

Alcohol consumption in people aged 50 or older in Europe

Marina Bosque Prous

TESI DOCTORAL UPF / 2016

DIRECTORS DE LA TESI

Dr. Albert Espelt (Agència de Salut Pública de Barcelona)

Dra. M. Teresa Brugal (Agència de Salut Pública de Barcelona)

DEPARTAMENT DE CIÈNCIES EXPERIMENTALS I DE LA SALUT



Als meus pares

Acknowledgements

Així com qui no vol la cosa, en un obrir i tancar d'ulls, han passat tres anys. Tres intensos anys amb mil vivències i anècdotes, plens de bons moments per recordar i de no tan bons. Tres anys durant els quals s'ha anat gestant aquesta tesi. Ara, a punt de dipositar-la, acaba una etapa. Són moltes les persones que m'han acompanyat en aquest procés i a les que estaré sempre agraïda.

En primer lloc, agrair el suport incondicional als meus directors i tot el que m'han ensenyat durant aquests anys. A l'Albert Espelt, per la teva insistència perquè fes aquesta tesi, i contagiarme la teva il·lusió i les inesgotables ganes de treballar, perquè sempre estàs disposat a donar un cop de mà i per ser molt més que un director. A la Teresa Brugal, per dir sempre les coses tal com són, bones o dolentes, sense rodejos, i per no deixar-me perdre el nord recordant-me sempre que “lo mejor es enemigo de lo bueno”. Agrair també al meu tutor de la UPF, el Joan Ramon Villalbí, per l'ajuda rebuda durant aquests anys i els inestimables comentaris en els diferents articles.

Als coautors dels diferents articles (Anna Guitart, Anton Kunst, Carme Borrell, Kenio C. Lima, Luis Sordo, Maria José Bravo i Montse Bartroli) perquè sense la seva col·laboració, aquesta tesi no hagués estat possible. Un agraïment especial per l'Anton Kunst, per acollir-me durant tres mesos al seu grup de recerca a l'AMC d'Amsterdam. Gràcies per les reunions, les converses i els comentaris inspiradors i per ensenyar-me una altra manera de treballar.

A tots els companys del SEPAD: l'Alicia Queralt, l'Anna Guitart, la Beatriz Puertolas, la Carmen Vecino, la Dolors Graugés, l'Ester Teixidó, la Montse Bartroli, la Núria Ribot, l'Oleguer Parés, el Sergi Pardo, la Vicky Garcia... pel millor ambient possible a la feina i per fer el meu dia a dia molt més agradable i fer-me sentir com a casa. Agrair especialment al vermut team (Bea, Dr. Prats, Espelt, Ester, Fabi, Hare, Marcel, Montse i Oleguer) pels moments/tardes de desconnexió tant necessaris aquests últims mesos. I a l'Oleguer per la revisió crítica de la tesi i de l'anglès.

Aquests últims mesos han suposat canvis importants a nivell laboral, que han fet trontollar el deadline inicial de la tesi. Gràcies a l'Àlex Guarga i l'Alba Benaque per confiar en mi i donar-me la oportunitat de canviar de registre.

Així mateix, si ens remuntem als orígens, quan encara estudiava Nutrició Humana i Dietètica, dues professores van marcar el meu futur de manera més o menys conscient. D'una banda, la Laura Padró suggerint-me que encaminés el meu futur cap a la salut pública. I de l'altra, la Mar Grasa: si no fos per la teva insistència perquè col·laborés amb vosaltres, ben segur que aquesta tesi no existiria! Moltes gràcies a tu i la Montse Esteve per acollir-me al departament, per la vostra vitalitat i per fer que em retrobés amb la recerca.

De la mateixa manera, seria injust no recordar el prelude d'aquesta tesi: el Màster en Salut Pública. Dos anys durs, en els que vaig aprendre molt i vaig conèixer gent molt maca. Especialment els sesguitos. Gràcies Andrea Ramírez, César Velasco i Cristina Casajuana per estar sempre disposats pel que faci falta i per haver-vos convertit en

imprescindibles. Agrair també a la Cristina la revisió de l'anglès. Durant aquest temps també he realitzat diversos cursos, entre ells l'European Educational Programme in Epidemiology a Florència i l'European Drugs Summer School a Lisboa, que m'han permès conèixer epidemiòlegs de tot el món com la Laura van den Borre, el Pedro Gullón o l'Amelie Keller.

Agrair també a totes aquelles persones que d'una manera o altra m'han acompanyat en aquest viatge. A las negras (Elena, Glòria, Judith, Laura, Nerea i Noelia) i consortes, per ser una font inesgotable de bons moments, rialles i confessions varies. Melon, perquè l'estudiar no sé si mai acabarà! (ara faré un break, això sí!). Glò, ànims que en breu et toca a tu! A les amigues de la uni (encara que últimament això de veure'ns sigui una odissea), els amics d'Eivissa i els de Barcelona, els companys de pis (Àngel, Tamires, Diego...) i la gran família berguedana. A l'artista de la portada, moltes gràcies Esteve! Envejo la teva creativitat!! Gràcies també a tu i la Teresa per cuidar-me tant des del primer dia.

And last but not least, a aquelles persones que sempre han estat al meu costat. Als meus avis, per ser els millors del món. Ara ja no tindrè excuses per no venir a veure-us més sovint! Als meus pares, per recolzar-me sempre i per tot el que sempre heu fet per mi. No tothom té la sort de tenir uns pares tan motivats com per aprendre anglès només per poder entendre els articles que escric! Finalment, als Alberts de la meua vida, per il·luminar els dies foscos. Especialment a tu, per tenir sempre una paraula per un somriure. No sé com podré compensar-te! Infinites gràcies.

Abstract

Hazardous drinking in the elderly has become an important public health problem due to the ageing of the population and the fact that alcohol-related consequences are magnified in this age group. However, to date, few studies examine hazardous drinking in people aged 50 years or older and the factors associated with alcohol use.

The aim of this thesis is to quantify hazardous drinking in people aged 50 years or older in Europe, according to gender and country, and to analyze the possible individual and contextual factors related to such consumption.

Throughout the thesis, the source of information was the European project SHARE (Survey of Health, Ageing and Retirement in Europe), which includes data from different European countries. This thesis consists of five articles that attempt to respond to the different specific objectives.

The results suggest that the prevalence of hazardous drinking in people aged 50 years or older is around 22%, with variations between countries. These variations can be explained by individual factors, such as age or gender, and various contextual factors, such as alcohol advertising restrictions and the unemployment rate. Finally, one of the contextual aspects that may have had more impact in recent years is the economic crisis. We found that, in people aged 50 to 64 years, the incidence of hazardous drinking was greater in those who lost their jobs. However, from 2006 to 2013 there has been a decrease in

hazardous drinking and also in the average amount of alcohol consumed in people aged 50 to 64 years in Europe.

Resum

El consum de risc d'alcohol en la gent gran s'ha convertit en un important problema de salut pública degut a l'envelliment de la població i al fet que les conseqüències adverses del consum es magnifiquen en aquest grup d'edat. No obstant això, són pocs els estudis que analitzen el consum de risc d'alcohol en persones majors de 50 anys i els factors que s'associen al consum de risc.

L'objectiu d'aquesta tesi és quantificar el consum de risc d'alcohol en persones de 50 anys o més a Europa segons gènere i país i analitzar els possibles factors individuals i contextuais relacionats amb aquest consum.

Per tota la tesi, la font d'informació van ser les enquestes del projecte europeu SHARE (Survey of Health, Ageing and Retirement in Europe), amb dades de diferents països d'Europa. La tesi consisteix en 5 articles que intenten respondre als diferents objectius específics.

Els resultats suggereixen que la prevalença de consum de risc d'alcohol en les persones de 50 anys o més està al voltant del 22%, amb variacions entre països, que poden explicar-se per factors individuals, com el sexe o l'edat, i per diversos factors contextuais, com les restriccions en la publicitat de les begudes alcohòliques o la taxa d'atur. Finalment, un dels aspectes contextuais que pot haver tingut més impacte en els darrers anys és la crisi econòmica. El que hem vist és que en persones de 50 a 64 anys la incidència de consum de risc d'alcohol era major en aquells que havien perdut la feina. Tanmateix, durant el període de 2006 a 2013 s'ha produït una davallada en el

consum de risc d'alcohol i en la mitjana de la quantitat consumida en
persones de 50 a 64 anys a Europa.

Preface

This thesis was completed at the Agència de Salut Pública de Barcelona during the years 2013-2016, under the supervision of Dr Albert Espelt and Dr M Teresa Brugal. This thesis was supported by the Spanish Network on Addictive Disorders (grant numbers RD06/0001/1018 and RD12/0028/0018), through a research contract of the PhD student. It was presented as a collection of publications according to the PhD in Biomedicine program regulations at the Department of Experimental and Health Sciences at the Universitat Pompeu Fabra. This thesis is divided into the following sections: introduction, justification, hypotheses and objectives, methods and results, discussion and conclusions. Within the section on methods and results the five resulting papers are presented (4 published and 1 of them currently submitted).

All studies of this thesis used data from the European project “Survey of Health, Ageing and Retirement in Europe” (SHARE project) (<http://www.share-project.org/>), which is funded by European Commission, the US National Institute on Aging, and national sources. The SHARE project, whose first wave of data was collected in 2004, is the first study to examine the different ways in which people aged 50 and older live in several European countries from Scandinavia to the Mediterranean and in Israel. This thesis was made possible with the collaboration of different researchers based in Catalonia, Spain, the Netherlands and Brazil.

My personal contributions in the production of the articles presented in this thesis include the literature review, study design, statistical analysis of the data and the writing of the manuscripts.

Index

Acknowledgements.....	v
Abstract	ix
Resum	xi
Preface	xiii
Figures list.....	xix
Tables list	xix
1. INTRODUCTION	1
1.1 Alcohol consumption	1
a) Trends in alcohol consumption in Europe	2
b) Alcohol drinking patterns.....	5
1.2 Screening of risky drinking patterns.....	10
1.3 Alcohol-related consequences	13
a) Alcohol use disorder	15
b) Other alcohol-related morbidity	16
c) Mortality.....	18
d) Harms to society.....	19
1.4 Factors related to alcohol consumption.....	24
a) Socioeconomic and political context.....	24
b) Axes of inequality	32
c) Material circumstances.....	36
1.5 Alcohol use and ageing.....	38

1.6 The SHARE project	40
2. JUSTIFICATION.....	43
3. HYPOTHESES AND OBJECTIVES	47
3.1 Hypotheses.....	47
3.2 Objectives.....	48
a) General objective	48
b) Specific objectives	48
4. METHODS AND RESULTS	51
Article 1	53
Article 2	69
Article 3	85
Article 4	97
Article 5	115
5. DISCUSSION.....	133
5.1 Prevalence of hazardous drinking in European people aged 50 or more	135
5.2 Individual factors associated with hazardous drinking	136
a) Age	136
b) Gender	137
c) Employment status.....	137
d) Other individual factors	138
5.3 Contextual factors associated with hazardous drinking.....	140

a) Alcohol advertising regulations.....	140
b) Unemployment rate	143
c) Gender inequalities in a society	144
d) Gross domestic product.....	145
e) Other contextual factors	146
5.4 Effect of economic crises on alcohol consumption.....	147
a) Changes in alcohol consumption	147
b) Job loss in a context of economic crisis.....	148
5.5 Limitations	149
a) Limitations of the study 1	150
b) Limitations of the study 2.....	150
c) Limitations of the study 3.....	151
d) Limitations of the study 4.....	152
e) Limitations of the study 5.....	153
5.6 Implications and recommendations	154
6. CONCLUSIONS	157
BIBLIOGRAPHY.....	159
APPENDIX	183

Figures list

Figure 1. Total per capita alcohol consumption (15+ years; in litres of pure alcohol), 2010	1
Figure 2. Trends in per capita alcohol consumption (15+ years; in litres of pure alcohol), 1961-2010	4
Figure 3. Distribution of alcohol consumption categories in Western Europe	6
Figure 4. Alcohol-attributable fractions (AAFs) for selected causes of death, disease and injury, 2012	14
Figure 5. Burden of disease attributable to 20 leading risk factors in 2010, expressed as a percentage of global disability-adjusted life-years	17
Figure 6. Proportion of all deaths attributable to alcohol (AAFs; %; all ages), 2012	19
Figure 7. Conceptual framework of the effect of social determinants of health on alcohol consumption	23
Figure 8. Overview of the countries that participated in each wave of the SHARE project survey and the field time. 2004-2013	41

Tables list

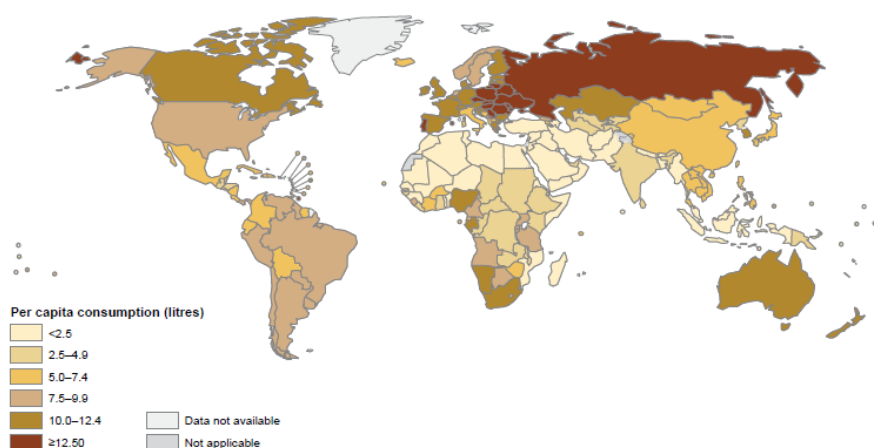
Table 1. Trends in per capita alcohol consumption (15+ years; in litres of pure alcohol), 1961-2010	3
Table 2. AUDIT-C questions	11

1. INTRODUCTION

1.1 Alcohol consumption

Alcohol production, distribution and consumption have been part of human culture since the beginning of history. However, from a public health perspective, alcohol use has been associated with a variety of adverse health and social consequences, being a major cause of disease, disability and death in many countries (Lim et al., 2012; Rehm et al., 2009).

Figure 1. Total per capita alcohol consumption (15+ years; in litres of pure alcohol), 2010.



Source: World Health Organization (Map produced by: Health Statistics and Information Systems (HSI). World Health Organization).

Worldwide consumption in 2010 was equal to 6.2 litres of pure alcohol consumed per person aged 15 years or older (13.5 grams of pure alcohol per day on average) (World Health Organization, 2014), with variations in the per capita consumption among countries (**figure**

1). The highest consumption levels are found in high-income countries, especially in Europe, but also in many countries of America, Australia, New Zealand and the south of Africa (Shield et al., 2013). In contrast, lower levels of alcohol use are found in northern African countries, Sub-Saharan Africa, the Middle East and southern Asian countries, which are regions with a higher proportion of Muslims and have, therefore, higher rates of abstention due to religious reasons (Bernards, Graham, Kuendig, Hettige, & Obot, 2009) and policies that ban alcohol distribution and consumption (Babor & Caetano, 2005).

Alcohol consumption in Europe is the highest in the World (10.9 litres of pure alcohol per capita in 2010) (World Health Organization, 2014). Around 15% of the world's population over 15 years live in the European region, where more than a quarter (25.7%) of the world alcohol consumption is made. Differences in the amount consumed are also seen among European countries. For example, the highest per capita consumption of the entire European region is found in Eastern European countries (13.9 litres of pure alcohol per adult per year) (Shield et al., 2013), which also have the largest alcohol-related adverse consequences (Rehm, Taylor, & Patra, 2006).

a) Trends in alcohol consumption in Europe

Alcohol consumption not only varies between countries and regions, but also over time. During the decades following the World War II, a gradual convergence regarding alcohol consumption began throughout Europe (Allamani, Olimpi, Pepe, & Cipriani, 2014). In fact, the Northern countries have increased their overall consumption, while the Mediterranean countries have decreased it. The Eastern and

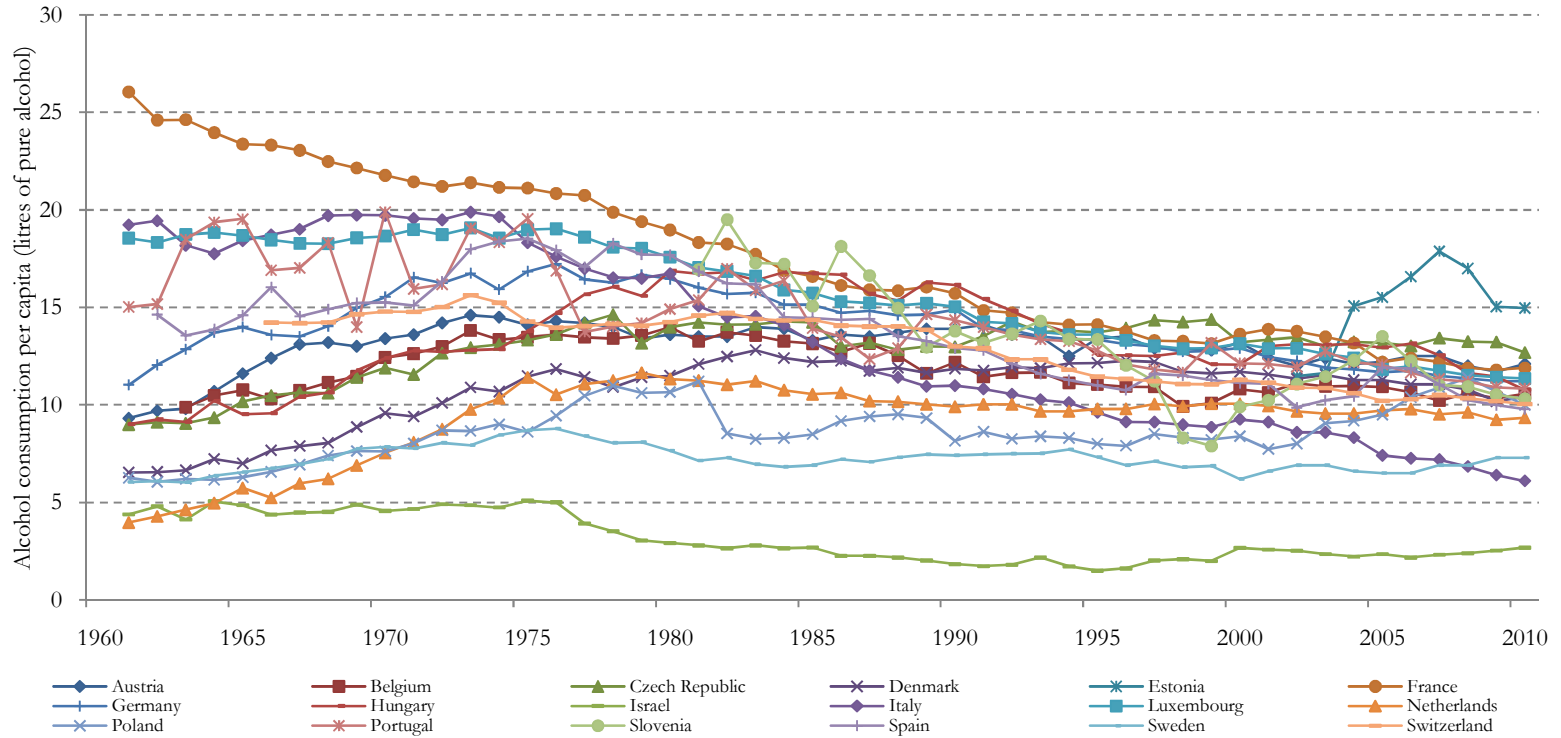
Central European countries show an intermediate drinking pattern. **Table 1** and **figure 2** show the trends in recorded per capita alcohol consumption, from 1961 to 2010, for 17 European countries and Israel.

Table 1. Trends in per capita alcohol consumption (15+ years; in litres of pure alcohol), 1961-2010.

Country	1961	1970	1980	1990	2000	2010
Austria	9.3	13.4	13.6	13.9	13.2	12.1
Belgium	9.9 ^a	12.4	14.0	12.2	10.8	10.6
Czech Republic	9.0	11.9	14.0	13.0	13.2	12.7
Denmark	6.5	9.6	11.5	11.9	11.7	10.4
Estonia					11.5 ^d	15.0
France	26.0	21.8	19.0	15.7	13.6	11.9
Germany	11.0	15.5	16.5	14.9	12.9	11.2
Hungary	9.0	12.4	16.9	16.2	12.1	10.8
Israel	4.4	4.6	2.9	1.8	2.7	2.7
Italy	19.2	19.7	16.7	11.0	9.3	6.1
Luxembourg	18.5	18.7	17.6	15.0	13.1	11.4
Netherlands	4.0	7.5	11.3	9.9	10.1	9.3
Poland	6.3	7.6	10.7	8.2	8.4	10.0
Portugal	15.0	19.9	14.9	14.4	12.1	10.8
Slovenia			16.9 ^c	13.8	9.9	10.3
Spain	14.6 ^b	15.3	17.7	12.9	11.1	9.8
Sweden	6.0	7.9	7.7	7.4	6.2	7.3
Switzerland		14.8	14.3	13.0	11.3	10.0

^aData from 1963; ^bData from 1962; ^cData from 1981; ^dData from 2002
Source: Global Information System on Alcohol and Health (World Health Organization, 2016).

Figure 2. Trends in per capita alcohol consumption (15+ years; in litres of pure alcohol), 1961-2010.



Source: Global Information System on Alcohol and Health (World Health Organization, 2016).

