CHAPTER 13. SCIENCE, ALCOHOL, HEALTH AND POLICY IN THE EUROPEAN UNION

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Over a four year period, 2009-2012, a consortium of 50 researchers and project partners from 12 European countries studied a range of alcohol policy approaches with a focus on member states of the European Union. In this concluding chapter, we draw out ten important findings.

1. **On average, European Union adults aged 15+ years drink 27g alcohol per day, more than twice the world's average. One in eight of this consumption is from unrecorded alcohol, which, with the exception of ethanol, is not normally a health risk. One in eight citizens consume 60g or more of alcohol at a time at least several times a week.**

The European Union (EU) is the region of the world with the highest levels of alcohol consumption, more than double the world's average (Shield et al 2012). EU citizens aged 15 years or older drink on average 12.5 litres of pure alcohol per year, 27 grams a day. One in eight of this consumption is from unrecorded alcohol. Sixteen per cent of men consume 60g or more of alcohol a day, and nine per cent of women consume 40g or more of alcohol a day, definitions of heavy drinking. Five point four per cent of men and 1.5% of women (11 million people in all) are considered alcohol dependent (Rehm et al 2012a).

2. **The best estimate is that about 138,000 people, aged 15-64 years, die prematurely from alcohol in any one year, with two-fifths of deaths due to liver cirrhosis, one third due to injuries, and one in five due to cancer.**

In 2004, almost 110,000 men and 28,000 women aged between 15 - 64 years living in the EU died prematurely due to alcohol (Rehm, 2013). Two-fifths of these deaths are due to liver cirrhosis, one third due to injuries, and one in five due to cancer. Three-fifths of these deaths occur in people who are dependent on alcohol. Taking into account the protective effect of alcohol on ischemic disease and diabetes, this means that 1 in 7 male and 1 in 13 female premature deaths were caused by alcohol. Moreover, as alcohol consumption contributes substantially to morbidity and disability as well, the overall alcohol-attributable burden of disease is high. In 2004, over 4 million disability-adjusted life years (DALYs), i.e., years of life lost either due to premature mortality or due to disability, were estimated to be caused by alcohol consumption, corresponding to 15% of all DALYs in men and 4% of all DALYs in women. Most of the health harms related to alcohol are caused by heavy drinking.

3. **Ethanol is a carcinogen, a teratogen and toxic to many body organs. Using the European Food Standards Authority guidance on risky exposure for human consumption of toxic substances in food and drink products, European drinkers consume more than 600 times the exposure level for genotoxic carcinogens, which is set at 50 milligrams alcohol per day; and more than 100 times the exposure level for non-carcinogenic toxins, which is set at 0.3 grams alcohol per day. [The average consumption of the 89% of EU citizens who drink alcohol is just over 30g/day].**

The International Agency for Research on Cancer (IARC 2010), the world's reference body on cancer causing agents classifies alcohol as a carcinogen, causing cancers of the oral cavity, pharynx, larynx, oesophagus, liver, colorectum and female breast. Some 26,000 EU citizens die each year from alcohol-caused cancers before the age of 65 years, nearly 1 in 5 of all alcohol caused deaths, and about 1 in 14 of all cancer deaths.

The Margin of Exposure (MOE) is the ratio of the dose of the consumed substance (for example ethanol or acetaldehyde) at the lower border of its toxic threshold divided by the estimated intake of the substance. Thus, for example a MOE of 1 means that the amount consumed is the same as the dose that is considered toxic. An MOE of 10 means that the amount consumed is only ten times lower than the dose that is considered toxic. An MOE of 1,000 means that the amount consumed is one thousand times lower than the dose that is considered toxic. For genotoxic carcinogens, (which ethanol, as well as acetaldehyde are), the European Food Safety Authority indicates an MOE of 10,000 as the cut off point for public health safety (EFSA 2005). This means that the amount consumed should be at least 10,000 times lower than the level considered toxic. However, when based on human studies, and for a substance that is not considered an essential part of the diet as is the case for ethanol's cancer producing role, a cut-off point of 1,000 is acceptable. This does not mean that it is 100% safe to drink below this level – only that it is a reasonable guidance to ensure safety as much as possible. For health problems other than cancer, the European Food Safety Authority indicates an MOE of 100 as the cut off point for public health safety. This means that the amount consumed should be at least 100 times lower than the level considered toxic. However, again, when based on human studies, and for a substance that is not considered an essential part of the diet as is the case for ethanol's disease producing role other than for cancer, a cut-off point of 10 is acceptable. This does not mean that it is 100% safe to drink below this level – only that it is a reasonable guidance to ensure safety as much as possible

One hundred and fifteen samples of unrecorded alcohol were collected from 16 European countries and margins of exposure were analysed for 10 potentially important substances, including alcohol (Lachenmeier & Rehm 2013). It was found that ethanol represented by far the highest risk in unrecorded alcohol. The MOE of ethanol reached down to below 10, which was the lowest level of all compounds under study.

Thus, using the European Food Safety Authority guidance on exposure for human consumption of carcinogens in food and drink products, with a margin of exposure set at 1,000, no one should drink more than about 50 milligrams of alcohol a day, equivalent to 20g or two drinks a year (Lachenmeier et al 2012). Currently, the 89% of Europeans who drink alcohol consume just over 30 grams a day, some 600 times the exposure level. Ignoring alcohol's cancer causing role, and just considering other health outcomes, no one should drink more than about 0.3 grams of alcohol a day, equivalent to 9g or about one drink a month year (Lachenmeier et al 2011). Currently, Europeans drink about 100 times the exposure level.

