DEEP SEAS
DEVELOPING AND EXTENDING EVIDENCE AND PRACTICE FROM THE STANDARD EUROPEAN ALCOHOL SURVEY

FAR SEAS
FETAL ALCOHOL REDUCTION & EU KNOWLEDGE EXCHANGE AFTER SEAS

Background Document for the
DEEP SEAS Thematic Capacity Building Workshop 2:

Alcohol and its relation to Cancer, Socioeconomic inequalities and Nutrition & Obesity

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Background paper

This background paper has been prepared under the DEEP SEAS service contract (www.deep-seas.eu, Contract No. 20177113) with the Consumers, Health, Agriculture and Food Executive Agency (Chafea), acting under the mandate from the European Commission (DG Santé). The information and views set out in this report are those of the author(s) and do not necessarily reflect the official opinion of the Commission/Chafea. The Commission/Chafea do not guarantee the accuracy of the data included in this study. Neither the Commission/Chafea nor any person acting on the Commission's/Chafea's behalf may be held responsible for the use which may be made of the information contained therein.

The scientific reviews and writing of the topic papers has been undertaken for the Cancer topic by Jürgen Rehm, from the Institute for Mental Health Policy Research in the Campbell Family Mental Health Research Institute (CAMH), Canada; for the Socioeconomic inequalities topic by Charlotte Probst, Heidelberg University, Germany; and for the Nutrition/obesity topic by Laura Rossi from the Council for Agricultural Research and Economics, Research Center for Food and Nutrition (CREA), Italy. Scientific and stylistic revisions and the executive summary has been written by Rebecca Gordon, from the Clínic Foundation for Biomedical Research (FCRB), on behalf of the DEEP SEAS and FAR SEAS coordinators. Independent peer-review of the papers has been carried out by Isabelle Soerjomataram, from IARC (Cancer), Pia Mäkelä, from the Finnish Institute for Health and Welfare, THL (Inequalities) and João Breda, from the WHO European Office (Nutrition/obesity).

Executive summary

The DEEP SEAS and FAR SEAS thematic capacity building workshops

Among other tasks, **DEEP SEAS and FAR SEAS** aim to support European Member States in knowledge gathering, sharing best practice and capacity building for evidence-based alcohol policy and harm-reduction across multiple sectors, adopting a **health in all policies approach**. To this end, with the support of hosts in selected EU member states, the projects will elaborate evidence-based briefing documents and organise a series of 5 multi-sectoral thematic workshops for knowledge exchange and capacity building throughout 2020-2022, within the frame of the prevention strand of Europe's Beating Cancer Plan.

The Beating Cancer Plan specifically recognises the intrinsic carcinogenic nature of alcohol and pledges the following under *3.3 Reducing harmful alcohol consumption*:

- support to Member States and stakeholders implementing best practices towards the aim of reducing harmful alcohol consumption by 10% by 2025
- to review EU legislation on alcohol taxation and cross-border alcohol purchases by private individuals
- to monitor implementation of the Audiovisual Media Services Directive and effective measures to reduce the exposure of young people to alcohol marketing
- to propose mandatory indication of ingredients and a nutrition declaration on alcoholic beverage labels before the end of 2022 and health warnings on labels before the end 2023
- support to Member States to implement evidence-based brief interventions in different settings.

The first workshop, *Alcohol Advertising and Sponsorship in Traditional and Digital Media* was held in December 2020, hosted by Charles University Prague and the Government of the Czech Republic.

The current workshop: ***Alcohol and its relation to Cancer, Socioeconomic Inequalities, and Nutrition & Obesity***, (March 2021) is co-hosted by General Directorate for Intervention on Addictive Behaviours and Dependencies (SICAD), of the Portuguese Ministry of Health. These briefing documents provide background to the topic areas to be discussed in the 3 sessions of the workshop:

9th March 2021 Alcohol and Cancer	12th March Alcohol and Socioeconomic Inequalities	16th March Alcohol, Nutrition & Obesity

Each briefing document includes a rapid review of current evidence, brief discussion of relevant policy and suggested areas for discussion and further work.

Workshop context

Alcohol and its relation to Cancer, Socioeconomic Inequalities, and Nutrition & Obesity

Europe has the highest level of alcohol consumption and alcohol-related harm in the world (1, 2). It also suffers the highest burden of non-communicable diseases (NCDs) (3). The GBD 2017 study estimated that over 91% of deaths and almost 87% of DALYs in the EU were the result of NCDs (4).

Socioeconomic inequality within and between European countries is reflected in a social gradient in health, with people with low socioeconomic status (SES) experiencing a greater burden of disease and higher mortality than those with higher SES. This gradient is clearly seen in alcohol-related harm — people with low

SES suffer greater alcohol-related harm than those with higher SES and similar levels of consumption (the alcohol harm paradox).

Alcohol use is a risk factor for cancer and a causal link has been established between alcohol and a number of cancer sites (5-12). However, awareness of this link is low in Europe and worldwide (13).

As well as being a risk factor for NCDs such as cancer and type II diabetes, alcohol is a likely driver of overweight and obesity given its high calorific value and its effects on appetite and metabolism (14-16). Consumer awareness of the contribution of alcoholic beverages to energy intake is low and this potential relationship between alcohol and weight gain is rarely considered in policy making.

Reducing the burden of NCDs by addressing known risk factors, reducing socioeconomic inequalities and promoting sustainable development are priorities at the national, European and global levels.

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Key messages from the briefing documents

<table>
<tr><th colspan="2">Common messages</th></tr>
<tr><td>Effective policy measures should aim to
Raise awareness of the health risks of even moderate alcohol consumption (general population and targeted campaigns)
Reduce alcohol affordability via well designed taxation and pricing policies which account for inflation and income changes
Restrict alcohol availability in an equitable manner
Ban/restrict marketing and advertising (including online and digital)
Review the inclusion of alcohol in food based dietary guidelines</td><td>Further research is needed into the complex multiple links between
Alcohol-cancer
Alcohol-overweight/obesity
Alcohol-inequalities
Research should consider drinking patterns and types of beverages
Further research is needed into:
Nutritional/warning labels on alcoholic-beverages (cancer and nutrition and overweight/obesity)</td></tr>
<tr><td colspan="2">Actions must be implemented within the broader context of the social determinants of health, NCDs and the complex relationships between these and alcohol use</td></tr>
</table>

Messages from each of the three briefing documents		
	Key messages	**Key policy actions & Further research directions**
Alcohol and Cancer	• There is low awareness of the alcohol-cancer link • A large proportion of alcohol-related cancers occur in low to moderate drinkers • Implement population level measures which: - Raise public awareness of alcohol-cancer link - Reduce consumption including in low/moderate drinkers - Intersect with actions related to other NCD risk factors	**Policy actions** • Raise awareness of the link between alcohol and cancer • Reduce affordability via taxation and pricing policies • Restrict availability • Ban marketing and advertising (including online and in digital media) • Place warning labels on alcoholic beverages **Further research** should be directed to: • Better understanding the alcohol-cancer link • Warning labels and the elements/features which enhance their effectiveness
Alcohol and Socioeconomic Inequalities	• People with low SES suffer greater alcohol-related harm than those with high SES with the same level of consumption — The alcohol-harm paradox • Alcohol use must be understood in the context of factors contributing to socioeconomic inequalities • Actions to reduce affordability have their greatest effect on people with low SES and heavy drinkers • MUP has the best evidence for reducing socioeconomic differences in alcohol-related harm	**Policy actions** • Reduce affordability via taxation and pricing policies, especially MUP **Further research** should be directed to: • The 'alcohol-harm paradox' and the relationship between alcohol-related harm and 'upstream' and 'downstream' factors (e.g. education, access to treatment) • Tailoring environmental actions, e.g. reducing outlet density considering socioeconomic distribution within communities

	Key messages	Key policy actions & Further research directions
Alcohol, nutrition and obesity	• Awareness of the association between alcohol and overweight/obesity and alcohol's high calorific value is low • Alcoholic beverages are not a basic food, contain empty calories and cannot be recommended as part of a normal diet • Depending on the type, alcohol can considerably increase overall energy intake • Alcohol production has an important role in food systems, which comprise health and non-health priorities (environmental, occupational and commercial)	**Policy actions** • Raise awareness of the association between alcohol and weight gain (e.g. via effective, mandatory labelling, revision of food based dietary guidelines) • Review food based dietary guidelines to include alcohol's contribution to energy intake and lack of nutritional value • Improve screening and intervention in primary care where alcohol is a risk factor for overweight and related morbidity • Carefully design agricultural policy to put health at the centre **Further research** is needed into: • Nutritional labelling and what makes it most effective • The role of types of alcoholic beverages and drinking patterns on influencing weight gain related to alcohol consumption

Workshop Agenda: Alcohol and its relation to Cancer, Socioeconomic Inequalities, and Nutrition & Obesity

Session 1 – Tuesday 9th March – Alcohol and Cancer (and relationships with nutrition, obesity and inequalities)

Time (CET)	Topic (and format)	Chair / Speaker
13:55	Participants admitted to the meeting	
14:00	Welcome and Setting the scene - Welcome from hosting Member State - Portugal - Frame of EU Beating Cancer Plan - Introduction to the workshop sessions	Toni Gual (chair) António Lacerda Sales (State Secretary for Health, PT) EC hosts (DG SANTE)
14:20	Evidence update: Topic 1: **Key messages from science on the real cancer burden of alcohol**	Video presenters: - Jürgen Rehm (CAMH/TUD)
14:45	Stakeholder perspectives – from multiple countries / Europe-wide - **France** – translating data into policy recommendations - **Czech Republic** – a public campaign to raise awareness - **Italy** – national guidelines to counteract "fake science"	Video presenters: - Isabelle Soerjomataram (FR) - Miroslav Barták (CZ) - Emanuele Scafato (IT)
15:10	10-minute break	
15:20	Summary by sub-topic expert + introducing discussions (live)	Toni Gual / Jürgen Rehm
15:25	Breakout discussions – (small parallel groups of 8-10 people): ▪ Discussion question (TBD): *What are the most important steps towards a set of policies or system for policy development that recognises the cancer burden of alcohol products? (3 top priorities)*	Moderators and rapporteurs pre-assigned to each group
16:00	Feedback to whole group – - Brief summaries by rapporteurs/moderators + Round of comments	Rapporteurs and Moderators
16:45	Wrap up by hosts and sub-topic expert	Toni Gual / Jürgen Rehm
17:00	End of afternoon 1	

Session 2 – Friday 12th March – Socioeconomic inequalities in health related to alcohol use

Time (CET)	Topic (and format)	Chair / Speaker
13:55	Participants admitted to the meeting	Administrator
14:00	Welcome back and order of the day /messages from previous day: - Alcohol inequalities and the impact on cancer (EU Cancer Plan) - Alcohol inequalities in the hosting Member State - Portugal - Introduction to the session topic	Toni Gual (chair) EC hosts (DG SANTE) João Castel-Branco Goulão (National Coordinator on Drugs and Alcohol, PT)
14:20	Evidence update - Topic 2: **Key lessons from recent research on inequalities and alcohol**	Presenters: - Charlotte Probst (Heidelberg, DE) - Jen Boyd (SHAAP, UK)
14:45	Stakeholder perspectives - **Finland** – Policy options to reduce alcohol-related inequalities - **Portugal** – Multi-sectoral approaches - **TBD** – tackling inequalities in alcohol harm in Eastern Europe	Video presenters: - Pia Mäkelä (FI) - Graça Vilar (PT) - (TBC)
15:10	10-minute break	
15:20	Summary by sub-topic expert + introducing discussions (live)	Gual + Probst
15:25	Breakout discussions: Discussion question (TBD): ***How can we balance a need for a broader approach to determinants of harm for less affluent groups against the primary aim of reducing consumption across the board?***	Moderators and rapporteurs pre-assigned to each group
16:00	Feedback to whole group - Brief summaries by rapporteurs/moderators + Round of comments	Rapporteurs and Moderators
16:45	Wrap up by hosts and sub-topic expert	A Gual / C Probst
17:00	End of afternoon 2	

Session 3 – Tuesday 16th March – Alcohol, nutritional impact and obesity

Time (CET)	Topic (and format)	Chair / Speaker
14:00	Participants admitted to the meeting (instructions slide on screen)	Administrator
14:05	Welcome back and order of the day /messages from previous day: - Frame of EU Beating Cancer Plan (DG SANTE) - Alcohol, food and obesity in the hosting Member State - Portugal - Introduction to the session topic	Toni Gual (chair) EC hosts (DG SANTE) Manuel Cardoso (Deputy Director of SICAD, PT)
14:20	Evidence update **Alcohol consumption, nutrition/caloric intake, overweight and obesity – scientific findings to inform policy**	Presenters: - Laura Rossi (CREA, IT)
14:45	Stakeholder perspectives - **Netherlands** – changes to guidelines regarding alcohol - **European research to guide policy on nutrition, BMI and alcohol** - **Alcohol and food - Lessons over time from EU initiatives and processes**	Video presenters: - Ninette van Hasselt (NL) - Pietro Ferrari (IARC) - João Breda (EU-WHO)
15:10	10-minute break	
15:20	Summary by sub-topic expert + introducing discussions (live)	Gual + Rossi
15:25	Breakout discussions – (4 small parallel groups of 8-10 active discussants): Discussion question: ***It is clear that alcohol is no ordinary commodity – which policy measures must be strengthened or changed to prevent promotion of a harmful product viewed as 'food'?***	Moderators and rapporteurs pre-assigned to each group.
16:00	Feedback to whole group - Brief summaries by rapporteurs/moderators + Round of comments	Rapporteurs and Moderators
16:45	The EU perspective — What is needed at the EC level to support Member states in acting on these discussions and taking forward the EU Cancer Plan – Feedback from CNAPA MS representatives	Manuel Cardoso Member states Representatives
17:00	Wrap up by hosts and topic experts	A Gual / L Rossi
17:15	End of afternoon 3	

Briefing papers

Session 1: Alcohol and cancer

Author: Dr Jürgen Rehm, CAMH, Canada

Key messages

Effective policy measures and programs should be implemented which:

- Raise public awareness of the link between alcohol and cancer
- Reduce alcohol consumption including in low and moderate drinkers
- Intersect with and support actions which address the other key risk factors for NCDs – lack of physical activity, poor nutrition and tobacco use

Population level interventions are most likely to be effective for reducing alcohol-attributable cancer. These are:

- Taxation
- Restricting availability
- Banning marketing and advertising (including online and in digital media)
- Warning labels on alcoholic beverages

1. Background

Cancer is the second leading cause of death globally, in 2020 there were an estimated 19.3. million new cancer cases and 10 million cancer deaths (1). Alcohol use is a leading risk factor for cancer and a causal link has been established between alcohol and a number of cancers (2-4). There is no apparent safe threshold for use. Ethanol (pure alcohol) is the carcinogenic compound found in all alcoholic beverages (5).

