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Alcohol consumption and harmful drinking: Trends and social disparities across OECD countries

Marion Devaux,

Franco Sassi

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ALCOHOL CONSUMPTION AND HARMFUL DRINKING: TRENDS AND SOCIAL DISPARITIES ACROSS OECD COUNTRIES

Marion Devaux and Franco Sassi

JEL: I10, I12, I14

Authorised for publication by Stefano Scarpetta, Director, Directorate for Employment, Labour and Social Affairs

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ABSTRACT

Harmful alcohol consumption is one of the leading causes of ill health and premature mortality worldwide. This paper illustrates trends and social disparities in alcohol consumption and harmful drinking in 20 OECD countries. Analyses are based on individual-level data from national health and lifestyle surveys.

Alcohol consumption, on average, remained relatively stable in OECD countries over the past 20 years, but with significant variations between countries. However, a closer look at trends and patterns of consumption in specific population groups reveals a more complex picture. Young people are increasingly taking up harmful drinking. Women with high education and high socio-economic status are more likely to engage in harmful drinking than their less educated and less well-off counterparts, while the opposite is observed in men. Levels and patterns of alcohol consumption have an impact on labour market. Heavy alcohol consumption is associated with less employment opportunities, high wage penalties, and lower productivity, whereas light and moderate consumption are associated with positive labour market outcomes.

By shedding light on some of the dimensions of alcohol consumption in OECD countries, this paper aims at contributing to the design of appropriate health policies to prevent alcohol-related harms. The findings presented in the paper provide a basis for a quantitative assessment of the impacts of alternative policy options, and may contribute to a better targeting of such policies.

RÉSUMÉ

La consommation à risque d'alcool est l'une des principales causes de maladie et de mortalité prématurée dans le monde. Ce document de travail s'intéresse aux tendances et aux disparités sociales face à la consommation d'alcool et à la consommation à risque dans 20 pays de l'OCDE. Les analyses reposent sur des données individuelles d'enquêtes nationales de santé.

La consommation d'alcool est restée en moyenne relativement stable dans les pays de l'OCDE lors des 20 dernières années, malgré de grandes variations entre pays. Une analyse approfondie des tendances et des modes de consommation dans certains groupes de population révèle cependant un schéma plus complexe. Les jeunes adultes adoptent de plus en plus des modes de consommation à risque. Les femmes les plus éduquées ou avec un statut socioéconomique élevé ont davantage une consommation à risque que celles moins éduquées ou avec un statut socioéconomique plus faible, alors que la relation inverse est observée chez les hommes. Les niveaux et les modes de consommation d'alcool ont un impact sur le marché du travail. Une consommation à risque est associée à de plus faibles opportunités d'emploi, des pénalités de salaires plus importantes, et une plus faible productivité, alors qu'une consommation légère et modérée est associée à des résultats positifs.

Ce papier apporte un éclairage sur certaines dimensions de la consommation d'alcool dans les pays de l'OCDE, et aide ainsi à la définition de politiques de santé en matière de prévention des risques de la consommation d'alcool. Les résultats présentés dans ce document sont utiles à une évaluation quantitative de l'impact des politiques de prévention, et peuvent contribuer à un meilleur ciblage de ces politiques.

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SECTION 1. BACKGROUND

1. The impact of alcohol use on population health is complex to determine, as alcohol may both benefit and harm people. A moderate use of alcohol may have health and social benefits (Bray, 2005; Stampfer *et al.,* 2005). On the other hand, alcohol misuse is harmful to health and brings considerable social and economic costs (Rehm *et al.,* 2009).

2. Harmful alcohol use is responsible each year for about 2.3 million premature deaths worldwide (WHO, 2007). Deaths directly or indirectly attributable to alcohol consumption can derive from injuries and accidents, violence, suicides, or diseases caused by alcohol, such as, for instance, cardiovascular diseases, cancers of mouth and oesophagus, and liver cirrhosis (Burki, 2010). Evidence of a statistical relationship between alcohol use and increased risk of a range of diseases is strong (Anderson *et al*., 1993; Byrne *et al*., 2004). A systematic review of existing studies concluded that the average volume of alcohol consumed is causally linked to many disease outcomes, as well as accidents and injuries (Rehm *et al*., 2010a). The review found a dose-response relationship linking alcohol use with a number of cancers, diabetes mellitus, alcohol use disorders, unipolar depressive disorders, epilepsy, hypertensive heart disease, ischaemic heart disease (IHD), ischaemic and haemorrhagic stroke, conduction disorders and other dysrhythmias, lower respiratory infections (pneumonia), cirrhosis of the liver, preterm birth complications and foetal alcohol syndrome.

3. This report aims to study alcohol consumption in OECD countries, including any alcohol drinking and harmful use of alcohol, by examining time-trends and social disparities in drinking patterns. Harmful alcohol use refers to any pattern of consumption that is dangerous for health. These patterns include (i) hazardous drinking which is defined as a consumption above a certain amount of alcohol, and (ii) heavy episodic drinking -also called binge drinking- which is related to a large quantity of drinks consumed over a short period of time.

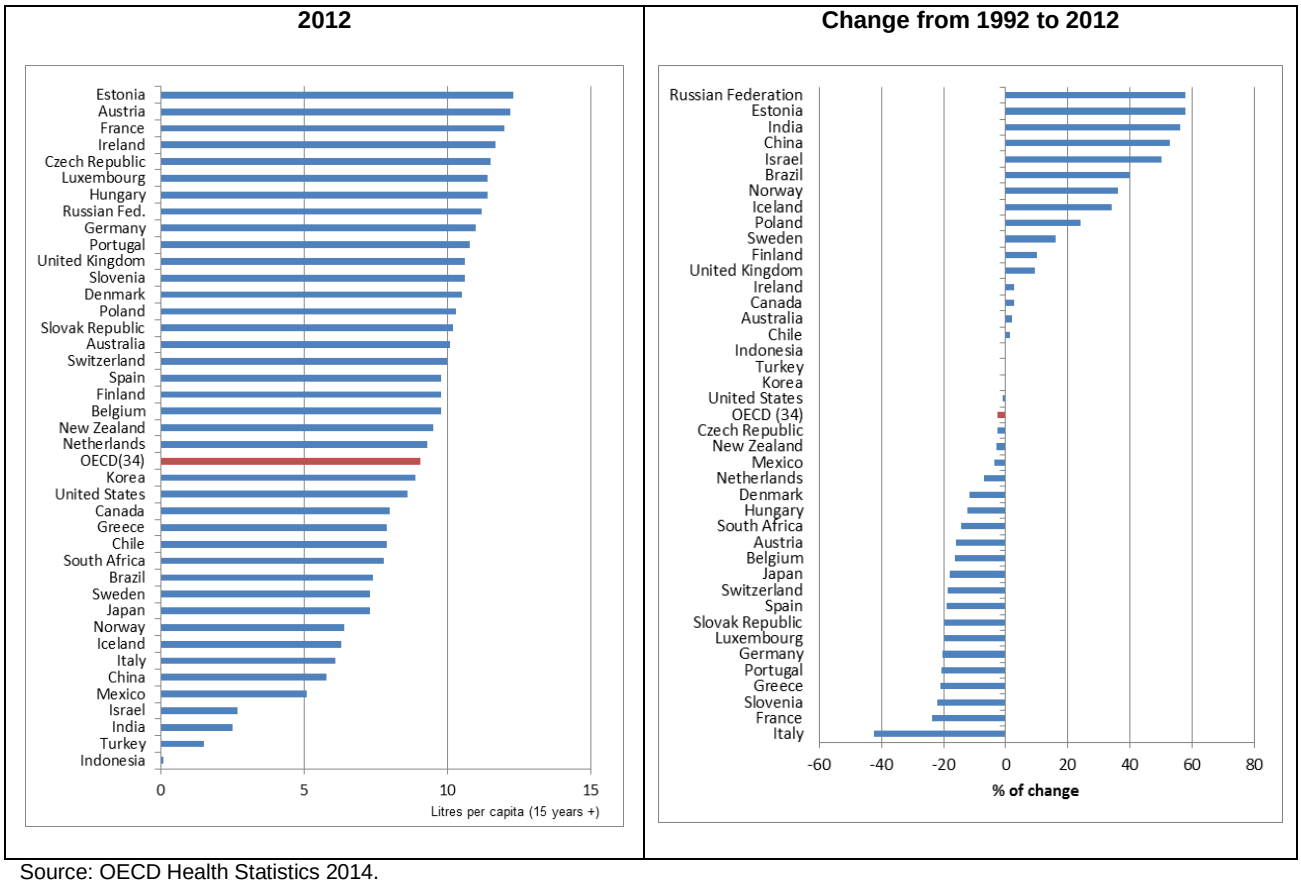
4. This document presents the background work and the full set of analyses that served to fuel the content of chapters 2 and 3 of the OECD publication on Tackling Harmful Alcohol Use (OECD, 2015). Section 1 gives an insight into existing evidence for time-trends and social disparities. Section 2 presents the data and methods used in the analyses. Section 3 and 4 presents findings on time-trends and social disparities respectively. Section 5 reviews the literature about the impact of alcohol consumption on labour market outcomes. Section 6 discusses the findings and concludes the paper.

1.1. Trends in alcohol consumption based on aggregate national data

5. The OECD regularly collects from its member countries data on alcohol consumption defined as annual sales of pure alcohol in litres per person aged 15 years and over. Data sources are mostly national statistical institutes, except for eleven countries for which the WHO Global Information System on Alcohol and Health is used (Belgium, Chile, Germany, Greece, Iceland, Israel, Italy, Luxembourg, Portugal, Spain, and UK). The methodology to convert alcoholic drinks to a more readily comparable metric of pure alcohol may differ across countries. Typically beer is weighted as 4-5%, wine as 11-16% and spirits as 40% of pure alcohol equivalent. In the OECD area, the consumption of alcohol is, on average, around 9.1 litres per capita per year in 2012 (Figure 1). Consumption of alcohol per capita over the period 1992-2012, on average, decreased by 2.5% in the OECD area, although consumption increased

in several Northern European OECD countries (Estonia, Finland, Iceland, Norway, and Sweden) as well as in Poland and Israel, by up to 50%. Concerning OECD key partner countries, it is worth noting that alcohol consumption in the Russian Federation, Brazil, China and India rose substantially, although in the latter two countries consumption per capita is still comparatively low.

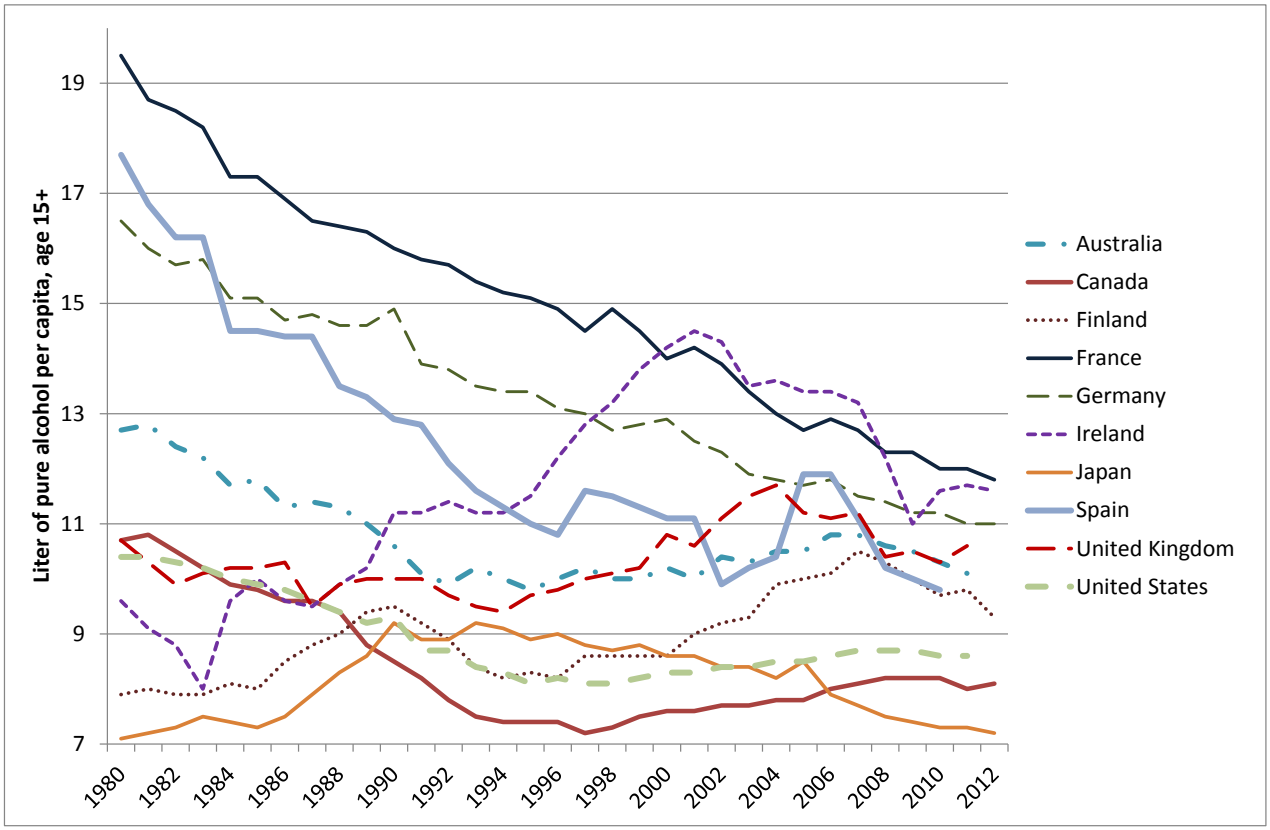
Figure 1. Alcohol consumption in litres per capita among population aged 15 and over, 1992 and 2012 (or nearest year), OECD area and key partners



Source: OECD Health Statistics 2014.

6. A closer look at trends in alcohol level per capita reveals a steady decrease over the past 30 years in countries where consumption was originally higher such as France, Italy, Spain, and Germany (Figure 2). In originally lower-consumption countries, data shows a continuous increase followed by a downturn in the latest years (e.g., Ireland, Finland, and the UK).

Figure 2. Evolution of alcohol consumption, 1980 and 2012, 10 selected OECD countries



Source: OECD Health Data 2014

7. Based on data from the Global Survey on Alcohol and Health (WHO, 2014), adult per capita alcohol consumption is about 6.2 litres on average worldwide, and about 9.6 litres in the high-income countries. Total adult per capita alcohol consumption is an estimate of recorded and unrecorded adult per capita consumption of pure alcohol in 2010. Unrecorded alcohol is defined as "*alcohol that is not taxed and is outside the usual system of governmental control, because it is produced, distributed and sold outside formal channels*" –it refers to homemade or illegally produced alcohol. Unrecorded alcohol consumption is estimated based on empirical investigations and expert judgements. The highest unrecorded consumption figures among OECD and key partner countries is 3.6 litres per capita in the Russian Federation. Thus, WHO total (recorded and unrecorded) estimates may significantly differ from OECD figures.