4. **Countries with more strict and comprehensive alcohol policies generally have lower levels of alcohol consumption. Regulating the economic and physical availability of alcohol are particularly effective in reducing the harm done by alcohol, and such regulations have tended to become more restrictive throughout the European Union in recent years, particular so in the eastern part of the Union. Involvement of alcohol producers in alcohol policy making tends to be associated with weaker alcohol policies, whereas the involvement of academia tends to be associated with stronger policies.**

By constructing a scale measuring the strictness and comprehensiveness of formal alcohol policies, and applying it in 33 European countries, we can create an overview on how alcohol is governed and controlled in Europe (Karlsson et al 2013a). The alcohol policy scale, with a mean score of 71.3, varied from 38.5 points (permissive Luxembourg) to 133 points (stringent Norway) out of a possible 160. Despite recent alcohol policy liberalizations in the Nordic countries, the four Nordic alcohol-monopoly countries have by far still the strictest alcohol

policies in Europe. A common denominator for the top ranking countries is high taxes and restricted physical availability of alcoholic beverages.

With the exception of the southern European countries, a higher AMPHORA policy score is associated with lower alcohol consumption. The decrease in alcohol (wine) consumption in the Mediterranean countries has been influenced mainly by societal factors like urbanization and changes in work organization, rather than changes in formal alcohol policies.

The mean scores for the strictness and comprehensiveness of alcohol policy vary by level of stakeholder involvement in alcohol policy development (König et al., 2012; König et al., 2013). An increased involvement of academia is associated with more strict and comprehensive policies (Beta=0.77, $p<0.01$). Increased involvement of producer companies is associated with less strict and comprehensive policies, but the relationship is not significant (Beta=-0.49, $p=0.063$). When looking at alcohol pricing and tax policy, increased involvement of academia is associated with more strict and comprehensive alcohol pricing and tax policies (Beta=0.604, $p<0.05$), while increased involvement of producer companies is associated with less strict and comprehensive alcohol pricing and tax policy (Beta=-0.73, $p=<0.01$).

Over the period 1980 to 2011, 383 studies have been published on the impact of changes in the physical and economic availability of alcohol in Europe, 40% of which were published after the year 2006 (Karlsson et al., 2011; Karlsson et al., 2013b). Most of the studies came from the Anglo-Saxon world and Northern Europe, with many parts of Southern and Eastern Europe poorly studied. Over this time, the collected evidence on effectiveness of certain policy measures has become strong and comprehensive enough to tell us what works and what does not work when it comes to reducing alcohol consumption and related harms. The accumulated knowledge base tells us that restrictions on the physical and economic availability on alcohol have a significant effect on reducing alcohol consumption and related harms.

Over the last few years, 83 unstudied cases of changes in physical and economic availability were identified in Europe (Lindeman et al 2012). Over four-fifths of these were restrictive, as opposed to liberal changes, and most of them took place in eastern Europe.

5. **Socio-demographic changes impact on alcohol consumption. In general, increased urbanization results in increases in overall alcohol consumption, and a greater maternal age across all child births results in decreases in overall alcohol consumption. However, even when taking into account the impact of these socio-demographic changes, alcohol policy matters. Restricting the availability and advertising of alcohol, increasing the minimum purchase age, and lowering the legal blood alcohol concentration for driving can all reduce alcohol consumption.**

Using data over the time period 1960–2008, the potential impact of socio-demographic changes and planned alcohol policies on alcohol consumption and deaths from liver disease and road transport accidents was studied in twelve countries: Austria, Finland, France, Hungary, Italy, Netherlands, Norway, Poland, Spain, Sweden, Switzerland, and the United Kingdom (Allamani et al., 2013a; Allamani et al., 2013b). Thirty seven types of social, cultural, economic, demographic, political, health and religious factors were collected. Factors with good data sets across all countries were used in the analyses: income, price of alcoholic beverages, proportion of total population that were males over the age of 65 years, proportion of population living in urban areas, proportion of women who had completed tertiary education, proportion of women employed, and the average maternal age at all childbirths. The factors were subjected to multiple imputations for the missing values. Table 1 summarizes time series analyses (TSA) of the impact of four socio-demographic factors on per capita

alcohol consumption for the twelve study countries over the nearly fifty year period, 1960 to 2008, when controlling for income, price of alcoholic beverages, and proportion of the total population that were males over the age of 65 years. In general, increased levels of urbanization are associated with increased consumption and maternal age at all childbirths with decreased consumption.

Table 1 Regression coefficients from 4 separate regression models for each socio-demographic factor, adjusted for time trend, income, proportion of males >65 years of age, and prices of beer & wine describing the relationship between the socio-demographic factors and aged 15+ years per capita recorded alcohol consumption. Bold numbers indicate statistical significance at 0.1 level.