Cancer shares common risk factors with other NCDs: tobacco smoking, alcohol use, physical inactivity and nutrition (4). In addition, there is often a clustering of these risk factors, for example with alcohol use and smoking (6). Between 30% and 50% of cancers could be prevented by avoiding known risk factors and the implementation of effective prevention strategies (7).

Non-communicable diseases (NCDs) including cancer are a recognized threat to global health and development (8). Alcohol use, along with physical inactivity, nutrition and smoking, has been included in the WHO *Global Monitoring Framework for NCDs* with a target of at least a 10% relative reduction in the harmful use of alcohol by 2025 (9).

2. Literature review

Europe has the highest level of alcohol consumption and alcohol-related harm in the world (10, 11). In Europe, in 2016 about 80,000 people died of alcohol-attributable cancer (12). As many cancers affect people relatively late in life, their impact is most pronounced in regions with a high life expectancy such as the European Union (13). Given this situation, population awareness of the impact of alcohol use on cancer needs to be established, and overall consumption of alcohol should be reduced in the EU. In February 2021 the European Commission launched *Europe's Beating Cancer Plan* (14). Prevention, by addressing key risk factors including harmful[1] alcohol consumption, is one of the plan's four priority areas.

Established causal relationship between alcohol and cancers

Alcohol use is a risk factor for a number of cancers. A causal relationship has been established between alcohol use and the following cancers (3, 15-21):

- Oral cavity
- Oropharynx
- Hypopharynx
- Oesophagus (squamous cell carcinoma)
- Colon
- Rectum
- Larynx
- Liver
- Breast (female)

For all of these cancers, there is a dose-response relationship with no apparent safe threshold: the higher the average level of consumption, the higher the risk of cancer incidence. Table 1 shows the level of evidence as determined by the International Agency for Research on Cancer (IARC), The Continuous Update Project of the World Cancer Fund and the French National Cancer Institute.

[1] Although the WHO and EU documents explicitly speak about "harmful" alcohol consumption, this is misleading as any alcohol consumption can cause cancer (see below).

Table 1: Level of evidence for a causal relationship between alcohol use and various cancers

	Level of evidence		
Cancer site (ICD-10 code)	International Agency for Research on Cancer (3, 15)	World Cancer Research Fund	L'Institut National Du Cancer, France (19)
Oral cavity (C02-06)	Sufficient evidence	Convincing (16)	Convincing
Oropharynx (C01, C09-10)	Sufficient evidence	Convincing (16)	Convincing
Hypopharynx (C12-13)	Sufficient evidence	Convincing (16)	Convincing
Oesophagus (C16)	Sufficient evidence	-	
adenocarcinoma	-	Limited, no conclusion (17)	Insufficient evidence
squamous cell carcinoma	-	Convincing (17)	Convincing
Colon (C18)	Sufficient evidence	Convincing (M) Probable (F) (18)	Convincing
Rectum (C19-20)	Sufficient evidence	Convincing (M) Probable (F) (18)	Convincing
Liver (C22)	Sufficient evidence	Convincing (21)	Convincing
Larynx (C32)	Sufficient evidence	Convincing (16)	Convincing
Breast (female) (C50)	Sufficient evidence	Convincing (20)	Convincing
Causality not established			
Stomach (C16)	-	Probable (22)	Controversial results
Gallbladder (C23)	-	Limited, no conclusion (23)	Not established
Pancreas (C25)	Observed association	Limited, suggestive (heavy consumption) (24)	Controversial results
Prostate (C61)	-	Limited, no conclusion (25)	May be associated at higher levels of consumption
Kidney (C64-65)	Evidence suggesting lack of carcinogenicity	Probable (intake up to 30 g/day) (26)	Insufficient data

Alcohol-attributable cancer in the European Union

In 2016, there were an estimated 80,000 alcohol-attributable cancer deaths in Europe and almost 1.9 million cancer DALYs (12). Alcohol use is one of the main known risk factors for cancer in the EU; in a recent comprehensive study on cancer risk factors in France, no other risk factor but tobacco smoking was reported to cause higher cancer incidence (27). Figure 1 shows burden of disease by alcohol-attributable cancers.

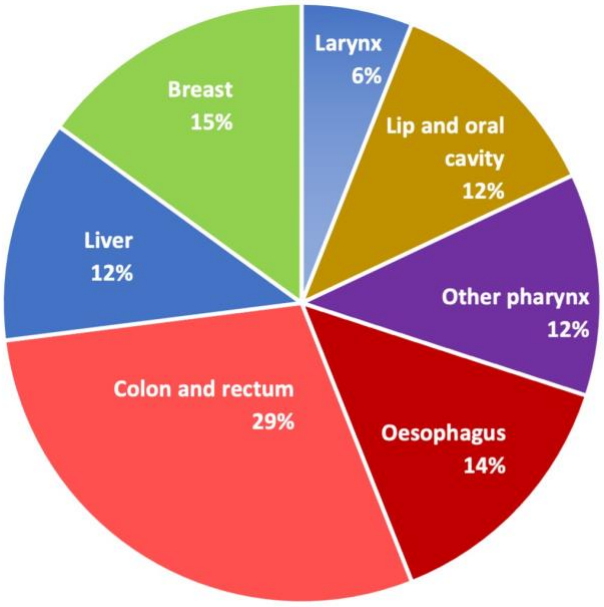


Figure 1: Alcohol-attributable cancer burden 2016 in Europe (total alcohol-attributable DALYs: 1,880,490)
Source: Own calculations based on Shield et al. (28); Europe is defined as by the Institute for Health Metrics and Evaluation (IHME)

Trends in alcohol-attributable cancers

Rates for both deaths and DALYs have been going down, following overall trends in average level of alcohol use in the EU (29, 30). These trends also reflect secular trends in all-cause mortality. While alcohol-attributable cancer indicators went down, alcohol-attributable cancer harm is still high in the EU.

In addition, the downward trend is expected to slow or even reverse in the future based on more recent trends in both alcohol use (29, 31, 32) and cancer mortality (33). Figure 2 shows alcohol-attributable, age-adjusted cancer mortality rates per 100 000 since 2000. Figure 3 shows alcohol-attributable age-adjusted DALYs per 100 000 from 2000. *Note: these mirror alcohol use trends between 1990 and 2006, due to the latency period of 10 years.*

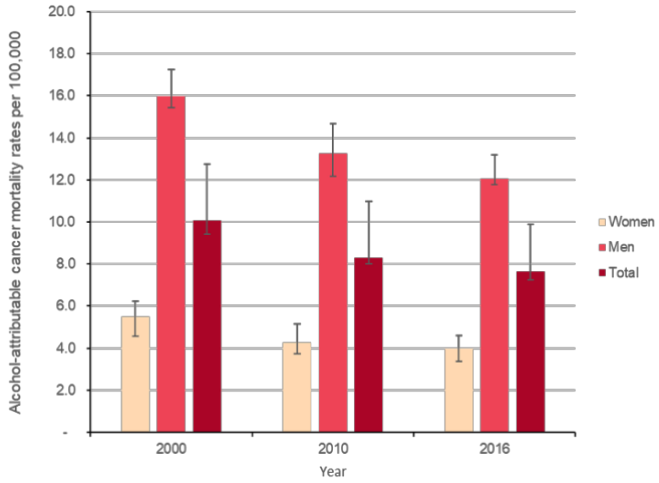


Figure 2: Alcohol-attributable cancer mortality rates per 100 000 and 95% confidence intervals 2000 – 2016.
Source: Own calculations based on Shield et al. (28)

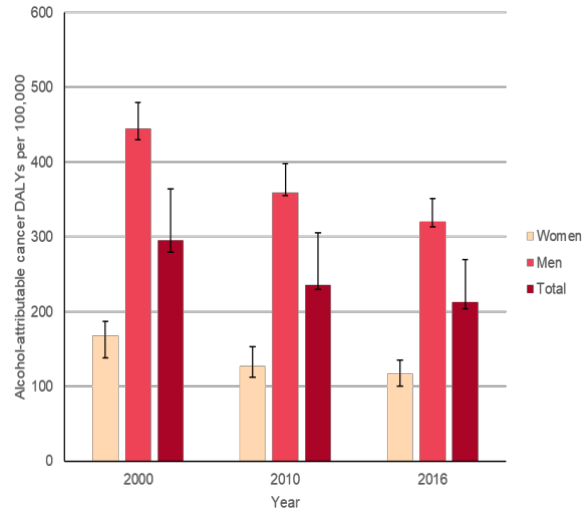


Figure 3: Alcohol-attributable cancer DALYs per 100 000 and 95% confidence intervals 2000-2016
Source: Own calculations based on Shield et al. (28)

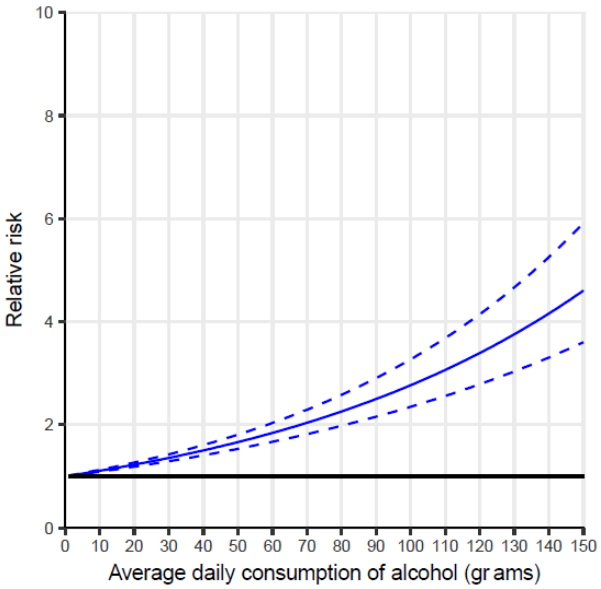
Risk relations between alcohol and cancer subtypes

While there is a clear dose-response relationship in alcohol consumption and cancer, there is no safe limit for alcohol use (3, 4). The dose-response curves are relatively flat and almost linear. This is due to the fact that most of the burden occurs in light to moderate drinkers (34). This is an example of the so-called preventive paradox (35), and supports population based preventive strategies for reducing the alcohol-attributable cancer burden (36, 37).

Protective effect

A number of studies appear to find a protective effect of low to moderate alcohol use, particularly related to cardiovascular health. However, when accounting for other factors this review found no protective effect and increasing risk with higher levels of consumption. The protective effect found in some publications is likely due to comparisons made to current abstainers, a group which includes former drinkers with elevated risk (21, 38-40) and lifetime abstainers (4).

The most researched alcohol-attributable cancer is breast cancer (30). For breast cancer, the findings of biological studies (30), individual and aggregate-level meta-analyses based on either cohort or case-control studies (individual level pooled analysis: (41); aggregate level meta-analyses: (42, 43), and large-scale individual studies (44) converge: even average alcohol intake, as low as 10 g of ethanol per day or lower (the most common size of a standard drink globally) is associated with a significantly increased risk of breast cancer as shown in figure 4. Similarly, for oesophageal cancer there is a clear dose-response curve as shown in figure 5.