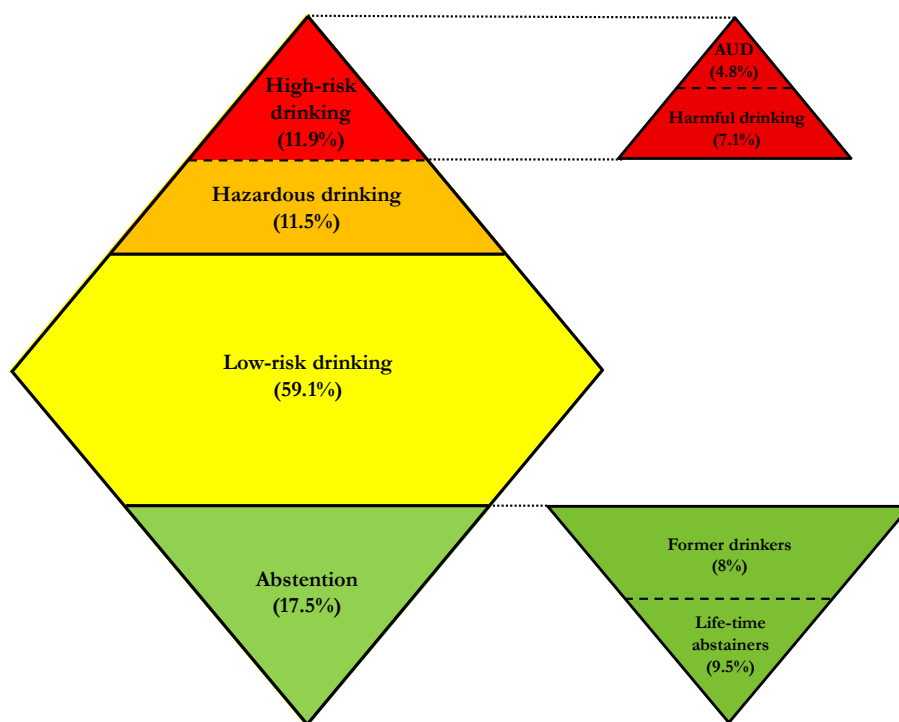
b) Alcohol drinking patterns

In general, the higher the alcohol consumption in a country, the greater the prevalence of alcohol-related problems (Babor et al., 2010). However, the impact of alcohol consumption in a population not only depends on the amount of alcohol consumed (Rehm, Room, van den Brink, & Jacobi, 2005). Different drinking patterns lead to distinct health consequences, despite a similar amount of consumption (Kuendig et al., 2008; Rehm, Rehn, et al., 2003). Besides, the drinking culture may also affect the reporting of negative consequences from drinking (Graham et al., 2011).

The expression “drinking pattern” refers to regularities in the frequency, amount, and type of alcohol consumed over a period of time (i.e. it reflects how alcohol is consumed in a society) (Babor et al., 2010). Alcohol drinking patterns have a direct effect on the alcohol-related consequences, regardless of the average amount consumed (Astudillo, Kuntsche, Graham, & Gmel, 2010; Rehm et al., 2006). Thus, an index measuring the degree of risk of the drinking pattern in each country, the Patterns of Drinking Score (PDS), was created (Rehm, Rehn, et al., 2003; World Health Organization, 2014). PDS is measured on a scale from 1 (least risky pattern of drinking) to 5 (most risky pattern of drinking) and is strongly associated with the alcohol-attributable burden of disease in a given country. The higher the score, the greater the alcohol-attributable burden of disease in the country. PDS estimates are based on the following six drinking attributes: the usual quantity of alcohol consumed per occasion; festive drinking; proportion of drinking events when drinkers get drunk; proportion of

drinkers who drink daily or nearly daily; drinking with meals; and drinking in public places. Countries with least risky patterns of drinking are found in southern and Western Europe, while the most risky patterns have been found in Russia and Ukraine (World Health Organization, 2016).

Figure 3. Distribution of alcohol consumption categories in Western Europe.



Source: This figure was created using data of alcohol consumption in Western Europe in 2005 from (Shield et al., 2013). AUD= Alcohol Use Disorder.

When describing the results of epidemiological data, drinking patterns can be classified in categories according to the average daily consumption and the possible adverse health and social consequences. **Figure 3** shows the drinking categories adapted from Rehm et al. (Rehm et al., 2004), and the proportion of the Western European

population in the different categories, using the estimates from Shield et al. (Shield et al., 2013). In the following subsections, there is a brief explanation of each category.

Abstainers

Although alcohol consumption is quite widespread, a large proportion of world's adult population does not consume it. An abstainer is defined as a person who has not consumed alcohol over a period of time. Abstainers are usually classified in two groups: a) life-time abstainers (i.e. individuals who have never consumed alcohol); b) former drinkers (i.e. individuals who have previously consumed alcohol but who have not done so in a previous period of time, usually a year). In Western Europe, the proportion of life-time abstainers and former drinkers is low when compared with other regions (Shield et al., 2013): 9.5% of western Europeans are life-time abstainers and 8% are former drinkers. However, globally more than 60% of the global adult population has not drunk alcohol in the past 12 months (48% life-time abstainers; 14% former drinkers) (World Health Organization, 2014).

Low-risk drinkers

People who drink alcohol, but small amounts at a time ($\leq 20\text{g/day}$ on average in women and $\leq 40\text{g/day}$ in men) are considered low-risk drinkers, as there is no drinking threshold below which alcohol can not pose a risk for health. In Western Europe, the proportion of low-risk drinkers is around 59% (Shield et al., 2013).

Hazardous drinkers

Hazardous drinking or heavy drinking is defined as a level of consumption or pattern of drinking that is likely to result in harm should drinking habits persist (World Health Organization, 1994). Although there is not a global consensus, several studies have defined hazardous or heavy drinking as the daily consumption of 40 or more grams of pure alcohol on average in men and 20 grams or more in women (Anderson & Baumberg, 2006; Rehm et al., 2004; World Health Organization, 2000). This lower threshold for hazardous drinking in women reflects biological differences between men and women in metabolism, blood alcohol concentration and health consequences of drinking after consuming the equivalent number of drinks. In Western Europe, the estimated proportion of adults that drink hazardously is 23.5% (Shield et al., 2013). Screening for hazardous drinking at primary care may help in early detection of these people at risk and permit brief interventions to minimize the adverse effects of drinking.

High-risk drinkers

Women and men who drink on average ≥ 40 and ≥ 60 grams of pure alcohol per day, respectively, are at higher risk of suffering alcohol-related consequences and to develop an alcohol use disorder (AUD). Estimates from 2010 suggest that around 12% of European adults are high-risk drinkers (Shield et al., 2013). However, within the high-risk drinkers, there is a subgroup that is at even higher risk of alcohol-related consequences and meet criteria for AUD.

AUD is defined as a cluster of cognitive, behavioural, and psychological symptoms indicating that the individual continues drinking despite significant alcohol-use problems (American Psychiatric Association, 2013). People with suspicion of an AUD should be remitted to an addiction treatment centre. The mean age of people seeking treatment for AUD has been described to be around 41 years, and after more than 20 years of alcohol consumption on average (Guitart et al., 2011).

New drinking patterns

In recent decades, some drinking patterns have become more common throughout the population. One of these patterns is known as binge drinking or heavy episodic drinking, which is defined as the consumption of large amounts of alcohol, usually six or more drinks (i.e. 60 or more grams of pure alcohol) on a single occasion (i.e. during a 2-4 hours period) at least monthly (Courtney & Polich, 2009; Valencia-Martín, Galán, & Rodríguez-Artalejo, 2007). Given that adverse effects of alcohol consumption are higher in women, sometimes a different threshold is used for both genders. In Europe, 16.5% of adults are binge drinkers (World Health Organization, 2014). Binge drinking is one of the most relevant predictors of acute health effects of alcohol consumption, such as injuries.

On the other hand, other drinking patterns such as drinking above the low-risk threshold but without meeting criteria for hazardous drinking or binge drinking, drinking at weekends, etc. have been described.

1.2 Screening of risky drinking patterns

Although any amount of alcohol consumed could be a health risk, the relationship between alcohol consumption and its adverse consequences is dose-dependent. Given that, and to facilitate screening for risky drinking patterns in primary care, thresholds for hazardous drinking have been established worldwide. Drinking above 40 grams of pure alcohol per day in men and 20 grams or more in women on a regular basis is associated with increased likelihood of suffering alcohol-related adverse effects. It is important to identify those individuals who drink at hazardous levels. Early detection of people with hazardous drinking, harmful use and AUD is crucial to minimize alcohol-related harms and permits interventions to reduce their consumption or their referral to a specialized treatment centre. Thus, various screening tools have been developed. Among them, the validated and most used ones are: the Alcohol Use Disorders Identification Test (AUDIT), its short version (AUDIT-C), the Fast Alcohol Screening Test (FAST) and the CAGE questionnaire (Ministerio de Sanidad y Consumo, 2008).

The AUDIT was developed by WHO in 1989 to detect both hazardous drinking and alcohol dependence. The AUDIT manual was revised in 2001 to take into account advances in research and clinical experience (Babor, Higgins-Biddle, Saunders, & Monteiro, 2001). The questionnaire includes 10 questions, divided into 3 domains: hazardous alcohol use (questions 1 to 3), dependence symptoms (questions 4 to 6), and harmful alcohol use (questions 7 to 10). Each question is ranked from 0 to 4, and the final score identifies risk of

hazardous drinking, harmful use or AUD. The original study on the AUDIT test obtained a sensitivity of 97% and a specificity of 78% for hazardous drinking with a cut-off of 8 or more (Saunders, Aasland, Babor, De la Fuente, & Grant, 1993).

Table 2. AUDIT-C questions.

1. How often do you have a drink containing alcohol?	
0 points	Never
1 point	Monthly or less
2 points	Two to four times a month
3 points	Two to three times a week
4 points	Four or more times a week
2. How many drinks containing alcohol do you have on a typical day when you are drinking?	
0 points	One or two
1 point	Three or four
2 points	Five or six
3 points	Seven to nine
4 points	Ten or more
3. How often do you have six or more drinks on one occasion?	
0 points	Never
1 point	Less than monthly
2 points	Monthly
3 points	Weekly
4 points	Daily or almost daily

POSSIBLE SCORES: 0-12 points.

CUT-OFF FOR HAZARDOUS DRINKING: ≥ 5 in men; ≥ 4 in women.

(Gual, Segura, Contel, Heather, & Colom, 2002)

The AUDIT-C is a three-question validated screening tool (**table 2**), which includes the three first questions of the AUDIT test. It has proven to be equivalent to the full 10-item AUDIT in identifying hazardous drinking in the general population (Bush, Kivlahan, McDonell, Fihn, & Bradley, 1998; Frank et al., 2008) and also in the population older than 65 years, with sensitivities and specificities that are comparable to those in younger ages (Gómez et al., 2006).

Moreover, as international guidelines recommend lower regular drinking levels for women than men (National Institute on Alcohol Abuse and Alcoholism, 2005; World Health Organization, 2000), researchers using the AUDIT-C increasingly use different thresholds for men and women (Bradley et al., 2007; Dawson, Grant, Stinson, & Zhou, 2005; Gual et al., 2002). In this dissertation, we have used an adaptation of this test to identify hazardous drinking in the study participants. The cut-off points used for hazardous drinking were 5 or more points in men and 4 or more points in women (Gual et al., 2002), which showed a sensitivity of 92% and 91%, and a specificity of 74% and 68%, respectively.

The FAST questionnaire is a 4-item initial screening test taken from the AUDIT test. It was developed in England for busy clinical settings as a two-stage initial screening test that is quick to administer since >50% of patients are identified by using just the first question. With a cut-off point of 3 for hazardous drinking, the FAST questionnaire showed a sensitivity of 93% and a specificity of 88% (Hodgson, Alwyn, John, Thom, & Smith, 2002).

The CAGE questionnaire is a 4-item test that was developed to facilitate the detection of alcohol dependence (Mayfield, McLeod, & Hall, 1974). Item responses on the CAGE are scored 0 or 1, with a higher score being an indication of alcohol use problems. The CAGE showed a sensitivity of 84% and a specificity of 95% with a cut-off of 2 or more in the detection of people who drink daily more than 64 g of alcohol (King, 1986).

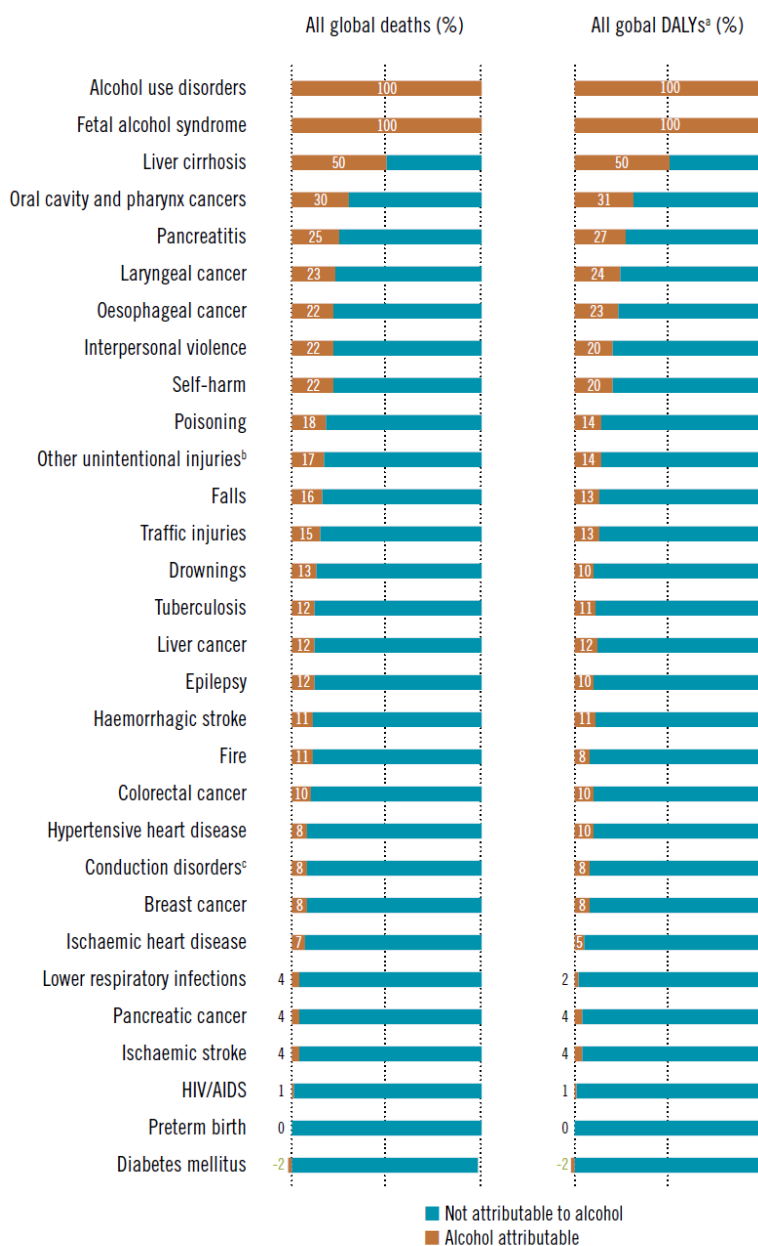
1.3 Alcohol-related consequences

The relationship between alcohol consumption and health outcomes is complex, as it depends not only on the average volume of alcohol consumption, but also on the patterns of drinking (Rehm, 2011). Although the majority of adult population consume alcohol at levels that pose a low risk to their health or do not consume it, different alcohol drinking patterns pose a high health risk and are a public health problem in many countries.

Figure 4 gives an overview of the net impact of alcohol consumption on the health status of the world as a whole, i.e. alcohol-attributable fractions (AAFs). As it can be seen, alcohol impacts different disease and injury outcomes to various degrees. Besides AUD and foetal alcohol syndrome, which are defined as being 100% attributable to alcohol, liver diseases have the highest AAF (World Health Organization, 2014). However, for most alcohol-attributable causes of death or burden of disease categories, less than 20% of the respective disease burden is attributable to alcohol. This has implications for the public perception of alcohol as a risk, since most people are not aware of the health risks of alcohol consumption for diseases other than AUD.

Alcohol consumption has not only been associated with morbidity and mortality of drinkers, but also with harms to other individuals and the society. The different alcohol-related consequences are explained briefly in the following subsections.

Figure 4. Alcohol-attributable fractions (AAFs) for selected causes of death, disease and injury, 2012.



^a As measured in disability-adjusted life years; ^b includes smothering, asphyxiation, choking, animal or snakebites, hypothermia and hyperthermia; ^c and other dysrhythmias. Note: For diabetes mellitus, the AAF was negative, meaning that, overall, alcohol consumption exerts a beneficial effect on this disease. Low-risk patterns of alcohol consumption also exert beneficial effects on some other diseases, e.g., ischemic heart disease, but these effects are not strong enough for the overall AAF to be negative.

Source: (World Health Organization, 2014).

a) Alcohol use disorder

As described before, alcohol use disorder (AUD) is defined in the DSM-5 as a cluster of cognitive, behavioural, and psychological symptoms indicating that the individual continues drinking despite significant alcohol-use problems (American Psychiatric Association, 2013). An important characteristic of AUD is an underlying change in brain circuits that may persist beyond detoxification, particularly in individuals with severe disorders. The behavioural effects of these brain changes may be exhibited in the repeated relapses and intense drug craving when the individuals are exposed to drug-related stimuli. According to the DSM-5, the diagnosis of an AUD is based on a pathological pattern of behaviours related to use of the substance. An AUD may develop after repeated alcohol use and its diagnostic criteria include a strong desire to consume, difficulties in controlling its use, persisting in its use despite harmful consequences, a higher priority given to alcohol use than to other activities and obligations, increased tolerance, and sometimes a physical withdrawal state (American Psychiatric Association, 2013). In the DSM-IV, AUD included alcohol dependence and harmful use or alcohol abuse (American Psychiatric Association, 1994), whereas in the DSM-5, AUD is divided in three categories according to the severity of the disorder: mild, moderate or severe (American Psychiatric Association, 2013).

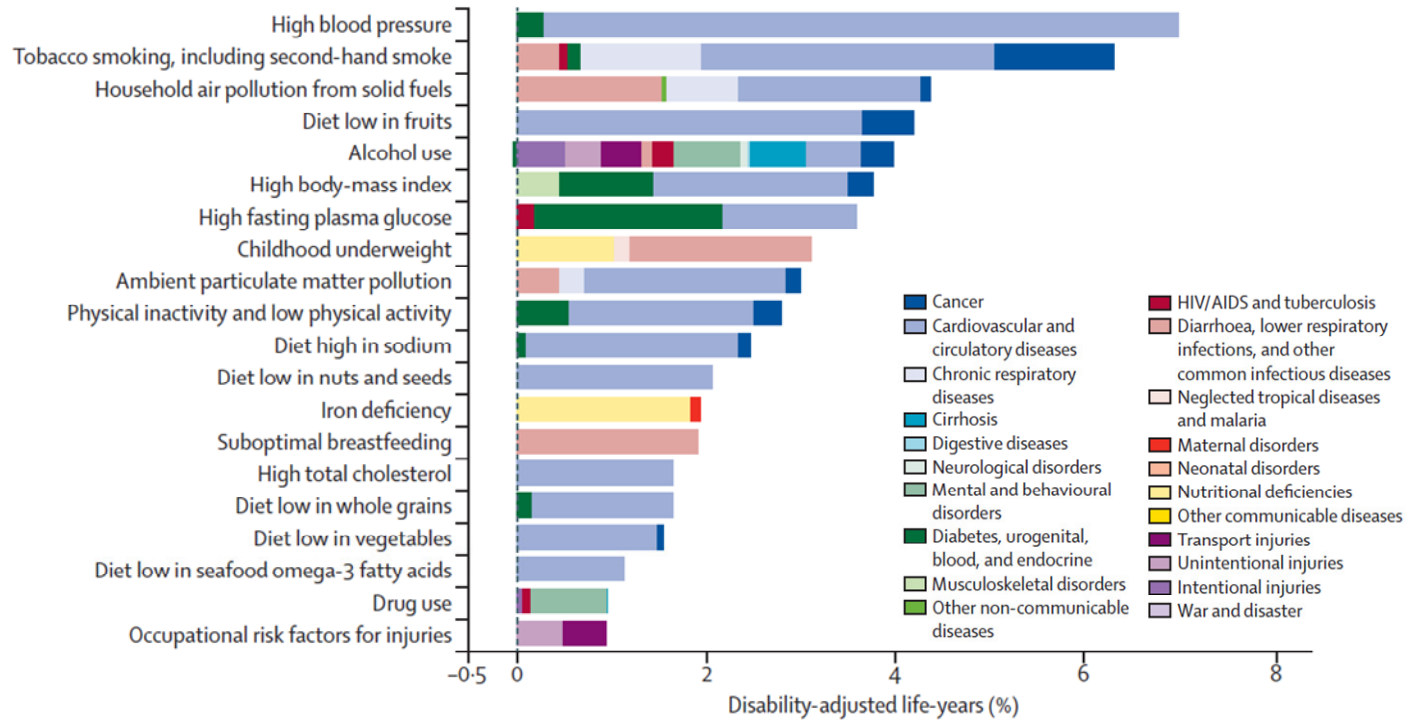
Alcohol use disorders are among the most common and undertreated mental disorders in developed countries (Rehm et al., 2015), and are more prevalent in men than women. People with alcohol use disorders account for around half of all the alcohol-related harm in developed

societies (Rehm et al., 2010; Samokhvalov, Popova, Room, Ramonas, & Rehm, 2010; Schuckit, 2009).

b) Other alcohol-related morbidity

Alcohol consumption is one of the leading risk factors of disease and injury. Overall, 5.1% of the global burden of disease was attributable to alcohol in 2012 (World Health Organization, 2014). **Figure 5** shows the burden of disease attributable to 20 leading risk factors in 2010, expressed as a percentage of global disability-adjusted life-years (DALYs). Besides alcohol use disorder, alcohol consumption has been related to a large number of medical conditions, which can be classified in the following categories: neuropsychiatric disorders (e.g. epilepsy) (Samokhvalov, Irving, Mohapatra, & Rehm, 2010), cancer (e.g. oral cavity and pharynx, oesophagus or breast cancers) (Praud et al., 2016; Schutze et al., 2011), cardiovascular diseases (e.g. ischemic heart disease) (Roerecke & Rehm, 2012, 2014; Ronksley, Brien, Turner, Mukamal, & Ghali, 2011), diabetes mellitus (Baliunas et al., 2009), gastrointestinal diseases (e.g. liver cirrhosis) (Bruha, Dvorak, & Petrtyl, 2012), infectious diseases (e.g. tuberculosis or HIV infection) (Baliunas, Rehm, Irving, & Shuper, 2010; Lönnroth, Williams, Stadlin, Jaramillo, & Dye, 2008; Jürgen Rehm et al., 2009), intentional injuries (e.g. self-inflicted injuries, suicide) (Rossow & Norström, 2014; Wilcox, Conner, & Caine, 2004), and unintentional injuries (e.g. motor vehicle crashes) (Ahlm, Björnstig, & Öström, 2009).