8. Worldwide, per capita alcohol consumption in adults remained stable in the last 20 years, but increased over the last five years (WHO, 2011, 2014), while alcohol use in the European Region decreased in the same period. In younger people, some data show increasing trends in alcohol consumption, in particular in low and middle income countries (WHO, 2011). Regarding European countries, the ESPAD study[1] shows small decreases from 2003 through 2007 to 2011 in the proportion of students who consume alcohol, and it finds increases of heavy episodic drinking from 1995 to 2007 with some sign of downturn in 2011 (Hibell *et al.*, 2012).

[1] The European School Survey Project on Alcohol and other Drugs (ESPAD) was carried out in 1995, 1999, 2003, 2007, and 2011. It focus on students aged 15-16.

9. Several reasons for these increases were suggested, including: the low cost of alcoholic beverages, the wider availability of alcohol, alcohol promotion designed for younger drinkers, and the acceptability of drinking in many societies. Burki (2010) discusses possible causes for the increases in average consumption and highlights a correlation between consumption and affordability (and availability) of alcohol, citing a report by the British Medical Association which shows a higher affordability of alcohol in the UK between 1980 and 2006, and an increase in per capita alcohol consumption of 1.5 l during the same period of time. Popova et al. (2009) review studies published from 2000 to 2008 focusing on availability of alcohol and found that hours and days of sale and density of alcohol outlets have an impact on overall alcohol consumption, drinking patterns and alcohol-related problems. Temptation of alcohol use for young people has increased over years, with the younger more frequently and at a younger age exposed to the promotion of alcoholic drinks (Hope, 2013). Exposure to alcohol marketing increases the likelihood of drinking initiation and adolescent's alcohol use (Anderson et al., 2009; Jones and Magee, 2011) and is associated with alcohol-related problems later in adolescence (Grenard et al., 2013). Evidence from Germany, Italy, the Netherlands and Poland shows that a higher exposure to online alcohol marketing increases the odds of heavy episodic drinking in adolescents (de Bruijn, 2012).

10. Existing aggregate sources and estimates of alcohol consumption provide the most reliable information to determine broad national trends and draw country profiles of alcohol consumption. However, their aggregate nature does not permit to identify and examine individual patterns of drinking. To design appropriate policies, it is necessary to understand how harmful forms of drinking evolved over time, and to identify which population groups are most likely to engage in, and what are most affected by, harmful drinking. Such analyses help policy makers to target population groups for strategies to reduce harmful drinking. Population health and lifestyle survey data providing information on alcohol consumption and individual characteristics are then best suited for assessing heterogeneous drinking behaviours, although these surveys do suffer from important limitations, which are discussed later in this paper.

11. National health survey data provide information on individual quantity and frequency of drinking. However, analysing drinking patterns based on only one of these dimensions may be misleading. For instance, frequent light consumption has clearly different health and societal impacts compared with frequent heavy consumption. Similarly, there are differences between hazardous drinking resulting from frequent moderate drinking and that resulting from infrequent drinking in large quantities. Thus, caution must be taken when defining the outcome variables of interest in analyses of alcohol consumption.

1.2. Evidence of social disparities in drinking based on individual-level data

1.2.1. Drinking by gender, age and ethnicity

12. Patterns of drinking may differ by age, gender, ethnicity and socioeconomic status (SES). The international literature on such patterns is vast and findings do not always appear consistent, largely due to the different measures of drinking used as outcomes in the analyses.

13. There is evidence that alcohol consumption varies with age, showing in particular a decrease with age (McKee *et al.*, 2000). In New Zealand, the frequency of drinking increased over early adult years and the quantities consumed peaked at age 21 and decreased thereafter for both men and women (Casswell *et al.*, 2003). Harmful forms of consumption, like Heavy Episodic Drinking (HED), were found to be more prevalent in younger age groups in the US (Kanny *et al.*, 2011). Grittner *et al.* (2013) confirmed in a meta-analysis covering 33 countries that young and middle-aged people are more likely to consume alcohol than older adults, and younger people are more likely to engage in HED.

14. Numerous international studies found gender differences in drinking. Men are more often drinkers and consume more alcohol than women. Smaller gender differences found in drinking are in northern, followed by western and central European countries, with the largest gender differences in countries with less developed economies (Bloomfield *et al*., 2006), and gender differences in drinking behaviour are smaller in countries with greater overall gender equality. Also, gender differences in drinking are intertwined with educational and socioeconomic gradients in harmful drinking patterns (Bloomfield *et al.,* 2006; Kuntsche *et al.,* 2006; Huerta and Borgonovi, 2010; Grittner *et al.,* 2013).

15. However, the gender gap tends to narrow as women's drinking behaviours increasingly resemble men's, and overall drinking patterns in men and women tend to develop similarly. This trend should be viewed in the context of changes in cultural and social norms, including changes in women's social position in societies as well as new market forces (e.g. market products directed towards women).

16. There is also evidence of disparities in harmful drinking behaviours by ethnic group. In the US, non-Hispanic Whites display higher prevalence of HED compared to Hispanics, non-Hispanic Blacks, and Asians/Native Hawaiians/Pacific Islanders, but no statistical difference with American Indians/Alaska Natives (Kanny *et al.,* 2011). While the frequency of HED is similar across ethnic groups, the quantity consumed differs, with American Indians/Alaska Natives heavy episodic drinkers reporting the largest number of drinks per occasion. In Australia, while Aboriginal and Torres Strait Islanders peoples are less likely to be current alcohol drinkers compared to the general population, those who do drink are more likely to do so at risky levels. Evidence suggests that rates of harmful consumption of alcohol among Indigenous Australians are generally twice those in the non-Indigenous population (Gray and Wilkes, 2010). In the UK, most minority ethnic groups (for instance, people from Pakistani, Bangladeshi and Muslim backgrounds) have higher rates of abstinence and lower drinking levels compared to people from white backgrounds, although drinking patterns vary both between and within minority ethnic groups (Hurcombe *et al*, 2010). These differences are associated with strong ethnic identity, strong family and local community ties, continuing links with the host country and maintaining religious values.

17. Patterns of alcohol consumption are also 'bound up in issues of cultural identity' (Burki, 2010). A substantial literature refers to cultures from an international perspective – where drinking is seen to vary according to regions; e.g. the 'Anglo-Saxon' and 'Latin' cultures (cf. below in Section 3).Also, it is likely that separate identifiable cultures may exist within a country, especially given the existence of immigrant households, and religion. It is difficult to empirically test these influences, due to problems defining culture and to the effect of confounding factors, such as socioeconomic status.

1.2.2. Relationship between education and alcohol consumption

18. Many studies looked at the association between education and patterns of alcohol drinking. However, this association varies by gender and with the choice of drinking outcome (e.g. any alcohol consumption vs. harmful consumption; frequency vs. quantity; etc.). For instance, there is evidence of a positive association between education and the frequency of consumption but also of a negative association between education and heavy drinking (Bloomfield *et al.,*2006; Caldwell *et al.,* 2008; Casswell *et al.,* 2003).

19. A strong positive link between educational attainment and frequency of alcohol consumption as well as life-time drinking problems is found in women in England, while no such association exists in men (Huerta and Borgonovi, 2010). Besides, academic performance in childhood is linked with alcohol abuse in both men and women, but to a lesser degree in men.

20. Less educated men are more likely to be hazardous drinkers, according to the prevailing pattern in a range of countries (Bloomfield *et al.,* 2006; Kuntsche *et al*., 2006). In a smaller number of countries,

men with low and average education were more likely to be heavy episodic drinkers than their more educated counterparts (Bloomfield *et al.,* 2006). This is consistent with findings for men in the United States, where those with higher levels of education reported fewer days with 5 or more drinks consumed (Kerr *et al.,* 2008). In the Baltic countries (Latvia, Lithuania and Estonia) and Finland, education was found to be negatively associated with alcohol abuse in men, but positively associated with heavy drinking, but not HED, in women (Helasoja *et al.,* 2007). In the Czech Republic, men, single persons and people with low education were found to be at higher risk of hazardous alcohol drinking (Dzurova *et al.,* 2010).

21. Conversely, the literature shows an opposite pattern for women, with the higher educated more likely to be hazardous drinkers. In Austria, France, Germany, the Netherlands, and Switzerland, women with higher education were more likely to be hazardous drinkers (Bloomfield *et al.,* 2006). This trend in women is confirmed in Germany, France Switzerland, and Norway, whereas in the Czech Republic, Finland, Hungary, and Sweden, less educated women were more likely to be hazardous drinkers (Kuntsche *et al.,* 2006).

22. In a meta-analysis of 33 countries, part of the GENACIS[2] project, men and women with greater education were found to be more likely to consume alcohol than their counterparts with less education. Concerning HED, results were more mixed. Education was negatively correlated with HED for men. Similarly, higher education leads to lower HED among women in higher income countries, whereas the opposite is true in lower income countries, possibly due to the diffusion of innovative patterns of HED among women (Grittner *et al.,* 2013). The authors suggest that high-SES women adopt men's behaviours and then they diffuse the new patterns of drinking to all classes of women, this diffusion being achieved in high income countries and being in process in low income countries.

1.2.3. Relationship between socioeconomic status and alcohol consumption

23. The relationship between SES and alcohol consumption is complex. Some studies found that people with a less privileged socioeconomic background drink more (Kuntsche *et al*, 2004; Leigh, 1996; Mossakowski, 2008), whereas others found the opposite (Grossman *et al*, 1995; Maggs *et al.*, 2008; NHS, 2008; McKee *et al.*, 2000). Some of the inconsistencies between findings may be explained by the wide variety of definitions of drinking used (e.g. weekly or monthly frequency of heavy drinking) and by the variety of definitions of socioeconomic background used (e.g. income, occupation, employment status).

24. In addition, the relationship between SES and drinking behaviours is difficult to study, as it may be influenced by a large number of factors such as, among other things, individual sensitivity to prices and price changes within countries.

25. Regarding any alcohol drinking, various findings seem to converge. In a number of countries (Switzerland, Germany, France, United Kingdom, Sweden, Finland, Czech Republic and Hungary) both men and women with higher incomes were found to be more likely to consume alcohol (Kuntsche *et al.*, 2006). Similar findings were reported based on data from Estonia, Latvia, and Lithuania (Mc Kee *et al.* 2000), with women in the highest income group being more likely to consume alcohol compared to women in the middle or lowest income group. Likewise, young people with higher incomes tend to drink more often, and this feature is persistent over time (Casswell *et al.*, 2003).

26. Regarding harmful drinking behaviours, a US study showed that HED was more prevalent in people with higher incomes compared to those with lower incomes. But once they engaged in HED, people with lower incomes did so more frequently and consumed larger numbers of drinks (Kanny *et al.,* 2011).

[2] GENASIS stands for Gender, alcohol and culture: an international study.

SECTION 2. DATA SOURCE AND METHODS

27. This section consists of three parts. The first part deals with the available data sources. The second part discusses data limitations. The third part presents the methodology used in the statistical analyses.

2.1. Data sources

28. This part deals with the available data sources, including a presentation of the 20 OECD countries studied, definitions of drinking patterns used, and a description of socio-demographic variables used in the analyses.

2.1.1. Presentation of the 20 OECD countries studied

29. Data were gathered from several waves of national health interview surveys for 20 OECD countries: Australia, Canada, Chile, Czech Republic, England, Finland, France, Germany, Hungary, Ireland, Italy, Japan, Korea, New Zealand, Portugal, Slovak Republic, Slovenia, Spain, Switzerland, and the US. These countries were selected on the basis of data availability and country willingness to participate in the project.

30. Health interview surveys generally gather information on individual socio-demographic characteristics, living and working conditions, perceived and objective health status (e.g. acute and chronic diseases), related-health behaviours (e.g. smoking, drinking, physical activity, aspect of diet), utilisation of health services (e.g. doctor consultation, preventive screening). Table 1 presents the list of national surveys used and the number of waves available for each country.

31. The use of different national surveys for several years may be a source of data heterogeneity across countries and over time, although all the variables are constructed in order to get the highest level of comparability across countries. International comparisons in alcohol consumption need to rely on a common measure of alcohol level. Each country has its own definition of a standard drink (how much pure alcohol it contains) and its own recommendation for hazardous drinking limits (defined as number of glasses or amount of pure alcohol per day or per week) (see Table 2). While some countries do not have official recommendations, others set national guidelines for maximum weekly and/or daily consumption, either expressed in standard drinks or grams of pure alcohol (Furtwaengler and de Visser, 2013). To overcome this problem, we transformed the various measures of frequency and quantity of alcohol drunk into a common measure of quantity in grams of pure alcohol per day.

Table 1. List of survey data

Country	Survey name	Available survey waves
Australia	National Health Survey	1989-90, 1995, 2001, 2004-05, 2007-08
Canada	National Health Population Survey and Canadian Community Health Survey	1994/95, 2000/01, 2003, 2005, 2007/08, 2009/10, 2011/12
Chile	Servicio Nacional de Drogas y Alcohol (ex-CONACE)	2008, 2010
Czech Republic	European Health Interview Survey in the Czech Republic (EHIS)	2008
England	Health Survey for England	1991--2011 (every year)
Finland	Finrisk	1997, 2002, 2007
France	Enquête Santé et Protection Sociale	2002, 2004, 2006, 2008, 2010
Germany	Epidemiological Survey on Substance Abuse	1995, 1997, 2000, 2003, 2006, 2009
Hungary	European Health Interview Survey (EHIS)	2009
Ireland	Survey on Lifestyle And Nutrition	1998, 2002, 2007
Italy	Multiscopo Aspect of Daily Life	2005,2006, 2007, 2008, 2009, 2010
Japan	National Survey on Alcohol Drinking and Lifestyle	2003, 2008
Korea	Korean National Health and Nutrition Examination Survey	2008
New Zealand	National Health Survey	1996/97, 2002/03, 2006/07
Portugal	General Population Survey on Psychoactive Substances	2007
Slovak Republic	Európsky prieskum zdravia 2009 (EHIS)	2009
Slovenia	Anketa o zdravju in zdravstvenem varstvu 2007 (EHIS)	2007
Spain	Encuesta Nacional de Salud de Espana	2006
Switzerland	Swiss Health Survey	1992, 1997, 2002, 2007
United States	National Health and Nutrition Examination Survey / and National Survey on Drug Use and Health	NHANES: 1999/2000, 2001/02, 2003/04, 2005/06, 2007/08, 2009/10 NSDUH: 1999-2009

Note: All survey editions were used for trends analysis while only the most recent years (underlined) are used for disparity analysis. Data sources are detailed in Annex 1. (*) In England, the most recent data reporting hazardous drinking are 2001-2002 followed by 2011, and those reporting HED are 2010-2011. EHIS stands for European Health Interview Survey.

