, Tanya Chikritzhs

Organisations initiating this report are voluntary or academic organisations independent of commercial interests.

CERA is an interdisciplinary and collaborative centre for education and research into hazardous use, abuse and addiction at Gothenburg University – which works to strengthen and develop research and education in the field of addiction, and to disseminate scientific expertise to people working professionally in the field of abuse and addiction, and other interested parties.

The Swedish Brain Foundation (Hjärnfonden) works for a society free of brain disease. The Swedish Brain Foundation raises money for research and information about the brain and its diseases, injuries and disabilities. and works to increase knowledge among the general public.

IOGT-NTO focuses on the effects of alcohol and narcotics on individuals and society, but is also engaged in broad social and club activities.

Junis is a child rights organization that offers environments and activities where children are free to be children. Junis runs local clubs across the whole of Sweden where the children have a say in planning the activities. We advocate for the right to a safe childhood free of alcohol and other drugs. Everything we do is based on principles of democracy, solidarity and soberness.

Movendi International is the largest independent global movement for development through alcohol prevention. Movendi unite, strengthen and empower civil society to address alcohol as serious obstacles to development on personal, community, societal and global level.

SFAM is the professional and scientific college of general practitioners (family physicians) in Sweden with continuing professional development, training of future GPs, assessment of competence, quality improvement and research in general practice/family medicine as main areas of interest.

The foundation **Stiftelsen Ansvar För Framtiden** aim to further Nordic cooperation and scientific research regarding sober life styles, public opinion in this regard, as well as care of children. The foundation have eight member organisations in three Nordic countries.

The Swedish Society of Nursing is a nonprofit organization and a forum for discussing and developing nursing care by promoting nursing research, ethics, education and quality in nursing.

Sveriges Landsråd för Alkohol- och Narkotikafrågor is an umbrella organisation for county temperance organisations in Sweden and other organisations who work for restrictive alcohol and drug policies.

UNF is an NGO of young people for young people. UNF provides opportunities for youth to development, influence society and simply to spend time with awesome people. All activities, projects, programs and campaigns are created by young people, for young people.

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Foreword

Alcohol affects both individuals and society in profound ways – from health risks and addiction to social and economic consequences. Despite this, research on the harmful effects of alcohol often does not reach the public in an accessible way.

That is why we are jointly releasing this report series – to share knowledge that can contribute to more informed decisions, both at an individual level and in society as a whole. By increasing awareness, we can work towards a future where fewer people suffer from alcohol-related harm.

This year's report focuses on the health benefits and positive societal effects that can result from reduced alcohol consumption. The report shows that lower alcohol consumption leads to improved heart- and mental health, as well as reduced risk of alcohol-related cancer. On a population level, case studies show that reduced availability and consumption of alcohol result in significant public health benefits.

We would like to thank the research team for their outstanding work on this year's report, and hope that you, as a reader, find it thought-provoking.

The organisations initiating this report

Executive summary

- Alcohol causes significant global harm. Health risks increase with the amount, pattern, and duration of alcohol use. This report reviews evidence for the benefits of reduced alcohol use for individuals and for populations.
- Health benefits of reducing alcohol:
  - **Cardiovascular:** Lowers blood pressure, improved heart function, and reduced risks of heart disease, stroke, and atrial fibrillation, especially for heavy drinkers.
  - **Cancer:** Lowers risk of alcohol-related cancers, notably cancers of the mouth, throat, oesophagus, colon and female breast, especially for heavy drinkers.
  - **Brain health:** Reducing consumption, avoiding binge drinking and delaying onset of alcohol use (i.e. in youth) all promote cognitive and neurological health and reduce the risk of dementia, especially early onset.
  - **Mental health:** Improved mental well-being, reduced depressive symptoms and enhanced quality of life.
  - **Reproductive health:** Reduced miscarriage risk and improved fertility in both men and women.
- Population-level impacts: Reducing per capita alcohol consumption reduces alcohol-related diseases, injuries, and deaths. Abrupt reductions in population consumption (e.g. during strikes by alcohol workers or comprehensive COVID-19 restrictions) have shown substantial public health benefits.
- Global policy gaps: Unlike tobacco, there is no global framework for alcohol regulation. WHO recommends that national policies raise alcohol prices (e.g. through taxation), limit availability, promote early interventions and restrict marketing to effectively reduce harm.

Conclusion: Reduced alcohol consumption at both the population and individual levels results in substantial health and social benefits. Effective policy measures such as taxation, availability restrictions, and marketing bans can drive population-wide change. On an individual level, initiatives like time-limited abstinence campaigns, support for behaviour change, and tailored health interventions can help people reduce their alcohol intake, leading to improved physical and mental health outcomes.

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She has qualifications in epidemiology and biostatistics, some 20 years experience in alcohol research and a national profile as an expert in her field. Her research covers many areas of alcohol policy and alcohol epidemiology, such as alcohol consumption, alcohol related harms, alcohol taxation, liquor licensing, alcohol and heart disease, and alcohol and cancer.

She has received many awards including the prestigious Commonwealth Health Ministers Award for Excellence in Health and Medical Research and an NHMRC Achievement Award (1st ranked in Population Health).

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Dr. Holder holds a doctorate in communication science and mathematical sociology from Syracuse University. He has explored two major alcohol research areas: the prevention of substance abuse, and the cost and benefits of alcoholism and drug abuse treatment and published work on the impact of changes in retail sales of wine and spirits on drinking and alcohol-involved traffic crashes. His policy studies also include assessments of the prevention potential of alcohol server liability, mandated server training, and environmental strategies as part of comprehensive approaches to prevention. Dr. Holder has undertaken a series of collaborative

studies in the Nordic Countries to study the effects of public policies. These collaborations with researchers from Sweden, Norway, and Finland concern the role and changes in alcohol policy resulting from membership or association in the European Union. In addition, Dr. Holder has participated with prevention scientists from a dozen countries in international projects to document the effects of alcohol policy. The projects have produced three books in which he was a co-author, Alcohol Policy and the Public Good (1994), Alcohol: no ordinary commodity – Research and public policy (2003) and Alcohol: no ordinary commodity, second edition (2010). His most recent professional work has entailed working with a number of U.S. states and local communities on the application of prevention science to practice.

Recently Dr. Holder chaired an international research group in an evaluation of Swedish research on alcohol, narcotics, doping, tobacco and gambling for the Swedish Council for Working Life and Social Research. The evaluation report was published in 2012.

Dr. Holder has received the 1995 Jellinek Memorial Award, awarded for distinction gained by advancing knowledge about alcoholism or fostering its study, treatment, or prevention.

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Tim Stockwel is a Fellow of the Royal Society of Canada and past recipient of the 2013 international E.M. Jellinek Memorial Award for Outstanding Research on Alcohol Policy.

1 Introduction

There are a number of reasons why people choose to drink alcohol or not drink alcohol. In terms of health and social problems alcohol causes substantial harms in Sweden and globally. Although there is much discussion about health effects of low levels of consumption, possible benefits seem increasingly implausible and are insignificant in comparison to the harms. Whether for populations or individuals, these harms are directly related to (among other factors, modifiable and unmodifiable) the dose of ethanol, the patterns with which alcohol is consumed (e.g. small amounts most days, high amounts once a week), and the number of years over which this occurs.

People reduce consumption or stop drinking for a variety of reasons. Some of these are based on "environmental" factors such as changes in alcohol policy that make alcohol less affordable or available, a shift in "social norms" around drinking such that it becomes less desirable or appealing, or changes within one's immediate social network (e.g., a new partner who encourages less drinking). There are also individual-level factors that tend to lead to reduced consumption. In general, as people age the balance of alcohol's pleasurable vs. unpleasant effects tends to shift such that people often consume less alcohol as they age. Similarly, those who become frail or who develop medical conditions may reduce their consumption or stop drinking altogether. Some may cut back because they want to improve health, sleep better, lose weight, save money or improve their relationships. Others may reduce consumption or abstain from alcohol use in an effort to address an alcohol use disorder. The key point is that alcohol consumption is not static – people can and do change their consumption, and alcohol consumption is far more modifiable than it is fixed.

With respect to the health of populations or individuals, the overwhelming conclusion from the past several decades of scientific literature is that "less is better than more". Yet too often the focus is on the harms and the effects of the "more", while relatively less attention is paid to the benefits of drinking less, and ways in which less drinking might be achieved. So, in this report we will focus on the more optimistic side of the story i.e., the extent to which alcohol-related harms are reduced when alcohol consumption is reduced among individuals or in whole populations. In other words, what does the scientific evidence say about the effects of drinking less, and how do we get there as societies or as individuals interested in reducing consumption?

First, we will examine evidence on health outcomes of reductions in consumption for individuals who choose to cut down or cease drinking, whether through participating in abstinence or controlled drinking treatment programs, participating in time-limited alcohol abstinence campaigns (e.g. "Dry

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January") or independently for health reasons. Next, we will report outcomes for major natural experiments or events which involved substantial population-level reductions in alcohol consumption, whether deliberately through temporary or longer lasting limits on alcohol sales or through sudden reductions in alcohol availability. We note that alcohol policies globally, particularly over the last few decades and since World War II, have mostly involved relaxing alcohol availability and most published studies concern effects from increases in consumption. There are exceptions to this, for example restrictions introduced in Gorbachev's Russia and in some countries in response to the COVID-19 pandemic. Other examples include strikes by alcohol workers employed by government alcohol monopolies e.g. in Canada and some Nordic countries.