Figure 5. Burden of disease attributable to 20 leading risk factors in 2010, expressed as a percentage of global disability-adjusted life-years.



Source: (Lim et al., 2012).

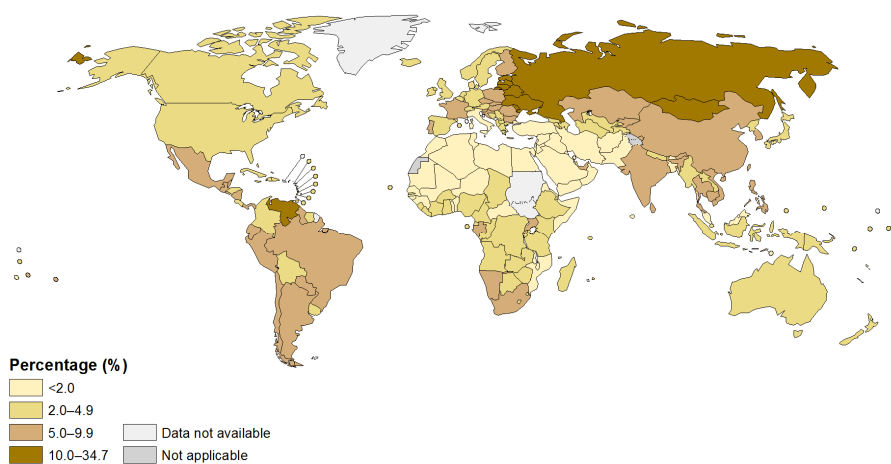
A dose-response relationship between alcohol consumption and its adverse consequences has been found in many diseases (i.e. the greater the volume of alcohol consumed, the higher the risk of disease) (Room, Babor, & Rehm, 2005). On the other hand, regular consumption of small amounts of alcohol (low-risk drinking) can have a protective role against certain diseases, mainly cardiovascular diseases and diabetes (Puddey, Rakic, Dimmitt, & Beilin, 1999; Rehm, et al., 2003). However, these beneficial effects are largely outnumbered by the harmful effects of alcohol on health (Rehm et al., 2004).

c) Mortality

In 2012, 5.9% of all global deaths were attributable to alcohol (7.6% for men, 4.0% for women), which means that about 3.3 million deaths in 2012 were caused by alcohol consumption (World Health Organization, 2014). The highest numbers of deaths are from cardiovascular diseases, followed by injuries, gastrointestinal diseases and cancers.

On the other hand, there are significant geographic differences in alcohol-attributable deaths (**figure 6**). These variations are a consequence of differences in per capita alcohol consumption and patterns of drinking in different regions of the world. For example, in countries where the majority of the population is Muslim, the number of alcohol-attributable deaths is low, while in Russia and ex-Soviet Union countries, a large proportion of deaths are attributable to alcohol (Rehm et al., 2007; Zaridze et al., 2014).

Figure 6. Proportion of all deaths attributable to alcohol (AAFs; %; all ages), 2012.



Source: World Health Organization (Map produced by: Health Statistics and Information Systems (HSI). World Health Organization).

d) Harms to society

The impact of alcohol consumption reaches deep into society. Alcohol consumption causes harm far beyond the physical and psychological health of the drinker. It also causes harm to the well-being and health of others. As stated in the WHO Global Strategy to reduce the harmful use of alcohol (World Health Organization, 2010), special attention needs to be given to reducing these harms.

Harm to other people

Social harm from drinking may be a consequence of how alcohol use affects important roles and responsibilities of everyday life (work, family, friendship and public character).

Alcohol consumption is related with problems in the workplace. Intoxication interferes to a greater or lesser extent with most productive labour. Thus, the drinker's own productivity may be reduced and affect their job, which may have social adverse consequences such as job loss or income reductions (French, Maclean, Sindelar, & Fang, 2011). Moreover, alcohol use has been associated with higher absenteeism rates (Schou, Storvoll, & Moan, 2014).

Domestic roles and responsibilities may also be adversely affected by drinking. In this sense, alcohol use has been related with worse intimate and family relations, family disruption and domestic violence (Cunradi, Caetano, & Schafer, 2002; McKinney, Caetano, Rodriguez, & Okoro, 2010; Woodin, Caldeira, Sotskova, Galaugher, & Lu, 2014). In addition, the ability of an intoxicated person to care for children or other people is adversely affected by alcohol, which may be related to significant serious adverse effects for the children in the short- and long-term, either through negligence in the care or abuse by the drinker (Famularo, Stone, Barnum, & Wharton, 1986; Locke & Newcomb, 2004).

However, besides the adverse social impact on family members, relatives, friends and co-workers, people's drinking can also impact on strangers, who can be victims of traffic crashes caused by a person driving under the influence of alcohol or be assaulted by an intoxicated person (World Health Organization, 2011a). Intoxicated people are more likely to commit crimes, including homicide, robbery, violence, sexual assaults, etc., which may be due to increased aggressiveness and reduced aversion to risk caused by alcohol

(Cherpitel, 2009; Heinz, Beck, Meyer-Lindenberg, Sterzer, & Heinz, 2011; Hoaken & Stewart, 2003). The well-being of others can also be affected by verbal threats, noise and nuisance from intoxicated people.

The main alcohol-attributable cause of harm to other people is transport injuries, while violence is the second cause (Anderson, Møller, & Galea, 2012).

Harm to society at large

Harmful use of alcohol may also entail significant social and economic costs on society. Diseases and injuries, as well as deaths, have social implications, which include medical cost, negative effects on productivity, and financial and psychological burdens on families. These social implications are not only related to the fact that alcohol use disorders and other alcohol-attributable diseases are often very disabling, but they are also a consequence of the alcohol-attributable mortality and burden of disease caused by harm to others, which is substantial (Anderson, Møller, et al., 2012).

Economic costs of alcohol use can be classified in three major categories:

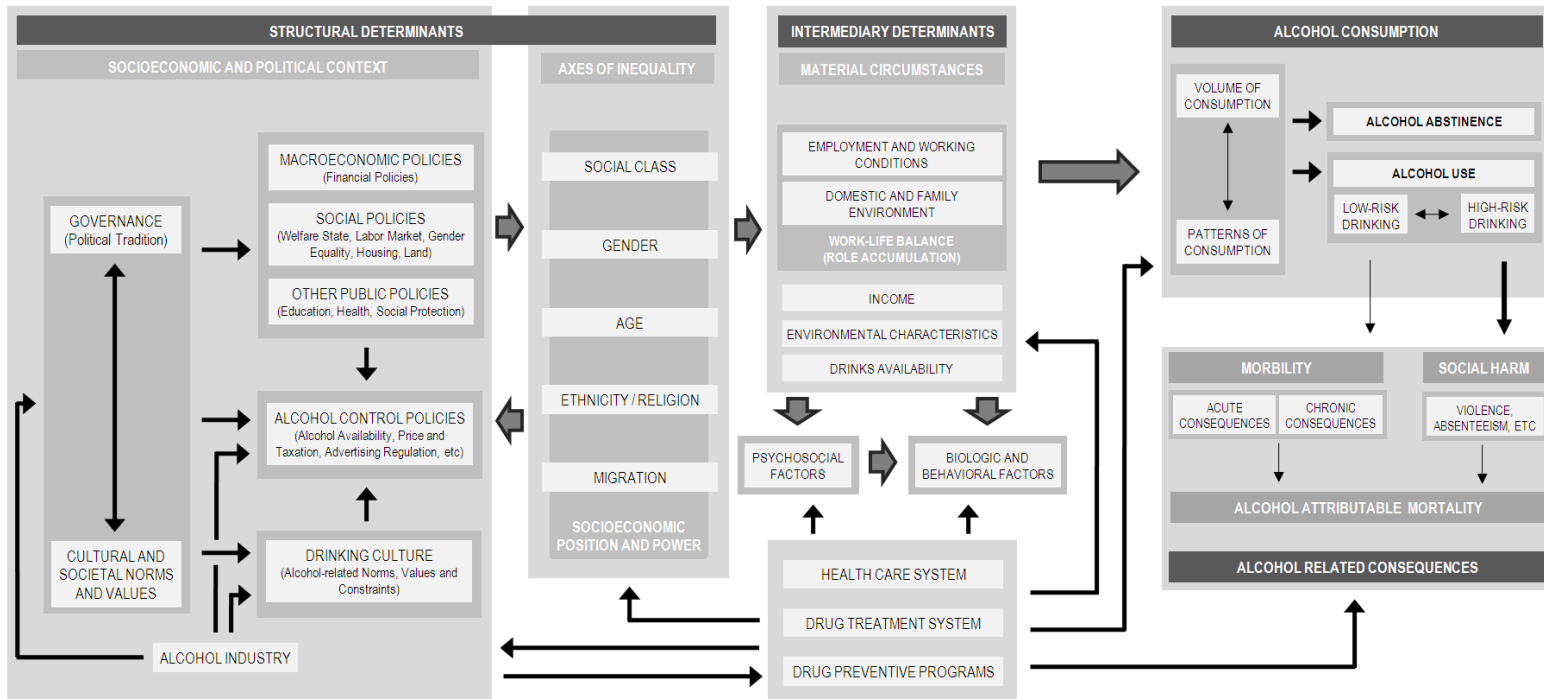
- Direct economic costs of alcohol consumption: They measure the value of resources used as a consequence of alcohol consumption. This category encompasses costs for multiple types of health-care services, such as hospitalizations, ambulatory care and prescription medicines, which represent 9-24% of all alcohol-attributable social costs (van Gils, Hamberg-van Reenen, van den Berg, Tariq, & de

Wit, 2010). Besides, direct costs also include costs of crime and law enforcement, costs of property damage or loss and costs of welfare assistance or social work (Anderson & Baumberg, 2006; Thavorncharoensap, Teerawattananon, Yothasamut, Lertpitakpong, & Chaikledkaew, 2009). These costs are generally borne by the governments.

- Indirect economic costs of alcohol consumption: These costs are those for which resources are lost without a direct payment actually being made. These result from lost productivity due to absenteeism, unemployment, reduced earnings potential and lost working years due to premature pension or death (Anderson & Baumberg, 2006; Thavorncharoensap et al., 2009). These costs are typically borne by the society at large.
- Intangible costs: These are the costs assigned to pain and suffering, and more generally to a diminished quality of life (Anderson & Baumberg, 2006; Thavorncharoensap et al., 2009). These costs are borne by the drinkers, as well as their families and other individuals linked to the drinker.

Alcohol-attributable costs have been estimated at about 155.000 million Euros in the European Union for 2010 (Rehm, Shield, Rehm, Gmel, & Frick, 2012). The costs associated with alcohol amount to more than 1% of the gross national product in high-income and middle-income countries, with the costs of social harm constituting a major proportion in addition to health costs (Rehm et al., 2009; Rehm et al., 2012; Thavorncharoensap et al., 2009).

Figure 7. Conceptual framework of the effect of social determinants of health on alcohol consumption.



Source: Adaptation from (Comisión para reducir las desigualdades sociales en salud en España, 2012; Rehm et al., 2010; Solar & Irwin, 2007).

1.4 Factors related to alcohol consumption

Multiple factors both at the individual and contextual level may influence the volume consumed and patterns of drinking, determining the final consequences of this consumption on health and society.

Figure 7 shows the conceptual framework developed for this dissertation, which has been adapted from the WHO conceptual framework for action on the social determinants of health (Solar & Irwin, 2007), the conceptual framework of the determinants of social inequalities in health from the Spanish Commission to reduce the social inequalities in health (Comisión para reducir las desigualdades sociales en salud en España, 2012) and a causal model of alcohol consumption, intermediate mechanisms and long-term consequences (Rehm et al., 2010). The resulting conceptual framework shows how social determinants could affect alcohol consumption and their interrelations.

a) Socioeconomic and political context

Several country-level factors may be related to alcohol consumption and its adverse consequences. First, the political tradition of the government and the culture of a country, which are a reflection of the values and norms prevailing in the society, determine which policies are developed (macroeconomic, social, alcohol control policies, etc.) (Huber, Ragin, & Stephens, 1993). Country-level policies may have an indirect effect on alcohol consumption through their effects on different axes of inequality (e.g. social class, gender, age, ethnicity or religion and migrant status) and intermediate determinants of alcohol

consumption (e.g. poverty, social networks, drug prevention and treatment systems, etc.). The evidence of the effect of different socioeconomic factors and policies on alcohol consumption is described in the following subsections.

Macroeconomic and social factors

Some macroeconomic factors have been related to alcohol use, such as the wealth of a country, the unemployment rate or economic inequalities.

Overall, in countries with higher wealth per capita, expressed by the gross national income or gross domestic product, the proportion of drinkers is larger than in countries with lower gross national income (Grittner, Kuntsche, Gmel, & Bloomfield, 2013).

The increase in the national unemployment rate has been associated with a small decrease in alcohol-related health behaviours (Nandi, Charters, Strumpf, Heymann, & Harper, 2013). However, risky drinking patterns can rise in response to increases in the unemployment rate. For example, it was estimated that a 5% increase in the unemployment rate in the U.S. would increase the mean prevalence of binge drinking by 8% (Dee, 2001).

Economic inequalities within a country are a determinant of health related with morbidity and mortality. The Gini index has been used to measure the deviation of the distribution of income among individuals or households within a country from a perfectly equal distribution. A positive association between economic inequalities in a country and alcohol-related problems in adolescents was suggested in a study of 34

countries (mainly from Europe) (Elgar, Roberts, Parry-Langdon, & Boyce, 2005). However, another study in adults found that risky drinking was more prevalent in countries with more income equality, which may be explained by the higher prevalence of binge drinking in some European countries with high-income equality (Grittner et al., 2013).

Relevant socioeconomic changes, such as increases in unemployment rates and decreases in gross domestic product, have occurred in recent years in most European countries as a result of the late 2000s economic crisis (Karanikolos et al., 2013). Social consequences of previous economic crises have been related with an increase in alcohol-related morbidity and mortality (Marmot & Bell, 2009; Stuckler, Basu, Suhrcke, Coutts, & McKee, 2009). Although overall alcohol consumption decreases during times of economic recession, risky patterns could rise (Bor, Basu, Coutts, McKee, & Stuckler, 2013; Burgard, Ailshire, & Kalousova, 2013; Dávalos, Fang, & French, 2012; Dee, 2001; Harhay et al., 2014; Henkel, 2011). The discrepancies on the consequences of economic crises and unemployment on alcohol consumption could be partly explained by country differences in social protection and political and social measures implemented by governments (Karanikolos et al., 2013; Mattei, Ferrari, Pingani, & Rigatelli, 2014; Uutela, 2010).

Several mechanisms could be involved in the relationship between economic downturns and alcohol use. Alcohol consumption in a country could decrease during an economic recession because of a global loss of purchasing power. Moreover, during these periods, there is a generalized economic insecurity and many people lose their jobs

or reduce their income, which may result in tighter individual budget constraints, which can lead to less money being spent on alcoholic beverages and less alcohol consumption (de Goeij et al., 2015). However, certain subpopulations could increase their consumption and be more likely to adopt risky drinking patterns due to stress (de Goeij et al., 2015; Ettner, 1997; Harhay et al., 2014; José, van Oers, van de Mheen, Garretsen, & Mackenbach, 2000; Keyes, Hatzenbuehler, Grant, & Hasin, 2012).

The extent of gender inequalities in a society seems also related with alcohol consumption. Women's empowerment increases gender equality and may contribute to changes in gender-based norms in a society. Although an increase in gender equality may improve the health of both men and women, it may also lead women to adopt riskier health behaviours that traditionally were more common among men (Sen, Östlin, & George, 2007), such as substance use (Sánchez-López, Cuellar-Flores, & Dresch, 2012). Traditionally, drinking has been more socially restricted among women than men worldwide, as a consequence of gender roles and due to the belief that women's social behaviour and responsibilities may be more affected by drinking (Wilsnack et al., 2000).

Alcohol control policies

Alcohol policy can be defined as any purposeful effort on the part of governments or non-government groups to minimize or prevent alcohol-related consequences (Babor & Caetano, 2005). Health and social problems attributable to alcohol can be effectively reduced through the development and implementation of policies or

interventions (Babor, 2008). The alcohol industry is an important actor in the design of alcohol control policies, being against tax increases, reduction of alcohol accessibility and advertising regulations (Crombie, Irvine, Elliott, & Wallace, 2007; Zeigler, 2009). Regarding the evidence base for effective alcohol policy, there is good scientific support for the interventions highlighted in the WHO Global Strategy to reduce the harmful use of alcohol (ordered according to effectiveness) (World Health Organization, 2010):

- *Limits on the availability of alcohol:* Reductions in the hours and days of sale, controls on the number of alcohol outlets, and restrictions on access to alcohol are associated with reductions in both alcohol use and alcohol-related problems (Babor et al., 2010; Duailibi et al., 2007; Wagenaar & Toomey, 2002).

- *Taxation and pricing policies to discourage frequent and heavy alcohol consumption:* Increases in alcohol prices or taxation lead to a reduction in alcohol consumption and alcohol-related harm (Anderson, Chisholm, & Fuhr, 2009; Booth et al., 2008; Elder et al., 2010; Wagenaar, Tobler, & Komro, 2010), even in hazardous drinkers (Mäkelä, Hellman, Kerr, & Room, 2011) and young people (Wagenaar, Salois, & Komro, 2009).

- *Drink-driving countermeasures:* Introducing or lowering legal blood alcohol limits is effective in reducing drink-driving casualties (Mann et al., 2001). Intensive random breath testing and drink-driving checkpoints also reduce alcohol-related injuries and fatalities (Erke, Goldenbeld, & Vaa, 2009; Shults et al., 2001).

- *Increasing the capacity of health and social welfare systems to deliver treatment and early intervention:* The effectiveness of early identification and brief advice for people with hazardous and harmful alcohol use has been proven and also several treatments for people with severe alcohol dependence (Anderson, Chisholm, et al., 2009; Colom, Scafato, Segura, Gandin, & Struzzo, 2014).

- *Restrictions on alcohol marketing:* Alcohol is marketed through increasingly sophisticated advertising in mainstream media, and through linking alcohol brands to sports and cultural activities, through sponsorships and product placements, and through direct marketing such as the internet, podcasting, and mobile telephones (Anderson, Chisholm, et al., 2009). Alcohol advertising may influence people's behaviour and promote an increase of alcohol consumption (Anderson, de Bruijn, Angus, Gordon, & Hastings, 2009; World Health Organization, 2004), as it contributes to normalize such consumption (Smith & Foxcroft, 2009) and associates it with physical and social wellbeing (de Bruijn, van den Wildenberg, & van den Broeck, 2012).

- *Reducing the public health impact of illicit and informally produced alcohol:* Unrecorded alcohol (i.e. informally produced alcohol, illegally produced or smuggled alcohol products, and surrogate alcohol that is not officially intended for human consumption) could have health consequences due to a higher ethanol content and a possible contamination with methanol, lead or higher alcohols (Lachenmeier, Rehm, & Gmel, 2007; Lachenmeier, Sarsh, & Rehm, 2009). The prohibition of toxic compounds used to denature alcohol (e.g.

methanol) can improve health outcomes associated with use of illegally produced alcohol (Lachenmeier, Taylor, & Rehm, 2011).

- *Measures to control social contexts that promote excessive drinking:* These prevention strategies attempt to limit the amount of drinking in the environments where alcohol is typically sold and consumed such as bars or restaurants (Babor & Caetano, 2005). The most effective strategies include the enforcement of serving regulations and measures making bar staff and owners legally liable for the actions of intoxicated patrons (Babor et al., 2010; Room et al., 2005).

Besides these different types of alcohol policy that have proven effective in reducing the harmful use of alcohol, there are other policies that have also been implemented in some countries. Universal prevention through *education and information programs* increase knowledge and improve attitudes towards alcohol, but are not effective in reducing alcohol use (Anderson, Chisholm, et al., 2009). The impact of these interventions tends to be low and does not last over time. However, some authors suggest that there may be variability, and that some programs can be effective if well implemented (Ariza, Villalbí, Sánchez-Martínez, & Nebot, 2011).

Many interventions explained in this section are universal measures that restrict the affordability, availability and accessibility of alcohol. Given their broad reach, the expected impact of these measures on public health is relatively high, especially when the informal market and illegal alcohol production can be controlled (Babor, 2010). When universal measures are combined with interventions targeted at high-risk populations, such as adolescents (age restrictions), automobile

operators (drink-driving), people with AUD (treatment and support) and hazardous drinkers (brief interventions in primary health care), the combined effect is likely to be substantial (Babor et al., 2010; Brand, Saisana, Rynn, Pennoni, & Lowenfels, 2007).

Alcohol industry

The alcohol industry is a multinational business complex that includes not only the producers of beer, wine, and distilled spirits but also a large network of distributors, wholesalers, and related industries, such as hotels, restaurants, bars, and advertisers (Babor & Robaina, 2013). The largest producers of branded alcoholic beverages, which account for approximately 78% of beer and 40% of spirits consumption worldwide, tend to be large multinational corporations that rely on marketing for their survival (Jernigan, 2009). The industry's interests have traditionally been promoted by trade associations that deal with commercial issues such as taxes, marketing, and regulation. There are hundreds of trade associations with a primary focus on alcohol throughout the world, which represent the interests of brewers, distillers, winemakers, bartenders, importers, and wholesalers. Also, the alcohol industry has created public relations organizations that foster their policies under disguise.

As seen in previous sections, costs and consequences of alcohol misuse and the evidence for different prevention and harm reduction approaches have been documented. In this sense, the global alcohol producers have taken an active role in the formulation of alcohol policies, designed ostensibly to address the health and social impact of alcohol misuse. However, since the most effective strategies involve

the reduction of alcohol consumption at the population level, there has been a strong suspicion, reinforced by circumstantial evidence (Babor & Robaina, 2013; Jernigan, 2012), that these activities are mainly being taken to impede the development of effective alcohol control policies advocated by the public health community that would run counter to their commercial interests (Babor et al., 2013).

b) Axes of inequality

Gender

Traditionally, differences in alcohol consumption have been found in women and men in terms of quantity and frequency of consumption as well as on drinking patterns. In most societies, men consume alcohol more frequently and in larger amounts than women (Mäkelä et al., 2006; Rahav, Wilsnack, Bloomfield, Gmel, & Kuntsche, 2006), and consequently have more alcohol-related problems (Graham et al., 2011). In recent decades, gender differences in drinking patterns and related problems seem to be narrowing in younger generations in many countries (Babor & Winstanley, 2008; Keyes, Li, & Hasin, 2011; Simons-Morton et al., 2009), as drinking has become more common among women and has decreased or stabilized in men. For this reason, smaller gender differences may lead to greater alcohol-related problems among women (Bond et al., 2010).