2.1.2. Definitions of alcohol drinking variables

32. The drinking variables are derived from national survey questions, if data permits. More detail of data is available in Annex 2. The variables of interest are:

- Drinking status, indicating whether people drank alcohol in the past 12 months or were abstainer. This variable is available over time in nearly all countries.

- Hazardous drinking, corresponding, in this study, to weekly amount of pure alcohol of 140 grams or more for women and 210 grams or more for men. This measure refers to the limits above which people are at risk for their health as defined in a number of countries. Other studies may use different thresholds[3]. For the purpose of our analysis, since most of the 20 countries studied have national guidelines set around 20g pure alcohol daily for women and 30g for men, we chose to use these cut-offs.

- Heavy Episodic Drinking (HED), also called binge drinking, is reported in most of national surveys. Usually, it is in the form: *In the past 12 months, how often did you have 5 or more drinks on one occasion?*, one occasion referring to a drinking session. The threshold varies across countries[4] (5 drinks in Canada, Germany, and the US; 6 drinks in Chile, Czech Republic, France, Hungary, Ireland, Italy, and Switzerland for instance; 7 drinks for men and 5 drinks for women in Australia[5]). This study focuses on regular HED i.e. that happens at least once a week.

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3 The WHO uses four risk drinking groups founded on epidemiological evidence (Rehm and Eschmann, 2002; Rehm *et al.*, 2004). The first group refers to abstainers. Category I indicates drinkers at low risk (below 20g of pure alcohol daily for women and 40g for men). Category II consists of alcohol use at risk for health (≥20-40g for women and ≥40-60g for men). Category III consists of alcohol consumption that is already causing harm to the drinker, who may also have symptoms of dependence (≥40g for women and ≥60g for men). Despite this, most countries have different national guidelines for hazardous drinking (see the thresholds in Table 2).

4 The definition of HED mainly depends on national survey questions. Discrepancies are found in HED thresholds among countries due to the alcohol content of a standard drink which varies across countries. For instance, HED is defined above 68g of pure alcohol per occasion in Canada, versus 60g in Ireland (see Table 2)

5 The definition of HED in Australia is derived from the NHMRC 2001 Guidelines. The guideline has been updated and since 2009 the guideline has been: "For healthy men and women, no more than four standard drinks on a single occasion reduces the risks of alcohol related injury arising from that occasion".

Table 2. National drinking guidelines in OECD countries

Country	Quantity in grams of pure alcohol contained in a standard drink National definition	Hazardous drinking limit (limit above which people are at risk for their health) National guidelines	Heavy episodic drinking limit (maximum recommendations for the number of drinks per drinking occasion) National guidelines and definition in national survey
Australia	10g	>2 drinks per day (20g)	Guideline: >4 drinks per occasion (40g) Questionnaire NHS: men: 7+ / women: 5+ drinks in a day (70/50g); more recently: 4+ drinks per occasion (40g)
Austria [1]	8g	Men: >3 drinks/ day (>24g/day) Women : >2 drinks/ day (>16g/day)	Guideline: not defined
Belgium	not defined	Not defined	Guideline: not defined
Canada	13.6g	Men: >3 drinks/ day and up to 15 drinks/week (>30g/day) Women: >2 drinks/ day and up to 10 drinks/week (>20g/day)	Guideline (2012): men: 4+ / women: 3+ drinks per occasion (54/41g) Questionnaire: 5+ drinks per occasion (68g)
Chile	13-15.5g	Men: >4 drinks per day (>52-62g/day) Women : >3 drinks per day (>39-46.5g/day)	Guideline: 5+ drinks per occasion (>69g); Questionnaire SENDA: 6+ drinks per occasion, other survey: 5+ drinks per occasion
Czech Republic [2]	16g	Men: > 40g/day. Women: > 20g/day.	Guideline: not defined Questionnaire: 5+ drinks per occasion (80g)
Denmark [3]	12g	Men: >2 drinks per day (24g) Women : >1 drinks per day (12g)	Guideline: 4+ drinks per occasion (48g)
Estonia	10g	Men: >4 drinks per day (40g), at least 3 alcohol-free days in a week, Women : >2 drinks per day (20g), at least 3 alcohol-free days in a week	Guideline: not defined Questionnaire: 6+ drinks per occasion (60g)
Finland	12g	Men: 2 drinks per day (24g) Women: 1 drink per day (12g) *High risk in clinical guidelines issued by Medical Association: Men: >24 drinks/week (>40g/day) Women : >16 drinks/ week (>27 g/day)*	Guideline: no guideline *but men: 7+ / women: 5+ defined as high risk in clinical guidelines issued by Medical Association* Questionnaire: men 7+ / women 5 + drinks per occasion (84/60g)
France [4]	10g	Men: >3 drinks per day (30g) Women : >2 drinks per day (20g)	Guideline: not defined Questionnaire: 6+ drinks per occasion
Germany	12g	Men: >24g per day Women : >12g per day, no more than 5 days a week	Guideline: not defined Questionnaire: 5+ drinks per occasion (60g)
Greece	10g	Men: >3 drinks per day (30g) Women : >2 drinks per day (20g)	Guideline: not defined
Hungary	12g/16g	Men: >3 drinks per day (36-48g) Women : >2 drinks per day (24-32g)	Guideline: not defined Questionnaire: 6+ drinks per occasion (72-96g)
Iceland	12g	not defined [6]	Guideline: not defined
Ireland	10g	Men: >17 drinks per week ~2.4 drinks per day (24g) Women: >11 drinks per week ~1.6 drinks per day (16g)	Guideline: 6+ drinks per occasion (60g) Questionnaire: 6+ drinks per occasion (60g)
Israel	14g	Men: >3 drinks per day (30g) Women : >2 drinks per day (20g)	Guideline: not defined
Italy	12g	Men: >2-3 drinks per day (24-36g) Women : >1-2 drinks per day (12-24g)	Guideline: not defined Questionnaire: 5/6+ drinks per occasion (60-72g)

Note: National guidelines for hazardous drinking limit relate to general population and may not refer to specific groups (like pregnant women). (1) In Austria, no official definition of the content of standard drink and drinking limits. (2) No official guideline, the only relevant limits can be deducted from national survey questionnaires. (3) Denmark has low-risk and high-risk drinking limits. Definition of hazardous drinking here corresponds to low-risk drinking. (4) In France, the quantity mentioned is the maximum quantity but less is better. For pregnant women, the recommendation is zero alcohol. (5) In Iceland, in clinical guidelines for primary health care, there is a criteria for reference at 21 units for male and 14 units for female a week. This is though not a published or advertised recommendations.

Table 2. National drinking guidelines in OECD countries (cont.)

Country	Quantity in grams of pure alcohol contained in a standard drink National definition	Hazardous drinking limit (limit above which people are at risk for their health) National guidelines	Heavy episodic drinking limit (maximum recommendations for the number of drinks per drinking occasion) National guidelines and definition in national survey
Japan	10g	Men: >= 4 drinks per day (40g) Women: >=2 drinks per day (20g)	Guideline: not defined Questionnaire: 7+ drinks per occasion
Korea [6]	8.5g	Men: 14 unit per one week Women : 10 unit per one week	Guideline: not defined Questionnaire: men: 7+ / women: 5+ drinks per occasion
Luxembourg	12g	Men: >2 drinks per day (24g) Women : >1 drinks per day (12g)	Guideline: 5+ drinks per occasion (60g) Questionnaire: 5+ drinks per occasion (60g)
Mexico	not defined [7]	not defined [7]	Guideline: not defined Questionnaire: 5 or more drinks per one occasion for male; 4 or more drinks per one occasion for female
Netherlands	10g	Men: >2 drinks per day (20g) Women : >1 drinks per day (10g)	Guideline: not defined
New Zealand	10g	Men: >3 drinks per day (30g) and no more than 15 per week Women : >2 drinks per day (20g) and no more than 10 per week	Guideline: men: 5+ / women: 4+ drinks per occasion (50/40g) Questionnaire: men: 6+ / women: 4+ drinks per occasion
Norway	not defined [8]	not defined	Guideline: not defined Questionnaire: 6+ drinks per occasion
Poland	10g	Men: >4 drinks per day (40g) Women : >2 drinks per day (20g)	Guideline: men: 6+ / women: 4+ drinks per occasion (60/40g) Questionnaire: 6+ drinks per occasion
Portugal	12g	Men: >2-3 drinks per day (24-36g) Women : >1-2 drinks per day (12-24g)	Guideline: men: 6+ / women: 5+ drinks per occasion (72/60g)
Slovak Republic [9]	no official definition	no mandatory national recommendation	Guideline: not defined Questionnaire: 6+ drinks per occasion
Slovenia	10g	Men: > 2 drinks per day (>20g/day), Women: > 1 drink per day (> 10g/day),	Guideline: men: 50g / women: 30g per occasion. Questionnaire: men: 6+ / women: 4+ drinks per occasion
Spain	10g	Men: >4 drinks per day (40g) Women : >2 drinks per day (20g)	Guideline: men: 6+ / women: 4+ per occasion (60/40g) Questionnaire: 6+ drinks per occasion
Sweden [10]	12g	Men: >14 drinks/week (>24g/day) Women : >9 drinks/ week (>15g/day)	Guideline: men: 5+ / women: 4+ drinks per occasion (60/48g) Questionnaire: 60g per occasion
Switzerland	10-12g	Guideline (2008): Men: > 4 drinks per day (40g - 48g) Women: > 2 drinks per day (20g - 24g)	Guideline (2008): men: 5+ / women: 4+ drinks per occasion (50-60/40-48g) Questionnaire (Swiss Health Survey): 6+ drinks per occasion (60-72)
Turkey	not defined	not defined	Guideline: not defined
United Kingdom (England)	8g	Men: >21 drinks/week (>24g/day) Women : >14 drinks/ week (>16g/day)	Guideline: men: 8+ / women: 6+ drinks per occasion (64/48g) Questionnaire: idem.
United States	[11]	[11]	[11]

Note: (6) In Korea No national definition. Limits reported here correspond to the Korea National Health & Nutrition Examination Survey. (7) In Mexico, no official definition of the standard alcoholic drink, although a 2001 study estimated the Mexican standard drink contains 13 grs of pure alcohol (available at: http://www.alcoholinformate.org.mx/seminarios/Cuaderno11.pdf). There are no national guideline that refers to the hazardous drinking limit. However, there is a Mexican Official Norm that specifies the relation between the level of ethanol in blood and the intoxication level through the symptoms (available at: http://www.cofepris.gob.mx/MJ/Paginas/NormasPorTema/Alcohol.aspx). Such norm applies for workers that manipulate ethanol but it also appears in the national guideline for treatment of acute intoxication with ethanol among adult population. (8) The Norwegian Institute of Public Health defined a standard drink as 12-15g. (9) In Slovak Republic no official definition of the content of standard drink and drinking limits.(10) In Sweden, the recommendation to general public for risk-free consumption is zero alcohol. (11) In the US, answers may vary since State and local jurisdictions set the policies. More information is available on the NIAAA Policy Information System: https://alcoholpolicy.niaaa.nih.gov.

Source: OECD National correspondents; HED limits derived from national survey questionnaire as listed in Table1.

2.1.3. Definitions of socio-demographic variables

33. Micro-data sources provide information on adults such as gender, age, ethnicity, marital status, working status, alcohol consumption, education level and socioeconomic status (occupation-based or income level). Age was categorized into 5-year age groups or 10-year age groups according to the need of the analysis. Ethnicity is provided in England, New Zealand, and the US. Marital status is categorized into Married / Single / Other (divorced, separated, widow). Working status is defined as working / Not working.

34. International standard classifications, such as ISCED for education and ISCO for occupation, were used to deal with the problem of data heterogeneity. Education level is recoded into three groups: low (ISCED 0, 1, 2) / medium (ISCED 3, 4) / high (ISCED 5, 6). An attempt was made to standardise different occupation-based socioeconomic status, by recoding professions as: lowest (unskilled manual) / middle-low (semi-skilled manual) / middle (skilled manual, non-manual) / middle-high (managerial technical) / highest (professional). Five-level occupation-based socioeconomic status variable was available or could be derived in Chile, England, France, Hungary, Italy, Japan, Portugal, Spain, and Switzerland. In countries for which an occupation-based social class variable could not be derived, household income was instead used as an indicator of socioeconomic status. These include Australia, Canada, Czech Republic, Finland, Germany, Ireland, Korea, New Zealand, Slovak Republic, Slovenia, and the US. More information on data comparability is available in Annex 2.

35. The analyses of time-trends include adults aged 16 and over, with some exception in Australia, France, Italy, and Ireland (age 18+), Germany (18-65), Japan and the US (20+), Finland (25-74), Portugal (15-64), and Chile (12-64). The analysis of disparities in drinking among social groups focuses on people aged 25 and over in order to account for reverse causality[6]. All analyses use sampling weights provided with the data. If not, we devised appropriate weights to account for sample size differences across survey waves (e.g. Finland, first survey editions in England). All analyses were undertaken with Stata 12.

2.2. Data limitations

36. The section on data limitations describes the different sources of bias: self-reporting bias and sampling bias, and then discusses the correction of biases.

2.2.1. Self-reporting bias

37. A limitation of survey-based datasets is that alcohol consumption is a self-reported measure which commonly suffers from self-reporting bias (most often downward). Underreporting bias in self-reported alcohol use has been largely described in the literature (Boniface and Shelton, 2013; Meier et al. 2013, Rehm *et al.*, 2010b, Ely *et al.*, 2001, Stockwell *et al.* 2004). Also, it is shown that reported drinking level accounts for only 40 to 60% of alcohol sales (Midanik, 1982; WHO, 2011). This underreporting bias is also verified in our datasets since we found for England in 2002 a survey-based estimate of 5.8 litres of pure alcohol per capita per year (population aged 16-75) whereas the WHO estimate of recorded adult (15+ years) per capita consumption is 11 litres[7]. Similarly, our per capita alcohol intake survey-based estimate for Canada in 2009 is 3 litres versus 8.2 litres in WHO data, and respectively 3.6 versus 8.7 in the US. In the framework of an inequality analysis this would not necessarily affect the interpretations of the results significantly, but there is some evidence that underreporting may not be uniformly distributed across

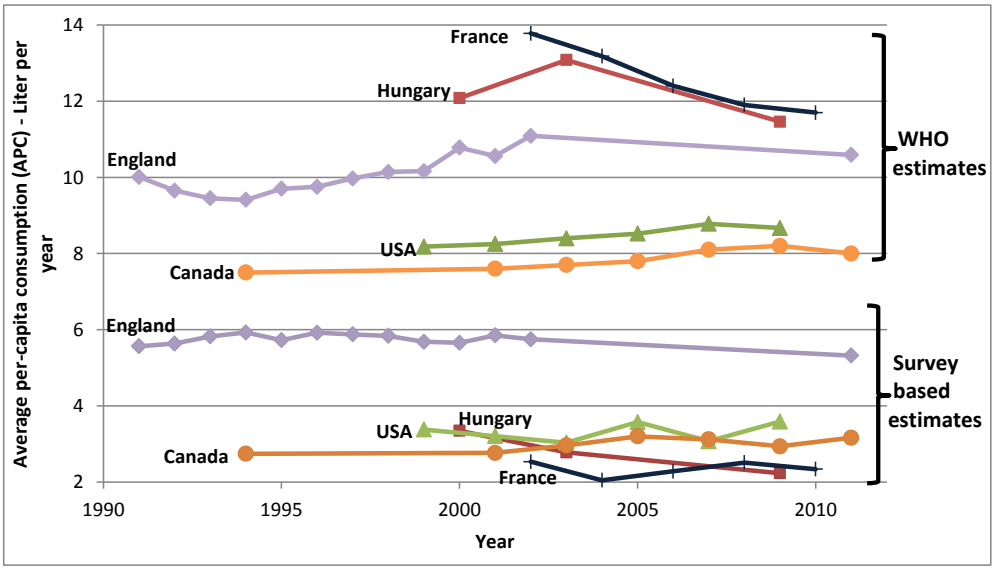
6 Analyses were initially conducted on population aged 16 and over for three countries (Czech Republic, Slovenia, and Slovak Republic). It was not possible to re-perform the analysis on a restricted sample because of data access rights.

