AMPHORA
Alcohol Public Health Research Alliance

Alcohol Policy in Europe: Evidence from AMPHORA

Edited by Peter Anderson, Fleur Braddick, Jillian Reynolds and Antoni Gual

SEVENTH FRAMEWORK PROGRAMME

Edited by:
Peter Anderson, Fleur Braddick, Jillian Reynolds & Antoni Gual
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CHAPTER 1. INTRODUCTION

Antoni Gual & Peter Anderson

The European Union (EU) is the region of the world where, by far, the most alcohol is produced and consumed. Data show that EU citizens aged 15 years or older drink around 12-13 litres of pure alcohol per year on average. This is an average daily consumption of 27-29 grams of pure alcohol, an amount that is around 3 standard drinks per day in most European countries. 'Alcohol is not only our favourite drug, but also our most dangerous drug' (the ALICE RAP project, 2012).

EU citizens drink double than the world's average, and this has an important negative impact on the health of citizens and on the European economy. It has been estimated that, in 2004, almost 95,000 men and more than 25,000 women (aged between 15 - 64 years) died prematurely of alcohol-attributable causes. The burden alcohol poses to European society in terms of mortality, morbidity and disability is enormous, as shown by the more than four million Disability Adjusted Life Years (DALYs) attributable to alcohol in 2004 (15% of all DALYs in men and 4% in women) (Rehm, 2012). On top of that, social costs attributable to alcohol are well underestimated, since they do not take fully into account the costs associated to people other than the drinker, such as children, partners and colleagues.

The problem is not new to Europeans, and does not seem to improve. Alcohol consumption in the EU remains quite stable, with a slow trend towards homogenization of drinking patterns between countries. During the last decade there have been European initiatives on alcohol, including the European Commission 'EU strategy to support Member States in reducing alcohol-related harms' (European Commission, 2006) and the WHO European Alcohol Action Plan to reduce the harmful use of alcohol 2012-2020 (WHO Regional Office for Europe, 2011). These are supported at the global level with the WHO strategy to reduce the harmful use of alcohol (2010) and the WHO 2008-2013 Action Plan for the Global Strategy for the Prevention and Control of Non-communicable Diseases (WHO, 2008).

It is in this context that the AMPHORA project was launched in 2008, with the aim to promote the creation of an Alcohol Public Health Research Alliance that could influence the debate on alcohol policy at a European level.

This ebook with the key findings of the AMPHORA project is timely, because the new EC strategy on alcohol is under discussion. Our research shows we are still lacking a good monitoring system to control alcohol-related harm (Rehm, 2012), but the available data show that improvement has not occurred, probably because most of the political and policy initiatives have not taken into account what the evidence says. The most relevant evidence (Anderson et al 2009; Babor et. al, 2010; Anderson et al 2012) shows the importance to act on price and availability. Institutions like the World Economic Forum and the World Health Organization (2011) have stated clearly that increasing price, reducing availability and banning advertising are the best buys to decrease alcohol-related problems.

AMPHORA is the first research project on alcohol from a public health perspective that has ever been co-funded by the European Commission through the Seventh Framework Program of Research. With 33 partner institutions from 12 EU countries, counterparts and affiliated

organizations from all 27 member states and a budget of €4 million, the AMPHORA project has developed during the past 4 years intensive research in some of the areas where evidence was more needed.

The areas of knowledge were evidence is more conclusive have been omitted deliberately in order to use resources efficiently. This is why no studies have focussed on areas where there is robust evidence supporting its implementation, like drink & driving policies, or areas where the evidence is also consistent showing lack of efficacy, like educational programs (Anderson et al 2012). Anyhow, AMPHORA has studied the wide majority of action areas identified in the WHO Europe Alcohol Action Plan, and this also means that most of the priority areas defined by the EC Strategy on Alcohol have also been studied.

During the last 4 years, AMPHORA has worked to create scientific knowledge in areas where this knowledge can have an impact on alcohol policy. Drinking venues, alcohol marketing, treatment availability, surrogate alcohols, monitoring systems and policy infrastructures are some of the areas studied.

In all cases, a real European approach has been taken, and the work carried out in all our studies has been developed in a variety of EU countries and by researchers from those countries. In fact, the following chapters will give the reader an overview of the differences and commonalities between EU countries in relation to alcohol. It is clear from our data that Europe is still far from homogenization concerning alcohol policies, and it is also clear that differences arise from cultural, social and economic differences between countries.

Nevertheless, it is also clear that those differences are narrowing and that through a project like AMPHORA we get to know them much better. Moreover, those differences offer a unique opportunity to learn from each other and choose the 'best buys' out of them.

AMPHORA has put together a relevant number of scientists, setting the basis for a Public Health Research Alliance. It is true that the core group of researchers had already been working together in previous studies, but AMPHORA offered the opportunity to enlarge this group to cover most of the EU countries, and has also provided excellent opportunities for networking and for the development of new and interesting projects, such as ODHIN (www.odhinproject.eu) and ALICE RAP (www.alicerap.eu).

But the aim of AMPHORA is not just to do research, but to have an impact on policy, and this is why the project has put an emphasis in the science-policy debate. Through the life of the project we have had joint yearly meetings with WHO national counterparts and relevant national policy makers in Madrid, Zurich and the final meeting in Stockholm, framed as the Fifth European Alcohol Policy Conference, and we think this formula has promoted a very much needed debate between science and policy makers that needs to continue far beyond the life of our project.

This ebook is a summary of our research, and it has been organized in a way that it can fit the needs for the science-policy debate. The reader can easily go through each chapter. They are organized in a simple way: introduction, what we did, what we found, what does it mean and take home messages. It intends to provide the busy reader with a quick and clear vision of each of the topics covered. A more in depth vision can be obtained through the references and at the projects' website (www.amphoraproject.net).

Finally, the reader will notice that a few data are still lacking. The reason is that the project ends in December 2012, but we wanted to have this ebook ready for the final conference in

October 2012. Nevertheless, the final results will be made available in early January in a 2nd edition of the ebook.

This ebook presents a summary of a relevant amount of work conducted during the last four years by a real multidisciplinary and multinational team. Nevertheless, we must acknowledge there is still a lot to be done. In the context of the financial and economic crisis facing the European Union, it is even more important to reduce the burden that alcohol poses to society in order to keep people healthy, and thus the EU productive and competitive. Good alcohol policy improves the sustainability and efficiency of social and health care systems, so we need to identify more clearly which factors at an EU level are limiting the implementation of efficient and innovative alcohol policies.

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CHAPTER 2. WHAT ALCOHOL CAN DO TO EUROPEAN SOCIETIES

Jürgen Rehm

Summary

Alcohol consumption has been identified as a risk factor for burden of disease and social harm. As the European region features a level of alcohol consumption which ranks among the highest globally, the countries of the European Union show a high level of alcohol-attributable harm. In the EU, in 2004, almost 95,000 men and more than 25,000 women between 15 and 64 years of age were estimated to have died prematurely of alcohol-attributable causes. This means that 1 in 7 male and 1 in 13 female premature deaths were caused by alcohol. These are net numbers, already taken into consideration the protective effect of alcohol on ischemic disease and diabetes. 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. The high toll of alcohol-attributable burden requires alcohol policy countermeasures including a monitoring system that is capable of evaluating change. While the tools for such a monitoring system exist, it is not possible to implement fully, as almost all countries lack comparable routine data on burden of disease such as DALYs.

Introduction

Alcohol is a major risk factor for burden of disease (Rehm et al., 2009b, World Health Organization, 2009) and social harm (Gmel and Rehm, 2003). As Europe is the highest consuming region for alcohol in the world, alcohol-attributable burden is high there as well (Rehm et al., 2009b, World Health Organization, 2009). The European Union (EU) at the core of Europe is no exception to this; alcohol consumption in the EU is more than twice the global average and alcohol-attributable burden by far exceeds the global average as well (Anderson and Baumberg, 2006, Rehm et al., 2011b, Rehm et al., In Press, Shield et al., 2012, Rehm et al., 2012).

Determination of alcohol-attributable harm, both in terms of burden of disease (= health harm) and social harm was one of the major goals of our work within the Amphora project. However, we did not want to stop at describing the burden, but try to help establish and implement an epidemiological monitoring and surveillance system which would enable regional, national and international policy makers to quantify the harm associated with alcohol consumption, to identify key areas where most of the harm occurred and thus to lay the basis for specific policy measures, both in the field of prevention and treatment. This goal is in accordance with the WHO Global Strategy to Reduce the Harmful Use of Alcohol (World Health Organization, 2010) and the corresponding action plan of WHO European Region for the years 2012 to 2020 (http://www.euro.who.int/data/assets/pdf_file/0018/150552/RC61_R4.pdf ; http://www.euro.who.int/en/what-we-do/health-topics/disease-prevention/alcohol-

use/publications/2011/wd13-european-action-plan-to-reduce-the-harmful-use-of-alcohol-20122021).

What we did

We used the methodology of the Comparative Risk Assessment for alcohol within the Global Burden of Disease and Injury 2005/2010 Study (GBD) to estimate alcohol-attributable mortality and burden of disease (for exposure see (Rehm et al., 2010b, Kehoe et al., 2012); for risk relations see (Rehm et al., 2010a)). In addition, we tried to develop guidelines for monitoring and surveillance based on efforts of the EU, the World Health Organization and the GBD study (Rehm and Scafato, 2011).

There was not a clear standardized model for social harms (as there is for health harms), so we tried to develop part of such a model for harm to others based on the Australian study (for the estimates for Europe and background see (Rehm et al., 2012, Shield et al., 2012); for the Australian study see (Laslett et al., 2011)).

What we found

In the following we will give a summary of the results of alcohol-attributable burden of disease and injury (based on (Rehm et al., 2011b, Shield et al., 2012, Rehm et al., 2012)), alcohol-attributable harms to others (based on (Rehm et al., 2012)) and of the recommendation for monitoring and surveillance (based on (Rehm and Scafato, 2011)).

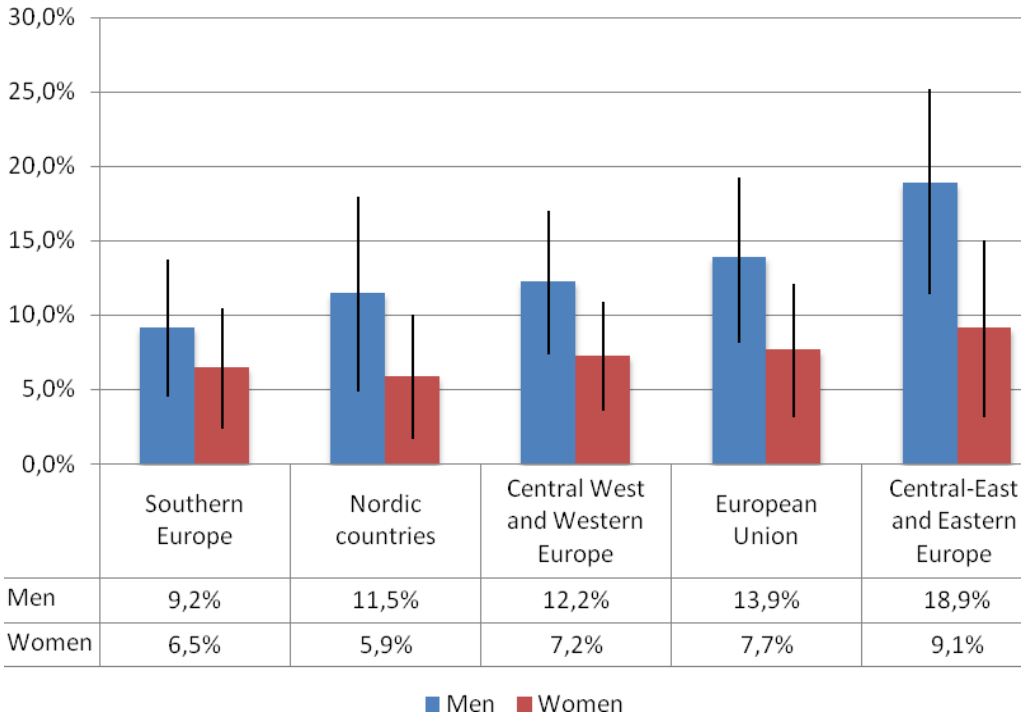
Alcohol-attributable burden of disease

Overall, alcohol-attributable mortality is high. In 2004, 13.9% (95% CI: 8.1% to 19.2%) of all premature deaths in men in the EU were estimated to be attributable to alcohol consumption, corresponding to an overall toll of about 95,000 deaths (94,500; 95% Confidence Interval–CI: 55,500 to 130,500), or one in 7 premature deaths. Premature deaths here are defined as deaths in the age group between 15 and 64 years of age. For women, the corresponding numbers were 7.7% (95% CI: 3.1% to 12.1%), corresponding to 25,000 premature deaths (95% CI: 10,500 to 40,000) or one in 13 of these deaths being caused by alcohol. For both sexes combined, the proportion of alcohol-attributable deaths amounted to 11.9% of all deaths (95% CI: 6.5% to 16.9%). There were clear regional variations[1] (Figure 1).

The proportion of alcohol-attributable deaths in central-eastern and Eastern Europe is much higher than in the southern region of the EU, for men more than twice as high. Three reasons can be given for the difference: first, the volume of drinking is higher in central-eastern and eastern European countries. Second, the drinking pattern, i.e. how alcohol is consumed is more detrimental: more irregular drinking with high variation (i.e., more binge drinking occasions with higher volume per occasion), more drinking to intoxication and less drinking with meals (Popova et al., 2007). Finally, these countries have lower economic wealth (as measured in GDP-PPP) and alcohol has been shown to have relatively more impact in poorer populations (Rehm et al., 2009a).

1 The regional coding used is based on average volume and patterns of drinking. Central east and Eastern Europe includes 10 countries: Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia. Nordic countries includes 5 countries: Denmark, Finland, Iceland, Norway, Sweden. Central west and Western Europe includes 9 countries: Austria, Belgium, France, Germany, Ireland, Luxembourg, Netherlands, Switzerland, UK. Southern Europe includes 6 countries: Cyprus, Greece, Italy, Malta, Spain, Portugal.

Figure 1. Proportion of all premature deaths (defined as deaths in people 15-64 years of age) in the EU caused by alcohol consumption by sex and region



	Southern Europe	Nordic countries	Central West and Western Europe	European Union	Central-East and Eastern Europe
Men	9,2%	11,5%	12,2%	13,9%	18,9%
Women	6,5%	5,9%	7,2%	7,7%	9,1%

Which diseases leading to death (i.e., which `causes of death`) are attributable to alcohol? If only the main categories of alcohol-attributable mortality are considered the following picture emerges (Table 1): for men, liver cirrhosis and injury (both unintentional and intentional) make up more than 60% of all deaths; cancer, with more than 15%, is also an important alcohol-attributable cause of death. For women, cancer and liver cirrhosis alone make up more than two thirds of all alcohol-attributable deaths.

Overall, looking into alcohol-attributable deaths, it is clear that the detrimental effects by far outweigh the beneficial effects, which are mainly stemming from ischemic heart disease. Cancer mortality alone outweighs all of the beneficial effects: ischemic heart disease, ischemic stroke and diabetes. This seems to be in some contrast to the media reports and public knowledge on alcohol and its effects on cancers in many countries (e.g., (O'Dowd, 2011, Ipsos MRBI, 2012)).

In addition, the effect of alcohol on deaths from mental and neurological disorders seems low. There are two reasons for this: first, these disorders, especially mental disorders, are often more disabling than fatal (e.g., (World Health Organization, 2008); for alcohol use disorders see (Samokhvalov et al., 2010)), and if they lead to death, it is often indirectly (e.g., alcohol use disorders via liver cirrhosis; depression via suicide). Secondly, while there are clear and strong associations between alcohol, alcohol use disorders and other mental disorders, it has been virtually impossible to quantify the impact of alcohol on other disorders (except alcohol use disorders, where by definition the attributable fraction is 100%; i.e., 100% of alcohol use disorders would disappear, if there was no alcohol in a society). For other disorders, we are left with associations without being able to disentangle and quantify causality. Consider the case of alcohol, alcohol use disorders and depression: clearly, alcohol or alcohol use disorders can cause depression, but depression can also cause heavier use of alcohol or alcohol use disorders. Finally, there may be third variables such as genetic variability which can cause both alcohol and depression. Similar arguments can be made for almost all other mental disorders,

and thus quantification of alcohol-attributable mental disorders has been rarely tried, and if, only with very crude methods (for further reasoning and an example see (Graham et al., 2004)).

Table 1. Alcohol-attributable premature deaths in the EU 2004 by sex and main causes

Detrimental effects	Men #s	Women #s	Men %	Women %
Cancer	17,358	8,668	15.9%	30.7%
Cardiovascular disease (other than Ischemic heart disease)	7,914	3,127	7.2%	11.1%
Mental and neurological disorders	10,868	2,330	9.9%	8.3%
Liver cirrhosis	28,449	10,508	26.0%	37.2%
Unintentional injury	24,912	1,795	22.8%	6.4%
Intentional injury	16,562	1,167	15.1%	4.1%
Other detrimental	3,455	637	3.2%	2.3%
Total detrimental	109,517	28,232	100.0%	100.0%
Beneficial effects				
Ischemic heart disease	14,736	1,800	97.8%	61.1%
Other beneficial	330	1,147	2.2%	38.9%
Total beneficial	15,065	2,947	100.0%	100.0%

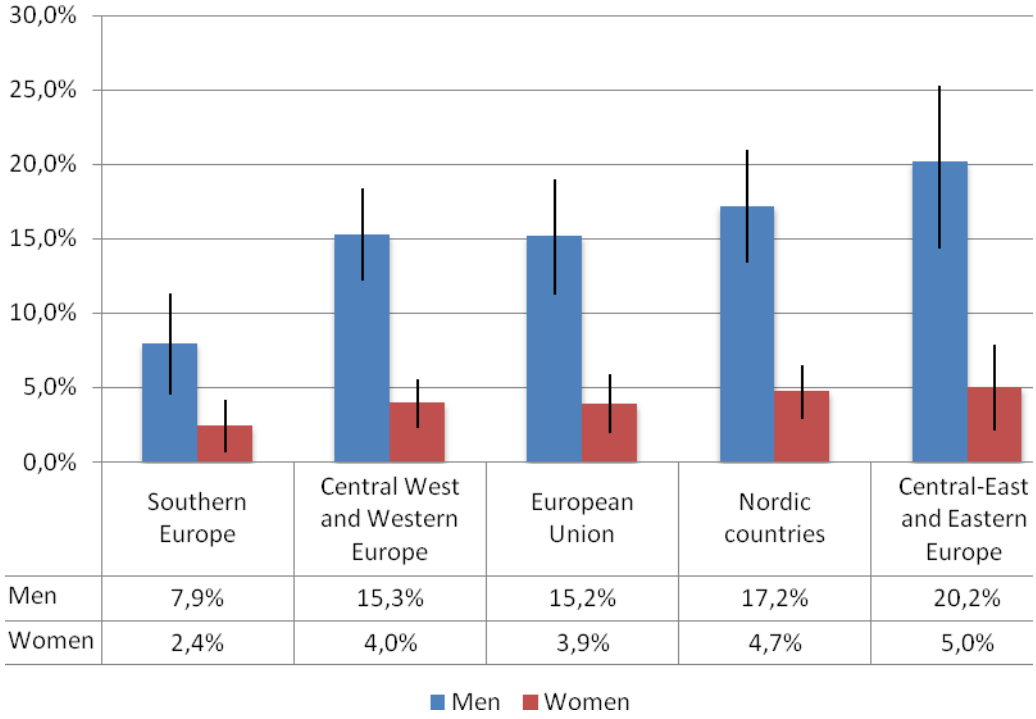
With respect to the impact of alcohol on burden of disease in the EU, a similar picture emerges. Burden of disease is usually measured in Disability-Adjusted Life Years (DALYs), which are a summary measure of health combining years of life lost due to premature mortality and years of life lost due to living with disability. DALYs have become the most-used indicator for comparing health across different jurisdictions, used by the WHO, by the World Bank, and by scientific studies such as the GBD.

We estimated that in 2004 in the EU, 3,359,000 (95% CI: 2,477,000 to 4,191,000) DALYs in men and 684,000 (95% CI: 330,000 to 1,030,000) DALYs in women were lost due to alcohol-attributable causes (total 4,043,000 (95% CI: 2,807,000 to 5,221,000)). This corresponded to 15.2% (95% CI: 11.2% to 19.0%) of all DALYs in men, 3.9% (95% CI: 1.9% to 5.9%) of all DALYs in women and 10.2% (95% CI: 7.1% to 13.2%) of all DALYs. In other words, the proportional impact of alcohol on burden of disease in the EU is slightly smaller than on mortality; it is slightly higher in men, but markedly lower in women.

In terms of main underlying causes, the same causes as for mortality emerge with one notable exception: alcohol use disorders comprise a sizable portion of all alcohol-attributable burden of disease. As a result, the category mental and neurological disorders, which constituted less than 10% of all the direct causes of death for both sexes (see Table 1), accounted for more than 40% of all alcohol-attributable DALYs in both sexes.

Alcohol use disorders are relatively more important in the Nordic countries, due their higher prevalence (for alcohol dependence 2.7% in women and 7.4% in men compared to the EU average of 1.5% and 5.4%, respectively; cited from Rehm et al., 2012; Web Appendix 13). This leads to an overall higher proportion of alcohol-attributable DALYs in these countries relative to their consumption, or relative to alcohol-attributable mortality (see Figures 2 and 3).

Figure 2. Proportion of all DALYs (in people 15-64 years of age) in the EU caused by alcohol consumption by sex and region



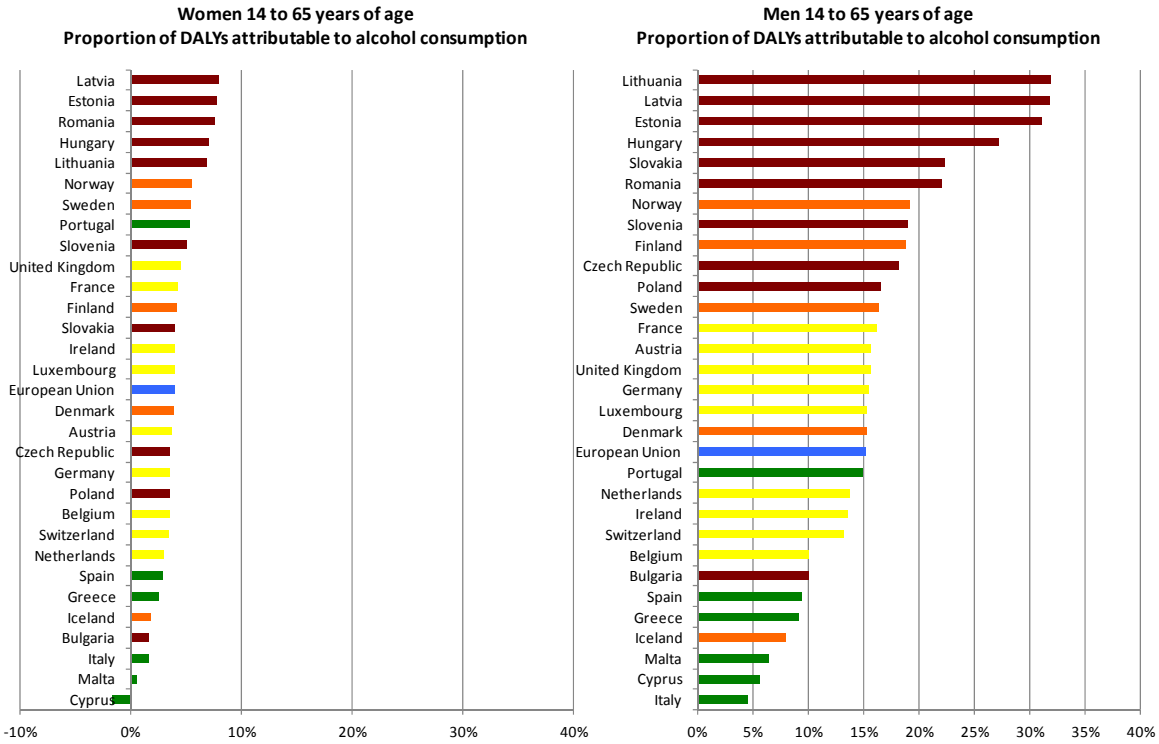
	Southern Europe	Central West and Western Europe	European Union	Nordic countries	Central-East and Eastern Europe
Men	7,9%	15,3%	15,2%	17,2%	20,2%
Women	2,4%	4,0%	3,9%	4,7%	5,0%

Since alcohol use disorders make up such a large portion of burden of disease, it is worth questioning whether the underlying data are comparable. Clearly, the variation in rates of alcohol use disorders or alcohol dependence is much larger than the variation in rates of heavy drinking (Rehm et al., 2005, Rehm et al., 2012). In the EU, prevalence for alcohol dependence varies between countries in the South, such as Italy, with rates well below 1% for both sexes (de Girolamo et al., 2006) and countries like Latvia with rates of 21% for men and 4% for women (Snikere et al., 2011). While we certainly would expect a lower prevalence of alcohol dependence in Italy compared to Latvia, a more than 20-fold higher prevalence in Latvia almost certainly seems unrealistic given other indicators such as adult *per capita* consumption or treatment rates.

There are several reasons for this. First, a number of prevalence estimates for different European countries including the estimate for Italy stems from the earlier iterations of the World Mental Health Survey, which used an errorenous procedure of only asking the criteria for alcohol dependence when at least one criterion for abuse was endorsed, thus systematically underestimating alcohol dependence prevalence (Grant et al., 2007). This was only corrected in later surveys, but most of the national World Mental Health Surveys in the EU have this error (Rehm et al., 2012). Secondly, in countries located in Southern Europe (primarily Mediterranean countries with wine drinking habits), while alcohol (most often wine) is deeply culturally embedded, alcohol problems and dependence are deeply taboo. This means that residents of these particular countries, more than others, may tend not to report symptoms of alcohol dependence, for reasons of social stigma. (For a wider context and

additional explanations, see (Room and Mäkelä, 2000)). Other indirect indicators traditionally used for estimating AD rates (such as liver cirrhosis rates) suggest a potential underestimation for Italy and Spain, in particular (for liver cirrhosis rates in the EU see (Zatonski et al., 2010); however, such estimation methods have problems of their own (Lipscomb, 1966).

Figure 3. Standardized rates for alcohol-attributable DALYs (in people 15-64 years of age) in the EU by sex and country



The role of heavy drinking

Most of the mortality or burden of disease attributable to alcohol was caused by heavy drinking. Almost 80% of all male net deaths attributable to alcohol, and about 67% of all female alcohol-attributable net deaths, were due to heavy drinking—defined as consuming at least 60g of pure alcohol per day for men, and at least 40g for women (Rehm et al., 2012). With respect to the burden of disease, heavy drinking accounted for an even higher proportion of alcohol-attributable net DALYs with almost 90% of the burden caused by this form of consumption. Heavy drinking, both regular and irregular, thus causes the overwhelming majority of the alcohol-attributable health burden. This has important implications for prevention and alcohol policy: any measure which wants to successfully reduce alcohol-attributable harm has to cut down regular and irregular heavy drinking occasions.

Alcohol-attributable harm to others

Thus far we have discussed the effects of alcohol consumption in terms of disease and mortality affecting the drinkers themselves. However, drinkers not only endanger their own health, but also the health of others. This section will describe the major harms to others due to alcohol consumption. The victims of these damages are people who may or may not drink themselves, but are affected by other people's drinking.

Harm to others as calculated in comparable fashion for EU countries includes three major items, with different prevalence (Shield et al., 2012). The most prevalent category is transport injuries: passengers or other drivers who are injured or killed by drunk drivers. This is the main

estimated cause of harm to others in EU countries, with the next item coming a distant second: physical violence or homicide engaged in by individuals under the influence of alcohol. The calculations focused solely on the drinking of the persons responsible for assault. Although it is true that people who drink do increase their own probability of being assaulted, there were not enough data to take into consideration this aspect. Finally, babies born with low birth weight due to the mother's drinking account for a small but significant proportion of harm to others.

One way in which this section differs from the sections above is that it includes all age groups. The category of "harm to others" affects people of all ages, and so this particular analysis is not restricted to people 15–64 years of age.

In the EU in 2004, for men of all ages, the harm to others caused by alcohol consumption included 5,564 deaths, 139,824 potential years of life lost due to premature mortality (PYLL), 18,987 years of life lost due to disability (YLD), and 158,811 DALYs—all estimated to be attributable to drinking. For women of all ages, the analogous figures were 2,146 deaths, 51,326 PYLL, 8,423 YLD and 59,749 DALYs. For both sexes, the totals were 7,710 deaths, 191,151 PYLL, 27,410 YLD, and 218,560 DALYs. Overall, even though the above numbers are clear underestimates, as they are only based on three categories, it is clear that harm to others is an important factor in alcohol-attributable harm.

These numbers are clearly only very rough estimates, as they are based on a number of assumptions stemming from the Australian "harm to others" study (Laslett et al., 2011), and there is no good evidence whether these assumptions hold true or not for European countries. It is thus recommended that EU countries engage in building their own evidence base for harm to others, not only with respect to health indicators, but also with respect to alcohol-attributable social harm.

Monitoring and surveillance for alcohol-attributable harm

In an ideal world, alcohol-attributable DALYs would be suggested as the best summary measure to capture all alcohol-attributable burden of disease. Clearly, a measure like DALYs is able to integrate non-fatal outcomes and by doing so reflects the values of modern societies, where life expectancy is no longer the major goal, but healthy life expectancy or health adjusted life-expectancy (Wolfson, 1996, Mathers et al., 2004) (i.e., years of life without disability) is the predominant measure by which a healthy society is measured. The problem with an indicator such as DALYs is that data are limited; currently, the last data for all EU countries are for the year 2004, and these are rough estimates, mainly derived by making the assumption that regional patterns can be transferred proportionally to the country level (World Health Organization, 2008). Later in the year 2012, we expect data for the years 2005 and 2010 from the ongoing GBD study. In lack of having such data available on a regular basis, Rehm and Scafato as result of the AMPHORA project (Rehm and Scafato, 2011) suggested 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 present in all EU countries, that there are regular studies on alcohol exposure indicators (adult per capita consumption and prevalence of drinking, former drinking and lifetime abstention), as population standardized rates that enable better comparability should be used in the monitoring system.

In addition, on a country level, the authors propose to use more direct indicators such as liver cirrhosis, alcoholic liver cirrhosis and alcohol poisoning (alcohol poisoning is a medical emergency that results from high blood alcohol levels that suppress the central nervous system and can cause loss of consciousness, low blood pressure and body temperature, coma,

respiratory depression, or death (Sanap and Chapman, 2003); for the chronic respective acute disease consequences attributable to alcohol (Rehm and Scafato, 2011)), wherever valid and reliable information is available. Again, it would be important to measure fatal and non-fatal outcomes (e.g., hospitalizations or emergency visits for acute consequences; see e.g. (Verelst et al., 2012)), especially for alcohol poisoning in young people.

If there are good data on other disease outcomes related more closely to alcohol in a certain country or region, while fulfilling criteria for good monitoring indicators (Rehm and Room, 2009, Rehm and Scafato, 2011), these outcomes should be used as long as they are justified. In all cases, at least one chronic and one acute indicator should be used, and standardized YLLs rates due to the indicator should be calculated.

What does this mean?

There is a good and internationally accepted framework for measuring the impact of alcohol on mortality and burden of disease. The data show a very high impact of alcohol consumption, especially heavy consumption, on mortality in countries of the EU, where 1 in 7 premature deaths in men and 1 in 13 premature deaths in women were caused by alcohol. In principle all of these deaths are avoidable (Rehm et al., 2006a). In practice, given that alcohol consumption has long been engrained in the European culture (Anderson and Baumberg, 2006), policy will have to focus on which measures can make the biggest impact and are still acceptable to societies (Babor et al., 2010).

We have shown (Rehm et al., 2011b) that epidemiology can help guide alcohol policy. 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 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 inacceptable 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 (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 August 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.

In consequence, in order to make monitoring relevant, measures will have to be developed which are based on routinely collected statistics (e.g. hospitalization which could be comparable for a region like the EU – for the use of hospitalizations as a tool to quantify

alcohol-attributable harm see e.g., (Rehm et al., 2006b, Rehm et al., 2011a)) and which can be reported within one or two years after the event. Only if we achieve monitoring and surveillance to give timely updates, can these data be really used as policy tools. Otherwise, the recent developments in alcohol epidemiology will remain academic successes without any impact on policy making.

Take home messages

1. The countries of the European Union have a high level of alcohol consumption, more than twice the global average.

2. Consequently, alcohol-attributable harm is also at high levels, with almost 12% of all premature deaths and more than 10% of all premature burden of disease as measured in DALYs being caused by alcohol. In other words, 1 in every 7 premature deaths before age 65 in men, and 1 in every 13 premature deaths in women is estimated to be caused by alcohol.

3. Given the high level of alcohol-attributable health harm, new forms of alcohol policy, including monitoring and surveillance systems to evaluate effectiveness, should be implemented.

4. While all the elements of such monitoring and surveillance systems have been developed, the underlying data currently limit them to indicators based solely on mortality. This does not correspond to the focus in most societies on increasing healthy life expectancy rather than just prolonging life. There is an urgent need for developing a monitoring and surveillance system for alcohol, which includes non-fatal health outcomes.

5. With respect to social harm, some progress has been made, but further developments to derive comparable and comprehensive indicators are still necessary.

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CHAPTER 3. DOES ALCOHOL POLICY MAKE ANY DIFFERENCE? SCALES AND CONSUMPTION

Thomas Karlsson, Mikaela Lindeman & Esa Österberg

Summary

By constructing a scale measuring the strictness and comprehensiveness of formal alcohol policies, and applying it in 33 European countries, we can create an overlook on how alcohol is governed and controlled in Europe. The filled-in scales showed that, although signs of convergence, there are still vast differences on what kind of alcohol policy measures are implemented in Europe and also on how strict the measures are.

The alcohol policy score, with a mean score of 71.3, varied from 38.5 points (permissive Luxembourg) to 133 points (stringent Norway) out of a possible 160. The four Nordic alcohol-monopoly countries still have by far the strictest alcohol policies in Europe. The results also show us that higher alcohol policy scores, as a rule, correlate with lower alcohol consumption levels. This is true for three of the four different regional profiles in Europe, the southern European profile being the exception that proves the rule.

Introduction

The demonstrated link between level of alcohol consumption and level of alcohol-related harm makes the implementation of effective alcohol policies an important public health question (Babor et al. 2010). In order to maneuver the consumption and alcohol-induced harm into a preferred direction, governments have the possibility to implement different types of alcohol policies and control measures.

The alcohol policy palette includes several different alcohol policy measures. Countries can combine the different components into, more or less, functional entities. The study that was conducted within the AMPHORA project aimed to measure the strictness and comprehensiveness of the diverse alcohol policies implemented across Europe. By developing a scaling tool and by implementing it in 33 European countries we are able to get a state of the art picture of the current alcohol policy situation in Europe.

The scale developed within the AMPHORA project is not the first one of its kind. Many attempts have been made to scale and measure alcohol policy, the first ones dating back to the late 1970's and early 1980's. Recent attempts to develop policy scales were undertaken in, for example, The European Comparative Alcohol Study (Karlsson & Österberg 2001) and the Eurocare project "Alcohol Policy Network in the Context of a Larger Europe: Bridging the Gap" (Karlsson & Österberg 2007).

The AMPHORA alcohol policy scale is built on the foundations of the Davies & Walsh scale from 1983 and has the same principle idea, but with added updated elements from current-day policies. The AMPHORA scale also includes more contextual information than any of its predecessors, plus an attempt to take the complex question on enforcement into consideration.

This chapter covers how the scales were structured, filled in and put into use. Some of the built-in weaknesses of the methodology are discussed, and the correlation between alcohol consumption and the strictness of policies is analyzed.

What we did

The AMPHORA scale consists of a four-page questionnaire on formal alcohol policies. There are over 50 questions - most of them are answered by ticking boxes, but open answers are also included. The questionnaire is divided into seven subcategories, dealing with different aspects of alcohol policies. The subcategories have been given weights, and questions within each subcategory generate points. All questions do not receive points, as some are used for collecting contextual information on the alcohol situation.

In the scale constructed in the Bridging the Gap project, a panel of experts were asked to give their verdict on the effectiveness of different alcohol policy measures included in the scale. In the AMPHORA scale, however, the weights were adjusted and validated by referring to state of the art research on evidence-based practice (WHO Regional Office for Europe 2009; Babor et al. 2010). As physical and economic availability are the most powerful tools in controlling alcohol consumption, each of them generate 25% of the total maximum scores. Age limits, drink driving and alcohol advertising controls are each rewarded with a share of 15% of the maximum score, while public policy's share of the total score is a mere 5%. The first subcategory in the scale, i.e. "Starting points" is a general, descriptive category, which gives the possibility to specify how alcoholic beverages are defined in the country in question, and offers the opportunity to give a brief description on how alcohol is regulated by law in the country. One can, for instance, state that there is a specific Alcohol Act in force, or indicate that alcohol is regulated mainly through other, non-alcohol specific, legislations. Subcategory one is mainly for information gathering purposes, and it does not generate any numeric score, unlike the other subcategories in the scale.

The 33 forms were filled in using data collected by the WHO-EURO in the European Survey on Alcohol and Health, corresponding to the year 2010. In addition, we contacted experts in the countries in order to get more contextual information.