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Finally, we will briefly review evidence about the kinds of policies that lead to significant reductions in a population's consumption of alcohol (i.e. population-level) and thereby result in population-wide health benefits. In addition to reviewing research evidence, we use case studies that provide graphic illustrations of how powerful abrupt or large reductions in alcohol consumption can be for improving health outcomes, for both individuals and populations. It may surprise some readers that the best and most effective strategies for reducing population-level consumption and harms are whole-of-population focussed rather than targeted at specific behaviours of vulnerable groups. Attempts to isolate and reduce risks among specific groups often fail because relationships between average behaviours and the prevalence of problem behaviours requires that in order to help vulnerable minorities, the broader population must also change. A more effective approach requires collective responsibility for societal health and well-being (exceptions to the rule will be noted and explanations provided).

We also provide some suggestions for individuals seeking to reduce their alcohol consumption (see Box 4, page 23)

We will ground the report in published comprehensive and systematic reviews, also prioritising significant international as well as Sweden-specific studies that are both recent and of high quality.

Case studies chosen are indicative of more general findings highlighted in high quality literature reviews. Some of these will be historical in nature, thereby capturing some of the lessons of history in relation to alcohol prohibition and other restrictions on availability.

BOX 1

This report, as with all others, is undertaken in two major steps. First, an extensive search is completed to identify relevant published science. Second, the search results are reviewed and summarized. This is done by in-person discussions and evaluation of the strength of scientific methods of studies by the group as well as opportunity to discuss each written draft in total as a group. In the end, all authors contribute writing, reviews, and edits to all sections of the report. The result is truly a group product extending over several months.

2 Cutting down or stopping drinking: physical and mental health outcomes among individuals

This chapter is focused on studies focusing on individual-level benefits of cutting down or stopping drinking. The "bottom line" is that in terms of deaths from all causes (i.e. all-cause mortality), well-being, and a range of health conditions (e.g., cardiovascular diseases, alcohol-related cancers, gastrointestinal illness, mental health and cognition including dementia), there is substantial evidence that drinking less is better for health than drinking more.

Most of this evidence comes from studies that assess risk relationships between various levels of consumption. Even though these studies typically assess information about consumption and outcomes over time, they tend to compare risks among groups of people who consume greater or lesser amounts of alcohol. There are many observational studies of this type across various conditions. In recent times research evidence in this area has been greatly strengthened by the addition of Mendelian (i.e., genetic) randomization (MR) studies about the effects of alcohol on coronary heart disease, stroke, hypertension, diabetes and dementia. While these studies

Reductions in drinking, generally or among those who drink heavily and/or have an alcohol use disorder, indicate improvements in overall health.

affirm better outcomes for those who drink less than heavy levels (i.e. consistent with observational data), they find no benefits from low levels of consumption (this has been controversial for conditions including coronary heart disease, stroke and dementia).

The studies discussed above refer to comparisons among groups of people drinking more or less. Far fewer are the number of studies that examine outcomes of individual persons who drink more or less over time (i.e., where people are grouped by their change in consumption over time, rather than their average consumption), so we have tried to highlight these studies when available. Based on these studies, the evidence is most consistent in showing that reducing consumption among heavy drinkers is clearly linked with health benefits. However, there is relatively less – and less consistent – evidence about the effects of reducing or stopping drinking among those who drink low-to-moderate amounts of alcohol to begin with.

One issue with the observational data is that those who are more ill or frail– from alcohol or from other causes – are more likely to reduce consumption or to stop drinking. This can lead to the false impression that stopping or cutting right down on drinking can lead to poor health, when in fact it is poor health that has caused reductions in drinking. This is why there is an urgent need for gold-standard, randomized clinical trials in which people or patients do not self-select their drinking. Doing trials of this nature (e.g., randomizing persons to non-drinking) with participants who have already suffered a heart attack or stroke to determine the impact of reducing alcohol consumption (i.e. secondary prevention) is feasible and urgently needed. One recent trial which is doing exactly that for atrial fibrillation is noteworthy and serves as a model for how this can be accomplished (see Section 2.2).

2.1 Overview of effects of reduced drinking on health and mortality

Reductions in drinking, generally or among those who drink heavily and/or have an alcohol use disorder, indicate improvements in overall health. For example, a systematic review of 63 studies on individual consumption[1] effects found that reduced consumption among harmful, hazardous and dependent drinkers: improved mental health (fewer anxiety and depression symptoms) and quality of life and social functioning; reduced alcohol-associated injuries, enabled recovery of ventricular heart function in alcoholic

BOX 2 TYPES OF SCIENTIFIC EVIDENCE

Scientific studies considered in this report are of following types:

- **Mendelian randomization studies** are those that rely on genetic variants that are related to alcohol consumption in order to indirectly study effects of alcohol consumption.
- **Randomized controlled trials** "flip a coin" to randomly assign one group of participants to an intervention and another to not partaking of that intervention (e.g. experimental lab studies that administer alcohol to participants in the intervention group).
- **Observational studies** generally use data obtained from non-randomly "observing" participant self-reports of alcohol use to investigate whether drinking affects risk of mortality or morbidity from various diseases.
- **Neuroimaging studies** use non-invasive imaging technology (e.g. Magnetic Resonance Imagining [MRI]) to study the structure and function of the brain and central nervous system under certain conditions (e.g. presence or absence of alcohol).

Each type of study brings its own strengths and weaknesses. As discussed in previous reports and explained here in Box 3, non-randomized observational studies are particularly prone to finding spurious protective effects from low-to-moderate alcohol intake for conditions that are more likely to occur in middle and older age.

BOX 3 APPARENT BUT IMPLAUSIBLE HEALTH BENEFITS OF LOW-TO-MODERATE ALCOHOL USE

In the section on individual-level outcomes in this report, the issue of apparent health benefits (i.e. protective effects) from drinking at low-to-moderate levels (compared to not drinking) occurs under almost every topic considered. This recurring theme of apparent protection, which we have drawn attention to in previous reports, highlights the difficulty inherent to interpreting results from (non-random) observational studies which aim to investigate associations between complex and changeable alcohol use behaviours and health.

There are various reasons why apparent protective effects from low-to-moderate alcohol use are unlikely to reflect genuine health benefits. In the first place, the ubiquity of this finding across diverse and unrelated conditions within the observational study literature points to unresolved methodological weaknesses being a more likely explanation. Alcohol use has for instance been reported (implausibly) to reduce risk of deafness, common cold, some cancers, liver cirrhosis and even to benefit children exposed to alcohol during pregnancy.[173] Examples of apparent protective effects from low-to-moderate alcohol use described in this report include: (i) improved cognitive and emotional development of infants whose mothers drank alcohol during pregnancy; (ii) superior educational attainment among young adults; (iii) improved cognitive abilities of adolescents and adults; (iv) better mental health and less depression among adults; and, (v) reduced risk of dementia among older people.

Methodological critiques have pointed to three key problems pervasive in the observational research literature on alcohol: residual confounding, misclassification error and reverse causation. (i) In addition to their alcohol use, low-to-moderate drinkers are also characteristically different from their non-drinker counterparts in ways other that can protect against illness and injury e.g. higher income, better diet, more exercise, better access to healthcare.[174] When these other differences are not fully accounted for, residual confounding can make it appear as if the low-to-moderate drinker group is in better health due to their alcohol use. (ii) Misclassification error occurs when study drinking groups (e.g. non-drinkers, low level drinkers, heavy drinkers) do not accurately reflect actual alcohol exposure of participants in those groups. This is highly problematic when the non-drinker group (presumed to be unexposed to alcohol), against which drinkers are usually compared, in fact contains many people who once drank alcohol (often heavily). Most people change their drinking status as they age and many who were heavy drinkers in their 20s and 30s become ex-drinkers in their middle years due to increased ill-health and frailty. Because change in alcohol use over time is not independent of health, misclassification error is a serious problem for studies that recruit middle-aged and older people and then fail to classify participants on the basis of their true lifetime exposure.[8,175,176] (iii) The phenomenon of "reverse causation" may underpin many unexpected findings that arise from o-bservational studies.[7,177] Observational studies are not well suited to determining cause and effect, especially when behaviors change over time. In reverse causality, what is presumed (incorrectly), by the research study to be the "effect" (e.g. the disease) actually precedes what is presumed (incorrectly), to be the "cause" (e.g. alcohol use or absence of alcohol use). For example, people who become depressed may reduce participation in activities which, for many, involve drinking (e.g. attending dinner parties, socializing at sports clubs) or simply lose interest in alcohol use per se. A study which suffers from reverse causation will measure alcohol use and depression and erroneously conclude that absence of alcohol use leads to depression.

Taking all these factors into account, we take a skeptical view of reported benefits of low-to-moderate drinking unless they are supported by randomised controlled or Mendelian randomisation studies (which are less susceptible to reverse causation and residual confounding than observational studies). Where applicable, this issue will be noted again throughout each section of the report.

Summary

Is low-to-moderate drinking a panacea for all ills?

Published studies (implausibly) suggest low-to-moderate drinking protects against a diverse range of unrelated health problems (e.g. deafness, the common cold, liver cirrhosis, cancer, educational attainment, cognitive functioning and mental health across the life-course). These apparent benefits are implausible because:

- Low-to-moderate drinkers have many health protective behaviours and characteristics unrelated to their drinking e.g. higher income, better diet and access to healthcare.
- Low-to-moderate drinkers are usually compared with abstainers who may have stopped or cut down on drinking because of poor health.
- Observational studies of alcohol and disease are prone to reverse causation.

cardiomyopathy, improved blood pressure, normalized biochemical parameters, reduced body mass, and improved histological measures in alcohol-related liver disease. Reduced consumption was also associated with better economic outcomes including productivity.

Reviews also find that those with an alcohol use disorder who manage to reduce or stop drinking have a reduced risk of death (e.g.[2]). These benefits accrue to a variety of organs and organ systems including the heart and cardiovascular system, the brain and neurological system, the gastrointestinal system (e.g., intestines, pancreas, liver) and the skeletal system.