	Female education	Female employment	Urbanization	Maternal age, all childbirths
Austria	NA	**0.53**	**23.6**	**1.73**
Finland	-0.33	**0.77**	**1.23**	-0.65
France	0.04	**2.46**	0.21	**-3.52**
Hungary	**0.22**	0.48	**4.51**	**-3.38**
Italy	**0.1**	0.11	**6.96**	**-4.01**
Netherlands	0.02	-0.02	**-3.07**	**-1.97**
Norway	**-0.98**	**0.76**	**1.22**	**-3.17**
Poland	**0.19**	**-0.29**	**5.67**	**1.63**
Spain	0.17	-0.11	**3.14**	-2.2
Sweden	**0.07**	**-0.64**	**3.15**	**-4.35**
Switzerland	-0.01	-0.13	**0.75**	**-1.12**
United Kingdom	0.02	-0.24	0.43	**-0.57**

The planned policy measures documented included a mixture of administrative and regulatory measures related to availability, advertising, drink driving, and prevention and treatment responses. Alcohol taxes were not included, as the price of alcohol was include as a socio-demographic factor. Table 2 looks at the impact of policy changes on alcohol consumption. In general, the introduction of a legal blood alcohol concentration was associated with an increase, rather than a decrease in consumption, whereas, in general, a decrease in the legal level was associated with a reduction in consumption. Increasing the minimum age for purchase was generally associated with a reduction in consumption. In general, increased availability was associated with increase in consumption and decreased availability with decreases in consumption. In France and Spain increased advertising restrictions were associated with decreases in consumption, whereas in Austria and Norway with increases. The introduction of prevention and treatment programmes were more often associated with increases in consumption. Although there were a few individual country and policy exceptions, in general, it was not possible to find consistent associations between the planned policies and changes in death rates from transport accidents and liver cirrhosis, either directly or mediated through consumption changes. The lack of findings is probably due to insufficient data being available over time.

Table 2 Regression coefficients from separate regression models for each policy factor, adjusted for time trend, income, proportion of males >65 years of age, and prices of beer & wine and the one country specific-socio-demographic factor that had the greatest explanatory power for changes in alcohol consumption. Bold numbers indicate statistical significance at the 0.1 level. 'A' indicates an administrative measure; 'R' indicates a regulatory measure.

	Establishment BAC	**Reduction BAC**	**Minimum age**	**Availability**	**Advertising**	**Prevention/treatment**
Austria		**R -0.17**	**R 0.19**		**R 0.10**	**A -0.13**
Finland				**[R 0.42]**		
France	**R 0.14**	**R -0.11**	**R -0.18**		**R -0.11**	**A 0.14**
Hungary	**R 0.04**			R 0.02	[R 0.04]	A -0.03
Italy	R 0.03	R -0.02		R 0.02 R -0.02	R -0.02	
Netherlands	**R 0.12** A 0.03			[R -0.01] **A 0.04** **R -0.05**		A 0.03
Norway				[R 0.01] **[R 0.08]**	**R 0.02**	**A 0.06** **A 0.04**
Poland				**R 0.05** **[R 0.13]** **[R 0.09]** A -0.02 **[R -0.18]**		
Spain	R 0.02	**R 0.14**	**R -0.14**	**R -0.12** **R -0.07**	**R -0.12**	
Sweden		**R -0.07**		[R -0.05] **R -0.07** **R -0.11** **[R 0.12]**		
Switzerland		**R -0.13**	**R -0.12**	**[R 0.07]** **R 0.13**		
United Kingdom	R 0.03 A 0.03			**[A 0.06]** **A 0.07** **[R0.09]**		**A 0.07**

6. The greater the exposure 13-16 year olds have to online alcohol marketing and alcohol branded sports sponsorship, the greater the likelihood that young drinkers will consume alcohol 14-15 months later. Such 13-16 year olds would not feel deprived of information should the advertising of alcohol be banned.

Forty eight focus group interviews with a total of 326 youngsters in the age range of 13-16 years from Finland, Italy, Denmark, Germany, the Netherlands and Poland documented how teenagers negotiate messages of televised beer commercials (Hellman 2011; Hellman 2013). Meaning-making concerning alcohol drinking differed between the young audiences in the different alcohol geographies. Differences were found in terms of norms on drinking contexts and drinking-related problems. No essential difference was found with regards to level of advertisement literacy or persuasion knowledge between different countries. All youngsters interviewed were equally aware of the persuasion techniques applied by commercial producers. The expression of such knowledge seemed to be very much stimulated by the study setup of the focus group sessions. The project suggests an added value of combining research

strategies on commercial alcohol messages and their young audiences. Such mixed-approach strategies may not only give valuable insights into the question, but also strengthen a general credibility of the research area in question.

The impact of alcohol marketing in digital media and alcohol sport sponsorship on subsequent youth alcohol consumption was studied amongst 6,651 students with a mean age of 14 years from Germany, Italy, the Netherlands and Poland in a longitudinal setting (de Bruijn et al., 2012; de Bruijn et al., 2013). The study is important because the internet is the leading medium with adolescents, who spend more time on the internet than they do watching television. For this reason, the alcohol industry utilizes the internet as an important marketing tool, especially via the producers' websites, by banners in other websites, and on social networking sites. Alcohol sports sponsorship is also considered common and impactful on young people's drinking. It is thought that part of the impact of marketing on drinking behaviour is due to marketing influencing adolescents' attitudes of how drinking will affect them in a positive way, which in turn predicts actual drinking behaviour. The students were first studied between November 2010 and February 2011 (Time 1), when their alcohol use and their exposure to digital advertising, controlling for their internet use, was measured. Exposure to alcohol sponsored football championships and exposure to alcohol sponsorship of their own sport club were measured. The students were studied again 14-15 months later (Time 2), when their attitudes to alcohol and alcohol use were measured. The relationship between their exposures to digital advertising and sport sponsorship at Time 1 on their alcohol use at Time 2 was analysed.