No safe limit for alcohol use: breast cancer

Even use as low as 10g or less per day is associated with significantly increased risk of breast cancer

Figure 4: Relative Risks and 95% confidence intervals for breast cancer among female alcohol users by average volume of drinking (as compared to lifetime abstainers). Source: own calculation based on Bagnardi et al. (45)

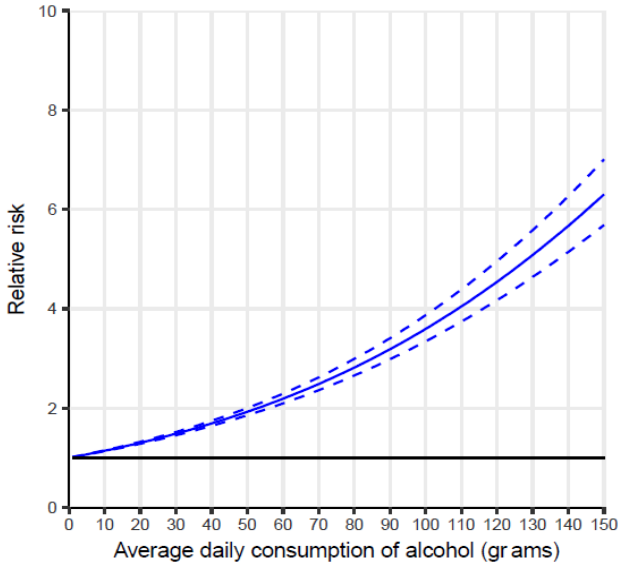


Figure 5: Relative Risks and 95% confidence intervals for oesophageal cancer among alcohol users by average volume of drinking (as compared to lifetime abstainers)

3. Policy context

Most of the burden of mortality and morbidity in the WHO European Region is due to four preventable diseases: CVD, cancer, diabetes, and chronic respiratory diseases. These have shared risk factors: tobacco, alcohol, physical inactivity and unhealthy diet. These NCDs and their determinants can be influenced by policies in a range of sectors (46).

As mentioned, population level interventions are best suited to addressing alcohol-attributable cancer. A number of population level policies and strategies to reduce alcohol consumption and related harm have been implemented in European countries, either targeting alcohol use directly or with reducing alcohol use as a target within a broader strategy. These include the areas of NCDs, health equity and sustainable development, and diet, food and nutrition.

Evidence based recommendations for cost-effective interventions to reduce alcohol consumption and related harms from the WHO 'Best Buys' and the SAFER intervention include:

- decreasing affordability through pricing and taxation policies
- restricting availability through restricting hours of sale, enforcing age limits for purchases
- restricting or banning marketing and advertising (47, 48).

Specific strategies targeting alcohol as the main focus include the WHO Global strategy to reduce the harmful use of alcohol 2010 (48) and the European action plan to reduce the harmful use of alcohol 2012–2020 (49). The European action plan proposes options for Member States for the 10 action areas of the Global strategy. The action areas include availability of alcohol; marketing of alcoholic beverages; pricing policies; and reducing the negative consequences of drinking and alcohol intoxication.

In addition to the three options listed in the Best Buys and SAFER the European action plan includes placing warning or information labels on all alcoholic beverages and all commercial communication materials. The Plan proposes these in relation to health risks including cancer.

Cancer and other non-communicable diseases

Cancer

The European Commission's *Beating Cancer Plan* launched in February 2021, has a focus on prevention, treatment and care. The Plan aims to raise awareness of and address key risk factors, including harmful alcohol consumption. In the Plan the European Commission commits to "*increase support for Member States and stakeholders to implement best practices and capacity-building activities to reduce harmful alcohol consumption in line with the targets of the UN Sustainable Development Goals*" which also include targets directly related to alcohol use (50).

Key actions of the *Beating Cancer Plan* related to alcohol include:

- A review of EU legislation on alcohol taxation
- Publishing a study mapping fiscal measures and pricing policies on sugars, soft drinks and alcoholic beverages in 2022
- Proposing mandatory labelling of ingredients and nutrient content, along with health warnings on alcoholic beverages –2021-2023 (14).

NCDs

Globally, the World Health Organization's Global NCD Action Plan 2013-2020 (51, 52) includes the 25x25 objective to reduce premature deaths from cancers, heart and lung diseases, and diabetes by 25% by 2025. The strategy has 9 voluntary targets aligned with the SDGs of which target 1 is "A 25% relative reduction in the overall mortality from cardiovascular diseases, cancer, diabetes, or chronic respiratory diseases." Target 2 is "At least 10% relative reduction in the harmful use of alcohol, as appropriate, within the national context" (9).

Policy options supported by the Plan to reduce the harmful use of alcohol include the aforementioned actions of pricing policies, restrictions on availability and restricting or banning advertising and promotion. Although the Plan supports promoting nutrition labelling, this is only specifically mentioned within the context of reducing salt intake, addressing diabetes and obesity and hypertension.

Inequality and sustainable development

Harmful alcohol use is a threat to achieving health equity and sustainable development. Goal 3 of the UN Sustainable Development Goals (SDGs) (53) *"Ensure healthy lives and promote well-being for all at all ages"* includes the following targets related to alcohol and cancer:

3.4 "*Reduce premature mortality from NCDs and promote mental health and well-being*". In the WHO European Region alcohol causes 6% of deaths from cancer. To reduce the NCD mortality burden, a target was set in 2013 of at least a 10% relative reduction in the harmful use of alcohol by 2025. By 2020 this target had been achieved in the WHO European Region overall, but with high variation between Member States. Insignificant progress has been made in countries within the EU (a 1.5% reduction in total consumption) (53).

3.5*: "Strengthen the prevention and treatment of substance abuse, including narcotic drug abuse and harmful use of alcohol"* (50). Preventing harmful use of alcohol would have a direct impact on alcohol-attributable cancers.

Health 2020 A European policy framework and strategy for the 21st century (54) focuses on reducing health inequalities. The policy notes cost-effective interventions to address alcohol-related harm include restricting access to retailed alcohol; enforcing bans on alcohol advertising, including in social media; raising taxes on alcohol; and instituting a minimum price per gram of alcohol.

Diet, food and nutrition

Despite the fact that alcohol is not a basic food and cannot be recommended as part of a healthy diet it is still included in food based dietary guidelines in several European countries with variation between countries in the level of consumption considered risky (55). This is an important area to address as a substantial proportion of alcohol-attributable cancers occur in low and moderate drinkers.

Revision of nutritional guidelines has begun at EU level but is not yet completed (56) Several Member States have lowered the level of consumption considered risky in guidelines (57).

4. Recommendations for policy

Although it is well established scientifically that alcohol is a carcinogen and alcohol use can cause cancer this knowledge has still not entered into broad public awareness in most countries (58). One common way of disseminating this information would be via the use of specific cancer-warning labels (59). In addition to effective labelling other population based measures such as those which increase price and reduce affordability, restrictions on availability, and banning marketing and advertisement are the most likely to be effective in reducing consumption and related harms (60).

Issue	Policies
• There is an urgent need to raise awareness of the link between alcohol and cancer	• Cancer warning labels on alcoholic beverages
• Due to the dose-response relationship between alcohol consumption and cancer there is a need to reduce consumption	• Reduce affordability: via taxation and pricing policies • Reduce availability: restricting hours of sale • Ban marketing and advertising

Labelling

Although the current evidence for labelling leading to behaviour change behaviour is limited (61), it is nonetheless important to first raise awareness of the fact that alcohol is a carcinogen and if it were introduced as a food item today in its usual forms, it would likely fail to pass current regulations (62, 63). The evidence on behaviour may be limited in part due to the more general, small and unspecific labels used to date on alcoholic beverages. As was the case with the first research on labels used on tobacco packaging (64, 65). The only field trial on the effectiveness of a specific cancer label on alcoholic beverages had to be stopped early due to interference from the alcohol industry (66).

Reducing affordability and availability and restricting or banning advertising and marketing

Global and European actions and strategies to reduce alcohol-related harm reflect the current evidence and consistently recommend policy measures described in the WHO 'Best Buys' for alcohol policies and the SAFER intervention including population based measures such as pricing and taxation policies, restricting alcohol availability, and restricting alcohol marketing and advertising (47, 48). The dose-response relationship between alcohol use and cancer supports population based measures.

5. Key areas for discussion

- How to raise awareness of the link between alcohol and cancer
- Research is needed into the effectiveness of warning labels
    - What features make them effective (content, design, placement, other factors)
    - Lessons from tobacco labelling
- Barriers to introducing warning labels
- Other areas supporting the use of labels e.g. nutrition and obesity
- Population health interventions: taxation, minimum unit pricing, restricting availability
    - How are different countries / regions implementing these, with what level of success?
- How can the overlaps between different policy areas be used to maximise their effectiveness?
- What are the knowledge gaps in the relationship between patterns of drinking and cancer?
    - What research needs to be done?
    - How can it be funded?

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Session 2: Socioeconomic inequalities in health related to alcohol use

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Key messages

- People in lower socioeconomic groups suffer higher levels of alcohol-related harm than those in higher socioeconomic groups with the same level of consumption
    - To plan effective policies and interventions, alcohol use must be understood in the context of a broad network of factors contributing to socioeconomic inequalities
    - Policies which reduce affordability have a greater impact on consumption among people with low SES and heavy drinkers
    - Policies that raise the price of cheapest alcohol have best evidence for reducing socioeconomic differences in alcohol-related harm
    - Reducing alcohol-related harm within the broader context of reducing inequalities emphasises the need for a Health in All Policies (HiAP) approach

1. Background

Europe has the highest level of alcohol consumption and alcohol-related harm in the world (1, 2). The health risks associated with alcohol use depend largely on the volume and pattern of alcohol use and often follow a dose-response relationship. As shown in figure 1, the relationship between alcohol use and mortality is influenced by both societal and individual vulnerability factors. Societal vulnerability factors include such aspects as level of development, culture and drinking context, while individual vulnerability factors include such aspects as age, sex, and socioeconomic status (SES).

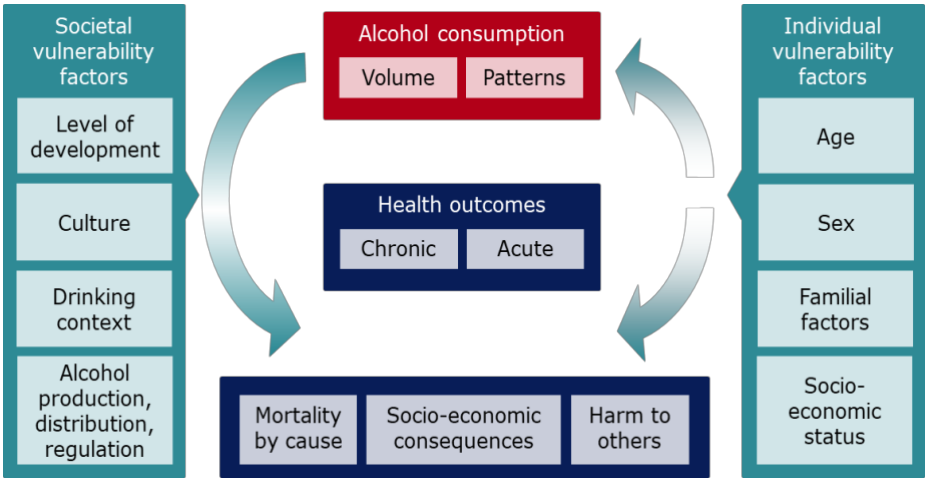

Figure 1. Conceptual model of the causal relationships between alcohol use and health outcomes.
Source: WHO (3)

A socioeconomic gradient is seen across health in general. Health is progressively better as socioeconomic position increases (4, 5). Socioeconomic differences and health determinants are underlying factors in health inequalities between and within EU member states (6).

The social determinants of health (SDH) are: "*the conditions in which people are born, grow, work, live, and age, and the wider set of forces and systems shaping the conditions of daily life. These forces and systems include economic policies and systems, development agendas, social norms, social policies and political systems. The SDH have an important influence on health inequities - the unfair and avoidable differences in health status seen within and between countries" (7).*

Socioeconomic status (SES) refers to a person or group's position in society. It is often measured as one or a combination of the following factors: education, income, and occupation (8, 9). Reducing health inequities is a key strategic objective of Health 2020 (10), and guidance has been issued to assist European policy-makers in achieving this objective (11). As demonstrated in this report, addressing alcohol use and alcohol-attributable mortality is a promising approach to reducing health inequalities between socioeconomic groups.

2. Literature review – The relationship between SES, alcohol use and mortality, and implications for policy

A new systematic literature search of peer-reviewed literature was performed to identify recent evidence on the relationship between socioeconomic status (SES), alcohol use, and mortality, with a particular focus on interaction effects between SES and alcohol use. This search was later used as the starting point for a paper published in the Lancet Public Health in July 2020 (12). Outcomes considered were a) mortality from 100% alcohol-attributable causes of death; b) all-cause mortality; and c) mortality and hospitalizations from 100% alcohol-attributable causes. Methods are described in appendix 1.

Twelve studies were included (13-24). All were from high income countries: Denmark (2), the Netherlands (1), Norway (1), Scotland (2), Sweden (2), the United States (2), and Finland (2). An overview of all included studies is shown in appendix 2. While socioeconomic inequalities generally follow a social gradient, this report focusses on the lowest and the highest SES groups in each study.