Table 1. Subcategories of alcohol policy measures

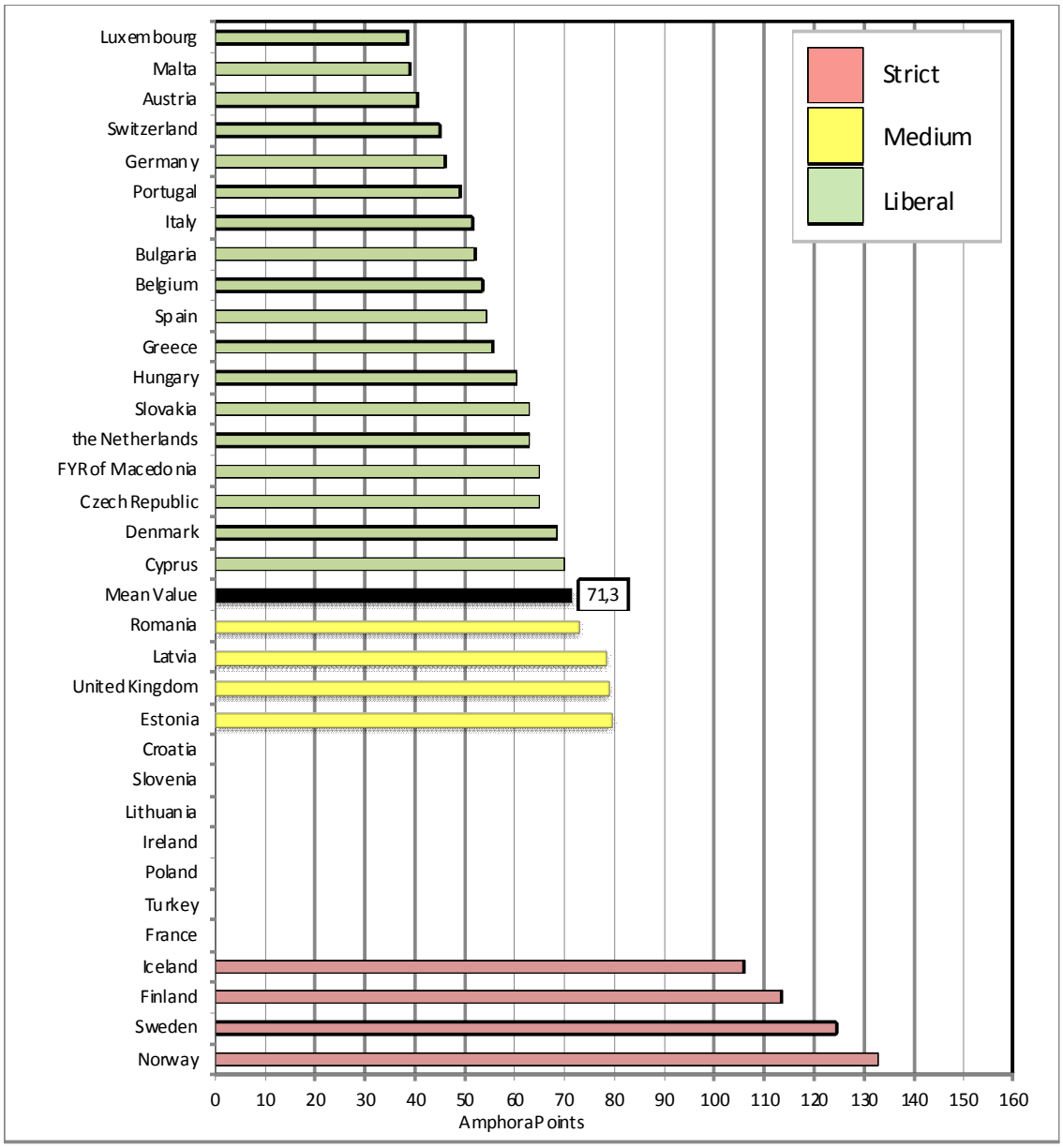
	Subcategory of alcohol policy measures	**%**	**Max points**
I	Starting points	0	0
II	Control of production, retail sale and distribution of alcoholic beverages	25	40
III	Age limits and personal control	15	24
IV	Control of drunk driving	15	24
V	Control of advertising, marketing and sponsorship of alcoholic beverages	15	24
VI	Public policy	5	8
VII	Alcohol taxation and price	25	40
	Total	**100**	**160**

What we found

After filling in the scales for the 33 countries included in the study (EU 27 + Switzerland, Norway, Iceland, Croatia, Former Yugoslavian Republic of Macedonia and Turkey) we can determinate which countries have strict and/or comprehensive policies, and which countries have chosen a more liberal/lenient path. By looking at the ranking order of the countries, one can conclude that there are quite big differences in how the European countries have chosen to deal with the question of alcohol policies. In order to classify alcohol policies according to their strictness and comprehensiveness, the countries included in the study were divided into *low, medium* and *high* alcohol policy countries (Figure 1).

This was done by dividing the scores between maximum and minimum in three equally large parts. The countries having the lowest scores contain the countries with the weakest formal alcohol policies in Europe. This group contains 18 countries that rank below the 33rd percentile of the scores (break point 70).

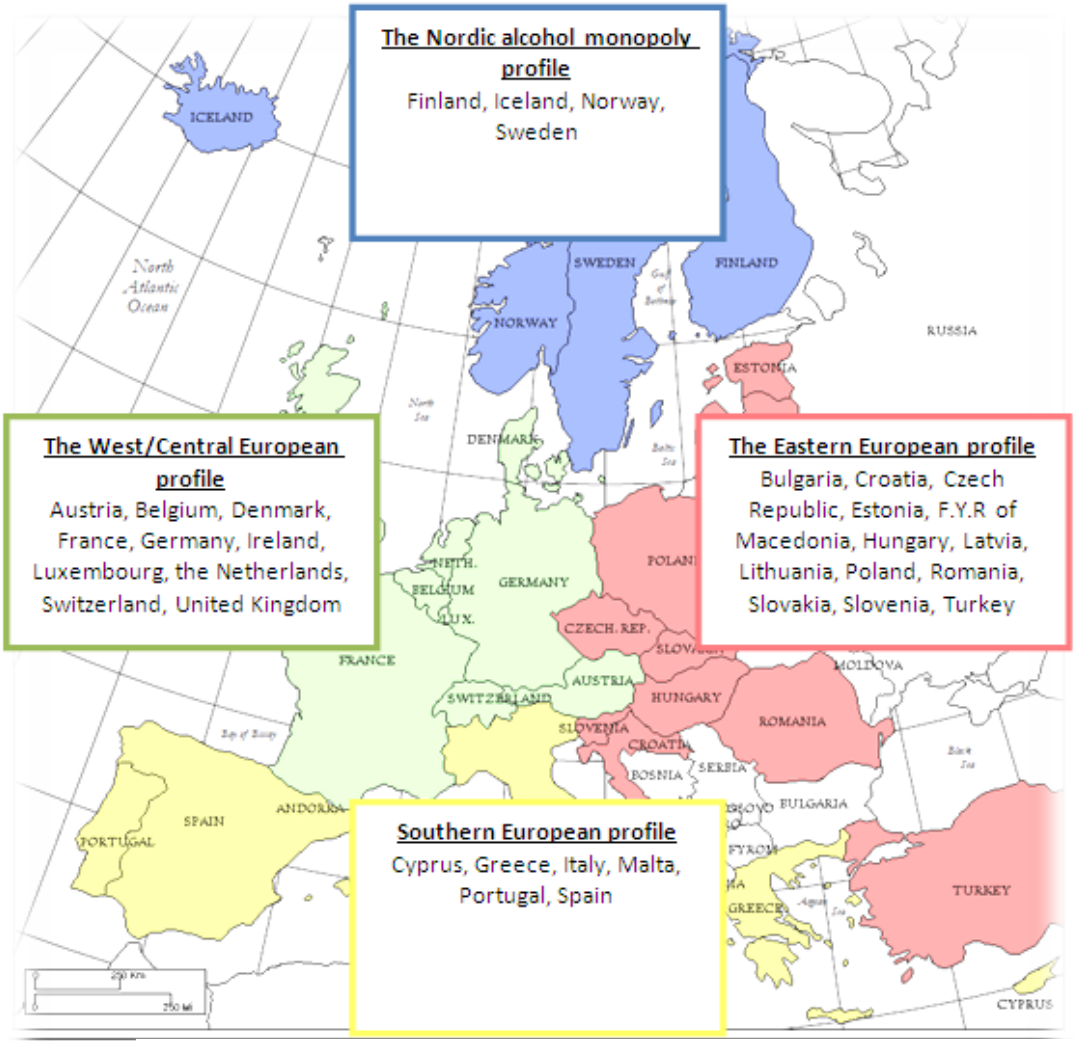
Figure 1. Ranking of alcohol policies



The medium alcohol policy group consists of 11 countries below the 66th percentile (break point 101), whereas only four countries were classified as high alcohol policy countries. It hardly comes as any surprise that the countries with high alcohol policy scores are the Nordic countries that still have retail alcohol monopolies. The medium policy countries are a more heterogenic group that comprises three old EU member states (France, Ireland and the United Kingdom), six EU member states situated in the Eastern part of Europe, and the EU applicant countries Croatia and Turkey. The third and largest group is formed by the low-alcohol policy countries, which is also heterogenic considering geography, culture and history.

Another way of categorizing the countries is to divide them into four profiles according to drinking patterns, consumption levels and historical background (Shield et al. 2012; Figure 2).

Figure 1. Regional alcohol policy profiles in Europe[2]



Map provided by Cartographic Research Lab, University of Alabama

The four alcohol policy profiles are: the Nordic monopoly profile, the eastern European profile, the west-central European profile and the southern European profile. They all have diverse

2 Finland, Iceland, Norway and Sweden form a Nordic group. Originally Shield et. al also included Denmark in this group, but the fact that Denmark lacks a retail monopoly makes it structurally very different from the other Nordic countries.

characteristics as well as different strengths and weaknesses when looking at separate subcategories of alcohol policy (Table 2).

Table 2. Scores for the regional alcohol policy profiles, according to category (percentage of maximum points for that particular category in brackets)

	I. Starting Points	II. Control of production, retail sale and distribution of alcoholic beverages	III. Age limits and personal control	IV. Control of drunk driving	V. Control of advertising, marketing and sponsorship of alcoholic beverages	VI. Public Policy	VII. Alcohol taxation and prices	Total
Max points	**0**	**40**	**24**	**24**	**24**	**8**	**40**	**160**
The Nordic monopoly profile	-	24.3 (61 %)	19.5 (81 %)	14.5 (60 %)	14.5 (60 %)	6.5 (81 %)	40.0 (100 %)	119.3 (75 %)
The eastern European profile	-	12.8 (32 %)	17.1 (71 %)	11.4 (47 %)	9.2 (38 %)	5.5 (69 %)	16.9 (42 %)	73.0 (46 %)
The west/central European profile	-	9.4 (24 %)	11.0 (46 %)	8.2 (34 %)	3.6 (15 %)	6.4 (80 %)	22.4 (56 %)	61.0 (38 %)
The southern European profile	-	11.1 (28 %)	10.0 (42 %)	8.7 (36 %)	4.5 (19 %)	6.7 (83 %)	12.3 (31 %)	53.3 (33 %)

The Nordic Alcohol Monopoly profile receives the highest scores for all categories except one. It also has the highest total score of 119.3 out of a possible 160. This profile has a lead over the other profiles especially in the second subcategory measuring the control of production, retail sale and distribution of alcoholic beverages, and in the seventh category measuring alcohol taxation and prices. The taxation tool can be applied for several different reasons, to meet for example fiscal, social order or public health interests, and the taxation levels vary a lot in Europe as the scores for the seventh subcategory show (see e.g. Österberg 2012).

We can, however, conclude that despite all the fundamental changes regarding physical and economic alcohol availability that the Nordic countries have encountered during the past few decades (Cisneros Örnberg & Ólafsdóttir 2008), the physical and economic availability in these countries is still restricted through retail monopolies and high taxes and prices.

Age-limits are also strictly regulated in the Nordic countries compared to the rest of Europe. Iceland, Norway, Sweden and Finland all have some age limits for alcoholic beverages set at 20 years, which gives them clearly the highest points in comparison. It is, however, also worth mentioning that the Eastern European profile scores highly in this category. None of the countries belonging to this profile have lower age limits than 18 years, whereas many countries in west and southern Europe have set age-limits of 16 years or even lower.

The points are fairly equally divided among the four profiles regarding control of drunk driving. Again, the Nordic monopoly profile scores highest with 14.5 points, while the west/central European profile scores the lowest with 8.2 points out of a possible 24. This is mainly explained

by the high BAC limits (0.08 %) in Ireland and United Kingdom, which lowered the score for the west/central Profile. However, in November 2011, and after the AMPHORA scale was created, Ireland has lowered the BAC limit to 0.05%.

Most of the countries included in the AMPHORA scale have fairly similar drink-driving policies. Twenty-two countries have set a BAC limit of 0.05% (only three countries had a limit of 0.08 % and eight countries, 0.02%), most countries have random breath testing in use, and a great majority of all the countries did not use alcohol ignition locks in 2010. This means we did not find huge variations between the four profiles when comparing drink driving policies.

Category number five dealing with control of advertising, marketing and sponsorship of alcoholic beverages shows that there are vast differences on how these issues are governed throughout Europe. Voluntary restrictions, in place in many European countries, did not generate any points in the scale because they can easily be trespassed or changed (Babor et al. 2010). This is the reason why the west/central European profile and the southern European profile show remarkably low scores for this category, only 3.6 points and 4.5 points respectively out of a possible 24. France is an exception in its group because of Loi Évin, a strict law regulating alcohol advertising. Countries both in the west/central profile and in the southern profile have long traditions of wine and beer producing. Strong industries tend to have interests to preserve their own markets and prevent or delay restrictions that would cause them to sell less of their products (Bond & Daube & Chikritzhs 2010). Hence, the strong presence of the alcohol industry in southern and Western Europe could at least partly explain the lack of strong advertising restrictions.

“Public Policy”, was the narrowest subcategory and could generate a maximum of 8 points including questions on alcohol strategies, authorities and information campaigns. All four country profiles came out with high scores for this category, with the Mediterranean countries at the top (6.7 points out of 8).

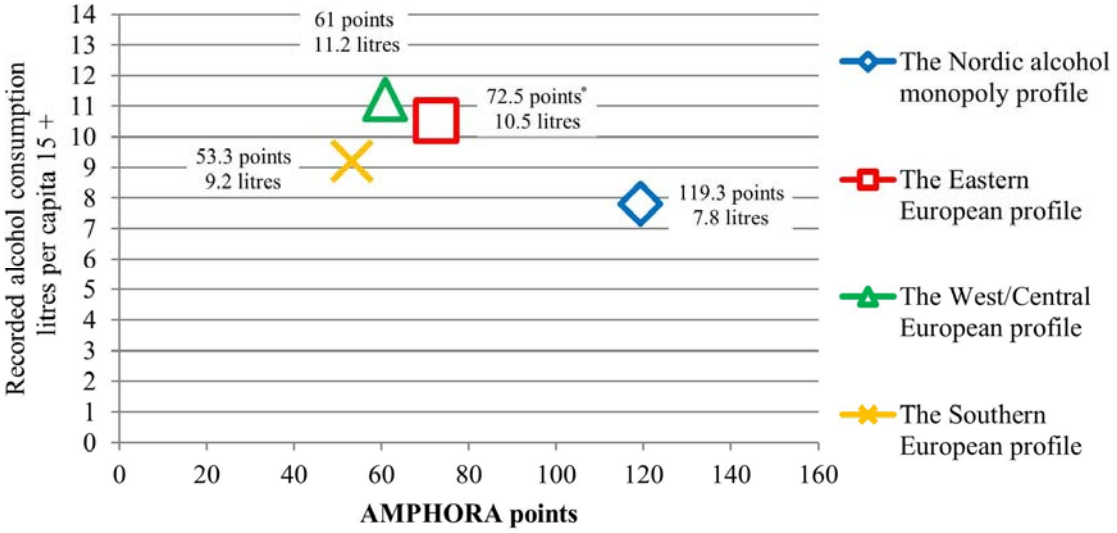
In order to conclude whether the policies implemented in the different countries are not only comprehensive, but also effective, we need to look at the alcohol consumption levels to see whether or not the implemented alcohol policies regulate the consumption in a desired manner. There is an established link between total alcohol consumption and alcohol-related harm, meaning that alcohol policies can be used to limit consumption, and improve public health (Bruun et al 1975).

When combining alcohol consumption data and the alcohol policy score, the Nordic alcohol monopoly countries have the highest score on alcohol policy (119.3) and the lowest consumption level (7.8 litres per capita 15 +). The eastern (10.5 litres/72.5 points) and west/central European profile (11.2 litres/61 points) are placed linearly in relation to the Nordic countries, suggesting that a higher alcohol policy score equals lower alcohol consumption. The southern European profile turns out to be a deviant case as it receives the lowest mean score for alcohol policy (53.3) and still has the second lowest consumption level (9.2 litres). The low alcohol policy score is mainly explained by low alcohol taxes (zero on wine in most countries), liberal marketing restrictions and weak physical control on alcohol availability (Figure 3).

It is worth pointing out that the alcohol consumption in southern Europe has been declining for some time now and, at the same time, changes in drinking patterns have occurred. Wine consumption especially has been decreasing since the 1970’s, and for example in Italy, the drinking patterns amongst young people are starting to look like the ones traditionally found in the West, with beer and spirits consumption on the rise (Allamani, Beccaria & Voller 2010).

This is also the case in Spain where the "*botellón*" phenomenon has become a part of the young people drinking habits (Gual 2006).

Figure 3. Consumption and policies [3]



There is, however, no direct causal link between changes in alcohol policy and alcohol consumption. Instead the relationship between these two seems quite complicated. For example, Italy set its first BAC limit only in 1988, and the first decree on guidelines for prevention and treatment for alcohol problems came only in 1993 – many years after the consumption started to fall. This "Mediterranean Mystery", which cannot be explained by alcohol policies, has instead been accounted for by changes in society. One contributing factor has been urbanization, while changes in work organization is another one (Allamani & Prina 2007).

What does this mean?

The results from the AMPHORA alcohol policy scale show us that there are great differences in how alcohol is governed throughout Europe.

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, 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. Having the "least hazardous" drinking patterns compared to other European countries is another reason why the southern European countries should be regarded as the exception proving the rule (Shield et al. 2012).

When using policy scales, one should remember that there are some built-in problems with the methodology. First of all, it is hard to quantify and reduce complex policies into numbers

3 Latvia excluded from the profile due to lack of consumption data

that are trustworthy and internationally comparable. It is also tricky to measure the degree of enforcement, and including informal control practises in a scale should be avoided altogether. An attempt to measure enforcement was included in the AMPHORA scale derived from the WHO material, but only for a limited number of policies (BAC limits and advertising restrictions). It is hard to get objective data on how well policies are enforced, and in the end the enforcement estimates did not have any greater effect on the final scores in the AMPHORA scale. However, it is something worth looking closer at in future research.

It's also good to keep in mind that the scales measure formal, national policies and therefore, the differences between regions/cantons/länder etc. are not taken into account.

Despite several built in flaws, the pros of the scaling approach still clearly outweigh the cons. The scale gives us a large amount of data in numerical form, which makes it a strong tool in communicating with the public or politicians. With the help of scales it is easy to compare and rank countries, as well as getting an overview of the alcohol policies implemented in Europe.

Take home messages

1. The scale, which also serves as a tool for information gathering, translates formal alcohol policies into a single quantifiable figure, making it a strong tool in communicating with the public or politicians.

2. The results should be interpreted with caution, acknowledging the built in weaknesses of the scaling approach.

3. Although there are signs of convergence regarding both alcohol consumption and alcohol policies, there are still immense differences on how alcohol is governed in Europe.

4. Despite a turn towards more liberal alcohol policies during the past few decades, the four Nordic alcohol-monopoly countries still have by far the strictest policies in Europe.

5. With the exception of the Southern European Profile countries, higher alcohol policy scores, i.e. more strict and comprehensive alcohol policies, are strongly associated with lower alcohol consumption.

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CHAPTER 4. POPULAR NORMS, ALCOHOL POLICY AND DRINKING BEHAVIOUR

Sturla Nordlund

Summary

The aim of this chapter is to study the dynamics between the informal rules (norms) for alcohol consumption and the formal rules (alcohol policy) in different parts of Europe. The norms for drinking were measured by a method which had proved efficient to show changes over time in drinking norms in Norway. The same method was supposed to be applicable for measuring differences in norms between countries. The method was to present 18 descriptions of drinking behaviour to representative samples of the populations in seven countries representing different alcohol cultures in Europe. The descriptions were obtained by systematically varying three levels of frequency, three levels of intoxication and two levels of sociability (alone or with friends). The respondents were asked if they would characterize each of the described drinking behaviours as "alcohol abuse" or not. The mean number of descriptions characterized as "abuse" is seen as an indication of the general "normative climate" for alcohol consumption in each country. The formal rules, or more precisely the comprehensiveness and strictness of the alcohol policy in each country, was measured by a new scale developed within the AMPHORA project by Karlsson, Lindeman and Österberg (2012). A comparison of these two types of rules showed a complementary relation: where the norms are strict the policy is more liberal, and vice versa. A similarity in the "normative climate" between neighbouring countries was also shown, indicating that areas of relatively uniform alcohol cultures exist in different parts of Europe.

Introduction

When people from Scandinavia travel in southern Europe, they see excessively intoxicated people less often than in their home countries. At the same time they experience that there are very few formal rules for sale, serving and use of alcoholic beverages. In Scandinavian countries, traditionally, these areas have been regulated much more strictly by alcohol policy measures, and the price of alcohol has been considerably higher (Karlsson & Österberg 2001, Holder et al. 1998). However, excessive intoxication seems to be much more common in the Nordic countries than in southern European countries (Anderson & Baumberg 2006). This can be seen as quite paradoxical.

To a large extent, the way people behave is governed by norms and rules that can be more or less formalized. When norms are violated different kinds of sanctions may come into force. Norms and rules are social constructs, which sometimes are rationally motivated. However, they may be completely irrational in the sense that they do not serve any particular purpose except the possible pleasure of experiencing the distinction between those who follow the norm and those who do not. For instance, fashion in clothing and hairstyles are examples of quite irrational norms, while alcohol policy measures are assumed to be rationally motivated. Hardly any norms seem to be universal in the sense that they apply to all cultures at any time.

Neither will all norms apply in all groups of a society. There will often be great variation between individuals and groups.

The relationship between the prevailing norms in a society and people's behaviour can be described as a feedback process. Informal norms govern behaviour by use of informal sanctions when the norms are violated. These sanctions vary widely in severity, from a disapproving look, expressed concern, objurgation, avoidance and social isolation, to bullying and beating. But if the violations continue and become more common, this may have an influence on the norms, and the norms may be changed. In the alcohol field, people seem to have quite distinct views on what is acceptable and unacceptable, normal and deviant, use and abuse (Heath 1995; Greenfield & Room 1997). But also here there are large individual differences and changes over time. A study from Norway has demonstrated considerable changes in the perception of "alcohol abuse" over a period of more than 40 years; a clear liberalization in norms has taken place (Nordlund 2008).

Formal rules and sanctions are also important for regulating people's behaviour. There are formal rules for sale, serving and use of alcohol in all European societies, but these rules vary both within and between countries and over time. Variation within a country is obvious in the Nordic countries, where several alcohol policy measures are decided on locally in the municipalities. Therefore, there are large differences, for instance, in the density of on-premise and off-premise outlets, opening hours and control of age limits. This can be seen as an indication of a good adjustment of alcohol policy to local attitudes and norms. But local attitudes and norms also have a direct impact on drinking practices. Where norms are most restrictive people also drink less. What is then cause and what is effect in this interaction? When it comes to regulating drinking practices, are people's informal norms or alcohol control policy most important?

This question can also be asked on a more global level. In all countries, the main determinant for how politicians act, and how alcohol policy is shaped and expressed in formal laws and regulations, is the common perception of "the alcohol problem". Apart from personal experience, "common perceptions" are shaped through the public debate around presentations in the media of specific incidents, statistics, research reports and other kinds of reports, and statements from influential persons. A central concept in the public debate on "the alcohol problem", and on alcohol policy in general, is "alcohol abuse". Everybody agrees that "alcohol abuse" should be reduced, but when it comes to political practice, it seems very difficult to agree both on the meaning of "alcohol abuse" and on the measures to reduce it. Therefore variation in policies arises. This is obvious when we look at the political debate within each country, but here, again there are great differences between countries. Karlsson and Österberg (2001) and others (Davies & Walsh 1983; Anderson & Lehto 1995), have shown that there is great variation in the comprehensiveness and strictness of alcohol policy between different European countries. They have also shown great changes in the policies over time. However, the differences in alcohol culture still seem to endure. Therefore, it is interesting to study the dynamics between formal and informal rules for alcohol consumption and behaviour in more detail. There are at least two possible hypotheses:

The first hypothesis is that alcohol policy in a country is a direct consequence of the popular norms in the country, so that restrictive norms lead to restrictive policy and liberal norms lead to liberal policy. We can call this the *congruence hypothesis*.

The second possible hypothesis is that the informal norms in some countries are very liberal so that alcohol policy must be restrictive in order to keep alcohol problems at an acceptable level. On the other hand, the informal norms may be so restrictive that introduction of a restrictive

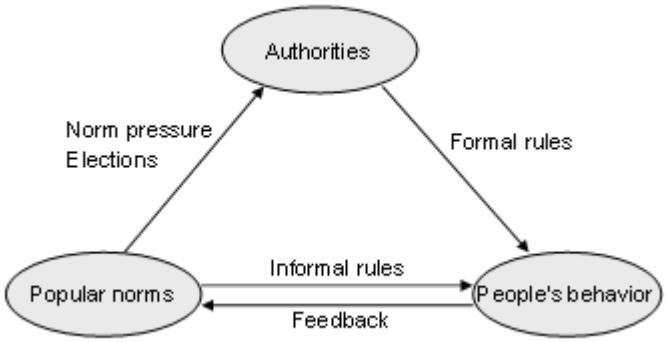
alcohol policy is not necessary. In this case the formal rules are seen to be complementary to the informal rules: if one is liberal the other must be restrictive in order to keep "the alcohol problem" at an acceptable level. We can call this the *complementary hypothesis*.

What we did

The aim of this AMPHORA research was to study the dynamics between formal and informal rules for alcohol consumption and behaviour empirically, and to try to decide which one of the two hypotheses above (if any) provides the best explanation of the relationship between popular norms, policy and behaviour.

The relationship between formal rules (alcohol control policy), informal rules (norms/attitudes) and drinking behaviour can be expressed as shown in the following simplified model:

Figure 1. Links between popular norms, policy and behaviour



The figure illustrates the connection between norms/attitudes and behaviour as a feed-back process. However, the shaping of formal rules is not seen as a direct response to people's behaviour, but is influenced by people's attitudes to different kinds of behaviour. This influence comes from public discussions in the media, or from strong organizations, which puts a normative pressure on politicians. In the longer perspective, the shaping of formal rules is also influenced by replacement of politicians at elections.

In order to study the dynamics of this model, we need to define more precisely and to operationalize the concepts which have been used for the general description of the model. Of course, it is difficult to give precise and measurable definitions for the informal rules (norms/attitudes) and the formal rules (alcohol control policy). However, this has been the aim of two recent studies that are part of the AMPHORA project. The norms in seven European countries were compared by Nordlund and Østhus (2012) and the policies were compared by Karlsson, Lindeman and Österberg (2012). This article is based on the results from these studies.

Comparing "normative climates"

The method that was used to compare norms was originally developed by Lise Paulsen (1969) for comparing drinking norms in different parts of Norway. In order to study the development of these norms over time, the same method was used on two other occasions by Arner (1993) and Nordlund (2008). This revealed a clear liberal development in drinking norms in Norway over a period of more than 40 years. It was a natural idea to use the same method for comparing alcohol norms in different drinking cultures (countries).

The method is based on the central concept of "abuse", and how people in different societies distinguish between "normal use" and "abuse". It was assumed that alcohol habits could be described using three dimensions: frequency, quantity and context. However, the quantity dimension was seen as inadequate, since a certain quantity of alcohol can affect different people differently, depending on their gender and weight. Therefore, this dimension was changed to intoxication, which was seen as more adequate. These dimensions were divided into levels in the following way:

- Three levels of frequency: "a couple of times a week", "a couple of times a month" and "a few times a year".
- Three levels of intoxication: "mildly", "fairly" and "strongly".
- Two levels of context: "alone" and "with friends"

Of course, there are problems with describing drinking habits using a limited number of concepts like these. The validity of these dimensions and levels for a sufficient and precise description of alcohol habits in different languages is discussed more thoroughly in the above-mentioned article by Nordlund and Østhus, and is not repeated here.

The different levels were combined into 18 (= 3 x 3 x 2) statements describing drinking habits, which range from the most cautious: "Drinks a few times a year with friends and gets mildly intoxicated", to the most extreme: "Drinks a couple of times a week alone and gets strongly intoxicated". The 18 statements represent a scale on which the respondents can indicate if they would characterize each statement as "alcohol abuse", "not alcohol abuse" or "uncertain". When the response to a statement was "uncertain", the statement was presented once more to the respondent at the end of the session.

The statements were presented written on cards in a random order (but in the same order for all respondents and all countries) to representative samples of the population in seven countries. In order to have a large variation in cultural norms, it was decided to include two Nordic countries (Finland and Norway), two countries from central Europe (Germany and Poland), and three Mediterranean countries (Italy, Spain and Slovenia). However, Italy was represented only by the region of Tuscany, which for the sake of convenience will be called a country in this article. The samples consisted of about 1000 respondents aged 15 years and over from each country. The interviews were conducted in 2010 for all countries except Norway (2006) and Tuscany (2011). For each country the mean number of descriptions of drinking habits that were characterized as "abuse" was calculated, and this number formed the basis for the comparisons between countries. The mean values were seen as indices characterizing the general "normative climate" for alcohol consumption in each country.

Comparing alcohol policies

A comparison of the comprehensiveness and strictness of the alcohol policy in different countries was made according to a new scale developed by Karlsson, Lindeman and Österberg (2012). This scale is a further development of the previous scale developed by Karlsson and Österberg (2001), because more aspects of the policies are considered and it includes an assessment of how the formal rules are enforced in the different countries. The scale is a sum score of six different categories of alcohol policy measures. The two main categories are a) *control of production, retail sale and distribution*, and b) *alcohol taxation and price*, which weigh 25 per cent each in the total score. The other categories are: c) *age limits and personal control*, d) *control of drunk driving* and e) *control of advertising, marketing and sponsorship of alcoholic beverages*, which weigh 15 per cent each, and f) *public policy*, which weighs 5 per cent. The six categories are divided into several subcategories, presented in a questionnaire, which was filled out by experts in each country. The countries were given points for each

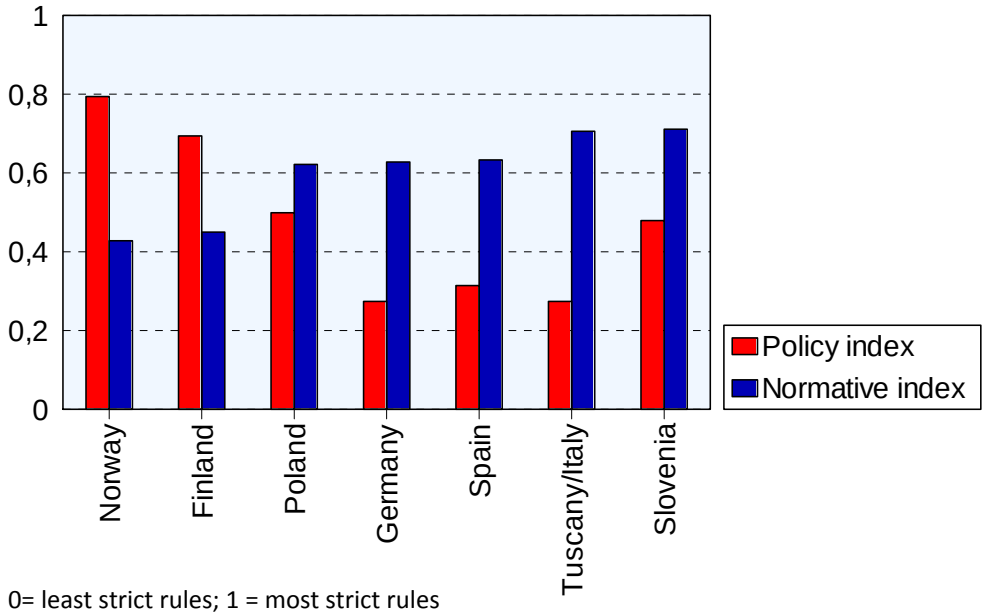
subcategory of restrictions that were in place. The maximum number of points a country could have is 160. The scores for the seven actual countries are presented here by permission of the constructors of the scale.

An interesting aspect of this study is the comparison between the formal and informal rules that are assumed to regulate alcohol consumption, and the drinking patterns themselves. This is a difficult task, because we lack relevant data on drinking patterns that are comparable between countries. The only relatively credible data source is recorded alcohol consumption in the different countries. But in addition we have consumption from unrecorded sources. These sources are not very reliable for comparative purposes due to different estimation methods in different countries. Nevertheless, mean consumption is not the most interesting feature of drinking habits in relation to formal and informal rules. It is not drinking itself that is important to other people and to legal authorities, but the problems it generates. Therefore, what is needed is comparable data on different types of alcohol-related behaviour that could be seen as problematic or worrying and cause reactions, either from the general public (normative response) or from the authorities (formal rules and laws), or from both. This type of data is scarce, and not very reliable for comparisons. The most comprehensive meta-study on these topics is probably the report of Anderson and Baumberg (2006), and their conclusions are used here.

What we found

In order to compare the strength and strictness of formal rules (alcohol policy) with the strength and strictness of informal rules (norms/attitudes), the indices for these conditions were transformed to a common scale. By dividing both indices by their maximum value (18 for the norm index, 160 for the policy index), the two indices were normalized to the interval (0,1) in each country. Figure 2 shows both indices for each country.

Figure 2. Indices for the strictness of formal and informal rules for drinking behaviour in 7 countries



0= least strict rules; 1 = most strict rules

The countries shown in the figure are ranged according to increasing normative index. The normative indices seem to lie on three different levels, forming three groups of countries: They are lowest for the two Nordic countries, higher for Poland, Germany and Spain, and highest for Tuscany and Slovenia. The differences between these three levels are statistically significant

(Nordlund & Østhus 2012). Each group contains only neighbouring countries (with the exception of Spain, which has no neighbouring country here), indicating the existence of different areas of relatively homogeneous alcohol cultures in Europe.

The policy indices are contrary to the normative indices; when the normative index is low, the policy index is high, and vice versa. If we compare the Nordic countries with Germany, Spain and Tuscany/Italy, this is very obvious. The policy indices in Poland and Slovenia lie in-between the policy indices in the Nordic countries and the three other countries. Although the normative indices are relatively high in Poland and Slovenia, the policy indices are also relatively high, though not as high as in the Nordic countries.

In their report, Anderson and Baumberg (2006) summarize European drinking patterns in four points:

- People in southern countries prefer wine, while people in central and northern countries prefer beer.
- People in southern countries do more of their drinking with meals than people in other countries.
- People in southern countries drink alcohol more often than people in northern countries.
- Binge drinking and drunkenness are more common in northern countries than in southern countries.

In other words, and even though there are exceptions to this main conclusion, their study supports the common impression of a north-south gradient in drinking habits: drinking on more occasions, especially of wine and with meals, but less drunkenness in the south, and vice versa in the north of Europe.

What does this mean?

The results seem to support the complementary hypothesis: While the Nordic countries have strict alcohol policy measures, the "normative climate" seems to be quite tolerant for drunkenness. In Germany, Spain and Tuscany/Italy it is the other way round: The norms for drinking behaviour are rather strict, corresponding to a more decent behaviour, while the formal rules are more liberal. The norms in Poland and Slovenia come in a middle position: While the informal norms are rather strict, and quite similar to those in the neighbouring countries, the formal rules are stricter than in the neighbouring countries. This might be seen as a remnant from the quite recent communist period of these two countries. In this period, many areas were controlled by more formal rules, including the area of alcohol. Probably the authorities in these countries do not see it as rational to abandon these rules, especially since all other European countries are either continuously introducing stricter rules (Karlsson & Österberg 2001), or stricter rules already apply (the Nordic countries).

The question is how to interpret this finding in causal terms. Is it *because* people in the Nordic countries are so tolerant of drunkenness, and therefore do not behave in an acceptable way under the influence of alcohol, that control policy has to be strict and comprehensive? And is it *because* people in southern Europe have strict norms and therefore behave in a civilized and orderly way even when they are drunk, that they do not need a strict policy?

Or is it the other way round: Are drinking norms and behaviour a reaction to the formal rules, so that people in the north drink seldom but heavily and to intoxication, just because the rules try to prevent them from doing so? And when the formal rules are so liberal in the south, does that make it necessary for people to develop informal rules just to survive in a civilized society?

It is not easy to answer these questions. Probably there is no clear answer, because cultural norms, policy and behaviour have developed over centuries as a process of mutual influence. The different powers that have dominated parts of Europe throughout history have all made their cultural mark, including on alcohol-related norms, rules and behaviour. Religious and ideological ideas and domination have also had an influence in different parts of Europe in different ways. So it is not surprising that drinking cultures have developed differently.

However, at the moment both alcohol control policies and the levels of alcohol consumption seem to be converging slowly among European countries (Karlsson & Österberg 2001; Leifman 2001, 2002; Simpura & Karlsson 2001). But there are still great differences in drinking norms and habits, and we do not know much about the trends in these differences. We know that norms for drinking have developed in a clearly liberal direction in Norway, at least since the 1960s (Nordlund 2008), but in other countries little is known.

One might ask whether modern alcohol policy, as a result of the dominating place of the single distribution theory, has become too focussed on total consumption as the only policy indicator of interest. If total consumption is low, policy is assumed to be efficient and satisfactory. But as we have shown, general norms for drinking are also important, maybe not for curbing total consumption, but for developing more sensible and safer drinking habits, which might reduce the problems and injuries connected with intoxication and drunkenness.

Finally, it must be underlined that the conclusions in this article are based on data from seven countries only. This might be seen as a too fragile basis for general conclusions. On the other hand, the countries participating in this study were deliberately chosen as representing different alcohol cultures. The similarity of norms in neighbouring countries indicates that such areas of relatively uniform alcohol cultures really exist in different parts of Europe. Other countries would therefore probably represent the same cultures, and therefore would not add much to the conclusions. But, of course, more data and more studies would have increased the reliability of the results.

Take home messages

1. Areas of relatively uniform alcohol cultures seem to exist in Europe.
2. In Europe, norms for alcohol consumption generally seem to be more restrictive in southern countries than in the northern countries.
3. There seems to be a complementary relation between the informal norms for alcohol consumption and the formal alcohol policy in the European countries: where the norms are restrictive the policy is relatively liberal, and vice versa.

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CHAPTER 5. BALANCE OF POWER IN ALCOHOL POLICY. BALANCE ACROSS DIFFERENT GROUPS AND AS A WHOLE BETWEEN SOCIETAL CHANGES AND ALCOHOL POLICY

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Summary

This chapter describes the forces that have shaped alcohol beverage consumption, and the resulting harmful consequences in Europe during the last 50 years. It shows that planned alcohol policies impact on alcohol consumption and alcohol-related harm at a population level. However, it also shows that a number of economic, cultural and political forces, that were not specifically planned to prevent alcohol problems, also impact alcohol consumption in different countries. Considering the whole spectrum of these intervening factors could help alcohol policy planners to design the most effective interventions in their countries and jurisdictions.