2.2 Cardiovascular system and diabetes

Average alcohol consumption above low-to-moderate levels, or any pattern of use that includes binge drinking (in most studies defined as consuming 5+ drinks for men or 4+ drinks for women during a drinking occasion) increases the risk of coronary heart disease (CHD), heart failure and stroke. Furthermore, increasing average alcohol consumption is positively associated with higher blood pressure and risk of atrial fibrillation (and irregular heart rhythm that can lead to strokes).[3]

However, there are relatively fewer studies specifically about the effects of reduced consumption on the incidence of, or recovery from, cardiovascular diseases. This lack of evidence is especially the case for clinical trials which are far more informative than observational studies which are highly susceptible to bias (e.g. the "sick quitter" effect due to people stopping or cutting down drinking alcohol when they become unwell or frail).

CORONARY HEART DISEASE: Contrary to popular opinion, alcohol is not generally good for the heart, including CHD. Average alcohol consumption above low-to-moderate levels, or any pattern of use that includes binge drinking increases the risk of CHD. Although

low-to-moderate levels of consumption are associated with reduced risk of CHD in observational studies, observational studies have a number of methodological limitations that make possible benefits unlikely (see Box 3). In addition, Mendelian randomization (i.e., genetic randomization) studies, which have fewer scientific limitations than observational studies, find only increased risk of CHD with increasing consumption, and do not find any benefits, even at very low levels.[4]

In terms of primary prevention for CHD (i.e., preventing further coronary events among people with a history of heart disease), there is a dearth of longitudinal studies in the scientific literature on effects of reduced drinking, and no clinical trials. In relation to secondary prevention (i.e., coronary events among persons with existing coronary heart disease), we are not aware of any clinical trials that have randomized drinkers with a prior CHD event to reduced consumption or usual care. For heavier drinkers, a Korean study of 21,000 persons aged 40 to 79 years found that patients who shifted to low-to-moderate drinking had 23% lower risk of major adverse cardiovascular events, mostly from reduction in the incidence of angina and ischemic stroke.[5]

STROKE: Alcohol consumption is a risk factor for stroke. Consumption above low-to-moderate levels or binge drinking is clearly associated with increased risk of both ischemic (blockage of an artery) and haemorrhagic (bursting of an artery) stroke. Many observational studies also find protective effects for ischemic stroke at low-to-moderate levels of consumption (but less so for haemorrhagic stroke). Research evidence in this area has evolved and expanded beyond traditional epidemiological approaches. It has become increasingly apparent that methodological limitations common to observational studies (e.g. misclassification bias, reverse causation, residual confounding) predispose to finding spurious protective effects from low-to-moderate drinking or "J-shaped curves".[6-9]

There have been no clinical trials randomizing people to reduced or no consumption in order to determine effects on stroke outcomes. As with CHD, a randomized trial of reduced consumption among those who have suffered a stroke would be feasible and clinically valuable. In terms of observational data, a Korean study of ~3.5 million persons aged 40+ years were followed from 2009 to 2018[10] and alcohol consumption was recorded 2009, 2011 and 2013. Reduction of alcohol intake from heavy (> = 30g pure alcohol per day) to low (<15g pure alcohol per day) was associated with a 17% decreased risk of ischemic stroke. In addition, sustained low level drinking was significantly associated with a lower risk of ischemic stroke compared with sustained non-drinking but it was noted by the authors that despite attempt to minimise reverse causality, they were unable to rule out the "sick quitter" effect.

ATRIAL FIBRILLATION: Atrial fibrillation is an irregular, generally rapid heart rhythm that can cause clots within the heart that can then dislodge and lead to embolic strokes. Observational studies find that for all levels of consumption, less alcohol consumption is associated with a reduced risk of atrial fibrillation or the recurrence of atrial fibrillation.[11-13] A recent clinical trial[14] randomized non-alcohol dependent Australian drinkers with a prior history of atrial fibrillation to alcohol abstinence for 6 months versus usual care. The abstinence group had larger reductions in consumption (~80% vs. 20%), almost 60% lower recurrence of atrial fibrillation and experienced a significantly longer period of time before recurrence. A study of Korean heavy drinkers without atrial fibrillation found that those who stopped drinking had a substantially reduced risk of developing atrial fibrillation compared to those who remained heavy drinkers; findings were not significant for those who reduced to low level consumption.[15] The Atherosclerosis Risk in Communities Study[16] (ARIC) studied people without atrial fibrillation. After

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adjustment for potential confounders, having fewer drinks per day was also associated with a lower risk of atrial fibrillation, and every decade without alcohol consumption was associated with an approximately 20% lower rate of incident atrial fibrillation.

HEART FAILURE: Alcohol reduces contractility of the heart muscle and can cause heart failure on its own (alcoholic cardiomyopathy) or contribute to other forms of heart failure. Although we are not aware of clinical trials on the subject, observational studies generally find that those with alcoholic cardiomyopathy have improved outcomes if they reduce or stop drinking. In addition, for all forms of heart failure, heavy drinkers who reduce their consumption have improved outcomes compared to those who do not.[17] The effects of reductions among those consuming at lower levels is not clear, and some studies find protective effects for those who continued or began to drink at low levels compared to those who abstain completely.[18]

BLOOD PRESSURE AND HYPERTENSION: The impacts of hypertension on health and well-being are substantial – it is the biggest risk factor for premature deaths in all Global Burden of Disease world regions[19] and a leading cause of ischemic heart disease, stroke and type 2 diabetes.[20-22] Three reviews of clinical trials[23-25] find that blood pressure can be lowered by reducing alcohol consumption and that beneficial effects are largest and most consistently found among heavier drinkers. The most recent review (2017) of 36 clinical trials found significant reductions in blood pressure among those drinking two or more drinks per day on average. and that reductions in blood pressure were greatest for those who drank six or more drinks per day if they reduced their intake by about 50%.[23] The review did not find a significant reduction in blood pressure when drinking at baseline was at low levels. However, an earlier review of 15 randomized controlled trials demonstrated significant dose-response relationships between alcohol use and both mean systolic and diastolic blood pressures such that as alcohol use declined, blood pressure also declined.[24] What's more, it appears that where alcohol use has led to raised blood pressure, effects are largely reversible within 2–4 weeks of abstinence.[25]

DIABETES: Observational studies point to increased risks of type 2 diabetes mellitus (T2DM) at higher levels of consumption, but also tend to find protective effects at lower levels of consumption among women.[26] However, a two-year Israeli trial randomizing non-drinkers to a glass of wine per day found no favourable effects on haemoglobin A1C (average blood sugar level over past few months) or glucose levels.[27] A Mendelian randomization study concurred, finding only positive associations between alcohol consumption and the likelihood of T2DM, that is, risk increases with increasing consumption.[28] One plausible pathway for the association between alcohol and diabetes is obesity. Obesity is a major risk factor for T2DM diabetes, as it contributes to insulin resistance and beta-cell dysfunction. Studies on alcohol consumption changes and changes in weight have shown that increases in alcohol intake, especially heavy drinking, appear to promote weight gain in some individuals.[29,30]

In terms of observational studies that have examined changes in consumption and risk over time, a large study in China on participants aged 18 to 79 years[31] found increased risk of T2DM among former drinkers. However, risk decreased with more years of abstinence, and became similar to that of people who had never drunk after approximately 10 years.

A recent Japanese study[32] used propensity score (PS) matching, which quantifies the likelihood of experiencing a particular exposure (such as varying levels of alcohol intake), based on a predefined array of covariates as a means of dealing with co-variates in cohort studies. After 11 years of follow-up, this study found that participants with lower alcohol

consumption had a ~70% lower risk of developing diabetes compared to those with excessive alcohol consumption.

2.3 Alcohol-related cancers

Given what is known about the mechanisms of alcohol-related carcinogenesis, it is likely that an individual's risk of alcohol-related cancer can be lowered by reducing or stopping drinking, however, evidence in direct support of this is under-developed for some types of cancers. Most evidence focuses on the link between reduced alcohol consumption and the risk of developing alcohol-related cancer, with little research on its impact on cancer recurrence or death. Some data exist on reverting to non-drinker risk levels, but gaps remain for specific cancer types, and these studies are methodologically challenging.

A working group of international experts concluded[33] that there is sufficient evidence that reduction or cessation of alcohol consumption reduces the incidence of cancers of the oral cavity and the oesophagus, limited evidence for cancers of the larynx, colorectum, and breast, and inadequate evidence for cancers of the pharynx and liver. However, they also concluded that there is strong evidence for the mechanistic pathways involving acetaldehyde metabolism, genotoxicity (such as DNA damage), and the immune and inflammatory systems and that cessation can reverse these mechanisms.

Some older reviews suggest that risk reduction happens most quickly in the early years after quitting, then slows down and that it may take many years for full reversal. A meta-analysis on risk of liver cancer after alcohol cessation[34] found four studies

that quantified the effect of liver cancer for those who stopped drinking. The result suggested that risk of liver cancer falls after drinking cessation by 6–7% a year, and that it takes approximately 20 years for the risk to become equal to that of never-drinkers. A 2017 review found that the risk of head and neck cancer[35] returns to that of never drinkers after about 20 years of alcohol cessation. A 2012 meta-analysis showed a similar pattern for oesophageal cancer after 16 years.[36] A meta-analysis of five studies on alcohol cessation and risk of stomach (i.e., gastric) cancer[37] found no significant effect from cessation but results were not stratified for those with heavy drinking at baseline (where studies show the risk of gastric cancer is known to be increased) compared to those with lower levels of consumption.

Reduced cancer risk from reduced drinking appears to be most pronounced for heavy drinkers. A Korean study[38] found that those who increased consumption generally had increased risks of alcohol-related cancers. Among those who reduced consumption, people who were heavy drinkers at the outset of the study and who reduced consumption to moderate or mild levels had lower risk of alcohol-related cancer.