Age

Adolescence is a period in which many risk behaviours, including alcohol consumption, are initiated (Jackson, Sher, Cooper, & Wood, 2002). Alcohol use can cause alterations in the structure and function

of the adolescent brain and often co-occurs with other problem behaviours (e.g. academic problems, delinquent behaviour, driving or riding under the influence of alcohol), which may pose significant challenges to making a successful transition from adolescence to adulthood (Ellickson, Tucker, & Klein, 2003; Ewing et al., 2015; Font-Ribera et al., 2013; Schulenberg & Maggs, 2002; Siqueira, Smith, & Committee on Substance Abuse, 2015), and may become a lifelong habit (Andersen, Due, Holstein, & Iversen, 2003). Prevalence rates among European adolescents vary from 6 to 23% for weekly alcohol consumption (Green, Leyland, Sweeting, & Benzeval, 2013; Richter, Kuntsche, de Looze, & Pfortner, 2013), and from 27% to 70% for monthly binge drinking (i.e. drinking large amounts of alcohol in a single occasion) (Danielsson, Wennberg, Hibell, & Romelsjö, 2012).

Another age group particularly vulnerable to alcohol consumption are the middle-aged and older adults. They are more susceptible to the harmful effects of alcohol consumption because of the physiological changes associated with ageing (Wilkinson & Dare, 2014; Wu & Blazer, 2014), and the interaction with medication (Pringle, Ahern, Heller, Gold, & Brown, 2005). Alcohol intake in middle-aged and older people has increased since the 1990s (Knott, Coombs, Stamatakis, & Biddulph, 2015). Risky drinking patterns are common among adults aged 50 or over. For example, in a U.S. national sample, the prevalence of hazardous drinking was 16.7% in men and 10.9% in women, whereas the prevalence of binge drinking was 19.6% and 6.3% in men and women, respectively (Blazer & Wu, 2009).

Socioeconomic position

The socioeconomic position (SEP) refers to social and economic factors that influence the place occupied by an individual or group within a society's hierarchy. In public health, many SEP indicators have been used including education, income and wealth (Krieger, Williams, & Moss, 1997). In general, lower SEP is associated with poorer health, more health-related problems and an increased risk of mortality (Mackenbach et al., 2008). Although the specific mechanisms by which SEP is associated with health are unknown, it is known that the life-styles play an intermediate role (van Oers, Bongers, van de Goor, & Garretsen, 1999), often acting as mediators (Babyak, 2009).

In most countries, the proportion of abstainers is lower among the people with higher SEP (Grittner et al., 2013), although their drinking patterns tend to be less risky. Besides, lower educated people seem to be more likely to report alcohol-related consequences than higher educated people even if they drink in the same manner (Grittner, Kuntsche, Graham, & Bloomfield, 2012).

Social class

Social epidemiology and health sociology consider social class as a relevant axis of social stratification to explain the origin of social inequalities in health (Domingo-Salvany et al., 2013). The expression “social class” is used to refer to social groups arising from interdependent economic relationships among people. These relationships are determined by a society's forms of property, ownership, and labour, and their connections through production,

distribution, and consumption of goods, services, and information (Krieger et al., 1997). A social class gradient has been described for alcohol consumption and alcohol-related consequences. In Sweden, manual workers drank more than non-manual workers (Norström & Romelsjö, 1998). Besides, cirrhosis mortality was found to be substantially higher in lower social classes in the UK (Crombie & Precious, 2011). This social class gradient has changed since 1920s, when the people in higher social classes drank more and suffered more adverse consequences of alcohol use than lower classes.

Ethnicity, religion and migrant status

Religion has been identified as having a protective effect against substance use, even for the youth (Wallace Jr & Bachman, 1991). Some religions explicitly prohibit substance use. Others, although they may not prohibit use, prescribe behaviour norms that may operate to discourage substance use (Benda, 1997; Oetting, Donnermeyer, & Deffenbacher, 1998).

Religiosity is a multidimensional construct referring to a person's behavioural and attitudinal religious fervour, regardless of the content of their beliefs (Amey, Albrecht, & Miller, 1996). Religiosity seems to be a protective factor against alcohol consumption. However, the protective effect of greater religiosity operates more strongly in some religions than in others (Marsiglia, Kulis, Nieri, & Parsai, 2005).

The role of the migrant background is mediated by the differences in the drinking culture and religion between the birth and host countries (Walsh, Djalovski, Boniel-Nissim, & Harel-Fisch, 2014). The degree of

acculturation plays an important role, as some immigrants may adopt the drinking culture of the host country (Bryant & Kim, 2013; Donath et al., 2011).

c) Material circumstances

Employment and working conditions

The individual employment and working conditions also influence alcohol consumption. Unemployment, job loss or problems at work have been related to alcohol consumption and an increased risk for alcohol use disorders (Catalano et al., 2011; Gili, Roca, Basu, McKee, & Stuckler, 2013; Henkel, 2011; Keyes et al., 2012). Increases in anxiety and stress could be a consequence of income reductions and/or job loss and the subsequent loss of social status and relationships (de Goeij et al., 2015; Stuckler et al., 2009; Wahlbeck & McDaid, 2012). Two psychological theories can explain the effect of changes in employment and/or working conditions on increasing alcohol consumption: the stress-response-dampening-theory and the self-medication theory. On the one hand, the *stress-response-dampening-theory* argues that individuals drink alcohol to reduce their psychological distress, as alcohol consumption could have an anxiolytic effect that reduces the stressfulness of the stimuli (Sayette, 1999; Sher, Bartholow, Peuser, Erickson, & Wood, 2007). Certain dosages of alcohol can reduce some signs of tension in some individuals under certain circumstances (Greeley & Oei, 1999). On the other hand, the *self-medication theory* argues that alcohol use to cope with stressful situations can lead to the development of alcohol dependence in certain people (Bolton, Robinson, & Sareen, 2009; Khantzian,

1997). In fact, individuals with history of alcohol abuse or dependence may be at higher risk of relapse when dealing with stressful situations (Kim et al., 2014). Moreover, according to the *non-working time theory*, a decrease in working hours could lead to more time for social activities and sports, which are often accompanied by alcohol consumption (French, Popovici, & Maclean, 2009). In contrast to these theories, the *income-effect theory* suggests that job loss or changes in job conditions that result in income reductions will produce tighter budget constraints and, as a result, a reduction in the money spent on alcoholic beverages and thereby less alcohol consumption (Catalano, 1997; Ruhm, 1995).

Economic crisis may also negatively affect working conditions and the quality of new job offers. Getting a job usually boosts disposable income, and the worker's ability to afford increased alcohol consumption. In this sense, getting a high quality job (i.e. with job security, fair pay and control over work conditions) leads to improved mental health, whereas getting a poor quality job is more detrimental for mental health than remaining unemployed (Butterworth et al., 2011). In fact, an adverse working environment, lack of social support at work, and job precariousness are associated with risky drinking patterns (Colell, Sánchez-Niubò, Benavides, Delclos, & Domingo-Salvany, 2014).

Domestic and family environment

Partnership, parenthood, and paid labour bring individuals into contact with others and are associated with activities that are defined by the expectations of significant others (Kuntsche, Knibbe, & Gmel,

2009). The more everyday life is structured by social activities which the individual and others deem important, the more likely it is that they will take care that the time spent in drinking situations and/or behaviour changes due to drinking (e.g. drunkenness) does not interfere with their role obligations (Knibbe, Drop, & Muytjens, 1987; Kuntsche et al., 2009; Neve, Lemmens, & Drop, 1997). In this line, being married or living with a partner has been associated with lower risk of hazardous drinking (Helasoja et al., 2007; Ortega et al., 2011), and parenthood with women's drinking patterns. Having children decreases a woman's alcohol consumption, especially among young mothers, but in many societies older mothers also drink less. Parenthood seemed to protect women from heavy drinking (Ahlström, Bloomfield, & Knibbe, 2001). Conversely, single people drink more per occasion and the drinking takes place more often in public places (Ahlström et al., 2001).

1.5 Alcohol use and ageing

Older adults are particularly susceptible to the harmful effects of alcohol consumption, because of the physiological changes associated with ageing (Hallgren, Högberg, & Andréasson, 2009; Wilkinson & Dare, 2014; Wu & Blazer, 2014), such as increased sensitivity and decreased tolerance to alcohol and a slower metabolism (Sacco, Bucholz, & Spitznagel, 2009; Wang, Steier, & Gallo, 2014), which are strengthened by the interaction with prescribed medication to treat comorbidities (Pringle et al., 2005). Alcohol use problems may be more entrenched among middle-aged and older people, after years of established hazardous drinking or dependence (Ferreira & Weems,

2008). In fact, more than two-thirds of all alcohol-attributed deaths among people aged 20–64 years occur in the 45–64 years group (Rehm, Zatonksi, Taylor, & Anderson, 2011). The proportion of people aged 60 years or older in Europe is expected to rise from 23% in 2013 to 35% in 2050 (United Nations, Department of Economic and Social Affairs, Population Division, 2009, 2013). Thus, this rapid ageing of the global population has made the issue of alcohol use and ageing a pressing public health concern (Wang & Andrade, 2013; Wilkinson & Dare, 2014).

Alcohol intake in middle-aged and older people has increased since the 1990s (Knott et al., 2015). A review analysing patterns of gender- and age-specific alcohol consumption found that the prevalence of frequent drinking was higher in older age groups and that the prevalence of high-volume drinking did not consistently decline with age (Wilsnack, Wilsnack, Kristjanson, Vogeltanz-Holm, & Gmel, 2009). Risky drinking patterns are common among adults aged ≥ 50 years. In a U.S. national sample of people aged 50 years or more, the prevalence of at-risk use (i.e. consuming two or more drinks on a usual drinking day within the past 30 days) was 16.7% in men and 10.9% in women, while the prevalence of binge drinking was 19.6% and 6.3% in men and women, respectively (Blazer & Wu, 2009). However, as alcohol consumption has traditionally been higher in Europe than in the rest of the world, higher estimates are found in Europe: in 2007 27% of Europeans aged 55 or more had episodes of binge drinking at least once a week during the previous 12 months (European Commission Directorate General & Communication, 2007).

Besides the increasing prevalence of alcohol consumption in people aged 50 or more and the ageing of the population, during periods of economic downturn or crisis, the middle-aged are more vulnerable to job loss and their likelihood of finding a new job is lower than younger active people (Sigurdsson, Ring, O'Reilly, & Silverman, 2012; Skärlund, Åhs, & Westerling, 2012).

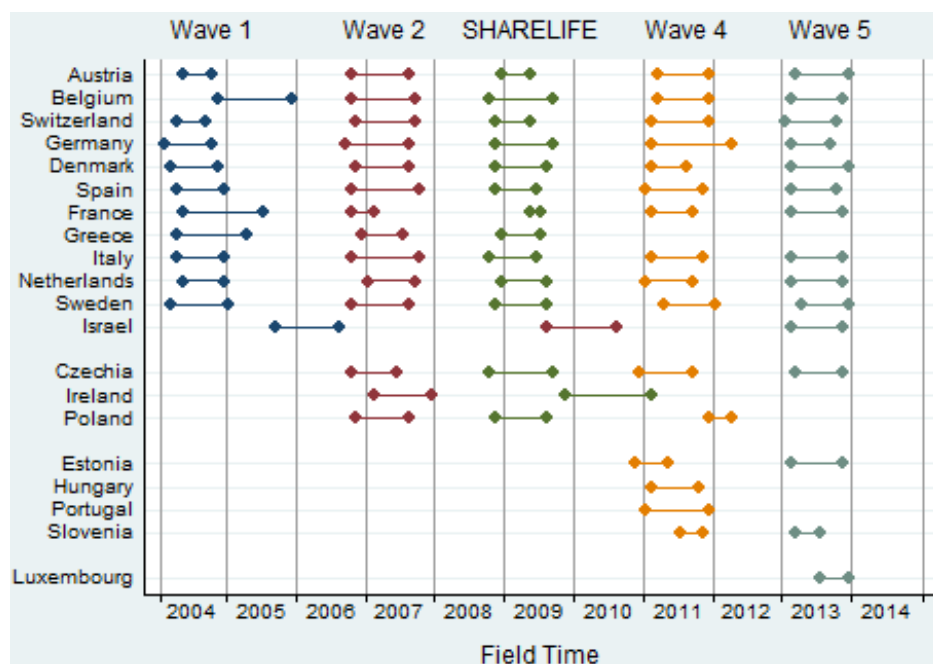
1.6 The SHARE project

The source of information of this thesis has been the European project “Survey of Health, Ageing and Retirement in Europe” (SHARE project). This project was created in response to the European Commission’s strong interest in obtaining scientific evidence on population’s ageing in its member states (Börsch-Supan et al., 2013). The ultimate goal of the SHARE project is to provide high-quality micro-level panel data of economic, social and health factors that accompany and influence ageing processes at the individual and societal levels.

The SHARE project consists in a survey that is conducted biannually since 2004 in several European countries and Israel. To date, five waves of data from the SHARE project have been published: four panel type waves on the current life circumstances of participants (2004, 2006, 2011 and 2013) and one retrospective wave that focus on people's life stories (2008). An overview of the countries that participated in each wave and the field time is shown in **figure 8**. The SHARE target population consists of people aged 50 years and over at the time of the interview. Each country selects its own probability

sample, such that while the type and size of samples is different in each country, the data are comparable. The interviewers use computer-assisted personal interviewing (CAPI) to collect most of the data in all waves. All SHARE respondents who were interviewed in any previous wave are part of the longitudinal sample. They are traced and re-interviewed if they moved within the country (Börsch-Supan & Jürges, 2005; Malter & Börsch-Supan, 2013, 2015).

Figure 8. Overview of the countries that participated in each wave of the SHARE project survey and the field time. 2004-2013.



Source: (<http://www.share-project.org/>).

2. JUSTIFICATION

With the rapid ageing of the global population (United Nations, Department of Economic and Social Affairs, Population Division, 2013) and the increase in alcohol intake in middle-aged and older people since the 1990s (Knott et al., 2015), the issue of alcohol use and ageing has become an important public health concern.

Middle-aged and older adults are particularly susceptible to the harmful effects of drinking due to the physiological changes associated with ageing (Wilkinson & Dare, 2014). Besides, they are more likely to have a range of co-morbid conditions and be taking prescribed medication, which may interact with alcohol (Pringle et al., 2005; Weathermon & Crabb, 1999). Thus, an older person can experience the onset of alcohol problems even though their drinking pattern remains unchanged. Alcohol problems may be more entrenched among this population, after years of established hazardous drinking or dependence (Ferreira & Weems, 2008). In fact, more than two-thirds of all alcohol-attributable deaths among people aged 20-64 years occur in the 45-64 years group (Rehm et al., 2011). Moreover, higher mortality has been observed among people with alcohol dependence than among age-matched people in the general population (Guitart et al., 2011). It is important to detect alcohol problems in this population, as giving up drinking has been associated with health improvement and a substantial decline in the risks of several cancers in the short term (Ahmad Kiadaliri, Jarl, Gavriilidis, & Gerdtham, 2013; Heckley, Jarl, Asamoah, & G-Gerdtham, 2011). Early detection of people with hazardous drinking or dependence permits interventions

to reduce their consumption and/or their referral to a specialized treatment centre. Despite all this, most studies on alcohol consumption focus on adolescents and young adults.

Traditionally, men have consumed alcohol more frequently and in larger amounts than women, and consequently have more alcohol-related problems (Mäkelä et al., 2006). Social and cultural factors seem to be related to the gender differences in alcohol use (Ahlström et al., 2001). Although drinking has been more socially restricted among women than men, in recent decades women's empowerment and gender equality have increased which may have contributed to change the gender-based drinking norms in a society. In fact, gender differences in drinking patterns and related problems seem to be narrowing in younger generations in many countries (Keyes et al., 2011). However, the possible convergence on alcohol consumption has not been analysed in older generations.

Several country-level factors, such as alcohol control policies (e.g. taxation or advertising regulations) or macroeconomic factors (e.g. GDP or unemployment rate) seem to have an effect on alcohol consumption that is not captured by the variables at the individual level (de Goeij et al., 2015). A better understanding of the factors that drive individual and country differences in drinking would facilitate the development of more effective policies aimed at reducing hazardous drinking. This is especially important nowadays, as relevant socioeconomic changes, such as increases in unemployment rates and decreases in gross domestic product, have occurred in most European countries as a result of the late 2000s economic crisis (Karanikolos et

al., 2013). In fact, economic downturns and shrinking job markets have a substantial negative impact on the re-employment opportunities among individuals approaching retirement (Sigurdsson et al., 2012; Skärlund et al., 2012), which places them at higher risk of adopting risky drinking patterns. The impact of these changes on the population's drinking is unknown.

Therefore, to analyse in depth the magnitude of hazardous drinking prevalence in people aged 50 or more at the European level and its gender and age distribution in each country, as well as to study the effect of the changes in the economic and social context in recent years in their alcohol consumption is necessary in order to face the significant public health challenges of the population's ageing and develop policies and interventions to facilitate their healthy ageing. However, there is a lack of research on alcohol consumption and ageing. Studies on the factors influencing hazardous drinking and harmful use in middle-aged and older adults have been recommended (Alcohol and Ageing Working Group, 2006; Hallgren et al., 2009).

3. HYPOTHESES AND OBJECTIVES

3.1 Hypotheses

The following assumptions were made:

- The prevalence of hazardous drinking varies among European countries.
- There are gender differences in hazardous drinking in European people aged 50 or older. The prevalence is higher in men than women.
- The prevalence of hazardous drinking is higher in middle-aged than in older European people.
- Individual factors such as the employment situation, the educational level or the self-perceived health are related with hazardous drinking in European people aged 50 or older.
- Country-level factors, such as the unemployment rate, the degree of gender equality in society or alcohol control policies, are related with hazardous drinking in European people aged 50 or older.
- The prevalence of hazardous drinking in European people aged 50 or older is lower in countries with stronger regulations on alcohol advertising.
- Gender differences in hazardous drinking are more acute in societies in which gender roles are more polarized, as in these countries drinking is more socially restricted in women.

- Losing one's job is related with the incidence of hazardous drinking.
- Increases in the unemployment rate are related with higher incidence of hazardous drinking among middle-aged European people.
- During a period of economic crisis, there are reductions in alcohol consumption in both men and women. These reductions in drinking are more pronounced in the countries more affected by the recession.

3.2 Objectives

a) General objective

The main objective of this thesis is to quantify hazardous drinking in people aged 50 or older in Europe according to gender and country and analyse which individual and contextual factors have an influence on alcohol consumption.

b) Specific objectives

1. To estimate the prevalence of hazardous drinking in people aged 50 years and older.
2. To assess gender and age differences in hazardous drinking and to analyse and compare the individual factors associated with hazardous drinking in people aged 50 or older in Europe.
3. To analyse the association between alcohol advertising restrictions and the prevalence of hazardous drinking among people aged 50-64

years in Europe, taking into account both individual- and contextual-level factors.

4. To estimate the magnitude of gender differences in hazardous drinking among middle-aged people and to analyse whether these differences are associated with contextual factors.

5. To estimate the incidence of hazardous drinking in middle-aged people during an economic recession and ascertain whether individual job loss and contextual changes in unemployment influence the incidence rate in that period.

6. To compare alcohol drinking patterns in economically active people aged 50-64 years before the last economic crisis (2006) and during the crisis (2013).

4. METHODS AND RESULTS

In order to achieve the objectives, the thesis was carried out in five separate studies. From each study, a scientific article was written:

a) Article 1: **Bosque-Prous M**, Brugal MT, Lima KC, Villalbí JR, Bartroli M, Espelt A. Hazardous drinking in people aged 50 years or older: a cross-sectional picture of Europe, 2011-2013. *Int J Geriatr Psychiatry* 2016 Jul. [Epub ahead of print].

b) Article 2: **Bosque-Prous M**, Espelt A, Guitart AM, Bartroli M, Villalbí JR, Brugal MT. Association between stricter alcohol advertising regulations and lower hazardous drinking across European countries. *Addiction* 2014 Oct;109(10):1634-43.

c) Article 3: **Bosque-Prous M**, Espelt A, Borrell C, Bartroli M, Guitart AM, Villalbí JR, Brugal MT. Gender differences in hazardous drinking among middle-aged in Europe: the role of social context and women's empowerment. *Eur J Public Health*. 2015 Aug;25(4):698-705.

d) Article 4: **Bosque-Prous M**, Espelt A, Sordo L, Guitart AM, Brugal MT, Bravo MJ. Job Loss, Unemployment and the Incidence of Hazardous Drinking during the Late 2000s Recession in Europe among Adults Aged 50-64 Years. *PLoS One*. 2015 Oct 7;10(10):e0140017.

e) Article 5: **Bosque-Prous M**, Kunst AE, Brugal MT, Espelt A. Changes in alcohol consumption in the 50-64-years-old European economically active population in a period of economic crisis. *Eur J Public Health*. Submitted.