A second search was conducted to identify grey literature reports on alcohol to inform the discussion around policy. Searches were done on a list of international agencies, NGOs and associations which are a benchmark for alcohol-related harm and policy making. A total of 14 grey literature reports were identified. An overview of all sources identified in the grey literature search is shown in appendix 3.

Background

Inequalities related to alcohol use

In European countries, the prevalence of alcohol use has been shown to be lower among individuals with low SES compared to high SES (25, 26). Furthermore, as detailed in a comprehensive report by the OECD, (27) social gradients in heavy alcohol use and heavy episodic drinking differ depending on country and sex. However, people with low SES have between two and five times the risk of dying from an alcohol-attributable cause compared to people with high SES (28-30). This gap between the lowest and highest SES groups is one and a half to two times wider than for all-cause mortality (28).

In the few studies available, differences in mortality could not be sufficiently explained by differences in alcohol consumption between the socioeconomic groups with differences in alcohol-attributable harms by SES more pronounced than differences in alcohol consumption (14, 17). People in lower socioeconomic groups suffer higher levels of alcohol-related harm than those in higher socioeconomic groups with the same level of consumption (25, 26, 30-34). This phenomenon commonly referred to as the 'alcohol harm paradox', suggests more complex relationships between socioeconomic factors, alcohol use, and alcohol-related harm.

Policies to reduce alcohol-related harm

A number of policy actions which have been shown to be effective in reducing alcohol consumption and alcohol-attributable harm have been implemented at European, national, and regional level (35). Section three of this report gives further detail of European policies and actions to reduce alcohol-related harm and its socioeconomic inequalities and the overlaps between these.

Both the WHO 'Best Buys' and the SAFER intervention include pricing and taxation policies, restricting alcohol availability, and restricting alcohol marketing and advertising as cost-effective interventions

to reduce alcohol consumption and related harms (36, 37). While these policies are effective overall, only some of these policies have been evaluated from an equity perspective, that is the authors have specifically looked at their impact on different socioeconomic groups.

Policies which affect affordability (e.g., minimum pricing policies) have the best evidence for reducing socioeconomic differences in alcohol-related harm and have been deemed highly cost effective (38-40). It has also been shown that policies which *reduce* the price of alcohol, e.g., those which aim to protect local producers against cheaper imports, or comply with trade regulations, can inflict further harm on people of low SES and harmful drinkers as the evidence has shown increased consumption as a result of such policies (41, 42).

Findings of the included studies

All-cause mortality

All six of the included studies which examined the role of alcohol use for socioeconomic differences in *all-cause mortality* found that people with low SES had an increased risk of premature mortality irrespective of the SES indicator used (13, 15, 18-21).

Of the six studies, five measured alcohol consumption as average number of drinks consumed per week (13, 15, 20, 21) or per month (18). These found that average consumption per week or month explained between 0% and 10 % of the observed socioeconomic inequalities in all-cause mortality, with very few exceptions. The highest proportion explained was when accounting for a pattern of heavy episodic drinking rather than average weekly or monthly consumption.

Two studies measured consumption as quantity of drinks consumed per occasion (19) or heavy episodic (binge) drinking (21). Nandi et al. (19) looked at the average quantity consumed per drinking occasion and found that it explained 18% of the socioeconomic inequalities in all-cause mortality between the lowest and highest SES groups. Sydén and Landberg (21) found that when taking drinking pattern into account 17%-27% of socioeconomic inequalities in all-cause mortality could be explained.

Alcohol-attributable mortality and hospitalization

Three studies investigated socioeconomic differences in 100% alcohol-attributable events, that is alcohol-attributable mortality and hospitalization (14, 17, 22). All found that those with lower SES had a higher risk of alcohol-related harm or dying from an alcohol-related cause.

Katikireddi et al.(17) examined alcohol-attributable events (hospitalization or death) and associations with four SES measures (education, deprivation, social class (occupation), and income). They reported more than three-fold higher rates of an alcohol-attributable event among the most disadvantaged populations compared with the most advantaged. The largest association was reported comparing unskilled workers to professionals (more than 5-fold). Sydén et al.(22) found that compared to higher non-manual employees, unskilled workers had a four-fold risk of dying from an alcohol-attributable cause of death. Mäkelä and Paljärvi (14) found that compared with non-manual workers, manual workers had a 1.8 to 2.1-fold hazard of alcohol-related death or hospitalisation.

Surprisingly, the proportion of socioeconomic inequalities in fully alcohol-attributable outcomes that was explained by alcohol consumption was not considerably higher than the proportions explained for inequalities in all-cause mortality. As with all-cause mortality, heavy episodic or binge drinking explained the highest proportion of inequality in alcohol-attributable outcomes. Katikireddi et al.(17)

reported that between 4% and 15% of the differences between educational groups were explained by weekly alcohol consumption and binge drinking. Using occupation as measure of SES the proportion was slightly higher with 15% to 22% of the socioeconomic differences explained by drinking behaviour. For income as the SES indicator, alcohol use did not explain the socioeconomic differences in alcohol-attributable mortality and hospitalizations.

Sydén et al. (22) found that as for all-cause mortality, the frequency of heavy episodic drinking explained the highest proportion of the inequality in alcohol-attributable events among less skilled compared to higher non-manual employees. The number of drinks per week did not explain the socioeconomic inequalities in alcohol-attributable events between occupational groups. The only exception was self-employed individuals compared to higher non-manual employees, where the volume of alcohol consumed explained 14% of the inequalities between the two groups. The number of drinks consumed per week and frequency of heavy episodic drinking combined explained between 12% (intermediate non-manual employees) and 45% (self-employed) of the inequalities between the two groups.

The findings from Mäkelä and Paljärvi (14) are in line with those from the other studies. Adjusting for the total volume of alcohol consumed did not explain the socioeconomic differences in the risks of experiencing an alcohol-attributable event. However, in this case neither did the addition of heavy episodic drinking patterns.

Joint effects of socioeconomic status and alcohol use

Four studies investigated joint effects of SES and alcohol use on mortality and hospitalizations (16, 17, 23, 43).

Christensen et al.(16) showed that at high levels of alcohol use, the mortality risk related to alcohol use differed by SES. Specifically, consuming high quantities of alcohol was associated with higher risks for people with low compared to people with high SES. The authors calculated that in total an excess of between 200 and 300 events per 100,000 person-years occurred among men and women with low SES due to interaction effects, that is due to increased vulnerability to the harmful effects of alcohol use among people with low SES.

Similarly, the study by Degerud et al.(23) found that using alcohol frequently (at least four times per week) increased the risk of dying 1.5-fold for individuals with low SES but not for those with middle or high SES. This increased risk could not be explained by accounting for a number of other behavioural risk factors and disease markers. While all socioeconomic groups experienced elevated risks related to heavy episodic drinking (one or more heavy episodic drinking occasions per week), the risks were again slightly higher among those with low than among those with high SES.

The study by Katikireddi et al.(17) authors found that compared to light drinkers with high education, excessive alcohol use (drinking more than 51 and 36 drinks per week among males and females, respectively) was associated with an over five-fold increased risk of alcohol-attributable death or hospitalization among those with high education but a nearly ten-fold risk among those with low education. This was true even after accounting for other relevant aspects such as age, sex, survey wave, smoking, BMI, and binge drinking in past seven days. The authors found similar effects for the other SES indicators.

Overall, the available evidence indicates that individuals with low SES are more vulnerable to the harmful effects of alcohol. This increased vulnerability can explain a part of the alcohol harm paradox, that is the phenomenon that individuals with low SES experience greater alcohol-attributable harm at identical or lower levels of alcohol use.

The research further indicates that other behavioural risk factors, such as smoking, may contribute to this phenomenon. However, other factors which increase vulnerability (such as more precarious drinking environments or cumulative exposure to stress throughout the lifetime) and factors which impact the chances of recovery (such as access to health care or social networks that can mitigate the negative effects of alcohol consumption) likely play a role in putting individuals with low SES at elevated risk of alcohol-attributable harm.

Finally, a study by Peña et al.(24) found that joint effects of low SES and high alcohol intake resulted in 46.8 additional alcohol-attributable deaths per 10 000 person-years. Furthermore, the authors showed that similarly, although to a slightly lesser extent, joint effects of low SES and smoking contributed to the elevated alcohol-attributable mortality risks among people with low SES.

3. Policy actions and socioeconomic inequities in alcohol-related harm

The following section was informed by the findings of the included peer reviewed literature and a review of grey literature relevant to alcohol use and inequity, inequality and socioeconomic status. An overview of all sources identified in the grey literature search is shown in appendix 3. Two reports focused on inequities in alcohol-related harm (38, 39).

In 2008, the WHO Commission on Social Determinants of Health published a report on the social determinants of health and the potential ways to overcome socioeconomic differences in morbidity and mortality (44). The first part of this report demonstrated that individuals with a lower SES face greater risks related to alcohol use. As Loring (45) points out, this effect may be, among other aspects, explained by the fact that wealthier drinkers "have a wider social buffer to protect them from harm as a result of alcohol consumption". The first part of the report focused on mortality and hospitalizations. However, individuals face a much broader array of consequences related to alcohol use, including but not limited to stress, loss of employment, household impoverishment, social exclusion, marginalization, and stigma, violence, injury, crime, and incarceration (45). This bandwidth of consequences should be kept in mind when designing alcohol control policies and interventions to reduce socioeconomic inequalities.

As mentioned, there are a number of policy actions at European, national, and regional level, which aim to address alcohol related-harm directly or which include actions to address alcohol-related harm as part of a broader objective such as reducing inequality or non-communicable disease. Alcohol related-harms are influenced by social determinants and are also social determinants themselves (e.g. health and social harms associated with alcohol use leading to further disadvantage) (46).

Addressing alcohol-related harm within the context of other health determinants and inequality can both address alcohol-related harm and contribute to reducing inequality and improving health overall.

To plan effective policies and interventions, alcohol use must be understood in the context of a broad network of factors contributing to socioeconomic inequalities.

Addressing upstream social determinants to reduce alcohol-related harm

Policies and interventions can address root causes or "upstream" social determinants such as poverty, education and employment opportunities. Both the WHO Commission on Social Determinants of Health (44), and Michael Marmot in his book The Health Gap (47), recommend intervening on such "upstream" causes of SES inequalities. Policies and interventions can also target "downstream" factors, such as improved access to health care and harm reduction programs such as safe drinking environments.

Alcohol control policies which affect inequalities in alcohol-related harm

The evidence shows that the largest impact of changes (reducing or increasing) to affordability is on people with low SES and harmful drinkers (38-40, 42). Furthermore, MUP and specific (volumetric, by volume of alcohol) taxation have limited regressive effects as their impact is greatest for the heaviest consumers, irrespective of income (48).

A systematic review by Wood and Bellis (38) found that policies which affect affordability (e.g. MUP) have the best evidence for narrowing the socioeconomic gap in alcohol-related harm and are also highly cost-effective. The authors examined studies that evaluated the impact of policies which affected the price of alcohol on different SES groups, this included policies which reduced prices as well as those which increased prices. Policies which changed the price of alcohol had the most impact in lower educational groups with regard to harmful alcohol consumption, including moderate-heavy drinking and binge drinking, and alcohol-related mortality (42, 49).

Research by Smith et al. (39) also supports MUP as an effective measure to address alcohol-related health inequalities. They note that MUP would not have a significant effect on moderate drinkers but that harmful drinkers, regardless of SES would be most affected by interventions such as MUP which increase the prices on the cheapest alcohol. They cite strong evidence that reducing the affordability of alcohol by raising prices leads to a reduction in alcohol consumption and associated harms.

O'Donnell et al. (40) aimed to assess the immediate impact of the introduction of minimum unit pricing in Scotland on household alcohol purchases. An increase in the price of alcohol was associated with a reduction of 9.5g of alcohol in weekly purchases of alcohol per adult, per household. The reduction in purchased alcohol was greatest in lower income households and in higher income households with the highest previous purchasing level.

Modelling studies included in Wood and Bellis predicting the outcomes of increased prices in different socioeconomic groups reported greater decreases in consumption and alcohol-attributable mortality in people with low SES and those with hazardous drinking patterns (40, 50-53). Two UK-based studies modelled the effect of minimum pricing policies on purchasing behaviour and found that individuals with low SES would indirectly benefit most from the policy. Notably, the studies estimated that low-income households that purchased alcohol at harmful levels were more likely to purchase cheap alcohol and would thus be most affected by the policies (50, 51). Meier et al. (53) modelled different taxation approaches in England including tax increases, based on the value of the product (ad valorem), based on the alcohol content (volumetric tax), and MUP. MUP and volumetric tax were found to be most likely to reduce socioeconomic differences in mortality.

Vandenberg and Sharma (48) examined potential regressive effects of taxation and/or pricing policies across income levels and found limited regressive effects of alcohol taxation and pricing policies and that the magnitude of tax costs for the lowest income consumers is small relative to the household income. They highlight the importance of considering the differential level of alcohol consumption across income groups and the actual value of tax costs (rather than only tax costs as a proportion of income).