Introduction

Alcohol policy today is an established body of science and practice. Over the years, an increasing scientific literature has identified evidence-based policies that can reduce the harm done by alcohol to individuals and societies (Bruun et al., 1975; Edwards et al., 1994; Babor et al., 2010). Recently, Anderson et al (2012) for the WHO recommended: a) increasing the price and taxes of alcoholic beverages, which would affect all kinds of drinkers and would reduce alcohol-related deaths; b) reducing alcohol retail availability and exposure to alcohol in advertising and marketing communication; c) setting and enforcing legal drinking-age limits; and d) introducing or reducing legal blood alcohol concentration levels for driving. While these conclusions would support the dissemination and implementation of these policies across Europe, some problems may ensue when policies are transferred from one country to another; local drinking habits need to be taken into account when planning alcohol policy measures (Österberg, 2012).

One characteristic alcohol consumption data clearly shows is that the consumption of alcoholic beverages changes in Europe over time (Anderson et al 2012). This leads to a series of questions: how and why do they change? How do control policies affect these changes? To what extent do liberalizing policies drive consumption? How do changes in alcohol consumption occur without any alcohol policy, that is, as a consequence of other unplanned contextual factors?

This chapter presents a study which examined 12 European countries during the period 1960-2008. The aims are to understand *which* forces have shaped alcohol beverage consumption, what changes have occurred over time, and what the resulting harmful consequences have been in these countries. The focus is both on alcohol policy and on other determinants

affecting alcohol consumption in a country. The thesis are that the impact of evidence-based alcohol prevention policies will vary by country and by time period, this variation often being due to the impact of wider social, economic and cultural forces.

What we did

We studied twelve European countries (Allamani et al. 2011), grouped geographically as shown in Table 1.

Table 1. European countries involved in the study

Northern countries	***Central countries***	***Western countries***	***Eastern countries***	***Southern countries***
Sweden	Austria	UK	Hungary	France
Norway	Switzerland	Netherlands	Poland	Spain
Finland				Italy

The research team posed the following questions:

1. How do alcohol policies affect alcohol consumption?
2. How do unplanned factors affect alcohol consumption?
3. To what extent do unplanned factors and alcohol policies explain changes in alcohol consumption?
4. How do policies and unplanned factors affect alcohol-related deaths?
5. What are the similarities and differences between the 12 European countries included in the study, with regards to the 4 points above?

Data were collected in each country for the period 1960–2008 for the following factors (Allamani et al., 2011):

- Alcohol consumption per capita by type of beverage;
- Deaths from chronic liver disease and cirrhosis, and transport accidents;
- Policy measures: 9 main types of alcohol policy measures, regarding availability, taxes, drunk driving, advertising, country-wide prevention plans (see Table 2);
- *Unplanned* factors: 21 main types of social, cultural, economic, demographic, political, health and religious determinants of alcohol consumption changes (see Table 3). Prices of alcoholic beverages were considered as part of market strategies by the alcohol industry, and were therefore treated as unplanned variables. Border import of alcohol, which to a great degree depends on price differences between countries, was also considered an unplanned variable.

Table 2. Main types of alcohol policy measures investigated in the 12 study countries (1960 – 2008)

1. Taxes
2. Advertising control
3. Availability: minimum age to buy alcohol; licensing rules for selling places and trading hours
4. Drink driving - BAC
5. National prevention plans
6. Enforcement
7. Nationwide education programs
8. Community projects
9. Development of alcohol - treatment programs

(For operationalization, see Allamani et al 2011)

When lacking national information, data were complemented by information from the following international sources: the World Bank, Eurostat, and the Organization for Economic Co-operation and Development (OECD).

Unplanned factors were classified in three categories:

- Factors with relatively large amount of data for most countries, including: age group (operationalized as proportion of males over 65 of age), level of education for women, employment status of women, mean maternal age at all births, proportion of urban versus rural living, per capita income, price of alcohol beverages, and price of food items. These factors turned out to have data for at least once every 5 years from about 1960 to 2008, for all countries.
- Factors for which only a limited amount of data was available in most countries over time, such as migration, single parent/single household, water/soft drink consumption, smoking.
- Factors with little data, data limited to only a few countries, or qualitative descriptors, such as major socio-political and economic changes, border trade and travellers' imports of alcoholic beverages, tolerance of intoxication, and secularization.

Table 3. Main types of alcohol unplanned factors investigated in the 12 study countries (1960–2008)

1. Demographic Issues	12. Food consumption
2. Urbanisation	13. Price of food items
3. Migratory movement from other countries	14. Household expenditure on food
4. Education	15. Density of on & off licensed premises selling alcohol
5. Employment	16. Social attitude towards alcohol
6. Income	17. Major socio-political & economic events
7. Age of women at childbirth	18. Motor road traffic density
8. Price of alcohol beverages	19. Secularization
9. Household expenditure on alcohol	20. Smokers
10. Alcohol advertising	21. Border import of alcoholic beverages
11. Impact of alcohol industry	22. Unintended counter-effects like methanol intoxication

(For operationalization, see Allaman et al 2011)

Method of analysis

Multiple imputation of missing entries

A Multivariate Imputation by Chained Equations (MICE) was carried out in order to account for missing information (Raghunathan et al., 2001). Variables with more than 40 missing values (on a series of 50 values) were removed from the dataset. The limit of 40 was chosen to maintain variables with values every 5 years. Separate multiple imputation were done by country. Separate regression analyses were performed on the 5 complete datasets produced by the MICE technique, and the results were combined according to the methods of Little et al (2002).

Modelling the effect of policy measures

The effect of each policy measure, adjusted for the effect of unplanned factors, was estimated by introducing the same value, i.e. 0 before the year of the introduction of the policy and 1 in the following time period. In this way, each policy measure was considered to have an immediate and constant effect over time, with no accumulation with other policy measures which could be implemented before, during, or after.

Modelling the effect of the unplanned factors

For each of the 12 countries, a linear regression model was specified for log alcohol consumption, controlling for log transformed income, proportion of males over 65 of age, and prices of alcoholic beverages. A time trend was added to capture long- term consumption changes that could be related to unobserved factors.

Then, four unplanned factors, which were identified on the basis of optimal data coverage (female education, female employment, urbanization, and mother's age at childbirth), were inserted in the model one at time, after a logarithmic transformation. Since the effects of the unplanned factors were expected to be delayed, the mean value between the values of each factor in the current year and in the two preceding years was taken into account. The AIC (Akaike information criterion) for each of the resulting four models was calculated (AIC measures the parsimony of models: a lower AIC value indicates a better model).

Partial correlation

In order to check the overall relative role of each of the two groups of factors in explaining the alcohol consumption changes, and the alcohol- related harm, the partial square correlation coefficients between consumption and harm on the one hand, and policies taken together, and unplanned factors taken together, on the other hand, were calculated for each country.

What we found

In general, the results of the analysis of alcohol consumption and the selected main *policy measures* support previous observations that policies impact alcohol consumption over time. For the *unplanned variables*, the results support the thesis that urbanization, mean maternal age at childbirths, and female employment, as indicators of general changes in society, impact alcohol consumption.

As space does not permit a description of all 12 countries, we contrast the examples of Finland and Italy. The results for Finland were similar to those for Norway and Sweden. The results for Italy were similar to those of France and Spain as to the effect of the unplanned factors, but differed from them concerning the effect of planned measures, as in France and Spain alcohol policy measures were found to impact alcohol consumption generally in the expected direction.

Results from two countries: *FINLAND*

Policies

Figure 1 plots the development of total recorded and unrecorded alcohol consumption in Finland during the last five decades. The first dramatic change in consumption occurred in 1969, when a new, more liberal alcohol act came into force. In just one year, consumption increased by 46%. Another peak in total alcohol consumption occurred in 1995 when Finland joined the EU and introduced new more liberal alcohol legislation. This resulted in a 10% increase in total alcohol consumption; this was due mainly to increased quotas for traveller's alcohol imports. In 2004, a large tax-reduction for all alcoholic beverages, but particularly spirits, led to another 10% increase in total alcohol consumption.

Statistical analysis of three selected policy measures gives comparable conclusions. Table 4 shows that, when controlling for the effect of unplanned factors, the two 1969 liberalizing policies (reducing minimum age of purchase and allowing sales of medium strength beer in grocery stores) were associated with increases in recorded alcohol consumption. Overall, however, Finnish alcohol consumption has to a large extent been driven by changes in alcohol

taxation. This is not presented separately in Table 4, since it is included in the analyses controlling for changes in alcohol prices, as an unplanned factor.

Figure 1. Selected policy measures and total recorded and unrecorded alcohol consumption (litres of pure alcohol per capita) in Finland - 1958–2011 – Source: Official Statistics, Finland

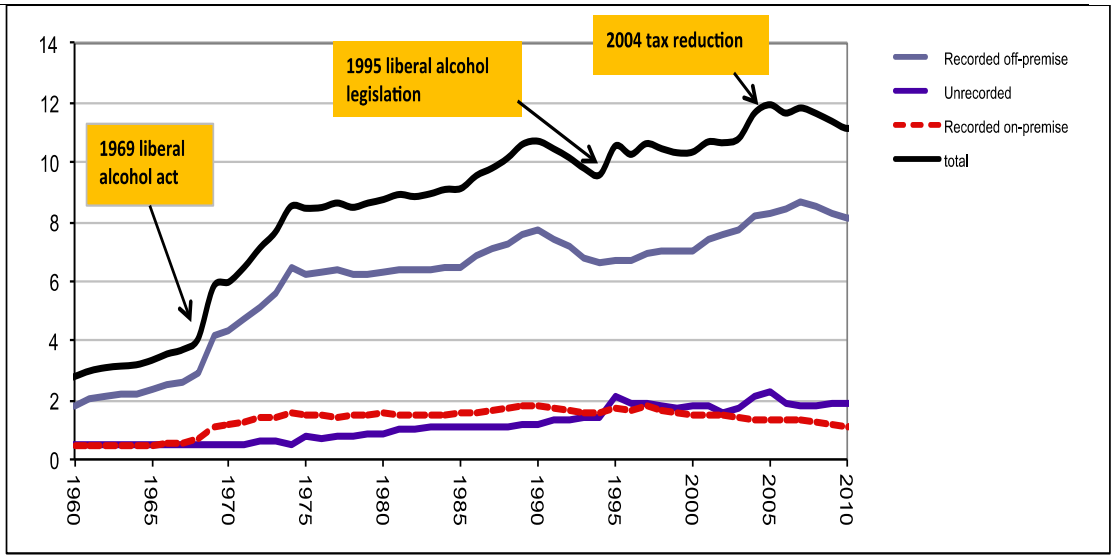


Table 4. Correlation coefficients of recorded alcohol consumption (source: WHO 2011) and selected policy measures in Finland, with 90% confidence intervals (CI 90)

Policy measures, Finland	Coefficient	IC 90
1969 reducing minimum age and allowing sales of medium strength beer in grocery stores	0,42	(0.31, 0.53)
1995 liberal alcohol legislation[4]	-0,09	(-0.21, 0.03)

Unplanned factors

Table 5 reports the results of separate regression models for four unplanned factors, with each model controlled for time trend, income, proportion of males over 65 years of age, and prices of alcoholic beverages. There is a significant positive association between level of urbanization and alcohol consumption. During the past 60 years, the proportion of Finnish people living in urban areas grew from 32% to 85%.

A higher level of female education was associated with less consumption, whereas a greater level of female employment was associated with more consumption. The present analysis is not able to determine the reason for these apparent contrasting findings. This will be investigated in subsequent work.

4 1995 Alcohol Act: On January 1st 1995, due to Finland's membership in the European Union, the new 1994 Alcohol Act abolished the monopoly on production, import, export and wholesale of alcoholic beverages. The 1994 Alcohol Act granted domestic wine farmers the right or license to sell their products (but only products containing 13% alcohol by volume or less) at the production site. Grocery stores and cafés were allowed to sell beverages produced by fermentation (ciders, long drinks etc.) containing less than 4.7% alcohol by volume. All alcoholic beverages could be served on-premise from 9 a.m. onwards.

Table 5. Regression coefficients describing the relationship between recorded alcohol consumption (source: WHO 2011) and four selected unplanned indicators in Finland *, with 90% confidence intervals (CI 90), and AIC (Akaike information criterion) values **

Unplanned factors, Finland	coefficient	CI 90	AIC
Female education	-0,33	(-0.47, -0.19)	-119,99
Female employment	0,77	(0.4, 1.15)	-102,96
Urbanization	1,23	(0.91, 1.55)	-112,89
Mean maternal age at all childbirths	-0,65	(-3.25, 1.94)	-96,95

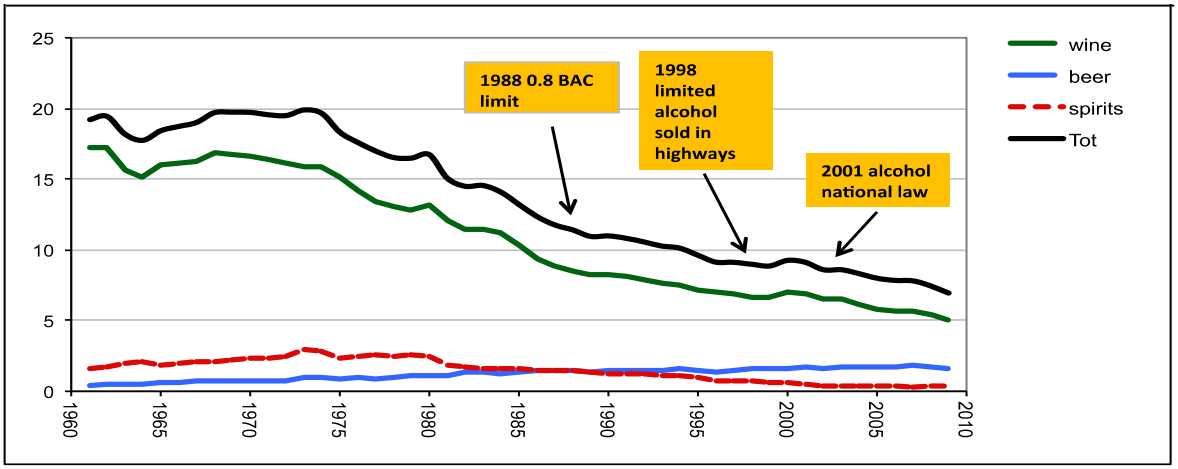
*Results from 4 separate regression models for each unplanned factor, adjusted for time trend, income, proportion of males over 65 of age, and prices of alcoholic beverages
**lower AIC values indicate better models

Results from two countries: *ITALY*

Policies

In Italy, common to other southern European countries, the significant drop in alcohol consumption, largely due to decreases in wine consumption, occurred before any alcohol policy acts came into force (Figure 2). There appears to be little relation between the main alcohol policy measures and levels of alcohol consumption.

Figure 2. Italy: Selected policy measures and 15+ per capita pure litres of recorded alcohol consumption, 1961-2009 in Italy- Source: WHO 2011



Statistical analysis of some selected policy measures supports the same conclusions (Table 6). A lack of a relationship could be due to poor enforcement of policies, or the enactment of policies which, in any case, might only have little impact.

Table 6. Regression coefficients describing the relationship between recorded alcohol consumption (source: WHO 2011), and four selected policy measures in Italy, with 90% confidence intervals (CI 90)

Policy measures, Italy	Coefficient	CI 90
1988 BAC	0,03	(-0.01, 0.08)
1991 no alcohol sale during events	0,03	(-0.01, 0.07)
1998 limited alcohol sold in highways	-0,02	(-0.05, 0.02)
2001 general alcohol policy law	-0,02	(-0.05, 0.02)

Unplanned factors

Table 7 reports the results of separate regression models for four unplanned factors, with each model controlled for time trend, income, proportion of males over 65 years of age, and prices of alcoholic beverages. As in Finland, there is an association between levels of urbanization and increased alcohol consumption. This is an unexpected finding as it runs contrary to the explanation of urbanization being associated with decreased alcohol consumption in Italy (see Tusini, 2007; Cipriani & Prina, 2007). In contrast to Finland, increased levels of female education were associated with increased alcohol consumption, but there was no relationship with levels of female employment. A higher mean age of maternal childbirth was strongly associated with decreased levels of alcohol consumption. As with Finland, further work is needed to understand and explain these relationships.

Table 7. Regression coefficients describing the relationship between recorded alcohol consumption (source: WHO 2011) and four selected unplanned indicators in Italy*, with 90% confidence intervals (CI90), and AIC (Akaike information criterion) values**

Unplanned factors, Italy	coefficient	CI 90	AIC
Female education	0,1	(0.06, 0.14)	-148,85
Fem. employment	0,11	(-0.1, 0.33)	-119,99
Urbanization	6,96	(6.3, 7.61)	-181,35
Mean maternal age at all childbirths	-4,01	(-4.52, -3.5)	-163,06

*Results from 4 separate regression models for each unplanned factor, adjusted for time trend, income, proportion of males over 65 of age, and prices of alcoholic beverages
**lower AIC values indicate better models

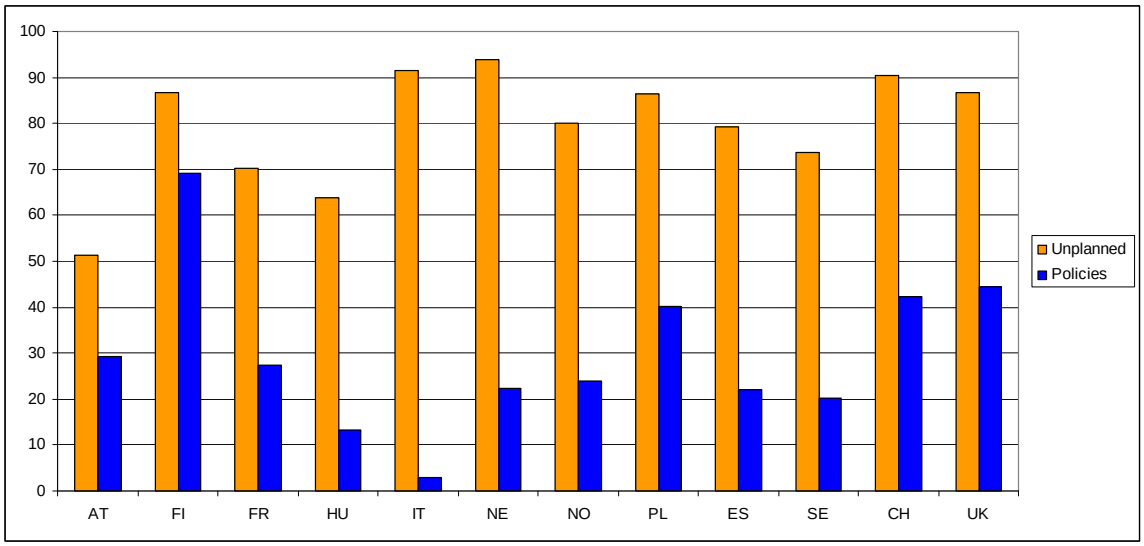
In conclusion, when controlling for the effect of unplanned factors, more liberal alcohol policies in Finland were associated with increases in alcohol consumption, sometimes dramatically, whereas the introduction of albeit not very strong alcohol preventive policies in Italy were not associated with changes in alcohol consumption. In both Finland and Italy, increased urbanization was associated with increased alcohol consumption, with the strong association in Italy being contrary to the explanation of urbanization being associated with decreased alcohol consumption. The role of women in society as measured by level of female education and employment and maternal age at childbirth were associated with changes in alcohol consumption, although the findings were not consistent and differed between the two countries. Results from Norway and Sweden, not reported here, also found associations between liberalization of alcohol policies and increased alcohol consumption. However, in contrast to Italy, which seems to be the exception, the introduction of restrictive preventive alcohol policies in France and Spain were associated with decreases in alcohol consumption, even though these tended to be introduced some time after alcohol consumption had started to decrease, and in a few cases appeared to induce a consumption increase. In all three countries, urbanization was associated with increases in consumption, even if this relationship was not statistically significant for France. And in all three countries increased maternal age at childbirth was associated with decreased alcohol consumption, although the relationship in Spain was not statistically significant.

Results from the 12 EU countries: Contribution of policies and of unplanned factors to consumption changes

The partial correlations between both the main six alcohol policy measures of Table 2 and the unplanned factors with large data coverage, which also includes the price of alcohol, and total alcohol consumption are plotted in Figure 3, with the correlations not indicating the direction of change. Unplanned factors have higher correlations than policy measures. There is wide variability in the size of the correlations between countries, with no obvious explanations (for

example, policy correlations are higher in France than in Norway and higher in Spain than in Sweden).

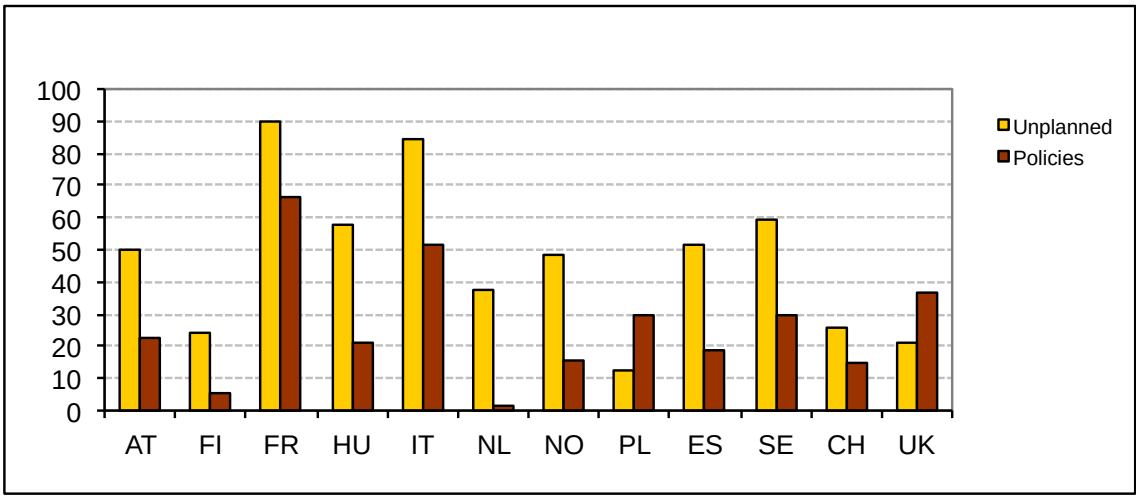
Figure 3. Policy measures and unplanned variables: partial correlations (in percent) with total alcohol consumption, 12 EU countries, 1960-2008



Results from the 12 EU countries: Contribution of policies and of unplanned factors to alcohol-related harm

Figure 4 shows the same correlation analyses as in Figure 3, but this time for deaths from chronic liver disease and cirrhosis, and Figure 5 for transport accident deaths, with the correlations not indicating the direction of change.

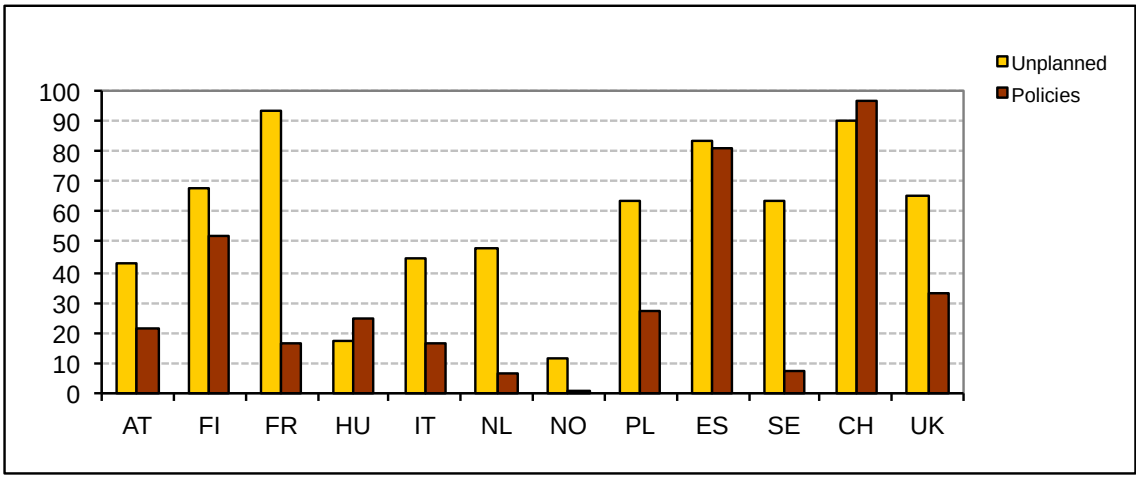
Figure 4. Policy measures and unplanned variables: partial correlations (in percent) with chronic liver and cirrhosis deaths in 12 EU countries, 1970-2008



Concerning transport accidents, a notable limitation of this analysis is that these series of data are incomplete for many countries. Correlations are found between both the policy measures and the unplanned factors and deaths from chronic liver disease and cirrhosis and transport accidents. Unplanned factors tend to have higher correlations than policies, although the differences are somewhat less than with alcohol consumption. Again, there is considerable

variation between countries, with no obvious explanations. Correlations between both policies and unplanned factors with deaths from chronic liver diseases and cirrhosis are highest in France and Italy, countries with historically high liver cirrhosis death rates. Correlations between policies and deaths from transport accidents are highest in Spain and Switzerland.

Figure 5. Policy measures and unplanned variables: partial correlations (in percent) with transport accident deaths in 12 EU countries, 1979-2008



What does this mean?

This study, the first of its kind, confirms that both the measured planned alcohol policies and measured unplanned factors (which also include the price of alcohol) impact on alcohol consumption and alcohol-related harm, with, in general, the measured unplanned factors having higher impacts. Although further work is still to be done with the data, urbanization, women's increasing levels of employment and improved education, and older maternal age at childbirth, seem to be the most important unplanned factors, mirroring the large social changes that have occurred in European countries over the last fifty years.

Understanding the role of contextual factors enables policy makers to take these into account when implementing existing evidence-based policies and designing new policies.

Take home messages

1. *Alcohol policies do impact on alcohol consumption.* In general, liberalization of policies is associated with increased consumption and the introduction of preventive policies is associated with decreased consumption. There is variability of the size of the associations across the 12 countries studied, with no observable relationship between policy and consumption in Italy.

2. *Alcohol policies do impact on measures of alcohol-related harm.* Correlations are found between policies and death rates from liver disease and transport accidents. Again, there is variability of the size of the associations across the 12 countries studied, but this time observable relationships are found in Italy (and in France and Spain).

Take home messages

3. *Unplanned factors impact on alcohol consumption.* A range of factors, particularly levels of urbanization and female roles (but also the price of alcohol) are related to alcohol consumption. Further understanding of these relationships is required because some of them (for example increased urbanization being associated with increased consumption in Italy) run contrary to what has been argued in previous studies.

4. *Unplanned factors do impact on measures of alcohol related harm.* Correlations are found between unplanned factors and death rates from liver disease and transport accidents. Again, there is variability of the size of the associations across the 12 countries studied.

5. *Unplanned factors seem to have a greater impact than policies.* This applies to both consumption and harm, although more so to consumption than harm. Understanding the role of these factors needs to be taken into account when implementing existing evidence-based alcohol policies and designing new policies.

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CHAPTER 6. EUROPE'S DIVERSE ALCOHOL POLICIES: WHAT ALL THE NATURAL EXPERIMENTS TELL US

Thomas Karlsson, Mikaela Lindeman & Esa Österberg

Summary

Accumulated research findings show that people are consuming less alcohol, the less available and affordable alcohol is. This chapter deals with policy changes regarding the physical and economic availability of alcohol in Europe. Work in the AMPHORA project covered previously studied cases of availability changes, as well as newer cases that had not yet been scientifically studied.

The literature review conducted in the first part of the project showed the majority of studies on changes in alcohol availability come from the Anglo-Saxon world and Northern Europe. Many parts of Southern and Eastern Europe were poorly studied in this respect, but curiously the second part of the study showed that most of the changes that have been taking place during the past few years – most of them restrictive- are found in Southern and Eastern parts of Europe. Especially the economic availability of alcohol during the past decade has been restricted in several countries, which indicates that raising alcohol excise duties is not only an effective public health measure, but also serves fiscal interests in the form of increased state revenues.

Introduction

The level of alcohol consumption is affected by a range of variables, from socio-cultural and demographic to economic and political factors. Furthermore, there is an established link between changes in alcohol consumption levels and levels of alcohol-related harms. Moreover, the level of alcohol consumption can be curbed and steered by implementing effective alcohol policy measures (Bruun et al. 1975; Edwards et al. 1994; Babor et al. 2003; Babor et al. 2010).

There is an extensive variety of alcohol policy measures used for social policy or public health interventions. These include regulating economic and physical availability of alcohol, modifying drinking contexts, affecting drink driving, and alcohol marketing. Also, alcohol education and persuasion, as well as treatment and early interventions belong to the strategies to try to curb alcohol-related social, economic and public health problems. Previous studies have shown that policies regulating the availability of alcohol are amongst the most effective and cost effective measures (Anderson 2009; Babor et al. 2010).

Availability policies can be divided into those affecting the physical availability and into those affecting the economic availability of alcoholic beverages. Retail alcohol monopolies, licensing-systems, specific restrictions on sales-hours and days, as well as places and densities of alcohol retail networks are all examples of how the physical availability can be regulated. Age limits and personal control, for example refusing sales to intoxicated persons or applying a maximum size or numbers of drinks that can be purchased in one go, are also measures of this kind (Österberg 2012a). Economic availability of alcohol can in turn be steered by changing excise duties or value added taxes, or by setting minimum prices of alcoholic beverages or by regulating discount prices (Österberg 2012b).

Many of the scientific studies confirming the effectiveness and cost-effectiveness for the availability measures are from North America or Northern Europe (Anderson 2009; Babor et al. 2010; however see also Room et al. 2002). For the AMPHORA project this was not a special problem as work was dedicated to study the effects of alcohol availability changes in Europe. Another aspect which was included in the study was to examine how culturally and geographically stable the effects of availability changes were, i.e. can we expect the same reaction for a certain change in alcohol availability in Southern, Western, Eastern and Northern Europe?

Our work was split into two parts. We first looked at what kind of studies already existed on the subject, and what they told us about changes in availability policies. In the second stage we switched our focus to changes that were so recent they had not been scientifically studied. The data gathered in the study also allows us to evaluate current trends of affecting alcohol availability in Europe.

What we did

In the first part of the study, the already studied cases on changes in alcohol availability in Europe were identified, collected and categorised. This was done by extensive literature searches and by going through certain summary reports and meta-analyses. The time period for the literature search was from 1980 and onwards. We also turned to alcohol policy experts in Europe and asked them for help in identifying studies that we might have missed. By doing this we ended up with a list of 383 studies, categorized according to country and type of measure (Karlsson et al. 2011). Most of the studied cases collected, 290 studies (or 76%) are in English. The Scandinavian languages (Swedish, Danish and Norwegian) make up 13%, while 3% are in Russian and some 2% are in Finnish.

When identifying cases for the second part of the study, we followed two strategies. For the first, our contact network provided us with valuable information regarding changes that had recently occurred or were about to happen in the near future. With the help of this sampling method a handful of responses were acquired, which formed the basis of our collection of unstudied cases. Secondly, the list was updated with cases picked up from national and regional online newspapers, newsletters, mailing lists, web portals, NGO's, Governmental institutions and European organisations (Karlsson et al. 2012).

What we found

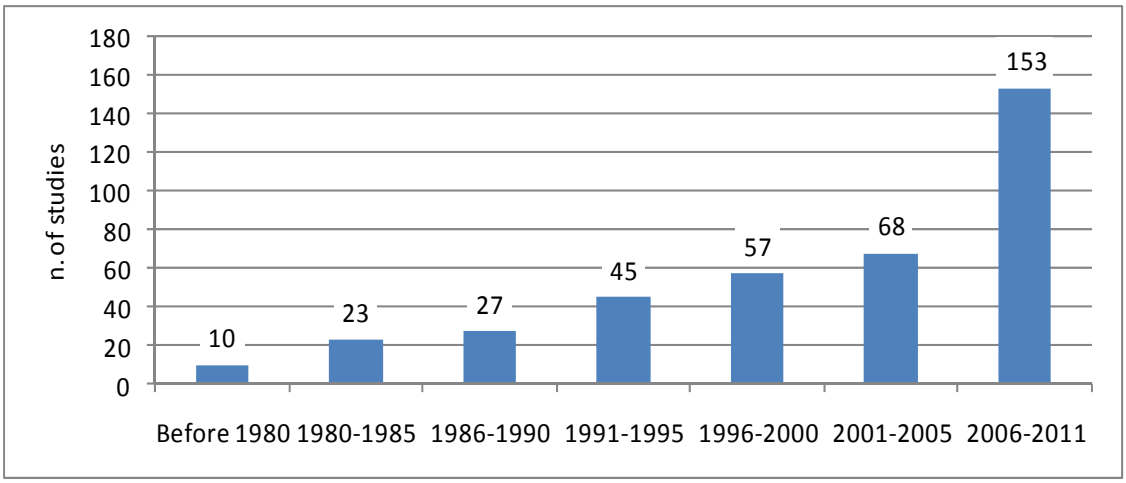
The plan for AMPHORA was finalized in 2008 and the project started in January 2009. Under the course of the project several new books and reports have been published on the effects of changes in alcohol availability, as for example "Evidence for the effectiveness and cost effectiveness of interventions to reduce alcohol-related harm" in 2009 (Anderson 2009), the second edition of "Alcohol No Ordinary Commodity" in 2010 (Babor et al. 2010) and "Alcohol in the European Union" in Spring 2012 (Anderson & Møller & Galea 2012) including two chapters based on AMPHORA's work (Österberg 2012a; Österberg 2012b). The latest meta-analyses of alcohol price and consumption were published in 2009 (Wagenaar et al. 2009). These publications crown the lion's share of the conclusions that AMPHORA has drawn from the material collected in the first half of the project (Karlsson et al. 2011).

A substantial number of global and inter-European studies are identified in our material. Also the Nordic countries are well represented. We found both comparative studies dealing with several Nordic countries, as well as studies from the Nordic countries separately. The United Kingdom is quite well covered, too, whereas it was a little more difficult to identify relevant studies from some other central European countries. The difficulty level grew even more when

moving on further south. The Balkan countries, most of them still outside the European Union, were also challenging, whereas we managed to discover a decent number of studies from almost all of the eastern European countries, many not belonging to the European Union.

When it comes to when the studies were published, our timeframe spanned from 1980 to 2011. A handful of earlier studies are also included. Most of the studies are, however, remarkably new. A total of 153, or almost 40%, are written after the year 2006 (Figure 1).

Figure 1. Time span of the published studies



Approximately two-thirds of the studies are articles from scientific journals. Some 40 articles are published in Addiction, which makes it the largest single source for studies. Roughly one fifth of the studies are public investigations, publications by governmental organizations, reports by national research institutes and the like. About 15%are either books or chapters from books. The remaining few per cent are papers presented at meetings or other grey literature.

All the identified studies were classified into five different subcategories: overall reviews, studies on alcohol policy, studies on economic availability, studies on physical availability and studies on consumption and related consequences or harms. The broad category "alcohol policy" is the largest subcategory with 30% of the studies including studies on price elasticity, studies on demand, studies on challenges for alcohol policy brought along by Europeanization in the Nordic countries, as well as descriptive studies on what kind of policies countries have implemented.

Studies on the physical availability make up 25% of the studies. Here we find, for example, studies dealing with alcohol monopolies and licensing on retail sales of alcohol as well as a few studies looking at rationing or ban of selling alcohol. The third largest category consists of studies on consumption and related consequences with 24% of the cases. In this category we find studies on alcohol-related harm, brought along by changes in alcohol availability as well as large sample studies. The following category of studies dealing with economic availability stood for about 15% of the studies. Also some studies on border trade belong to this category. The last 6% of the studies were overall reviews.

In the WHO EURO publication "Alcohol in the European Union", countries are divided into four regions based on their drinking habits (Shield et al. 2012). We have used this division with the exception that here Nordic countries consist of Nordic alcohol monopoly countries, that is, Finland, Iceland, Norway and Sweden. Denmark has been moved to central European

countries, consisting of Austria, Belgium, Denmark, France, Germany, Ireland, Luxembourg, the Netherlands, Switzerland and the United Kingdom. South European countries includes Cyprus, Greece, Italy, Malta, Portugal and Spain. The fourth region, eastern European countries, includes Belarus, Bulgaria, Croatia, Czech Republic, Estonia, the Former Yugoslavian Republic of Macedonia, Hungary, Latvia, Lithuania, Moldova, Poland, Romania, Russia, Slovakia, Slovenia, Turkey and Ukraine.

The number, but also the subcategory of studies, varies in different categories of European countries. The Nordic monopoly countries are dominated by studies on physical availability, partly explained by the state alcohol monopolies that have been closely studied and monitored over the years. The central European countries in turn have a remarkably large share of studies on economic availability, whereas the southern European studies spring from only two categories: consumption and consequences, and alcohol policies. Eastern Europe is dominated by the same two categories as southern Europe.

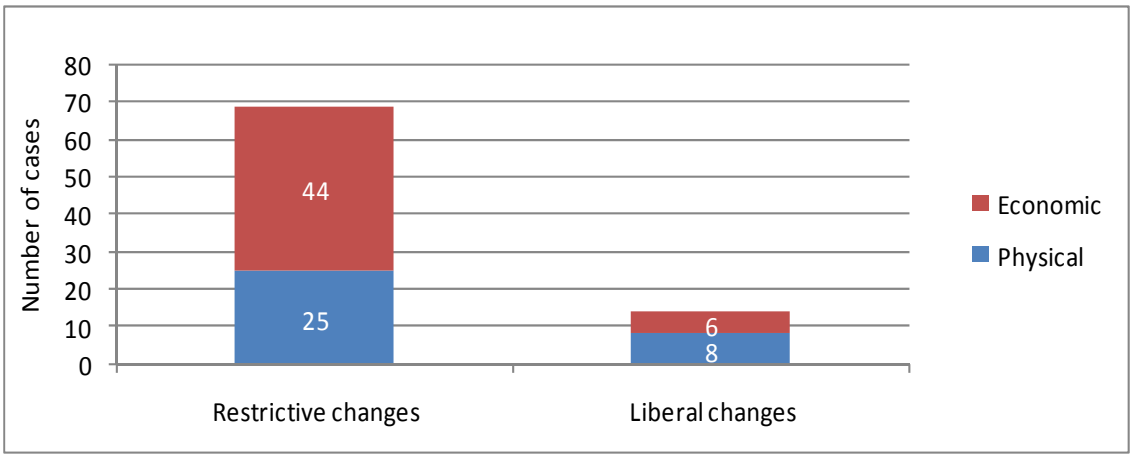
To wrap up the first part of this AMPHORA research based on already studied cases: much of the literature we found on alcohol availability comes from the English-speaking world and the Nordic countries. Many of the studies do not exclusively deal with availability measures only but several aspects of alcohol control and consumption. The number of studies published on economic and physical availability has peaked in the last decade (figure 1). This means that 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 alcohol consumption and related harms.