ARTICLE 1

Hazardous drinking in people aged 50 years or older: a cross-sectional picture of Europe, 2011-2013

Bosque-Prous M, Brugal MT, Lima KC, Villalbí JR, Bartroli M, Espelt A. [Hazardous drinking in people aged 50 years or older: a cross-sectional picture of Europe, 2011-2013](#). *Int J Geriatr Psychiatry*. 2017 Aug;32(8):817–28. DOI: 10.1002/gps.4528

ARTICLE 2

Association between stricter alcohol advertising regulations and lower hazardous drinking across European countries

Bosque-Prous M, Espelt A, Guitart AM, Bartroli M, Villalbí JR, Brugal MT. [Association between stricter alcohol advertising regulations and lower hazardous drinking across European countries](#). *Addiction*. 2014 Oct;109(10):1634–43. DOI: 10.1111/add.12562

Jernigan DH, Ross CS. [Commentary on Bosque-Prous et al. \(2014\): Alcohol advertising and older adults](#). *Addiction*. 2014 Oct;109(10):1644–5. DOI: 10.1111/add.12649

Gender differences in hazardous drinking among middle-aged in Europe: the role of social context and women's empowerment

Bosque-Prous M, Espelt A, Borrell C, Bartroli M, Guitart AM, Villalbí JR, et al. [Gender differences in hazardous drinking among middle-aged in Europe: the role of social context and women's empowerment](#). *Eur J Public Health*. 2015 Aug;25(4):698–705. DOI: 10.1093/eurpub/cku234

ARTICLE 4

Job Loss, Unemployment and the Incidence of Hazardous Drinking during the Late 2000s Recession in Europe among Adults Aged 50-64 Years

Bosque-Prous M, Espelt A, Sordo L, Guitart AM, Brugal MT, Bravo MJ. [Job Loss, Unemployment and the Incidence of Hazardous Drinking during the Late 2000s Recession in Europe among Adults Aged 50–64 Years](#). PLoS One. 2015 Oct 7;10(10):e0140017. DOI: 10.1371/journal.pone.0140017

**Changes in alcohol consumption in the 50-64-
years-old European economically active
population in a period of economic crisis**

Bosque-Prous M, Kunst AE, Brugal MT, Espelt A.
[Changes in alcohol consumption in the 50- to 64-year-
old European economically active population during
an economic crisis](#). Eur J Public Health. 2017 Aug
1;27(4):711–6. DOI: 10.1093/eurpub/ckx044

5. DISCUSSION

The main results of this thesis are:

1) Around 1 in 5 European people aged 50 or older are hazardous drinkers.

2) At the individual level, some variables are associated with hazardous drinking in people aged 50 or older.

2.1) Age is associated with hazardous drinking: the older the person, the lower the risk of being a hazardous drinker.

2.2) Gender is associated with hazardous drinking. Men drink more alcohol than women.

2.3) The employment situation is associated with hazardous drinking. The unemployed are at higher risk of being hazardous drinkers than the employed.

2.4) Other variables related with hazardous drinking at the individual level are: migrant background, marital status, educational level, tobacco smoking, depression and self-perceived health.

3) At the country level, there are differences between European countries in the prevalence of hazardous drinking in people aged 50 or older. These differences may be partially explained by contextual factors.

3.1) Alcohol advertising regulations are strongly related to hazardous drinking. There is an inverse association between the prevalence of hazardous drinking in a country and alcohol advertising restrictions.

3.2) An increase in the unemployment rate is associated with higher incidence of hazardous drinking.

3.3) Gender inequalities in society are related with alcohol consumption in women. In countries with higher gender equality, the prevalence of hazardous drinking in women is higher.

3.4) The higher the gross domestic product in a country, the higher the prevalence of hazardous drinking.

4) A period of economic crisis seems to influence alcohol consumption.

4.1) The incidence of hazardous drinking during a period of economic crisis was associated with both job loss at the individual level and with increases in the unemployment rate at country level.

4.2) Between 2006 and 2013, the prevalence of hazardous drinking and the mean number of drinks per week decreased in Europe among middle-aged people.

In order to explain and discuss the main findings of the thesis, the discussion has been divided into six sections. In the last two sections, we discuss the limitations of the studies and expose the implications and recommendations drawn from our findings.

5.1 Prevalence of hazardous drinking in European people aged 50 or more

The study 1 on the prevalence of hazardous drinking in the middle-aged and older people (Bosque-Prous et al., 2016) has provided estimates of hazardous drinking prevalence in 17 European countries and Israel. We found that, in 2011-2013, around 1 in 5 people aged ≥ 50 years were hazardous drinkers in these countries.

As seen throughout the development of this thesis, the prevalence of alcohol consumption, and particularly of hazardous drinking, varies among countries. This finding is consistent with estimates of previous studies (Shield et al., 2013). We have described that the European countries with higher prevalence of hazardous drinking are Denmark, the Netherlands, Belgium and Switzerland, whereas the countries with lower prevalence of hazardous drinking are Sweden, Slovenia, Poland and Hungary. This variability in alcohol consumption has been traditionally related to regional differences in drinking culture (Anderson, Braddick, Reynolds, & Gual, 2012). For example, the Mediterranean drinking pattern is characterized by daily drinking of low quantities, and often drinking wine with meals, whereas the Northern drinking pattern can be characterized by drinking spirits in episodic binge drinking occasions and the acceptance of drunkenness in public places (Allamani, Voller, Kubicka, & Bloomfield, 2000; Mäkelä et al., 2006; Popova, Rehm, Patra, & Zatonski, 2007). However, our results did not show clear differences in the pattern in hazardous drinking between European regions, which may be in line with some studies that suggest a homogenization of drinking cultures

in the last decades (Allamani et al., 2000; Gordon, Heim, & MacAskill, 2012).

5.2 Individual factors associated with hazardous drinking

We found that hazardous drinking was associated with several sociodemographic (age, gender, employment status, migrant background, marital status and educational level), life-style (tobacco use) and health factors (depression and self-perceived health) (Bosque-Prous et al., 2016), which is confirmed by previous studies in the general population. In the following subsections, the main results on age, gender, employment status and other individual factors are discussed.

a) Age

In the study 1 of this thesis (Bosque-Prous et al., 2016), we found that, in both men and women, the prevalence of hazardous drinking was higher in middle-aged than in older people, although in women the differences were not statistically significant. Besides, the proportion of abstainers was significantly higher in the older group. This is consistent with the hypothesis that many drinkers reduce or quit drinking as they get older (Moos, Schutte, Brennan, & Moos, 2009; Wilsnack et al., 2000). This shift could be a potential result of the emergence of concomitant chronic diseases that may be aggravated by alcohol use or require treatment with medication that can interact with alcohol and produce side effects in drinkers (Weathermon & Crabb,

1999), and the increased vulnerability to the adverse effects of alcohol consumption (Sacco et al., 2009; Wang et al., 2014). Moreover, the lower proportion of hazardous drinkers in the elderly with respect to the middle-aged could be a consequence of a survivor effect, as many people drinking in a harmful way for years may develop an alcohol-related illness and die prematurely.

b) Gender

As expected, the prevalence of hazardous drinking was higher in men than women (studies 1 and 3), in line with previous studies which show that not only was the frequency of alcohol consumption higher in men, but also the prevalence of risky drinking patterns such as hazardous or binge drinking (Mäkelä et al., 2006; Wilsnack et al., 2009). A moderate to high prevalence of hazardous drinking was observed among men in most countries, while the prevalence in women was more variable (e.g. up to six times higher in some countries than others) (Bosque-Prous, Espelt, Borrell, et al., 2015). Consequently, although globally the risk of being a hazardous drinker was around 1.7 times higher in men than women, the extent of gender differences in hazardous drinking varied widely among countries. Variations among countries can be partially explained by the context at country level, and consequently this finding is discussed in more detail in section 5.3.

c) Employment status

We found that being unemployed was associated with a higher risk of hazardous drinking compared with being employed (Bosque-Prous et

al., 2014), which is in line with previous research (Catalano et al., 2011; Gili et al., 2013; Henkel, 2011). Our finding may be explained by the increase in stress and anxiety as a consequence of being unemployed and having a reduced income, which may lead to an increase in alcohol consumption to cope with the stressful situation, as suggested by psychological theories such as the stress-response-dampening-theory and the self-medication theory (Bolton et al., 2009; Khantzian, 1997; Sayette, 1999; Sher et al., 2007). However, as this result was found in a cross-sectional study (study 2), we cannot determine whether job loss may have lead to an increase in alcohol consumption or vice versa. In the subsection 5.4, we discuss in more detail the effects of changes in the employment situation on alcohol consumption.

d) Other individual factors

Being a migrant to European countries was associated with a lower risk of hazardous drinking, which may be due to cultural and religious differences between the country of origin and the country of residence (Bryant & Kim, 2013; Walsh et al., 2014). Marital status was also related to alcohol consumption, but the direction of the relationship differed between genders. We found that the prevalence of hazardous drinking was higher in divorced or widowed men, while it was lower in divorced or widowed women. These differences may be related to gender roles and also to the influence of the spouse on the partner's drinking behaviour (Brennan, Moos, & Kim, 1993). With respect to the educational level, women with a higher educational level consumed more alcohol than those with lower education, which may reflect the empowerment provided by higher education to women,

both economically and socially (Ahlström et al., 2001). No differences were found in men.

Tobacco smoking and alcohol consumption show a high degree of co-occurrence and share common risk factors (Bonevski, Regan, Paul, Baker, & Bisquera, 2014; Halperin, Smith, Heiligenstein, Brown, & Fleming, 2010; Jackson et al., 2002). In the study 1, current and former smokers were more likely to be hazardous drinkers than never smokers. The relationship was stronger for current smokers. Concurrent use of alcohol and tobacco is of concern due to the known synergistic effects that increase the risk of some types of cancer (La Vecchia, Zhang, & Altieri, 2008; Talamini et al., 2002).

With regard to health factors, we found an association between hazardous drinking and being depressed (measured using the EURO-D scale) in men but not in women. A stronger association between depressive symptoms and alcohol consumption in men than women was also suggested in previous studies (Nolen-Hoeksema, 2004). Having fair or poor self-perceived health seems to be a protective factor for hazardous drinking in both men and women, which may be related with an increased susceptibility to the harmful effects of alcohol use and with the prescription of medication to treat comorbidities (Pringle et al., 2005; Wang et al., 2014; Weathermon & Crabb, 1999; Wilkinson & Dare, 2014).

5.3 Contextual factors associated with hazardous drinking

Throughout the thesis we have assessed which contextual factors may be related to alcohol consumption and hazardous drinking. The main results are discussed in the following subsections.

a) Alcohol advertising regulations

We found that one of the factors more strongly related with hazardous drinking is alcohol advertising. The effect of alcohol advertising on alcohol consumption and drinking patterns had been previously studied in adolescents (Anderson, de Bruijn, et al., 2009; Smith & Foxcroft, 2009). The study 2 (Bosque-Prous et al., 2014) was the first study to focus on the relationship between alcohol advertising regulations and prevalence of hazardous drinking in people aged 50 or older, adjusting for individual and country-level factors. The findings of this study were confirmed in the studies 1 and 3 (Bosque-Prous, Espelt, Borrell, et al., 2015; Bosque-Prous et al., 2016).

We found an association between the strength of alcohol advertising regulations and hazardous drinking across European countries: the stricter the regulations in a given country, the lower the prevalence of hazardous drinking. As far as we know, the only study that had analysed the influence of advertising on drinking among adults before our study was a very small study conducted in the United States that took into account only outdoor alcohol advertising (Kwate & Meyer, 2009). However, it found a statistically significant association between

exposure to outdoor advertising of alcoholic beverages and problematic alcohol consumption. This increases the relevance of our attempt to assess the association between alcohol advertising and hazardous drinking.

As a previous study in adolescents hypothesized that the effects of alcohol advertising on girls were greater than on boys (Saffer & Dave, 2006), in the study 3 (Bosque-Prous, Espelt, Borrell, et al., 2015) we assessed whether alcohol advertising had a different effect in middle-aged men and women. Our findings did not confirm the hypothesis for middle-aged people, as we found that alcohol advertising had a similar effect on both men and women's drinking.

Alcohol advertising may influence people's behaviour and promote an increase of alcohol consumption (Anderson, de Bruijn, et al., 2009; World Health Organization, 2004) because it contributes to normalize such consumption (Smith & Foxcroft, 2009) and to associate it to physical and social wellbeing (de Bruijn et al., 2012). Furthermore, alcohol advertising could hamper the cessation of alcohol drinking among people who were thinking of quitting drinking (Edwards, 1997). Besides, hazardous or harmful drinkers have a higher probability of continuing with or aggravating that behaviour if exposed to alcohol advertising (Kwate & Meyer, 2009).

The variations in the prevalence of hazardous drinking among countries in the same category of advertising restrictions (no restrictions, self-regulation, partial restrictions or ban) could be explained by several factors, such as the duration of advertising regulatory measures or to different levels of compliance with

regulations between countries (de Bruijn et al., 2012). Differences in drinking culture between countries may also explain the country variations.

Trade agreements in the European Union forced some countries to relax alcohol control policies in the late 1990s (Nelson, 2010). For example, Sweden had to reduce slightly the comprehensive ban applied to alcohol advertising to allow marketing campaigns of drinks with low alcohol content (<2.5% alcohol). With the globalization of trade, cross-national advertising exposure has increased and, therefore, alcohol control policy has become a global issue (Casswell, 2012), which needs to be monitored and assessed. For example, although the Nordic countries have one of the most comprehensive restrictions in alcohol advertising, their television ban is partially undercut by the availability of channels from English-speaking countries (e.g. United Kingdom), with intensive alcohol advertising.

Moreover, we found that countries without restrictions or with voluntary restrictions present the highest prevalence of hazardous drinking, which tallies with the suggestion that self-regulation of advertising by the alcoholic beverages industry itself does not protect the population from exposure to alcohol advertising (Anderson, Chisholm, et al., 2009; Babor et al., 2010; Booth et al., 2008; Hastings et al., 2010). The introduction of partial alcohol advertising regulations may lead companies to alternative forms of marketing, such as sponsorships or discounts at the point of sale, as documented for tobacco (Saffer & Dave, 2006), and thus it can be difficult to ascertain the impact of partial regulations (Hollingworth et al., 2006). Moreover,

the interests of the alcohol industry are focused on increasing sales, generating trends and new values. These interests are generally opposed to public health interests due to the industry's need to increase the number of consumers of these potentially harmful products. In addition, the increase in sales of alcoholic beverages not only requires a rise in the number of consumers, but also promotes an increase in the frequency and quantity of consumption, which may lead to the development of some degree of physical or psychological dependence on the individual. For that reason, policymakers should not rely on self-regulation, but rather promote statutory measures to protect the citizens (Babor, 2010). The most probable scenario, based on theoretical and empirical evidence, is that comprehensive restrictions on alcohol advertising would have an impact on alcohol consumption, provided that it was a measure accepted by the population and that non-compliance is penalized (Alwan et al., 2011; Anderson, Chisholm, et al., 2009; Babor et al., 2010).

b) Unemployment rate

Another factor that seems to be related to alcohol use is the national unemployment rate. In the study 4 (Bosque-Prous, Espelt, Sordo, et al., 2015), we found that increases in the unemployment rate were associated with a higher incidence of hazardous drinking. This finding is consistent with previous studies that highlight the relationship between declining macroeconomic conditions and alcohol-related risky behaviours (Dávalos et al., 2012; Dee, 2001; Henkel, 2011). A possible explanation may be that an increased national unemployment rate could generate real or perceived economic insecurity among

workers, increasing their stress and possibly alcohol consumption (Bor et al., 2013).

Besides, differences in the prevalence of hazardous drinking between men and women in a country were partially explained by the national unemployment rate, as seen in the study 3 (Bosque-Prous, Espelt, Borrell, et al., 2015). Higher unemployment rates were associated with lower prevalence of hazardous drinking among middle-aged women, but not in men. Our results suggest that the national unemployment rate affects men and women differently. However, the relationship between unemployment rates and hazardous drinking are complex (Henkel, 2011). Further studies are needed to confirm the observed association and to verify the hypothesis of unemployment rates affecting both genders differently.

c) Gender inequalities in a society

We found that gender inequalities in society were related with hazardous drinking in women, but no differences were found in men (Bosque-Prous et al., 2016). In countries with smaller gender inequalities, the prevalence of hazardous drinking in women was higher. Probably this finding is related to the drinking culture in each country, the gender-based drinking norms in a society and the degree of women's empowerment (Mäkelä et al., 2006). In societies in which gender roles are more polarized (e.g. societies where women are largely confined to the home and to domestic work, while men spend a lot of time working outside the home), gender differences in alcohol consumption may be more acute (Ahlström et al., 2001; Wilsnack et al., 2000). Traditionally, drinking has been more socially restricted

among women than among men, due to the belief that women's social behaviour and responsibilities may be more adversely affected by drinking (Wilsnack et al., 2000). Thus, risky health patterns have been more common among men (Sen et al., 2007). However, relatively high gender equality is expected in societies where drinking is well integrated into social life. These hypotheses match the results of the study 3 of this thesis (Bosque-Prous, Espelt, Borrell, et al., 2015). Greater gender equality in a country appears to be related to higher alcohol consumption in women, and suggests that improvements in women's social conditions might be accompanied by the adoption of unhealthy lifestyles which were traditionally more common among men (Bond et al., 2010).

d) Gross domestic product

An association was found between the prevalence of hazardous drinking in the middle-aged and the gross domestic product (GDP) of the country: the higher the GDP in a country, the higher the prevalence of hazardous drinking (Bosque-Prous et al., 2014). However, in studies 1 and 3, we observed that the GDP was related to hazardous drinking in crude models, but not in adjusted models. Besides, the GDP was strongly correlated with the degree of gender inequalities in a society, which does not necessarily mean that women's empowerment depends only on national wealth, as suggested by Varkey et al. (Varkey, Mbbs, Kureshi, & Lesnick, 2010). Our results indicate that the degree of gender inequalities in a society has a greater influence on hazardous drinking than the GDP.

e) Other contextual factors

Throughout the thesis, the association between alcohol consumption and other contextual factors was tested. We found no association between the prevalence of hazardous drinking and factors such as other alcohol control policies and the patterns of drinking score.

Although we found a strong relationship between alcohol advertising regulations and hazardous drinking, no association was found for other alcohol control policies (studies 2 and 3). The effectiveness of alcohol policies such as taxation or availability of alcohol is known (Anderson, Chisholm, et al., 2009; World Health Organization, 2010), however, it is possible that the variable we used in our studies did not reflect this relationship as it combined different policies in a single index (Karlsson & Österberg, 2007).

The Patterns of Drinking Score (PDS) was another variable that was not related with hazardous drinking in our studies (Bosque-Prous, Espelt, Borrell, et al., 2015; Bosque-Prous et al., 2014). A possible explanation for this finding is that the variability in the PDS in the European countries studied is low, as the less risky drinking patterns are found in Southern and Western Europe (World Health Organization, 2016).

5.4 Effect of economic crises on alcohol consumption

In recent years, Europe has been affected by a serious economic recession, in which relevant socioeconomic changes, such as increases in the unemployment rates and decreases in the GDP, have occurred in many countries (Karanikolos et al., 2013). Concerns about the effects of the late 2000s economic crisis on health and health-related behaviours have risen. In the studies 4 and 5, we attempted to assess changes in alcohol consumption from the pre-crisis period (2006) to the crisis period (2013).

a) Changes in alcohol consumption

Previous studies in some countries have registered a decrease in the per capita alcohol consumption during times of economic downturn. This decrease has been related to a lower prevalence of hazardous drinking (Colell, Sánchez-Niubò, Delclos, Benavides, & Domingo-Salvany, 2015; Ruhm & Black, 2002). In the study 5, we found that the mean number of drinks consumed in a week per drinker decreased in both men and women. The prevalence of hazardous drinking was lower in the crisis period, but only in men. According to some studies, men are more affected by economic stressors (Colell et al., 2015), which may be related to traditional gender roles. Moreover, the proportion of abstainers increased globally, although the differences between the pre-crisis and the crisis period were only statistically significant for women. Our results may be explained by the income effect theory: alcohol use would decrease during economic downturns

as less income is available and this would result in tighter individual budget constraints, so that less money would be spent on alcoholic beverages (Bor et al., 2013; Catalano et al., 2011; de Goeij et al., 2015).

During the last decades a gradual convergence regarding the per capita alcohol consumption has occurred throughout Europe (Allamani et al., 2014), which may partially explain the reductions in alcohol consumption. Despite this, it seems unlikely that the changes found are only a consequence of this convergence instead of an effect of the economic changes because we also found that the studied countries most hardly hit by the recession (Spain and Italy) were those with the largest decreases in alcohol use (study 5).

b) Job loss in a context of economic crisis

Despite not observing an increase in global risky drinking patterns, it is possible that some population groups, such as the unemployed, are more affected by an economic crisis and increase their alcohol consumption. To test this hypothesis we conducted the study 4 (Bosque-Prous, Espelt, Sordo, et al., 2015).

We found that job loss in middle-aged people is a risk factor for hazardous alcohol consumption when comparing to employed people, which is consistent with several studies in active population of all ages (Ettner, 1997; José et al., 2000; Mossakowski, 2008). Our finding implies that losing the job may also have an effect on the health of the economically active people over 50 years. Middle-aged individuals face a lower probability of being reemployed than younger ones (Sigurdsson et al., 2012; Skärlund et al., 2012), which would make

individual job loss a relevant factor leading to very important levels of strain or hardships for affected middle-aged individuals during economically challenging times in a context of generalized job insecurity. The diminished expectations of finding a new job would increase their stress, which might raise the risk of increasing the intake of alcohol. Studies on mental health found that job loss is also associated with worsening of mental health in all age groups (Riumallo-Herl, Basu, Stuckler, Courtin, & Avendano, 2014; World Health Organization, 2011b). This finding is of concern not only because of the potential harmful health effects of hazardous drinking, but also because negative health behaviours established or re-established during economic difficulties can persist afterwards and become a life-long pattern (Kalousova & Burgard, 2014).

5.5 Limitations

When evaluating the results of this thesis, certain limitations that appear in the different studies should be taken into account. The most important limitations are described below, but more details can be found in each article.

A common limitation of all studies included in the thesis is that overall response rate to the survey was low. At first wave, the response rate was about 62% on average, but it decreased in the following waves (Börsch-Supan et al., 2013). In this respect, the SHARE project is no exception to the general decline in response rates in face-to-face surveys in Europe and worldwide (Börsch-Supan et al., 2005; Matsuo, Billiet, Loosveldt, Berglund, & Kleven, 2010). Another common

limitation of all studies is that the drinking status of each individual was based on self-reported data, which could lead to recall or social desirability bias because heavy drinkers tend to underestimate their consumption more than other drinkers (Northcote & Livingston, 2011). Even so, for the studies 1, 2 and 3, it was possible to adapt the SHARE questions to a format that was very similar to the AUDIT-C test (Bush et al., 1998), which has been validated and is widely used to detect hazardous drinking (Frank et al., 2008).