2.4 Gastrointestinal system

In terms of acute gastrointestinal problems due to alcohol including esophagitis, gastritis, pancreatitis and alcoholic hepatitis, the cornerstone of medical care is cessation (ideally) or reduction of alcohol consumption. In terms of chronic diseases (i.e., those that develop more slowly over time), a review of alcohol-associated liver disease found[39] survival is greater among those who stop drinking compared to those who relapse to alcohol consumption. In terms of chronic liver disease, a longitudinal study of over 20,000 current drinkers in the US[40] found that very-high-risk drinkers who reduced their consumption had significantly lower odds of liver disease. In terms of non-alcoholic fatty liver disease (to which alcohol can contribute), a smaller longitudinal biopsy study[41] found that non-drinkers had a greater mean reduction in steatosis grade than modest drinkers and a greater reduction in mean level of aspartate transaminase. Non-drinkers also had roughly three times higher adjusted odds resolution compared with low-to-moderate level drinkers.

2.5 Brain and central nervous system

Alcohol has the potential to affect structure and function of every part of the human brain and central nervous system (CNS), even at low doses. It is not surprising therefore that alcohol exposure can manifest as a wide array of both short- (e.g. response time and coordination, impulse control, body temperature) and long-term (e.g. reduced brain tissue, impaired executive function and memory formation) consequences. When alcohol use is relatively heavy and ongoing over some time,

brain neurotransmitter levels (e.g. dopamine) become accustomed to the presence of alcohol such that when alcohol use is stopped, the brain requires time to re-adjust. In the short-term, cessation of regular heavy alcohol use can result in a week or two of uncomfortable (e.g. headache, increased anxiety, irritability, difficulty sleeping, nausea, tremors) and in rare cases, serious withdrawal effects that are best managed in conjunction with a health professional. Nonetheless, there is evidence to support the view that once consumption has been reduced or stopped, given time, the human brain has considerable capacity to recover from alcohol-related damage or at least to slow disease progression.[42-44]

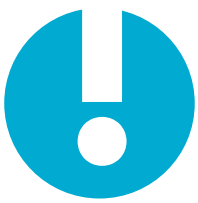
Studies focused on the benefits of reducing alcohol use on the brain and CNS are relatively rare compared to studies of how alcohol exposure influences disease risk. Even so, for most drinkers, especially heavy drinkers, it is reasonable to assume that for brain and CNS related conditions where alcohol is causally attributed (e.g. early onset dementia), reducing alcohol exposure confers significant health benefits.

DEMENTIA: A growing body of evidence from a range of research areas points to alcohol use as a key, yet under-appreciated and complex risk factor in the onset of dementia and cognitive decline. Studies able to measure changes in brain volume and structure using magnetic resonance imaging (MRI) techniques have detected reductions in grey and white brain matter even at low doses of regular alcohol use (i.e. 8g of pure alcohol) among otherwise healthy adults.[45]

A meta-analysis of three observational studies concluded that limiting total consumption to 168g or less (21, 8g units) of pure alcohol per week attracts a lower risk of dementia.[46] Avoiding both regular heavy use and episodic heavy use are particularly important for minimising risk of alcohol-related dementia, especially early on-set dementia (i.e. diagnosis before age 65yrs).[47,48] However, a recent, high quality Mendelian randomization (MR) study of British current drinkers found a positive linear relationship between alcohol use and any form of dementia (all-cause).[49] This means that in terms of overall dementia risk, drinkers at all levels can benefit from reducing their alcohol intake – and the greater the reduction, the greater the benefit. In addition, alcohol use appears to be significantly linked to many other known dementia risk factors such as high blood pressure, overweight, diabetes, poor diet, tobacco use, cardiovascular disease and low exercise and is thereby an excellent target for both population- and people-level prevention strategies.[47] It is also noteworthy that although observational studies find mixed results, more methodologically robust MR studies and imaging (MRI) studies do not support a role for low-to-moderate level alcohol consumption in the prevention of dementia.[45,49,50]

The length of time taken to significantly reduce dementia risk is likely to vary between individuals depending on factors such as level and years of exposure, age of disease onset, type of dementia and severity of functional dysregulation. Even so, significant reductions in dementia risk have been reported to occur in less than 6.5 years, among middle-aged heavy drinkers (>=30g per day) who reduced consumption to a moderate level (15–29.9g per day).[51]

COGNITIVE FUNCTIONING AND LEARNING: In addition to its role in dementia, alcohol use has a more general impacts on cognitive functioning and the brain's capacity to learn and acquire new information. There is no doubt that alcohol is a teratogen, that is, it causes abnormal fetal brain and organ developement. Alcohol exposure before birth is the most common cause of preventable intellectual disability in the world[52] and there is no known "safe" level of alcohol to which a developing fetus can be exposed. As such, and as explained in detail in earlier reports from this series, there are clear life-long cognitive, behavioural and social benefits to offspring



Nonetheless, there is evidence to support the view that once consumption has been reduced or stopped, given time, the human brain has considerable capacity to recover from alcohol-related damage or at least to slow disease progression.

Drinkers who consume more than 36 grams of pure alcohol a day on average experience faster decline in all cognitive domains including global cognitive score, executive functioning and memory.

when alcohol is avoided entirely during pregnancy.[9,53]

The brain continues to develop well into the third decade of life. A review of current research concluded that chronic alcohol exposure during critical developmental periods can create deficits in cognitive and related circuitry.[54] Young brains therefore benefit from delaying onset of drinking for as long as possible. Gains in terms of educational achievements of delayed onset of use, and/or lower levels of use (e.g. less likely to skip classes, complete homework, aspire to further education) have been reported for high school aged young people, among whom heavy episodic drinking is prevalent.[55] In adulthood, beneficial effects of reduced consumption on cognitive functioning are particularly notable for heavy drinkers. Drinkers who consume more than 36 grams of pure alcohol a day on average experience faster decline in all cognitive domains including global cognitive score, executive functioning and memory.[56]

2.6 Mental health and well-being

Heavy alcohol use and mental health problems, especially depression, have long been understood to be related but there is ongoing debate in the scientific literature about the direction of the relationship. That is, does heavy alcohol use (e.g. alcohol use disorder, AUD) cause depression or does depression cause heavy alcohol use? Questions about causality may be interesting for scientists to pursue but are perhaps of less import to individuals (and their health care professionals) interested in mitigating debilitating symptoms. (And the same may be said for policy makers interested in reducing social and financial burdens on ageing workforce and public health systems). Pragmatic approaches centred on reducing alcohol use at both person and population levels appear warranted. Beyond the question of causation, however, it is well established that alcohol use can exacerbate existing depression.

There is a growing body of evidence that for heavy alcohol users who also suffer depression, reducing alcohol consumption, as well as abstinence, leads to a reduction in depressive symptoms.[57,58] In a recent longitudinal cohort study of mood disorders and alcohol use in the general population, drinkers at all levels who ceased alcohol consumption and drinkers who substantially reduced the number of alcoholic drinks consumed per week (e.g. from > 10.5 (heavy) to < 3.5 (low)) within a 6-year period experienced significant reductions in depressive symptoms over time.[58] This suggests that in terms of depressive symptoms, although the benefits of reducing consumption over time may be primarily experienced by heavy drinkers and/or drinkers with an alcohol use disorder, benefits of stopping alcohol use entirely may improve depressive symptoms experienced by drinkers at all levels.

Whether benefits of alcohol cessation extend to the general population requires further confirmation using participants from other regions with variable drinking patterns and cultures but there is some support from general population well-being and perceived health studies from Hong Kong which show that cessation of alcohol use coincides with improvements in mental well-being.[59,60]

Time-limited drinking cessation initiatives, sometimes referred to as "one-month alcohol abstinence campaigns" (e.g. "Dry July", "Dry January", "Sober October", "Feb Fast", "Tournée Minérale campaign") have become popular among general populations in a growing number of countries and evaluations frequently find support for improvements in areas related to mental health and well-being. A review of studies that have attempted to examine (with varying degrees of methodological approach and rigour) person-level effects among successful and unsuccessful programme participants[61] has reported benefits including but not limited to: higher mental well-being scores on standardized tests at one and six months follow-up, weight loss and better sleep. It is worth noting that registrants of these programmes tend to be female, heavier drinkers, more concerned

about their health in general, and have higher levels of educational attainment and incomes than expected.

2.7 Reproductive systems

Alcohol consumption can significantly disrupt hormone levels and impair reproductive health in both men and women. In women, alcohol can interfere with menstrual cycles and ovulation, contributing to an increased risk of miscarriage. In men, alcohol has been shown to reduce testosterone levels, increase the likelihood of erectile dysfunction, lower sperm count, and decrease sperm motility, all of which can negatively affect fertility.

PREGNANCY: A large study involving over 4.5 million women in China found that preconception alcohol consumption increased the risk of miscarriage, with both paternal and maternal alcohol consumption contributing to this risk.[62] Another study involving US participants highlighted that even low levels of alcohol consumption during the first trimester increased the risk of spontaneous abortion, with the risk rising for each additional week of alcohol exposure.[63] Studies have increasingly shown that male preconception alcohol consumption can impact offspring brain development through epigenetic mechanisms. Evidence suggests that paternal alcohol use is associated with a higher risk of mental health issues in offspring, including hyperactivity and attention-deficit disorders.[64]

There is also evidence that both maternal and paternal alcohol consumption negatively affect IVF outcomes, even at low-to-moderate levels of use. A systematic review of studies on alcohol and in vitro fertilization (IVF)[65]

Reducing alcohol intake, however, can benefit reproductive health. Lower alcohol consumption is associated with better hormonal balance, enhanced fertility, and reduced risks for reproductive system complications.

showed that both maternal and paternal alcohol consumption negatively impacted IVF outcomes. Women who consumed alcohol saw a 7% decrease in the likelihood of achieving pregnancy, while men experienced a 9% reduction in the chance of their partner achieving a live birth following IVF treatment, even at low levels of alcohol consumption (i.e. 84 g/week).