More than 9 out of 10 students regularly used the internet during school days, with nearly two fifths of all students using the internet for more than two hours each day. Nearly one third of students reported using a social media site which contained alcohol advertisements, and two thirds reported noticing alcohol advertisements on an internet page. Over half the 14 year old students had used alcohol, and one quarter of all students reported drinking five or more drinks on at least one occasion during the previous 30 days.

Controlling for the students' sex, age, level of education, whether or not they smoked, how much they used the internet, and in which country they lived, the use of alcohol during the previous 30 days, exposure to digital marketing, and exposure to sport sponsorship at Time 1 independently predicted the use of alcohol during the previous 30 days at the follow-up time, Time 2, 14-15 months later. Thus, students who had used alcohol during the previous 30 days at Time 1 were more likely to use alcohol during the previous 30 days at Time 2 ($\beta = 0.41$, $p<0.001$). The greater the exposure to digital alcohol marketing at Time 1, the more likely students were to use alcohol during the previous 30 days at Time 2 ($\beta = 0.12$, $p<0.001$). The greater the exposure to alcohol sponsored championships at Time 1 (but not non-alcohol sponsored championships), the more likely students were to use alcohol during the previous 30 days at Time 2 ($\beta = 0.07$, $p<0.01$), and the greater the exposure to alcohol sponsorship of own sports club at Time 1, the more likely students were to use alcohol during the previous 30 days at Time 2 ($\beta = 0.04$, $p<0.01$).

That part of the effect of marketing was due to its impact on attitudes is shown by the associations becoming less strong, when taking into account the students attitudes at Time 2. The coefficient, β, which measures the strength of the association dropped from 0.12 for the impact of online marketing at Time 1 to 0.08 when the impact of attitudes at Time 2 was taken into account. The association was still highly significant ($p<0.001$). For exposure to alcohol sponsored championships at Time 1, β dropped from 0.07 to 0.04 when the impact of attitudes at Time 2 was taken into account, with the association losing significance. For exposure to alcohol sponsorship of own sports club at Time 1, β dropped from 0.04 to 0.03 when the

impact of attitudes at Time 2 was taken into account, with the association still being significant ($p<0.01$).

7. **Brief interventions for risky drinking are effective in primary health care and emergency care settings, also in Europe, in reducing alcohol consumption by 18 grams and 11 grams per week respectively more than the control group at 12 month follow-up. The pharmacological treatments, acamprosate and naltrexone are effective in treating alcohol use disorders, also in Europe, with success rates of 18%-20% at 3-6 months follow-up.**

The effectiveness of brief interventions for risky drinking in primary health care settings was analysed, comparing the results from studies undertaken in Europe with those undertaken in the rest of the world. It was found that brief interventions work, and they work just as well in European studies as they do in studies from the rest of the world (Elzerbi et al., 2013). In European studies, brief interventions lead to about 20 grams less alcohol (two drinks) being drunk per week compared to groups that did not received the brief intervention 12 months after the intervention. This is a large difference. The effectiveness of brief interventions for risky drinking in emergency departments was also analysed, comparing the results from studies undertaken in Europe with those undertaken in the rest of the world (Elzerbi et al., 2013). Brief interventions were found to work, working just as well in European studies as they do in studies from the rest of the world. In European studies, brief interventions lead to 9 grams less alcohol (one drink) being drunk per week compared to groups that did not received the brief intervention 12 months after the intervention. This is a large difference.

The effectiveness of the pharmacological treatment, acamprosate, in treating alcohol use disorders was analysed, comparing the results from studies undertaken in Europe with those undertaken in the rest of the world (Elzerbi et al., 2013). In European studies, acamprosate resulted in a 17% less chance of returning to drinking after stopping, six months after starting the treatment. This is a large difference, but was not been replicated in the two non-European studies identified for comparison. The effectiveness of the pharmacological treatment, naltrexone, in treating alcohol use disorders was analysed, comparing the results from studies undertaken in Europe with those undertaken in the rest of the world (Elzerbi et al., 2013). In the European studies, it could not be conclusively demonstrated that naltrexone worked, but the results of the European studies did not differ significantly from the results of the studies from the rest of the world. Thus, it is fair to conclude that naltrexone seems to work just as well in European studies as it does in studies from the rest of the world. In all studies naltrexone resulted in an 18% less chance of relapsing to heavy drinking three months after starting the treatment. This is a large difference.

8. **Across six European countries studied, there is great variation in the health systems and treatment provision for alcohol use disorders, with the proportion of people in need of treatment who actually access it ranging from 1 in 25 to 1 in 7.**