The specific limitations of each study are described below:

a) Limitations of the study 1

All individual variables were based on self-reported data. These could be a source of classification bias with respect to the depression and chronic diseases variables, as medical records could not be checked to assure their accuracy. In addition, our study 1 has the limitations of any cross-sectional study. We obtained data on drinking status at one point in time, therefore we could not determine trends. However, the high prevalence of hazardous drinking in most countries suggests that political measures should be taken to reduce this prevalence, especially considering that alcohol use is one of the leading risk factors of disease and disability worldwide (Lim et al., 2012).

b) Limitations of the study 2

We had 16 groups (57% of European Union countries plus Switzerland) in the second level of our analyses, which could be a limitation because it is more difficult to observe whether there are

statistically significant differences between groups in small sample sizes. Despite this, we found differences between advertising restriction groups. Another limitation of this study is that the advertising restrictions classification elaborated by WHO was based on reports from each government, but without data on the degree of compliance with regulations, as alcohol advertising is not monitored systematically (de Bruijn et al., 2012). Despite this, the degree of compliance would only affect countries with restrictions. Given that we found a gradient in the association between degree of restriction and hazardous drinking prevalence, we may assume that if there was absolute compliance, differences would have been greater. Although we controlled for different factors that can condition the relationship between hazardous drinking and alcohol advertising restrictions, there could be other factors influencing the association found. For example, we could not account for the cross-border exposure to alcohol advertising due to a lack of monitoring and estimates of this exposure.

c) Limitations of the study 3

Data on advertising restrictions were self-reported. Since alcohol advertising is not systematically monitored in each country, compliance with regulations could not be assessed (de Bruijn et al., 2012). Gender differences in hazardous drinking among middle-aged people may have been affected to some extent by different mortality rates among younger hazardous drinkers in each sex in some countries, but we were unable to test this hypothesis. The study was based on only 16 units in the second level of our analyses, which may

limit our ability to detect statistically significant differences between groups.

d) Limitations of the study 4

We could not determine whether changes in employment status lead to hazardous drinking or vice versa, since time of changes in employment status was unknown, and data on drinking only captured the three months prior to the follow-up interview. Besides, 36.5% of individuals did not have a follow-up interview and were excluded from the study, which indicates a potential differential follow-up bias. However, in our assessment of the follow-up bias, we found some differences between those who were lost to follow-up and those who were not for some individual-level variables, but not for employment status. We analysed each cross-sectional survey separately (including all participants, regardless of their follow-up status), and observed no statistically significant difference between baseline and follow-up in the prevalence of hazardous drinking in these variables. Moreover, our conclusions are further supported by the fact that the risk of hazardous drinking among unemployed compared to employed participants was 1.42 (95%CI: 1.13–1.80) in the entire 2011–12 sample, and only 1.19 (95%CI: 0.88–1.60) in the 2006–07 sample. Thirdly, the incidence of hazardous drinking could be underestimated because of survival bias: individuals with a history of hazardous drinking but who gave up drinking following development of a serious alcohol-related illness are more likely to die during follow-up than those without serious illnesses. Fourthly, while we controlled for various individual-level factors related to alcohol consumption, we

were not able to account for participants' previous consumption of alcohol or other substances due to lack of data. We could only assess whether the participants were not hazardous drinkers in the three months prior to the baseline interview. Individuals with history of alcohol abuse or dependence may be at higher risk of relapse when dealing with stressful situations (Kim et al., 2014). The risk of relapse among former hazardous drinkers is potentially higher after losing a job during economically challenging times. Predictably, the availability of data on previous risk patterns among participants would have reinforced our results. Finally, Poland was excluded from the analysis because it had a very low incidence of hazardous drinking with respect to other countries and the values of its contextual variables were also quite different, however, a sensitivity analysis including Poland provided similar results at the individual level.

e) Limitations of the study 5

Although hazardous drinking usually decreases during periods of economic crisis, it has been suggested that other alcohol-related risky patterns, such as binge drinking could increase (Bor et al., 2013; Burgard et al., 2013; Colell et al., 2015; Dávalos et al., 2012; Dee, 2001; Harhay et al., 2014; Henkel, 2011; Ruhm & Black, 2002). However, based on our data, we could not estimate changes in binge drinking between 2006 and 2013 due to changes in how the question was asked between the two surveys (in 2006, binge drinking was considered as drinking four or more drinks in one occasion, while in 2013 the binge drinkers were the ones who consumed six or more drinks on a single occasion).

5.6 Implications and recommendations

The prevalence of hazardous drinking is around 20% in European people aged 50 or older, with variations between countries, age groups and gender. The findings of this thesis suggest that several individual and contextual factors are related with hazardous drinking, which may help explain the differences among countries. Given the rapid ageing of the European population and the increased susceptibility to the adverse consequences of alcohol use in older people, reinforcing effective policies and interventions aimed at preventing or reducing alcohol consumption in middle-aged and older people should be a priority.

When focusing in gender differences in hazardous drinking, we found that the prevalence of hazardous drinking was higher in men than women. In this sense, countries with the highest gender differences in hazardous drinking were those with the greatest restrictions on women's behaviour or the greatest gender inequality in the society. In other words, in countries with higher gender equality, women drink more and show riskier drinking patterns. This finding suggests that gender equality policies should be accompanied by specific alcohol control policies with proven effectiveness to reduce the probability of engaging in alcohol consumption. Otherwise gender inequalities would be reduced but the adverse effects attributable to alcohol consumption would increase in women.

As stated in the WHO global strategy to reduce the harmful use of alcohol (World Health Organization, 2010), there are many effective policy options and interventions that should be implemented at

country level to tackle alcohol-related harm. Among them, governments should strengthen the regulations on alcohol consumption and monitor the compliance of laws and measures, something our findings highlight. Some countries promote self-regulation of advertising by the alcoholic beverages industry, which does not seem to protect the population from exposure to alcohol advertising (Anderson, Chisholm, et al., 2009; Babor et al., 2010; Booth et al., 2008; Hastings et al., 2010). For that reason, policymakers must not rely on self-regulation, but rather enact regulations to protect citizens from alcohol-related harm (Babor, 2010).

To reduce the magnitude of the health, social and economic problems caused by harmful use of alcohol, an increased commitment by governments to act, strengthened partnerships and better coordination among stakeholders are required (World Health Organization, 2010). This thesis contributes to improve knowledge on the magnitude of the issue of alcohol use and ageing and to clarify some social determinants related to hazardous drinking and alcohol-related harm. Our findings also highlight that the interventions and policies implemented should take into account gender and age differences in hazardous drinking, as well as individual and contextual characteristics associated with hazardous drinking. Besides, during the current economic challenging times, prevention policies should pay special attention to the most vulnerable groups, such as those facing unemployment, especially middle-aged people.

6. CONCLUSIONS

The main conclusions of this dissertation are:

- 1) In Europe, around 20% of people aged 50 or older may be hazardous drinkers, with relevant differences between countries.
- 2) Hazardous drinking seems more prevalent in the middle-aged than in older people in Europe.
- 3) The prevalence of hazardous drinking is higher in men than in women. Gender differences in hazardous drinking are larger in countries with lower gender equality in the society.
- 4) At the individual level, hazardous drinking is related with demographic, socioeconomic and health factors.
- 5) At the country level, hazardous drinking is related with alcohol advertising regulations, the unemployment rate, and gender inequalities in society.
- 6) During an economic downturn, average alcohol consumption decreased in European middle-aged people. However, job loss is an individual-level risk factor for increasing alcohol use in a context of economic instability.

Bibliography

- Ahlm, K., Björnstig, U., & Öström, M. (2009). Alcohol and drugs in fatally and non-fatally injured motor vehicle drivers in northern Sweden. *Accident; Analysis and Prevention*, *41*(1), 129–136.
- Ahlström, S., Bloomfield, K., & Knibbe, R. (2001). Gender Differences in Drinking Patterns in Nine European Countries: Descriptive Findings. *Substance Abuse*, *22*(1), 69–85.
- Ahmad Kiadaliri, A., Jarl, J., Gavriilidis, G., & Gerdtham, U.-G. (2013). Alcohol drinking cessation and the risk of laryngeal and pharyngeal cancers: a systematic review and meta-analysis. *PloS One*, *8*(3), e58158.
- Alcohol and Ageing Working Group. (2006). Alcohol and Ageing. Is alcohol a major threat to healthy ageing for the baby boomers? Health Scotland.
- Allamani, A., Olimpi, N., Pepe, P., & Cipriani, F. (2014). Trends in consumption of alcoholic beverages and policy interventions in europe: an uncertainty “associated” perspective. *Substance Use & Misuse*, *49*(12), 1531–1545.
- Allamani, A., Voller, F., Kubicka, L., & Bloomfield, K. (2000). Drinking Cultures and the Position of Women in Nine European Countries. *Substance Abuse*, *21*(4), 231–247.
- Alwan, A., Armstrong, T., Bettcher, D., Branca, F., Chisholm, D., Ezzati, M., ... Wild, C. (2011). *Global Status report: on noncommunicable diseases 2010*. Lisbon, Portugal: World Health Organization.
- American Psychiatric Association. (1994). *Diagnostic and Statistical Manual of Mental Disorders: DMS-IV*. Washington DC: American Psychiatric Publishing.
- American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders: DSM-5*. American Psychiatric Association.
- Amey, C. H., Albrecht, S. L., & Miller, M. K. (1996). Racial differences in adolescent drug use: the impact of religion. *Substance Use & Misuse*, *31*(10), 1311–1332.
- Andersen, A., Due, P., Holstein, B. E., & Iversen, L. (2003). Tracking drinking behaviour from age 15-19 years. *Addiction*, *98*(11), 1505–1511.

- Anderson, P., Braddick, F., Reynolds, J., & Gual, A. (2012). *Alcohol policy in Europe: Evidence from AMPHORA*. The AMPHORA project. Retrieved from http://amphoraproject.net/view.php?id_cont=45
- Anderson, P., Chisholm, D., & Fuhr, D. C. (2009). Effectiveness and cost-effectiveness of policies and programmes to reduce the harm caused by alcohol. *Lancet*, 373(9682), 2234–2246.
- Anderson, P., de Bruijn, A., Angus, K., Gordon, R., & Hastings, G. (2009). Impact of alcohol advertising and media exposure on adolescent alcohol use: a systematic review of longitudinal studies. *Alcohol & Alcoholism*, 44(3), 229–243.
- Anderson, P., Møller, L., & Galea, G. (2012). *Alcohol in the European Union. Consumption, harm and policy approaches*. Copenhagen, Denmark: World Health Organization.
- Anderson, P., & Baumberg, B. (2006). *Alcohol in Europe. A public health perspective*. London: Institute of Alcohol Studies.
- Ariza, C., Villalbí, J. R., Sánchez-Martínez, F., & Nebot, M. (2011). [Process evaluation in relation to effectiveness assessment: experiences with school-based programs]. *Gaceta Sanitaria*, 25 Suppl 1, 32–39.
- Astudillo, M., Kuntsche, S., Graham, K., & Gmel, G. (2010). The Influence of Drinking Pattern, at Individual and Aggregate Levels, on Alcohol-Related Negative Consequences. *European Addiction Research*, 16(3), 115–123.
- Babor, T. F. (2008). Tackling alcohol misuse in the UK. *BMJ*, 336(7642), 455.
- Babor, T. F. (2010). Public health science and the global strategy on alcohol. *Bulletin of the World Health Organization*, 88(9), 643.
- Babor, T. F., & Caetano, R. (2005). Evidence-based alcohol policy in the Americas: strengths, weaknesses, and future challenges. *Revista Panamericana de Salud Pública*, 18(4–5), 327–337.
- Babor, T. F., Caetano, R., Casswell, S., Edwards, G., Giesbrecht, N., Graham, K., ... Rossow, I. (2010). *Alcohol: No Ordinary Commodity: Research and Public Policy*. New York: Oxford University Press.
- Babor, T. F., Higgins-Biddle, J. C., Saunders, J. B., & Monteiro, M. G. (2001). *The alcohol use disorders identification test: Guidelines for use in primary care* (2nd ed.). Geneva: World Health Organization.

- Babor, T. F., & Robaina, K. (2013). Public health, academic medicine, and the alcohol industry's corporate social responsibility activities. *American Journal of Public Health, 103*(2), 206–214.
- Babor, T. F., & Winstanley, E. L. (2008). The world of drinking: national alcohol control experiences in 18 countries. *Addiction, 103*(5), 721–725.
- Babor, T., Hall, W., Humphreys, K., Miller, P., Petry, N., & West, R. (2013). Who is responsible for the public's health? The role of the alcohol industry in the WHO global strategy to reduce the harmful use of alcohol. *Addiction, 108*(12), 2045–2047.
- Babiyak, M. A. (2009). Understanding confounding and mediation. *Evidence-Based Mental Health, 12*(3), 68–71.
- Baliunas, D. O., Taylor, B. J., Irving, H., Roerecke, M., Patra, J., Mohapatra, S., & Rehm, J. (2009). Alcohol as a risk factor for type 2 diabetes: A systematic review and meta-analysis. *Diabetes Care, 32*(11), 2123–2132.
- Baliunas, D., Rehm, J., Irving, H., & Shuper, P. (2010). Alcohol consumption and risk of incident human immunodeficiency virus infection: a meta-analysis. *International Journal of Public Health, 55*(3), 159–166.
- Benda, B. B. (1997). An examination of a reciprocal relationship between religiosity and different forms of delinquency within a theoretical model. *Journal of Research in Crime and Delinquency, 34*(2), 163–186.
- Bernards, S., Graham, K., Kuendig, H., Hettige, S., & Obot, I. (2009). "I have no interest in drinking": a cross-national comparison of reasons why men and women abstain from alcohol use. *Addiction, 104*(10), 1658–1668.
- Blazer, D. G., & Wu, L.-T. (2009). The epidemiology of at-risk and binge drinking among middle-aged and elderly community adults: National Survey on Drug Use and Health. *The American Journal of Psychiatry, 166*(10), 1162–1169.
- Bolton, J. M., Robinson, J., & Sareen, J. (2009). Self-medication of mood disorders with alcohol and drugs in the National Epidemiologic Survey on Alcohol and Related Conditions. *Journal of Affective Disorders, 115*(3), 367–375.
- Bond, J. C., Roberts, S. C. M., Greenfield, T. K., Korcha, R., Ye, Y., & Nayak, M. B. (2010). Gender differences in public and private drinking contexts: a multi-level GENACIS analysis. *International Journal of Environmental Research and Public Health, 7*(5), 2136–2160.

- Bonevski, B., Regan, T., Paul, C., Baker, A. L., & Bisquera, A. (2014). Associations between alcohol, smoking, socioeconomic status and comorbidities: evidence from the 45 and Up Study. *Drug and Alcohol Review, 33*(2), 169–176.
- Booth, A., Meier, P., Stockwell, T., Sutton, A., Wilkinson, A., Wong, R., ... Taylor, K. (2008). Independent review of the effects of alcohol pricing and promotion. Part A: systematic reviews. Sheffield: University of Sheffield.
- Bor, J., Basu, S., Coutts, A., McKee, M., & Stuckler, D. (2013). Alcohol use during the great recession of 2008-2009. *Alcohol and Alcoholism, 48*(3), 343–348.
- Börsch-Supan, A., Brandt, M., Hunkler, C., Kneip, T., Korbmacher, J., Malter, F., ... Zuber, S. (2013). Data Resource Profile: The Survey of Health, Ageing and Retirement in Europe (SHARE). *International Journal of Epidemiology, 42*(4), 992–1001.
- Börsch-Supan, A., Brugiavini, A., Jürges, H., Mackenbach, J., Siegrist, J., & Weber, G. (2005). *Health, Ageing and Retirement in Europe. First Results from the Survey of Health, Ageing and Retirement in Europe*. Mannheim: Mannheim Research Institute for the Economics of Aging (MEA).
- Börsch-Supan, A., & Jürges, H. (2005). *The Survey of Health, Aging, and Retirement in Europe – Methodology*. Mannheim: Mannheim Research Institute for the Economics of Aging (MEA).
- Bosque-Prous, M., Brugal, M. T., Lima, K. C., Villalbí, J. R., Bartroli, M., & Espelt, A. (2016). Hazardous drinking in people aged 50 years or older: a cross-sectional picture of Europe, 2011–2013. *International Journal of Geriatric Psychiatry, 31*(12), 1303–1311.
- Bosque-Prous, M., Espelt, A., Borrell, C., Bartroli, M., Guitart, A. M., Villalbí, J. R., & Brugal, M. T. (2015). Gender differences in hazardous drinking among middle-aged in Europe: the role of social context and women's empowerment. *European Journal of Public Health, 25*(4), 698–705.
- Bosque-Prous, M., Espelt, A., Guitart, A. M., Bartroli, M., Villalbí, J. R., & Brugal, M. T. (2014). Association between stricter alcohol advertising regulations and lower hazardous drinking across European countries. *Addiction, 109*(10), 1634–1643.
- Bosque-Prous, M., Espelt, A., Sordo, L., Guitart, A. M., Brugal, M. T., & Bravo, M. J. (2015). Job Loss, Unemployment and the Incidence of

- Hazardous Drinking during the Late 2000s Recession in Europe among Adults Aged 50-64 Years. *PLoS One*, 10(10), e0140017.
- Bradley, K. A., DeBenedetti, A. F., Volk, R. J., Williams, E. C., Frank, D., & Kivlahan, D. R. (2007). AUDIT-C as a brief screen for alcohol misuse in primary care. *Alcoholism, Clinical and Experimental Research*, 31(7), 1208–1217.
- Brand, D. A., Saisana, M., Rynn, L. A., Pennoni, F., & Lowenfels, A. B. (2007). Comparative analysis of alcohol control policies in 30 countries. *PLoS Medicine*, 4(4), e151.
- Brennan, P. L., Moos, R. H., & Kim, J. Y. (1993). Gender differences in the individual characteristics and life contexts of late-middle-aged and older problem drinkers. *Addiction*, 88(6), 781–790.
- Bruha, R., Dvorak, K., & Petryl, J. (2012). Alcoholic liver disease. *World Journal of Hepatology*, 4(3), 81–90.
- Bryant, A. N., & Kim, G. (2013). The relation between acculturation and alcohol consumption patterns among older Asian and Hispanic immigrants. *Aging & Mental Health*, 17(2), 147–156.
- Burgard, S. A., Ailshire, J. A., & Kalousova, L. (2013). The Great Recession and Health People, Populations, and Disparities. *The Annals of the American Academy of Political and Social Science*, 650(1), 194–213.
- Bush, K., Kivlahan, D. R., McDonell, M. B., Fihn, S. D., & Bradley, K. A. (1998). The AUDIT alcohol consumption questions (AUDIT-C): an effective brief screening test for problem drinking. Ambulatory Care Quality Improvement Project (ACQUIP). Alcohol Use Disorders Identification Test. *Archives of Internal Medicine*, 158(16), 1789–1795.
- Butterworth, P., Leach, L. S., Strazdins, L., Olesen, S. C., Rodgers, B., & Broom, D. H. (2011). The psychosocial quality of work determines whether employment has benefits for mental health: results from a longitudinal national household panel survey. *Occupational and Environmental Medicine*, 68(11), 806–812.
- Casswell, S. (2012). Current status of alcohol marketing policy-an urgent challenge for global governance. *Addiction*, 107(3), 478–485.
- Catalano, R. (1997). An emerging theory of the effect of economic contraction on alcohol abuse in the United States. *Social Justice Research*, 10(2), 191–201.

- Catalano, R., Goldman-Mellor, S., Saxton, K., Margerison-Zilko, C., Subbaraman, M., LeWinn, K., & Anderson, E. (2011). The health effects of economic decline. *Annual Review of Public Health, 32*, 431–450.
- Cherpitel, C. J. (2009). *Alcohol and Injuries: Emergency department studies in an international perspective*. Geneva: World Health Organization.
- Colell, E., Sánchez-Niubò, A., Benavides, F. G., Delclos, G. L., & Domingo-Salvany, A. (2014). Work-related stress factors associated with problem drinking: A study of the Spanish working population. *American Journal of Industrial Medicine, 57*(7), 837–846.
- Colell, E., Sánchez-Niubò, A., Delclos, G. L., Benavides, F. G., & Domingo-Salvany, A. (2015). Economic crisis and changes in drug use in the Spanish economically-active population. *Addiction, 110*(7):1129-1137.
- Colom, J., Scafato, E., Segura, L., Gandin, C., & Struzzo, P. (2014). Brief interventions implementation on alcohol from the European health systems perspective. *Frontiers in Psychiatry, 5*, 161.
- Comisión Para Reducir Las Desigualdades Sociales En Salud En España. (2012). [A proposal of policies and interventions to reduce social inequalities in health in Spain. Commission to Reduce Social Inequalities in Health in Spain]. *Gaceta Sanitaria, 26*(2), 182–189.
- Courtney, K. E., & Polich, J. (2009). Binge drinking in young adults: Data, definitions, and determinants. *Psychological Bulletin, 135*(1), 142–156.
- Crombie, I. K., Irvine, L., Elliott, L., & Wallace, H. (2007). How do public health policies tackle alcohol-related harm: a review of 12 developed countries. *Alcohol and Alcoholism, 42*(5), 492–499.
- Crombie, I. K., & Precious, E. (2011). Changes in the social class gradient of cirrhosis mortality in England and Wales across the 20th century. *Alcohol and Alcoholism, 46*(1), 80-82.
- Cunradi, C. B., Caetano, R., & Schafer, J. (2002). Alcohol-related problems, drug use, and male intimate partner violence severity among US couples. *Alcoholism, Clinical and Experimental Research, 26*(4), 493–500.
- Danielsson, A.-K., Wennberg, P., Hibell, B., & Romelsjö, A. (2012). Alcohol use, heavy episodic drinking and subsequent problems among adolescents in 23 European countries: does the prevention paradox apply? *Addiction, 107*(1), 71–80.