Reducing alcohol intake, however, can benefit reproductive health. Lower alcohol consumption is associated with better hormonal balance, enhanced fertility, and reduced risks for reproductive system complications.[62] Importantly, risk of fetal alcohol syndrome and fetal alcohol spectrum disorder are avoided completely by zero alcohol intake during pregnancy. Likewise, avoidance of alcohol during breast feeding removes any risk of alcohol-related harm to the developing child.[53]

A Czech study on over 3,500 women[66] indicated that mothers who abstained from alcohol showed greater emotional engagement with their child, were better at managing the demands of motherhood, and were more attentive to their child's educational needs. By contrast, moderate drinkers were found to be less engaged in these aspects of parenting.

In a study of over 3,500 Finnish twin pairs followed over 33 years[67], it was found that both abstinence and heavy drinking during late adolescence and early adulthood were linked to higher rates of childlessness and fewer children born later in life compared to moderate drinkers.

ERECTILE DYSFUNCTION: Studies show a complex relationship between alcohol and erectile dysfunction (ED), with both beneficial and harmful effects depending on the amount consumed. It is important to recognise, too, that methodological problems such as recall bias, selection bias, and the "sick quitter" effect, continue to affect this literature and can distort findings.[68]

Moderate alcohol intake has been associated with a lower risk of ED. A meta-analysis of 46 studies found a J-shaped relationship, where low-to-moderate use reduced ED risk by promoting relaxation and better vascular function.[68] An earlier review[69] drew similar conclusions, suggesting that mechanisms such as increased vasodilatory factors may be in play at low-to-moderate levels of alcohol consumption. However, excessive drinking, particularly chronic heavy use, negates these benefits, increasing ED risk due to vascular damage and other health issues.[68]

However, significant and rapid improvements in ED symptoms have been observed from cessation. One study, for example, found that 68.5% of patients with an alcohol use disorder experienced ED, but significant improvements were seen after just one month of abstinence[70] and another study found that 88.5% alcohol-related ED cases improved after three months of abstinence.[71] Notably, the combined use of alcohol and smoking further increases the risk of ED, with both substances contributing to vascular damage. Quitting alcohol and smoking is crucial for men looking to prevent or reverse ED.[72,73]

Summary

This chapter reviewed studies on the individual health benefits of reducing or stopping alcohol consumption. Across various conditions – such as cardiovascular diseases, alcohol-related cancers, gastrointestinal illness, mental health, and reproductive health – the evidence overwhelmingly shows that drinking less is associated with less harms to health.

Most research compares groups with different levels of alcohol intake, with recent Mendelian randomization studies strengthening the findings by showing reduced risks for conditions like heart disease, stroke, hypertension, and dementia at lower levels of consumption (i.e., without a J-shaped curve finding protection at low levels of consumption). However, fewer studies focus

on individuals who change their alcohol consumption over time. Among those studies, evidence is strongest for heavy drinkers benefiting from reduced intake and less consistent about benefits among those drinking modest amounts of alcohol.

One issue with observational studies, which constitutes much of the available evidence, is that people who are already ill often stop drinking which can lead to false conclusions that quitting alcohol leads to poor health. To resolve this, randomized clinical trials are needed to assess the true impact of reduced alcohol consumption, particularly for conditions such as CHD, stroke and depression. Secondary prevention trials should be feasible and ethical. The recent atrial fibrillation trial[14] serves as a strong model for such research. In addition, the number and quality of Mendelian randomization studies will continue to increase which will also be highly informative.

BOX 4 TIPS FOR INDIVIDUALS TO REDUCE THEIR CONSUMPTION

Assessing your relationship with alcohol can help you make informed decisions about your health. Self-assessment includes considering how much, how often, and the impact of your drinking. Tools like the **AUDIT – Alcohol Use Disorders Identification Test** – a ten-question screening tool from the WHO – can help

Here are practical steps to cut back on alcohol:

- **Reflect on your drinking habits:** Consider when, where, why, and with whom you typically drink as a first step to reducing alcohol consumption.
- C**onsider an alcohol-free period:** This can make it easier to change your habits moving forward.
- **Set a drinking goal:** Decide how much you plan to drink before an occasion, and stick to it.
- **Eat while drinking:** Eating slows alcohol absorption, reducing the risk of quick intoxication.
- **Stay hydrated:** Drink water between alcoholic beverages to prevent dehydration and its effects (e.g., headaches, dizziness).
- **Use smaller glasses:** This helps control portions and better track alcohol intake.
- **Choose low/no-alcohol options**: These reduce health risks, calories, and costs.
- **Plan alternatives:** Prepare in advance for moments where you might be tempted to drink. Have non-alcoholic options ready or other strategies to avoid drinking.
- **Recognise it's ok to not drink or refuse alcohol:** Practice declining alcohol and schedule alcohol-free activities.
- **Avoid triggers:** Identify situations or people that prompt drinking and try to avoid them. Develop alternative coping mechanisms.
- **Find support:** Stay committed and seek help if needed. Lean on friends, join support groups, or see a counsellor to stay on track.

Small changes can lead to significant benefits in reducing alcohol consumption.

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3 Impacts of reduced population level alcohol consumption on health and social outcomes

Many health and safety outcomes have been shown to be associated with alcohol consumption at a population level, often expressed as per capita (pure) alcohol consumption (PCAC). Examples of such outcomes include chronic health conditions (e.g. liver cirrhosis, cancers), rates of injury (e.g. interpersonal violence, self-harm, road crashes) as well as social problems such as crime (e.g. alcohol impaired driving, homicide). Historically, this relationship has often been emphasised as showing increased risk of alcohol-related harm in situations when per capita consumption has increased. The basic message from this research is that increased drinking can increase alcohol-related harm at a population level. In this chapter we will explore the other side of this association, namely the potential benefits for populations when there are significant reductions in total alcohol consumption.

3.1 Changes over time

The research literature in this area is dominated by population-level studies that examine changes over time or trends. Practically, there are many fewer specific studies of population level benefits from decreased consumption than there are on impacts of increased consumption. This may be because many population-level alcohol research studies tend to focus on evaluation of policy change impacts (e.g. natural experiments) and, in recent decades, most alcohol policy changes have occurred in the direction of deregulation or loosening alcohol controls as opposed to tightening. Furthermore, since World War II there have mostly been increasing trends in PCAC albeit with some brief reductions e.g. during financial crises and recessions. However, fewer studies should not be taken to imply less robust scientific evidence for an association but rather, fewer instances where population-level alcohol consumption has markedly decreased. Moreover, studies which show a strong overall association between PCAC and alcohol-related harms mostly do provide evidence of the bidirectional connection between consumption and harm for an inference that as drinking declines so will alcohol-related harms, especially if the longitudinal data utilized included periods of increased consumption as well as periods of declining consumption.

Studies which show a strong overall association between PCAC and alcohol-related harms mostly do provide evidence of the bidirectional connection between consumption and harm for an inference that as drinking declines so will alcohol-related harms.

3.2 Reviews

A recent review[74] found strong links between PCAC and population rates of a broader range of health and social harms. These associations were evident not only for population rates of heavy drinking but also the prevalence of drinking at low-to-moderate levels. The authors concluded that lower levels of intake both among heavy and low-to-moderate drinkers lead to fewer alcohol-related harms overall. Another review of time series studies on PCAC and health outcomes[75] found that liver cirrhosis, heart disease and suicide were harms most commonly studied. There was strong evidence for large immediate effects on most harms studied following changes in total alcohol consumption.

An older but comprehensive review[76] identified studies linking changes in PCAC with rates of liver cirrhosis, accidents, suicide, homicide, ischaemic heart disease (IHD) mortality and all-cause mortality, mainly from EU member countries, Canada and USA. The review found significant relationships between PCAC and (i) rates of alcohol-specific and liver cirrhosis deaths in all countries, (ii) rates of injury-related deaths, homicide and all-cause mortality in about half of the countries studied, and (iii) suicide rates in most countries. No systematic link was found, however, between PCAC and IHD mortality.

3.3 Multi-nation studies

Particularly compelling evidence comes from one time series study[77] that controlled for sales of tobacco products and for unobserved factors in the analyses to rule out competing interpretations. Using mortality data on

alcohol-related cancers including, larynx, esophageal, and lip, oral cavity, and pharynx, from 17 countries, the study found significant associations with increasing, decreasing, and stable trends in alcohol consumption and corresponding lagged trends. The fact that the study included countries that had varying trends in PCAC over time (i.e. increasing, decreasing or stable) and that the overall relationship was robust, lends strong empirical support for the proposition that declining population-level alcohol consumption is associated with declining alcohol-related cancers. The authors also singled out France as an example of where there was a long-term decline in PCAC over the study period (1961–2010) coupled with simultaneous and significant declines in deaths from alcohol-related cancers. Other countries studied during periods of declining PCAC also evidenced corresponding decreases in cancer deaths, including data from Italy, Canada, and Spain.

Other studies conducted on data from multiple European countries confirm a positive association between PCAC and death from all causes. One study of 14 European countries between 1950 and 1995[78] included countries with low, medium and high PCACs such as France where alcohol consumption declined for almost the entire period and for almost half of the period for Italy, Spain and Portugal. Significant changes in all-cause mortality were found for men living in France, Italy and Portugal corresponding to the changes in PCAC, though not in Spain. Another study that included 25 European countries during a period of mostly declining consumption (between 1982 to 1990)[79] found PCAC was significantly related to all-cause mortality: such that a change in consumption (i.e. increase or decrease) of one litre of pure alcohol resulted in a parallel (i.e. decrease or increase) change in all-cause mortality of 1.3%. In other words, increases (decreases) in consumption of 1 litre of pure alcohol were accompanied by increases (decreases) in mortality rates of about 1.3%. Similar findings were reported in a study[80] for earlier periods with data from France and Prussia 1885–1958 and mostly increasing PCAC. Taken together these studies of European data show that both increasing and decreasing PCAC is closely related with rates of all-cause mortality over time.