7 Some of this discrepancy may be due to higher levels of alcohol consumption in other UK countries.

respondents. For instance, the underreporting bias is higher among the hazardous drinkers (Townshend and Dukat 2002, Lemmens *et al* 1988).

38. To illustrate discrepancies in alcohol consumption estimates across data sources, Figure 3 provides a comparison of the WHO sales data and OECD survey-based estimates. Despite the use of a rough approximation to derive the amount of alcohol from survey data[8], survey-based estimates are well below estimates based on alcohol sales and data clearance (WHO source). Besides, drinking levels vary widely within countries, but trends over time are rather similar in all countries except France. Data for France display a decreasing average per-capita alcohol consumption based on WHO estimates, but an increasing consumption based on survey-based data.

Figure 3. Average per-capita consumption with different data sources, in five selected OECD countries



Source: WHO Global Information System on Alcohol and Health, National Health Surveys and OECD estimates.

2.2.2. Sampling bias

39. Another limitation of these survey data is a possible under-sampling bias since household based surveys may underrepresent some groups of people who drink the most (e.g. students, alcohol dependent people) or even do not represent groups of population the most at risk (e.g., homeless, people in institution) (Stockwell *et al.* 2004, Boniface and Shelton, 2013, Meier *et al.* 2013). The assumed size and strength of a standard drink may also contribute to under-estimate survey data.

40. Likewise, sales and excise duty clearance data may also misestimate alcohol consumption level due to unrecorded alcohol (illicit, homemade) but also due to wastage and tourism effects. Efforts are being made to measure the impact of the main forms of bias by combining information from different data sources (Boniface and Shelton, 2013; Meier et al. 2013; Rehm *et al.*, 2010b). A recent study in the UK estimated that the total amount of alcohol not captured in alcohol sales statistics (between 2.1 and 2.9 litres

[8] Per capita liter of pure alcohol per year is derived with three different methods: (i) the average number of drinks in the past 7 days in Canada, Hungary, and England; (ii) the frequency of drinking and the number of drinks on a typical drinking day in the US; (iii) categorical answers related to frequency and quantity of drinking in France. For more detail on national survey data, see Annex 1.

per capita) outweighs the quantity of alcohol not captured in surveys (between 1.9 and 2.1 litres per capita) without accounting for underreporting (Boniface and Shelton, 2013).

2.2.3. Correction of biases

41. To our knowledge, so far there is no source of general population survey data collecting both self-reported and measured alcohol intake, which would permit to assess underreporting bias at the individual level. In particular, it would be of interest to analyse differences across population groups in the size of underreporting bias (e.g. larger underestimation by hazardous drinkers) as this can exist with the measure of Body Mass Index (Cawley, 2000; Lakdawalla and Philipson, 2002).

42. An innovative approach published in an Alcohol Research UK report by Ely *et al.,* 2001, examined alcohol consumption data collected from a 7-day recall (ex-post) and a more accurate 7-day diet diary, for about 1,300 adults aged 43 in 1989. The proportion of hazardous drinkers is found to vary between recall and diary from 21% to 35% for men and from 6% to 15% for women. And, the extent of underreporting is large: 20% of male and 11% of female drinkers, who were classified moderate drinkers by their recall, were classified hazardous drinkers by their diary declarations. And, 31% of male and 5% of female drinkers who were classified hazardous drinkers by their recall, were classified 'harmful' drinkers by their diary declarations.

43. Similar attempts to combine recall and diary data exists (Hill-McManus et al, 2014), but are rare. For instance, the NHANES data provides, in addition to the number of drinks on a typical drinking day and the number of days in the past 12 months, a 24-hour dietary recall and a secondary 24-hour dietary recall 3-10 days later. However the alcohol consumption based on two-day recall does not allow estimating a correction for underreporting, as it would miss the fact that drinking patterns vary strongly by day of the week.

44. While data on household expenditure seems to be more reliable than self-reported alcohol consumption, linkage of household expenditure and lifestyle behaviours would be of interest for this approach. However to our knowledge, there are no such data sources.

45. The most advanced work on correcting underreporting bias in alcohol survey data was recently published by Rehm and colleagues (Rehm et al., 2010b). This new approach is based on the triangulation of survey data with recorded aggregated per capita consumption data by modelling the upshifted distribution of alcohol consumption. The methodology is described in Annex 3. The initial distribution of self-reported alcohol consumption is shifted to the right after correction, reflecting the fact that people consume more than they declare. Table 3 illustrates the size of the underreporting bias, by displaying the rates of hazardous drinkers before and after correction in 10 OECD countries. These estimates corroborate Canadian findings showing that the proportion of adults drinking above 40 grams of pure alcohol daily increases from 5% to 20% after correction in men and from 1% to 6% in women (Shield and Rehm, 2012).

Table 3. Rates of hazardous drinkers, before and after correction

%hazardous drinkers in total adult population	Survey based estimates		Corrected estimates	
	Men	Women	Men	Women
Canada 2009	9%	4%	27%	14%
Chile 2010	1%	0%	31%	10%
England 2011	18%	12%	32%	21%
France 2008-2010	5%	2%	41%	23%
Germany 2009	16%	11%	30%	21%
Hungary 2009	9%	1%	47%	3%
Ireland 2007	12%	5%	42%	26%
Japan 2008	19%	5%	30%	5%
Spain 2006	13%	5%	36%	12%
USA 2009	11%	6%	29%	15%

Source: OECD estimates, see Annex 3 for methodology.

46. Despite the evidence of large discrepancies between survey data and sales data, all analyses presented in the following sections of this paper do not include any data correction or adjustment. This permits to limit smearing data with other sources of bias.

2.3. Methods

47. This section describes the methods used for assessing social disparities, analysing social disparities over time, and comparing disparities across countries.

2.3.1. Assessing social disparities

48. Disparities in drinking patterns among population groups were analysed separately for men and women, with logistic models adjusting for a range of covariates. In particular, we controlled for age (assuming a non-linear relationship), marital status, ethnicity (when available, i.e. in England, New Zealand, and the US), smoking status, occupation status, education attainment, and socioeconomic status (SES).

49. The advantage of the logistic model lies in providing odds ratios that are easily interpretable as the relative odds of an event (being a drinker at risk) comparing individuals for whom a given characteristics takes different values (e.g. high vs. low educational attainment).

50. The common denominator for all analyses of social disparities in drinking patterns is the entire adult population. Adjusted probabilities of being an alcohol consumer, a hazardous drinker and a heavy episodic drinker were derived separately for men and women according to education level and socioeconomic status after fitting the statistical models. Adjusted probabilities were calculated for a typical individual aged 40 years-old and with all other covariates fixed at the sample mean.

2.3.2. Analysing social disparities over time

51. To assess time-trends in social disparities in drinking patterns, we measure the difference in rates of drinkers over time, among different socioeconomic groups by introducing into the regression model an interaction term between SES and the squared survey year. Hence, we test time-trends in education-related disparities and socioeconomic-related disparities in drinking. Similarly, using the same technique, we test

the interaction term between age group and the squared survey year in order to assess time-trends in drinking behaviours by age.

2.3.3. Comparing disparities across countries

52. The use of logistic regressions described above provides an accurate picture of inequalities within countries. However that approach is less useful in comparisons across countries, and over time, because of differences in the size and nature of socioeconomic groups in different settings and time periods. Therefore, further analyses were undertaken using indexes of inequalities which overcome, at least in part, the problems just described.

53. Disparities in drinking patterns related to education level and the socioeconomic status are assessed and gauged using the concentration index (CI). This study uses the corrected CI proposed by Wagstaff (2005) in order to take into account the bounded nature of the health outcome (e.g. probability of being alcohol consumer).

54. Since the studied outcomes are negative health outcomes (e.g. being drinkers at risk), the education and socioeconomic ladders are ranked from the highest to the lowest level, in order to facilitate the interpretation of the CI. The CI is bounded between -1 and 1, with the sign indicating the direction of inequality -a positive index indicates that the well-off are less likely to be alcohol consumers (or hazardous or heavy episodic drinkers)[9], a zero value indicates no inequality, and a negative index indicates that the well-off are more likely to be alcohol consumers (or hazardous or heavy episodic drinkers)[10].

55. We compute the concentration index and its standard error using the Stata concindc command for the micro-data with a categorical welfare variable (Kakwani *et al.*, 1997, Chen, 2007, O'Donnell *et al.*, 2008).

[9] This refers to pro-rich inequality i.e. the well-off have better health outcomes.

[10] This refers to pro-poor inequality i.e. the worse-off have better health outcomes.

SECTION 3. TIME-TRENDS IN ALCOHOL CONSUMPTION

56. This section presents results on time-trends in alcohol consumption. It is divided into four parts: (1) Evolution of drinking patterns over time for the three selected indicators (drinking status in the past 12 months, hazardous drinking, and heavy episodic drinking (HED)), (2) Evolution of cross-cultural differences in drinking patterns, (3) Trends by age group, and (4) Age effect on drinking over lifetime.

3.1. Evolution of drinking patterns

57. Figure 4 presents age-standardised proportions of people reporting to have drunk (any) alcohol in the past 12 months in the adult population. In all countries, rates are higher among men than women. Rates of male alcohol drinking are around 90% in most countries whereas female drinking rates are more fluctuating. Rates are relatively stable over time, once sampling variation is accounted for.

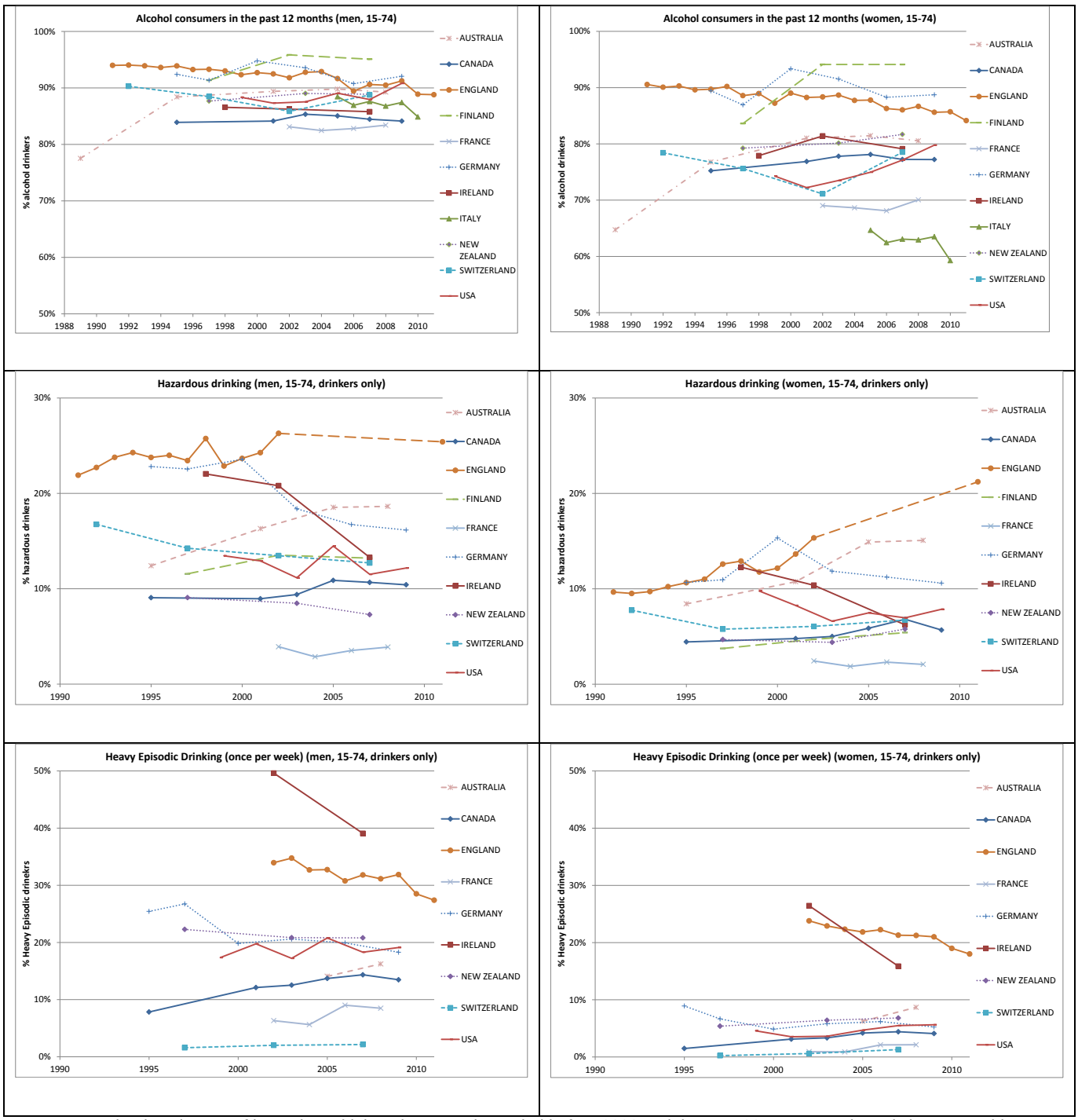
58. Rates of hazardous drinking and HED display a larger degree of variation, partly due to differences between surveys, which exist not only across countries, but also across surveys within the same countries (e.g. see Box 1). In particular, the definitions used for hazardous drinking and HED vary, and so do interview approaches. Despite efforts to standardise definitions in the analyses presented here, differences remain across surveys, which suggest that the value of these analyses is more in the assessment of trends over time than in the comparison of rates across countries.