Principles for policy and intervention planning

- Ensure policies/interventions do not further increase inequalities
- Consider multiple levels: upstream (root causes) and downstream (consequences) factors

The first principle when planning alcohol control interventions should be to ensure that inequalities do not increase as a consequence of the policy/intervention (31). For example, some health promotion interventions, e.g. brief interventions in some cases, have been found to predominantly benefit individuals of higher SES, partly due to differences in access (54-56). Policy must explicitly assess accessibility and potential consequences for the most disadvantaged groups.

A second principle is to consider multiple levels when planning an intervention. As outlined above, a comprehensive approach to reduce socioeconomic inequality in alcohol-attributable mortality addresses the root causes and social determinants ("upstream" factors) as much as it treats the consequences and symptoms to directly reduce socioeconomic inequalities in health outcomes ("downstream" factors) (31, 57). Accordingly, when assessing the potential or observed effects of an intervention, multiple levels have to be taken into account ranging from the socioeconomic context to the social and physical environment, to the individual.

For example, interventions which aim to improve access to primary health care at a broader level can also improve access for harmful drinkers and therefore their access to brief alcohol interventions, drinking cessation support, screening and treatment for other physical and mental health issues, and referral to other social services (45).

Accordingly, when assessing the potential or observed effects of an intervention, multiple levels have to be taken into account ranging from the socioeconomic context to the social and physical environment, to the individual. The priority public health conditions analytical framework developed by Blas and Kurup and shown as figure 2 illustrates these levels with three dimensions of activity: analyse, intervene and measure. The framework was designed as a practical way to organize work from analysis to action aligned with the conceptual framework of the CSDH and other frameworks (58).

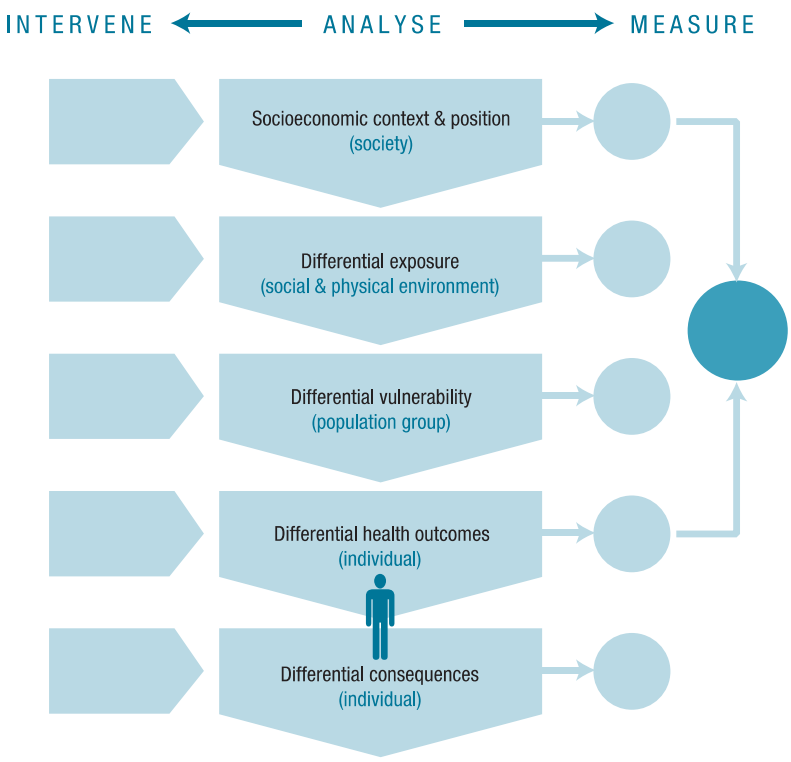

Figure 2 Priority public health conditions analytical framework from Blas and Kurup (58)

Similarly, the 2014 Review of social determinants of health and the health divide in the EU notes the importance of going "beyond disaggregation by age, sex and harmful levels of drinking, particularly given the different patterning of the social determinants in relation to alcohol-related harm" (5). The report proposes actions that should be part of an effective alcohol prevention and treatment strategy, and considerations for equity. In summary, these include:

- ensuring early identification and screening of hazardous and harmful drinking and that those least likely to use and receive primary health care and able to access and benefit from them
- work with other sectors to implement population-based strategies for reducing the availability of alcohol (e.g. regulating hours of sale, minimum purchasing age, location of outlets, increasing prices (and taxes), restricting advertising and marketing and monitoring the impact on different socioeconomic groups
- develop tailored prevention, harm-reduction and treatment services and make them more accessible, appropriate and available for people with harmful and hazardous alcohol use who are more likely to experience disproportionate harm and consequences due to their socioeconomic circumstances
- expand current routine data collection on alcohol-related harm to include sex- and age-disaggregated data and SES indicators e.g. place of residence, income, employment or

education; include a health, socioeconomic and gender equity analysis in routine monitoring, reports and/or evaluations of the national alcohol strategy

- develop an awareness-raising education campaign that changes and challenges understandings about: (a) public perceptions and stigma about alcohol use; (b) the nature of the social gradient in alcohol-related harm (the impact of harmful or hazardous alcohol use is disproportionately high among those of lower SES); and (c) gender-related behaviours, perceptions of harm and stigma about alcohol.

Specifically related to health care access and utilisation, Loring (48) proposes actions to address differential access to and treatment within the health system which contributes to inequities in alcohol-related harm:

- reducing financial, geographical and cultural barriers to accessing primary care and alcohol treatment services for groups experiencing disproportionate alcohol-related harm
- ensuring that people from groups vulnerable to alcohol-related harm are identified and offered brief advice interventions in primary care settings
- boosting social support and post-discharge care for people engaging in harmful alcohol consumption who are also experiencing other social disadvantages (45).

4. Mapping and discussion of European policy to reduce alcohol-related harm

The following section maps implementation of policies which reduce affordability and availability.

Minimum Unit Pricing (MUP)

Eight European countries have implemented some form of MUP (59):

- Armenia
- Belarus
- Kazakhstan
- Kyrgyzstan
- The Russian Federation
- Ukraine
- United Kingdom (Scotland and Wales)
- Uzbekistan

In addition to these eight, Ireland has approved MUP, but it is yet to come into force.

Taxation

All 53 countries in the WHO European Region levy a form of taxation on alcoholic beverages. All 53 (except Andorra) levy alcohol duty on beer and spirits and 30 also impose alcohol duty on wine. Duty is generally higher on spirits than on wine (59). The basis for these vary in whether they are based on volume, volume of alcohol or value of the product. It is important to note that the impact of these policies is likely to decrease over time if the rate of taxation is not linked to inflation and salary increases (60). Around a third of countries have duties which are linked to inflation (59).

The Russian Federation and Lithuania have both recently implemented significant increases in alcohol taxation, imposed restrictions on alcohol availability, and imposed bans on the marketing and

advertising of alcohol within short time spans. Both countries subsequently saw significant decreases in alcohol consumption and all-cause mortality (60) .

Availability

Measures to restrict density of alcohol outlets, opening hours for sale of alcohol, and restrictions on who can buy and consume alcohol or where it can be bought and consumed appear to be the most commonly used policies in Europe. Overall availability in the EU remains high and has seen little change in the last decade. The most marked reductions in availability have been in the Eastern part of the WHO European Region (60). In some Nordic countries government monopolies on alcohol sales are one measure to control availability. All European countries have a minimum age for purchasing and consuming alcoholic beverages of at least 16 years, with most placing the minimum age at 18 years.

5. Summary of overlaps between policy areas

Numerous policies directly or indirectly relate to alcohol consumption and related harms. There are key overlaps with policies in health and across other sectors including those which aim to reduce alcohol consumption and related harms and those aimed at reducing health and social inequalities and promoting sustainable development. The intersections between policy areas emphasise the need for a health in all policies (HiAP) approach which considers the consequences of pubilc policies on health systems, determinants of health, and well-being. HiAP also contributes to sustainable development (61).

Sustainable development and achieving social and health equity

Promoting sustainable development and reducing socioeconomic inequalities are priorities at the global, regional and national level. Alcohol's inclusion in the Sustainable Development Goals (SDGs) recognises its social and economic impact (62) in addition to health related harms. Directly related to alcohol, in Goal 3 *"Ensure healthy lives and promote well-being for all at all ages"* is target 3.5*: "Strengthen the prevention and treatment of substance abuse, including narcotic drug abuse and harmful use of alcohol"* (63).

However, alcohol use has a broader impact on achieving SDGs. Alcohol undermines efforts to achieve 13 of the 17 SDGs and a total of 52 targets cutting across the three dimensions of the 2030 Agenda (economic, social and environmental) (64). Alcohol use is one of the key drivers of the global rise in NCDs along with tobacco, physical activity and nutrition. It also has a direct impact on areas including mental health, maternal and child health, infectious diseases, and road injuries.

Policies to reduce alcohol-related harm and policies to address inequities in health

Reducing health inequities is a key strategic objective of the WHO European health policy framework Health 2020: the European policy for health and well-being (10). Health 2020 notes cost-effective interventions to address alcohol-related harm include restricting access to retailed alcohol; enforcing bans on alcohol advertising, including in social media; raising taxes on alcohol; and instituting a minimum price per gram of alcohol. As shown by numerous studies, actions which increase prices through taxation and minimum pricing have the most effect on socioeconomic inequities in alcohol related harm.

The *European action plan to reduce harmful use of alcohol 2012-2020* (65) and The WHO *Global Strategy to reduce the harmful use of alcohol* (37) also note the effectiveness of policies which increase alcohol prices. The European action plan further states that "Effective alcohol policy over the coming years will have a number of attributes, reflecting the two-way processes and interactions between effective alcohol policy, social development and social capital." (65)

Other policies and strategies to address social determinants and health inequality already discussed in this report include the *Review of social determinants and the health divide in the WHO European Region* (4).

Overlaps between specific health policies and reducing alcohol use and inequality

Europe's *Beating Cancer Plan* launched in February 2021 has a focus on prevention, treatment and care. The Plan aims to raise awareness of and address key risk factors including harmful alcohol consumption, The Plan takes into account health determinants, including education, socio-economic status, gender, age, and employment and notes that attention should be paid to inequalities in access to prevention and cancer care.

In the Plan the European Commission commits to "increase support for Member States and stakeholders to implement best practices and capacity-building activities to reduce harmful alcohol consumption in line with the targets of the UN Sustainable Development Goals." Key actions related to alcohol and which will impact on socioeconomic inequalities include:

- A review of EU legislation on alcohol taxation
- Publishing a study mapping fiscal measures and pricing policies on sugars, soft drinks and alcoholic beverages in 2022
- Proposing mandatory labelling of ingredients and nutrient content, along with health warnings on alcoholic beverages –2021-2023 (66).

Priority action areas of WHO Europe's *Action plan for implementation of the European Strategy for the Prevention and Control of Noncommunicable Diseases 2012–2016* (67) which relate to alcohol and inequality include:

- Reorienting health services towards prevention and care of chronic diseases including reviewing affordability. As noted earlier, improving access to primary health care would benefit people with low SES and improve their access to screening and treatment of alcohol-related problems.
- Promoting healthy consumption via fiscal and marketing policies by using fiscal policies and marketing controls to full effect to influence demand for tobacco, alcohol and foods high in saturated fats, trans fats, salt and sugar. For alcohol, measures include increases in taxes, enforcing advertising bans and restricted access to retailed alcohol.

6. Policy topics recommended for discussion

1) Patterns of drinking and socioeconomic differences in alcohol-related harm in and within EU member states. Types of alcohol consumed (incl. non-beverage), drinking contexts, cultural aspects.
2) Policies in and within EU member states related to pricing policies and availability
3) Policies in and within EU member states related to reducing inequality overall and in alcohol-related harm
4) Policies in and within EU member states which target alcohol as part of a broader strategy (e.g. inequalities, NCDs, injury/violence, healthcare access)
5) Health In All Policies and inequities in alcohol-related harm
6) Stigma as a barrier to healthcare and specialised treatment

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8. Appendices

Appendix 1. Search strategy

Databases searched: Embase, Medline, Psychinfo (via OvidSP) and Web of Science.

Search terms: included terms on alcohol consumption [alcoholic beverages OR alcohol AND (drinking OR intake OR consumption) OR (Alcohol abuse)]; mortality [mortality OR death OR cause of death]; socioeconomic status [SES OR socioeconomic status OR social class OR socioeconomic variable OR (education AND (attainment OR status OR level)) OR income OR employment]; and study design [case-control study OR cohort study OR ratio OR risk OR prospective OR follow-up OR longitudinal OR retrospective OR effect modification]. The searches included a set of keywords, wildcards, truncation and medical subject headings (where applicable). Each search was adapted for the database to be searched.

Inclusion criteria: Population-based samples of adults aged at least 15 years. Included study designs were observational, quantitative (e.g. case-control, cohort, prospective, longitudinal, data-linkage), and retrospective. Intervention studies and studies using exclusively cross-sectional data were excluded. Effect measures: proportion of SES inequalities that can be explained by alcohol use; RR comparing high and low SES stratified by levels of alcohol use; RR related to alcohol use stratified by SES; a measure of effect modification or interaction for the combined risks related to alcohol use and SES, or studies which reported sufficient original data to calculate the above. No language restrictions were applied.