3.4 Nordic countries

The strong and consistently positive associations found across European and English-speaking countries between PCAC and alcohol harms are also evident for the Nordic region. Norström and Ramstedt investigated quarterly Swedish PCAC data from 1987 to 2015[81], and found a positive association with liver cirrhosis deaths, fatal injuries, suicide, drink driving and assaults. Similarly, annual estimates of Finnish PCAC accounting for unrecorded consumption showed that deaths from wholly alcohol caused conditions (e.g. alcoholic liver cirrhosis, alcohol dependence) increased when PCAC increased.[82]

Summary

While relatively few studies have specifically examined the impacts of declines in PCAC on alcohol-related harms, there is nonetheless a substantial set of findings across a wide variety of countries in which periods of reduced PCAC were included in the analyses. Studies which have assessed the overall association of PCAC (whether increasing or decreasing) with various alcohol-related harms provide strong evidence of a bi-directional relationship. As one recent review[83] observed, reductions in population consumption can yield considerable benefits to communities, regions, and countries.

As one recent review observed, reductions in population consumption can yield considerable benefits to communities, regions, and countries.

4 Health and social effects of natural experiments or alcohol bans

This chapter examines the health and social effects of short and longer-term restrictions on alcohol availability introduced in countries, states or local areas that have resulted in marked reductions in consumption. While such restrictions have often been introduced under unusual circumstances or emergencies such as during wartime or a pandemic, they nonetheless offer insights into potential benefits to health and social well-being from substantially reduced consumption. We also consider unintended negative consequence sometimes associated with longer lasting local or national prohibitions.

Our literature search uncovered examples from responses to the COVID-19 pandemic, strikes of government alcohol monopoly workers in Nordic countries, wartime rationing and temporary local restrictions in North America and Australia. In each case substantial reductions in total population consumption were demonstrated and we focus on corresponding changes to health and social outcomes. We also found examples of longer lasting statewide or national prohibitions in North America, Nordic countries and Indian states.

4.1 Alcohol strikes

The following examples demonstrate how sudden reductions in overall consumption can result in reduced alcohol-related harms,

including among heavy and marginalized drinkers. Strikes have often resulted in reduced arrests for public intoxication, fewer domestic disturbances, and decreases in alcohol-related injuries. Fears that such extreme restrictions would result in demand from alcohol dependent individuals for treatment of alcohol withdrawal overwhelming health services were not realised. Brief spikes in such cases where evident immediately after the restrictions were imposed but soon levelled out to a much lower level than before.

MANITOBA, CANADA (1978):[84] During a strike by liquor store workers, there was a substantial reduction in the availability of wine and spirits resulting in a significant reduction in overall alcohol consumption. Hospital admissions for alcohol withdrawal dropped during the strike, indicating an impact on heavy drinkers.

FINLAND (1972 AND 1985):[85,86] During strikes by liquor store workers, alcohol sales dropped by one-third, with men and frequent drinkers being most affected. Alcohol-related crimes and arrests for drunkenness dropped by about 50%, even though there was an increase in homebrew and non-beverage alcohol use. Those with higher consumption habits, particularly alcohol dependent individuals, were most significantly impacted.

NORWAY (1982):[87] Production facilities of the Norwegian alcohol monopoly went on strike for over 100 days. During this time, overall alcohol consumption dropped 10% compared with the previous year. The strike particularly impacted heavy drinkers, as evidenced by a 41% reduction in admissions to detoxification centres. Police-reported violent crimes also dropped by 9.4%.

SWEDEN (1963):[88] A 7–12 week strike in Sweden's alcohol monopoly system led to a 47.3% reduction in sales of spirits, a 7.6% drop for wine and an only partly compensatory increase in beer sales of 38%. Alcohol-related harms, including police interventions for public drunkenness and alcohol-related accidents, decreased during the strike.

4.2 COVID-19 restrictions

The COVID-19 pandemic led many countries to impose temporary bans or restrictions on alcohol sales as part of broader measures to mitigate public health risks. In South Africa, Botswana, and the Indian state of Tamil Nadu, complete prohibitions on alcohol sales were introduced.

South Africa implemented a comprehensive ban on alcohol sales during two periods in 2020, totalling about three months. The ban aimed to free up hospital resources to handle COVID-19 cases by reducing alcohol-related trauma admissions. During this period, homicides decreased by over 50%, and hospital trauma admissions related to accidents, assaults, and injuries dropped by 59–69% during the first ban and 39–46% during the second, returning to pre-pandemic levels after the bans, even with other pandemic restrictions still in place. The ban also led to a temporary, short-term rise in alcohol withdrawal syndrome presentations, which soon decreased to levels lower than before the ban.[89-92]

During a month-long alcohol sales prohibition in Botswana, prevalence of recent self-reported alcohol consumption dropped from 92% to 62% among surveyed alcohol users, returning to 90% after the ban ended. Hospital admissions related to alcohol also dropped sharply during the prohibition, mirroring experiences in South Africa.[93]

In Mexico, temporary alcohol bans during the COVID-19 lockdown contributed to reductions in crimes against women, including domestic violence and sexual assault. These findings support the link between alcohol availability and domestic violence, particularly in situations where stress and confinement are heightened.[94]

In Tamil Nadu, India, the state government imposed a temporary ban on alcohol sales as part of broader COVID-19 lockdown

In Mexico, temporary alcohol bans during the COVID-19 lockdown contributed to reductions in crimes against women, including domestic violence and sexual assault.

Countries that imposed outright bans, such as South Africa and parts of India, saw major reductions in hospital admissions for injuries, declines in violent crimes, and fewer deaths related to alcohol consumption.

measures. The ban resulted in a reduction in alcohol-related violence and accidents, with significant declines in emergency hospital admissions for alcohol-related injuries during lockdown periods.[95,96] There was also a short, sharp increase in cases of alcohol withdrawal syndrome among dependent drinkers, followed by a period of substantially fewer cases than before the ban.[97] There was a corresponding reduction in harmful use by dependent individuals. On the negative side, there was also a surge in illegal alcohol production and sales through unregulated channels, which exposed consumers to health risks from adulterated alcohol.[98]

The COVID-19 pandemic demonstrated how limiting alcohol availability can significantly reduce alcohol-related harms in the short-term. Countries that imposed outright bans, such as South Africa and parts of India, saw major reductions in hospital admissions for injuries, declines in violent crimes, and fewer deaths related to alcohol consumption, and temporary spikes in withdrawal admission initially, which then decreased to levels lower than before the bans.

4.3 National or state-wide bans

Usually referred to as "prohibitions", large scale, enduring national bans on the sale and supply of alcohol famously occurred in the United States during the 1920s and early 1930s. However, they have also occurred in Norway, in several Canadian provinces and, more recently, in India.

ALCOHOL PROHIBITION IN NORWAY: Norway introduced a complete prohibition on the production and sale of alcohol from 1917 until 1927. A narrative description[99] of the episode indicated substantial reductions in alcohol-related harms but also problems policing the policy with many people accessing alcohol illicitly.

ALCOHOL PROHIBITION IN BIHAR, INDIA: A complete prohibition of alcohol was declared in the state of Bihar in 2016. Survey data demonstrated substantial reductions in alcohol consumption by both men and women.[100] There was also evidence of reduced sexual violence against women and decreased prevalence of hypertension in men.[101]

During the first seven months of an earlier prohibition period in Bihar 1979, numbers of intoxicated people admitted to hospital decreased significantly, but then reverted to the previous level. Alcohol-related crimes also decreased significantly. Opinions about the prohibition were favourable in lower income groups but not in higher income groups. Some members of both groups continued to access alcohol from the black market.[102]

ALCOHOL PROHIBITION IN NORTH AMERICA: The best known and most studied example of prohibition occurred in the US between 1920 and 1933. Less well known are the provincial prohibitions introduced in several Canadian provinces around the same period. After 1933, severe restrictions or prohibitions also continued in some individual US "dry" states.

One review of US prohibition effects on alcohol use and harms[103] concluded that alcohol consumption was reduced by between 20% and 40% and then gradually increased thereafter with substantial reductions in alcohol-related harms observed. One study[104] also estimated the impact of prohibition on overall alcohol consumption using data on yields of the grains used for alcohol production i.e. avoiding the problem of legally versus illegally supplied (hence unrecorded) alcohol. They estimated that beer consumption fell from 50 gallons per person per year to just 18 gallons.

Decreased alcohol consumption during North American prohibition was associated with significantly decreased alcohol-related deaths. One study[105] reported a 43% reduction in deaths from alcohol use disorders, a 12–26% reduction in liver cirrhosis deaths and a 12–18% reduction in suicides. Similar reductions in cirrhosis deaths were noted in Canada, particularly in Nova Scotia during early 1900s prohibition.[106]

Evidence on homicide during prohibition is mixed. One study[107] found that rates decreased after state-level enforcement of prohibition but returned to previous levels after three years. In contrast, a time-series study in Chicago (1890–1930)[108] showed total and non-alcohol-related homicides increased by 21% and 11%, respectively, while alcohol-related homicides remained unchanged. The authors suggested, therefore, that prohibition may not have contributed to the overall rise in homicides.

In terms of overall impact on mortality, one study[109] show prohibition was associated with increased male longevity by 0.17 years. After repeal, infant mortality rose by 4.0% in previously wet counties and 4.7% in previously dry counties.[110]

For social outcomes, a detailed study on a nationally representative sample of people born between 1900 and 1925[111], found that temperance laws were associated with a 3–8% increased probability of completing high school. Another study[112] comparing farm estate values in counties within the same state that adopted dry laws early or late found that adoption of prohibition increased farm real estate values and population numbers, by people moving to these counties. The study also found a strong effect on farm productivity. Another study found that county-level repeal was associated with increases in murders, assaults, drug crimes, embezzlements and fraud/forgery arrests but had no effect on robbery, weapons, burglary or automobile thefts was seen.[113] On the negative side of the ledger, repeal of the prohibition in the US was associated with a decrease in some non-road crash injuries, a significant proportion of which involved alcohol poisoning deaths[114] i.e. there were likely fewer deaths caused by adulterated illicit alcohol.