By looking at unstudied cases from the last few years, we have the possibility to add new evidence to this knowledge base and to discuss and re-evaluate the evidence base regarding the impacts of economic and physical availability of alcohol in a range of European countries. It has to be admitted that it is hard to identify all relevant and unstudied changes that have occurred in Europe regarding the availability of alcohol during the last few years partly because of language barriers. Even though information and news is accessible online and through the WHO Global Information System on Alcohol and Health Database, there are still obstacles to overcome.

During this second phase, around 80 cases of unstudied changes on alcohol availability were identified. Most of the changes have occurred on the national level, but also a few larger regional or local level changes have been included. The vast majority of the recent changes have been restrictive (Figure 2).

These recent changes are not equally spread all over Europe (Figure 3). An overwhelming majority of the changes have occurred in Eastern Europe. Most of the unstudied cases we found from Eastern Europe are from non-EU countries, where the absence or small amount of formal regulations in many cases gives room for implementing stricter alcohol policies, for example raising alcohol excise duties in Moldova and Ukraine and slapping minimum prices on vodka in Russia. Because of the significant share of the unstudied cases has happened in the eastern parts of Europe we feel it is worth taking a closer look on these counties. Therefore, we are working to publish a special monograph with recent experiences from Eastern Europe as a part of the AMPHORA project's work.

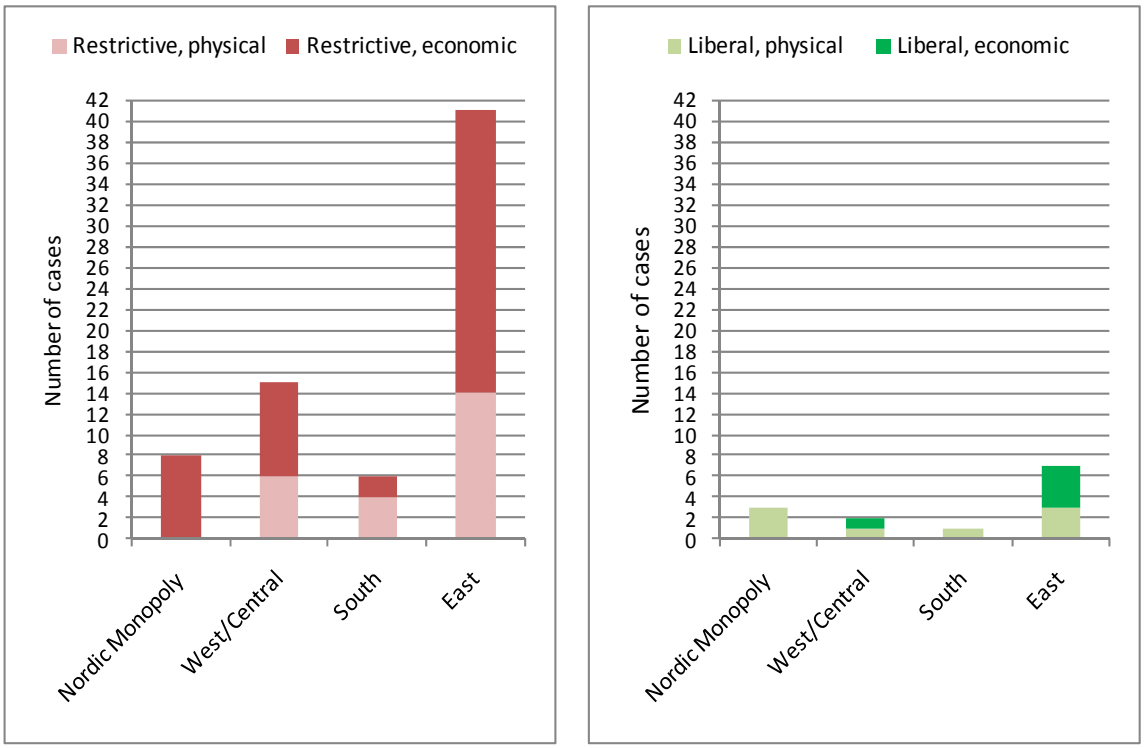
Figure 2. Recent unstudied cases in Europe



The Nordic alcohol monopoly countries, on the other hand, have been forced to liberalise their strict alcohol policies during the past decades (eg. Ugland 2002). Despite this, the unstudied cases showed that the monopoly countries have altered the tax levels several times during the last few years.

The central European countries, with Denmark and the UK as frontrunners, have made many restrictive changes, such as raising the age-limits and excise duties on alcohol, banning multi-buy deals and introducing or planning to introduce minimum pricing for alcoholic beverages.

Figure 3. Unstudied cases from different parts of Europe



Southern European countries have traditionally had relatively low formal alcohol control and have mostly relied on informal, social control of alcohol consumption, (Allamani & Prina 2007) but even for this area we find recent examples of restrictive measures - though, for example in

Greece, raising alcohol taxes reflects the economic recession in Europe and served as a fiscal instrument rather than as a public health measure.

What does this mean?

The research identified and analysed points in the direction that restricting physical and economic availability on alcohol is one of the most effective tools battling against alcohol-related harm. The first part of our study showed that there is a vast amount of research on this subject and that it has culminated during the last decade. The second part of our study showed that during the past decade or so, alcohol policy in Europe has taken a restrictive turn in many countries. Especially the economic availability of alcohol has been restricted in several countries in Europe (Karlsson & Österberg 2012), which indicates that raising alcohol excise duties is not only an effective public health measure, but also serves fiscal interests in the form of increased state revenues.

In the beginning of the 21st century we can clearly detect a restrictive trend regarding alcohol policy in Europe. In order to register and classify changes in alcohol availability in a more structured way in the future, we could for example use the alcohol policy scale developed within the AMPHORA project as an instrument. The scale is a refined enough tool for detecting changes in physical and economic availability, and if it were used with regular intervals it would be an efficient and convenient way to detect alcohol policy changes either towards more liberal or stricter policies. We would also be able to see how much the policies are changing, and compare policy scores concerning availability for different countries.

Take home messages

1. The strong knowledge base tells us that restricting the physical and economic availability on alcohol has a significant effect on alcohol consumption and related harms, and is therefore one of the most effective tools against alcohol-related harm.

2. Raising alcohol excise duties is not only an effective public health measure, but also serves fiscal interests in the form of increased state revenues.

3. Many European countries have implemented stricter alcohol policies during the last few years.

4. The knowledge of the effectiveness and cost-effectiveness of different alcohol availability measures is pretty good but there is a lack of evidence on how to implement these effective alcohol measures to in order to decrease alcohol-related economic and social harms and to improve public health.

5. The alcohol policy scale constructed in the AMPHORA project could in the future be used in order to monitor changes in economic and physical availability of alcohol.

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CHAPTER 7. ALCOHOL ADVERTISEMENTS. RECEPTION AMONG YOUNG EUROPEANS

Matilda Hellman

Summary

The chapter reports results from a qualitative study on how teenagers from six European countries negotiate messages of televised beer commercials. We have completed 48 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. The study establishes that meaning-making concerning alcohol drinking differs between the young audiences in different alcohol geographies. Differences are 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.

Introduction

Knowledge production in the field of youth and alcohol marketing has mostly been concerned with the impact that advertisement has on initiation of alcohol use or level of consumption. Without denying the importance of such research, there are no valid arguments for the research community *not* to engage with knowledge production on how meaning is negotiated between message and its young audience. On the contrary, acknowledging that both advertising and drinking alcohol are meaning-based activities, the Amphora project identified a need to make qualitative inquiries into this politically topical subject.

New knowledge has been produced in three main areas. First, the cultural differences among youngsters from different alcohol cultures can tell us how well certain stereotypical commercial messages can be adapted to different alcohol drinking norms. Second, the level and kind of persuasion knowledge may indicate the potential that young people have to distance themselves from the messages. Thirdly, the study has initiated a general theoretical and methodological discussion on how to study young recipients of alcohol commercials. This last issue is of particular importance, as the political question of restrictions on alcohol marketing “lives and breathes” through scientific knowledge production.

The qualitative youth study of Amphora has resulted in four scientific articles. In this chapter, the proceedings and results will be summarised, and some concrete suggestions for using the knowledge made.

What we did

In each country, participants were recruited from two schools: one in an urban area and the other in a rural region. We aimed to include 28 pupils from each school: 7 girls and 7 boys from

a 13–14 age group (7th grade in most countries) and, similarly, 7 girls and 7 boys aged 15–16 (9th grade in most countries). The sampling resulted in eight targeted focus group interviews per country, comprising a total of 326 European youngsters in the age range of 13-16 years.

We used four televised beer commercials as stimulus texts for the group discussions. The same commercials were used in all countries, and the adverts came from other countries than the ones of the study, with as little spoken text as possible due to different languages. The group discussions were oriented around specific predetermined topics, formulated in an open-ended manner. By analysing the discourse on the clips, we learned how the group members perceived the messages, how they framed them, and what they knew about the things they saw. This method has been shown to improve comparability of qualitative data in cross-national research (see Sulkunen & Egerer, 2009)

Throughout the analysis, the following questions were kept in mind: Which cross-cultural differences between the interpretations of commercials can be discerned from the study data sets from the different countries? What tools do the youngsters have at hand when negotiating, interpreting and examining the commercial messages? How can we connect inquiries in this field to valid and updated theorization from sociology, public health and communication science?

What we found

The initial phase examined *cultural variations* in how the study participants interpreted the beer commercials. We chose commercial clips which showed different types of drinking situations (hedonistic, playful, social, "adult" etc.). The data showed a significant difference between the Italian data and the rest of the countries (Hellman et al. 2010). The Italian material was of greater volume and much more comprehensive than material from other countries, and the discussion surrounding alcohol drinking was more serious and problem-oriented. The drinking situations were also interpreted by the Italians in a different fashion from the other groups. The natural explanation for this circumstance is likely to be that Italy was the only country with a traditionally wet, Mediterranean, drinking culture represented in the study[5]. In the other countries (Finland, Germany, Poland, Netherlands and Denmark) beer is a more common drink than wine, and young drinkers in these countries more often report the intention of becoming intoxicated than in Italy (Hibell et al., 2012).

A distinctive feature of the Italian material was that images of drinking in solitude and with individualistic solutions (not paying attention to the social situation) were held to be more difficult to accept and explain. Earlier research has acknowledged a difference in audience interpretations between individualistic and collectivistic value climates, and our results seem to conform to this theoretical interpretation[6] (see Hellman et al. 2010). Typical collectivism value traits of the drinking behaviour – in terms of living up to expectations of social togetherness and in-group-oriented behaviour – were important explanations for drinking behaviour used by the Italian youngsters. In the Danish focus groups the adolescents were

5 We are suggesting that alcohol cultures could be conceptualized in terms of alcohol geographies, as they are not only bound by national considerations, but also regional character and according to alcohol policy traditions and landscapes.

6 For example, an association network created by German and Spanish students for a beer brand showed that the German associations belonged to more individualistic notions like success, self-esteem, independence and freedom, while the Spanish students stressed belonging, happiness and sophistication (see de Mooij, 2010: 41). Images of people enjoying beer alone - or in an 'egocentric' manner, as in the case of the first commercial – have been considered by advertising practitioners as non-applicable in collectivistic cultures where one enjoys beer together (De Mooij, 2010: 225).

more likely to refer to commercials that were culturally more understandable (Danish ones) in their presentations of themselves. The concordance with cultural context (alcohol use, familiarity with brands, language etc.) thus seems to correlate with level of identification (Demant & Poulsen, 2012).

At a later stage of the project, in a separate study, we explored further the possibilities of employing the distinction between individualist and collectivist cultures in cross-cultural alcohol research (Hellman, Rolando & Rossetti, 2012). We compared the differences between the materials from Italy and Finland against the typical dissimilarities featured in comparisons between individualistic and collectivistic cultures. Although the differences presented in the individualist-collectivist dichotomy may not be unambiguous enough to be applied without some reservations, they can, indeed, be beneficial for examining how the values attached to alcohol drinking are logically bound together and reflected in drinking action in the two cultural contexts.

The collectivistic-individualistic dichotomy seemed to especially concern dimensions of agency (the self living up to expectations) and autonomy (liberty to make own decisions). We have argued that there are at least three important reasons for bringing up agency and autonomy in this research area (Hellman, Rolando & Rossetti 2012). First, these dimensions have proven important in previous research on the meaning-making of alcohol use among young people. Second, values related to agency and autonomy have been suggested to be crucial dimensions for studying and understanding contemporary childhood and youth behaviour and culture. Third, it is precisely in the process of understanding competence in terms of agency, and expressions and choices in terms of autonomy, that the collectivist and individualist dichotomy pops out of the analysed material. The circumstances presented above have convinced us that we have a good case to apply this theoretical distinction, not only for the material under study, but also in future research involved with the themes in question. The project group hopes that these aspects are further developed in comparative alcohol studies in the future.

The teenagers of this study did not express significantly different levels or types of *persuasion knowledge and advertisement literacy* (Hellman et al., in review). The most common techniques discussed as being employed to make people drink and buy beer did not differ between the material from the different countries. In the format that the interviews were conducted – focus groups in which the interviewees were able to freely express their opinion and comment the commercials' genre and content –, the youngsters seemed prone to express sceptical stances to the genre and the messages of the beer commercials.

A lack of cross-country, gender or age variations as regards to scepticism is an important result in itself (Hellman et al., in review). The study hypothesised that the knowledge of commercial persuasion codes could be less culture-bound than the participants' alcohol attitudes. An explanation for this circumstance could be that adolescents of the different European countries were likely to be used to rather similar (globalised) commercialised media image milieus.

A general critical discourse with regards to the genre of alcohol marketing dominated all data. The youth zeitgeist, or contemporary demands that makers of advertisements may claim that they are performing or living up to, does not match the stances of the young people interviewed for this study. We found nothing in our material that would contradict the claim that production of the commercials stem purely out of the producers own interests to stimulate demand for products. We found no explicitly formulated "need" or specific "usage" of the commercials expressed by the youngsters of our study. In the view of the interviewees, advertisement seemed mostly to cause irritation.

The participants' beliefs about their own coping and resisting abilities were high. They showed little difficulty reading the commercial subtexts and they conceptualized and described the objectives of the genre and how the messages had been produced. Overall they expressed a stance 'above' the commercial message: the viewer is in control, whereas the advertisement producer is the one who is to perform and is seldom perceived as doing so successfully. This finding contradicts the stereotype of the young victimized receivers who are injected with commercial messages that they will go out and act upon. In all group discussions, it seemed both acceptable and expected to reflect critically on the persuasion techniques applied in commercial messages on alcohol. However, in the first analysis regarding the drinking messages, we found that a larger degree of scepticism was expressed on messages whose meanings were not obvious, whereas all participants easily identified with basic emotional images, such as social togetherness and joy (Hellman et al., 2010).

The present study introduced some *new methodological and theoretical approaches* in the research field in question. The project group came to review and question the existing research paradigms in the field. In an analysis of different studies' research theoretical domicile, a suggestion was formulated on the added value of combining different research strategies in this field of knowledge production (Hellman, 2011).

There are some fundamental differences among social and psychological theories on communication of (commercial) messages. A basic division reigns between theories of communication effects and theories on meaning generation (Fiske 1990, 39). The differences are obvious between the mainstream methodological approaches on the impact of alcohol marketing on youth, and this present qualitative approach. The former uses different instruments to measure possible influences, whereas the qualitative inquiries of this study chose to leave out the causal influence relationship altogether. Although these positions represent independent philosophical stances, they can be complementary for understanding the phenomena under study. Perceptions and influences are intuitive, knowledge-based and patterned at the same time. An integrated view of the young recipients as both – in some way – possibly affected by the messages in terms of a confirmation of a positive image of drinking, and also capable of a sceptical stance or ignoring the messages altogether may be beneficial for the comprehension of the processes under study. It may also help evolve towards a more nuanced and credible picture, to be referred to by the expertise in the area.

The marketing issue has received increased attention in European alcohol policy debates in recent years. The qualitative findings of this study, as part of the AMPHORA research project, have contributed with a new European perspective on the theme of young persons as recipients of alcohol marketing messages. We have demonstrated differences and similarities between the audiences from different alcohol geographies; we have highlighted some features of how they understand commercial messages; and we have shouldered the task of contributing to methodological and theoretical developments in the area.

What does this mean?

In view of preventing alcohol consumption among young Europeans, the study has managed to produce some interesting new knowledge.

We now have strong indications that there is a generally high level of ad literacy and commercial genre scepticism among young Europeans from the six countries studied. A general sceptical stance to the study's beer commercials and also, potentially, other commercial messages seem to be stimulated by the interview format of this study. The process of showing stimulus texts and arranging group discussions could thus be used for educational

and preventive programmes. They seem to actively stimulate the expression and generation of media literacy and raise the teenagers' self-awareness of the knowledge they possess in the area of persuasion techniques.

No demand for, enjoyment of or willingness to receive the messages of alcohol commercials were spontaneously expressed in any of the data sets. The genre of alcohol commercials seems to comprise merely discursive products that manifest their own existence in their own persuasive intentions, rather than in response to any need or enthusiasm to receive them. A qualified guess by the research team of this study is that bans on alcohol advertising would be, if not openly welcomed, at least not contravened by the young audiences interviewed for the study.

The study has shown that normative codes attached to drinking situations and levels of drinking vary among young Europeans from different alcohol geographies. The differences seemed to be most evident when it comes to dimensions of autonomy and agency, and they also showed a good fit with the dichotomy between value traits of individualistically and collectivistically -oriented cultures (adjusting behaviour to fit social expectations of a certain affirmative togetherness, or adjusting behaviour to conform with social codes that allow one to act alone or in a transgressive way).

Last but not least, the study suggests that young audiences of alcohol marketing as the study subject is viewed as beneficial within many different research paradigms, in order to give a more truthful picture of the complicated communication processes that take place. The study has suggested that combined research methods will strengthen knowledge in the alcohol public health field as a whole.

Take home messages

1. Focus group discussions of commercial clips are an efficient way to stimulate young people to formulate media critical positions and express ad literacy.

2. Youngsters in different European alcohol geographies negotiate and interpret alcohol drinking messages in different ways. The difference is especially obvious when it comes to autonomy and agency – two dimensions that seem crucial in determining the initiation of alcohol use.

3. Knowledge on youngsters as audiences of commercial messages on alcohol can and should be produced within different research traditions and using combined transdisciplinary methods.

4. The study's data sets indicate no reason or desire on the part of youngsters to be exposed to commercial messages on alcohol.

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CHAPTER 8. EXPOSURE TO ONLINE ALCOHOL MARKETING AND ADOLESCENTS' BINGE DRINKING: A CROSS-SECTIONAL STUDY IN FOUR EUROPEAN COUNTRIES

Avalon de Bruijn

Summary

The role of alcohol advertising on adolescents drinking is gaining increased attention in academic and policy circles, and, in particular, there is a growing need for evidence-based knowledge on the interactions between online alcohol advertising and adolescent consumption in Europe.

This study investigates associations between online alcohol marketing exposure and binge drinking among adolescents in Germany, Italy, the Netherlands and Poland. Binary and logistic regression analyses were undertaken on cross-sectional cross-country survey data from a total of 9032 students with a mean age of 14.05 (SD.82). Exposure to alcohol marketing in online media and television, and ownership of alcohol branded items was estimated together with social influences, demographics as well as media use and onset of binge drinking in the last 30 days was measured as an outcome variable.

A higher exposure to online alcohol marketing was found to increase the odds of binge drinking in the last 30 days ($p<.001$). This effect was found to be consistent in all four countries. Youngsters in the four European countries report being frequently exposed to online alcohol marketing. The association between this exposure and adolescents' binge drinking was robust and seems consistent in several national contexts.

Introduction

Underage binge drinking in the European Union

Heavy episodic drinking or binge drinking among youth is associated with being involved in accidents, getting into fights, problems at school or work, passing out and having unsafe sex (Wechsler & Nelson, 2001). Long term effects, among others, are: liver damage, depression, brain impairment and alcohol problems later in life (McCambridge, McAlaney, & Rowe, 2011; Wechsler, Davenport, Dowdall, Moeykens, & Castillo, 1994). The prevalence of binge drinking (having five or more drinking on one occasion) among 15 and 16 year olds differs greatly between European countries, ranging from 13% in Iceland to 56% of students reporting such behaviour in Denmark and Malta. In almost all European countries, however, binge drinking is more common among boys than girls (Hibbel, 2012).

The role of alcohol advertising

The role of alcohol advertising on adolescents drinking has recently gained increased attention. In general, longitudinal studies show a moderate but significant effect of alcohol advertising exposure on adolescents drinking (Anderson et al., 2009; Smith & Foxcroft, 2009). Most of these studies examine the impact of traditional media and do not include alcohol advertising in digital media. However, lately, somewhat more attention has been given to this.

The only studies conducted in Europe have looked at Scottish youth, and suggest a cumulative effect of alcohol marketing channels on drinking, which includes exposure to non-traditional media (Gordon et al., 2010, 2011; Gordon, MacKintosh, & Moodie, 2010). A study by Lin et al (2011) underlines the importance of examining the impact of web-based marketing in addition to traditional marketing, as this has been found to be a significant predictor of onset of drinking and the amount of drinking among teenagers from New Zealand. Additionally, results of a cross-sectional study among Australian adolescents are consistent with studies from other countries and suggest that exposure to online alcohol advertisements are associated with drinking patterns (Jones & Magee, 2011).

Alcohol advertising in digital media in Europe

The current study looks at the impact of alcohol marketing exposure on recent binge drinking among European youth from Germany, Italy, the Netherlands and Poland, with a special focus on the impact of alcohol marketing in digital media. This is particularly relevant due to the large amounts of time European youngsters spend using digital media. The internet is the leading medium, and even more time is spent on the internet than watching television (EIAA Mediascope Europe 2007). The alcohol industry has made the use of the internet as a marketing tool common practice, most notably via producers' websites, by banners on other websites and on social networking sites (Nicholls, 2012). For example, as of November 2011, ten alcohol brands chosen for their youth appeal had uploaded 35,725 photos on Facebook (CAMY, 2011).

What we did

Survey design

In each country, Germany, Italy, the Netherlands and Poland, a stratified sample of schools in an urban and rural area was taken, giving a total of 339 schools, of which 163 were eligible for participation. Of the eligible 10810 students that were invited, 9709 participated (89.8% response rate). Two thirds of the non-response of individuals was due to lack of active parental consent (N=732); non-response in the remainder was mostly due to lack of motivation in the students' teachers. Technical difficulties concerning the internet connection at the times of the survey, or other technical failures, reduced the sample to 9032 students. For these, data was recorded using the online questionnaire and responses to appropriate questions. The mean age of the sample was 14.05 (SD .82), and 50% were male.

Before drafting the questionnaire, 8 focus groups were held in each country with 12-15 year-olds (a total of 32 focus groups, N=218), in order to examine the cultural context of the concepts of interest (see also Hellman et al., 2011). A draft of the survey was pre-tested and commented upon by approximately 100 students in each country. Data was collected through self-administered online questionnaires, which were anonymous. Students who volunteered to participate gave active consent. In Germany, active parental consent was required, in all other countries passive parental consent was used. Ethical approval of the study was granted by the European Commission and the Ethical board of the Radboud University (number ECG 24092009).

Alcohol use

Onset of binge drinking was established by asking respondents 'During the last 30 days, how many times did you have five or more drinks on the same occasion?' Students that responded positively were classified as 'recent binge drinkers', all others were classified as 'not recent binge drinkers'. This question mirrored questions used in the ESPAD survey (Hibell, 2009).

Alcohol marketing exposure

Dichotomous questions used by Gordon et al (2010; 2011; Lin et al 2011 were adapted to measure the frequency of exposure to alcohol marketing in online media with a 5-point Likert scale (1 never, 2 rarely, 3 sometimes, 4 often, 5 very often). Respondents were asked whether they had ever received 'promotional mail, e-mails or joke, chain, or wind up e-mails mentioning alcohol brands', 'looked at a web site for alcohol brands or about drinking (not including health-related sites)', 'downloaded a mobile phone or computer screensaver containing an alcohol brand name or logo', 'used a profile page on sites such as Hyves, Facebook, MSN or Myspace containing alcohol brand or logo', 'noticed an internet page that contained an alcohol advertisement ', and 'purchased or ordered alcohol via the internet'. All items were combined into one factor (Eigen value= 2.544 with 50.88% variance explained and Cronbach Alpha=.742).

Ownership of an alcohol-branded promotional item was determined by asking respondents 'Do you own an item – like a t-shirt, lighter, matches, hat, or sunglasses – with an alcohol brand name on it?' (Henriksen et al., 2008). Those who answered 'Yes' to this question were coded as owner of an alcohol branded promotional item. Respondents answering 'No' or 'I don't know' were coded as not being an owner of an alcohol branded promotion item.

Exposure to televised alcohol advertising was measured by asking respondents about the frequency with which they had seen a selection of 8 television programmes in February 2010 (approximately 1-2 months before the survey). Respondents indicated their frequency of watching with a 5-point Likert scale (1 never, 2 rarely, 3 sometimes, 4 often, 5 very often). The list of television programmes in each country questionnaire was drawn from a list of most popular television programmes among 13-17 year olds in each country during which (or immediately before or after) an alcohol commercial was aired. A total score of televised alcohol advertising exposure was calculating by multiplying the number of ads broadcasted in each programme by the frequency of watching the programme. These scores were added together for each respondent and divided by the total number of alcohol ads broadcast in all 8 television programmes, to get a score between zero and one for each respondent.

Confounders

Demographic data were recorded for age, gender, education and smoking (yes/no). Social influences were measured by perceived constraints towards alcohol use in religion (yes/no), number of four closest friends drinking and their approval of participant's drinking, alcohol use of mother and whether she gave the participant permission to drink. Additionally, non-alcohol-branded media exposure was measured. Internet use was measured by asking respondents 'On a usual school day (Monday to Friday) how many hours do you spend using the internet?' indicating (1) None; (2) Less than 1 hour; (3) 1-2 hours; (4) 3-4 hours; (5) 5 hours or more. Additionally, exposure to non-alcohol-branded television programmes was measured by asking respondents the frequency of watching 4 television programmes in which (or around which) no alcohol advertisements were aired. The selection of television programmes in each country was based on a list of the most popular television programmes among 13-17 year-olds in each country in September 2010, obtained from Nielsen Media.

Statistical analysis

Analyses were conducted with M-Plus version 6.1. Data were nested due to the school-based sample design. Consequently, in all models, class was identified as a cluster variable which resulted in sandwich adjusted variance.

Descriptive analysis was carried out by observing the prevalence of drinking and other measures in each country, compared to the total sample. Binary logistic regression analysis was carried out to observe whether alcohol marketing exposure and, more specifically, online alcohol marketing exposure was associated with being a recent binge drinker, independent of potential confounders. In a second step, possible differences in effect sizes of the impact of online alcohol marketing was examined by generating unconstrained the effect sizes, so as to be equal between countries, with all other parameters being equal. In a third step, models were run for each country separately.

What we found

Table 1 presents the distributions of study variables among respondents from each participating country, and for the total sample. Non-drinkers accounted for approximately half of the respondents, and this group was smallest in Italy, with approximately one third of the sample never using alcohol. Approximately three-quarters of the respondents were not classified as binge recent drinkers, ranging from 65 percent in Italy to 82 percent in the Netherlands and Poland.

Table 1. Sample descriptives

		Overall (n=9032)	Germany (n=1857)	Italy (n=2654)	Netherlands (n=2038)	Poland (n=2433)
Alcohol use	Onset of drinking					
	Never used alcohol	47	46	32	55	59
	Ever used alcohol	53	54	68	45	41
	Binge drinking last 30 days					
	Never	74	70	65	82	82
	Once	8	10	11	6	6
	2-5 times	13	15	19	9	8
	>5 times	4	5	6	3	3
Demographics	Female	50	48	50	51	51
	Age, mean (SD)	14.05(.82)	13.86(.73)	14.77(.70)	13.8(.54)	13.57(.62)
	Education					
	General level	28	4	0	0	100
	Lowest level	26	35	28	47	0
	Intermediate level	22	36	30	26	0
	Highest level	24	26	42	27	0
	Smoking					
	Never smoked	67	73	54	77	71
	Ever smoked	22	19	27	17	23
	Nowadays smoke	11	8	19	6	7
Social influences	Number of four friends using alcohol					
	0	47	47	33	58	54
	1-2	27	29	32	23	24
	3-4	26	23	36	19	22
	Permission peers alcohol use					
	Unlikely*	43	41	24	44	65
	Neither unlikely nor likely	33,4	24,0	18,0	22,0	22,7
	Likely	23	26	37	28	12
	Alcohol use mother					
	Never/Almost never/ I don't know	47	53	67	55	14
	Every month	21	16	8	7	51
	More times a month	10	11	5	9	17
	Every week	12	13	10	14	11
	More times a week/daily	11	8	11	16	8
	Permission mother alcohol use					
	Unlikely	68	72	55	64	84
	Neither unlikely nor unlikely	27	22	43	25	13
	Likely	5	6	3	12	3
	Restrictions alcohol in religion					
	No	90	94	92	94	80
	Yes	11	6	8	6	21

Table 1 (cont.). Sample descriptive

		Overall (n=9032)	Germany (n=1857)	Italy (n=2654)	Netherlands (n=2038)	Poland (n=2433)
Media exposure	Exposure non-alcohol branded TV programs, mean (SD)	2.12(.84)	.34 (.19)	2.23 (.80)	2.20 (.82)	2.11 (.93)
	Hours spend on the internet					
	None	8.5	4.3	13.9	5.9	7.8
	Less than 1 hour	19.9	17.7	21.9	23.0	16.9
	1-2 hours	32.8	34.8	32.6	34.0	30.5
	3-4 hours	22.5	24.3	19.5	23.0	24.3
	5 hours or more	16.2	18.9	12.0	14.1	20.5
Alcohol marketing exposure	Ownership ABI					
	No	74	80	71	76	69
	Yes	27	20	29	24	31
	Exposure alcohol branded TV programs, mean (SD)	.28 (.22)	.19 (.73)	.34 (.19)	.42 (.24)	.18 (.22)
	Ever received promotional emails					
	Never	67	63	67	69	68
	Rarely/ Sometimes	27	32	28	26	25
	Often/ Very often	6	5	5	6	7
	Ever looked at websites for alcohol brands					
	Never	79	74	77	79	84
	Rarely/ Sometimes	18	23	20	18	13
	Often/ Very often	5	3	4	3	4
	Downloaded a screensaver with alcohol ad					
	Never	82	86	71	86	87
	Rarely/ Sometimes	14	11	13	11	10
	Often/ Very often	4	3	6	3	4
	Used a profile site on social media with alcohol ad					
	Never	68	79	75	71	49
	Rarely/ Sometimes	25	17	20	22	39
	Often/ Very often	7	4	6	7	12
	Noticed an alcohol ad on internet page					
	Never	34	53	31	37	22
	Rarely/ Sometimes	45	37	50	53	48
	Often/ Very often	21	10	19	21	30

Table 2. Binary logistic regression results on the odds of onset of recent binge drinking

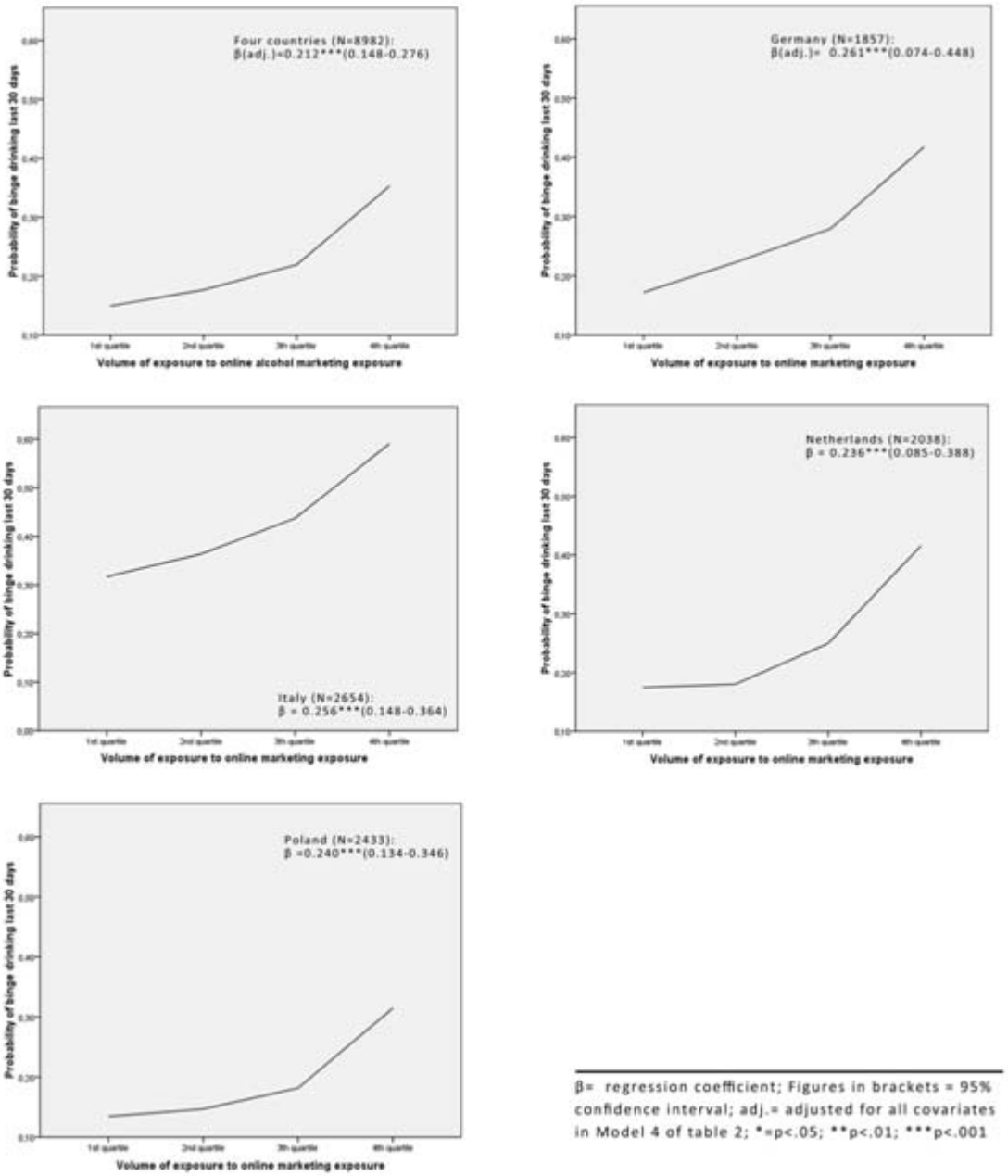
	Model 1.		Model 2.		Model 3.		Model 4.	
	Odds ratio	(95% CI)	Odds ratio	(95% CI)	Odds ratio	(95% CI)	Odds ratio	(95% CI)
Male	1.08*	(0.98-1.18)	1.06	(0.96-1.17)	1.11**	(1.00-1.23)	1.04	(0.94-1.16)
Age	1.25***	(1.18-1.33)	1.13***	(1.06-1.20)	1.14***	(1.08-1.22)	1.17***	(1.10-1.24)
Education	1.00	(0.94-1.07)	0.95*	(0.90-1.02)	0.97	(0.91-1.03)	0.97	(0.91-1.04)
Smoking	2.47***	(2.30-2.66)	1.84***	(1.71-1.99)	1.81***	(1.68-1.95)	1.74***	(1.61-1.89)
Restrictions Religion	0.95**	(0.91-0.99)	1.00	(0.96-1.05)	1.00	(0.96-1.05)	1.01	(0.97-1.06)
Alcohol use peers			1.35***	(1.31-1.39)	1.34***	(1.30-1.38)	1.31***	(1.27-1.36)
Alcohol use mother			1.12	(1.07-1.17)	1.12***	(1.07-1.18)	1.12***	(1.07-1.17)
Permission peers			1.30***	(1.24-1.37)	1.29***	(1.23-1.36)	1.27***	(1.20-1.34)
Permission mother			0.89***	(0.76-1.04)	0.89	(0.80-1.04)	0.87*	(0.75-1.02)
Internet use					1.11***	(1.08-1.16)	1.09***	(1.05-1.14)
TV non-alcohol ad exposure					1.07**	(1.03-1.13)	1.03	(0.97-1.09)
TV alcohol ad exposure							1.20*	(0.95-1.52)
Ownership ABI							1.15***	(1.05-1.26)
Online alcohol ad exposure							1.24***	(1.16-1.32)
N	9032		8997		8996		8982	
R2	0.32		0.50		0.51		0.52	
CFI	1.00		1.00		1.00		1.00	
RMSEA	0.00		0.00		0.00		0.00	

***p<.001; **p<.01; *p<.05. Adjusted for all predictors shown in the table. CI: 95% confidence interval

Table 2 presents binary logistic regression odds ratios of onset of recent binge drinking. Higher exposure to online alcohol advertising increased the odds of being a recent binge drinker, while adjusting for all the listed confounders. Positive associations were also found for ownership of alcohol-branded items and higher exposure to televised alcohol advertising.

We found few between-country differences in the strength of the adjusted relationship between online alcohol marketing exposure and onset of binge drinking. Figure 1 shows the B coefficients for the relationship between online alcohol marketing exposure (expressed in quartiles) and predicted probability of onset of recent binge drinking, adjusted for all confounders, overall and by country. The graphs indicate a dose-response relationship between online alcohol marketing exposure and the probability of recent binge drinking ($p<.01$) in all countries.

Figure 1. Predicted probability of onset of binge drinking in last 30 days by different levels of exposure to online alcohol marketing (adjusted for covariates)



β= regression coefficient; Figures in brackets = 95% confidence interval; adj.= adjusted for all covariates in Model 4 of table 2; *=p<.05; **p<.01; ***p<.001

What does this mean?