Grey literature searches were done of international agencies, NGOs and benchmark organisations for alcohol-related harm and policy making. Search terms included: [Alcohol AND equity]; [Alcohol AND inequality]; [Alcohol AND equality]; [Alcohol AND socioeconomic status]. All hits were consulted. All selected publications were in English.

Appendix 2. Overview of studies included in the systematic literature review

			Exposure assessment				Outcome assessment		
Study	**Country**	**Sex (Age)**	**Time frame**	**Sample (N)**	**SES indicator**	**Alcohol use**	**Time frame**	**Outcome**	**Events (n)**
Christensen et al. (2017)(1)	Denmark	M, F (30-70)	1981-2001	74,278	Education	Quantity	1981-2009	AAM/ AAM & AAH	302/ 1,718
Degerud et al. 2018(2)	Norway	T (n/a) §	1987-2003	188,603	Combined measure*	Frequency, frequency HED	n/a¶	ACM	21,624
Katikireddi et al. (2017)(3)	Scotland	T (n/a)	1995-2012	50,236	Education, occupation, household income	Quantity	1995-2012	AAM & AAH	1,020
Mäkelä and Paljärvi (2018) (4)	Finland	T (15-69)	1969-1984	6,406	Occupation	Quantity, drinking pattern	1969-2000	AAM, AAH	n/a
Mehta et al. (2015)(5)	USA	T (25-96)	1989-2012	3,617	Education, income	Quantity	1986-2011	ACM	1,832
Nandi et al. (2014)(6)	USA	T (50-59+)	1992	8,037	Combined measure*	Quantity	1998-2008	ACM	51
Nordahl et al. (2014)(7)	Denmark	M, F (30-70)	1981-2001	36,388	Education	Quantity	1981-2009	ACM	7,015
Peña et al. (2021) (8)	Finland	T (25+)	1978-2007	53,632	Income	Quantity	1978-2016	AAM	865
Syden & Landberg (2017)(9)	Sweden	T (25-74)	2002	21,064	Education, occupation, personal income	Quantity, HED, drinking pattern	2002-2007	ACM	300
Sydén et al. (2017)(10)	Sweden	T (25-64)	2002	17,440	Occupation	Quantity, frequency HED, drinking pattern	2002-2011	AAM & AAH	388
van Hedel et al. (2018)(11)	Netherlands	M, F (15-47)	1991	6,099	Education	Quantity	1991-2013	AMC	n/a
Whitley et al. (2014)(12)	Scotland	T, F, M (n/a)	1987-2008	1,534†; 1,426‡	Occupation	Quantity	1987-2011	AMC	719† 120‡

* SES measured by combining multiple indicators such as education, occupation, labour force status, and household income, conditions and wealth
§ Average age 47 years (SD = 11.1 yrs) ¶ Average follow-up time 16·6 (SD 4·0) yrs † 1932 cohort ‡ 1952 cohort

n/a: information not available **AAM**: alcohol-attributable mortality **AAH**: alcohol-attributable hospitalization **ACM**: all-cause mortality; **F**: females; **M**: males; **T**: total (males and females combined)

Appendix 3. Grey literature sources

Reference	Country/region	Methodology	Objective/Key actions identified
CORDIS | EC (13) [Webpage]	EU countries	Lit. review	1. Develop, evaluate and refine methodologies for assessing the effects of policies on the pattern and magnitude of health inequalities. 2. Assess the differential health effects of policies in the fields of unemployment and poverty reduction; tobacco and alcohol control; and access to education and preventive health care. 3. Synthesize the evidence from the findings of objectives 1 and 2, and to actively engage users in the research to promote effective exchange of knowledge for policy and practice.
Wood and Bellis (14)	EU countries	Lit. review + expert consultation	To increase understanding of socio-economic differences in alcohol consumption and harms in the EU and what can work to reduce these inequalities.
WHO (15)	WHO Member States	Lit. review + survey	To provide a comprehensive picture of how harmful alcohol use impacts population health, and identifies best ways to protect and promote health and well-being
WHO (16)	WHO Member States	Lit. review + survey	The report highlights some progress in WHO Member States in the development and implementation of alcohol policies according to the ten areas of action at the national level recommended by the Global strategy
Blas, Sivasankara Kurup (17)	WHO Member States	Lit. review + expert consultation	Analysis of the impact of social determinants on specific health conditions, identified possible entry-points, and explored possible interventions to improve health equity by addressing social determinants of health.
WHO (18)	WHO Euro. Region	Policy guidance	To improve design and implementation of policies to reduce inequities in alcohol-related harm.
Marmot M, World Health Organization (19)	WHO Euro. Region	Lit. review	Commissioned to support the development of the new European policy framework for health and well-being, Health 2020. Builds on the global evidence and recommends policies to ensure that progress can be made in reducing health inequities and the health divide across all countries, including those with low incomes.
OECD (20)	EU and other countries	Lit. review + expert consultation	Assesses health, social and economic impacts of key policy options for tackling alcohol-related harms
Cecchini, Devaux (21)	EU and other countries	Simulation approach	Identifying efficient and equitable means of improving the health of OECD countries through appropriate combination of preventing strategies to tackle alcohol harmful consumption.
Devaux and Sassi (22)	OECD Countries	National surveys, Lit. review + expert consultation	Contributing to the design of appropriate health policies to prevent alcohol-related harms. The findings provide a basis for a quantitative assessment of the impacts of alternative policy options and may contribute to a better targeting of such policies.

Reference	Country/region	Methodology	Objective/Key actions identified
McDaid, Sassi, Merkur (23)	EU and other countries	Lit. review + expert consultation	To contribute to the evolution of a more evidence- based approach to policy formulation in the health sector
Chafea (24)	European Member States	Expert opinion	To call on all stakeholders involved in alcohol policy and especially Member States to act on working together to prevent and reduce alcohol related harm.
Alcohol Policy Youth Network (25)	EU and other countries	Group discussions	Suggestions for policy makers and youth organizations for actions to ensure inclusion of young people, and young people with fewer opportunities (YFOs).
European Alcohol Policy Alliance (26)	EU and Member States	Lit. review	Addressing the issue of alcohol related harm through effective policies will offer measurable health system savings and enhance the growth and productivity agenda for Europe 2020.
Smith and Foster (27)	UK	Lit. review + expert consultation	To provide evidence about important synergies between alcohol and health inequalities research and likely policy agendas.
Vandenberg and Sharma (28)	Australia	Estimation of baseline spending and consumption, and modelling policy-to-price and price-to-consumption effects of policy changes.	To compare estimated effects of two policy alternatives, (i) a minimum unit price (MUP) for alcohol and (ii) specific (per-unit of alcohol) taxation, upon current product prices, per capita spending (A$), and per capita consumption by income quintile, consumption quintile and product type. Found limited regressive effects of alcohol taxation and pricing policies and that the magnitude of tax costs for the lowest income consumers is small relative to the household income.

List of organisations consulted

- World Health Organization (WHO)
- WHO Regional Office for Europe
- The International Agency for Research on Cancer (IARC)
- Organisation for Economic Co-operation and Development (OECD)
- European Commission and EU-funded projects
- Chafea
- World Food Programme (WFP)
- European Observatory on Health Systems and Policies
- Eurocare
- Common Agricultural Policy (CAP)
- Alcohol Policy Network (APN)
- Alcohol Policy Youth Network (APYN)
- Committee on National Alcohol Policy and Action (CNAPA)
- European Public Health Alliance (EPHA)
- European Monitoring Centre for Drugs and Drug Addiction (EMCDDA)
- European Cancer Leagues (ECL) & European Code Against Cancer
- Institute of Alcohol Studies (IAS)

Session 3: Alcohol, nutrition and obesity

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Key messages

- Alcohol contains empty calories, that is it adds calories without having any nutritional value
- Alcoholic beverages are not an essential food and this should be reflected in food based dietary guidelines
- Awareness of the association between alcohol and overweight/obesity is low
- Policy actions should include those which:
    - raise awareness of the association between alcohol and weight gain
    - improve screening and intervention in primary care
- Further research is needed into what makes alcoholic beverage labels most effective
- Further research is needed to understand how types of alcoholic beverages and drinking patterns influence weight gain related to alcohol consumption

1. Background

The WHO European Region is the region with both the highest burden of non-communicable diseases (NCDs) (1) and the highest level of alcohol consumption and alcohol-related harm (2, 3). The GBD 2017 study estimated that over 91% of deaths and almost 87% of DALYs in the EU were the result of NCDs (3). Four groups of diseases are responsible for most NCD deaths: CVD, cancers, respiratory diseases and diabetes. Being overweight or suffering obesity is a risk factor for both cancer and diabetes and is associated with other risk factors for NCDs including unhealthy behaviours such as poor diet and lack of physical activity.

Obesity has tripled in many European countries since the 1980s (4). Alcohol is both a risk factor for NCDs such as cancer and type II diabetes, and a contributor to other NCD risk factors such as overweight and obesity. And there are additional risks for people who are already overweight who consume alcohol.

Much of the conversation around alcohol-related harms to health highlights the risk for diseases such as liver disease, CVD and cancer. There is little awareness of alcohol's contribution to overweight and obesity (5, 6). Alcohol is even included in some food based dietary guidelines. However, like sugary drinks, alcoholic beverages are discretionary foods and cannot be recommended as part of a healthy diet.

Alcohol (ethanol) contains 7.1 Kcal per gram (29kj), second only to fat with 9 calories per gram. Ethanol has pharmacological effects on the central nervous system, has gastrointestinal effects, affects blood sugar levels, and affects appetite (7). Acetaldehyde a biproduct of ethanol has further toxic effects.

Being aware of energy balance — the balance between energy in (consumed in the diet) and energy out (expended), is a key recommendation for maintaining a healthy weight. Alcoholic beverages contain *empty* calories. That is, they have no nutritional value but add calories to the diet and can contribute to weight gain and obesity (8). Alcohol use must therefore be considered in the context of energy balance and overall caloric intake. A single 150mL glass of 14% alcohol red wine contains around

120 calories, equivalent to just over a tablespoon of olive oil or four to five teaspoons of sugar. A 450ml bottle of full strength (5%) beer contains 180 calories. Some alcoholic drinks also contain natural (e.g. Port wine) or added sugars or are mixed with sugary drinks further increasing their caloric content.

In the European Union alcohol is regulated within food policy, but in relation to nutrition, is in some ways less regulated than foods. For example, in the European Union, alcoholic beverages containing more than 1.2% by volume of alcohol are exempted from the mandatory listing of ingredients and nutrition declaration on food labels (9). This has an impact on consumers' awareness of what they are consuming and reduces their ability to make informed choices about their health.

2. Literature review

Objective

The main objective of this paper is to provide a picture of the contribution of alcohol consumption to overweight and obesity in Europe. It is intended to provide evidence to inform the discussion of key policy issues and to contribute to discussions on the role of alcohol in public health nutrition.

Methods

A literature search was carried out of peer reviewed papers and technical reports from international organizations and governmental bodies. Searches for peer reviewed literature were done in Medline, ScienceDirect and Ingenta. The authors own database of literature from previous work was also searched for any additional relevant papers. Searches included papers published after 2000. However, key documents published earlier were included for completeness.

Systematic reviews and meta-analyses with large sample sizes were included; single studies and observational studies were also included and reported separately. Papers were limited to those published after the year 2000. Older papers were included if they were considered key or seminal papers. Animal model and cellular studies have been critically examined in the light of the objectives of this paper and included only if considered pertinent.

Findings

Observational studies

Clinical and epidemiological studies have demonstrated that alcohol consumption increases overall daily food energy intake (10-12). Calories from alcohol are less controlled by the body's compensation mechanisms meaning that a relatively modest amount of alcohol implies an increase in caloric intake (13). Observational studies have reported conflicting results in terms of associations between alcohol consumption and body weight (14-17). In many cases there is a positive correlation (18-24) but this is not confirmed by all studies (25-28). This suggests that the relationship between alcohol consumption and body weight could follow the classic J-curve, similar to the risk for cardiovascular mortality, diabetes and alcohol-related cancers (29-31). That is, risk increases as level of consumption increases. Furthermore, it has been reported that the type of drink consumed influences both general and abdominal adiposity (18, 32, 33).

Some studies suggest a neutral or even protective effect with moderate consumption. This can generally be explained by other factors such as moderate drinkers being more likely to have healthier

behaviours overall, whereas there is a clear association between heavy drinking and other harmful behaviours such as poor diet and low levels of physical activity (10, 22, 34).

It appears that calorie intake from alcohol is not compensated for by a reduction in other substrate metabolism (35, 36). Despite this, the available observational studies do not demonstrate a clear relationship between alcohol consumption and weight gain, at least for moderate amounts (28, 37, 38). It was hypothesized that calories from alcohol are not completely used as a source of energy but are to some extent dispersed especially in female groups (27, 28, 39) and in chronic consumers (40).