59. As shown in Figure 4, most countries show relatively stable trends of hazardous drinking, although declines were observed in Ireland and Germany, where rates were originally high. These findings are in line with national trends reported elsewhere (e.g. Morgan *et al.*, 2008; Pabst *et al.*, 2010). In contrast, increasing trends are seen in Australia (both genders) and England (women) although some caution is necessary when interpreting these trends as the content of standard drinks and alcohol strengths may have changed over time[11]. Most countries present low rates of female HED. In 6 out of 8 countries, less than 8% of female drinkers report HED at least once per week, this rate being especially low in France and Switzerland. Rates were broadly constant over time, with the exception of a noticeable decrease in England and Ireland[12], where HED rates were originally high.

11 In England, estimates of hazardous drinkers between the period before 2002 and the year 2011 may not be strictly comparable due to changes in survey methods in order to reflect better assumptions on wine glass sizes and wine and beer strengths.

12 Findings for Ireland must be interpreted with caution since survey methods changed over the period covered in the analysis (from postal questionnaires in 2002 to face-to-face interviews in 2007) (Morgan *et al*, 2008).

Figure 4. Age-standardised rates of three drinking patterns



Note: In England, estimates of hazardous drinkers between the period before 2002 and the year 2011 may not be strictly comparable due to changes in survey methods.

Source: National health surveys mentioned in Table 1, OECD estimates.

3.2. Evolution of cross-cultural differences in drinking patterns

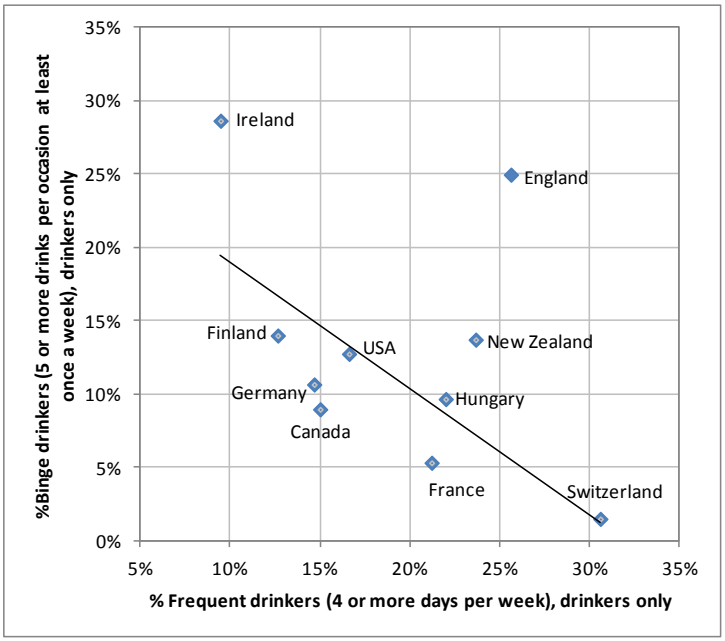
60. Cross-country comparisons raise the question of cross-cultural differences in drinking and in particular, cross-cultural variations in the way people behave when they drink alcohol. Cultural differences have been identified between societies where alcohol is associated with disinhibition, violence and anti-social behaviour (ambivalent drinking cultures such as the UK, the US, Australia and some Nordic countries) and societies where alcohol is more neutral, integrated in ordinary everyday life (integrated drinking cultures such as Latin and Mediterranean countries) (SIRC, 1998).

61. A European comparative study confirms cultural differences in drinking (Ramstedt and Hope, 2004). The authors highlight a combination of a high drinking level and high drinking abstention rates in Ireland, which suggests that people who drink alcohol consume more and engage more in risky drinking compared to other western European countries.

62. The 1998 SIRC report states that cross-cultural variations cannot be attributed to levels of consumption. Countries with low consumption levels (e.g., Iceland, Ireland) report higher rates of alcohol-related social and psychiatric problems than countries with high consumption levels (e.g., France, Italy). But these variations are related to different cultural beliefs, attitudes, norms and expectancies about drinking. Societies with generally positive beliefs and expectancies about alcohol (*integrated drinking-cultures*) experience significantly fewer alcohol related problems; societies with negative or inconsistent beliefs and expectancies (*ambivalent drinking cultures*) are associated with higher levels of alcohol-related problems.

63. An OECD analysis provides evidence that the simple pattern of drinking which used to dichotomise societies into “integrated” and “ambivalent” drinking societies is no longer prevalent. Figure 5 presents the proportion of frequent drinkers against the proportion of heavy episodic drinkers. While Ireland displays the highest level of HED and the lowest rate of frequent drinkers, France and Switzerland show opposite characteristics. England stands out with both high heavy episodic drinking level and high frequency. This finding supports previous results on the importance of using both quantity and frequency of drinking. Rehm *et al*. (2004) found on more than 130 countries that patterns of drinking were unrelated to per capita consumption, suggesting that drinking pattern may provide important unique information about the risks of drinking alcohol beyond that captured by per capita consumption.

Figure 5. Rates of heavy episodic drinkers and frequent drinkers in selected OECD countries, latest year available



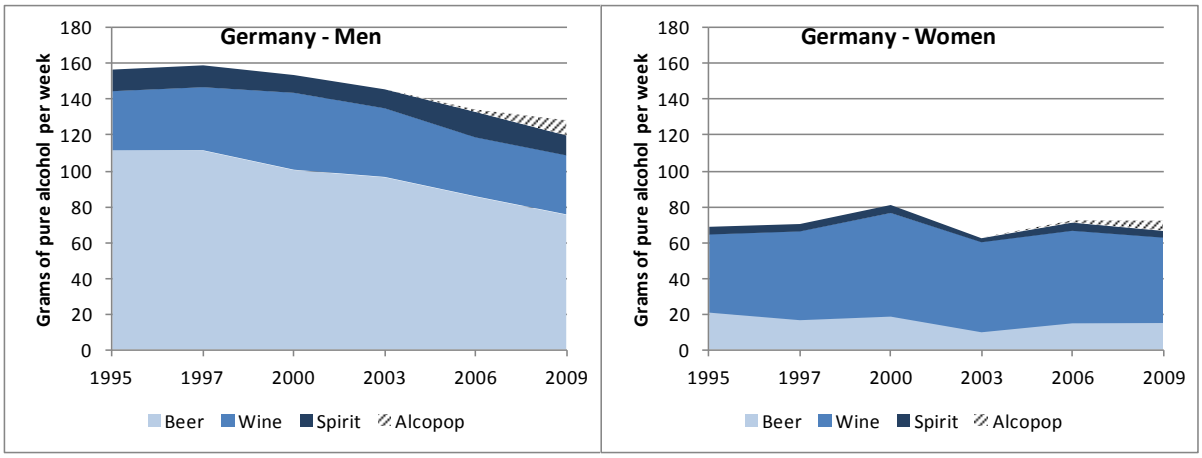
Source: National health surveys mentioned in Table 1, OECD estimates, and Health behaviour and health among the Finnish adult population 2011 report for Finland.

64. Another previous typology divides European countries into three zones according to the traditionally dominant alcohol type: wine-drinking countries (southern area), beer-drinking countries (Germany, the UK) and spirit-drinking countries (northern area). Although some years ago, there seemed to be clear differences among European countries with respect to beverages preference, drinking patterns have changed and these distinctions have vanished (Mäkelä *et al.* 2005; Ahlström and Osterberg, 2005).

65. Evolution of alcohol consumption patterns and erasing cultural cleavages are notably related to changes in types of alcohol consumed. Evidence shows that in Europe, regional differences in preferred beverage types remains with more wine drinkers in France and Switzerland, and more beer drinkers in middle Europe, but there is no longer trace of a spirit-drinking zone in Nordic countries (Mäkelä *et al.*, 2005). The 2011 WHO Global status report on alcohol and health states that "*Geographical differences exist among the type of alcohol people consume […] Wine constitutes the largest proportion of alcohol consumed in some European countries and the South American wine growing countries of Argentina and Chile. The traditional European differences in beverage preference, where northern Europeans once preferred beer while southern Europeans drank more wine, are diminishing. Today, in Spain the most consumed alcoholic beverage in litres of pure alcohol is beer, while in Sweden, it is wine.*" New alcopops may also participate to this phenomenon.

66. Our investigation of national health surveys does not permit to analyse consumption by type of alcohol except for Germany where the questionnaire allows to distinguish types of alcohol. Figure 6 shows that weekly amount of alcohol consumed in men has decreased over 14 years in Germany, in particular with a decrease in beer consumption, while consumption in women has remained stable. In any picture, there is no clear evidence for substitution across types of alcoholic beverages.

Figure 6. Weekly average consumption over the past 30 days, by type of alcohol, in Germany



Source: Epidemiological Survey on Substance Abuse 1995-2009, OECD estimates.

3.3. Trends by age group

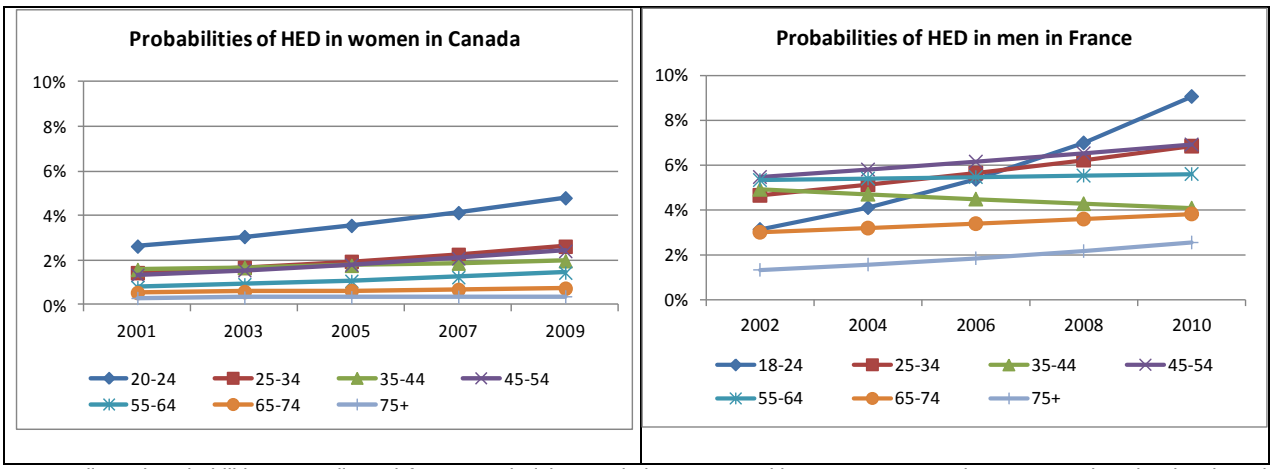
67. When focusing on specific age groups, different patterns of drinking emerge, in particular, with the young adults increasingly affected by heavy episodic drinking. Results are available in Annex 4.

68. Regarding any alcohol drinking, results show increasing rates of alcohol drinkers among the younger (both genders) in Germany, and in the elderly in England and the US (men) and in New Zealand (both genders).

69. Regarding hazardous drinking, results show increasing rates of hazardous drinkers among young adults in England (both genders) and in Switzerland and the US (men). In Ireland and Germany, hazardous drinker rates stagnate in young women while they decline in the other age groups.

70. Last, more and more young adults experience weekly HED session. Results show that rates of heavy episodic drinkers in young adults have been increasing in New Zealand (female) and in Canada and the US (both genders), although rates of HED are low. In Germany, HED rate in young people has been increasing but shows a decline in the last year, in 2012. Results for the complete set of countries are available in Annex 4. As an example, Figure 7 displays the trends in heavy episodic drinking in two selected countries, Canada and France.

Figure 7. Trends of Heavy Episodic Drinking (HED) by age groups, in Canada and France



Note: Adjusted probabilities are adjusted for age, ethnicity, marital status, smoking status, occupation status, education level, and socioeconomic status.

Source: Canada: Canadian Community Health Survey 2001-2010; France: Enquete Santé et Protection Sociale 2002-10, OECD estimates.

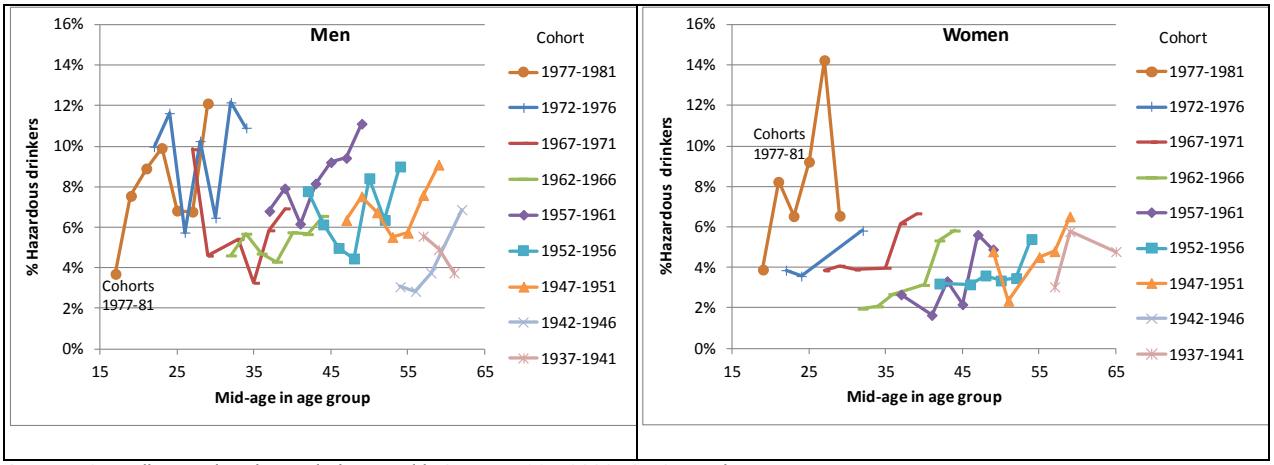
3.4. Age effect on alcohol consumption

71. An important dimension of time and its impact on drinking patterns is the age component, since changes in drinking patterns may occur in the life course. An attempt on available longitudinal data is made to understand how alcohol-related behaviours change with age.

72. Some studies have examined age-period-cohort effects on drinking patterns. Pabst *et al.* (2010) show on German data that on average across age and cohort groups, alcohol consumption has considerably declined over the last 15 years. Cohort effects indicate a decline in alcohol volume from the 1940s to the 1970s birth cohort groups and a steep increase in younger cohorts. Moreover, cohorts born after 1980 were found to drink more often to intoxication than older cohorts. Likewise, age-period-cohort effects were studied on US and Finnish data. William *et al.* (2008) show that average alcohol consumption in US adults aged 26 and over has declined over time whereas in the younger (age 18-25) it has substantially increased. There is, here as well, some evidence for a positive cohort effect in the younger cohorts. A Finnish study examined light and heavy episodic drinking and found increasing period effects in light drinking, and increasing cohort effects in heavy episodic drinking in men and women (Härkönen and Mäkelä, 2011).