- Dávalos, M. E., Fang, H., & French, M. T. (2012). Easing the pain of an economic downturn: macroeconomic conditions and excessive alcohol consumption. *Health Economics*, *21*(11), 1318–1335.
- Dawson, D. A., Grant, B. F., Stinson, F. S., & Zhou, Y. (2005). Effectiveness of the derived Alcohol Use Disorders Identification Test (AUDIT-C) in screening for alcohol use disorders and risk drinking in the US general population. *Alcoholism, Clinical and Experimental Research*, *29*(5), 844–854.
- de Bruijn, A., van den Wildenberg, E., & van den Broeck, A. (2012). *Commercial promotion of drinking in Europe. Key findings of independent monitoring of alcohol marketing in five European countries*. Utrecht: European Centre for Monitoring Alcohol Marketing.
- de Goeij, M. C., Suhrcke, M., Toffolutti, V., van de Mheen, D., Schoenmakers, T. M., & Kunst, A. E. (2015). How economic crises affect alcohol consumption and alcohol-related health problems: a realist systematic review. *Social Science & Medicine*, *131*:131-46.
- Dee, T. S. (2001). Alcohol abuse and economic conditions: evidence from repeated cross-sections of individual-level data. *Health Economics*, *10*(3), 257–270.
- Domingo-Salvany, A., Bacigalupe, A., Carrasco, J. M., Espelt, A., Ferrando, J., & Borrell, C. (2013). [Proposals for social class classification based on the Spanish National Classification of Occupations 2011 using neo-Weberian and neo-Marxist approaches.]. *Gaceta Sanitaria*, *27*(3), 263–72.
- Donath, C., Grässel, E., Baier, D., Pfeiffer, C., Karagülle, D., Bleich, S., & Hillemecher, T. (2011). Alcohol consumption and binge drinking in adolescents: comparison of different migration backgrounds and rural vs. urban residence--a representative study. *BMC Public Health*, *11*, 84.
- Duailibi, S., Ponicki, W., Grube, J., Pinsky, I., Laranjeira, R., & Raw, M. (2007). The effect of restricting opening hours on alcohol-related violence. *American Journal of Public Health*, *97*(12), 2276–2280.
- Edwards, G. (1997). Alcohol policy and the public good. *Addiction*, *92* Suppl 1, S73-79.
- Elder, R. W., Lawrence, B., Ferguson, A., Naimi, T. S., Brewer, R. D., Chattopadhyay, S. K., ... Task Force on Community Preventive Services. (2010). The effectiveness of tax policy interventions for reducing excessive alcohol consumption and related harms. *American Journal of Preventive Medicine*, *38*(2), 217–229.

- Elgar, F. J., Roberts, C., Parry-Langdon, N., & Boyce, W. (2005). Income inequality and alcohol use: a multilevel analysis of drinking and drunkenness in adolescents in 34 countries. *Eur J Public Health, 15*(3), 245–250.
- Ellickson, P. L., Tucker, J. S., & Klein, D. J. (2003). Ten-year prospective study of public health problems associated with early drinking. *Pediatrics, 111*(5 Pt 1), 949–955.
- Erke, A., Goldenbeld, C., & Vaa, T. (2009). The effects of drink-driving checkpoints on crashes--a meta-analysis. *Accident; Analysis and Prevention, 41*(5), 914–923.
- Ettner, S. L. (1997). Measuring the human cost of a weak economy: does unemployment lead to alcohol abuse? *Social Science & Medicine, 44*(2), 251–260.
- European Commission Directorate General, & Communication. (2007). Special Eurobarometer 272b/Wave 66.2 – TNS Opinion and Social. Attitudes towards alcohol. European Commission. Retrieved from http://ec.europa.eu/public_opinion/archives/ebs/ebs_272b_en.pdf
- Ewing, B. A., Tucker, J. S., Miles, J. N. V., Shih, R. A., Kulesza, M., Pedersen, E. R., & D'Amico, E. J. (2015). Early Substance Use and Subsequent DUI in Adolescents. *Pediatrics, 136*(5), 868–875.
- Famularo, R., Stone, K., Barnum, R., & Wharton, R. (1986). Alcoholism and severe child maltreatment. *American Journal of Orthopsychiatry, 56*(3), 481.
- Ferreira, M. P., & Weems, M. K. (2008). Alcohol consumption by aging adults in the United States: health benefits and detriments. *Journal of the American Dietetic Association., 108*(10), 1668–1676.
- Font-Ribera, L., Garcia-Continente, X., Pérez, A., Torres, R., Sala, N., Espelt, A., & Nebot, M. (2013). Driving under the influence of alcohol or drugs among adolescents: The role of urban and rural environments. *Accident Analysis & Prevention, 60*, 1–4.
- Frank, D., DeBenedetti, A. F., Volk, R. J., Williams, E. C., Kivlahan, D. R., & Bradley, K. A. (2008). Effectiveness of the AUDIT-C as a screening test for alcohol misuse in three race/ethnic groups. *Journal of General Internal Medicine, 23*(6), 781–787.

- French, M. T., Maclean, J. C., Sindelar, J. L., & Fang, H. (2011). The morning after: alcohol misuse and employment problems. *Applied Economics*, *43*(21), 2705–2720.
- French, M. T., Popovici, I., & Maclean, J. C. (2009). Do alcohol consumers exercise more? Findings from a national survey. *American Journal of Health Promotion*, *24*(1), 2–10.
- Gili, M., Roca, M., Basu, S., McKee, M., & Stuckler, D. (2013). The mental health risks of economic crisis in Spain: evidence from primary care centres, 2006 and 2010. *European Journal of Public Health*, *23*(1), 103–108.
- Gómez, A., Conde, A., Santana, J. M., Jorrín, A., Serrano, I. M., & Medina, R. (2006). The diagnostic usefulness of AUDIT and AUDIT-C for detecting hazardous drinkers in the elderly. *Aging & Mental Health*, *10*(5), 558–561.
- Gordon, R., Heim, D., & MacAskill, S. (2012). Rethinking drinking cultures: a review of drinking cultures and a reconstructed dimensional approach. *Public Health*, *126*(1), 3–11.
- Graham, K., Bernards, S., Knibbe, R., Kairouz, S., Kuntsche, S., Wilsnack, S. C., ... Gmel, G. (2011). Alcohol-related negative consequences among drinkers around the world. *Addiction*, *106*(8), 1391–1405.
- Greeley, J., & Oei, T. (1999). Alcohol and tension reduction. In K. Leonard & H. Blane (Eds.), *Psychological theories of drinking and alcoholism* (2nd ed., pp. 14–53). New York: The Guilford Press.
- Green, M. J., Leyland, A. H., Sweeting, H., & Benzeval, M. (2013). Socioeconomic position and adolescent trajectories in smoking, drinking, and psychiatric distress. *Journal of Adolescent Health*, *53*(2), 202–208.e2.
- Grittner, U., Kuntsche, S., Gmel, G., & Bloomfield, K. (2013). Alcohol consumption and social inequality at the individual and country levels--results from an international study. *European Journal of Public Health*, *23*(2), 332–9.
- Grittner, U., Kuntsche, S., Graham, K., & Bloomfield, K. (2012). Social inequalities and gender differences in the experience of alcohol-related problems. *Alcohol and Alcoholism*, *47*(5), 597–605.
- Gual, A., Segura, L., Contel, M., Heather, N., & Colom, J. (2002). Audit-3 and audit-4: effectiveness of two short forms of the alcohol use disorders identification test. *Alcohol and Alcoholism*, *37*(6), 591–596.

- Guitart, A. M., Espelt, A., Castellano, Y., Bartroli, M., Villalbi, J. R., Domingo-Salvany, A., & Brugal, M. T. (2011). [Impact of alcohol use disorder on mortality: are there age and gender differences?]. *Gaceta Sanitaria*, *25*, 385–90.
- Hallgren, M., Högberg, P., & Andréasson, S. (2009). *Alcohol consumption among elderly European Union citizens* (Vol. 21). Retrieved from <http://www.folkhalsomyndigheten.se/pagefiles/12338/alcohol-consumption-among-elderly-european-union-citizens-2009.pdf>
- Halperin, A. C., Smith, S. S., Heiligenstein, E., Brown, D., & Fleming, M. F. (2010). Cigarette smoking and associated health risks among students at five universities. *Nicotine & Tobacco Research*, *12*(2), 96–104.
- Harhay, M. O., Bor, J., Basu, S., McKee, M., Mindell, J. S., Shelton, N. J., & Stuckler, D. (2014). Differential impact of the economic recession on alcohol use among white British adults, 2004–2010. *European Journal of Public Health*, *24*(3), 410–415.
- Hastings, G., Brooks, O., Stead, M., Angus, K., Anker, T., & Farrell, T. (2010). Failure of self regulation of UK alcohol advertising. *BMJ*, *340*, b5650.
- Heckley, G. A., Jarl, J., Asamoah, B. O., & G-Gerdtham, U. (2011). How the risk of liver cancer changes after alcohol cessation: a review and meta-analysis of the current literature. *BMC Cancer*, *11*, 446.
- Heinz, A. J., Beck, A., Meyer-Lindenberg, A., Sterzer, P., & Heinz, A. (2011). Cognitive and neurobiological mechanisms of alcohol-related aggression. *Nature Reviews, Neuroscience*, *12*(7), 400–413.
- Helasoja, V., Lahelma, E., Prättälä, R., Petkeviciene, J., Pudule, I., & Tekkel, M. (2007). The sociodemographic patterning of drinking and binge drinking in Estonia, Latvia, Lithuania and Finland, 1994–2002. *BMC Public Health*, *7*, 241.
- Henkel, D. (2011). Unemployment and substance use: a review of the literature (1990–2010). *Current Drug Abuse Reviews*, *4*(1), 4–27.
- Hoaken, P. N. S., & Stewart, S. H. (2003). Drugs of abuse and the elicitation of human aggressive behavior. *Addictive Behaviors*, *28*(9), 1533–1554.
- Hodgson, R., Alwyn, T., John, B., Thom, B., & Smith, A. (2002). Manual for the Fast Alcohol Screening Test (FAST): Fast screening for alcohol problems. London: Health Development Agency.

- Hollingworth, W., Ebel, B. E., McCarty, C. A., Garrison, M. M., Christakis, D. A., & Rivara, F. P. (2006). Prevention of deaths from harmful drinking in the United States: the potential effects of tax increases and advertising bans on young drinkers. *Journal of Studies on Alcohol*, *67*(2), 300–308.
- Huber, E., Ragin, C., & Stephens, J. D. (1993). Social democracy, Christian democracy, constitutional structure, and the welfare state. *American Journal of Sociology*, *99*, 711–749.
- Jackson, K. M., Sher, K. J., Cooper, M. L., & Wood, P. K. (2002). Adolescent alcohol and tobacco use: onset, persistence and trajectories of use across two samples. *Addiction*, *97*(5), 517–531.
- Jernigan, D. H. (2009). The global alcohol industry: an overview. *Addiction*, *104 Suppl 1*, 6–12.
- Jernigan, D. H. (2012). Global alcohol producers, science, and policy: the case of the International Center for Alcohol Policies. *American Journal of Public Health*, *102*(1), 80–89.
- José, B. S., van Oers, H. A., van de Mheen, H. D., Garretsen, H. F., & Mackenbach, J. P. (2000). Stressors and alcohol consumption. *Alcohol and Alcoholism*, *35*(3), 307–312.
- Kalousova, L., & Burgard, S. A. (2014). Unemployment, measured and perceived decline of economic resources: contrasting three measures of recessionary hardships and their implications for adopting negative health behaviors. *Social Science & Medicine*, *106*, 28–34.
- Karanikolos, M., Mladovsky, P., Cylus, J., Thomson, S., Basu, S., Stuckler, D., ... McKee, M. (2013). Financial crisis, austerity, and health in Europe. *Lancet*, *381*(9874), 1323–1331.
- Karlsson, T., & Österberg, E. (2007). Scaling alcohol control policies across Europe. *Drugs: Education, Prevention, and Policy*, *14*(6), 499–511.
- Keyes, K. M., Hatzenbuehler, M. L., Grant, B. F., & Hasin, D. S. (2012). Stress and alcohol: epidemiologic evidence. *Alcohol Research: Current Reviews*, *34*(4), 391–400.
- Keyes, K. M., Li, G., & Hasin, D. S. (2011). Birth cohort effects and gender differences in alcohol epidemiology: a review and synthesis. *Alcoholism, Clinical and Experimental Research*, *35*(12), 2101–2112.

- Khantzian, E. J. (1997). The self-medication hypothesis of substance use disorders: a reconsideration and recent applications. *Harvard Review of Psychiatry*, 4(5), 231–244.
- Kim, J. H., Martins, S. S., Shmulewitz, D., Santaella, J., Wall, M. M., Keyes, K. M., ... Hasin, D. S. (2014). Childhood maltreatment, stressful life events, and alcohol craving in adult drinkers. *Alcoholism, Clinical and Experimental Research*, 38(7), 2048–2055.
- King, M. (1986). At risk drinking among general practice attenders: validation of the CAGE questionnaire. *Psychological Medicine*, 16(1), 213–217.
- Knibbe, R. A., Drop, M. J., & Muijtjens, A. (1987). Correlates of stages in the progression from everyday drinking to problem drinking. *Social Science & Medicine*, 24(5), 463–473.
- Knott, C. S., Coombs, N., Stamatakis, E., & Biddulph, J. P. (2015). All cause mortality and the case for age specific alcohol consumption guidelines: pooled analyses of up to 10 population based cohorts. *BMJ*, 350, h384.
- Krieger, N., Williams, D. R., & Moss, N. E. (1997). Measuring social class in US public health research: concepts, methodologies, and guidelines. *Annual Review of Public Health*, 18, 341–378.
- Kuendig, H., Plant, M. A., Plant, M. L., Miller, P., Kuntsche, S., & Gmel, G. (2008). Alcohol-related adverse consequences: cross-cultural variations in attribution process among young adults. *European Journal of Public Health*, 18(4), 386–391.
- Kuntsche, S., Knibbe, R. A., & Gmel, G. (2009). Social roles and alcohol consumption: a study of 10 industrialised countries. *Social Science & Medicine*, 68(7), 1263–1270.
- Kwate, N. O. A., & Meyer, I. H. (2009). Association between residential exposure to outdoor alcohol advertising and problem drinking among African American women in New York City. *American Journal of Public Health*, 99(2), 228–230.
- La Vecchia, C., Zhang, Z. F., & Altieri, A. (2008). Alcohol and laryngeal cancer: an update. *European Journal of Cancer Prevention*, 17(2), 116–124.
- Lachenmeier, D. W., Rehm, J., & Gmel, G. (2007). Surrogate alcohol: what do we know and where do we go? *Alcoholism, Clinical and Experimental Research*, 31(10), 1613–1624.

- Lachenmeier, D. W., Sarsh, B., & Rehm, J. (2009). The composition of alcohol products from markets in Lithuania and Hungary, and potential health consequences: a pilot study. *Alcohol and Alcoholism*, 44(1), 93–102.
- Lachenmeier, D. W., Taylor, B. J., & Rehm, J. (2011). Alcohol under the radar: do we have policy options regarding unrecorded alcohol? *International Journal on Drug Policy*, 22(2), 153–160.
- Lim, S. S., Vos, T., Flaxman, A. D., Danaei, G., Shibuya, K., Adair-Rohani, H., ... Memish, Z. A. (2012). A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet*, 380(9859), 2224–2260.
- Locke, T. F., & Newcomb, M. (2004). Child maltreatment, parent alcohol and drug-related problems, polydrug problems, and parenting practices: a test of gender differences and four theoretical perspectives. *Journal of Family Psychology*, 18(1), 120–134.
- Lönnroth, K., Williams, B. G., Stadlin, S., Jaramillo, E., & Dye, C. (2008). Alcohol use as a risk factor for tuberculosis - a systematic review. *BMC Public Health*, 8, 289.
- Mackenbach, J. P., Stirbu, I., Roskam, A. J., Schaap, M. M., Menvielle, G., Leinsalu, M., & Kunst, A. E. (2008). Socioeconomic inequalities in health in 22 European countries. *New England Journal of Medicine*, 358(23), 2468–2481.
- Mäkelä, P., Gmel, G., Grittner, U., Kuendig, H., Kuntsche, S., Bloomfield, K., & Room, R. (2006). Drinking patterns and their gender differences in Europe. *Alcohol and Alcoholism Supplement*, 41(1), i8-18.
- Mäkelä, P., Hellman, M., Kerr, W. C., & Room, R. (2011). A bottle of beer, a glass of wine, or a shot of whiskey? Can the rate of alcohol-induced harm be affected by altering the population's beverage choices? *Contemporary Drug Problems*, 38(4):599-619.
- Malter, F., & Börsch-Supan, A. (2013). *SHARE Wave 4: Innovations & Methodology*. Munich: MEA, Max Planck Institute for Social Law and Social Policy.
- Malter, F., & Börsch-Supan, A. (2015). *SHARE Wave 5: Innovations & Methodology*. Munich: MEA, Max Planck Institute for Social Law and Social Policy.

- Mann, R. E., Macdonald, S., Stoduto, L. G., Bondy, S., Jonah, B., & Shaikh, A. (2001). The effects of introducing or lowering legal per se blood alcohol limits for driving: an international review. *Accident; Analysis and Prevention*, *33*(5), 569–583.
- Marmot, M. G., & Bell, R. (2009). How will the financial crisis affect health? *BMJ*, *338*, b1314.
- Marsiglia, F. F., Kulis, S., Nieri, T., & Parsai, M. (2005). God forbid! Substance use among religious and non-religious youth. *American Journal of Orthopsychiatry*, *75*(4), 585–598.
- Matsuo, H., Billiet, J., Loosveldt, G., Berglund, F., & Kleven, Ø. (2010). Measurement and adjustment of non-response bias based on non-response surveys: the case of Belgium and Norway in the European Social Survey Round 3. *Survey Research Methods*, *4*, 165–178.
- Mattei, G., Ferrari, S., Pingani, L., & Rigatelli, M. (2014). Short-term effects of the 2008 Great Recession on the health of the Italian population: an ecological study. *Social Psychiatry and Psychiatric Epidemiology*, *49*(6), 851–858.
- Mayfield, D., McLeod, G., & Hall, P. (1974). The CAGE questionnaire: validation of a new alcoholism screening instrument. *American Journal of Psychiatry*, *131*(10), 1121–1123.
- McKinney, C. M., Caetano, R., Rodriguez, L. A., & Okoro, N. (2010). Does alcohol involvement increase the severity of intimate partner violence? *Alcoholism, Clinical and Experimental Research*, *34*(4), 655–658.
- Ministerio de Sanidad y Consumo. (2008). *Prevención de los problemas derivados del alcohol*. Madrid: Ministerio de sanidad y de consumo.
- Moos, R. H., Schutte, K. K., Brennan, P. L., & Moos, B. S. (2009). Older adults' alcohol consumption and late-life drinking problems: a 20-year perspective. *Addiction*, *104*(8), 1293–1302.
- Mossakowski, K. N. (2008). Is the duration of poverty and unemployment a risk factor for heavy drinking? *Social Science & Medicine*, *67*(6), 947–955.
- Nandi, A., Charters, T. J., Strumpf, E. C., Heymann, J., & Harper, S. (2013). Economic conditions and health behaviours during the “Great Recession.” *Journal of Epidemiology and Community Health*, *67*(12), 1038–1046.

- National Institute on Alcohol Abuse and Alcoholism. (2005). *Helping patients who drink too much: a clinician's guide*. Washington, D.C: US Department of Health & Human Services.
- Nelson, J. P. (2010). Alcohol advertising bans, consumption and control policies in seventeen OECD countries, 1975–2000. *Applied Economics*, 42(7), 803–823.
- Neve, R. J., Lemmens, P. H., & Drop, M. J. (1997). Gender differences in alcohol use and alcohol problems: mediation by social roles and gender-role attitudes. *Substance Use & Misuse*, 32(11), 1439–1459.
- Nolen-Hoeksema, S. (2004). Gender differences in risk factors and consequences for alcohol use and problems. *Clinical Psychology Review*, 24(8), 981–1010.
- Norström, T., & Romelsjö, A. (1998). Social class, drinking and alcohol-related mortality. *Journal of Substance Abuse*, 10(4), 385–395.
- Northcote, J., & Livingston, M. (2011). Accuracy of self-reported drinking: observational verification of “last occasion” drink estimates of young adults. *Alcohol and Alcoholism*, 46(6), 709–713.
- Oetting, E. R., Donnermeyer, J. F., & Deffenbacher, J. L. (1998). Primary socialization theory. The influence of the community on drug use and deviance. III. *Substance Use & Misuse*, 33(8), 1629–1665.
- Ortega, F. B., Brown, W. J., Lee, D., Baruth, M., Sui, X., & Blair, S. N. (2011). In fitness and health? A prospective study of changes in marital status and fitness in men and women. *American Journal of Epidemiology*, 173(3), 337–344.
- Popova, S., Rehm, J., Patra, J., & Zatonski, W. (2007). Comparing alcohol consumption in central and eastern Europe to other European countries. *Alcohol and Alcoholism*, 42(5), 465–473.
- Praud, D., Rota, M., Rehm, J., Shield, K., Zatoński, W., Hashibe, M., ... Boffetta, P. (2016). Cancer incidence and mortality attributable to alcohol consumption. *International Journal of Cancer*, 138(6), 1380–1387.
- Pringle, K. E., Ahern, F. M., Heller, D. A., Gold, C. H., & Brown, T. V. (2005). Potential for alcohol and prescription drug interactions in older people. *Journal of the American Geriatrics Society*, 53(11), 1930–1936.

- Puddey, I. B., Rakic, V., Dimmitt, S. B., & Beilin, L. J. (1999). Influence of pattern of drinking on cardiovascular disease and cardiovascular risk factors--a review. *Addiction*, *94*(5), 649–663.
- Rahav, G., Wilsnack, R., Bloomfield, K., Gmel, G., & Kuntsche, S. (2006). The influence of societal level factors on men's and women's alcohol consumption and alcohol problems. *Alcohol and Alcoholism Supplement*, *41*(1), i47-55.
- Rehm, J. (2011). The Risks Associated With Alcohol Use and Alcoholism. *Alcohol Research & Health*, *34*(2), 135–143.
- Rehm, J., Anderson, P., Barry, J., Dimitrov, P., Elekes, Z., Feijão, F., ... Gmel, G. (2015). Prevalence of and potential influencing factors for alcohol dependence in Europe. *European Addiction Research*, *21*(1), 6–18.
- Rehm, J., Baliunas, D., Borges, G. L., Graham, K., Irving, H., Kehoe, T., ... Taylor, B. (2010). The relation between different dimensions of alcohol consumption and burden of disease: an overview. *Addiction*, *105*(5), 817–843.
- Rehm, J., Mathers, C., Popova, S., Thavorncharoensap, M., Teerawattananon, Y., & Patra, J. (2009). Global burden of disease and injury and economic cost attributable to alcohol use and alcohol-use disorders. *Lancet*, *373*(9682), 2223–2233.
- Rehm, J., Rehn, N., Room, R., Monteiro, M., Gmel, G., Jernigan, D., & Frick, U. (2003). The global distribution of average volume of alcohol consumption and patterns of drinking. *European Addiction Research*, *9*(4), 147–156.
- Rehm, J., Room, R., Graham, K., Monteiro, M., Gmel, G., & Sempos, C. T. (2003). The relationship of average volume of alcohol consumption and patterns of drinking to burden of disease: an overview. *Addiction*, *98*(9), 1209–1228.
- Rehm, J., Room, R., Monteiro, M., Gmel, G., Graham, K., & Rehn, N. (2004). Alcohol use. In M. Ezzati, A. Lopez, A. Rodgers, & C. Murray (Eds.), *Comparative quantification of health risks. global and regional burden of disease attributable to selected major risk factors, vol. 1* (pp. 959–1108). Geneva: World Health Organization.
- Rehm, J., Room, R., van den Brink, W., & Jacobi, F. (2005). Alcohol use disorders in EU countries and Norway: an overview of the epidemiology. *European Neuropsychopharmacology*, *15*(4), 377–388.