The frequency of exposure to alcohol marketing was found to be associated with risky drinking behaviour, even when media use, like hours spent using the internet, and demographic and social factors were controlled for. Not only was the impact significant, its effect size was also substantial when compared to the impact of other factors. In general, only the influence of peers and smoking was found to be stronger predictors of alcohol use. The association of alcohol-branded online marketing exposure and recent binge drinking was found to be consistent in all measures of risky drinking behaviour examined (onset of drinking, onset of binge drinking, and volume of alcohol consumed among those who already drink). This finding is in line with other studies that examined the impact of exposure to online alcohol marketing on adolescents' drinking (Gordon et al., 2010, 2011; Lin et al., 2011; Jones & Magee, 2011). To our knowledge, this is the first study that has examined the impact of several different levels of exposure to online alcohol marketing practices and the first cross-country study that examined the impact of alcohol advertising on adolescents drinking.

A limitation of this study is the measurement of online alcohol marketing exposure (and ownership of alcohol-branded items) by self-reported exposure only. Responses on this memory-based measures can be strongly affected by the interpretation of the respondent, and can be highly correlated to potential confounders, such as past drinking experience (Stacy et al., 2004) in the sense that drinkers may be more familiar with the product and may memorize alcohol advertisements better. This brings us to the most important limitation of this study: the use of cross-sectional data. We cannot rule out the possibility that higher reported online alcohol marketing exposure is a result of drinking experience.

Our data on the frequency of exposure to online alcohol marketing among respondents indicate the degree in which alcohol producers are able to reach young people at a very vulnerable age. For example, Heineken and Google have started a global partnership which increases the international beer producer's YouTube activity. This deal, made in 2011, will very likely mean that at least 103 million minors around the world are being exposed to the harmful effects of alcohol marketing on a monthly basis (EUCAM, 2011).

As in most countries, the volume of alcohol marketing on the internet is not regulated by law in the countries in our study. These countries rely on self-regulation, which seems to be unable to protect young people from high exposure to alcohol marketing on the internet, nor protect them against the harmful impact of this exposure on their drinking. Results of this study show a need for governments to seriously address this issue and to limit the volume of alcohol marketing in digital media by legislation.

The cross-sectional data analyses presented here suggest that higher exposure to online alcohol marketing was found to be associated with recent binge drinking. This finding was robust after controlling for media use, demographic and social factors. Consequently alcohol marketing on the internet (as with alcohol marketing practices in other channels) can be seen as a serious but avoidable threat to adolescents' health. The consistency of this effect among the four European countries and its effect size seriously raises the demand for legal restrictions of the volume of alcohol marketing in online media in European countries, and at a pan-European level.

Take home messages

1. European youngsters from various countries are highly aware of alcohol marketing on the internet.
2. European youngsters report high exposure to online alcohol marketing.
3. These cross-sectional findings indicate that higher exposure to online alcohol marketing is associated with higher odds of being a binge drinker.
4. The findings indicate a dose-response effect: the association with binge drinking becomes stronger with high levels of exposure to online alcohol marketing. This effect seems robust and consistent in various national contexts.
5. Results of the analysis give reason to support a ban on online alcohol marketing to protect youngsters from the harmful effects of exposure to commercial communications, and more specifically online alcohol marketing.

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CHAPTER 9. ALCOHOL INTERVENTIONS AND TREATMENTS IN EUROPE

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Summary

This research focuses on six European countries (Austria, England, Germany, Italy, Spain and Switzerland) in order to assess similarities and differences in three main areas relating to, and influencing, service provision for alcohol use disorders (AUD) and service utilisation.

Semi-structured questionnaires were designed for key clinical and policy experts, to provide a fuller picture of treatment systems including the availability of strategies, protocols, care pathways, prevalence, historical context and common barriers and facilitators for provision. Practitioner attitudes were then examined via two surveys for general practice and accident and emergency settings. Finally, data were extracted from the country reporting in element one – and sourced elsewhere, where necessary – in order to estimate the gap between need for, and access to, specialist alcohol treatment for each country.

We found a diverse provision of alcohol interventions in the key informant study, with devolved responsibility for alcohol treatment policy and significant private health insurance involvement being important contributors to this diversity. Considerable variation existed in the demographics of general practitioners, and in their knowledge of screening and intervention tools, although attitudes to working with alcohol misusers were similar and largely positive. Prevalence of alcohol dependence varied greatly; Italy and Spain having the lowest, and Switzerland the highest. England had the highest number of people accessing specialist treatment and Switzerland had the lowest.

Results, and particularly variation in prevalence and access to treatment, should be interpreted with caution, as the data collection methods vary considerably between countries. Meaningful comparison is therefore limited. The devolution of health systems and powers appears to exacerbate this problem, with fragmented or incompatible monitoring systems. Clear guidance should be provided to all countries on how to improve and more accurately assess the public health impact of alcohol interventions.

Introduction

This research takes as its starting point the existing extensive international research that has been carried out on brief interventions and treatment for alcohol use disorders over the past 20 years, much of it pioneered in Europe. The WHO Collaborative research programme on identification and management of alcohol problems concluded recently with a Phase IV

international project on implementation of screening and brief interventions (SBI) for hazardous and harmful drinkers, involving several European countries: the *Primary Health Care European Project on Alcohol* (PHEPA), on implementing brief interventions in Europe (PHEPA, 2009). This work built on earlier phases which variously identified a valid screening tool for alcohol use disorders - the AUDIT questionnaire (Babor et al., 2001) - in addition to identifying studies on the efficacy and effectiveness of SBI as an intervention, and research on optimal methods for its implementation.

There is an extensive international literature on the effectiveness of SBI. Most recently a Cochrane review (Kaner et al., 2007) confirmed that SBI is highly effective in reducing hazardous and harmful alcohol consumption and health costs in primary health care (PHC) settings. There is also growing evidence of effectiveness in other health settings including accident and emergency departments (Dinh-Zarr et al., 2004; Crawford et al., 2005), and growing evidence of cost-effectiveness of these interventions (Chisholm et al., 2004; NICE, 2010). This and other evidence has recently led to the UK National Institute for Healthcare and Clinical Effectiveness (NICE) to recommend widespread implementation of SBI in the National Health Service (NICE, 2010).

Most research on the implementation of alcohol interventions in Europe has been restricted to screening and brief interventions (Drummond et al., 2011), however several reviews have taken place of the international literature on effectiveness of specialist treatment for people with alcohol dependence. A recent review by NICE in England concluded that various forms of specialist treatment (including psychosocial and pharmacological interventions) are both effective and cost-effective in harmful drinking and alcohol dependence (NICE, 2011). This review also emphasised the need for coordinated systems of care for people with alcohol use disorders (AUDs), offering a stepped care approach to deliver the most appropriate interventions to the in-need population in a cost-effective way. Therefore across the spectrum of severity of alcohol problems, there is clear evidence of the effectiveness of these interventions, at an individual level.

However three clear gaps exist in considering the contribution of individually directed alcohol interventions as a public health measure to reduce harm caused by alcohol:

1. Alcohol treatment system characteristics: Health care utilization varies greatly across European countries, as does the nature of services (European Commission, 2004). These differences in implementation and utilization are likely to be due to political, financial, practical and ethical considerations; however there is a lack of comparative data on variations in alcohol treatment systems across European countries (Drummond et al., 2011). A comparative study of characteristics of treatment systems across European countries – and the country-specific factors facilitating or hampering implementation – could lead to improved guidance on optimal implementation methods.

2. Barriers and facilitators to implementation of SBI at the practitioner level: This study builds on previous studies and reports of attitudes towards and practices of SBI among GPs and primary care nurses in England (Deehan et al., 1998; Kaner et al., 1999; Lock et al., 2002; McAvoy et al., 1999) and in Europe (Anderson et al, 2003; 2004). There is evidence that implementation of SBI is related to practitioners' attitudes, and that these attitudes can be influenced by appropriate training and support. Attitudes to SBI and managing patients with AUDs may vary from one country to another across Europe, though commonalities are also to be expected, and are equally interesting and important; Identification of barriers and facilitators is the first step to developing

optimal methods of implementation.

3. The gap between need for and access to interventions for alcohol dependence. The findings of a recent literature review of existing research on the prevalence of AUD and availability of interventions across Europe has pointed to key gaps in knowledge relating to European alcohol interventions, including a lack of comparative data on the prevalence of AUDs across European countries and the relative gap between need and access to treatment (Drummond et al., 2011). A recent needs assessment study in England (Drummond et al., 2005) found that only 1 in 18 (5.6%) of alcohol dependent drinkers in the general population actually accessed treatment per annum with regional variation from 1 in 102 to 1 in 12. Previous North American research suggested an access level of 1 in 10 was "low", in public health impact terms (Rush, 1990). Several studies have also shown that only a small minority of hazardous and harmful drinkers who could benefit from brief interventions are identified or treated (Kaner et al., 1999; Cheeta et al., 2008). An increase in access to interventions could potentially have a major public health impact. Yet, despite the fact that a developed needs assessment methodology exists, and has been utilised in some places (Drummond et al, 2005; Drummond et al, 2009; Rehm et al., 2012), there has been little use made of this methodology across European countries, and there has been no purpose-designed EU-wide alcohol needs assessment conducted to establish the gap between need and access to interventions for AUD in different countries (Drummond et al., 2011). Finally, a clear demonstration of the cost-effectiveness of interventions (cost offset) across European countries could provide a rationale for increased spending to support more widespread implementation.

What we did and what we found

Under the AMPHORA project, a set of studies were carried out to address all three of the points above. The work comprises several linked research projects, conducted over 4 years, and has six core participating European countries (Germany, Italy, Spain, Switzerland, Austria and England).

1. Descriptive study of alcohol intervention systems in six European countries

This work-stream seeks to describe the systems of early intervention and treatment for AUD, in order to provide comparative information on approaches and the extent of their implementation across the six participating countries. Data collected was used to identify similarities and differences in the systems of provision of SBI and treatment for AUD. System level factors contributing to the effective implementation and public health impact of alcohol interventions were also identified, in order to inform future European public health action on alcohol. Information obtained was both qualitative and quantitative and provides a context for subsequent linked research.

Methods (what we did)

Key informants were identified in each participating country, including: government officials; senior public health specialists with a remit for alcohol treatment provision; senior alcohol treatment service providers; senior primary health practitioners involved in the implementation of early identification and interventions for hazardous and harmful drinkers. This process was assisted by core AMPHORA investigators, additional collaborators, and contacts from within PHEPA, the European Working Group on Treatment Alcohol Dependence, and the World Health Organisation (WHO). Initial interviews were conducted to ascertain appropriateness of the selected key informants, and to encourage positive engagement.

A formal literature search of available published and unpublished official information on provision of alcohol interventions in the participating countries was conducted, supplemented with advice from the key informants.

Semi-structured questionnaires were developed in order to collect comparable information for each country based on previous published and on-going work mapping the provision of alcohol interventions, including PHEPA, UK National Audit Office (2008), and WHO (Babor & Poznyak, 2010). The contents and terminology were examined and discussed in order to maximise comprehension and retain cultural or contextual accuracy. In most cases the questionnaire was posted in advance of the interview, to ensure completeness of data provided.

Qualitative and quantitative data was sought on a range of issues including: present and historical provision of alcohol interventions; policy initiatives to increase implementation of alcohol interventions and their impact; comparable data on annual spending relating to alcohol interventions across the spectrum of care provision (based on the intervention categories, or "service tiers" as described in Models of Care for Alcohol Misusers (Department of Health, 2006); comparable data on numbers of individuals identified and receiving alcohol interventions; information on available materials and methods to deliver alcohol interventions (including services, prescribed medication, psychosocial interventions, training, protocols and tools); descriptive information on typical care pathways for AUD; identification of barriers and facilitators to the implementation of alcohol interventions; and key informants' perceptions of the extent to which alcohol intervention have been successfully or otherwise implemented in their respective countries, and reasons for this.

Results (what we found)

Six country reports were produced on the findings from key informant interviews, and these were collated into a final comprehensive report, which provided comparisons across countries, where possible, given the variations in formats of information and availability of comparable data.

Table 1 summarises the health systems and treatment provision for AUD across the 6 countries. Most countries (83.3%) were able to report having some alcohol service mapping mechanism in place, to describe current alcohol service provision, however only half (50%) had a formal national alcohol strategy which included alcohol service provision. All countries were able to provide examples of initiatives designed to increase implementation of alcohol interventions, however the success rates and impact of these initiatives was less straightforward to demonstrate or compare, as each country used different methods of data collection. Likewise, data on annual spending is collated and estimated in different ways in each country. Indeed, the more federalised state structures found it difficult to collate all regional data to inform an overall national picture.

The availability of materials and methods to deliver alcohol interventions is described in Table 2. It can be seen that most of the countries had access to appropriate methods to deliver alcohol interventions, although the extent to which this was the case or was actively promoted, varied between countries.

Drawing meaningful comparisons on national prevalence rates of AUD and numbers receiving an alcohol-specific intervention presented challenges. Data is available across all countries on patients who have received specialist treatment in a range of settings, but methods of coding and recording are different, some using primary or secondary alcohol-attributable diagnoses, or number of people entering treatment for AUD within a year, or hospital discharge diagnoses. In the case of hospital discharge diagnoses it is unclear if patients identified with

alcohol dependence actually received an alcohol intervention as opposed to being in hospital only for treatment of a physical illness (e.g. alcoholic liver disease). The resulting between-country comparisons are therefore less robust than would be ideal.

Table 1. Health systems and treatment for AUD (of the six participating countries)

Country	Provision of screening and brief interventions, for hazardous/ harmful drinking	Provision of specialist treatment for alcohol dependence	Health system funding sources	Treatment monitoring systems in place	Availability of a national alcohol strategy (including aspects of service provision)	Existence of decentralisa-tion in the health system
Austria	No	Yes Mainly residential setting	Social insurance, Government / tax (local, regional, national), private insurance and co-payments	Not mentioned	No	Yes 9 Länder and very decentralised. Plus multi-layered health systems.
England	Yes	Yes Specialist (community or residential) - medical and psychosocial	Government / tax	Yes	Yes Little if any service provision	Yes Strategic Health Authorities, and potentially more so with new structures due in the present reorganisation of National Health Service
Germany	Rarely	Yes	Social insurance	Yes	No	Yes 16 Bundesländer
Italy	Yes Primary health care and other settings	Yes Specialist addictions clinics, departments or hospital - medically assisted and psychosocial	Regional and national tax, and co-payments	Yes	Yes Increase in service provision included	Yes Localised Health Units (ASLs)
Spain	Yes	Yes Outpatient and inpatient	Tax	Yes	Yes But contains nothing on service provision	Yes 17 autonomous communities
Switzerland	Yes Widespread, but not officially driven	Yes Range of inpatient, outpatient, medical and psychosocial	Tax, health insurance, and a mixture of other funding sources (depends on the particular service and setting)	Not mentioned	No Service provision tackled in forerunning documentation for strategy in the future	Yes 26 Cantons

Countries were able to provide little recorded or monitored information on SBI taking place within non-specialist settings compared to specialist treatment episodes. Formalised care pathways and treatment protocols are similarly much more documented for people with alcohol dependence than those with hazardous and harmful use of alcohol. Many common experiences were shared across countries as to which were the barriers and facilitators in implementing alcohol interventions, including attitudinal, fiscal, administrative or political factors.

Table 2. Summary of availability of materials and methods to deliver alcohol interventions (this table states whether examples have been provided for each of these categories)

	Austria	England	Germany	Italy	Spain	Switzer-land
a) Materials, methods, screening tools	Yes	Yes	Yes	Yes	Yes	Yes to some degree, but not promoted
b) Interventions: used & promoted in practice	Yes	Yes	Yes	Yes	Yes	Yes
c) Number of service providers delivering alcohol interventions (stat/non-stat)	Yes	Yes	Yes	Yes	Yes	Yes
d) Pharmacological products: licensed and available	Yes	Yes	Yes	Awaiting clarification	Yes	Yes
e) Psychological interventions available	Yes	Yes	Yes	Awaiting clarification	Yes	Yes
f) Service provider workforce training (& any national initiatives to promote training)	No (very small number)	Yes	Yes	Yes	Yes	Yes
g) Protocols or tools, promoted to deliver effective alcohol interventions	Yes	Yes	Yes	Yes	Yes	Yes
h) National review of effectiveness of treatment, or published national standards in treatment delivery	No	Yes	No	Yes	No	No
i) Internet based interventions	Yes	Yes (but not to a great extent)	Yes	No	Yes	Yes
j) Internet based resources for professionals	Yes	Yes	Yes	Yes	Yes	Yes
k) Active mutual aid and/or self-help organisations	Yes	Yes	Yes	Yes	Yes	Yes

Common themes regarding barriers to implementation of alcohol interventions were identified across countries. These included low awareness of risk and related harm due to alcohol in the general public and health care system; lack of education of health professionals on SBI; competing demands on health professionals' time; lack of dedicated funding allocation for alcohol interventions, particularly those extending beyond pilot or demonstration projects; organisational fragmentation; negative attitudes and low motivation towards alcohol misusers amongst health professionals; a lack of clear implementation strategies; a lack of dedicated staff to provide alcohol interventions, including both SBI and specialist treatment. Countries that had a more devolved administration for health care reported greater fragmentation and

poor national coordination of alcohol public health initiatives, including alcohol interventions. Countries with more substantial private health care insurance encountered particular problems in obtaining reimbursement for alcohol interventions, which were not viewed by some insurance providers as being as important as other health care interventions. Some countries had a historically higher level of inpatient provision, compared to outpatient/community provision, than would be supported by the research evidence base.

Few countries identified positive facilitators for implementation of alcohol interventions. However some countries noted that the development of national monitoring systems was helping to inform health care commissioning in this area as gaps were identified. There were also some national initiatives described such as the Alcohol Improvement Programme led by the UK Department of Health in England, and two countries reported specific training initiatives with medical students to increase their awareness of alcohol interventions and competence in delivering them.

Many of the barriers to implementation are common across countries. Roll-out of interventions is hampered in most countries by a lack of clear national strategy for training, funding and implementation. Several country respondents noted that the public health response to alcohol is some way behind equivalent initiatives towards tobacco and illicit drug misuse.

Conclusions

These findings point to the fact that there is much work to do if meaningful, cross-national comparisons are to be achieved. This applies to numbers in need of treatment and numbers accessing treatment, as much as it does to expenditure on the provision of services. A clear framework for data collection and strategy for implementation is lacking in many countries and we are clearly a long way from a Europe-wide standard to enable between country comparisons.

Recommendations include the need to formalise the monitoring of alcohol problem and treatment data, and collate this data at a national level, frequency of monitoring, and the future provision of guidance on periodical data collection.

Some examples of good practice in implementation of alcohol interventions were noted in individual countries. But these were few in number and practice largely does not appear to be currently shared across Europe.

2. Survey of medical practitioners in primary care and emergency departments

We conducted a parallel series of national surveys of alcohol intervention service providers across the 6 countries. This included medical practitioners in primary health care settings (PHC) and accident and emergency departments (A&E). The aims of this study were to identify barriers and facilitators to service provision in PHC and A&E.

Methods (what we did)

We aimed to survey a random sample of 100 primary care staff (general practitioners – one from each practice/surgery) in each of the six countries, using national databases and registers of primary care practitioners or selected from the relevant professional organisations. Table 3, below, summarises the number of respondents for each country, sampling frame and methods used to collect this data. This provided a total of 683 primary care staff across the six participating countries. A survey was developed based on the recent UK (Kaner et al., 2008;

Deluca et al., 2008), US and WHO surveys of health professionals on the identification and management of AUDs, which also included the Short Alcohol and Alcohol Problems Perception Questionnaire (SAAPPQ, Anderson and Clement, 1987).

The SAAPPQ is a 10 item, 7-point Likert-type questionnaire measuring the attitudes of professionals towards the provision of care to those with alcohol use disorders. The SAAPPQ is a shorter version of the original AAPPQ (Cartwright, 1980). The SAAPPQ measures two attitudinal dimensions – 'role legitimacy' and 'therapeutic commitment'. 'Role legitimacy' refers to the way in which professionals perceive the adequacy of their skills and knowledge in relation to problem drinkers and how appropriate it is for them to work with such clients. 'Therapeutic commitment' refers to the extent to which professionals seek to engage drinkers in treatment and the extent that they find the work rewarding on both a professional or personal level (Gorman and Cartwright, 1991).

Once finalized the survey was adapted and translated to meet different national languages and contexts.

Participating staff either completed an electronic survey online, received an electronic version via email, received a printed copy by post, or were interviewed over the phone, in order to achieve the sample size as quickly and efficiently as possible. Data collected from each partner country were entered into a single SPSS file for analysis.

For Accident and Emergency staff, we aimed to randomly select five Accident and Emergency departments in each country. Twenty staff from each department were invited to complete an online survey, or postal survey, or were interviewed over the phone. In the UK, staff invited to take part consisted of A&E consultants, Associate Specialists, Specialist Registrars, Senior House Officers, Advanced Nurse Practitioners, Emergency Nurse Practitioners, Senior Sisters, Junior Sisters and Staff Nurses. As data collection is still on-going in Italy, Germany, Switzerland and Austria the results from those countries will be presented elsewhere.

Table 3. Summary of the Primary health care survey methods

Country	Method/s	Sampling	Completed
Austria	Email/online	5,000	103
Germany	Letter (and email)	800	103
Italy	Online	1,300	198
Spain (Catalonia)	Online	100 (centres)	74
Switzerland	Postal	500	102
UK (England)	Online/Phone	300	103
		Total	683

Results (what we found)

Table 4 shows the proportion of males and average age of the respondents across the six countries. The gender balance of respondents varied between countries, with the percentage

of male GPs varying between 74.2% in Italy to 23.3% in Catalonia. Mean age of respondents also varied from 56.2 years in Italy to 46.5 years in England.

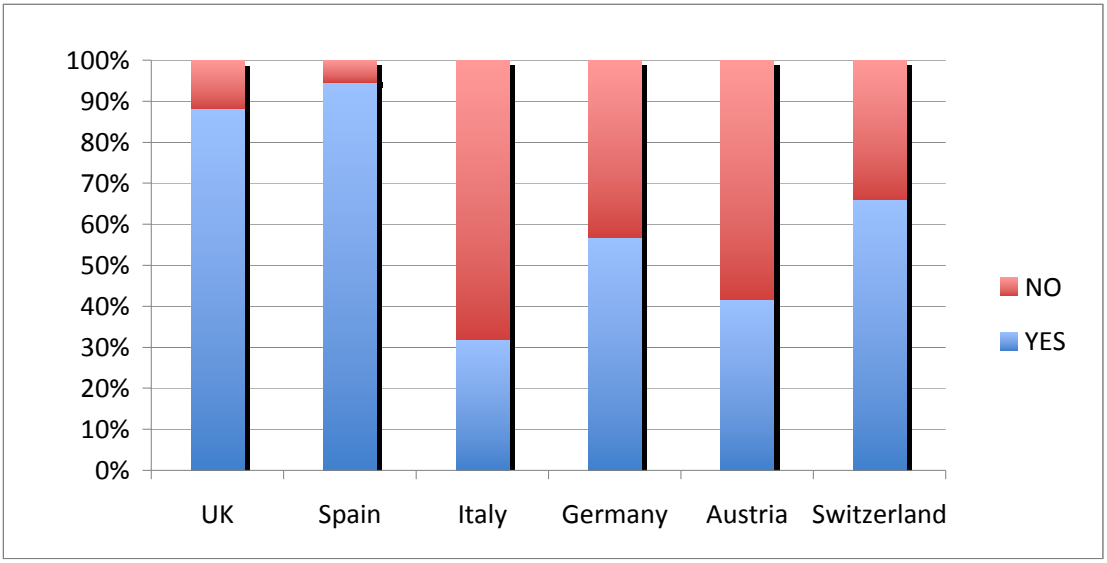
Number of patients seen each week by each individual general practitioner was highest in Austria (n=285) and lowest in Switzerland (n=98). However, when adjusted for the number of people seen, GPs in Switzerland were able to identify more people with AUDs (4.5%) than GPs from any other country (Table 4).

Table 4. Sample demographics and patients seen and screened positive for AUD per week

Country	Gender (% males) of respondents	Age (Mean) of respondents	Patients per week	Patients screen positive/week (%)
Austria	46.5%	55.2	285	6.54 (2.5%)
Germany	53.4%	53.8	203	7.76 (3.8%)
Italy	74.2%	56.2	117	5.18 (4.4%)
Spain (Catalonia)	23.3%	47.3	149	4.14 (2.8%)
Switzerland	61.8%	52.5	98	4.40 (4.5%)
UK (England)	52.4%	46.5	110	3.87 (3.5%)
Total (mean)	56.3%	52.7	154	5.34 (3.5%)

Figure 1 shows the proportion of GPs who are familiar with standardized alcohol screening tools such as FAST or AUDIT across the countries. Spain (Catalonia) and UK (England) were top of the list with 94.6% and 88.2% respectively. GPs in Italy are the least aware of standardized tools for the identification of people with alcohol problems.

Figure 1. Are GPs familiar with standardized alcohol screening tools?



Similarly the majority of GPs in Spain (Catalonia) and the UK (England) are more familiar with alcohol brief interventions. With this term we refer to interventions carried out in non-specialist settings, by non-specialist personnel and which are directed at hazardous and harmful drinkers who are not typically complaining about, or seeking help for, an alcohol problem. These interventions might vary in length from 5 minutes to 30/40 minutes, and from a single session to repeated sessions.

Figure 2. Are GPs familiar with brief interventions?

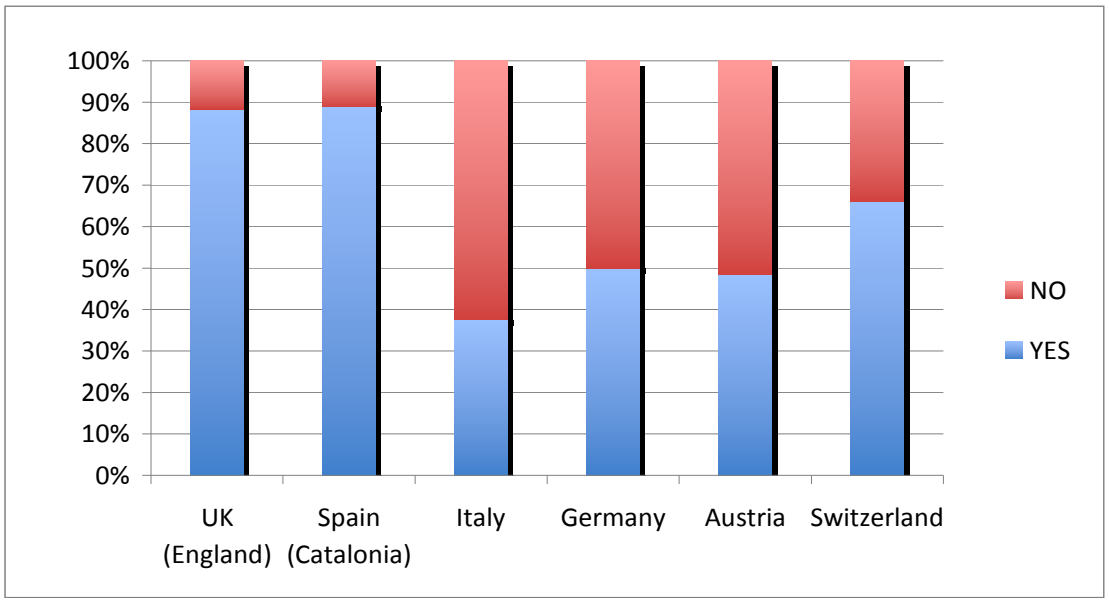
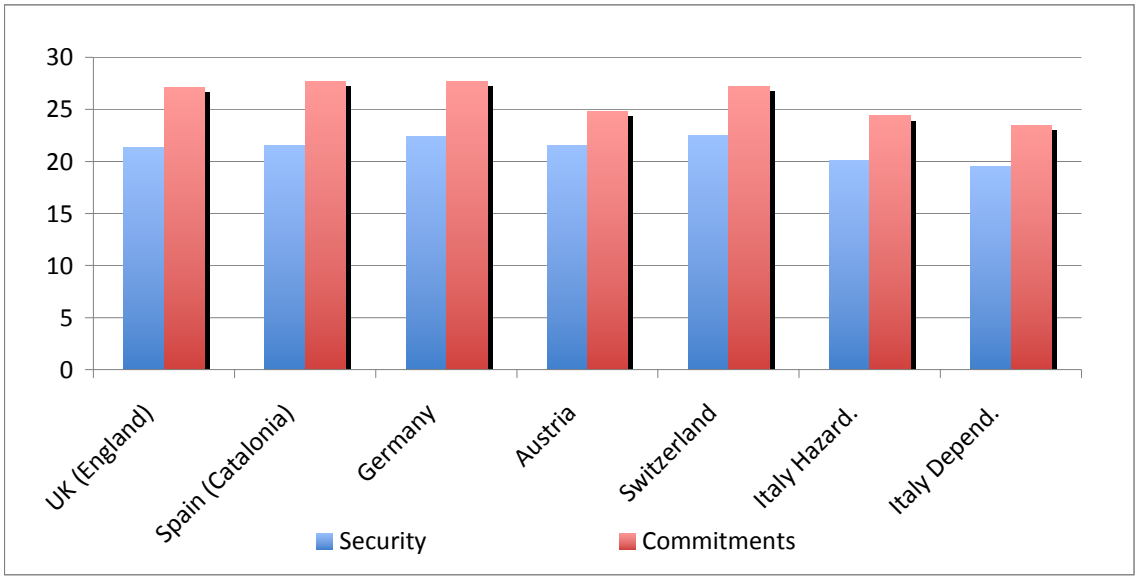


Figure 3 compares the subscale-scores of the SAAPPQ relating to Role legitimacy / Role security and Therapeutic commitment. These show no statistically significant differences between the respondents across countries.

Figure 3. GPs SAAPPQ score by country



Conclusions

In summary, several points of interest emerged from the between country comparisons of attitudes and practices of primary care practitioners. There was considerable variation in the demographic characteristics and level of activity of practitioners across the countries. It is also interesting to note that there was considerable variation in knowledge of screening and intervention methods across countries, although attitudes towards working with alcohol misusers were remarkably similar.

Further analysis will examine the extent to which demographic and attitudinal factors were related to SBI knowledge and activity. We will also report the results of the A&E study and comparisons between PHC and A&E elsewhere.

3. Study of the gap between the need for and access to treatment for alcohol dependence across Europe

The aim of this work-stream was to estimate the prevalence of alcohol dependence in the six participating countries, and to conduct a needs assessment to estimate the gap between alcohol-related need and access to specialist alcohol treatment in each country. Available data on the prevalence of alcohol dependence and alcohol-related morbidity and mortality was identified in each country, and the prevalence compared with access to treatment for people with alcohol dependence in all six countries, creating a prevalence-service utilisation ratio (PSUR).

Methods (what we did)

First, all relevant data was extracted from the country expert reports that would inform estimates of the prevalence of alcohol dependence and access to treatment in each of the six countries.

- Need for treatment: Data was combined from country reports, where available, to estimate the prevalence of alcohol dependence in each country. Where this data was unavailable, prevalence figures were used from the recent European alcohol needs assessment by Rehm et al. (2012).
- Access to treatment. All available published or unpublished national data on patients accessing specialist treatment was identified. Some countries routinely collect national data on treatment access. Data on numbers accessing specialist inpatient and outpatient treatment was therefore extracted from the country reports where available. In countries with more devolved health care administration or greater private health insurance involvement, comprehensive national data was not possible to obtain. Where possible, treatment access data relating to the same year as the prevalence estimates was used. Only data on access to state- or insurance-funded treatment episodes was included. Data on self-help and mutual aid organizations was not included. In some countries (e.g. Italy) this was noted to be a significant contributor to the overall service provision. However where the data was unclear, unobtainable, or simply not anchored in a specific year of reference, the recently published specialist alcohol service access data relating to 2004 (Rehm et al., 2012) was used in the gap analysis.
- Gap analysis. The gap between the need for alcohol interventions (number of people who are alcohol dependent in the general population) and access to specialist treatment services (including inpatient and outpatient services) was analysed to produce a prevalence-service utilization ratio (PSUR) for each country. The methodology used was obtained from a recent national alcohol needs assessment study in England (Drummond et al., 2005). The prevalence rates of

alcohol dependence based on available survey data was combined with the relevant years' population estimates for each country, in order to estimate the number of individuals in need of specialist alcohol intervention in each country.

Results (what we found)

The results of the gap analysis are shown in Table 5. It can be seen that the prevalence of alcohol dependence based on the available data varied considerably across the 6 countries. Italy had the lowest male prevalence rate (0.7%) and Spain had the lowest female prevalence rate (0.2%). Switzerland had the highest male prevalence rate (7.2%) and Austria had the highest female prevalence rate (2.5%). Given the convergence of other alcohol-related indicators (e.g. per capita alcohol consumption, alcoholic liver disease mortality) between European countries over the last 20 years, this variance is surprising and probably more an indication of differences in methods of estimating prevalence of alcohol dependence than being a true reflection of real differences in alcohol dependence.

By comparison there was less variance between countries in the estimated numbers accessing treatment, which tends to support the conclusion that perhaps there is less between country variation in prevalence of alcohol dependence than the available data suggest. England had the highest number of people accessing specialist alcohol treatment (111,381) and Switzerland had the lowest (23,589 – 39,000). However this may be more a reflection of different systems of data collection between countries. England has had a National Alcohol Treatment Monitoring System since 2008, which records data on treatment access contemporaneously. In Switzerland on the other hand a reliable national estimate was not possible to obtain as data tends to be collected locally or via multiple health insurance providers. So it is possible that the access level is higher than the data suggest. As a consequence mainly of the different prevalence rates, the PSURs vary widely across Europe. Italy had the highest level of access with 1 in 4.2 (23.3%) people with alcohol dependence accessing treatment per year. Germany had the lowest level of access with 1 in 28 (3.6%) people with alcohol dependence accessing treatment per year. For more details of the data sources and limitations of the data please refer to the full technical report on AMPHORA work package 6 (Drummond et al., forthcoming).

Conclusions

The results of the gap analysis must be interpreted with great caution. It is not clear that meaningful comparisons of prevalence of alcohol dependence can be made across Europe given the different methods used to achieve the estimates. Countries with large general household surveys (e.g. England) probably have more reliable estimates than those based on hospital discharge diagnosis. However, even then different measures have been used to estimate alcohol dependence (e.g. the Adult Psychiatric Morbidity survey in England used the AUDIT questionnaire, which is not ideal for estimating prevalence of alcohol dependence as it was designed as a screening tool for hazardous and harmful drinking). Given the importance of alcohol dependence to European public health, there is therefore a clear need for a Europe-wide household survey to estimate comparative prevalence rates using the same time frame and survey instruments. This would be essential to the rational planning of alcohol treatment provision and benchmarking across Europe.

Table 5. Gap analysis of specialist treatment for alcohol dependence

	General population (full & aged 15yrs+) T-Total M- Male F- Female	Prevalence rate (% of population aged 15yrs+): M=male, F=female, T=Total population, if figure provided	Number of adults with AD (n) (aged 15yrs+, England 16yrs+)	Access to treatment (n) (aged 15yrs+, England 18yrs+)	PSUR (% of in need population accessing treatment)
Austria *	T: 8,363,040 M: 3,431,078 F: 3,679,527 = 7,110,605 (15yrs+)	M: 7.5% F: 2.5% T: 5%	357,000	39,983	8.9 (11.2%)
England **	T: 53,012,500 43,640,400 (15yrs+)	M: 6.0% F: 2.0% T: 4%	1,745,616	111,381	14.4 (6.4%)
Germany ***	T: 81,902,000 70,770,700 (15yrs+)	T: 2.3%	1,600,000	57,259	28.0 (3.6%)
Italy ****	T: 60,045,068 M: 24,818,220 F: 26,798,140 = 51,616,360 (15yrs+)	M: 0.7% F: 0.4%	280,919	65,360	4.2 (23.3%)
Spain *****	T: 45,593,000 43,769,280 (15yrs+)	M: 1.2% F: 0.2%	271,200	49,036	5.5 (18.1%)
Switzerland******	T: 7,593,500 6,021,646 (20yrs+)	M: 7.2% F: 1.4%	249,100	39,000 - 23,589	10.6 - 6.4 (9.4% - 15.6%)

*Austria: All data presented is for 2009. Access to treatment combines "main" and "secondary" alcohol dependence hospital diagnoses (31,218) and outpatient figures from the country report spanning different years between 2002 & 2009.
**England: Population data is from 2011 census, so a new PSUR has been calculated using the 2007 APMS prevalence data (although it refers to adults 16yrs+). Treatment access data is for 2009-10 and refers to adults 18yrs+ in treatment with alcohol as the primary substance.
***Germany: Population is for 2009. Number of population with alcohol dependence is 2011 – although this is not adequately referenced in the country report to be sure – and experts believe this to be an underestimate (with alcohol dependence actually affecting 5% men and 2% women, and number to be at least 2m). Access data is for 2007 and is described as inpatient and outpatient treatment "provisions granted".
****Italy: Population figures are for 2009, but prevalence is for adults aged 15yrs+ in 2001-03, from the European Study of the Epidemiology of Mental Disorders (ESEMeD). This has been used to calculate an estimate number AD "in need" population for 2009. Access to treatment figures are for 2009 and describe "the total number of alcoholics who received a community treatment at a specialist service"
*****Spain: All data provided is for 2008. Prevalence refers to adults aged 15yrs+ and has been taken from the WHO world mental health surveys. Treatment numbers have been sourced directly and are for outpatient, hospital and non-hospital.
******Switzerland: Population figures are for 2007 and for adults 20yrs+ estimated on the proportion of 2011 population in this category (age 15yrs+ is not accessible and nor are age breakdowns except for most recent year). Prevalence figures are for adults aged 15yrs+ in the year 2007 and treatment (higher and lower estimates) are from 2004.

Similarly, there were problems in obtaining reliable estimates of the number of people entering specialist alcohol treatment. Countries with national treatment monitoring systems (e.g. England, Germany, Italy, Spain) were able to provide more reliable data than countries with no similar system. There is therefore a need to develop harmonization between European countries on the collection of prospective treatment monitoring data. Again, this would be helpful in estimating the relative potential public health impact of alcohol treatment across Europe.

What does this mean? Overall conclusions

This study builds on knowledge from earlier cross-European studies of alcohol interventions. In all areas of the research, we identified considerable between-country variation in the organisation and provision of alcohol interventions. Countries that appear to have more developed national alcohol strategies appear to be achieving higher levels of implementation of both SBI and specialist treatment than countries without such strategies. The devolution of health care management and funding to local levels appears to hamper implementation of effective public health strategies, although these countries may be more effective in delivering other types of health care for other disease conditions.