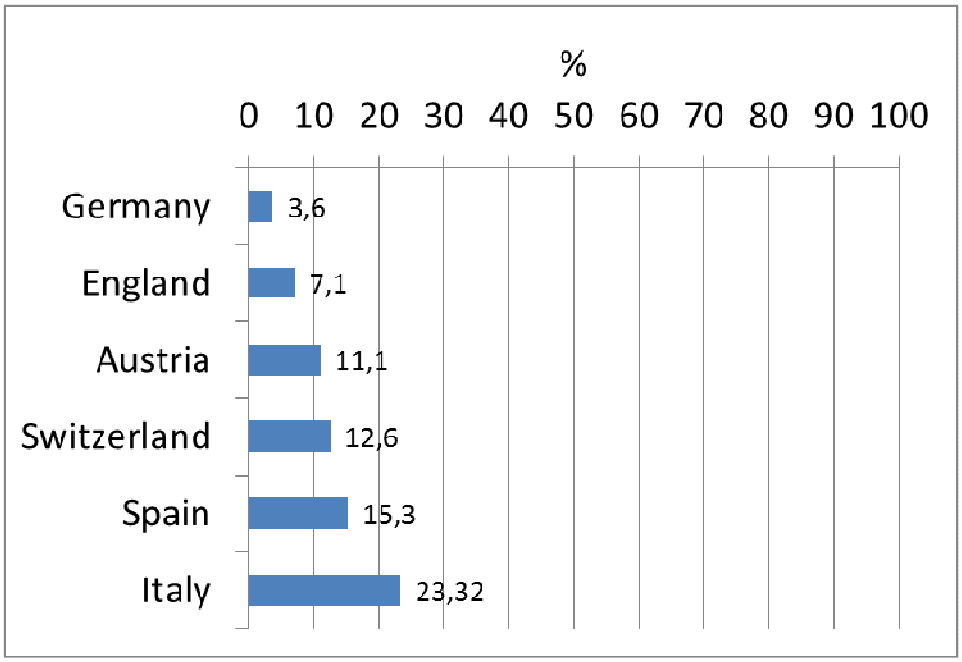
The provision of screening and brief interventions for risky drinking and treatment for alcohol use disorders (AUD) was studied in six European countries (Austria, England, Germany, Italy, Spain and Switzerland) over the years 2009-2012 (Wolstenhome et al 2013a; Wolstenhome et al 2013b). Considerable variation was found in the organisation and provision of alcohol interventions between the six countries.

Across the six countries, out of the 154 patients seen per week, only five patients were screened positive for an alcohol use disorder (AUD) over a four-week period, representing only 0.8% of the patients seen. This is considerably lower than the actual prevalence of AUD in

primary care. GPs were found to have a fairly high level of knowledge and understanding of screening tools, but the actual use of screening tools was lower across the six countries. GPs reported time constraints and the risk of upsetting the patient as the two main barriers to alcohol screening. GPs had a fairly high level of knowledge and practice of brief interventions across the six countries. They reported time constraints and lack of training as the two main barriers to delivering brief alcohol interventions.

By comparing the number of people with alcohol dependence to the number of people accessing treatment, it is possible to calculate the prevalence-service utilisation ratio (PSUR), which measures the proportion of people in need who actually access treatment. Figure 1 shows that the gap varied across the six countries with only some 4% of people in need of treatment in Germany actually accessing it to some 23% of people in need of treatment in Italy accessing it. Overall, there is a large gap between the need for treatment and actually accessing treatment. The differences between countries are partly due to differences in the methodologies used to estimate the prevalence of alcohol dependence. Thus, there is an urgent need to standardise estimations of alcohol dependence across Europe.

Figure 1 Per cent of adults who would benefit from treatment for sustained heavy alcohol use who actually receive treatment



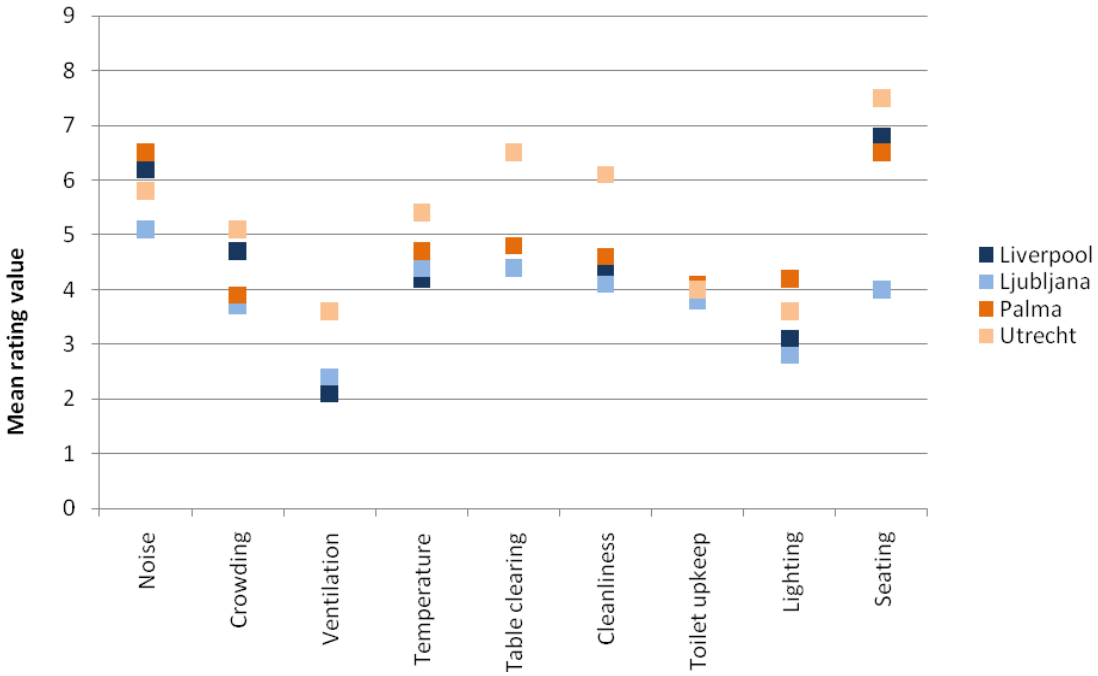
9. Across four countries studied, young people were already drunk by the time they went out to a drinking venue, fuelled by cheap alcohol purchased in shops and supermarkets; the drinking venues themselves exacerbated this problem by often being designed to promote further drunkenness and related problems.