In a French cohort, Dumesnil and colleagues (20) showed that frequency of consumption was negatively correlated to body mass index and abdominal circumference, even when the same *quantity* of alcohol was consumed. People who consumed alcohol daily had a lower risk of weight gain than those who concentrated their drinking in 1–2 days/week, with the effect being particularly evident with moderate consumption.

Systematic reviews and meta-analyses

Evidence of the effects of alcoholic beverage consumption on body weight dates back 30 years (40). More recently three systematic reviews (13, 37, 41) and two meta-analyses (13, 41) have focused on this issue.

Kwok et al. (13) in a systematic review and meta-analysis, highlighted that the consumption of alcoholic beverages increases overall energy intake. The review suggests that adults do not compensate appropriately for alcohol energy by eating less, and that a relatively modest alcohol dose may lead to an increase in food consumption. Moderate drinkers compared to non-drinkers showed an increase in their food energy intake of more than 90 kcal, with an overall daily energy increase greater than 180 kcal per day; while the increase in heavy drinkers is slightly less (59 kcal). This effect was more evident in men than women.

Sayon-Orea et al. (37) reported positive findings for an association between alcohol consumption and weight gain mainly from studies with higher levels of drinking. However, the association was not found for moderate drinkers, suggesting a stronger effect in heavier drinkers. The authors point out that beer and spirits have a greater impact on body weight than wine. Gender and sex differences also play a role; with differences in type, quantity and patterns of alcohol intake, as well as its metabolic effects, and the impact of sex must be taken into account in these studies of associations.

Discussion

Obesity and excessive alcohol intake are significant contributors to ill health. They represent two of the main drivers of the global rise in NCDs along with tobacco use, diet and physical activity. As such, it is important to improve our understanding of the relationship between alcohol consumption and overweight/obesity to better address the contribution of alcohol to ill health, particularly NCDs. In children and young people obesity and alcohol use have also been associated with a negative impact on educational performance and future educational attainment (42). Sex and gender must also be considered, given different consumption patterns and differences in the way men and women metabolise ethanol (43, 44).

Although the results of these studies provide fairly robust evidence that the consumption of alcoholic beverages leads to a greater energy intake and therefore a greater risk of weight gain, the data on

body weight are less solid and, as mentioned, not all on the same direction. However, considering all the data combined in the mentioned reviews and meta-analysis, we can see a positive relationship between alcohol consumption and body weight.

Type of alcoholic beverage and consumption patterns are important elements that could explain the conflicting results obtained from comparison of different populations in cross-sectional studies. Depending on the type alcohol beverages can considerably increase overall caloric intake, not only by adding calories from the drink itself, but also through stimulating appetite and by being associated (especially in the case of beer) with increased consumption of high calorie food. For example, beer and spirits appear to have a greater impact on body weight than wine (37).

There are differences between and within countries in the way different people consume and view alcohol. For example, within a Mediterranean diet which includes a selection of healthy foods such as fruit, vegetables and pulses, wine is generally consumed more than other types of alcoholic beverages. While other alcoholic beverages tend more often to be associated with food which is high in calories, saturated fats, salt and/or sugar (45). A Dutch survey showed that those who consume beer and spirits have worse eating habits (higher consumption of meat, soft drinks, margarine and snacks) than wine drinkers (46). In addition, the combination of the type of alcohol ingested and the types of food served may influence results.

In the review by Kwok et al. (13) the included studies indicated that energy consumption as food is acutely increased by an average of 82 kcal/day after consuming alcoholic compared to non-alcoholic beverages. Different mechanisms were hypothesised as being responsible for this association, such as appetite stimulation or reduced control over food consumption due to reduced cognitive capacity or deregulation of hormones that normally trigger sensations of satiety (47-49). In studies based on animal experiments, some authors hypothesize that the pharmacological effects of alcohol on different neurotransmitters in the central nervous system could influence food behaviour (12, 50). Low and moderate quantities of alcohol have the capacity to bind to receptors involved in the control of food intake in mice (49, 50). In vitro and animal studies have also shown that alcohol consumption stimulates the release of opioid peptides, associated with aspects of smell and taste rewards that influence food intake (51, 52).

Large quantities of ethanol are neuro- and hepato- toxic, and cause dose-dependent insulin resistance and metabolic syndrome (53, 54) which, in turn, increases the risk of heart disease, stroke and type 2 diabetes. Ethanol metabolism inhibits fat oxidation in the liver which can lead to insulin resistance (55).

Conclusions

Overweight and obesity are significant contributors to NCDs including cancer and diabetes. Alcohol can contribute to weight gain and a persistent unhealthy weight by adding empty calories to overall energy intake and represents an energy source which must be taken into account when evaluating energy balance. Alcohol consumption can contribute to weight gain by adding to overall energy intake, by influencing appetite, by leading to increased consumption of high calorie foods, and by reducing the body's ability to metabolise fats.

Although some studies have suggested a protective effect with moderate alcohol consumption this is likely explained by moderate drinkers being more likely to also adopt other healthy behaviours. These results should therefore be interpreted with caution.

Consumers have low awareness of the calorie content of alcoholic beverages and their contribution to weight gain and obesity. This could be addressed by interventions which aim to raise awareness of this relationship such as effective front of pack nutritional labelling and addressing the issue in health guidelines and those for the treatment of obesity. The fact that alcoholic drinks have no nutritional value and cannot be recommended as part of a healthy diet should be acknowledged.

Alcohol consumption is not only a risk factor for body weight increase but also an important health risk factor for those who are already obese. This is a key point considering the level of overweight and obesity in Europe. An obese person consuming more than two alcoholic units per day has a risk of death for liver disease 19 times higher than a non-drinker (56, 57) . Obesity and alcohol consumption are individual risks factors for ill health, but the combination of the two has multiplier effects and their relationship with socioeconomic factors and other health determinants must be considered. Addressing obesity and alcohol consumption simultaneously could make a significant contribution to improving public health (58).

Future research efforts should be directed towards the evaluation of the roles of different types of alcoholic beverages on body weight, focusing attention on the effects of consumption patterns and lifestyle.

Finally, little research has been conducted on the behavioural effects of including calorie labelling on *alcoholic beverages* (as opposed to other food products). This is an urgent matter for researchers and relevant public authorities, to determine the most effective way to use labels on alcohol products to protect health. Further research should be done into the effectiveness of labels considering content, design and placement.

3. Recommendations for developing policy addressing alcohol and overweight/obesity

Nutritional guidelines

Revision of nutritional and food based dietary guidelines should be strongly promoted. At EU level this process is started but is not yet completed (59) Several Member States have lowered the level of consumption considered risky in guidelines. They also warn against heavy single occasion (or binge) drinking and against drinking in certain population groups. (60)

Wine and beer are often treated differently to spirits. For example, many countries which have implemented minimum unit pricing for alcohol have not applied it to wine. Although wine and beer contain less alcohol with respect to other alcoholic drinks, they still remain the main source of alcohol. It should be noted that the small amount of bioactive components contained in wine and beer is irrelevant with respect to the fact that they are a source of alcohol a neurotoxic and carcinogenic substance.

Nutritional labelling

Alcohol labelling relates to consumer protection in that it can provide information on nutritional content and health risks. There is consolidated evidence that if consumers are better informed of the nutritional characteristics of products, they are more able to make better choices (61). Bringing alcohol packaging requirements into line with those that apply to non-alcoholic beverage packaging (as per EU

Regulation No. 1169/2011) (9) would involve listing ingredients and seven nutritional values per 100 ml (62).

A 2020 study of alcohol labelling in the WHO European Region found that 40% of Member States have some legislation on ingredients listing, 19% on inclusion of nutritional values, and 28% have some legislation on health information or warnings. The report also found that only 17% have laws that demand alcohol producers include ingredients, nutritional values and health information on labels at the same time (63). The report recommends (among other things): that labelling includes all recommended nutritional values and lists all ingredients; that labelling includes the harm done by alcohol to the whole population; that regulations include specific direction on presentation e.g. size and font, front of pack, easy-to-understand information; mandatory rather than voluntary commitments; considering introducing specific labelling as part of a larger policy package using a stepwise approach; leveraging contextual factors (e.g. public support); ensure mechanisms for enforcement, and monitoring and evaluation of impact, investing in strengthening research to identify the most effective form and content for labelling (63).

Nutritional labelling of alcoholic beverages labelling should be reviewed in depth. Including the effect of detailed information on caloric content specifying the contribution of ethanol and other components (most importantly, sugar). Labelling should provide nutritional/caloric information based on the size of a standard drink and state how many standard drinks are included in the unit.

Socioeconomic status and inequality

Socioeconomic status and inequality should be considered in developing policy and interventions to address alcohol and overweight/obesity. People with low socioeconomic status who drink alcohol are more likely to experience a combination of risk factors for ill health (64) e.g. they are more likely to be overweight/obese or to smoke. These factors and others such as lower access to and utilisation of health services must be considered. Health interventions should be individualised and pay particular attention to vulnerable groups, such as those with low SES, young people, the elderly, and pregnant and lactating women.

Alcohol's inclusion in the Sustainable Development Goals (SDGs) recognises its social and economic impact (65) in addition to health related harms. Directly related to alcohol, in Goal 3 *"Ensure healthy lives and promote well-being for all at all ages"* is target 3.5*: "Strengthen the prevention and treatment of substance abuse, including narcotic drug abuse and harmful use of alcohol"* (66).

Early identification and intervention

Early identification and intervention in risky alcohol consumption has been shown to be an effective way to reduce alcohol-related harm. However, primary care physicians are still not screening for and intervening sufficiently in their patients' alcohol misuse. Health authorities, including WHO, recommend asking all patients about their alcohol consumption pattern as a routine part of primary health care consultations. Evaluation of lifestyle health risks should always include an evaluation of alcohol use. Prevention of risky or harmful alcohol consumption should be discussed with other lifestyle risk factors in the framework of general dietary advice aimed at preventing obesity and overweight.

Actions in other areas

Both alcohol use and overweight and obesity are cross-cutting issues which relate to key policy areas in public health including NCDs (particularly cancer, diabetes and CVD), social determinants of health, and nutrition as well as areas such as food and agricultural policy, taxation and workplace. To be most effective actions should be aligned and possible effects considered. Policy overlaps are mapped in the following section.

4. Mapping of and overlaps in policy to reduce alcohol-related harm and overweight and obesity

Most of the burden of mortality and morbidity in the WHO European Region is due to four preventable diseases: CVD, cancer, diabetes, and chronic respiratory diseases. These have shared risk factors: tobacco, alcohol, physical inactivity and unhealthy diet. These NCDs and their determinants can be influenced by policies in a range of sectors (67).

The *European Action Plan for Food and Nutrition Policy for 2015-2020* (68) takes steps towards promoting healthy diets and addressing obesity and diet-related NCDs in the WHO European Region. It aligns with *Health 2020: the European policy for health and well-being* (1) stating as its mission to "achieve universal access to affordable, balanced, healthy food, with equity and gender equality in nutrition for all citizens of the WHO European Region through intersectoral policies in the context of Health 2020". The plan takes action through a whole of government Health in All Policies (HiAP) approach to promoting health and well-being through improving diet and nutritional status which will help to ensure coordinated approaches and multi-stakeholder action. The previous *European Action Plan for Food and Nutrition Policy for 2007–2012* (69) action area 3 "Providing comprehensive information and education to consumers" specifies actions to reduce the consumption of alcohol including alcohol limits in food-based dietary guidelines and nutrition counselling. A specific action of action area 5 "Strengthening nutrition and food safety in the health sector" is to engage primary health care staff in nutrition assessment and the provision of counselling on diet, food safety and physical activity, which includes weight measurement and dietary assessment in adults. Although it does not specifically mention assessment of alcohol consumption.

European policy to reduce alcohol-related harm

Policy actions which have shown to be effective in reducing alcohol consumption and attributable harm have been implemented at European, national, and regional level (70). A number of these policies will likely have a direct or indirect impact on alcohol-related weight gain and obesity by reducing consumption.

There is good evidence for interventions which decrease affordability of alcoholic beverages, particularly for people with low SES and heavier drinkers (71-73). The WHO 'Best Buys' and the SAFER intervention include, pricing and taxation policies, restricting alcohol availability, and restricting alcohol marketing and advertising as cost-effective interventions to reduce alcohol consumption and related harms (74, 75). These have been implemented to various degrees in a number of European countries.

Non-communicable diseases

In the scope of the *Action plan for implementation of the European Strategy for the Prevention and Control of Noncommunicable Diseases 2012–2016* (67) obesity is given special mention: "… *obesity merits specific attention, in that it is both a result of many of the same basic risk factors and a cause of other NCDs*."

The plan has four priority action areas, all of which are relevant to both alcohol use and overweight/obesity:

- Governance for NCD, including building alliances and networks, and fostering citizen empowerment
- Strengthening surveillance, monitoring and evaluation, and research
- Promoting health and preventing disease
- Reorienting health services further towards prevention and care of chronic diseases

Within "Promoting health and preventing disease" a specific action for Member States is the implementation of commitments made under the European Charter to Counteract Obesity (76), the European Action Plan for Food and Nutrition Policy for 2007–2012 (69), the Global Strategy on Diet, Physical Activity and Health (77), and the Global Strategy to Reduce the Harmful use of Alcohol (75). "Reorienting health services towards prevention and care of chronic diseases" includes reviewing affordability. Improving access to primary health care would both improve access to screening and treatment of alcohol-related problems, and to identifying and managing other lifestyle behaviours related to overweight such as physical activity and alcohol consumption.