Since alcohol places a considerable health, social and economic impact on Europe, there is a need for a more concerted effort to implement evidence-based early intervention and treatment strategies as part of the overall public health response. In order to assess the public health impact of these interventions and make comparisons between countries, there is a need for improved and up-to-date data on prevalence and service utilization to support rational and cost-effective health care planning. Currently, implementation appears to be based on relatively poor quality data, which is largely not comparable between countries in Europe. We suspect that, as this project was conducted in some of the more developed countries in Europe, the situation in less developed countries may be even more difficult to assess.

We therefore recommend that these issues are considered at the European Commission and WHO Europe level to develop an improved public health response to alcohol through implementation of early identification and treatment. High on the list of priorities will be the identification of a harmonised Europe-wide system of estimating prevalence of alcohol use disorders, and monitoring implementation of SBI and specialist alcohol treatment.

Take home messages

1. There is considerable variation in the implementation of alcohol interventions across Europe, partly related to national strategies and devolved responsibility.
2. There is a need for a more concerted effort across Europe to implement evidence based alcohol interventions.
3. There is a lack of comparable high quality information on the prevalence of alcohol use disorders and access to interventions.
4. A Europe-wide system for estimating prevalence of alcohol use disorders and monitoring implementation of early identification and treatment is needed.

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CHAPTER 10. FROM HOME TO PUB

Karen Hughes, Zara Quigg, Mark A. Bellis, Amador Calafat, Ninette van Hasselt & Matej Kosir

Summary

Pubs, bars and nightclubs have an important social and economic role in Europe, being major settings for socialising, entertainment and employment. However, drinking environments often see high levels of intoxication and alcohol-related harms, including violence and drink driving. Preventing harm in drinking environments is a key priority in European alcohol policy yet there is a scarcity of research and knowledge on drinking behaviours in European nightlife environments and on the factors in drinking venues that are associated with higher levels of intoxication and harm. The Amphora project aimed to address this gap by implementing a study of drinking behaviours and bar environments in four diverse European nightlife areas: Liverpool in the UK, Ljubljana in Slovenia, Palma (de Mallorca) in Spain and Utrecht in the Netherlands. Using a cross-sectional survey combined with breathalyser tests among young drinkers using the cities' drinking premises and a quantitative observational study in bars, the study has developed valuable knowledge to inform the development of alcohol policy in Europe. This chapter describes how the study was implemented and outlines its key findings and implications for policy makers and practitioners.

Introduction

Preventing alcohol-related harm in drinking environments is a growing priority across Europe. Pubs, bars and nightclubs play a central role in the recreational lives of individuals across Europe, particularly young people. These venues can provide a measure of social protection for drinkers and non-drinkers alike, for example through staff controlling access to alcohol and intervening in aggressive encounters. Despite this, public drinking environments are often associated with high levels of intoxication and problems including public disorder, violence, sexual assault, unintentional injury and drink driving. For example, studies in countries including the UK and Germany have shown that excessive alcohol use is common among young nightlife users, with many already under the influence of alcohol when arriving at public drinking premises after having pre-loaded with cheaper off-licensed alcohol (Bellis et al, 2010; Hughes et al, 2008; Hughes et al, 2010; Wahl & Berner, 2010). The convergence of large numbers of intoxicated individuals in busy bars and streets creates potential for alcohol-related harm, while areas that have greater densities of alcohol outlets typically see increased violence, as well as problems such as unintentional injury and road traffic crashes (Gruenewald et al, 2010; Gruenewald & Johnson, 2010; Livingston, 2011; Livingston, Chikritzhs & Room, 2007).

Research examining alcohol-related harm in drinking environments often shows that violence and other alcohol-related problems tend to cluster in and around specific 'problematic' venues (Newton & Hirschfield, 2009). This suggests that certain characteristics of these venues contribute to alcohol-related problems. A number of studies have set out to examine what these environmental factors are, in order to inform the development of preventive interventions (e.g. Graham et al, 1980; Graham et al, 2006; Homel et al, 2004). A systematic review conducted by the Amphora project brought together their findings, identifying

numerous factors that have emerged as important in predicting increased alcohol use and harm in bars. These include poor cleanliness, crowding, loud music, a focus on dancing and a permissive environment (i.e. tolerance towards anti-social behaviour) (Hughes et al, 2011a).

The European action plan to reduce the harmful use of alcohol 2012-2020 (World Health Organization Regional Office for Europe, 2011) has recognised the importance of the physical and social bar environment in increasing or reducing alcohol-related problems. Amongst options for action, the plan suggests the development of guidelines and standards for the design of drinking premises, server training and the monitoring and enforcement of licensing laws. However, despite a growing interest in this area of alcohol policy, understanding what action is needed where has been complicated by a scarcity of information and knowledge of both drinking behaviours among young European nightlife users and the environmental factors in European bars that contribute to increased harm. Understanding of youth drinking behaviours in Europe is largely limited to information gathered through school surveys of adolescents below the legal age for using bars and nightclubs, or general population surveys of adults that provide little context on nightlife behaviours. Equally, most studies on associations between environmental factors in bars and alcohol-related harm have been conducted in non-European settings (Hughes et al, 2011a). To address this gap in knowledge, the Amphora project conducted a study of drinking behaviours (Hughes et al, 2011b) and bar environments in four European cities: Liverpool (UK); Ljubljana (Slovenia); Palma (Spain); and Utrecht (Netherlands). This chapter outlines the methodology used, presents key findings from the study and discusses their implications for policy and prevention.

What we did

In each city, a team of trained researchers undertook a survey and breathalyser test with young drinkers (aged 16-35 years) using nightlife environments and conducted a series of structured observations in bars. Between September and November 2010, a total of 838 interviews (Liverpool n=222; Ljubljana n=221; Palma n=191; Utrecht n=204) were undertaken on Thursday, Friday and Saturday nights during peak nightlife hours in each city (Hughes et al, 2011b). Participants were surveyed on the streets in busy nightlife areas and asked about their drinking behaviour that night up to the point of survey, and their intended alcohol consumption over the remainder of the night. Alcohol consumption was recorded in terms of numbers of standard or large drinks of different types, and was later converted to grams of alcohol using an online conversion tool.[7] At the end of the survey, each participant was breathalysed and their breath alcohol concentration was recorded on their survey form, later converted to blood alcohol concentration (BAC) for analysis.

Over the same period, researchers conducted 238 hours of covert observation in bars – with 15 youth-focused bars in each city visited up to four times for a one hour period. The observations were conducted by mixed gender pairs and, after leaving the venue, each researcher independently completed a structured assessment tool. The tool was a slightly modified version of a bar assessment schedule developed in Canada and used in previous studies of bar environments (e.g. Graham et al, 2006), with some items removed (e.g. pool table atmosphere) and some added (e.g. the price of certain drinks) to tailor it to modern bar environments in the four cities. The tool recorded measures of the physical bar environment, staff practice, alcohol and food service, in addition to customer behaviours, and included a rating of overall levels of customer intoxication in the venue. Researchers also recorded any incidents of alcohol-related harm witnessed during the observation, including overt intoxication, vomiting, aggression and falls. For each visit, the two independently completed assessment tools were checked by the city research lead and inconsistencies were discussed

7 http://www.drinkaware.co.uk/tips-and-tools/drink-diary/

with researchers during a consensus meeting, providing a single combined assessment for each visit. Data from both the surveys and the observations were analysed in SPSS by the UK research team.

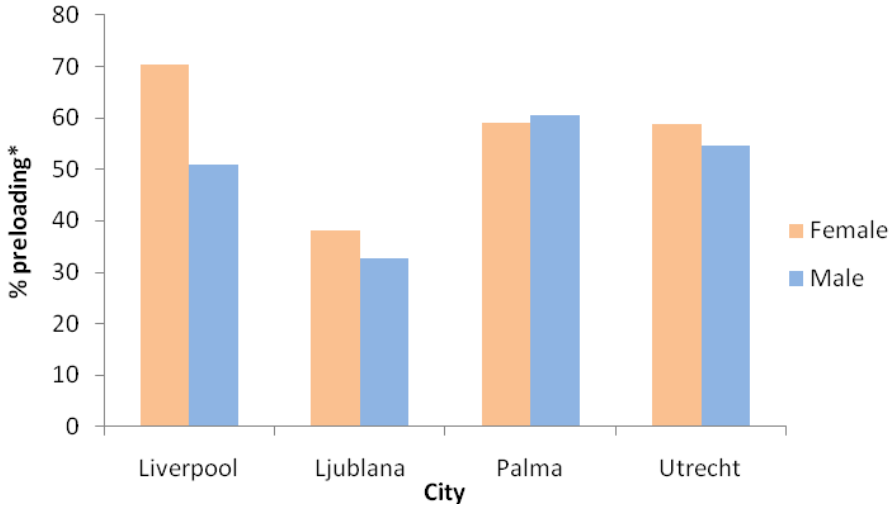
What we found

Drinking behaviours among European nightlife users

Of the 838 individuals who participated in the drinking behaviour survey, 57.6% were male and the mean age was 23 years. Significantly more females were surveyed in Liverpool while younger samples were obtained in Liverpool and Palma. In all cities, over three quarters of participants reported having had their first alcoholic drink that night at least three hours before taking part in the survey. Around half of those surveyed in Liverpool and Utrecht had been in the nightlife environment for less than three hours when interviewed, whilst most in Ljubljana and Palma had been out for at least three hours. Over half of those interviewed in Liverpool, Ljubljana and Palma expected to stay in the nightlife setting for a total of at least five hours, and around a third for more than seven hours. In Utrecht, almost 60% expected to stay out for less than five hours.

The survey asked participants whether they had preloaded (consumed alcohol at home or a friend's home) before going out that night. Almost half (45.1%) of all participants reported this type of preloading with levels highest in Liverpool (61.4%) and lowest in Palma (25.7%). However, a further 33.9% of participants in Palma reported having preloaded by participating in *botellón* – the consumption of off-licensed alcohol in public places such as streets and parks. Thus, overall, participants from Palma had preloading levels similar to those in Liverpool. Figure 1 shows the gender breakdown of preloading in each city; differences were only significant in Liverpool where significantly more females than males had preloaded.

Figure 1: Percentage of participants having preloaded*, by city and gender



* including participation in *botellón* in Palma

In both males and females, median %BAC at interview was highest among participants from Liverpool, followed by those from Utrecht. Despite this, for females there was no significant difference between cities in the amount of alcohol reported to have been consumed by interview (Table 1). This suggests that females from Liverpool may have underestimated the amount they had consumed that night. However, females from Liverpool did expect to drink more alcohol over the remainder of their night out than those from other cities, meaning the

total amount of alcohol they expected to consume (combining that reported and that expected) was significantly higher than in other cities. Among males, both the quantity of alcohol reported by interview and the amount expected over the remainder of the night out were highest in Liverpool, followed by Utrecht. Over the entire night (pre- and post-interview), males in Liverpool reported expecting to drink more than double the quantity of alcohol expected by those in both Ljubljana and Palma.

In the UK, binge drinking is often defined as consumption of more than six units of alcohol in one session by females and more than eight units by males, with one unit equating to 8 grams of alcohol. Based on this definition, median quantities of alcohol consumed by interview were equivalent to binge drinking in all cities. Combining alcohol already consumed and expected to be consumed post interview, the majority of participants in all cities expected to binge drink that night (Table 1).

Table 1. Recorded blood alcohol concentration (%BAC) at interview and reported alcohol consumption during the night out, by gender and city

	Liverpool	Ljubljana	Palma	Utrecht	P
Females					
Median %BAC at interview	0.10	0.05	0.06	0.07	<0.001
Median grams of alcohol reported by interview	56.8	50.4	50.4	54.4	0.147
Median grams expected over remainder of night	40.0	17.6	16.8	22.4	<0.001
Median total grams of alcohol	104.8	66.4	72.0	76.8	<0.001
% expecting to binge drink that night*	82.5	67.9	63.8	80.5	<0.05
Males					
Median %BAC at interview	0.13	0.08	0.07	0.09	<0.001
Median grams of alcohol reported by interview	104.0	64.0	70.4	92.8	<0.001
Median grams expected over remainder of night	62.4	18.4	16.8	33.6	<0.001
Median total grams of alcohol	176.8	79.2	87.2	139.2	<0.001
% expecting to binge drink that night*	96.0	61.6	72.3	85.8	<0.001

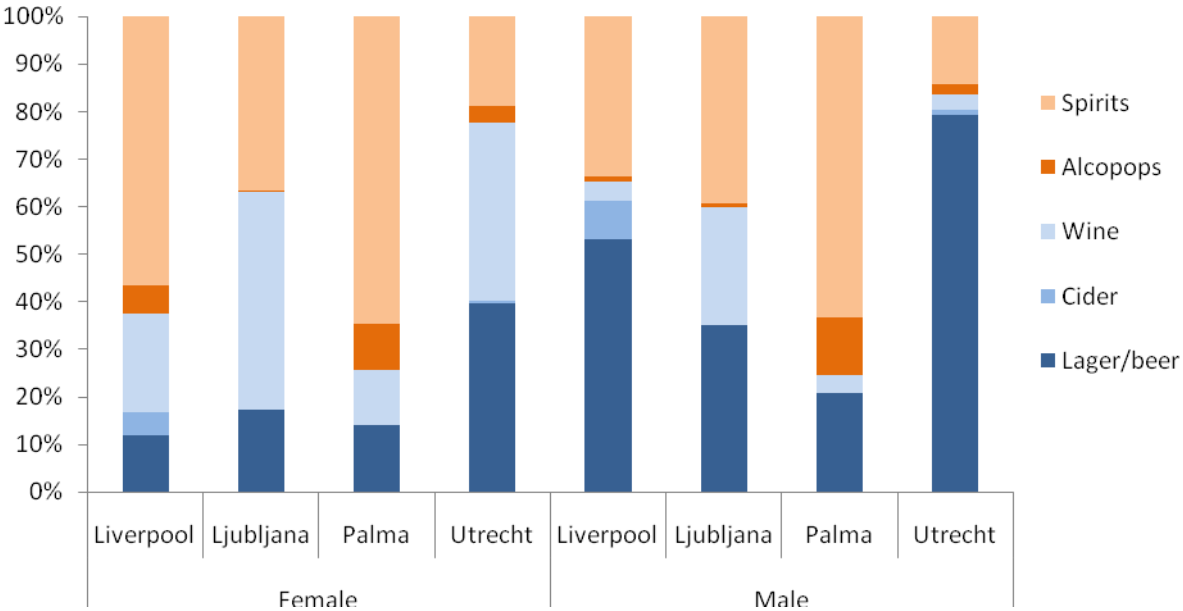
* Sum of grams consumed by interview and expected additional grams over the remainder of the night greater than 48.0 grams for females and 64.0 grams for males.

Figure 2 shows the proportion of alcohol consumed by interview that was accounted for by different drink types. Spirits accounted for over half of all grams of alcohol consumed by females in Liverpool and both females and males in Palma. Beer accounted for the majority of alcohol consumed by males in Utrecht, and over half of those by males in Liverpool. Almost half of all alcohol consumed by females in Ljubljana was accounted for by wine.

Due to the interviews and breathalyser tests being undertaken at different times of night, self-reported alcohol consumption by interview and %BAC were examined based on the length of time that participants had been drinking for when they were surveyed (i.e. time since their first drink). For those that had been drinking for less than three hours, there were no differences between cities or genders in either self-reported alcohol consumption or median %BAC. Across all cities, self-reported alcohol consumption increased in those who had been drinking longer (Table 2) with this increase being most pronounced among those from Liverpool. For females,

%BAC increased with time drinking in the Liverpool sample only, where median %BAC reached 0.13 among those that had been drinking for more than five hours, compared with 0.07 in females from Utrecht and Palma and 0.04 in those from Ljubljana (Table 3). Among males, significant increases in %BAC with time since first drink were seen in all but the Palma sample. Again, the increase was particular pronounced in the Liverpool sample where %BAC in those that had been drinking for over five hours by interview reached a median on 0.17, compared with 0.11 in Utrecht and 0.09 in both Ljubljana and Palma.

Figure 2. Percentage of alcohol consumed by participants prior to interview that was accounted for by different drink types



* grams of alcohol consumed by interview for individuals within each category were summed by drink type to show the proportion of grams reported by the sample that was accounted for by different drink types

Logistic regression analysis was undertaken to identify factors independently associated with participants recording a BAC of greater than 0.08% - a commonly used indicator of intoxication (e.g. Shanin et al, 2010). This found high BAC to be associated with being male, aged greater than 19 years, being from Liverpool, having consumed spirits prior to interview, and having been drinking for a longer period of time.

Table 2. Median grams of alcohol reported to have been consumed prior to interview, by time between participants' first alcoholic drink and interview

	Females					Males				
	Liverpool	Ljubljana	Palma	Utrecht	P[a]	Liverpool	Ljubljana	Palma	Utrecht	P[a]
< 3 hours	32	32	36	39	ns	45	35	48	45	ns
3-5 hours	64	58	44	58	ns	88	70	66	96	<0.001
> 5 hours	96	59	80	64	<0.05	146	89	89	112	<0.01
P[b]	<0.001	<0.01	ns	<0.001		<0.001	<0.001	<0.01	<0.001	

[a]P between cities across time periods, [b]P between time periods within cities

Table 3. Median BAC by time between participants' first alcoholic drink and interview

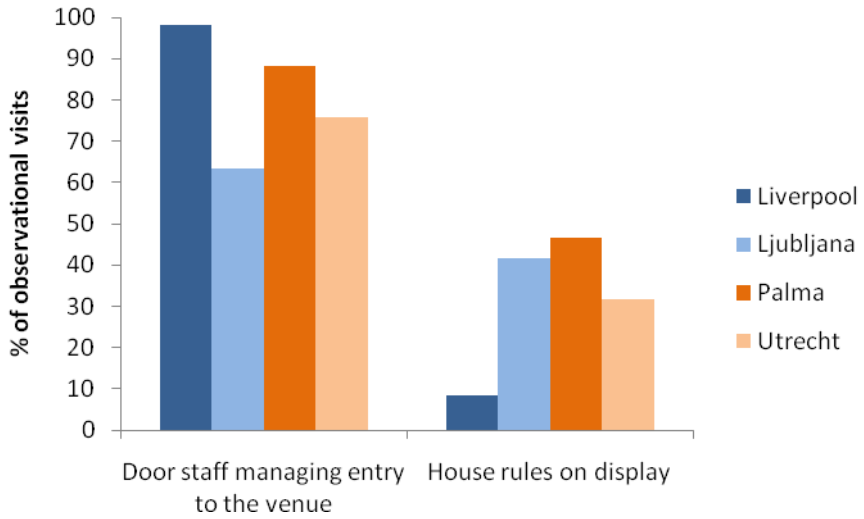
	Females					Males				
	Liverpool	Ljubljana	Palma	Utrecht	P[a]	Liverpool	Ljubljana	Palma	Utrecht	P[a]
< 3 hours	0.05	0.04	0.06	0.04	ns	0.05	0.05	0.07	0.05	ns
3-5 hours	0.12	0.05	0.06	0.06	<0.001	0.10	0.08	0.07	0.11	<0.01
> 5 hours	0.13	0.04	0.07	0.07	<0.05	0.17	0.09	0.09	0.11	<0.001
P[b]	<0.001	ns	ns	ns		<0.001	<0.05	ns	<0.01	

[a]P between cities across time periods, [b]P between time periods within cities

Environmental factors in European drinking environments

In the second part of the study, a total of 238 hours of structured observations were undertaken in youth focused bars in the four cities. In each city, 15 youth focused bars were selected to represent a range of low, medium and high risk premises, and four one-hour observational visits were undertaken in each one.[8] As venues can provide different forms of entertainment and vary their operating procedures, staff and customer bases on different nights and hours of trading, each observational visit was treated as a separate observation rather than data from the four visits being combined. The key variables assessed during the observations are listed in Box 1.

Figure 3. Proportion of observational visits recording selected features at entrance to the venue



Up to four observations conducted at 15 venues in each premise.
Differences between cities are significant, P<0.001

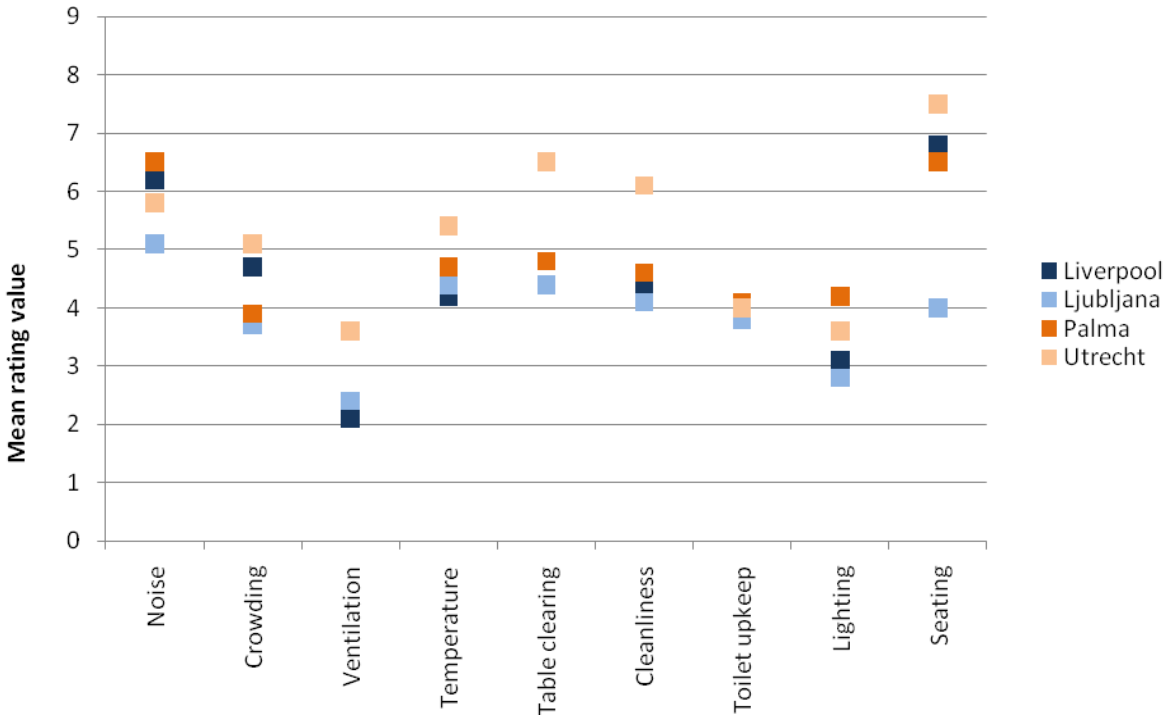
Although the venues visited in the study were not intended to be representative of all drinking premises in each city, initial findings suggest that the operation of premises and their physical and social environments vary across Europe. For example, the presence of door staff was almost ubiquitous in Liverpool, where staff was managing entrance to venues during all but one observational visit (98.3%). Conversely, in Ljubljana only two thirds of observations (63.3%) recorded the presence of door staff. Use of door staff is a mandatory requirement of late night operating licenses for drinking premises in Liverpool city centre (and throughout England in general), and the one observation during which door staff were not managing

8 In two venues in Utrecht, it was only possible for researchers to complete three observational visits.

venue entrance could be considered an incident of negligence by door staff who were not at their post. Other factors recorded at entrance to venues included the display of house rules. In Palma, almost half (46.7%) of all observational visits identified house rules being displayed at venue entrance, dropping to just 8.3% in Liverpool.

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. On all scales, higher values represented more 'problematic' levels (see Box 1). Although these data are limited by cultural interpretation of bar environments, with observations being undertaken by different research teams in each city, mean ratings are provided here for information purposes. The chief purpose of scale variables is to assess associations with alcohol-related harm rather than to compare across cities.

Figure 4. Mean ratings on physical environment scales



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

A range of factors associated with food and drink sales were recorded during observations. Food was rarely being served in observations in all cities, recorded most often in Ljubljana (16.7% of observations) and least often in Liverpool and Utrecht (<4%). The service of alcohol to tables (rather than just at the bar) was most common in Ljubljana (78.3% of observations) and least common in Liverpool (3.3%). Ljubljana also had the highest proportion of observations where the use of plastic glassware was recorded (73.3%) with the lowest proportion in Utrecht (8.6%). Alcoholic drinks promotions were most commonly observed in Liverpool (46.7% of visits) and least common in Palma (13.3%). Palma also had the highest mean drink prices across the four cities (see Table 4).

Regarding staffing, observations in Palma recorded lower staff to patron ratios than in other cities, as well as lower proportions of younger and male bar staff (Figure 5). Observations in Ljubljana were least likely to record the presence of designated glass collectors. Certain factors regarding staff behaviour were also recorded on scale variables (see Box 1). Using scale variables (again with caution), staff monitoring was rated as poorest in Utrecht and staff

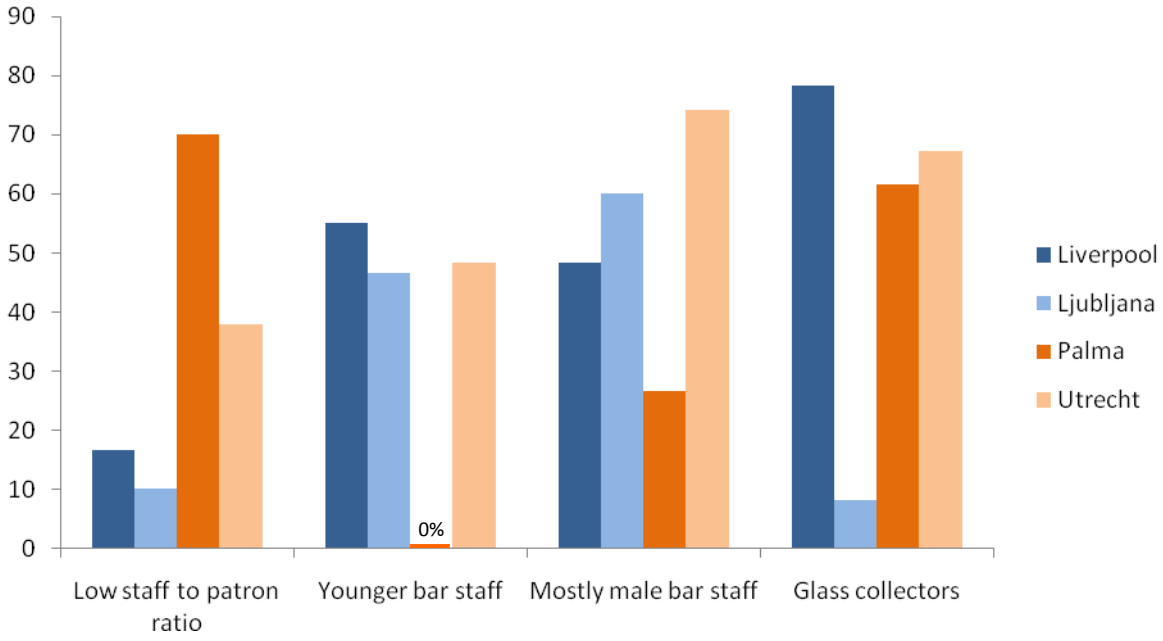
coordination rated poorest in Palma. Permissiveness (e.g. tolerance of abusive behaviour) was rated as highest in Liverpool.

Table 4. Mean prices of drinks recorded during observational visits, in Euros

	Liverpool[a]	Ljubljana	Palma	Utrecht
Bottle of lager	3.81	2.89	4.18	2.28
Standard glass of wine	3.58	2.29	3.69	2.83
Vodka and orange[b]	3.73	4.29	7.13	5.39
Glass of coke	1.69	2.02	3.65	2.09

[a] £ sterling prices converted to Euros at a rate of 1.1531
[b] Researchers were asked to request the price of a 'single' vodka yet in Spain spirits serving sizes are known to be larger (Gual et al, 1999).

Figure 5. Proportion of observations recording selected staffing factors



Low staff to patron ratio: more than 30 customers per bar staff
Younger bar staff: >50% appeared to be under age 25
Mostly male bar staff: >50% male
Glass collectors: presence of staff that appeared to be responsible for clearing glasses from tables

A range of variables were recorded regarding customer types and behaviours during observations. Ljubljana observations were most likely to record a male-dominated customer base (>50% of customers male; 81.7%, falling to 60.0% in Liverpool), while observations in Palma were least likely to record a customer base dominated by younger age groups (aged 21 or younger; 8.3%, rising to 32.8% in Utrecht). At least 70% of observations in Liverpool and Utrecht identified that the majority (>50%) of customers were in single sex groups, compared with around a third in Palma and Ljubljana.

Further analysis of the data will focus on two key variables: ratings of customer intoxication in the venue and whether incidents of alcohol-related harm (e.g. overt intoxication, accidents, vomiting and aggression) were observed during visits. There were no significant differences

between cities in mean ratings of customer intoxication, which was measured on a scale of 0 (no sign of intoxication) to 9 (everyone is drunk). Mean ratings were 3.5 in Ljubljana, 3.7 in Utrecht, and 4.0 in both Palma and Liverpool. However, there were significant differences in the proportions of visits in which alcohol-related harm was observed (Palma 3.3%, Utrecht 20.7%, Ljubljana 21.7%, Liverpool 45.0%). Analyses will examine which environmental features in bars are associated with increased intoxication ratings and incidents of alcohol-related harm. Findings will be added to this chapter when available, along with full data showing the distribution of indicators recorded in venues across cities.

What does this mean?

The Amphora study is providing a wealth of information on drinking behaviours and nightlife environments in Europe that will facilitate the development of policy and practice to reduce harm in drinking environments, and the implementation of further research into this important issue. Firstly, the study has highlighted some similarities in drinking behaviours across cities. The vast majority of participants in all cities expected to binge drink on the night of survey, and in fact the median grams of alcohol reported at interview had already reached binge drinking levels in all cities and for both genders. The study also found high levels of pre-loading in all cities, albeit lower in Ljubljana. 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 discrepancies between on- and off licensed premises in alcohol price is something that requires addressing. Increasing alcohol prices can impact on alcohol consumption and related harm, and consequently focus should be placed on increasing prices in off-licensed premises.

Despite the common features of nightlife alcohol consumption observed, this study has provided evidence for variation in nightlife drinking behaviours across Europe. Although the samples were not intended to be representative of young nightlife users in the four cities, British participants of both genders recorded significantly higher blood alcohol concentrations at interview and expected to drink a significantly greater quantity of alcohol during their night out. In fact, analysis of alcohol consumption and %BAC by time spent drinking suggested that participants in other cities had greater control over their alcohol consumption across the course of a night out, whereas those in the British sample continued to consume alcohol and become increasingly intoxicated. This requires further investigation with a more representative sample, but equally has important implications for the transferability of interventions to prevent intoxication and alcohol-related harm across Europe. Thus those developed to manage high levels of intoxication in UK settings may be inappropriate in countries where intoxication is less widespread, and vice versa. A deeper understanding of how and why people drink the way they do in different European settings would further support the development of measures to prevent alcohol-related harm.

The observations undertaken in drinking venues in each of the four cities have also suggested there are wide variations regarding the way venues are managed and staffed across Europe. The European action plan to reduce the harmful use of alcohol (World Health Organization Regional Office for Europe, 2011) proposes that guidelines and standards are developed for

the design of drinking premises, server training and the monitoring and enforcement of licensing laws. By examining which factors in these drinking environments are associated with greater ratings of customer intoxication and greater alcohol-related harm, this study will facilitate the development of such guidelines and standards across Europe.

Take home messages

1. Preloading and binge drinking are common features of nightlife participation in young people across Europe. In all cities most participants intended to binge drink on the survey night and in all except Ljubljana, the majority had preloaded before arriving at public drinking environments.

2. Nightlife drinking behaviours in the British sample appeared to be characterised by continued alcohol consumption and increasing intoxication throughout the course of a night out, compared with more moderated consumption and steady lower levels of intoxication elsewhere; further research is required to examine these patterns and their underlying drivers.

3. The physical, social and staffing environments in bars in the four cities varied. Identifying which of these factors is associated with increased intoxication and harm will support the development of guidelines and standards for managing drinking premises in Europe.

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Box 1. Description of observational schedule measurements to be used in the analysis

Scale variables		
Label	**Scale**	**Scale range**
Intoxication*	Intoxication level of people in the venue	0 no sign of intoxication 9 → everyone is drunk
Seating	% of venue floor space containing seating	0 90% or more → 9 <10%
Noise	Noise level in loudest part of venue	0 very quiet/easy to talk → 9 hurts ears/cannot talk
Crowding	Crowding at busiest time (excl.dancefloor)	0 lots of space → 9 cannot move
Ventilation	Ventilation in the venue	0 extremely fresh → 9 extremely stuffy/stale
Temperature	Temperature in the venue	0 very cold → 9 very warm
Clearing	Clearing of tables and other surfaces[a]	0 always → 9 never
Glass on floor	Extent of glass/bottles on venue floor[b]	0 none → 9 everywhere
Cleanliness	Extent that indoor premises are kept clean including the floor	0 always → 9 never
Toilets	Extent that toilets are kept in order and stocked	0 clean/fresh/stocked → 9 vandalised/foul
Lighting	Level of lighting inside the venue	0 bright/can clearly see venue → 9 very dark/can hardly see venue
Staff monitoring	To what extent are staff generally monitoring all areas of the venue?	0 constantly monitored → 9 unmonitored
Staff coordination	To what extent do staff seem to be coordinated as a team?	0 not coordinated at all → 9 constant radio or eye contact
Staff attitude	Are servers cheerful, courteous and friendly in a professional way or distant, unfriendly, stern or even rude/obnoxious?	0 all were CCF → 9 all were DUS
Staff boundaries	Extent that servers maintained professional (P) boundaries from patrons	0 all completely P, clear boundaries → all socialising with customers
Permissiveness	Overall decorum /behavioural expectations (e.g. tolerance of abusive behaviour)	0 no offensive/abusive behaviour → 9 anything goes
Dancing	Proportion of customers dancing	0 <10% → 9 90% or more
Sexual activity	Sexual activity in venue	0 none → 9 explicit sexual contact
Sexual competition	Sexual competition in venue	0 scoping not the focus for anyone → scoping the focus of 76-100%
Rowdiness	Global rating of rowdiness in the venue	0 none/very rare → 9 out of control
Movement	Movement (at busiest time/part of venue)	0 little movement → 9 constant
Categorical variables		
Label		**Yes/No**
Door staff		Staff managing entrance to the venue
Queue		There was a queue to enter the venue
Entrance fee		Entrance fee had to be paid
House rules (entry)		House rules displayed at venue entrance
Dance floor		Venue had a designated dance floor area

Label	Yes/No
Pool tables	Venue had pool tables
TV screens	Television screens[c] visible in the venue
House rules (venue)	House rules displayed inside the venue
Rock/heavy music	Rock or heavy metal music being played
Rap/hip hop music	Rap or hip hop music being played
Pop/dance music	Pop or dance music being played
Drinks promotions	Cheap drinks promotions[d] offered
Low drinks prices	Drink prices below average for that city[e]
Soft drinks	Non-alcoholic drinks promoted[f]
Plastic glassware	Drinks served in plastic glasses[g]
Table service	Drinks served to customers at their tables
Food service	Food available during the observation
Fewer bar staff	30 or more customers per bar server
Young staff	>50% thought to be under age 25
Male staff	>50% male
Glass collectors	Glass collectors working in the venue
Male clientele	>50% clientele were male
Young clientele	>50% clientele estimated to be <age 22
Single sex groups	>50% clientele in single sex groups
High alcohol drinks	Most common drink high alcohol content[h]
Police outside	Police were outside the venue at entry
Outdoor area	Outdoor eating/drinking/smoking area
100+ customers	100+ customers in venue at peak time
Later visit	Observation conducted later in the night[i]

* Main variable of interest. [a]Highest rating from two scales covering tables/other surfaces separately; [b]Highest rating from two scales covering glass/bottles separately; [c]Typically showing music videos or venue marketing/promotions; [d]E.g. buy one get one free, free shots; [e]Based on spirits or lager depending on which drink was most commonly being consumed in the venue; [f]Including energy drinks; [g]Partly or wholly; [h]High alcohol: spirits/wine, low alcohol: lager/cider/alcopops; [i]Later 50% of visits in each city.

CHAPTER 11. UNRECORDED ALCOHOL – NO WORRIES BESIDES ETHANOL: A POPULATION-BASED PROBABILISTIC RISK ASSESSMENT

Dirk W. Lachenmeier & Jürgen Rehm

Summary

In the WHO European region, 22% of the total alcohol consumption was unrecorded in 2005, for example, in the form of illicit or counterfeited alcohol, home-produced or surrogate alcohol. According to conjectural evidence, unrecorded alcohol consumption has been associated with an increased toxicity due to regular contamination. The AMPHORA project has studied the contamination status by analysing samples of unrecorded alcohol from 16 countries in Europe. Using these data, this article provides a detailed population-based risk assessment using a Monte-Carlo type probabilistic methodology for the following substances, most regularly found in unrecorded alcohol (from an analysis of 50 substances in total): ethanol, ethyl carbamate, acetaldehyde, methanol, copper, lead, nickel, manganese, boron, and aluminium. By calculating the margin of exposure, ethanol was found to be the compound posing the highest risk, clearly above toxicological thresholds, while average scenarios for all other substances did not exceed such thresholds.

Our results show that the composition of unrecorded alcohol in the European region poses no public health risks beyond the ethanol-specific harms inherent to any type of alcoholic beverage. The probabilistic exposure assessment also clearly invalidates assumptions of contamination as a factor in increased alcohol-related mortality caused by unrecorded alcohol consumption. Instead, we think that this higher mortality might be due to more detrimental drinking patterns associated with unrecorded alcohol consumption, brought about by lower prices in combination with higher alcoholic strengths.

Policy measures should aim to reduce unrecorded consumption in general, rather than focusing on specific contamination problems.

This study uses the **Margin of Exposure** approach (**MOE**). In this study, the 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 10,000 means that the amount consumed is ten 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. This means that the amount consumed should be at least 10,000 times lower than the level considered toxic.