73. Our investigation on longitudinal Canadian data shows that cohort effects exist in hazardous drinking. Figure 8 allows to identify individuals within the same cohort, and shows that hazardous drinking increases with age and that younger cohorts have higher rates of hazardous drinkers, this being especially marked in women. For instance, women from birth cohorts 1977-81 display, at the same ages, higher rates of hazardous drinking compared to women from cohorts 1972-76 and 1967-71.

Figure 8. Effects of age and birth cohort in hazardous drinking in Canada



Source: Canadian National Population Health Survey 1994-2008, OECD estimates.

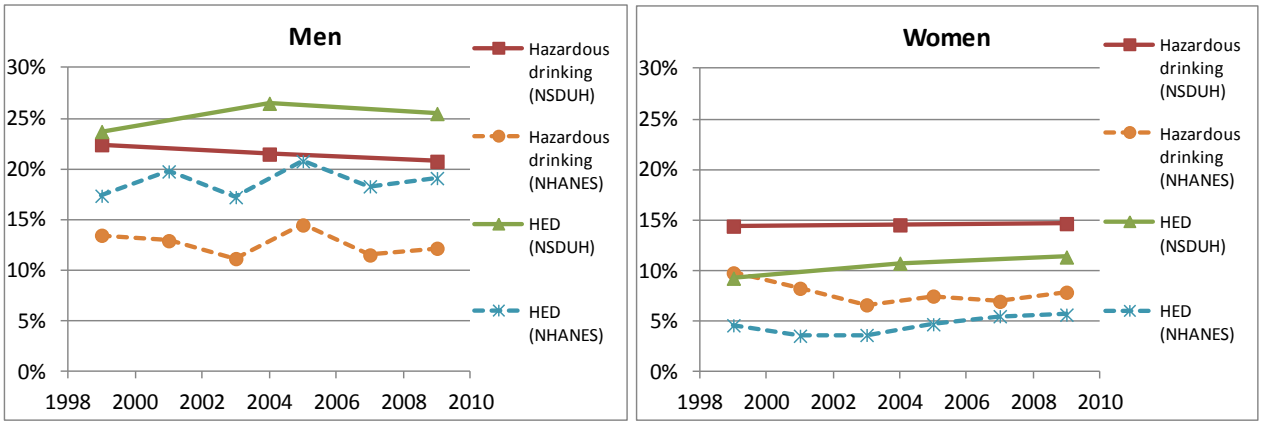
Box 1. Alternative sources of alcohol consumption data in the United States

Some countries have several national survey data. In the US for example, in addition to the NHANES data, information on alcohol drinking is available from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) (adults aged 18 and over), and from the National Survey on Drugs Use and Health (NSDUH) (with a focus on younger ages). Although it would be more suitable to use the NESARC for the purpose of this study on adult drinking, this survey only includes two data points, which is not sufficient for a meaningful assessment of trends.

A 2010 report examines changes in alcohol drinking between the two NESARC waves (2001-02 and 2004-05) (NIAAA, 2010). The report highlights that among current non-drinkers in 2001-02, 76% remain non-drinkers in 2004-05, 17% are current drinkers, and 7% are current 'harmful' drinkers (*i.e. drinking above the daily or weekly limits*[13]). These proportions vary by age, namely the share of new 'harmful' drinkers is 22% in the age group 18-24, 10% in the age group 25-44, 4% in the age group 45-64, and 1% in the age group 65 or above. Similarly, among current non-'harmful' drinkers in 2002-03, 17% become non-drinkers in 2004-05, 61% remain current non-'harmful' drinkers, and 22% are 'harmful' drinkers. The proportion of 'harmful' drinkers varies by age: 47% in the age group 18-24, 27% in ages 25-44, 17% in ages 45-64, 8% in ages 65 or above. These findings suggest that young adults are more affected by 'harmful' drinking behaviours compared to other age groups.

A comparison is shown below between rates of hazardous and heavy episodic drinking cased on NSDUH and NHANES data for the period 1999-2009. Figure 9 shows overall (population) rates in men and women; Figure 10 shows trends in HED in men and women by age group. The NHANES data show a clear increase in HED in the age group 20-24, while NSDUH data show a significantly milder, or no increase.

Figure 9. Comparison of age-standardised rates from alternative data sources, age 20+

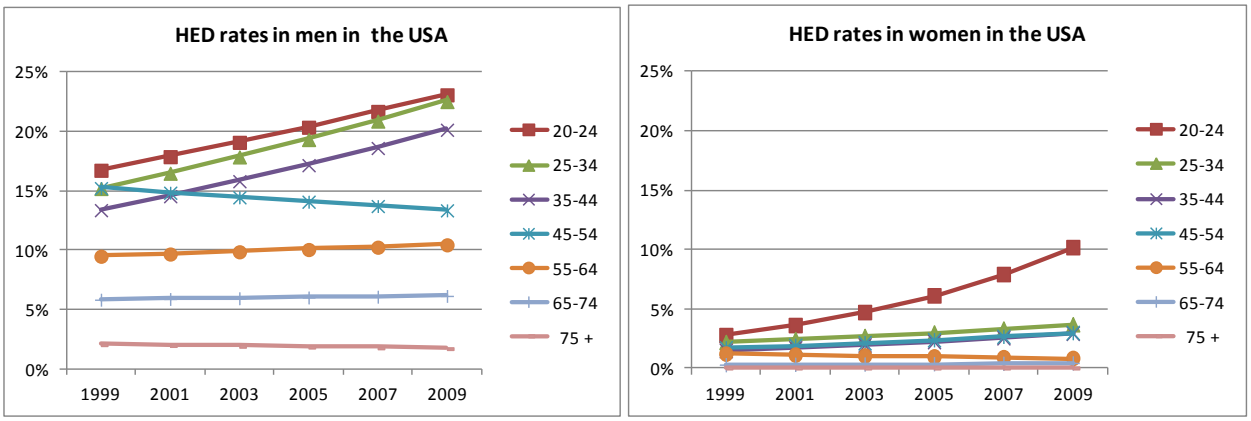


Note: NHANES and NSDUH data, 1999-2009.

13 Daily limit is 4 drinks per day for women and 5 for men. Weekly limit is 14 drinks per week for women and 21 for men.

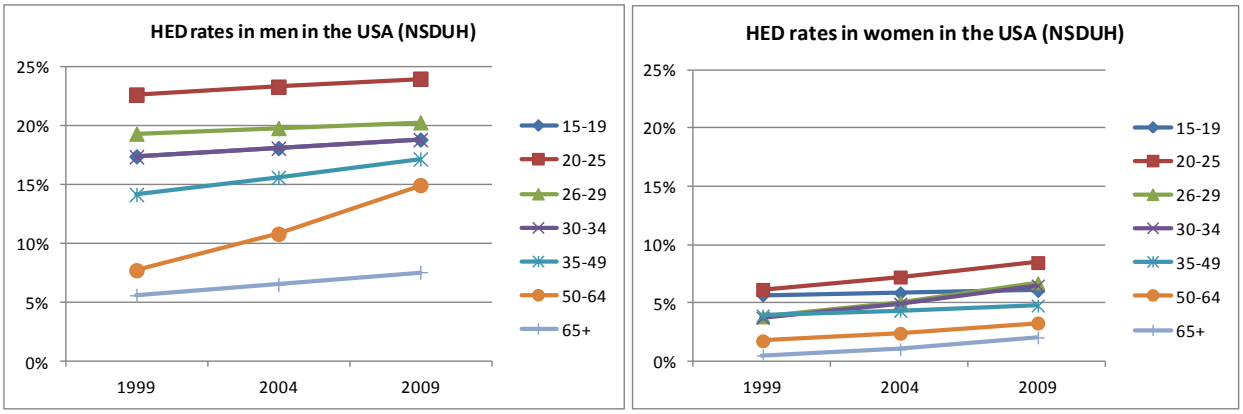
Figure 10. Regression-based estimates

Panel A. NHANES data



Note: NHANES data 1999-2009. Multivariate regression estimates (adjusted for ethnicity, marital status, smoking status, education, socioeconomic status, and a quadratic term for the survey year)

Panel B. NSDUH data



Note: NSDUH data 1999-2009. Multivariate regression estimates (adjusted for ethnicity, marital status, smoking status, education, socioeconomic status, and a quadratic term for the survey year).

SECTION 4. SOCIAL DISPARITIES IN DRINKING PATTERNS

74. This section presents findings on disparities in alcohol consumption. It deals with: (i) Disparities by education level and socioeconomic status, (ii) Disparities by ethnicity, (iii) Trends in social disparities over time.

4.1. Disparities by education level and socioeconomic status

75. This sub-section presents the findings on disparities related to education and socioeconomic status for three drinking patterns: (1) Any alcohol drinking and (2) Hazardous alcohol drinking, and (3) HED.

4.1.1. Any alcohol drinking

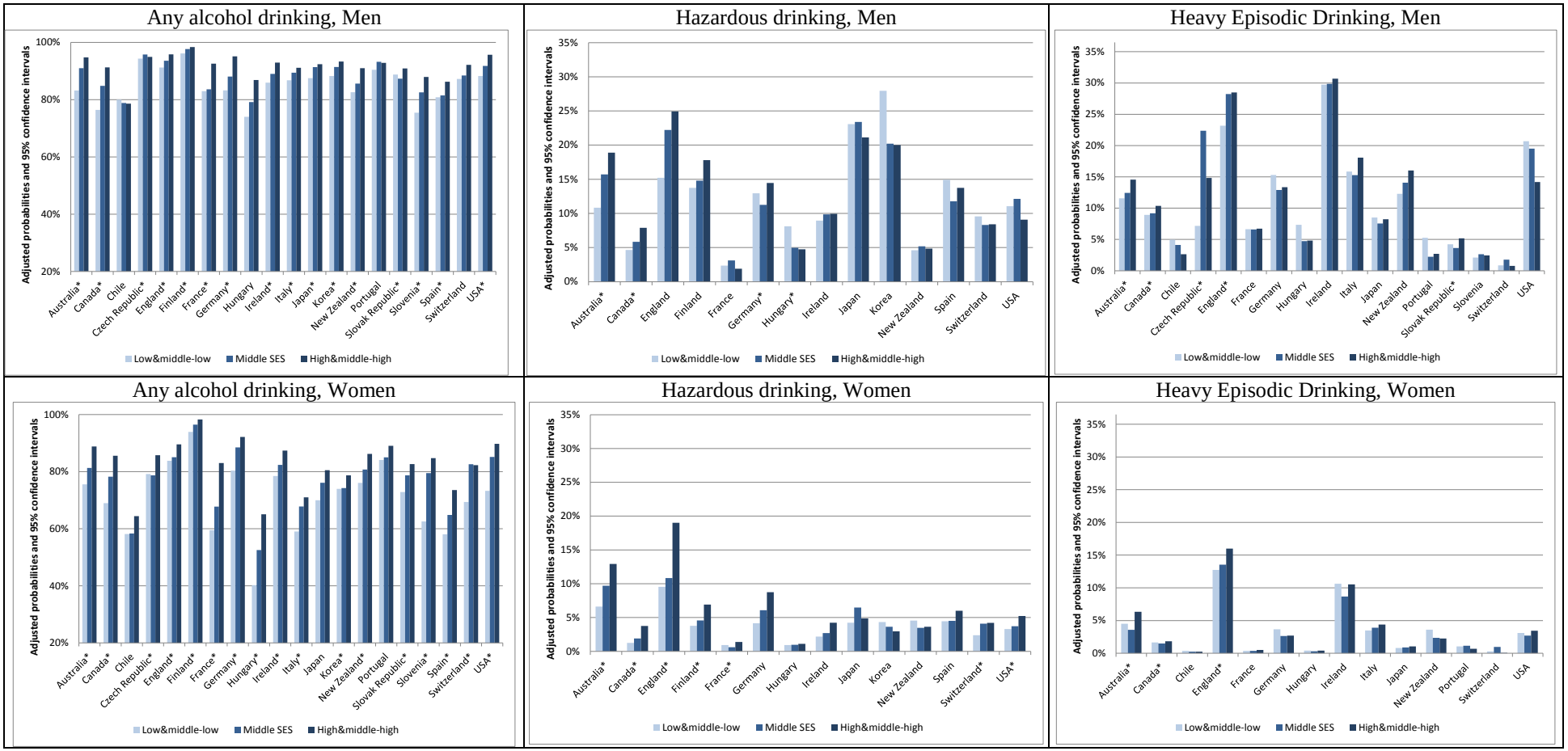
76. Nearly all countries display similar patterns of social disparity in drinking status in the past 12 months. For both genders, adults with higher education and higher socioeconomic status (SES) are more likely to consume alcohol than their counterparts with lower education and lower SES (Figures 11 and 12). This pattern is verified in all countries, although the gradient is not significant in a small number of countries, and with the exception of Korea which displays an unclear relationship between education and drinking status.

Figure 11. Adjusted probabilities by education level



Note: Analysis covering people aged 25+, except in Czech and Slovak republics and Slovenia where people are aged 16+. Adjusted probabilities are computed for an average individual aged 40 years-old, with all covariates (marital status, working status, smoking, ethnicity) fixed at the sample mean. (*) means the overall gradient is significant.
Source: OECD estimates on national health surveys, most recent years (see Table 1).