Drinking by young people before going out was studied in four European cities, Liverpool in the UK, Ljubljana in Slovenia, Palma (de Mallorca) in Spain and Utrecht in the Netherlands (Hughes et al 2011; Hughes et al 2013a). The vast majority of drinkers in all cities expected to binge drink on the night they were studied, and in fact the amount of alcohol reported at interview had already reached binge drinking levels in all cities and for both genders. With the exception

of those from Ljubljana, the majority of young nightlife users surveyed reported that they had consumed alcohol at home, a friend's home or, in the case of Palma, in public places prior to visiting public drinking environments. Such preloading behaviour is often motivated by price, with alcohol typically being vastly cheaper in supermarkets and other off-licensed premises than in pubs, bars or nightclubs. However such preloading has important implications for preventing harm in drinking environments as it means that individuals are arriving at pubs, bars and nightclubs already under the influence of alcohol, and in some cases likely intoxicated. Serving alcohol to individuals who are drunk is illegal in most European countries, yet a growing trend in preloading means that bar managers and staff face an increasingly intoxicated customer base.

The physical environment within venues was assessed using a series of rating scales (from 0 to 9) measuring noise levels, crowding, ventilation, temperature, levels of lighting and factors regarding cleanliness (Hughes et al 2012; Hughes et al 2013b), Figure 2. On all scales, higher values represented more 'problematic' levels. Venues that are crowded, loud, unclean and poorly monitored are likely to see higher levels of intoxication, and consequently higher levels of related harm. Such characteristics are likely to be symptomatic of poorly managed bars where drunkenness and anti-social behaviour is left unchecked, with permissiveness having one of the strongest independent relationships with intoxication.

Figure 2 Mean ratings on physical environment scales



0 mean rating value = "non problematic"; 9 mean rating value = "highly problematic"

Strong relationships were also found between increased customer intoxication ratings and both plastic glassware and the promotion of non-alcoholic drinks. Both of these characteristics could be considered harm reduction measures, yet findings here urge caution around recommending them to prevent alcohol related problems. Relationships between plastic glassware and intoxication likely represent the use (often enforced by police or licensing authorities) of this measure to prevent serious violent injury in high risk bars; yet suggest that bars' use of plastic does not stop customers getting drunk, and therefore would not stop

alcohol-related harm including violence. For non-alcoholic drink promotions, these were often focused on energy drinks that are typically consumed in combination with alcohol and have been linked to greater intoxication and alcohol-related harm.

10. **Monitoring alcohol policy and its impact in the European Union is rather poor. Although 18 of 32 countries (56%) had prepared a report on alcohol as of 2010, their coverage of relevant issues tended to be poor. Reporting of summary measures of alcohol-related harm tends to be outdated, sometimes by as much as eight years.**

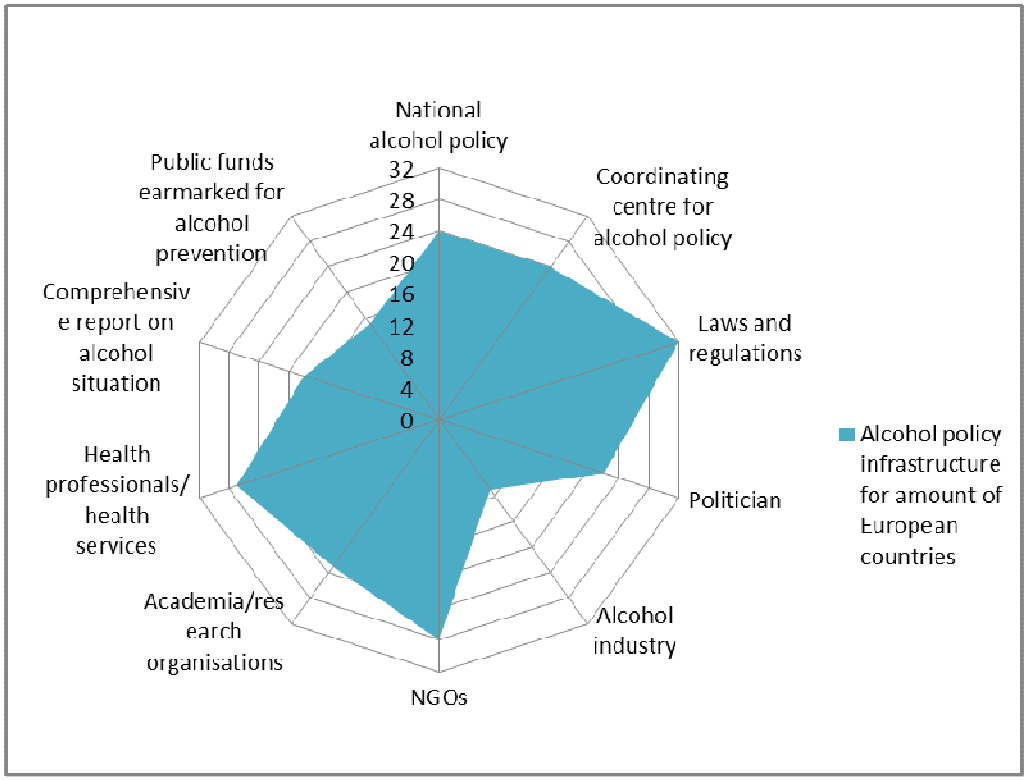
Ten alcohol policy infrastructure elements were studied in 32 European countries for the year 2010: (1) Policies, priorities and goals, i.e. a national policy document on alcohol needed to set priorities, guide action and allocate resources; (2) laws and regulations that build a legislative basis related to alcohol and its implementation; (3) different governmental sectors at different levels involved in alcohol policy (multisectoral approach) and a coordinating body; (4) national politicians specialised in alcohol issues; (5) the alcohol industry engaging in alcohol policy as a pressure group; (6) civil society organisations and 'voice' as public health advocates; (7) science and research-based organisations building the knowledge base for the development of effective alcohol policy; (8) the professional workforce engaged in alcohol policy and practice; (9) monitoring and surveillance systems to identify and make information available; and (10) funding basis needed to develop effective alcohol policy (Brummer & Sevestre 2012; König et al 2013).