- Rehm, J., Samokhvalov, A. V., Neuman, M. G., Room, R., Parry, C., Lönnroth, K., ... Popova, S. (2009). The association between alcohol use, alcohol use disorders and tuberculosis (TB). A systematic review. *BMC Public Health*, *9*, 450.
- Rehm, J., Shield, K. D., Rehm, M. X., Gmel, G., & Frick, U. (2012). Alcohol consumption, alcohol dependence and attributable burden of disease in Europe. *Centre for Addiction and Mental Health*. Retrieved from http://www.camh.ca/en/research/news_and_publications/reports_and_books/Documents/CAMH%20Alcohol%20Report%20Europe%202012.pdf
- Rehm, J., Sulkowska, U., Manczuk, M., Boffetta, P., Powles, J., Popova, S., & Zatonski, W. (2007). Alcohol accounts for a high proportion of premature mortality in central and eastern Europe. *International Journal of Epidemiology*, *36*(2), 458–467.
- Rehm, J., Taylor, B., & Patra, J. (2006). Volume of alcohol consumption, patterns of drinking and burden of disease in the European region 2002. *Addiction*, *101*(8), 1086–1095.
- Rehm, J., Zatonski, W., Taylor, B., & Anderson, P. (2011). Epidemiology and alcohol policy in Europe. *Addiction*, *106*, 11–19.
- Richter, M., Kuntsche, E., de Looze, M., & Pfortner, T.-K. (2013). Trends in socioeconomic inequalities in adolescent alcohol use in Germany between 1994 and 2006. *International Journal of Public Health*, *58*(5), 777–784.
- Riumallo-Herl, C., Basu, S., Stuckler, D., Courtin, E., & Avendano, M. (2014). Job loss, wealth and depression during the Great Recession in the USA and Europe. *International Journal of Epidemiology*, *43*(5), 1508–1517.
- Roerecke, M., & Rehm, J. (2012). The cardioprotective association of average alcohol consumption and ischaemic heart disease: a systematic review and meta-analysis. *Addiction*, *107*(7), 1246–1260.
- Roerecke, M., & Rehm, J. (2014). Chronic heavy drinking and ischaemic heart disease: a systematic review and meta-analysis. *Open Heart*, *1*(1), e000135.
- Ronsley, P. E., Brien, S. E., Turner, B. J., Mukamal, K. J., & Ghali, W. A. (2011). Association of alcohol consumption with selected cardiovascular disease outcomes: a systematic review and meta-analysis. *BMJ*, *342*, d671.

- Room, R., Babor, T., & Rehm, J. (2005). Alcohol and public health. *Lancet*, *365*(9458), 519–530.
- Rossow, I., & Norström, T. (2014). Heavy episodic drinking and deliberate self-harm in young people: a longitudinal cohort study. *Addiction*, *109*(6), 930–936.
- Ruhm, C. J. (1995). Economic conditions and alcohol problems. *Journal of Health Economics*, *14*(5), 583–603.
- Ruhm, C. J., & Black, W. E. (2002). Does drinking really decrease in bad times? *Journal of Health Economics*, *21*(4), 659–678.
- Sacco, P., Bucholz, K. K., & Spitznagel, E. L. (2009). Alcohol Use Among Older Adults in the National Epidemiologic Survey on Alcohol and Related Conditions: A Latent Class Analysis. *Journal of Studies on Alcohol and Drugs*, *70*(6), 829–838.
- Saffer, H., & Dave, D. (2006). Alcohol advertising and alcohol consumption by adolescents. *Health Economics*, *15*(6), 617–637.
- Samokhvalov, A. V., Irving, H., Mohapatra, S., & Rehm, J. (2010). Alcohol consumption, unprovoked seizures, and epilepsy: a systematic review and meta-analysis. *Epilepsia*, *51*(7), 1177–1184.
- Samokhvalov, A. V., Popova, S., Room, R., Ramonas, M., & Rehm, J. (2010). Disability associated with alcohol abuse and dependence. *Alcoholism, Clinical and Experimental Research*, *34*(11), 1871–1878.
- Sánchez-López, M. del P., Cuellar-Flores, I., & Dresch, V. (2012). The impact of gender roles on health. *Women & Health*, *52*(2), 182–196.
- Saunders, J., Aasland, O., Babor, T., De la Fuente, J., & Grant, M. (1993). Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO collaborative project on early detection of persons with harmful alcohol consumption-II, *88*, 791–804.
- Sayette, M. A. (1999). Does drinking reduce stress? *Alcohol Research & Health*, *23*(4), 250–255.
- Schou, L. A., Storvoll, E. E., & Moan, I. S. (2014). Alcohol-related sickness absence among young employees: gender differences and the prevention paradox. *European Journal of Public Health*, *24*(3), 480–485.
- Schuckit, M. A. (2009). Alcohol-use disorders. *Lancet*, *373*(9662), 492–501.

- Schulenberg, J. E., & Maggs, J. L. (2002). A developmental perspective on alcohol use and heavy drinking during adolescence and the transition to young adulthood. *Journal of Studies on Alcohol Supplement*, (14), 54–70.
- Schutze, M., Boeing, H., Pischon, T., Rehm, J., Kehoe, T., Gmel, G., ... Bergmann, M. M. (2011). Alcohol attributable burden of incidence of cancer in eight European countries based on results from prospective cohort study. *BMJ*, 342, d1584.
- Sen, G., Östlin, P., & George, A. (2007). *Unequal, unfair, ineffective and inefficient. Gender inequity in health: why it exists and how we can change it. Final Report to the WHO Commission on Social Determinants of Health. Women and Gender Equity Knowledge Network*. Geneva: WHO.
- Sher, K. J., Bartholow, B. D., Peuser, K., Erickson, D. J., & Wood, M. D. (2007). Stress-response-dampening effects of alcohol: attention as a mediator and moderator. *Journal of Abnormal Psychology*, 116(2), 362–377.
- Shield, K. D., Rylett, M., Gmel, G., Gmel, G., Kehoe-Chan, T. A. K., & Rehm, J. (2013). Global alcohol exposure estimates by country, territory and region for 2005—a contribution to the Comparative Risk Assessment for the 2010 Global Burden of Disease Study. *Addiction*, 108, 912–22.
- Shults, R. A., Elder, R. W., Sleet, D. A., Nichols, J. L., Alao, M. O., Carande-Kulis, V. G., ... Task Force on Community Preventive Services. (2001). Reviews of evidence regarding interventions to reduce alcohol-impaired driving. *American Journal of Preventive Medicine*, 21(4 Suppl), 66–88.
- Sigurdsson, S. O., Ring, B. M., O'Reilly, K., & Silverman, K. (2012). Barriers to employment among unemployed drug users: age predicts severity. *American Journal of Drug and Alcohol Abuse*, 38(6), 580–587.
- Simons-Morton, B. G., Farhat, T., ter Bogt, T. F. M., Hublet, A., Kuntsche, E., Nic Gabhainn, S., ... Kokkevi, A. (2009). Gender specific trends in alcohol use: cross-cultural comparisons from 1998 to 2006 in 24 countries and regions. *International Journal of Public Health*, 54 Suppl 2, 199–208.
- Siqueira, L., Smith, V. C., & Committee on Substance Abuse. (2015). Binge Drinking. *Pediatrics*, 136(3), e718-726.
- Skärlund, M., Åhs, A., & Westerling, R. (2012). Health-related and social factors predicting non-reemployment amongst newly unemployed. *BMC Public Health*, 12, 893.

- Smith, L. A., & Foxcroft, D. R. (2009). The effect of alcohol advertising, marketing and portrayal on drinking behaviour in young people: systematic review of prospective cohort studies. *BMC Public Health*, 9, 51.
- Solar O, & Irwin A. (2007). *A Conceptual Framework for Action on the Social Determinants of Health*. Geneva: WHO Commission on Social Determinants of Health.
- Stuckler, D., Basu, S., Suhrcke, M., Coutts, A., & McKee, M. (2009). The public health effect of economic crises and alternative policy responses in Europe: an empirical analysis. *Lancet*, 374(9686), 315–323.
- Talamini, R., Bosetti, C., La Vecchia, C., Dal Maso, L., Levi, F., Bidoli, E., ... Franceschi, S. (2002). Combined effect of tobacco and alcohol on laryngeal cancer risk: a case-control study. *Cancer Causes & Control*, 13(10), 957–964.
- Thavorncharoensap, M., Teerawattananon, Y., Yothasamut, J., Lertpitakpong, C., & Chaikledkaew, U. (2009). The economic impact of alcohol consumption: a systematic review. *Substance Abuse Treatment, Prevention, and Policy*, 4, 20.
- United Nations, Department of Economic and Social Affairs, Population Division. (2009). *World Population Ageing 2009*. New York.
- United Nations, Department of Economic and Social Affairs, Population Division. (2013). *World Population Ageing 2013*. New York.
- Uutela, A. (2010). Economic crisis and mental health. *Current Opinion in Psychiatry*, 23(2), 127–130.
- Valencia-Martín, J. L., Galán, I., & Rodríguez-Artalejo, F. (2007). Binge drinking in Madrid, Spain. *Alcoholism, Clinical and Experimental Research*, 31(10), 1723–1730.
- van Gils, P. F., Hamberg-van Reenen, H. H., van den Berg, M., Tariq, L., & de Wit, G. A. (2010). The scope of costs in alcohol studies: Cost-of-illness studies differ from economic evaluations. *Cost Effectiveness and Resource Allocation*, 8, 15.
- van Oers, J. A., Bongers, I. M., van de Goor, L. A., & Garretsen, H. F. (1999). Alcohol consumption, alcohol-related problems, problem drinking, and socioeconomic status. *Alcohol and Alcoholism*, 34(1), 78–88.

- Varkey, P., Mbbs, null, Kureshi, S., & Lesnick, T. (2010). Empowerment of women and its association with the health of the community. *Journal of Women's Health (2002)*, *19*(1), 71–76.
- Wagenaar, A. C., Salois, M. J., & Komro, K. A. (2009). Effects of beverage alcohol price and tax levels on drinking: a meta-analysis of 1003 estimates from 112 studies. *Addiction*, *104*(2), 179–190.
- Wagenaar, A. C., Tobler, A. L., & Komro, K. A. (2010). Effects of alcohol tax and price policies on morbidity and mortality: a systematic review. *American Journal of Public Health*, *100*(11), 2270–2278.
- Wagenaar, A. C., & Toomey, T. L. (2002). Effects of minimum drinking age laws: review and analyses of the literature from 1960 to 2000. *Journal of Studies on Alcohol Supplement*, (14), 206–225.
- Wahlbeck, K., & McDaid, D. (2012). Actions to alleviate the mental health impact of the economic crisis. *World Psychiatry*, *11*(3), 139–145.
- Wallace Jr, J. M., & Bachman, J. G. (1991). Explaining racial/ethnic differences in adolescent drug use: The impact of background and lifestyle. *Social Problems*, *38*, 333-357.
- Walsh, S. D., Djalovski, A., Boniel-Nissim, M., & Harel-Fisch, Y. (2014). Parental, peer and school experiences as predictors of alcohol drinking among first and second generation immigrant adolescents in Israel. *Drug and Alcohol Dependence*, *138*, 39–47.
- Wang, X., Steier, J. B., & Gallo, W. T. (2014). The effect of retirement on alcohol consumption: results from the US Health and Retirement Study. *European Journal of Public Health*, *24*(3), 485–489.
- Wang, Y.-P., & Andrade, L. H. (2013). Epidemiology of alcohol and drug use in the elderly. *Current Opinion in Psychiatry*, *26*(4), 343–348.
- Weathermon, R., & Crabb, D. W. (1999). Alcohol and medication interactions. *Alcohol Research & Health*, *23*(1), 40–54.
- Wilcox, H. C., Conner, K. R., & Caine, E. D. (2004). Association of alcohol and drug use disorders and completed suicide: an empirical review of cohort studies. *Drug and Alcohol Dependence*, *76 Suppl*, S11-19.
- Wilkinson, C., & Dare, J. (2014). Shades of grey: the need for a multi-disciplinary approach to research investigating alcohol and ageing. *Journal of Public Health Research*, *3*(1), 7–10.

- Wilsnack, R. W., Vogeltanz, N. D., Wilsnack, S. C., Harris, T. R., Ahlström, S., Bondy, S., ... Weiss, S. (2000). Gender differences in alcohol consumption and adverse drinking consequences: cross-cultural patterns. *Addiction, 95*(2), 251–265.
- Wilsnack, R. W., Wilsnack, S. C., Kristjanson, A. F., Vogeltanz-Holm, N. D., & Gmel, G. (2009). Gender and alcohol consumption: patterns from the multinational GENACIS project. *Addiction, 104*(9), 1487–1500.
- Woodin, E. M., Caldeira, V., Sotskova, A., Galaugher, T., & Lu, M. (2014). Harmful alcohol use as a predictor of intimate partner violence during the transition to parenthood: interdependent and interactive effects. *Addictive Behaviors, 39*(12), 1890–1897.
- World Health Organization. (1994). *Lexicon of Alcohol and Drug Terms*. Geneva: World Health Organization.
- World Health Organization. (2000). *International Guide for Monitoring Alcohol Consumption and Related Harm*. Geneva: WHO Division of Mental Health and Substance Abuse.
- World Health Organization. (2004). *Global Status Report: Alcohol Policy*. Switzerland: World Health Organization.
- World Health Organization. (2010). *Global strategy to reduce the harmful use of alcohol*. Geneva, Switzerland: World Health Organization.
- World Health Organization. (2011a). *Global status report on alcohol and health*. Geneva: World Health Organization.
- World Health Organization. (2011b). *Impact of economic crises on mental health*. Copenhagen, Denmark: World Health Organization. Regional Office for Europe.
- World Health Organization. (2014). *Global status report on alcohol and health 2014*. Geneva: World Health Organization.
- World Health Organization. (2016). WHO Global Information System on Alcohol and Health. Retrieved from http://www.who.int/substance_abuse/activities/gisah/en/
- Wu, L.-T., & Blazer, D. G. (2014). Substance use disorders and psychiatric comorbidity in mid and later life: a review. *International Journal of Epidemiology, 43*(2), 304–317.

- Zaridze, D., Lewington, S., Boroda, A., Scélo, G., Karpov, R., Lazarev, A., ... Peto, R. (2014). Alcohol and mortality in Russia: prospective observational study of 151,000 adults. *Lancet*, 383(9927), 1465–1473.
- Zeigler, D. W. (2009). The alcohol industry and trade agreements: a preliminary assessment. *Addiction*, 104 Suppl 1, 13–26

Appendix

Appendix 1: Collaboration in other articles on alcohol	185
a) Article 1	187
<u>Bosque-Prous M</u> , Kuipers MAG, Espelt A, Richter M, Rimpelä A, Perelman J, Federico B, Brugal MT, Lorant V, Kunst AE. Adolescent alcohol use and parental and adolescent socioeconomic position in six European cities. Eur J Public Health. Submitted	
b) Article 2	209
Espelt A, Mari-Dell'Olmo M, Penelo E, <u>Bosque-Prous M</u> . Applied prevalence ratio estimation with different regression models: An example from a cross-national study on substance use research. Adicciones 2016;823. [Epub ahead of print].	
c) Article 3	219
Suelves JM, Villalbí JR, <u>Bosque-Prous M</u> , Espelt A, Brugal MT. [Specialised treatment for alcohol abuse or dependence]. Rev Esp Salud Publica. 2014;88:541-9.	
d) Article 4	231
Villalbí JR, <u>Bosque-Prous M</u> , Gili-Miner M, Espelt A, Brugal MT. [Policies to prevent the harm caused by alcohol]. Rev Esp Salud Publica. 2014;88:515-28.	
e) Article 5	247
Villalbí JR, Bartroli M, <u>Bosque-Prous M</u> , Guitart AM, Serra-Batiste E, Casas C, Brugal MT. Enforcing regulations on alcohol sales and use as universal environmental prevention. Adicciones. 2015;27:288-93.	
Appendix 2: Presentation of results in congresses	255

APPENDIX 1

Collaboration in other articles on alcohol

OTHER ARTICLES

ARTICLE 1

Adolescent alcohol use and parental and adolescent socioeconomic position in six European cities

Bosque-Prous M, Kuipers MAG, Espelt A, Richter M, Rimpelä A, Perelman J, Federico B, Brugal MT, Lorant V, Kunst AE

Bosque-Prous M, Kuipers MAG, Espelt A, Richter M, Rimpelä A, Perelman J, et al. [Adolescent alcohol use and parental and adolescent socioeconomic position in six European cities](#). BMC Public Health. 2017 Dec 8;17(1):646. DOI: 10.1186/s12889-017-4635-7

OTHER ARTICLES

ARTICLE 2

Applied prevalence ratio estimation with different regression models: An example from a cross-national study on substance use research

Espelt A, Marí-Dell'Olmo M, Penelo E, Bosque-Prous M. [Applied Prevalence Ratio estimation with different Regression models: An example from a cross-national study on substance use research](#). *Adicciones*. 2016 Jun 14;29(2):105–12.

OTHER ARTICLES

ARTICLE 3

[Specialised treatment for alcohol abuse or dependence]

Suelves JM, Villalbí JR, Bosque-Prous M, Espelt A, Brugal MT. [Tratamiento especializado del abuso o dependencia del alcohol](#). Rev Esp Salud Publica. 2014 Aug;88(4):541–9. DOI: 10.4321/S1135-57272014000400008

OTHER ARTICLES

ARTICLE 4

[Policies to prevent the harm caused by alcohol]

Villalbí JR, Bosque-Prous M, Gili-Miner M, Espelt A, Brugal MT. [Políticas para prevenir los daños causados por el alcohol](#). Rev Esp Salud Publica. 2014 Aug;88(4):515–28. DOI: 10.4321/S1135-57272014000400006

OTHER ARTICLES

ARTICLE 5

**Enforcing regulations on alcohol sales and use
as universal environmental prevention**

Villalbí JR, Bartroli M, Bosque-Prous M, Guitart AM, Serra-Batiste E, Casas C, et al. [Enforcing regulations on alcohol sales and use as universal environmental prevention](#). *Adicciones*. 2015 Dec 15;27(4):288–93. DOI: 10.20882/adicciones.753

APPENDIX 2

Presentation of results in congresses

Bosque-Prous M, Espelt A, Guitart AM, Villalbí JR, Bartroli M, Brugal MT. Consumo de alcohol en personas de 50 a 64 años en 18 países de Europa. XXXI Reunión Científica de la SEE y I Congreso Ibero-americano de Epidemiología y Salud Pública. 2013

Bosque-Prous M, Espelt A, Guitart AM, Villalbí JR, Bartroli M, Brugal MT. Consumo de alcohol en europa y potencial influencia de variables individuales y contextuales. XXXII Reunión Científica de la SEE. 2014

Bosque-Prous M, Espelt A, Guitart AM, Bartroli M, Villalbí JR, Brugal MT. Influencia de la publicidad de las bebidas alcohólicas sobre el consumo de riesgo de alcohol en Europa. XLI Jornadas Nacionales de Socidrogalcohol. 2014

Bosque-Prous M, Espelt A, Borrell C, Bartroli M, Guitart AM, Villalbí JR, Brugal MT. Factores contextuales asociados a las diferencias de género en el consumo de riesgo de alcohol en personas de mediana edad de Europa. XLII Jornadas nacionales de Socidrogalcohol. 2015

Bosque-Prous M, Puertolas-Gracia B, Bartroli M, Lima KC, Villalbí JR, Brugal MT, Espelt A. Consumo de riesgo de alcohol en personas mayores de 50 años en Europa: situación en 2011-13. XLIII Jornadas nacionales de Socidrogalcohol. 2016

Bosque-Prous M, Kuipers MAG, Espelt A, Richter M, Rimpelä A, Perelman J, Federico B, Brugal MT, Lorant V, Kunst AE. Consumo de alcohol en adolescentes y posición socioeconómica en seis ciudades europeas. XLIII Jornadas nacionales de Socidrogalcohol. 2016

Espelt A, **Bosque-Prous M**, Pérez-Jiménez A, Sordo L, Brugal MT, Bravo MJ. Incidencia de consumo de riesgo de alcohol en europa en personas de 50 a 69 años. XXXII Reunión Científica de la SEE. 2014

Suelves JM, Villalbí JR, **Bosque-Prous M**, Espelt A, Brugal MT. Evolución del tratamiento especializado del abuso o dependencia del alcohol en la red de atención a las drogodependencias en barcelona y cataluña, 1991-2010. XXXI Reunión Científica de la SEE y I Congreso Ibero-americano de Epidemiología y Salud Pública. 2013

Villalbí JR, Bartroli M, **Bosque-Prous M**, Guitart A, Serra-Batiste E, Brugal MT, Casas C. Las regulaciones relativas a la venta y consumo de alcohol: ejercer la autoridad sanitaria como prevención ambiental. XXXII Reunión Científica de la SEE. 2014

Villalbí JR, Bartroli M, **Bosque-Prous M**, Guitart AM, Serra-Batiste E, Brugal MT, Casas C. Velar por el cumplimiento de las regulaciones relativas a la venta y consumo del alcohol como prevención ambiental. XLI Jornadas Nacionales de Socidrogalcohol. 2014

Villalbí JR, Espelt A, Suelves JM, Bartroli M, **Bosque-Prous M**, Teixidó-Compañó E, Brugal MT. Tratamiento del abuso y dependencia del alcohol: Barcelona, 1992-2012. XXXIII Reunión Científica de la SEE y II Congreso Ibero-americano de Epidemiología y Salud Pública. 2015