Introduction

Unrecorded alcohol is any alcohol that is either not taxed as an alcoholic beverage and/or not registered in the jurisdiction where it is consumed (Lachenmeier, 2012; Rehm, Kanteres & Lachenmeier, 2010). Unrecorded alcohol products include alcoholic beverages brought into the country via cross-border shopping, homemade, informally-produced alcohol, illegally-produced or smuggled alcohol products, as well as surrogate alcohol that is not officially intended for human consumption (see classification in Lachenmeier, Sarsh & Rehm, 2009). Some common examples of surrogate alcohol include mouthwash, perfumes, and eau-de-colognes (Lachenmeier, Sarsh & Rehm, 2009). In the WHO European region, the average unrecorded alcohol consumption per capita for adults was 2.67 litres of pure ethanol in 2005, which is 22% of the total alcohol consumption in the region (Lachenmeier et al., 2011a). Surrogate alcohol is widely consumed in Russia and countries of central and eastern Europe (Lachenmeier, Rehm & Gmel, 2007).

One of the main problems with these unrecorded alcohol products is that some of them, such as homemade beverages, are not subject to regulatory controls to ensure that their composition is free of contaminants or toxic compounds which could potentially harm health, while others are produced without human consumption in mind entirely (Lachenmeier et al., 2011b).

Problematic compounds can come from spoilage during the fermentation (e.g. very high levels of higher alcohols (with more carbon than ethanol, such as methylbutanol or propanol), ethyl acetate or acetaldehyde), contamination during processing (e.g. accumulation of metals such as lead) and/or the presence of chemical compounds related to the 'denaturing' of alcohol for non-beverage uses (e.g. methanol, diethyl phthalate). Some of these compounds can be carcinogenic, hepatotoxic, or teratogenic, if thresholds are exceeded. But, surprisingly, there is only a very limited scientific literature studying the composition of homemade and surrogate alcohols as well as examining their potential harm to health. Most of the alarmist reports about the "health threats" of unrecorded alcohol are based in conjecture rather than science (Lachenmeier & Rehm, 2009). To rectify the paucity of scientific data, the AMPHORA project has focused its efforts on analyzing the chemical composition of unrecorded types of alcohol. For this, samples of unrecorded alcohol were collected and analyzed from 16 European countries. A total number of 115 samples were analysed (81 spirits, 32 wine products and 2 beers). About half of the beverages presented abnormal parameters, the most common being ethyl carbamate contamination (n=29), and elevated levels of copper (n=20), manganese (n=16) and acetaldehyde (n=12). Apart from 10 of the samples, all other parameters (including methanol, higher alcohols, phthalates) did not exceed normative thresholds (Lachenmeier et al., 2011a).

At first sight, these results (i.e. non-compliance of 50% of samples) may sound alarming. However, exceeding normative thresholds cannot be directly interpreted as constituting an acute health risk for the consumer, as the thresholds are typically based on safety factors of 100 and higher. For example, the vodka methanol limit in the European spirits regulation (European Parliament and Council, 2008) is 500 times below that of the maximum concentration tolerable for humans (Lachenmeier et al., 2011b).

In this study, an approach other than the comparison with regulatory limits is applied for risk assessment, namely, the margin of exposure (MOE). To accomplish this, we combined the data from the AMPHORA project with other surveys on unrecorded alcohol, and applied a probabilistic Monte-Carlo-type method. to provide a population-based exposure estimation. The exposure was then compared with the toxicological threshold for each compound to

calculate the MOE, which is an indicator that can be used to judge comparatively the risk of compounds in mixtures, and to facilitate the prioritization of risk management actions (EFSA, 2005; IPCS, 2009; Lachenmeier, Przybylski & Rehm, 2012). This approach allows us, for the first time, to make a judgement about the risk of unrecorded alcohol and how it compares with and contributes to the risk generated by legal and recorded ethanol. The results will be used to point out options for alcohol policy.

What we did

The first step in every risk assessment study of constituents and contaminants in foods and beverages is the selection of compounds. The selection of substances and the decision to examine their occurrence in unrecorded alcoholic beverages was based on results from surveys conducted as part of the AMPHORA project in several European countries (Lachenmeier et al., 2011a), and combined with data from other surveys conducted with similar research methodology in Poland (Lachenmeier et al., 2009), Ukraine (Lachenmeier et al., 2010b) and Russia (Solodun et al., 2011).

From the more than 1,000 different components that may occur in alcoholic beverages (IARC Working Group on the Evaluation of Carcinogenic Risks to Humans, 1988), we had previously selected a sub-group of 50 compounds for chemical analysis in our samples of unrecorded alcohol by applying a risk-oriented approach (Lachenmeier et al., 2011b). From those compounds only 9 regularly exceeded the maximum limits available for drinking water or wine (Lachenmeier et al., 2011a), so we selected these substances for more detailed exposure assessment in this study. Ethanol was additionally included as major toxic compound of unrecorded alcohol, so that 10 substances in total were compared in this study.

The following list shows substances that were absent in most samples and did not exceed predefined thresholds of toxicity in any sample (see Lachenmeier et al. (2011b) for details), and were therefore excluded from our exposure assessment: 1-propanol, 1-butanol, 2-butanol, iso-butanol, amyl alcohols, 1-hexanol, benzyl alcohol, 2-phenyl ethanol, methyl acetate, benzyl acetate, ethyl lactate, ethyl caprylate, ethyl benzoate, benzaldehyde, thujone, chloride, nitrate, phosphate, sulphate, dimethyl phthalate, diallyl phthalate, dibutyl phthalate, n-butylbenzyl phthalate, diethylhexyl phthalate, diheptyl phthalate, di-n-octyl phthalate, di-ethylhexyl adipate, zinc, chromium, antimony, arsenic, tin, and selenium.

Furthermore, the following substances, occurring above limits in only single samples, were also excluded: ethyl acetate, cadmium, diethyl phthalate, diisobutyl phthalate, and polyhexamethyleneguanidine hydrochloride.

The remaining substances, included for assessment, were ethanol, ethyl carbamate, acetaldehyde, methanol, copper, lead, nickel, manganese, boron, and aluminium.

The methodology for comparative quantitative risk assessment was based on a previous study (Lachenmeier, Przybylski & Rehm, 2012) with the only difference being that probabilistic exposure estimation was conducted.

The toxicological thresholds for the selected substances, for which we used benchmark doses (BMD), where available, or ‘no observed effect levels’ (NOEL) or ‘no observed adverse effect levels’ (NOAEL), were typically identified in monographs of national and international risk assessments bodies such as WHO, International Programme on Chemical Safety (IPCS), JECFA, US Environmental Protection Agency (EPA) and EFSA (EFSA, 2010; IPCS, 1997; US EPA, 2005; Vavasour et al., 2006; WHO, 1982; WHO, 2003; WHO, 2005; WHO, 2011), and, if unavailable

from these sources, from our own studies (Lachenmeier, Kanteres & Rehm, 2009; Lachenmeier, Kanteres & Rehm, 2011).

The MOE approach was used for risk assessment (EFSA, 2005; US EPA, 1995). The MOE is defined as the ratio between the lower one-sided confidence limit of the BMD (BMDL) or NOEL/NOAEL and estimated human intake of the same compound.

Calculations of population-based exposure and of MOE require the following information: the amount of a substance found in unrecorded alcohol, per capita consumption of unrecorded alcohol and the bodyweight of consumers. Similarly to the approach of Medeiros Vinci et al. (2012) for probabilistic human exposure assessment of food contaminants, we applied best fit distributions to the lower limit scenario of substance contents (i.e., non-detectable samples were considered zero). For per capita unrecorded alcohol consumption, we selected a best fit distribution for the unrecorded alcohol consumption data, available from the WHO Global Information System on Alcohol and Health (GISAH) (WHO, 2012) for the countries with available sample survey data (Albania, Austria, Croatia, Czech Republic, Germany, Hungary, Italy, the Netherlands, Norway, Poland, Romania, Russia, Slovenia, Spain, Switzerland, UK and Ukraine). The bodyweight was assessed as normal distribution with average of 73.9 kg and standard deviation of 12 kg for males and females according to EFSA Scientific Committee (2012). The distribution fitting was conducted with a fixed lower limit of zero because negative values are factually impossible. Monte Carlo simulations were performed with 10,000 iterations using Latin Hypercube sampling and Mersenne Twister random number generator. Calculations were performed using the software package @Risk for Excel Version 5.5.0 (Palisade Corporation, Ithaca, NY, USA).

What we found

The toxicological thresholds of the 10 substances assessed are shown in Table 1. Where several endpoints were available, the most sensitive toxicological endpoint was chosen, in order to provide a conservative assessment. For four of the compounds, human epidemiological data were available as the basis for the assessments. For the rest of the compounds, the assessments had to be based on animal data. The thresholds of the compounds, as defined by lower bench mark dose limits, vary over a very wide range, from 0.0015 mg/kg bw/day for lead to 440 mg/kg bw/day for ethanol.

Table 2 gives an overview of the occurrence of the selected substances in unrecorded alcohol, as well as the best-fitting risk functions. In general, the contamination of unrecorded alcohol with the selected substances varied widely, depending on product category, raw material, or diligence during manufacturing. The non-normality of the fitted distributions can be explained by the presence of zero data below the limits of detection (LOD) of the analytical methodologies (especially in the case of ethyl carbamate or heavy metals). As the LODs of our analytical methodologies were quite low (e.g. 1 part per billion (ppb) for metals), the results when using other methods to deal with zero values (e.g. considering non-detectable values as LOD instead of zero) were not significantly different (data not shown). For this reason, we decided to leave the values at zero, thus giving a conservative estimate and avoiding exaggeration of the risk.

Table 1. Toxicological thresholds selected for calculating the margin of exposure (data updated from (Lachenmeier, Przybylski & Rehm, 2012) with permission from John Wiley and Sons)

Agent	Toxicological Endpoint [a]	Value [c] [mg/kg bw/day]	Type of endpoint [b]	Reference
Ethanol	Human epidemiology, liver cirrhosis mortality	440	$BMDL_{1.5}$	Lachenmeier, Kanteres & Rehm, 2011
Ethyl carbamate	Alveolar and bronchiolar neoplasms in mice	0.3	$BMDL_{10}$	Vavasour et al., 2006
Acetaldehyde	Tumour-bearing animals in male rats	56	$BMDL_{10}$	Lachenmeier, Kanteres & Rehm, 2009
Methanol	Blood formate accumulation in humans	20	Level deduced from endogenous concentrations	IPCS, 1997
Copper	Liver toxicity in dogs	5	NOEL	WHO, 1982
Lead	Cardiovascular effects in humans	0.0015	$BMDL_{1}$	EFSA, 2010
Nickel	Two-generation study on rats (NOAEL for all endpoints including perinatal lethality)	2.2	NOAEL	WHO, 2005
Manganese	Upper range manganese intake value from human dietary studies is considered NOAEL	0.18 [c]	NOAEL	WHO, 2011
Boron	Decrease in fetal body weight in rats	10.3	$BMDL_{05}$	US EPA, 2005
Aluminium	Histopathological changes in the spleen and liver in rats	52	NOAEL	WHO, 2003

[a] Human data was preferred over animal data, where available. The most sensitive endpoint was chosen if dose-response data for several organ sites were available.
[b] $BMDL_x$: lower one-sided confidence limit of the benchmark dose (BMD) for a x% incidence of health effect. The No Effect Level (NOEL) or No Observed Adverse Effect Level (NOAEL) are used in cases when no usable BMD-modelling for oral exposure was identified in the literature.
[c] Recalculated from the original value of 11 mg/day using a bodyweight of 60 kg.

Table 2. Overview of constituents and contaminants in European unrecorded alcohol with descriptive statistics and best fit distributions (original analytical survey data taken from Lachenmeier et al., 2009; Lachenmeier et al., 2010b; Lachenmeier et al., 2011a; Solodun et al., 2011)

Agent [a]	N [b]	Positive samples	Mean	Median	Standard Deviation	Best fitting risk function for concentration of agent in the beverage [c]
Ethanol (% vol)	232	100%	41.8	40.7	16.5	*RiskBetaGeneral(1.4588;4.2175;0.10)* [d]
Ethyl carbamate (mg/L pa)	228	41%	0.65	0.00	1.69	*RiskExpon(0.64943)*
Acetaldehyde (mg/L pa)	222	97%	226	100	671	*RiskGamma(0.68975;337.18)*
Methanol (mg/L pa)	222	99%	1977	121	3173	*RiskGamma(0.33647;5955)*
Copper (mg/L pa)	174	88%	8.27	0.69	15.92	*RiskGamma(0.32911;28.573)*
Lead (mg/L pa)	174	55%	0.14	0.01	0.66	*RiskGamma(0.33654;0.7801)*
Nickel (mg/L pa)	174	34%	0.23	0.00	1.43	*RiskGamma(0.3353;2.014)*
Manganese (mg/L pa)	174	47%	1.21	0.00	3.27	*RiskGamma(0.31699;8.0882)*
Boron (mg/L pa)	174	18%	3.70	0.00	10.79	*RiskExpon(3.6977)*
Aluminium (mg/L pa)	174	36%	0.68	0.00	2.39	*RiskGamma(0.44631;4.1782)*

[a] The results (besides ethanol) are reported as mg per litre of pure alcohol (mg/L pa) to ensure the comparability between the alcoholic beverages with highly variable alcoholic strengths.
[b] The differences in sample numbers is caused by the fact that not all samples were analyzed for all parameters (e.g. due to lack of samples volume)
[c] The best fit distributions were selected based on chi-squared statistics. The lower limit was set as zero. The upper limit was set as infinity.
[d] For ethanol, the risk function was modelled with unrecorded per capita consumption data taken from WHO GISAH WHO, 2012 for the countries with available survey data (Albania 2.1 L, Austria 0.6 L, Croatia 2.5 L, Czech Republic 1.5 L, Germany 1 L, Hungary 4 L, Italy 2.4 L, The Netherlands 0.5 L, Norway 1.6 L, Poland 3.7 L, Romania 4 L, Russia 4 L, Slovenia 3 L, Spain 1.4 L, Switzerland 0.5 L, UK 1.7 L and Ukraine 7.5 L of pure alcohol per capita).

Table 3 presents the point estimate as well as the probabilistic exposure estimates. In all cases, the highest exposure detected was for ethanol (average 77 mg/kg bodyweight (bw)/day), while the lowest found was for lead (average 2.5E-05 mg/kg bw/day). The probability density functions of the estimated exposures are shown in Figure 1 for all compounds. The results also underwent a sensitivity analysis, which allows a ranking of the input distributions which impact on exposure. In all cases, the concentration of the contaminant had the highest influence, followed by unrecorded consumption and a minor influence of bodyweight (normalized regression coefficient for concentration ranging between 0.71 and 0.79, for unrecorded consumption between 0.24 and 0.48, and for bodyweight between -0.08 and -0.12).

Table 3. Estimated exposure of the European population to constituents and contaminants found in unrecorded alcohol

Agent	Point Estimate [a] (mg/kg bw/day)	Probabilistic analysis [b] (mg/kg bw/day)			
		Mean	SD	P5	P95
Ethanol [c]	75	77	54	11	181
Ethyl carbamate	6.19E-05	6.40E-05	8.91E-05	1.58E-06	2.41E-04
Acetaldehyde	0.022	0.023	0.038	1.94E-04	0.088
Methanol	0.191	0.196	0.433	3.46E-05	0.920
Copper	8.96E-04	8.85E-04	1.88E-03	1.55E-07	4.09E-03
Lead	2.50E-05	2.52E-05	5.38E-05	5.39E-09	1.16E-04
Nickel	6.43E-05	6.77E-05	1.56E-04	1.12E-08	3.15E-04
Manganese	2.44E-04	2.49E-04	5.69E-04	3.04E-08	1.21E-03
Boron	3.52E-04	3.59E-04	4.89E-04	8.78E-06	1.31E-03
Aluminium	1.78E-04	1.84E-04	3.51E-04	2.41E-07	8.32E-04

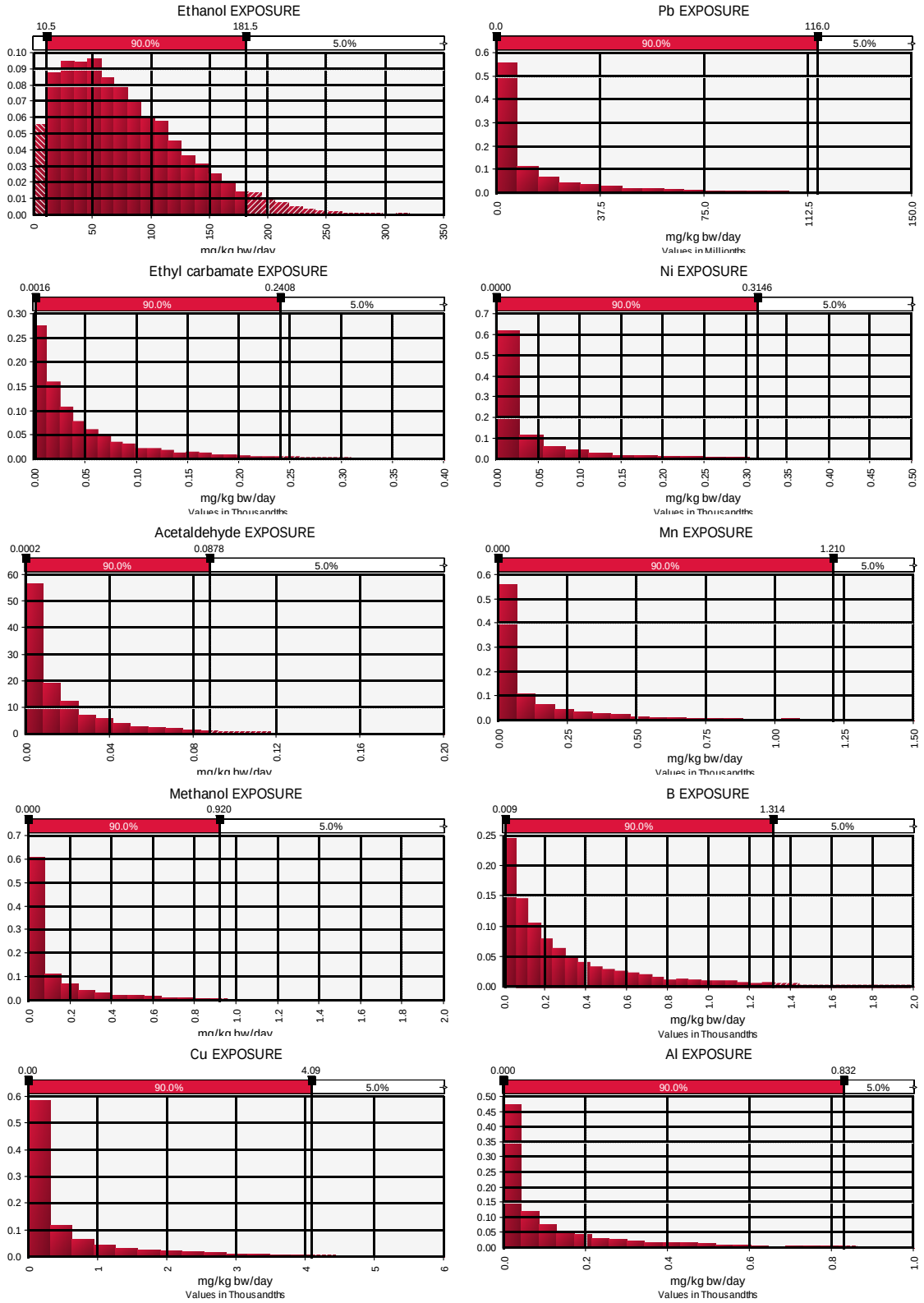
[a] Calculated with averages for all parameters

[b] Calculated for all agents except ethanol using the following formula with the risk functions defined in Table 2:
*Exposure = Risk function of unrecorded per capita consumption (L pa) / 365 days * risk function of concentration in beverage (mg/L pa) / risk function of bodyweight (kg).*
The risk function of bodyweight was *RiskNormal(73.9;12)* according to average and standard deviation from EFSA Scientific Committee, 2012.

[c] The exposure to ethanol was calculated using the following formula:
*Exposure = Risk function of unrecorded per capita consumption (L pa) / 365 days / risk function of bodyweight (kg) * 0.789 (kg/L) * 10^6.*

Finally, the margins of exposure (MOE) for all compounds are compared in Figure 2. Ethanol is the only compound for which the complete exposure distribution is below an MOE of 100, and, on average, below 10. From all other compounds, only methanol and lead reach MOEs below 100, but only in worst-case scenarios. All other compounds with a threshold-based mechanism of toxicity (e.g. Cu, Ni, Mn, B, Al) do not reach an MOE of below 100. From the genotoxic carcinogens, acetaldehyde and ethyl carbamate reached average exposures below the MOE threshold of 10,000 for this class of compounds.

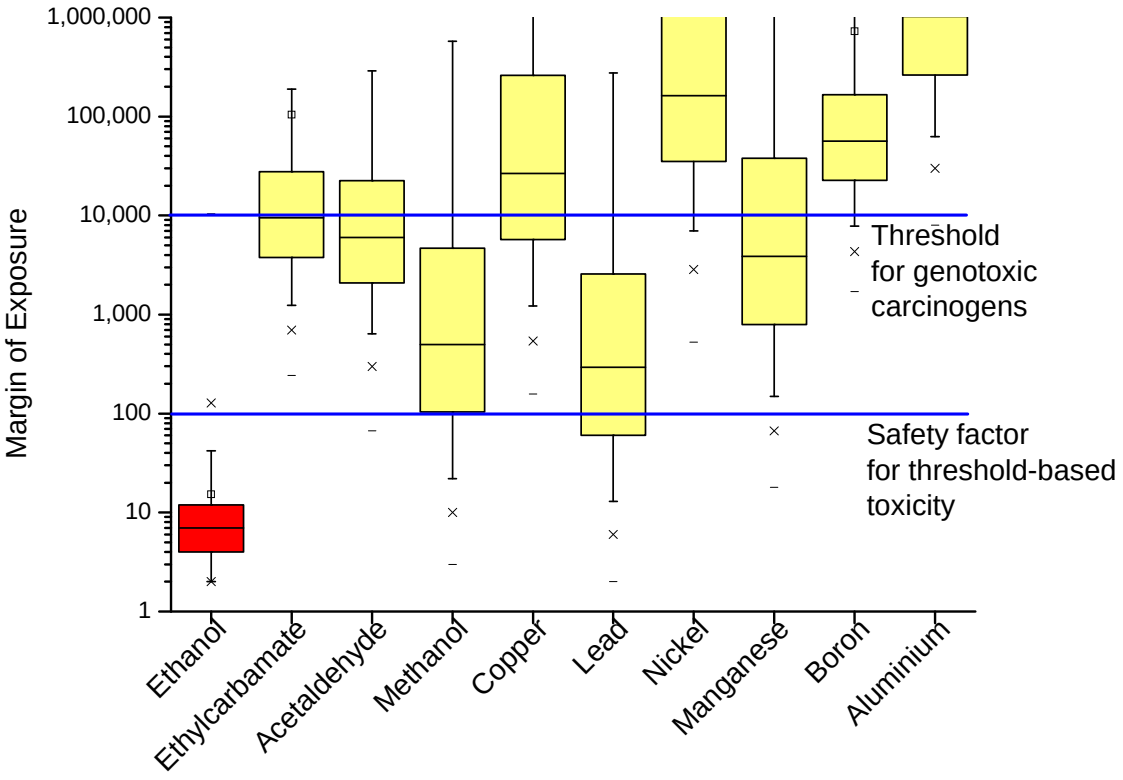
Figure 1. Histograms showing the probability density of estimated exposures using probabilistic simulation with 10,000 iterations (y-axis shows the relative frequency of a value in the range occurring)



What does this mean?

In traditional risk assessment studies, point-estimates are usually applied, which means that a fixed value for consumption (usually the mean population value) is multiplied by a fixed value for the chemical concentration (Lambe, 2002). In the past, we have done this, for example, to evaluate acetaldehyde or ethyl carbamate exposure from alcohol consumption (Lachenmeier et al., 2010a; Lachenmeier, Kanteres & Rehm, 2009). While point-estimates are easy to calculate and may provide a good first overview in assessing exposure, the uncertainty of what this means in terms of risk may be considerable, especially in the case of non-normal distributions, as in our case of contaminants in unrecorded alcohol samples. For this reason, we decided to additionally apply a probabilistic method, which takes account of every possible value that each variable can take, and weights each possible scenario by the probability of its occurrence (Lambe, 2002). To facilitate this, we applied the Monte-Carlo approach, which has been used in alcohol epidemiology for some time to estimate uncertainty of alcohol-attributable fractions (Gmel et al., 2011). Monte-Carlo methods have been also applied in food sciences to model dietary exposure to chemicals in food (Gibney & van der Voet, 2003; Lambe, 2002; Medeiros Vinci et al., 2012), but this study is the first to apply it to estimate the exposure to chemicals in alcoholic beverages. The advantage of the approach is that rather than single values for each scenario it generates distributions of the Margins of Exposure (MOE), which allow a direct visualization and comparison of all scenarios (Figure 2). The probabilistic approach also validates our previous point estimate approaches, conducted for single substances (Lachenmeier et al., 2010a; Lachenmeier, Kanteres & Rehm, 2009; Lachenmeier, Przybylski & Rehm, 2012), as the average point-estimates correspond closely to the average probabilistic estimates found in this study (Table 3).

Figure 2. Margin of Exposure (MOE) for compounds occurring in unrecorded alcohol based on probabilistic exposure estimation (simulation with 10,000 iterations). (The box is determined by the 25th and 75th percentiles. The whiskers are determined by the 5th and 95th percentiles. 1st and 99th percentiles are marked by x, while minimum and maximum are marked with dash. Values above 1,000,000 are not shown).



Coming back to our initial research question, our comparison clearly shows that ethanol represents by far the highest risk in unrecorded alcohol. The MOE of ethanol reaches down to below 10, which is the lowest level of all compounds under study (Figure 2). Both genotoxic carcinogens ethyl carbamate and acetaldehyde may reach MOEs below 10,000 in some scenarios, which according to EFSA indicates a concern for public health (EFSA, 2005). Nevertheless, we think that compared to ethanol, which must also be treated as a genotoxic carcinogen (Baan et al., 2007; IARC Working Group on the Evaluation of Carcinogenic Risks to Humans, 2010; Secretan et al., 2009), the risks of ethyl carbamate and acetaldehyde appear to be minor in the case of these unrecorded alcohol samples (the average MOEs are above 10,000). In considering acetaldehyde as contaminant of alcoholic beverages, for example, the German Federal Institute for Risk Assessment holds the view that mitigation measures are not required (BfR, 2010).

For non genotoxic substances, a 100-fold uncertainty factor is routinely applied. The factor is based on scientific judgement and allows for species differences (where animal data are used) and human variability (EFSA, 2005). None of the average MOEs for the non-genotoxic substances would be below 100. For methanol and lead, where the MOE may be less than 100 in some cases below the 25th percentile (Figure 2), it must be considered that the toxicological assessment is based on human data, so that a safety factor of 10 should be sufficient. The MOE for these two compounds (methanol and lead) may fall below 10 only in extreme worst-case scenarios in the lowest 1st percentile of the distribution.

We conclude that the composition of unrecorded alcohol in the European Union poses no worries beyond the ethanol-specific harms inherent to any type of alcoholic beverage. Our probabilistic exposure assessment clearly invalidates assumptions of contamination as a factor in increased mortality due to unrecorded alcohol consumption (Razvodovsky, 2008). To provide an epidemiologically detectable increased risk of contaminants, their MOEs would have to range in the magnitude of the MOE of ethanol, which clearly is not the case.

As we have stressed before (Lachenmeier et al., 2011a; Lachenmeier, 2012; Rehm, Kanteres & Lachenmeier, 2010), the disproportionate health hazards of unrecorded alcohol, which are sometimes postulated but not clearly proven, could be purely explained by the fact that unrecorded alcohol is regularly sold at higher alcoholic strength (>45% vol.), but for half the price, of legal beverages, which may lead to more detrimental patterns of drinking (Lachenmeier, 2012). Empirical research to prove or disprove this hypothesis is lacking so far. The same is true of the alternative hypothesis; that the unrecorded alcohol drinker may adjust his drinking volume by either “tasting” the ethanol content or “titrating” to the required effect level, so that the outcome would be similar to drinking recorded alcohol.

Conclusions for policy and practice

Our suggestion for alcohol policy would be that unrecorded alcohol in Europe clearly poses a public health problem, which is not due to contaminants but due to its strength in terms of ethanol itself. Most of the contaminants studied also occur in recorded types of alcohol at similar levels, and we can confirm our previous finding that no substantial difference in risk from chemical contaminants between unrecorded and recorded alcohol exists (Lachenmeier, Przybylski & Rehm, 2012).

Nevertheless, the contamination problem appears to be highlighted in public opinion, and perhaps among policy makers, due to the large media attention that isolated intoxication cases receive. Such intoxication cases (typically from methanol) are, of course, tragic and should be avoided, but from the point of view of population health, they appear to be negligible in light of the alcohol-related mortality of over 120,000 deaths per year in Europeans between 15-64

years due to recorded consumption (estimates for 2004, based on WHO, 2009; Rehm et al., 2009, Rehm et al., 2012). The question is also how methanol intoxications could be prevented, as they are typically caused when chemically pure methanol is added to ethanol either out of ignorance or criminal intent.

In our judgement, the major policy focus should be to reduce unrecorded consumption *per se*, for which some options exist (Lachenmeier, Taylor & Rehm, 2011). The incentive for drinking surrogate alcohol, which appears to be the group of unrecorded alcohol posing the highest risk, could be reduced by abolishing the tax privileges for denatured alcohols. If that is not possible, more suitable denaturants such as bittering agents should be chosen, which would clearly prohibit human consumption and would especially impact on unintentional consumption when such products are relabelled (substances with no taste such as methanol and diethyl phthalate should be forbidden as denaturant). Unregulated forms of home production should be brought into some form of state control to ensure the conformity of alcohol composition. Actions limiting illegal trade and counterfeiting could include introduction of tax stamps and electronic surveillance systems of alcohol trade (Lachenmeier, Taylor & Rehm, 2011). The individual marking and traceability of legal alcohol bottles through the complete supply chain appears to be one of the most promising measures, as the customer is often unaware that he is consuming (counterfeited) unrecorded alcohol, and currently has no means to differentiate recorded from unrecorded products. This measure has already been introduced by some producers of premium-brand wine to prevent counterfeiting (Domaines Barons de Rothschild, 2012). The consumer can check the authenticity of the product at the point of sale by scanning a QR code with his/her mobile phone. Similar measures are currently being discussed to prevent counterfeiting of medicinal products and we believe that such systems could be feasible to protect the supply chain of alcoholic beverages in general.

Take home messages

1. The AMPHORA project studied the chemical composition of unrecorded alcohol, which has been thought to be extremely toxic due to various contaminants.

2. Some contaminants such as acetaldehyde, ethyl carbamate, copper or lead were indeed found above regulatory limits set for legal products.

3. To consider the “dose makes the poison” principle, we have conducted a detailed exposure assessment using probabilistic methods to compare the risks between the different compounds in unrecorded alcohols.

4. Ethanol was the most dangerous toxic substance in unrecorded alcohol, while all other substances were below toxicological thresholds in average scenarios.

5. Policy measures should aim to reduce unrecorded consumption in general rather than focusing on specific contamination problems.

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CHAPTER 12. INFRASTRUCTURES. BUILDING A POLICY HOUSE

Claudia König, Lidia Segura & Peter Anderson

Summary

The importance of building and strengthening effective infrastructures within the field of public health has increasingly been recognised. This study has aimed to map existing alcohol policy infrastructures in European countries, such as policies, priorities and goals, or laws and regulations and also to examine the relationship between the involvement of stakeholders and alcohol policy. Data were collected from 32 European countries from three different sources. The data were analysed descriptively and summarised through a web diagram for Europe. In addition, cross-sectional analyses examined the relationship between the involvement of stakeholders and alcohol policy. All countries have a number of laws and regulations addressing alcohol. The majority of European countries have a written national policy document, and a coordinating body for national alcohol policy is available. However, just over half the European countries have prepared a comprehensive report on the alcohol situation in their country. NGOs, academia/research organisations and health professionals/health services, as well as the alcohol industry, show in most countries high or medium involvement in public policy development. The results indicate that the involvement of academia in policy making is related to more strict and comprehensive alcohol policy, whilst the involvement of alcohol producers is related to weaker pricing policy. NGO involvement did not show any relationships.

Introduction

"The importance of building and strengthening infrastructures within the field of public health has increasingly been recognised internationally (Moodie et al. 2000; Wise & Signal 2000; Ziglio, Hagard, McMahon, et al. 2000; International Union for Health Promotion and Education (IUHPE) 2004; Wise 1998; Ziglio, Hagard & Griffiths 2000) and a call to build capacity has been raised, along with alcohol policy, as a specific public health topic (Zatonski 2008; World Health Organization 2006; Anderson & Baumberg 2006)" (König & Segura 2011).

For the purpose of this study the definition of infrastructures includes: policies, priorities, regulations and material resources that facilitate an organised health promotion response to public health issues, as well as structures (systems and actors) that are involved in policy development, priority setting, monitoring and surveillance, research and evaluation, workforce development, and programme delivery (König & Segura 2011). This thus takes account of infrastructure for public health as well as infrastructures that represent a barrier to public health, and will consider a wider range of organisations and sectors beyond a focus on the health sector only (König & Segura 2011).

More specifically, the following alcohol policy infrastructure elements have been taken into consideration: (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 (König & Segura 2011). Specific infrastructures have been discussed as a strength or a barrier, respectively, for implementing effective alcohol policy (König & Segura 2011).

The aims of the study are to map existing alcohol policy infrastructures in European countries and carry out (1) a descriptive analysis of existing alcohol policy infrastructures throughout Europe, and (2) a cross-sectional analysis on the relationship between the involvement of stakeholders and alcohol policy.

What we did

Data from three different sources were collected for all 27 EU Member States and candidate countries as well as for Norway. Special emphasis was placed in avoiding duplications during data collection, in assuring the reasonable use of resources (of respondents as well as researchers) and thus promoting a high response rate.

Table 1. Data sources

Infrastructure elements	WHO survey	Amphora scaling	Amphora Questionnaire - map infrastructures
1. Policies, priorities and goals	Written national policy on alcohol including year, framework, multisectoral involvement and sectors represented		Name of written national policy on alcohol and link
2. Laws and regulations		**I Starting points** – law(s) regulating alcohol	
3. Governmental sectors at different levels and coordinating body	Coordination responsibility	**VI Public policy** – level of authority of alcohol administration	Name of coordinating entity
4. Politicians		**VI Public Policy** – level of public officials specialized in alcohol prevention	
5. The alcohol industry (stakeholder)	**Stakeholder's involvement** – community-based interventions/projects involving stakeholders – importance of the role played by stakeholders		Name of industry organizations and links
6. Civil society organizations and 'voice' (stakeholder)	**Stakeholder's involvement** – community-based interventions/projects involving stakeholders – importance of the role played by stakeholders		Name of NGOs and links
7. Science- and research-based organizations (stakeholder)	**Stakeholder's involvement** – importance of the role played by stakeholders		Name of science and research organizations, and links
8. The professional workforce (stakeholder)	**Stakeholder's involvement** – importance of the role played by stakeholders		Name of major training centres and links
9. Monitoring and surveillance systems			Name of systems and links
10. Funding basis		**VI. Public policy** – Public funds earmarked for alcohol prevention	Funds identifiable in national budget and in NGOs

Table 1 provides an overview of the information extracted about alcohol policy infrastructure from each data source. The most important data source to assess the status as at the end of 2010 was the European Survey on Alcohol and Health undertaken by the WHO during 2011 (Anderson et al 2012). The questionnaire of this survey was completed by WHO national counterparts, who are national experts on alcohol policy. It includes questions on alcohol policy infrastructure, mainly about written national policy and the involvement of stakeholders.

The second source was the Alcohol Policy Scale Measure developed by Karlsson et al. (2012) in the framework of the Amphora project, which also addresses alcohol policy infrastructure elements, mainly those on public policy.

In order to collect infrastructure data not covered by the two sources described above, a specific AMPHORA questionnaire was developed. National experts and members of the Alcohol Policy Network (www.alcoholpolicynetwork.eu) were requested to complete it.

The data were analysed descriptively and summarised through a web diagram for Europe. In addition, cross-sectional analyses examine the relationship between the involvement of stakeholders and alcohol policy.

What we found

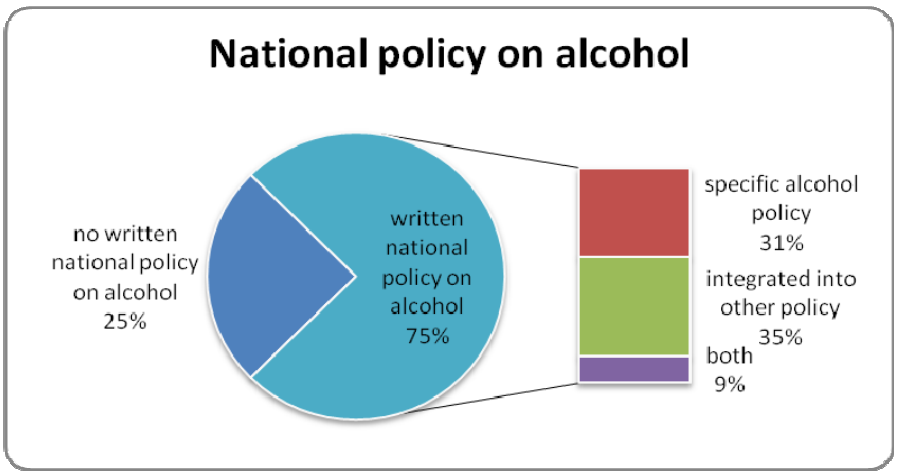
Thirty-two countries were included in the AMPHORA data collection on alcohol policy infrastructure. The results are presented according to a number of alcohol policy infrastructure elements.

Policies, priorities and goals

24 (75%) out of the 32 studied countries have a written national policy document. Eight countries (25%) do not have a written national document, although in two of them policies are available at sub-national level or a document is under development.

Ten (31%) out of the 24 countries that have a written national policy specifically address alcohol in this policy, while three (9%) of them have both a specific alcohol policy and an alcohol policy integrated into other topics. The other eleven countries (35%) address the topic of alcohol within other policies like substance abuse, mental health, non-communicable disease, general public health or other policies (see Figure 1).

Figure 1. National policy on alcohol



Laws and regulations

All European countries included in the study have laws and regulations concerning alcohol. Nine (28%) out of the 32 studied countries have a specific alcohol act, while 13 (41%) have a variety of laws addressing alcohol. Five countries (16%) have both a specific alcohol policy and other alcohol-related laws. Another five countries (16%) have no specific alcohol act and there is no information available about other alcohol-related laws.