The spider web graph below summarizes the number of countries that had these infrastructures in in blue, Figure 3. The assessment of the categories 'national alcohol policy', 'coordinating centre for alcohol policy', 'laws and regulations', 'politicians', 'comprehensive report on alcohol situation' and 'public funds earmarked for alcohol prevention' examines the presence or absence of that infrastructure element for all countries. The categories 'NGO', 'academia' and 'health professionals' show countries with high and medium involvement of those stakeholders in public policy. The category 'alcohol industry', in contrast, shows the amount of countries where both manufacturers and producers/retailers have low or no involvement in public policy, since such involvement is found to weaken alcohol policy.

All countries have a number of laws and regulations addressing alcohol. This might be a comprehensive alcohol act or a number of laws and regulations addressing alcohol besides other issues. Twenty four of the 32 countries have a written national policy document, which can contribute to set priorities, show commitment and allocate resources and shape a country's alcohol policy. The same number of countries had a coordinating body available that is responsible for the overall coordination of the development and monitoring of the national alcohol policy.

However, only about half the European countries have prepared a comprehensive report on the alcohol situation in their country despite the importance of monitoring and surveillance as a basis for priority setting and policy development. Only eleven countries had public funds earmarked for alcohol prevention. NGOs, academia/research organisations and health professionals/health services in most countries show high or medium involvement in alcohol policy. This could be a contributing factor to the development of effective alcohol policy. On the other hand, the alcohol industries showed a high involvement in alcohol policy, remembering that the spider web documents the number of countries with low no involvement in alcohol policy.

Figure 3 Spider web. European alcohol policy infrastructure



Epidemiology can help guide alcohol policy (Rehm et al 2013). However, what is necessary are relevant and timely data on a regular basis, i.e., a comprehensive monitoring and surveillance system, which can serve multiple purposes: as an early warning system, as a resource to monitor change and to evaluate the impact of policy, and as a comparator to benchmark against other countries. While in principle the elements to create such a monitoring system are in place, in practice meaningful monitoring and surveillance for alcohol-attributable harm is hindered by the data situation. Consider the following situation: at the media launch of the WHO European Region publication on alcohol, harm and policy in March 2012 (Anderson et al 2012), data from 2004 were launched as the most recent data on alcohol-attributable burden of disease. Such a time lag is unacceptable if monitoring and surveillance are to have real impact on policy making. The reason for this time lag is clear: conceptually, public health wants to move away from mortality as the main indicator and incorporate disability and quality of life into a summary measure of health.

The reason for this time lag is clear: conceptually, public health wants to move away from mortality as the main indicator and incorporate disability and quality of life into a summary measure of health (Murray et al., 2000). This goal is laudable as it reflects preferences of modern societies and individuals not only to increase life expectancy but also to maximize disability-free life expectancy.

However, while the goal is laudable, the implementation does not follow suit, and studies measuring burden of disease or other summary measures of health are rare. Thus, after the publication of the last Global Burden of Disease 2000 Study (World Health Organization, 2002), there has de facto been a 10 year gap before new data on burden of disease were presented (in December 2012, Lim et al 2012), with one non-empirical based update for the year 2004 in between (World Health Organization, 2008). During this time, few countries have conducted

their own burden of disease study, so monitoring of alcohol-attributable burden of disease on a continuous basis has been absent.
An alternative is to use alcohol-attributable years of life lost as an indicator for monitoring and surveillance systems. This indicator requires, in addition to a functioning vital registration system which is present in all EU countries, regular studies on alcohol exposure indicators (adult *per* capita consumption and prevalence of drinking, former drinking and lifetime abstention).

The WHO European Regional Office has started to use exposure and mortality data as a monitoring system (Shield et al., 2013), Figure 4.

Figure 4. Alcohol-attributable standardized death rates per 100,000 people in Europe