Furthermore, a priority intervention of the plan is "Promoting healthy consumption via fiscal and marketing policies" by using fiscal policies and marketing controls to full effect to influence demand for tobacco, alcohol and foods high in saturated fats, trans fats, salt and sugar with outcome measures of reduced tobacco use, reduction of harmful use of alcohol and reduced obesity. Process measures include increases in taxes, enforcing advertising bans and restricted access to retailed alcohol, and promotion of healthier diets via food pricing, labelling and marketing controls.

Europe's *Beating Cancer Plan* launched in February 2021 has a focus on prevention, treatment and care. The Plan aims to raise awareness of and address key risk factors including harmful alcohol consumption. In the Plan the European Commission commits to "*increase support for Member States and stakeholders to implement best practices and capacity-building activities to reduce harmful alcohol consumption in line with the targets of the UN Sustainable Development Goals*." Key actions relevant to overweight/obesity include:

- A review of EU legislation on alcohol taxation
- Publishing a study mapping fiscal measures and pricing policies on sugars, soft drinks and alcoholic beverages in 2022
- Proposing mandatory labelling of ingredients and nutrient content, along with health warnings on alcoholic beverages –2021-2023 (78).

5. Key policy actions

- Actions to raise consumer awareness of the link between alcohol and weight gain:
    - appropriate nutritional guidelines regarding alcohol consumption
    - adequate, effective nutritional labelling of alcoholic beverages – nutritional content including calories and sugar, using standard units
- Implementing assessment of alcohol use in primary health care including assessment of "empty calories" coming from alcoholic beverages e.g. early identification and brief intervention
- Actions addressing obesity and alcohol consumption simultaneously could make a significant contribution to improving public health
- Actions which address alcohol use and obesity within the context of other health behaviours

6. Policy topics recommended for discussion

- Effective interventions to raise awareness of the alcohol–weight gain link. Both among consumers and health professionals
- Opportunities in overlaps with existing policies in other sectors and within health e.g. nutrition and current reviews of dietary guidelines, taxation, labelling (e.g. current health warnings for, experiences from tobacco)
- Barriers to implementing effective policy to address the overweight/obesity in the context of alcohol-related harm and ways to overcome them
- The consumer's Right to Know and how this relates to nutritional information on alcoholic beverages
- Country and regional differences in drinking and dietary patterns
- Addressing the so-called protective effect

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Annexes

Annex 1. Peer-Review Report, Alcohol and Cancer

DEEP SEAS - FAR SEAS Background Document to the Thematic Workshop 2

This report is intended to compliment and complete the information provided in the briefing documents and executive summary; which have the aim of giving full and succinct, relevant background information to the participants of the DEEP SEAS-FAR SEAS Workshop 2: Alcohol and its relation to Socioeconomic inequalities, Nutrition & Obesity and Cancer.

The workshop objective is to facilitate clear communication and exchange of perspectives and priorities, and to establish sustainable connections which can endure after the events to enhance and promote health in all policy initiatives. To achieve this, participants need a grounding in the topic which enables them to join in discussions and address the most relevant overlapping cross-sectoral concerns.

Reviewer: Isabelle Soerjomataram Document: **Alcohol and cancer**
Short biography – Position, institution and background in the field: Deputy Head, Cancer Surveillance Branch, IARC. MD, cancer epidemiologist, public health, prevention
Global evaluation of the briefing document: Well done, brief but compact/comprehensive includes all scientific evidence, good amount of graphics to support the text.
Specific areas or messages to add or amend: All noted in the doc. Would be good to note that more policy and system research are needed on alcohol-related policies and their effectiveness. Would be good also to say that in many countries there is no specific alcohol-reduction plan or framework. We have this clearly set out for smoking, but for alcohol the actions/plans are run by different institutions and often fragmented. Lobbying is also very important – separation or specific regulation to prevent this is key in public health decision making.
Specific areas or messages to highlight as important: All discussed already. Perhaps if any to say that a comprehensive approach taking into account upstream (e.g. taxation) and downstream (e.g. awareness) is key. We'd like to see the secular (downward trends) continues.
Further references or information of interest in this area: Authors have done a really comprehensive overview, with key references noted.

Annex 2: Peer-Review Report, Alcohol and Socioeconomic inequalities

DEEP SEAS - FAR SEAS Background Document to the Thematic Workshop 2

This report is intended to compliment and complete the information provided in the briefing documents and executive summary; which have the aim of giving full and succinct, relevant background information to the participants of the DEEP SEAS-FAR SEAS Workshop 2: Alcohol and its relation to Socioeconomic inequalities, Nutrition & Obesity and Cancer.

The workshop objective is to facilitate clear communication and exchange of perspectives and priorities, and to establish sustainable connections which can endure after the events to enhance and promote health in all policy initiatives. To achieve this, participants need a grounding in the topic which enables them to join in discussions and address the most relevant overlapping cross-sectoral concerns.

Reviewer: Pia Mäkelä Document: **The relationship between SES, alcohol use and mortality, and implications for policy**
Short biography – Position, institution and background in the field: Pia Mäkelä is a research professor in the Alcohol, Drugs and Tobacco Unit at the Finnish Institute for Health and Welfare in Finland. Her research covers themes related to alcohol use and drinking culture, consequences of alcohol use, the socioeconomic inequities in these, and alcohol policy in Finland and comparatively, and she is a Senior Editor of the Journal Addiction.
Global evaluation of the briefing document: The document is a valuable review of the current state of knowledge of what socioeconomic differences in alcohol use and its consequences look like, what may explain the alcohol harm paradox, and what is known about policies that can be applied to try to reduce the inequities observed.
Specific areas or messages to add or amend: Socioeconomic differences in alcohol-related harm can in principle be due to, in addition to differences in drinking and differences in vulnerability and joint effects with other risk factors, also to methodological effects (e.g. bias in registration of diagnoses) and reverse causality (e.g., severe alcohol problems may lead to loss of incomes). However, evidence suggests that these have only modest explanatory power and in some but not all cases (e.g. more in the case of differences by income than by education).
Specific areas or messages to highlight as important: Because of the alcohol harm paradox (people in lower socioeconomic groups experience more alcohol-related harm than people in higher socioeconomic groups at identical or lower levels of alcohol use) it is important that efforts are made in different levels to prevent this differential harm, whether it's by addressing poverty and deprivation, by helping individuals in lower SES groups to reduce alcohol use, by using price policies that will work to the same effect, by reducing levels of other risk factors that may have joint effects with alcohol on alcohol-related harm (smoking, nutrition, obesity) and/or by ensuring wide access to safety nets, social support and treatment. Preferably all of these.
Further references or information of interest in this area:

Annex 3: Peer-Review Report, Alcohol and Nutrition & Obesity

DEEP SEAS - FAR SEAS Background Document to the Thematic Workshop 2

This report is intended to compliment and complete the information provided in the briefing documents and executive summary; which have the aim of giving full and succinct, relevant background information to the participants of the DEEP SEAS-FAR SEAS Workshop 2: Alcohol and its relation to Socioeconomic inequalities, Nutrition & Obesity and Cancer.

The workshop objective is to facilitate clear communication and exchange of perspectives and priorities, and to establish sustainable connections which can endure after the events to enhance and promote health in all policy initiatives. To achieve this, participants need a grounding in the topic which enables them to join in discussions and address the most relevant overlapping cross-sectoral concerns.

Reviewer: Dr. João Breda Title of background document: **Alcohol, overweight and obesity**
Short biography – Position, institution and background in the field: Senior Adviser Division of Country Health Policies and Systems |WHO Regional Office for Europe
Global evaluation of the briefing document: Very important document and a topic that has been going largely understudied. The document properly frames the issues and tries to summarize the science.
Specific areas or messages to add or amend: The recommendations and key messages would benefit from a bit more work and maybe divide them according to audiences. Improve and expand the methods section.
Specific areas or messages to highlight as important: The relation between alcohol and obesity could be better illustrated by providing information about obesity prevalence and also the contribution of alcohol to energy intake in many European populations.
Further references or information of interest in this area:

Annex 4: The situation in the hosting Member State — Portugal

Cancer, inequalities and obesity in Portugal

Behavioural factors, namely poor diet, smoking and excessive alcohol use are major contributors to illness and mortality in Portugal (1). In 2017 approximately 86% of deaths in Portugal were from NCDs, with the risk for men of dying from one of the four major NCDs almost double that of women (2). Although life expectancy is slightly above the EU average (PT: 81.6yrs, EU: 80.9yrs), there is a socioeconomic gradient in life expectancy at age 30, with those with the lowest level of education expected to live five and a half years (men) and almost three years (women) less than those with the highest level of education (1).

In the 2019 National Health Survey, more than 30% of people aged 15 and over reported daily alcohol consumption and 40% reported binge drinking (more than six alcoholic beverages on one occasion) at least once in the previous year (3).

Overweight and obesity present a significant public health challenge in Portugal, and also follows the social gradient. More than half of Portuguese adults are overweight (37%) or obese (16%) with marked inequalities in obesity rates. In 2017, 18% of people without a secondary education were obese - double the rate seen among those with a higher education (1).

Cancer causes approximately 7% of all mortality in Portugal (2) and Portugal is one of a small number of countries in the WHO European Region where alcohol-attributable cancer incidence was above 15 per 100 000 in 2018 (4).

The Portuguese health care model

Portugal's National Health Service provides universal coverage in a cost-sharing model. Recent health services reforms include greater decentralisation and a focus on improving access to care (1). Mortality from preventable and treatable causes are both below EU averages and barriers to accessing primary care seem to be decreasing, all despite healthcare spending being relatively low compared to other EU countries (about 1/3 less than the EU average) (1).

Portugal has taken action to introduce a Health in All Policies (HiAP) approach to policy making, and the *National Plan for Reducing Addictive Behaviours and Dependencies 2013-2020* (PNRCAD) (5) is an inter-ministerial plan in which the different ministries integrate an HiAP approach with interdependence across sectors (5).

National alcohol policy

The Portuguese *National Plan for Reducing Addictive Behaviours and Dependencies 2013-2020* (5) provides the overall policy framework and establishes the priorities of the Portuguese state in the field of addictive behaviours and dependencies. It stems from a redefinition of policies and health services and follows the *National Plan on Drugs and Drug Addiction 2005-2012* and the *National Plan for Reducing Alcohol Related Problems 2010-2012*. The Plan's strategic objectives reflect a broad, global and integrated view of addictive behaviours and dependencies. It has been developed to align with other national, EU, and global level plans and strategies, including the Portuguese *National Health Plan 2012-2016* (extended to 2020), the *EU Drugs Strategy 2013-2020,* the *EU strategy to support Member*

States in reducing alcohol related harm, and the WHO *Global strategy to reduce the harm use of alcohol*.

Portugal has implemented a number of actions to reduce alcohol-related harm which align with the aforementioned plans and strategies. These include: Restricting advertising and marketing; A minimum age for purchase and consumption; Guidance on 'low risk' consumption; Excise on beer and spirits; and Health messages on some alcoholic beverages

European and international action to reduce alcohol-related harm

Portugal is active in promoting knowledge sharing and action on drugs and alcohol internationally. The Portuguese General-Directorate for Intervention on Addictive Behaviours and Dependencies (SICAD) coordinated the Joint Action – Reducing Alcohol Related Harm (RARHA) (http://www.rarha.eu), funded under the second EU Health Programme. RARHA aimed to support Member States to take forward work on common priorities in line with the *EU strategy to support Member States in reducing alcohol related harm*. SICAD is also an active member of the consortium taking forward the work of RARHA on a Standard European Alcohol Survey (SEAS) and leading on a regional pilot of electronic brief interventions, in the service contracts DEEP SEAS and FAR SEAS (https://www.deep-seas.eu/ and https://far-seas.eu/). The General-Directorate is also leading the coordination of a more recent service contract ALHAMBRA, which will continue the series of Thematic Workshops, and deepen international knowledge and cooperation in the areas of tackling online alcohol marketing, effective labelling and health information for alcohol products, and regulating lower-alcohol products to reduce harm.

SICAD is a co-organiser of the European Conference on Addictive Behaviours and Dependencies (Lisbon Addictions: https://www.lisbonaddictions.eu/lisbon-addictions-2019/about) with the journal Addiction, Society for the Study of Addiction, the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) and the International Society of Addiction Journal Editors (ISAJE). Lisbon Addictions has been held every two years since 2015 and is about stimulating and promoting high quality scientific debate, showcasing leading European addiction research in the specialist areas of illicit drugs, alcohol, tobacco, gambling and other addictive behaviours.

Portugal has also participated in the European School Survey Project on Alcohol and Other Drugs (ESPAD) (http://www.espad.org/) a cross-sectional study of substance use and risk behaviour among students aged 15-16 years since it began in 1995.

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