Governmental sectors at different levels and coordinating body

Twenty-three (72%) of the 24 countries that have a national alcohol policy have a multisectoral approach, i.e. at least six to eight sectors are involved in alcohol policy. The following sectors are involved in most countries: health, education, road safety, the social sector, justice, law enforcement and the finance/taxation sector.

All countries that have a national alcohol policy, i.e. 24 (75%) out of 32 countries, also have a coordinating body that is responsible for the overall coordination of the development and monitoring of the national alcohol policy. The department of health is the responsible governmental sector in most (14 out of 24 countries). In three countries the responsibility lies within another sector, while the government divides the responsibility between several sectors in the remaining seven countries.

In ten (31%) out of 32 countries authorities deal with alcohol administration and supervision at the national level, while in just two countries (6%) it is dealt with at the sub-national level, and in 14 countries (44%) the responsibility is shared between the national and sub-national levels. Six countries (19%) do not have authorities that deal with alcohol administration and supervision at neither national nor sub-national level.

Politicians

Eleven (34%) of the studied countries have public officials specialised in alcohol prevention at the national level. In eleven countries (34%) there are specialists at both national and sub-national levels, while three countries (9%) have specialists at sub-national levels. The remaining seven countries (22%) do not have officials specialised in alcohol prevention at neither national nor sub-national level.

Stakeholders

Table 2 shows the number of European countries (N (%)) by the level of importance of the role played by different stakeholders at the national level in the following areas: prevention of underage drinking, targeted support (information, tools, counselling) for harmful and hazardous drinkers, prevention of drink-driving, and public policy development to reduce alcohol-related harm.

In addition, in most countries (29 (90%)) NGOs are very actively involved in community based interventions or projects, while there are interventions or projects involving young people and the civil society in 28 countries (88%). Economic operators, however, also have some involvement (13 countries (42%)) in community based interventions or projects.

Table 2. Importance of the role played by stakeholders in various areas

	Retailers and retail businesses	Alcohol manufacturers	Non-governmental organisations	Academia/ research organisations	Health professionals/ health services
Underage drinking					
High	8 (25%)	3 (9%)	11 (34%)	7 (22%)	14 (44%)
Medium	4 (13%)	8 (25%)	14 (44%)	13 (41%)	14 (44%)
Low	15 (47%)	16 (50%)	7 (22%)	10 (31%)	4 (13%)
No involvement	4 (13%)	4 (13%)	0	2 (6%)	0
Data not available	1 (3%)	1 (3%)	0	0	0
Targeted Support					
High	2 (6%)	0	13 (41%)	6 (19%)	18 (56%)
Medium	3 (9%)	7 (22%)	12 (38%)	8 (25%)	12 (38%)
Low	10 (31%)	13 (41%)	7 (22%)	12 (38%)	2 (6%)
No involvement	16 (50%)	11 (34%)	0	6 (19%)	0
Data not available	1 (3%)	1 (3%)	0	0	0
Drink driving					
High	3 (9%)	5 (16%)	11 (34%)	4 (13%)	10 (31%)
Medium	6 (19%)	9 (28%)	8 (25%)	8 (25%)	7 (22%)
Low	12 (38%)	10 (31%)	9 (28%)	15 (47%)	12 (38%)
No involvement	10 (31%)	7 (22%)	4 (13%)	4 (13%)	2 (6%)
Data not available	1 (3%)	1 (3%)	0	1 (3%)	1 (3%)
Public policy					
High	6 (19%)	5 (16%)	12 (38%)	9 (28%)	12 (38%)
Medium	6 (19%)	9 (28%)	16 (50%)	14 (44%)	15 (47%)
Low	11 (34%)	12 (38%)	3 (9%)	4 (13%)	4 (13%)
No involvement	8 (25%)	5 (16%)	1 (3%)	4 (13%)	0
Data not available	1 (3%)	1 (3%)	0	1 (3%)	1 (3%)

Monitoring and surveillance systems

A little more than half of the studied countries (18 – 56%) had prepared a comprehensive report on alcohol but the areas covered differ from country to country: drinking among adults (17 countries), drink-driving and alcohol-related traffic accidents (14), underage drinking (13), alcohol-related hospital admissions / discharge data (11), alcohol-attributable deaths (10), associations with socioeconomic variables (10), policy responses (10), availability of alcohol (7), geographical patterns of alcohol consumption(7), affordability of alcohol (6), alcohol-related public disorder and crime (6), association with other substance use (6), the general public's knowledge relating to alcohol (6), brief intervention in primary health care settings (5), drinking and pregnancy (4), expenditures on alcohol-related harm (4), and other topics (6).

Funding basis

Just about half the countries (15 – 47%) have public funds earmarked for alcohol prevention.

Infrastructures, stakeholders and alcohol consumption

Both Karlsson et al (2012) and Anderson (2013, in press) have demonstrated a relationship between the strictness and comprehensiveness of formal alcohol policies and levels of per capita alcohol consumption across European countries, with evidence that once a certain threshold of strictness and comprehensiveness is reached, the greater the strictness and comprehensiveness, the lower the level of alcohol consumption.

In this section we consider whether or not stakeholder involvement in public policy impacts on the strictness and comprehensiveness of alcohol policy. Figure 2 shows the numbers of countries in which various stakeholders had no, low, medium or high involvement in alcohol policy development as judged by the respondents to the WHO European Survey on Alcohol and Health (Anderson et al 2012)[9].

Figure 2. Number of countries in which various stakeholders had no, low, medium or high involvement in alcohol policy development, as judged by the respondents to the WHO European Survey on Alcohol and Health (Anderson et al 2012).

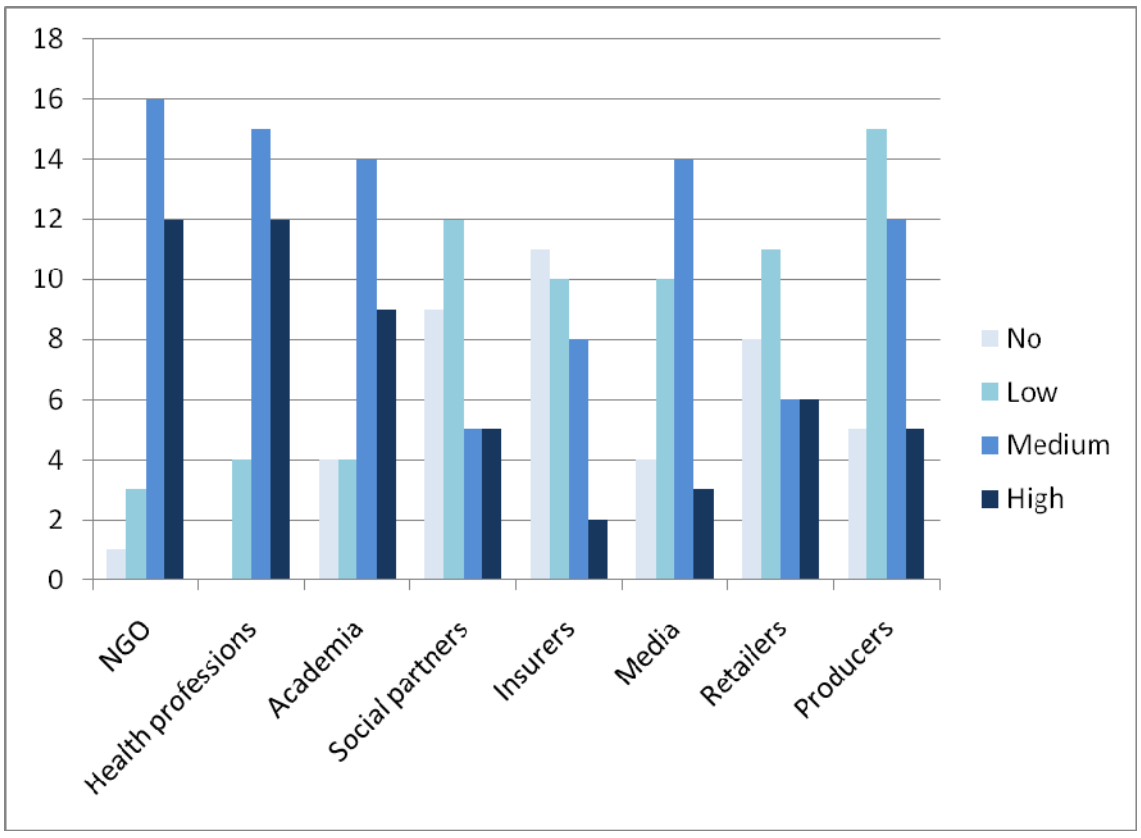
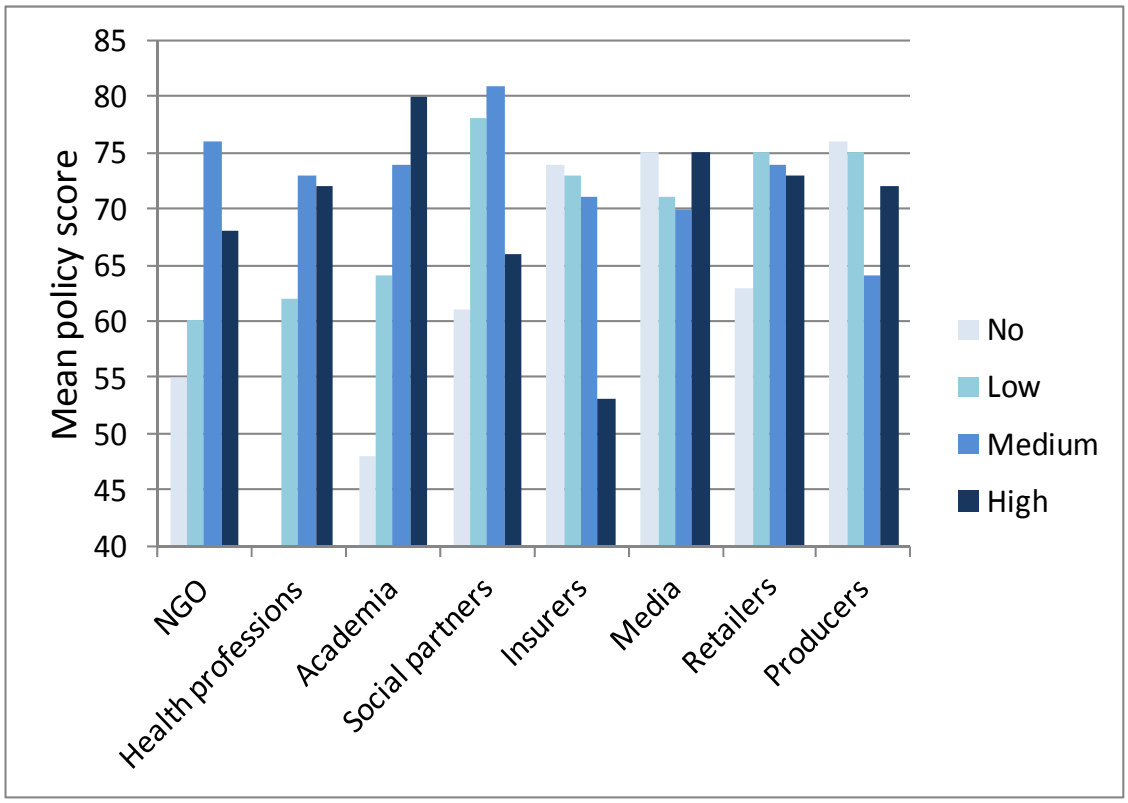


Figure 3 shows the mean scores for the strictness and comprehensiveness of alcohol policy derived from Karlsson et al (2012) by level of stakeholder involvement in alcohol policy development (no, low, medium or high). This figure has been constructed by grouping together the countries according to the level of involvement of each type of stakeholder, and then calculating the average policy score (on the strictness and comprehensiveness of alcohol policy scale) of each group of countries. Therefore, for example, in countries with low NGO

9 The 32 countries for which data were available were: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, FYRoM, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, The Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

involvement in alcohol policy development, the mean score on the strictness and comprehensiveness scale is 60 points out of a possible 160.

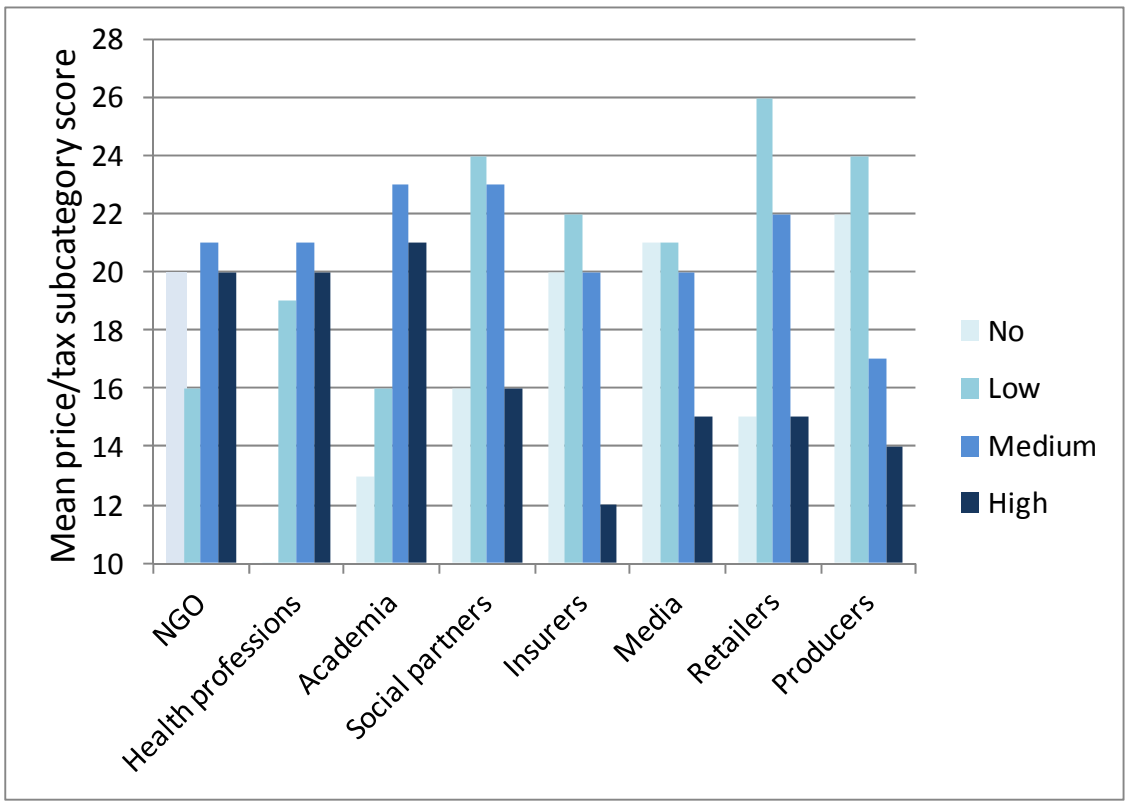
Figure 3. Mean scores for the strictness and comprehensiveness of alcohol policy by level of stakeholder involvement in alcohol policy development (no, low, medium or high). [Bottom of y-axis truncated at a score of 40].



The only group with a significant relationship was academia, where increased involvement was associated with more strict and comprehensive policies (anova test for linear relationship, $F=5.52$, $p<0.05$). When a regression analysis was undertaken with all stakeholders entered into the model, the strictness and comprehensiveness of alcohol policy being the dependent variable, the only significant relationship was for academia, where increased involvement was associated with more strict and comprehensive policies (Beta=0.77, $p<0.01$). Increased involvement of producer companies was associated with less strict and comprehensive policies, but the relationship was not significant (Beta=-0.49, $p=0.063$).

We have seen that only one type of stakeholder correlates significantly with the global alcohol policy scale created by Karlsson et al (see Karlsson et al 2012). When we look separately at each of the subcategories that form this scale, we find that the only subcategory that suggested a relationship was the price and tax subcategory (see Figure 4). The relationship with academia was not significant (anova test for linearity, $f=2.1$, $p=0.16$), and the relationship with alcohol producers failed to reach statistical significance (anova test for linearity, $f=3.6$, $p=0.069$). However, when repeating the regression analysis above once all stakeholders had been entered into the model, being the strictness and comprehensiveness of alcohol pricing and tax policy the dependent variable, increased involvement of academia was associated with more strict and comprehensive alcohol pricing and tax policies (Beta=0.604, $p<0.05$), while increased involvement of producer companies was associated with less strict and comprehensive alcohol pricing and tax policy (Beta=-0.73, $p=<0.01$).

Figure 4. Mean scores for the strictness and comprehensiveness of alcohol pricing and tax policy by level of stakeholder involvement in alcohol policy development (no, low, medium or high). [Bottom of y-axis truncated at a score of 10].



What does this mean?

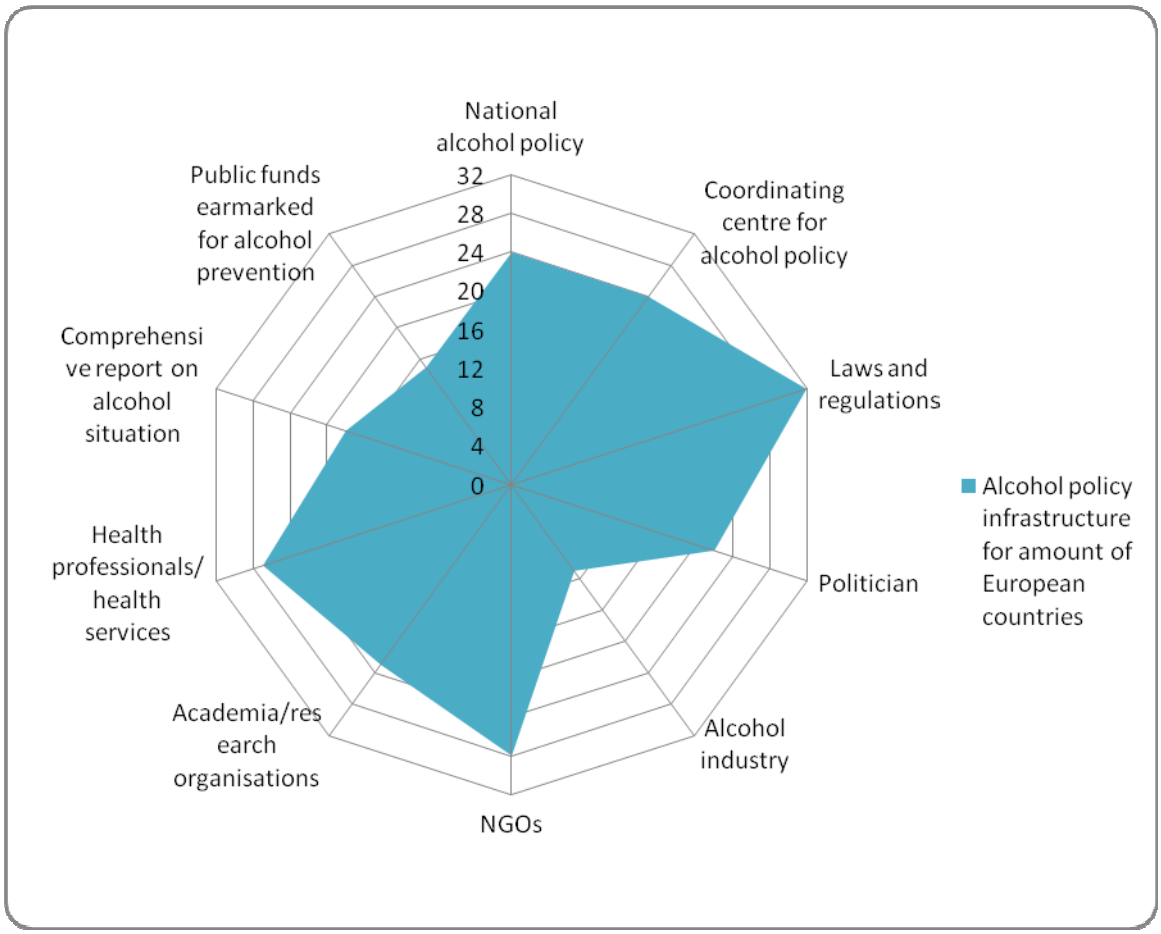
The results from the descriptive analysis show the presence or absence of a variety of alcohol policy infrastructure elements in European countries. This summary can serve as a basis for further analysis on areas with potential for further developments towards a sound alcohol policy infrastructure.

(1) Spider web

The spider web graph below intends to present European alcohol policy infrastructure supporting alcohol policy developments from a public health perspective just in one glance. It contains all infrastructure elements that were included in the study; for each of these elements, the number of European countries that have that particular kind of infrastructure is coloured in blue.

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 'workforce' 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.

Figure 5. European alcohol policy infrastructure



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. More essentially though, the majority of European 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. Most countries have a multisectoral approach to alcohol policy, i.e. a number of different departments are involved. However, typically there is a coordinating body available that is responsible for the overall coordination of the development and monitoring of the national alcohol policy. Also, the majority of countries have public officials specialised in alcohol prevention, which could contribute to emphasise the importance of and draw attention to alcohol-related issues.

Only about half the European countries, however, have prepared a comprehensive report on the alcohol situation in their country despite of the importance of monitoring and surveillance data as, for example, a basis for priority setting and policy development.

NGOs, academia/research organisations and health professionals/health services in most countries show high or medium involvement in public policy. This could be a contributing factor to the development of effective alcohol policy. On the other hand, the alcohol industries show their involvement in public policy, although they might be pursuing different interests and possibly counteract the implementation of effective alcohol policy (see relationship analysis).

(2) Relationship analysis

This study might also be the starting point to increase the understanding of the relationship between infrastructure and effective alcohol policy. Other work has shown relationships between the strength of alcohol policy and per capita consumption, once a certain policy threshold has been crossed. Analyses presented in this chapter indicate that the involvement of academia in policy making is related to more strict and comprehensive alcohol policy, whilst the involvement of alcohol producers is related to weaker pricing policy. NGO involvement did not show any relationships.

Take home messages

1. The exercise of conceptualizing and mapping alcohol policy infrastructure in Europe is complex but important to identify the elements that have a major impact on alcohol policy and strengthen them.

2. Laws and regulations, written national policy documents, and coordinating centres for alcohol policy are the most widespread infrastructures. However, efforts have to be done to extend comprehensive reports on the alcohol situation and to establish public funds earmarked for alcohol prevention in all countries.

3. The impact of the involvement of different stakeholders in alcohol policy is diverse. Whereas academia involvement seems to facilitate stricter and comprehensive alcohol policy, the involvement of alcohol producers could be a barrier, at least, to a stronger pricing policy, while NGO involvement did not show any relationship.

4. Future efforts should be invested in overcoming the difficulties encountered in operationalizing some of the infrastructure elements to be able to use them in a more analytic and inferential way.

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

Peter Anderson & Antoni Gual

In this final chapter, we draw out some of the conclusions that we have found important when considering science, alcohol, health and policy in the European Union.

Toxicological assessment of alcohol

Lachenmeier and Rehm (2012) undertook a toxicological analysis of unrecorded alcohols based on margins of exposure. But, of course, in so doing, they undertook a toxicological analysis of ethanol, and the results are rather startling.

For a safe environment, we all regard that we should not be exposed to toxins and carcinogens and we expect our governments to ensure this. As Lachenmeier and Rehm (2012) describe, the European Commission has its own guidelines about what these exposure levels should be. For genotoxic carcinogens (those carcinogens that damage genetic material, which ethanol does) the exposure level is set at 10,000. This means that one should not be exposed to the substance any greater than a level that is more than one ten thousandth of the toxic dose. For compounds that are harmful to health in other ways, as is ethanol, the exposure level is set at 100. This means one should not be exposed to the substance any greater than a level that is more than one hundredth of the toxic dose. When assessing a lifestyle chemical that is intentionally consumed and using human epidemiological data on health harms other than cancer, an exposure level of 10, as opposed to 100, might be considered acceptable.

Based on systematic reviews of the scientific evidence, Lachenmeier and Rehm (2012) find that the toxic threshold for ethanol is 440 mg per kg per day. For an average body weight of 74kg, which the EC uses, this works out at 32 grams of alcohol, about three drinks a day, based on 10g alcohol per drink. It is about 1,000 drinks a year. So, according to the European Commission guidelines, consumers should not be exposed to more than one drink every ten years to respect the carcinogenic threshold, and to no more than 10 drinks a year to respect the toxic threshold for health, or 100 drinks a year, two drinks a week, if the more liberal margin of exposure of 10 is chosen.

But, as we showed in Chapter 1 (Gual & Anderson 2012), the average alcohol consumption of an adult European Union citizen is about three drinks a day. Thus, the average margin of exposure for ethanol amongst European citizens is 1.0, meaning that on average European consumers are consuming alcohol at the toxic threshold for cancer and ill-health, or at levels 10,000 times higher than they should be.

Of course, there is no way that one could expect European citizens to adjust their drinking habits to respect toxic thresholds (one drink every ten years), but there are certain things that one might expect governments to do. Like, for example, mandating information and health warning labels on all alcohol beverage containers, pointing out that alcohol causes cancer, in the same way that cigarette packets carry labels saying that cigarettes cause cancer; or, like, for example, banning all forms of commercial communications on alcohol, as has been done for tobacco.

Perhaps, though, the other important thing to say is that the work of Lachenmeier and Rehm (2012) demonstrates that scientists are willing to go where governments fear to tread. As part of the risk evaluations for European Union directive 67/548/EC on classification, packaging, and labelling of dangerous substances, the Finnish national chemicals surveillance authority assessed ethanol in 1997. Following the normal procedure for any chemical substance, the national authority presented the data to the relevant European Commission Committee, with the following proposed classification: F; R11 Repr. Cat. 1; R61 Muta. Cat. 3; R40 Xn; R48/22[10]. For "Repr. Cat 1 ", chemicals can only be sold for industrial purposes. So, the Committee for the European Commission decided to terminate the evaluation.

The mortality burden of alcohol is very high

Rehm (2012) found that alcohol-attributable mortality is very high. In 2004[11], 14% of all premature deaths (defined as deaths in the age group between 15 and 64 years of age) in men in the EU were estimated to be due to alcohol consumption, corresponding to an overall toll of about 95,000 deaths, or 1 in 7 premature deaths. For women, the corresponding numbers were 8%, corresponding to 25,000 premature deaths, or 1 in 13 of these deaths being caused by alcohol. For both sexes combined, the proportion of alcohol-attributable deaths amounted to 12% of all deaths, about 1 in 8. One in eight for a single risk factor is a pretty staggeringly number for a cause of deaths. Rehm (2012) went on to show that the vast majority of these deaths were caused by heavy drinking. Four fifths of all male deaths came from consumption levels of at least 60g of pure alcohol per day, and two thirds of all female deaths from consumption levels of at least 40g of pure alcohol per day. Thus, any measure that wants to successfully reduce alcohol-attributable harm has to cut down regular and irregular heavy drinking occasions.

Best buys to reduce alcohol's burden

Fortunately, there are many effective and cost–effective ways to do this. Indeed, a joint report by the World Economic Forum and WHO for the September 2011 United Nations High Level meeting on non-communicable diseases included three actions on alcohol (tax increases, restricted access to retail alcohol and bans on alcohol advertising) as being among the "best buys" to reduce the global burden of non-communicable diseases (Bloom et al., 2011; World Economic Forum & WHO, 2011). We have considered all three of these in the AMPHORA project.

Tax increases, restricted access to retail alcohol

Karlsson, Lindeman & Österberg (2012a) demonstrated convincingly, as has been known for a long time, that restricting the economic and physical availability of alcohol is one of the most effective policy options to reduce alcohol-related harm. The first part of their analysis showed that there is a vast amount of research on this subject and that it has cumulated during the last decade. The second part of their analysis showed that during the past decade or so, alcohol policy in Europe has taken a restrictive turn in many countries. Especially the economic availability of alcohol has been restricted in several countries, and they note that raising alcohol excise duties is not only an effective public health measure, but also one that serves fiscal interests in the form of increased state revenues. Perhaps, though, what really stands out from their analyses is that most of the restrictive changes that have been taking place during the past few years are found in the southern and eastern parts of Europe.

10 F stands for "flammable" and is the only approved classification today. Repr. Cat. 1 = category 1 reproductive toxins (category 3 is a possible toxin and category 1 is a definite toxin). R61 = May cause harm to the unborn child. Muta. Cat. 3 = category 3 mutagens. R40 = Possible risk of irreversible effects. Xn – Harmful. R22 Harmful if swallowed. R48 Danger of serious damage to health by prolonged exposure.

11 Unfortunately, at the time of completing this ebook, the latest year for which such data is available is 2004. It will be updated for 2010, by the end of the year 2012.

Advertising bans

Hellman (2012) reported the results from a qualitative study on how teenagers from six European countries[12] negotiate messages of televised beer commercials, and de Bruijn (2012) investigated, as part of broader analyses, the associations between online alcohol marketing exposure and binge drinking among adolescents in four European countries[13]. The findings are remarkable.

Hellman (2012) found a high level of advertisement literacy and commercial genre scepticism amongst the teenagers. No demand for, enjoyment of, or willingness to receive the messages of the alcohol commercials were spontaneously expressed by any of the teenagers. Hellman concluded from the results that bans on alcohol advertising would be, if not openly welcomed, at least not contravened by the young audiences interviewed for her study.

De Bruijn (2012) is also very clear in her findings. European youngsters from the four countries are highly aware of alcohol marketing on the internet, and report high exposure to online alcohol marketing. The findings indicate that the higher the exposure to online alcohol marketing, the higher the risk of being a binge drinker, with a dose-response effect. She also concluded that the results support a ban on marketing to protect youngsters from the harmful effects of exposure to commercial communications, and more specifically to online alcohol marketing.

Other policy areas

In addition to the best buys, two other policy areas were studied: the role of health systems and the role of drinking environments.

Role of health systems

To some extent recognizing the contribution of heavy drinking to alcohol attributable deaths found by Rehm (2012), Wolstenholme and colleagues (2012), amongst other things, described the characteristics of alcohol treatment systems and attempted to identify the gap between need for and access to interventions for alcohol dependence. They found that countries that appeared to have more developed national alcohol strategies appeared to achieve higher levels of implementation of both brief interventions and specialist treatment than countries without such strategies. By contrast, devolution of health care management and funding to local levels appeared to hamper implementation of effective public health strategies for alcohol. The biggest problem though was simply lack of data and incompatibility of data between countries, impeding a rational approach to health care planning. Wolstenholme et al (2012) attempted to calculate the gap between need and treatment for alcohol dependence in six European countries[14], but were hampered by likely inaccurate estimates of the prevalence of alcohol dependence, particularly in southern European countries. They found that the proportion in need of treatment actually accessing it varied from 1 in 14 in England to 1 in 4 in Italy. Whatever the correct estimate, it is clear that there is an enormous challenge remaining in terms of providing adequate treatment for those who need it.

Role of drinking environments

Hughes et al (2012) studied nightlife in four European cities[15], and found that the purpose of young people going out in all four cities, including southern European cities, was to get drunk.

12 Denmark, Finland, Germany, Italy, the Netherlands and Poland
13 Germany, Italy, the Netherlands and Poland
14 Austria, England, Germany, Italy, Spain and Switzerland
15 Liverpool, Ljubljana, Palma de Mallorca and Utrecht

Although they identified many management and design opportunities to reduce drunkenness, the potential of these opportunities was compromised by the fact that most youngsters arrived at pubs and clubs already drunk, from drinking cheaper alcohol purchased in shops and supermarkets.

Policy environment

Chapters in the ebook have also looked at the policy environment, including analyses as to whether or not comprehensive policy matters for alcohol consumption, what infrastructures influence these policies, how the public view alcohol problems, and the extent to which broad societal changes, such as urbanization and the role of women moderate the impact of policies.

Does policy matter?

Karlsson, Lindeman & Österberg (2012b) scaled and scored alcohol policy across 33 European countries and found that alcohol policy, with a mean score of 71, varied from 38 with low policy in Luxembourg to 133 with high policy in Norway, out of a possible total score of 160. They demonstrated that policy matters, since once policy reached a certain threshold, the more comprehensive the policy the lower the alcohol consumption, similar to findings reported elsewhere (Anderson 2013, in press).

How infrastructures influence policy

König, Segura and Anderson (2012) described the extent of alcohol policy infrastructures across European countries. A key finding of their analyses was the extent to which involvement of stakeholders in policy making influenced the comprehensiveness of policy. They found that a greater involvement of academia in policy making was related to more strict and comprehensive alcohol policy, whilst a greater involvement of alcohol producers was related to weaker pricing policy. Perhaps more worryingly, the extent of involvement by non-governmental organizations had no bearing on the strictness and comprehensiveness of alcohol policy.

Public view of alcohol problems

In seven European countries[16], Nordlund (2012) compared people's definitions of what 'alcohol abuse' means with their country's comprehensiveness of alcohol policy, using the scale of Karlsson, Lindeman & Österberg (2012b). For 'alcohol abuse', he developed an 18 point scale, which ranged from the most cautious: "Drinks a few times a year with friends and gets mildly intoxicated", to the most extreme: "Drinks a couple of times a week alone and gets strongly intoxicated". The 18 statements represent a scale on which the respondents can indicate if they would characterize each statement as "alcohol abuse", or not. For each country the mean number of descriptions of drinking habits that were characterized as "abuse" was calculated. Nordlund (2012) found that across the countries studied, the stricter the alcohol policy, the smaller the number of items that were needed for a drinker to be defined as having 'alcohol abuse'. In other words, the stricter the policy, and thus in general the lower the level of per capita alcohol consumption, the more likely lower levels of drinking were defined as 'alcohol abuse'. Similar findings have been found over time in France, where, as alcohol consumption has declined and policies become stricter, lower cut off points of problematic drinking are perceived by the public as problematic (Messiah et al 2008).

Societal changes and alcohol policy

Allamani et al (2012) studied the interaction between alcohol policy, societal changes such as rates of urbanization and changing roles of women, and levels of alcohol consumption and

16 Finland, Germany, Italy (Tuscany), Norway, Poland, Slovenia and Spain

alcohol-related harm at the societal level in twelve European countries[17]. This is the first time that such an analysis has ever been undertaken. They found that liberalization of alcohol policies is associated with increased consumption and the introduction of preventive policies is generally associated with decreased consumption. Only in one country, Italy, did they find no observable relationship between policy and consumption, but then the alcohol polices studied in Italy were rather weak. They also found correlations between policies and death rates from liver disease and transport accidents, and this time with observable relationships in Italy. They found that a range of factors, particularly levels of urbanization and female roles, as measured by mean maternal age were related to alcohol consumption. In general, the greater the level of urbanization, the higher the level of alcohol consumption, and the higher the mean maternal age at childbirth, the lower the level of alcohol consumption. In general, the societal changes seemed to have a greater impact on alcohol consumption and alcohol-related harm than the planned policies.

Two things particularly stand out: first, this is the first time that empirical analyses using correlations between objective data of societal changes and per capita alcohol consumption have been undertaken, and some of the results (for example increased urbanization in Italy associated with increased alcohol consumption) run counter to previous publications, which, whilst not using correlations between objective data, proposed that increased urbanization was a core explanation of decreasing alcohol consumption in Italy (Tusini 2007; Cipriani & Prina 2007). Although Allamani et al (2012) intend further analysis of the data, their findings might suggest that previous suggested explanatory variables, at least urbanization in Italy, are not supported.

Second, when controlling for the societal changes, alcohol policies do impact on levels of consumption and harm. However, the findings suggest that in the presence of broad societal changes, such as changes in urbanization which are associated with increased levels of per capita alcohol consumption, alcohol polices need to be more strict and comprehensive to ensure impact.

Monitoring alcohol policy

Whilst epidemiology can help guide alcohol policy, Rehm (2012) simply points out that meaningful monitoring and surveillance for alcohol-attributable harm is not done. He notes that at the media launch of the WHO European Region's report 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. He notes that 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. 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 praiseworthy, 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, there has been a 10 year gap before new data on burden of disease were presented in August 2012, with one non-empirical based update for the year 2004 in-between. During this time, few countries have conducted their own burden of disease studies, so monitoring of alcohol-attributable burden of disease on a continuous basis has been absent. As Rehm (2012) notes, only if we achieve monitoring and surveillance to give timely updates, can these data be really used as policy tools. Otherwise, the recent

17 Austria, Finland, France, Hungary, Italy, the Netherlands, Norway, Poland, Spain, Sweden, Switzerland, United Kingdom

developments in alcohol epidemiology will remain academic successes without any impact on policy making.

Putting it all together

Putting this all together, we find three important outcomes:

1. Although alcohol is a toxic drug, with European citizens drinking on average at the toxic threshold levels for cancer and ill-health, there are no mandated warning labels on alcohol beverage containers throughout the European Union, and alcohol continues to be marketed as though it was not a toxic substance.

2. Comprehensive alcohol policies, including the best buys of pricing, restricted access and bans on advertising, matter. Involvement of alcohol producers in policy making is associated with weaker policies. Alcohol polices need to account for the impact of other societal changes, such as urbanization and lower maternal age at childbirth which are associated with increased alcohol consumption.

3. There is an apparent dissonance between the level of harm on the one hand (alcohol as a cause of 1 in 8 of all premature deaths) and an effective response, on the other hand. Three illustrations of this are: levels of per capita alcohol consumption in the European Union as a whole have remained static over recent years (Anderson et al 2012); there is a large treatment gap between what can be done for alcohol dependence and what is actually done; and there is a lack of seriousness with which monitoring of alcohol-related harm and the impact of alcohol policies on such harm is taken.

Where does this leave us now?

We are both clinicians, and it is common when discussing balance sheets or the pros and cons of any behaviour or desired action to ask the patient, so, where does this leave us now.

This ebook and the results of the AMPHORA project have shown that science matters. Science can effectively describe the problem and identify what can be done to reduce the problem. Science can go where governments fear to tread. Greater involvement of science is associated with better policy. But, what seems missing is greater courage on behalf of politicians to do what is needed to protect public health. When talking about preventing non-communicable diseases, New York's mayor Bloomberg (2011) said it all: "While government action is not sufficient alone, it is nevertheless absolutely essential. There are powers only governments can exercise, policies only governments can mandate and enforce, and results only governments can achieve. To halt the worldwide epidemic of non-communicable diseases, governments at all levels must make healthy solutions the default social option. That is, ultimately, government's highest duty. America's Franklin Delano Roosevelt – once put it: 'The state's paramount concern should be the health of its people.' "

Perhaps this all means that academia should be more active in getting out there and ensuring that science informs and impacts alcohol policy in the interests of the health of European people.

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