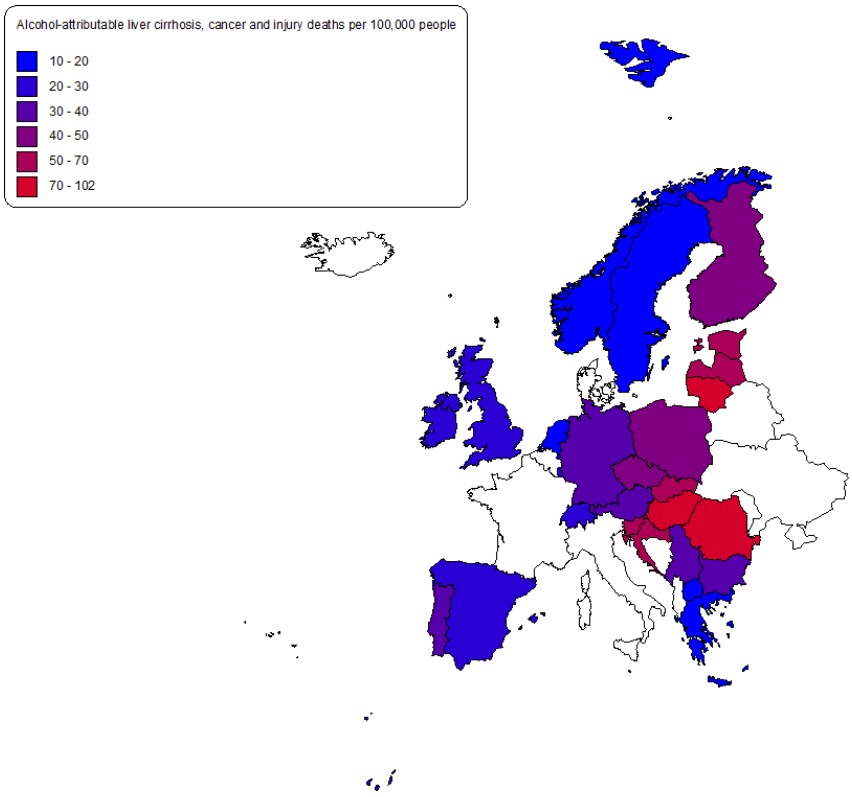


Figure 4 illustrates a clear West-East gradient. Alcohol-attributable mortality is highest in Central East and Eastern Europe regions, with Standardized Death Rates (SDRs) of more than 75 per 1,000 in Hungary, Romania and the Baltic countries. A simple regression analysis indicates that the correlation between adult *per capita* consumption of alcohol and alcohol-attributable mortality is strong ($R^2 = 0.70$), and that the number of alcohol-attributable deaths increases exponentially as adult *per capita* consumption increases. From a point of view of monitoring, such data seem to be relevant and could be updated on a yearly basis, based on standard data collection of WHO European Region.

CONCLUSIONS

The main outcomes of the scientific work of the AMPHORA project drive the need for stepped-up implementation of a number of alcohol policy actions. Were these actions implemented, there would be considerable benefit in terms of health gain, disability adjusted life years averted, and premature deaths avoided. This applies to price increases, restrictions on the availability of alcohol and bans on alcohol advertising. It also applies to brief interventions for risky drinking and treatments for alcohol dependence. Such actions not only improved health, but can also reduce crime, improve personal security and improve productivity at work. Alcohol tax increases also bring in much needed government revenue.

The ten core messages of the project are:

1. EU adults drink 27g alcohol (nearly three drinks) a day, more than twice the world's average.
2. About 138,000 EU citizens, aged 15-64 years, die prematurely from alcohol in any one year.
3. EU drinkers consume more than 600 times the exposure level set by the European Food Standards Authority for genotoxic carcinogens, of which ethanol is one.
4. Countries with more strict and comprehensive alcohol policies generally have lower levels of alcohol consumption, and policies are tending to get stricter in recent years.
5. Alcohol policies impact on alcohol consumption, even when talking into account broader socio-demographic changes, such as increased urbanization which is associated with increased consumption and increased maternal age at all childbirths which is associated with decreases in consumption.
6. Online alcohol marketing and alcohol branded sports sponsorship increase the likelihood of 14 year olds to drink alcohol.
7. Brief interventions for risky drinking and pharmacological treatments for alcohol use disorders are effective.
8. The proportion of people who need treatment who actually access it ranges from only 1 in 25 to 1 in 7.
9. Young people are often already drunk by the time they go out, fuelled by cheap alcohol from shops and supermarkets, with drinking venues exacerbating problems further.
10. Monitoring alcohol policy and its impact needs much improvement.

Policy options

The core policy options that derive from these findings, which are consistent with the extensive published literature on alcohol policy (Anderson & Baumberg 2006; Anderson et al 2009; Anderson et al 2012; Anderson et al 2013; Babor et al 2010; Rehm et al 2012; World Economic Forum 2011) are:

1. European countries should, in general, strengthen alcohol policy further as a matter of urgent public health policy to reduce alcohol consumption and the estimated 138,000 preventable deaths that occur annually. The most cost-effective way to do this is through implementing the three best busy for alcohol policy recommended by the World Economic Forum and the World Health Organization in their joint submission to the 2011 United

Nations High Level Meeting on non-communicable disease, increase the price of alcohol, reduce the availability of alcohol and ban alcohol advertising (World Economic Forum 2011).

2. Pricing policy should include the implementation of a minimum price per gram of alcohol, an alcohol policy option that reduces consumption and harm, and one which targets in particular young people's heavy drinking and drunkenness (Anderson et al 2013).
3. Reducing the availability of alcohol should be matched with a licensing system for the sale of alcohol in all countries, with the receipt and maintenance of the license dependent on adherence to a minimum set of environmental standards in the licensed premise (Anderson et al 2013).
4. Given their importance in promoting adolescent drinking, bans on alcohol advertising should include bans on digital alcohol advertising and alcohol branded sports sponsorship (Anderson et al 2013).
5. The availability and standards of brief advice and treatment for risky drinking and alcohol use disorders should be dramatically improved and harmonized upwards across all European Union member states to improve the existing poor coverage (Rehm et al 2012a).
6. Standardised monitoring and reporting on alcohol consumption, alcohol-related harm and alcohol policy responses should be improved and harmonized upwards across all European Union member states to ensure a monitoring system that can evaluate up-to-date change in health status (Rehm 2013).

Conflict of Interest Statement

Peter Anderson has no conflicts of interest to declare.

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