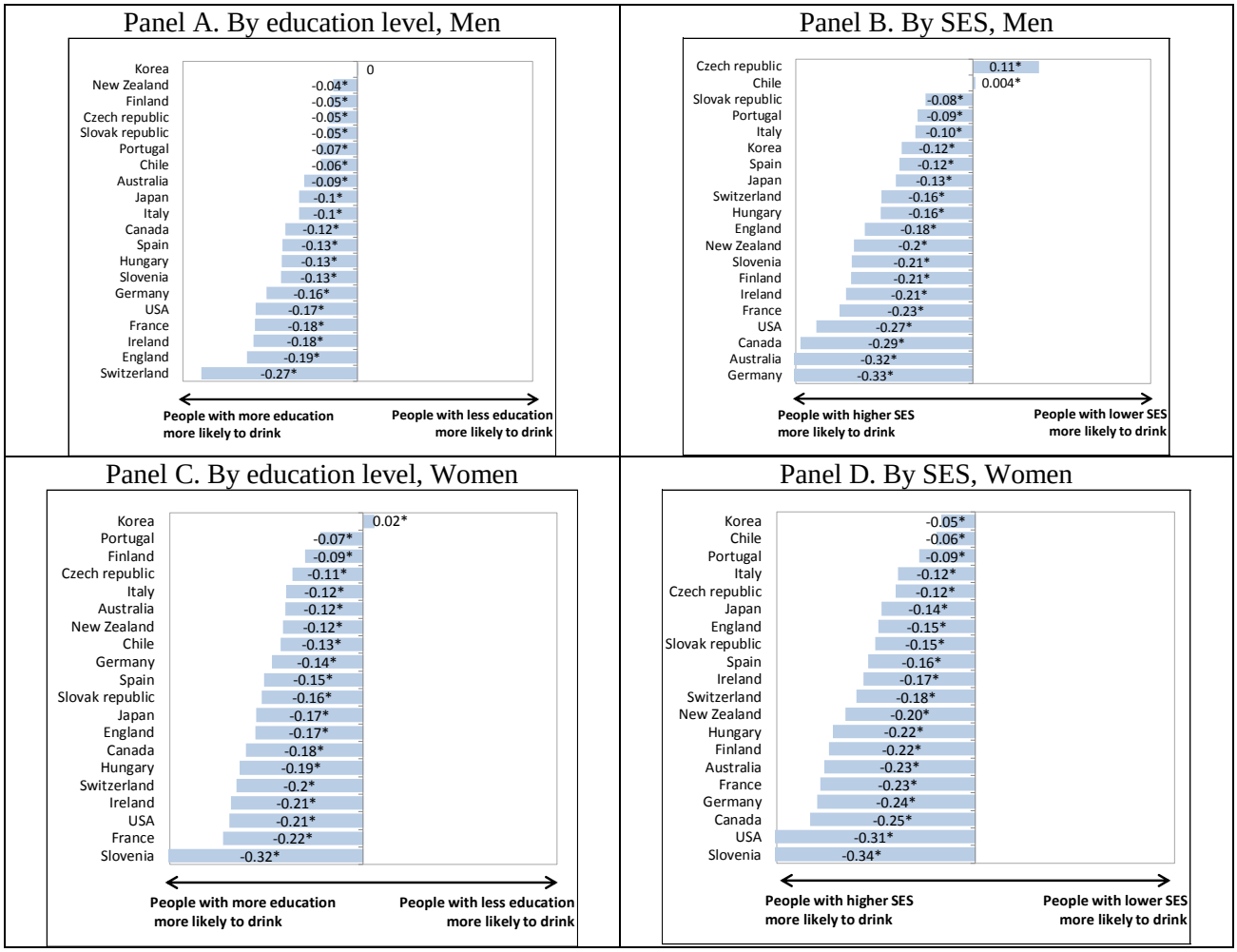
Figure 12. Adjusted probabilities by socioeconomic status



Note: Analysis covering people aged 25+, except in Czech and Slovak republics and Slovenia where people are aged 16+. Adjusted probabilities are computed for an average individual aged 40 years-old, with all covariates (marital status, working status, smoking, ethnicity) fixed at the sample mean. SES is based on occupation-based social class in Chile, England, France, Hungary, Italy, Japan, Portugal, Spain, and Switzerland, and on household income in other countries. (*) means the overall gradient is significant.
Source: OECD estimates on national health surveys, most recent years (see Table 1).

77. Figure 13 presents the concentration indexes which gauge the size of inequalities across countries. Almost all countries display a negative index indicating that people with less education and with lower incomes are less likely to consume alcohol in the past 12 months. The magnitude of these inequalities varies among countries. Education-related inequalities are marked in Switzerland in men, and in Slovenia in women. SES-related inequalities are strong in Canada, Germany, and the US in both men and women. On the other hand, the indexes of inequalities in men in Korea (by education level) and Chile (by SES) are near zero, indicating that no inequality is detected. Positive indexes are found in SES-related inequalities in men in Czech Republic and education-related inequalities in women in Korea. This indicates a reverse socioeconomic gradient: people at the bottom of the socioeconomic ladder are more likely to drink alcohol.

Figure 13. Concentration indexes for drinking status



Note: SES means socioeconomic status. SES is based on occupation-based social class in Chile, England, France, Hungary, Italy, Japan, Portugal, Spain, and Switzerland, and on household income in other countries. The analysis covers people 25+ except in Czech and Slovak Republics and Slovenia (16+). (*) means the CI is significant at 5%.

Source: OECD estimates on national health surveys, most recent years (see Table 1).

4.1.2. Hazardous drinking

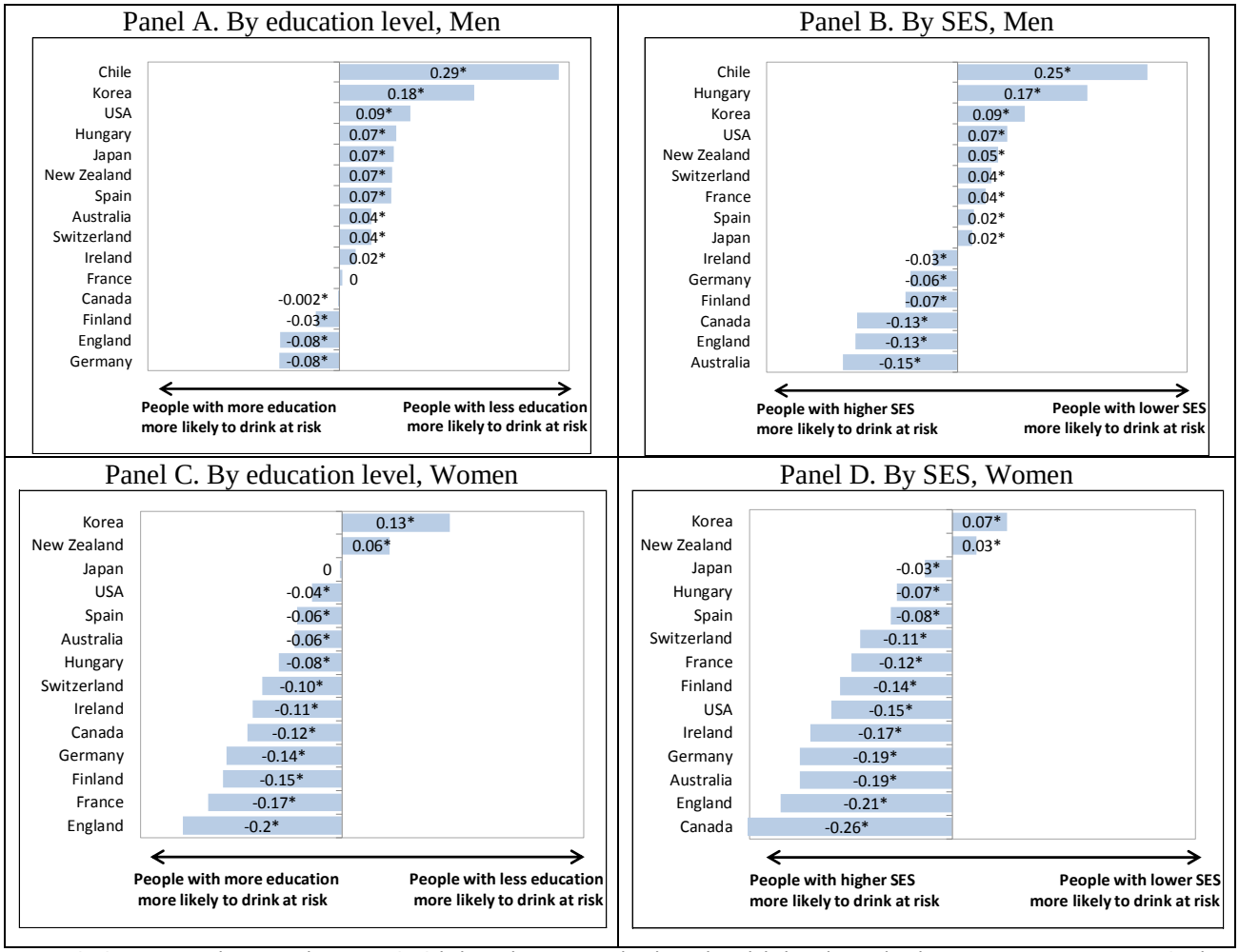
78. For men, the pattern of inequality in hazardous drinking is mixed. Figures 11 and 12 present the adjusted predicted probabilities of hazardous drinking by education level and by SES in 14 countries. Rates

of hazardous drinkers vary greatly across countries. In particular, France displays very low level of hazardous drinking in men and women. The direction of the gradient of inequality varies also among countries. Figure 11 shows that three countries have significant higher male hazardous drinking rates in the higher-educated (Canada, England, and Germany), seven countries display the reverse relationship –but not always significant-, and four countries (Australia, Finland, France and Ireland) have an unclear pattern. Figure 12 shows that men with higher-SES are significantly more likely to be hazardous drinkers in six countries (Australia, Canada, England, Finland, Germany, and Ireland), whereas they are less at risk in Hungary, Japan, Korea, Switzerland and the US.

79. For women, disparities in favour of the worse-off are observed in a large majority of countries. Higher-educated and higher-SES women are more likely to be hazardous drinkers in Australia, Canada, England, Finland, France, Germany, Hungary, Ireland, Spain, Switzerland, and the US (Figures 11 and 12).

80. In order to gauge inequalities across countries, Figure 14 compares the related concentration indexes in hazardous drinking. For men, most countries show a concentration index above zero indicating that the more educated and the better-off are less at risk. Hungary, Korea, and the US display the highest degree of inequality in male hazardous drinking. Conversely, for women, most countries show a concentration index under zero indicating that the more educated and the better-off are more at risk. Canada and England display the highest level of inequality in female hazardous drinking.

Figure 14. Concentration indexes for hazardous drinking



Note: SES means socioeconomic status. SES is based on occupation-based social class in England, France, Hungary, Japan, Spain, and Switzerland, and on household income in other countries. The analysis covers people 25+. (*) means the index is significant.

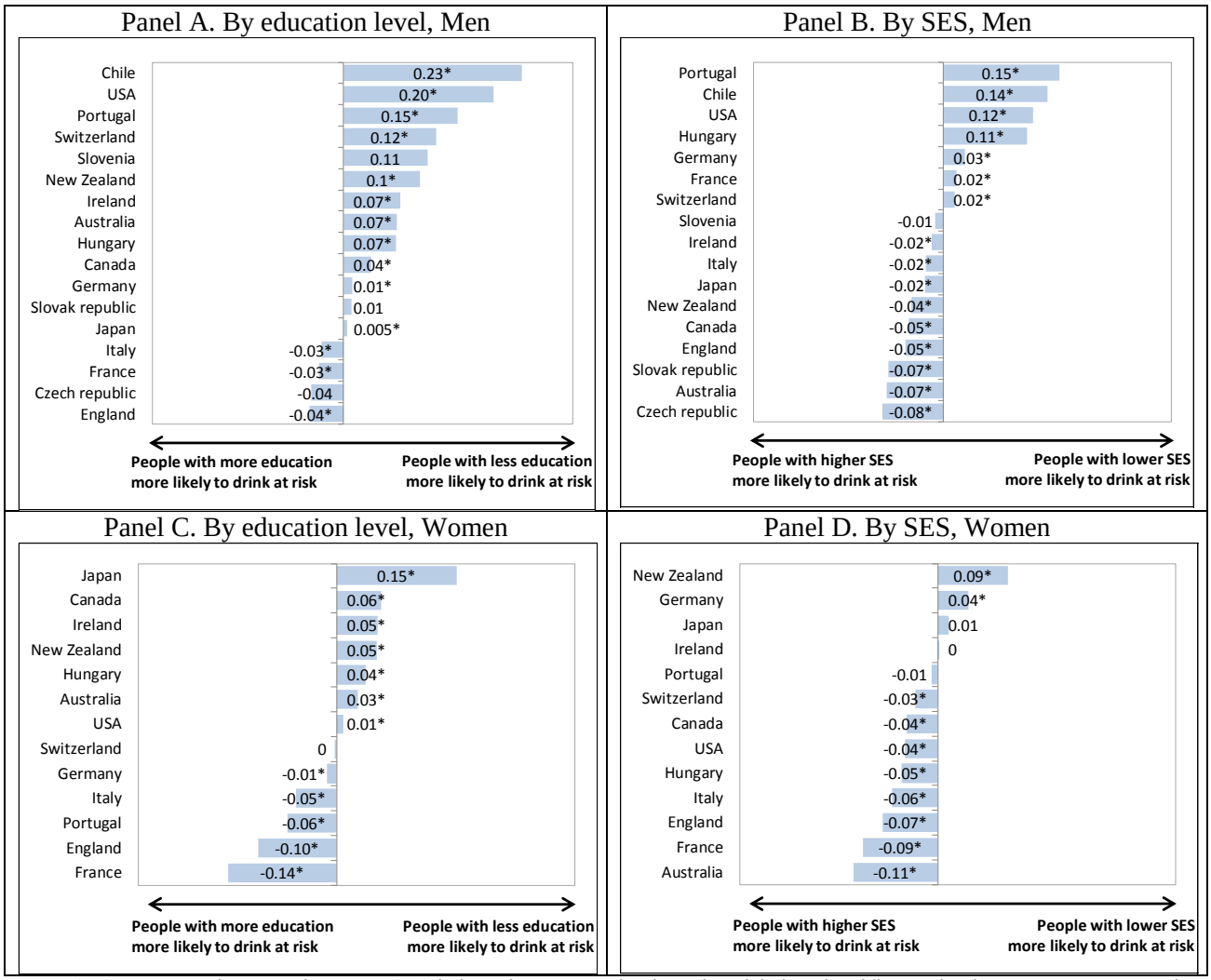
Source: OECD estimates on national health surveys, most recent years (see Table 1).

4.1.3. Heavy Episodic Drinking

81. For men, the pattern of social disparities in HED is mixed. Again, Figures 11 and 12 present the adjusted predicted probabilities of HED by education level and by SES in 17 countries. Rates of HED vary greatly across countries with very low levels of HED in Chile, France, Hungary, Portugal, Slovenia, and Switzerland. Men who have received higher education in Czech Republic, England, and Italy are more likely to engage in HED whereas they are less likely to do so in Australia, Chile, Hungary, Ireland, New Zealand, and the US. Regarding the SES gradient, Australia, Canada, and England show a significant social gradient (the well-off more at risk). Conversely, Chile, Germany, Hungary, Portugal, and the US show reverse social gradient but not always significant. Similarly, for women, the direction of the gradient of inequality is not clear-cut within all countries. Education-related disparities in HED emerge in few countries (Figure 11), with the higher-educated being more at risk, although five countries show the reverse relationship (Australia, Canada, Ireland, Japan, and New Zealand). Correspondingly, the pattern is mixed for SES-related inequalities in women (Figure 12).