In the United States, a study of 132 isolated villages in Alaska from 1991 to 2000 found that dry villages had lower rates of serious injuries from assault, motor vehicle collisions and other injuries.

4.4 Local area restrictions

There is a history with First Nations communities both in Australia[115] and North America (e.g.[116]) of local restrictions on alcohol in response to high levels of health and social problems. In the small town of Fitzroy Crossing, Western Australia, a detailed evaluation[117] was made of a near complete ban on takeaway alcohol. Liquor store sales were reduced by 91% and self-report data confirmed substantial reductions in alcohol use. Evidence was found for reductions in severity of domestic violence and for general rates of assault. Specifically, a 36% reduction in emergency room visits related to violent incidents was recorded. Residents reported that their town was quieter, cleaner and safer. However, there was an increase in children being left in the care of relatives as some people travelled to purchase alcohol. The restrictions provided net benefits, and the majority of the community supported their continuation.

A major recent review from 50 years of local alcohol restrictions in Aboriginal communities in Australia[115] provides many examples of how such restrictions result in major reductions in consumption and related harm, how they have been sustained for many years in some locations and also how some unintended negative consequences can be mitigated.

In the United States, a study of 132 isolated villages in Alaska from 1991 to 2000[118] found that dry villages had lower rates of serious injuries from assault, motor vehicle collisions and other injuries.

Another study on injury deaths 1990–1993 in remote Alaskan villages of fewer that 1,000 people[119] found that mortality rates of total and alcohol-related injuries were greater among First Nations Alaskans in wet villages compared to dry, especially for motor vehicle injury, homicide and hypothermia. For residents of villages who were not First Nations Alaskans, there was no difference alcohol-related injuries between wet and dry villages.

A time-series study of alcohol-related outpatient visits in the isolated community of Barrow, Alaska, during a 33-month period during which possession and importation was banned, made legal again and then banned again[120], found that visits decreased substantially during periods when alcohol was banned and increased when it was legal. Between 1986 and 2006[121], police-records from 23 communities across Nunavut, Canada showed that compared to dry communities where alcohol importation was prohibited, wet communities had 50% higher sexual assault rates, double serious assault and three times higher homicide rates.

Summary

This section has examined the impacts of temporary and longer-term prohibitions accompanied by markedly reduced alcohol consumption on alcohol-related harms. Examples from strikes, the COVID-19 pandemic, national/state-wide and local prohibitions demonstrate reductions in hospital admissions, violent crimes, and alcohol-related injuries, supporting the conclusion that limiting alcohol availability leads to substantial public health benefits. A common theme was also only brief spikes in demand for treatment of severe alcohol withdrawal followed by much lower demand as the restrictions continued.

5 Policy measures that reduce population alcohol consumption

In this chapter we consider the question of whether alcohol policies are effective tools for reducing population alcohol consumption and related alcohol problems. A landmark international review in 1975[122] first provided compelling evidence that alcohol-related harm was a public health problem. Famously, this publication first suggested "alcoholic beverages behave like other commodities" and that their consumption and related harms could be influenced by increased prices through taxation and by reduced physical availability.

Now 50 years later, evidence has accumulated to support these propositions and offer evidence for the effectiveness of a wide range of "policy measures" that can reduce individual and population levels of alcohol consumption i.e. measures which governments can directly influence. The most recent comprehensive review by Babor et al, 2023[83] also concluded the most effective policies involve decreasing affordability and physical availability of alcohol. It provides descriptions of detailed strategies to achieve these ends and notes other effective strategies including complete bans on alcohol marketing, drink-driving countermeasures and brief interventions for at-risk drinkers. This broad approach is also reflected in the World Health Organisations advice to member nations in relation to effective strategies for reducing alcohol-related harm.[123]

In this chapter we focus mainly on evidence for a few of the more powerful policy levers for reducing PCAC, namely those that reduce alcohol's affordability and availability. We also note evidence that advertising and marketing restrictions have been shown to influence drinking by younger people with some evidence also for wider impacts of advertising bans. There is a literature to support other important strategies such as enforcement of drink-driving laws[124], minimum drinking age laws[125], training bar staff and managers to serve alcohol responsibly[126], brief intervention for early stage problem drinkers[127] and educational campaigns.[128] While these have valuable focused impacts, they have less measurable impact on population-wide consumption. We will highlight the value of alcohol warning labels and advertising restrictions, though, as ways to create a favourable climate for the implementation of more directly beneficial strategies.

A landmark international review in 1975122 first provided compelling evidence that alcohol-related harm was a public health problem.

5.1 Combinations of policies

While we will discuss evidence that has accumulated for the effectiveness of individual policies like taxation and restrictions on liquor outlet density later in this chapter, in reality, multiple policies are often introduced simultaneously. A substantial research literature has examined the collective impacts of multiple policies finding strong effects for reduced population alcohol consumption (e.g.[129]), rates of injury (e.g.[130]), homicide (e.g.[131]) and youth drinking (e.g.[132]). One of the clearest examples of multiple strong policy interventions being introduced simultaneously comes from Lithuania where, between 2008 and 2018, alcohol taxes were increased, drink-driving legislation strengthened, and alcohol advertising greatly restricted. Strong longitudinal analysis identified significant reductions in PCAC and, critically, substantial reductions in liver cirrhosis mortality.[133] Other examples of effective multiple interventions have been reported for Poland[134] and for Low and Middle Income (LMIC) countries.[135]

5.2 Monopolies

Over 30 jurisdictions worldwide in North America, the Nordic countries and some Indian states have full or partial government monopolies on the production and/or retail sale of alcohol. Typically, control jurisdictions have lower rates of consumption than those which are fully privatized (e.g.[136,137]). Government monopolies enable policymakers to introduce and maintain strategies to limit alcohol affordability and availability and they have popular appeal.

In Sweden, it is clear that alcoholic products sold in grocery stores are cheaper than the same brands sold in government stores

– and their access is more convenient.[138] A Swedish policy experiment illustrated how reducing the strength of beer available for sale in grocery stores from 4.5% to 3.5% resulted in significantly reduced consumption as well as rates of alcohol dependence, alcoholic psychosis and road crash injuries.[139] A modelling study estimating the impacts of allowing cheaper alcohol of all varieties available for sale in all grocery stores in Sweden (i.e. privatizing Systembolaget, the government alcohol monopoly) estimated a 31.2% increase in consumption accompanied by 1,418 more deaths and 19,860 more hospital admissions per year.[138]

5.3 Increasing alcohol prices

Comprehensive reviews of the effectiveness of available alcohol policies have universally concluded that interventions to raise average prices, whether by taxation or minimum pricing, are the most impactful and have the strongest supporting body of evidence (e.g.[83,140]). A 2024 review[141] of nine published systematic reviews on alcohol prices concluded "Higher prices were consistently associated with lower demand" (p. 1) while noting some variations in effect sizes in different places and populations.

A major meta-analysis of 1,003 estimates from 112 studies[142] reported an "elasticity" of -0.44 for total alcohol consumption in response to price changes. This indicates that a 10% increase in price is on average associated with a 4.4% reduction in consumption. Variations were observed by beverage type and type of drinker with significant effects observed for both average and heavy drinkers.

Higher alcohol taxes are almost invariably passed on to consumers resulting in higher prices. They also always result in increased revenue for governments because the change in consumption is on average only about half the increase in price.[143,144] They have also been linked directly to impacts on rates of alcohol-related illness and death. For example, increases in alcohol tax rates in Florida over a 36-year period predicted significant reductions in deaths, with each 1% increase being associated with a significant 0.22% decrease in deaths.[145] And in the Northern Territory of Australia[146] where a relatively small tax increase was placed on beverages with 3% alcohol or greater, there were immediate declines in: PCAC, road deaths (34%), other injuries (23%), road crash injuries requiring hospital treatment (28%), and chronic alcohol-related illnesses.

Another powerful tool for influencing alcohol prices is to implement "floor prices" that eliminate availability of the cheapest alcohol favoured by younger people and heavier drinkers. This approach has been found to be particularly effective if the floor or minimum price is directly linked to the amount or "unit" of alcohol in a product container, a policy now widely referred to as minimum unit pricing or MUP. First introduced in Scotland in 2018 in its purest form, the success of this policy has also led to its implementation in the Republic of Ireland, in Wales, the Northern Territory of Australia and in several East-European countries.

The official evaluation of Scotland's MUP demonstrated a 13.4% decrease in alcohol-attributable deaths after its implementation when compared to rates in England. Effects were most pronounced in socially disadvantaged regions, making this an important contributor to reducing health inequality divides.[147] Implementation of MUP was associated with a significant reduction in PCAC in Scotland versus England. The impact of this change was most substantial for the heaviest, most dependent drinkers as the valuation also demonstrated an 12% reduction in liver cirrhosis deaths and 23% reduction in deaths of people with an alcohol use disorder.[148] Notably, in April 2024, the Scottish parliament reviewed the above evidence and voted unanimously to continue the policy for another five years and also, with a large majority, to increase the rate from 50p per 8 g "unit" of alcohol to 65p.[149]

Comprehensive reviews of the effectiveness of available alcohol policies have universally concluded that interventions to raise average prices, whether by taxation or minimum pricing, are the most impactful and have the strongest supporting body of evidence.

The review concluded that restricting trading hours at on- and off-licensed outlets was typically followed by decreases in the incidence of assault and hospitalization.

5.4 Restrictions on alcohol availability

A substantial literature now exists comprising evaluations of both deliberate and naturally occurring changes in alcohol availability from many countries, mostly demonstrating reductions in consumption and related harms from decreases in availability (e.g.[83]). The most studied examples are typically from developed countries but there is also a growing literature from LMICs. Most commonly studied examples of availability restrictions involve changes in the hours and days of permitted trading and of the density of liquor outlets, whether licensed for on- or off-premises consumption. Most such studies have captured the effects of increased availability but this section will focus mainly on examples where there have been reductions.

A systematic review[150] identified 22 high quality time series studies of changes to trading hours. The review concluded that restricting trading hours at on- and off-licensed outlets was typically followed by decreases in the incidence of assault and hospitalization. This concurred with earlier reviews that also supported a positive relationship between trading hours and overall alcohol consumption and drinking patterns[151] as well as a broader range of outcomes including crimes and emergency department presentations.[152] The latter reviewed forty-four studies on density of alcohol outlets and found that the majority of studies showed an impact on one or more of the three main outcome variables. Most of these studies evaluated increases rather than decreases in availability.

A good example of the more recent trend to expand alcohol availability was the addition of Saturday trading in Sweden in February 2000 (phase 1). Later, in July 2001, Saturday opening was extended to the whole country (phase 2). There were statistically significant increases in alcohol sales of around 3.7% during both phases. There were no significant changes in any of the assault indicators but there was a statistically significant increase in impaired driving (12%) during phase 1.[153] A subsequent analysis demonstrated the policy was associated with increased alcohol use and crime on Saturdays along with higher credit demands, defaults on payments, and increased dependence on welfare.[154,155]

This finding is consistent with a systematic review and meta-analysis of days of trading and impacts on consumption[156] which drew upon North American and Scandinavian policy experiments in which an additional day of trading was added for off-outlet sales. On average it was shown that total alcohol consumption increased by 3.4% for each extra day of off-outlet trading.

5.5 Restrictions on alcohol advertising

The evidence on whether restrictions or bans on advertising reduce overall population-level drinking and related problems is limited and shows mixed results. One recent review concluded "more research is needed on this topic".[157 p. 1424] Similarly, another recent review found "insufficient evidence to conclude that alcohol marketing bans reduce alcohol consumption".[158 p. 1] Even so, it is interesting to note that an interrupted time-series study of a complete ban on alcohol advertising in Norway 1975[159] found an immediate and lasting, significant decline in total alcohol sales of about 7%.

The evidence for advertising impacts on young people's drinking is, however, more clear-cut. A review of reviews[160] applied Bradford Hill causality criteria to 11 narrative and systematic reviews. They concluded that findings from the literature were consistent with a causal association between alcohol marketing and drinking among young people. This concurred with earlier reports regarding impact on drinking by young people. One systematic review identified 12 longitudinal studies all of which concluded that level of exposure and level of youth alcohol consumption were positively associated.[161] Another review[162] found that almost all longitudinal studies concluded there was an impact of exposure on subsequent alcohol use in young adulthood. Clearly, there are major benefits to young people of policies that reduce alcohol

advertising and address the rapid growth and sophistication of alcohol advertising in electronic media. Policies that benefit young people, will ultimately benefit society as a whole, socially and economically. The World Health Organization (WHO) has pointed out the important role that elected representatives have in "...prioritizing the health and well-being of citizens, especially children and adolescents, and protecting them from exposure to harmful products" (p. 13) and highlighted the stark contrast between the current global status of alcohol advertising and the major strides that have been made with restricting the advertising of tobacco products.[163]

5.6 Policies to raise awareness of risks

Alcohol warning labels are mandated in a number countries[164] but very few mention specific adverse health consequences such as increased cancer risk. At present, only South Korea mandates a series of three rotating health warnings, one of which refers to increased risk of liver cancer.[165] The Republic of Ireland recently passed legislation to introduce a series of rotating messages by 2026 conveying multiple types of risk including increased risk of cancer.[164] At present, the majority of people in most countries studied are unaware that alcohol carries an increased risk of cancer.[165] In countries where it has been studied, public opinion strongly supports providing consumers with health information on container labels.[166]

A recent systematic review of research studies evaluating the impacts of warning labels[166], identified 40 publications that studied 31 types of labels. In most cases the quality of studies and hence confidence in conclusions was rated as low or very low. An important exception concerned evidence of reduced consumption from rotating health messages from real-world studies with strong experimental designs. One such real-world study was conducted in the Yukon Territory of Canada where in 2017 both cancer warnings and information about low-risk drinking guidelines were manually placed on alcohol sold in the only government liquor store in the capital of Whitehorse. These labels included colour images and were of sufficient size to be clearly seen (3 X 5cm). Legal threats by Canadian alcohol producers resulted in the experiment being paused and only continued when the cancer warnings were removed.[165] In comparison with control sites, per capita alcohol consumption in Whitehorse decreased by 6.3% during the intervention period.[167] Customer surveys also showed that: awareness of risks from alcohol was increased; there was strong public support for the intervention; people who saw the new warnings were more likely to consider reducing their drinking; and, that there was increased support for strong alcohol policies.[168,169]

While frequently dismissed as an information-only educational strategy, this study illustrated how well designed, impactful warning labels are well supported by the public, can increase awareness of serious risks, increase support for more directly effective policies (e.g. increased pricing) and may even reduce PCAC. Giesbrecht (2007)[170] observed that education and persuasion interventions such as warning labels may play a key role in prompting public discussions about the rationale of alcohol policies and roles that citizens can play in promoting and supporting directly effective policies. However, a 2014 Swedish survey[171] found that even among individuals who held a positive view about the consequences of their own alcohol use, the great majority perceived alcohol to be a significant social problem warranting strong alcohol policies.

Clearly, there are major benefits to young people of policies that reduce alcohol advertising and address the rapid growth and sophistication of alcohol advertising in electronic media. Policies that benefit young people, will ultimately benefit society as a whole, socially and economically.

6 Summary and conclusions

In recent decades, discussions about alcohol tend to focus on its various health, social and economic harms, along with controversies about health effects at low-to-moderate levels of consumption compared to not drinking. However, the most consistent scientific evidence when it comes alcohol consumption is that less is better, whether for populations or for individuals. Even for those who argue for benefits of consumption at low levels, the lowest level of risk for drinkers is somewhere between zero and half a drink per day, so the benefits of reduced consumption would be realized for most drinkers, not just heavy drinkers. In addition, it should be noted that many drinkers who consume at low average levels report risky patterns of consumption (i.e., binge drinking), and reductions in consumption also applies to the pattern as well as the volume of consumption.

With growing evidence of harms (e.g., certain cancers) at even low levels of consumption and shrinking evidence of health benefits (e.g., for heart disease), in many parts of the world people have expressed increased interest in the benefits of abstinence or reduced use of alcohol. This is manifested in the growth of alcohol-free bars, low- and no-alcohol products, mocktails, and events such as Dry January and Dry July. Some of this commercial and social activity may be in response to an interest in improved health. In many high-income countries there have also been declines in youth drinking.[172] In terms of national drinking guidance, changes in science are reflected in guidelines delineating

reduced recommended limits for the UK, France, the Netherlands, Denmark, Canada and Australia.

So in this report we considered the evidence for potential health benefits of reduced alcohol consumption, both for individuals and populations. Some of our main findings were as follows:

- Reductions in consumption for individuals is associated with reduced risk for a variety of serious physical illnesses including a range of cardiac conditions, alcohol-related cancers, stroke, dementia and cognitive function, and a range of gastrointestinal conditions.
- Benefits related to mental health and general well-being have been reported among drinkers when they engage in a period of alcohol abstinence (e.g., Dry July) including improved sleep, mental energy, improved fitness, reduced stress.
- There is a strong relationship between the level of population consumption and harms from alcohol. While much of this evidence comes from periods when consumption increased, evidence also shows that decreases in consumption are accompanied by decreases in alcohol-caused deaths, rates of violence, sexual assault and alcohol-related cancers. These changes are observed with gradual reductions in consumption, and more dramatically when there are sudden, large reductions in consumption resulting from measures taken during emergencies (e.g. wartime, pandemics) and during temporary or longer lasting restrictions on alcohol sales.
- Similar effects can be achieved through a range of policy measures to reduce alcohol consumption, as highlighted in case studies of Lithuania, Scotland and Western Australia. Alcohol policies are the only readily modifiable means to affect consumption in the population. Examples of effective policies include taxes, minimum unit pricing, restrictions on outlet density and hours of sale, the maintenance of government alcohol monopolies, marketing and advertising restrictions.
- In general, alcohol policies are designed to protect those with alcohol-related vulnerability (e.g., those with risky consumption patterns, those who are at risk for heavy drinking or developing an alcohol use disorder) and in some cases, to protect others (e.g. drink driving laws). In addition, because of the so-called "alcohol harm paradox" (in which poorer persons or those from racial and ethnic minorities suffer more harms from alcohol at any given level of consumption compared to people with higher socioeconomic status), alcohol policies and attendant decreases in consumption generally reduce health inequalities and disproportionately benefit low-income persons and communities.
- Although the evidence of alcohol-caused harms has grown and public awareness has increased, changes to alcohol policies have often been in the direction of liberalization, typically with minimal weight given to the perspectives of public health and community well-being. Various segments of the alcohol industry can influence policy through lobbying, funding of political candidates, or through marketing and public communications campaigns.
- Although population efforts to reduce consumption are most impactful, individual efforts to reduce drinking are also important. In addition, better access to treatment, through primary care or specialty care, is needed. Medications to treat alcohol use disorder are greatly under-utilized.

We conclude that whether we consider individual or population drinking, less is better for health. Reduced consumption comes with a range of health and social benefits which can be achieved through a comprehensive series of relatively modest but evidence-informed strategies that reduce alcohol's availability, affordability and popular appeal.

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