82. Figure 15 presents a cross-country comparison of concentration indexes (CI) in HED in order to gauge inequalities across countries. For men, most countries show a concentration index above zero indicating that the more educated are less at risk to engage in HED, although this is not always verified in the picture of CI by SES. Chile, Portugal and the US display the highest degree of inequality in male HED. Similarly, for women, the pattern of education-related and SES-related inequalities is unclear. While Japan (CI by education) and New Zealand (CI by SES) stand with one of the highest degree of inequality in female HED (where HED is more concentrated among the less educated and the worst-off), at the other end of the scale, France (CI by education) and Australia (CI by SES) show high degrees of inequality (where HED is more concentrated among the more educated and the better-off).

Figure 15. Concentration indexes for HED



Note: SES means socioeconomic status. SES is based on occupation-based social class in Chile, England, France, Hungary, Italy, Japan, Portugal, and Switzerland, and on household income in other countries. The analysis covers people 25+ except in Czech and Slovak Republics and Slovenia (16+). (*) means the index is significant.

Source: OECD estimates on national health surveys, most recent years (see Table 1).

4.2. Trends in social disparities

83. The OECD analysis of trends over time reveals no major changes in the education and SES gradients in any alcohol drinking, but with exceptions for Finland and Switzerland. Finland displays an

increasing rate of alcohol drinkers in the less educated and the lower-SES women. Switzerland shows a decreasing rate among the less educated. The complete set of trends in social disparities by education level and by SES is available in Annex 5.

84. Trends in social gradients in hazardous drinking show: narrowing social disparities in six countries with decreasing rates of hazardous drinkers among the more educated and/or the better-off (England, Finland Germany, Ireland, Switzerland, and New Zealand). In contrast, increasing social disparities are observed among women in England with rates of hazardous drinkers growing among the more educated.

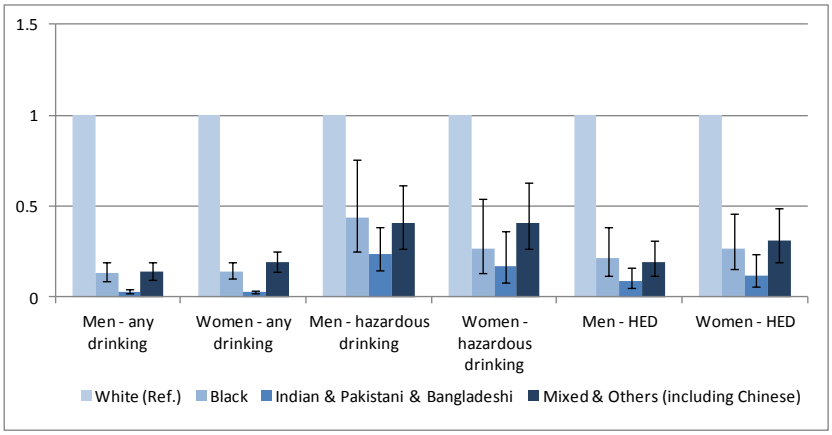
85. No major trends were found in disparities in HED, but again with some exceptions. Ireland, which has the highest proportions of heavy episodic drinkers, displayed a remarkable trend of narrowing social disparities. In contrast, social disparities have been increasing in Germany, New Zealand, and the United States (men only), with the worse-off increasingly at risk over time compared to other SES groups (although education-related inequalities in HED narrowed in Germany at the same time).

4.3. Disparities by ethnicity

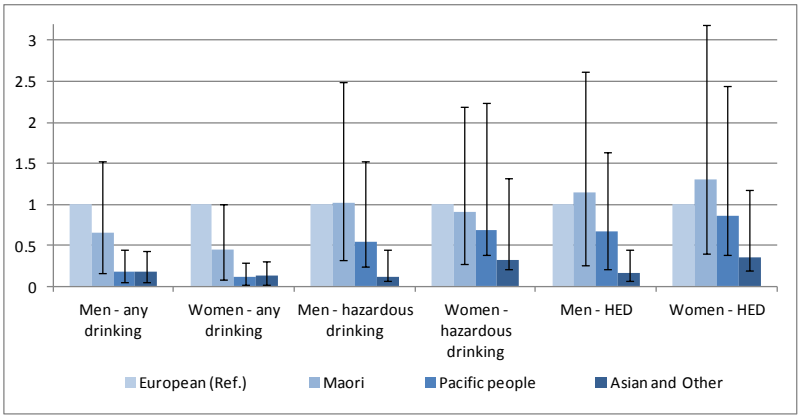
86. The OECD analysis gives evidence for disparities in drinking patterns by ethnic group. The relationship between ethnic status and alcohol drinking was analysed all other things being equal in England, New Zealand, and the US. Results show that minority groups generally drink less alcohol than the white population, except in the US where Mexican American men have a higher prevalence of any alcohol drinking than non-Hispanic white men. Concerning harmful forms of drinking, results show that in England, white men and women are more likely to engage in hazardous drinking and HED (Figure 16), while findings in other countries are seldom statistically significant.

Figure 16. Odds ratios for several alcohol patterns by ethnic status, adults aged 25 and above

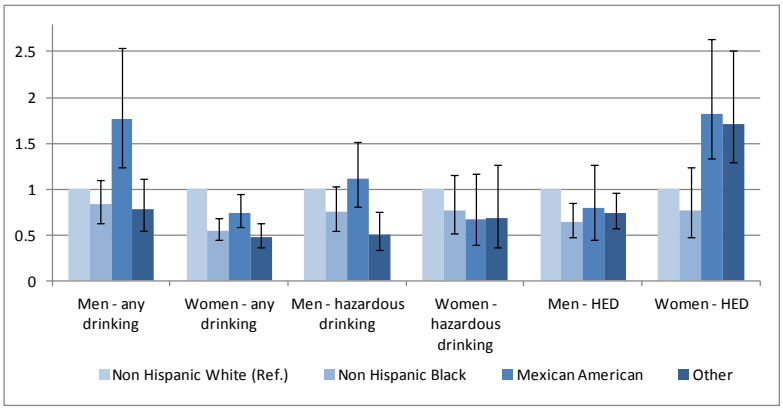
Panel A. England, 2002



Panel B. New Zealand, 2006-07



Panel C. The US, 2007-10



Note: Population aged 25+.
Source: OECD estimates on national survey data (see Table 1).

SECTION 5. ALCOHOL CONSUMPTION AND LABOUR MARKET OUTCOMES

87. Consequences of alcohol drinking may be greater than health outcomes, as they can affect labour market outcomes. This section reviews the relationships between alcohol use and various labour market outcomes: employment, wages, and productivity.

5.1. Alcohol and employment

88. The impact of alcohol consumption on employment, as well as on other labour market outcomes discussed in the following sections, depends on the quantity consumed and pattern of consumption. In Sweden, long-term light drinkers were shown to have better employment opportunities than any other group, including former drinkers, former abstainers, long-term heavy drinkers and abstainers (Jarl and Gerdtham, 2012). On the other hand, heavy drinking was shown to reduce the probability of being in employment for both men and women (Booth and Feng, 2002; MacDonald and Shields, 2004; Johansson *et al.,* 2008), although a number of studies found no significant relationship between alcohol abuse and employment (Feng *et al,* 2001; Asgeirsdottir and McGeary, 2009).

89. The effects of problem drinking on employment appear to vary over the life cycle. Some evidence suggests that alcohol-dependent people aged 30-59 are more likely to be unemployed than their non-dependent counterparts while this relationship is not significant in younger and older age groups (Mullahy and Sindelar, 1993).

90. The relationship between problem alcohol drinking and employment is complex, as lack of employment in turn may be a cause of alcohol problems. An increase in unemployment was found to be associated with higher suicide rates for people below age 65, and with a higher alcohol-related mortality (Stuckler et al., 2009). Working conditions, such as long working hours and job insecurity, have been linked with an increased likelihood of high-risk alcohol consumption (Marchand *et al.,* 2011).

91. Heavy alcohol consumption during early adulthood seems to impact on people's lives in the long run, affecting employment opportunities. A US study found that those who drank regularly during early adulthood had lower "occupational prestige" 15 years later, than occasional drinkers, the finding was particularly strong among African-Americans (Sloan *et al.,* 2009).

92. Some types of jobs may be affected by problem alcohol drinking more than others. For instance, in England and Wales, higher alcohol-related mortality was found among workers of the broader alcohol industry, including bar managers and staff (Romeri *et al.,* 2007).

5.2. Alcohol and wages

93. There is some evidence that moderate drinking is positively associated with wages, with the underlying cause being that moderate drinkers have a better health and better job performance than heavy drinkers and abstainers (Hamilton and Hamilton, 1997; Barrett, 2002; Peters, 2004; Lee, 2003; MacDonald and Shields, 2001). Moderate drinkers spend more time with their colleagues out of work and they tend to be in good health, which influences positively their wages. They have a higher degree of life satisfaction than abstainers and have stronger social networks. Social and networking skills are important factors in the labour market and determine wages to a high degree. A positive impact of moderate drinking on wages was also found in Germany, increasing in size and significance with age, starting from age 35 (Ziebarth and Grabka, 2009).

94. However, Lye and Hirschberg (2010) reviewed evidence of the labour market outcomes of alcohol consumption and found older studies indicating that alcohol consumption boosted wages (e.g. above studies) may be biased by the omission of relevant variables and inadequate accounting for selection and reverse causality. In addition, Jarl and Gerdtham (2010) argue that the cross-sectional relationship between alcohol and wages may be misleading, because past drinking may affect wages too, therefore longitudinal data are required to assess the relationship. They conclude that the error in measuring the relationship between wages and drinking can come from confounding factors and from misclassification. The authors report three types of bias: (a) *former drinker error*, when lifetime abstainers and former drinkers are pooled into "abstainers" - this is a confounding problem and can be solved by adjusting for a number of covariates (e.g. health status); (b) *former abstainer error*, when lifelong light drinkers and former abstainers are pooled into "current light drinkers" - this is a confounding problem and a misclassification bias because lifelong light drinkers are richer than former abstainers, which can be solved as above, and by using unpooled categories of drinkers; and (c) *former heavy drinker error*, when lifelong light drinkers and ex-heavy drinkers are pooled into "current light drinkers", - this is a confounding problem and a misclassification bias because lifelong light drinkers are richer than ex-heavy drinkers, which can be solved as above and by using unpooled categories of drinkers.

95. In contrast, studies found heavy drinking to be associated with lower earnings (Mullahy and Sindelar, 1991; 1993). Problem drinking has a negative impact on both earnings and productivity, and it impairs people differently depending on their gender and personal traits associated with the propensity to be heavy drinkers (Jones and Richmond, 2006). In a study by Renna (2008), alcoholism (defined on the basis of DSMMD criteria), but not alcohol abuse, was found to be linked with reduced earnings, and the mechanism identified was reduced working hours, rather than a lower wage rate.

96. Some research examined gender differences in the relationship between alcohol use and wages, and found this to be stronger in men and weaker, or absent, in women (Soydemir and Bastida, 2006; Van Ours, 2004). These findings were deemed to reflect differences in the propensity to risk taking as a common determinant of both drinking behaviour and professional success.

5.3. Alcohol and labour productivity

5.3.1. Absenteeism

97. Alcohol abuse has acute and chronic health consequences such as injuries from accidents, psychiatric and somatic diseases, all of which are likely to increase short- and long-term sickness absences. In a number of countries, there is evidence for a link between high-risk alcohol consumption and sickness absence among men, though not in women (Roche *et al.*, 2008; Norström and Moan, 2009; Norström, 2006; Johansson *et al.*, 2008).

98. A curvilinear relation between alcohol intake and sickness absence was observed in Finland, where medically certified absences were 20% higher among lifetime abstainers, former and heavy drinkers compared with light drinkers (Vahtera *et al.*, 2002). Additional evidence for the U-shaped relationship between alcohol consumption and sickness absence is found in the literature (Salonsalmi *et al.*, 2009; Jarl and Gerdtham, 2012).

99. A more pronounced association between quantity of alcohol consumed and sickness absence was observed in men with low levels of education (Johansson *et al.*, 2008), while another study suggested that perceived co-worker support may attenuate the relationship between alcohol abuse and absenteeism (Bacharach *et al.*, 2010).

5.3.2. Early retirement

100. In addition to increasing the risk of sickness absence, alcohol abuse may also be a cause of early retirement on disability grounds, with receipt of disability benefits, in middle-aged workers (Upmark et al., 1999). Problem drinking was found to increase the risk of being the beneficiary of a disability pension in Finland, Norway, and Sweden (Salonsalmi *et al*., 2012; Skogen *et al.,* 2011; Sidorchuk *et al.,* 2012) although there is also evidence for a link between abstinence and receiving a disability pension (Upmark *et al.,* 1999; Skogen *et al*., 2011; Salonsalmi *et al.,* 2012).

5.3.3. Presenteeism

101. Worker productivity is not only affected by time away from work or early retirement, but also by a reduced performance at the workplace, known as presenteeism. The latter is far more difficult to assess than absenteeism, and there is no agreement on how it should be measured. Estimates are generally based on the costs associated with reduced output, increased number of errors, and failure to meet production targets (Schultz *et al.,* 2009). Alcohol abuse is a cause of presenteeism. The after-effects of heavy drinking include inability to concentrate at work, deterioration in job performance and relationships with colleagues, higher safety risks and reduced overall output. These in turn can lead to disputes, grievances, loss of working time and reduced productivity (ILO, 2012).

5.4. The value of lost productivity

102. A review of 22 studies from different countries observed a substantial economic burden of alcohol on society (Thavorncharoensap *et al.,* 2009). In the UK, nearly 11 million working days were lost by alcohol-dependent workers in 2001, and the total cost of absenteeism due to alcohol was estimated to be £1.7 billion (NICE, 2010). In the European Union alcohol accounted for an estimated €59 billion worth of lost productivity through absenteeism, unemployment and lost working years through premature death in 2002 (Anderson and Baumberg, 2006). Productivity losses were found to be an important part of alcohol-related costs in Scotland, France and Canada (Rehm *et al.,* 2009). In Ireland, the value of output lost due to alcohol-related absences from work was of €330 million (9% of the total costs of absences from work) and the cost of alcohol related accidents at work of €197 million (5% of total work-related accident costs), in 2007. The total cost of alcohol (€3.7 billion) represented 1.9% of GDP in Ireland in 2007 (Byrne, 2010).

103. Lost labour earnings were found to account for the largest part of the economic costs associated with alcohol abuse in the Unites States (Harwood, 2000). In 2006, lost productivity represented 72.2% of the total economic cost of excessive drinking. The bulk of the value of lost productivity was attributable to impaired productivity at work (46%) and premature mortality (40%), while absenteeism accounted for 2.6% of the total value (Bouchery *et al.,* 2011). In Australia, based on data from the 2001 National Drug Strategy Household Survey, the cost of alcohol-related absenteeism was estimated to be $437 million, or 36% of the cost due to all absenteeism (Pidd *et al.,* 2006).

SECTION 6. DISCUSSION

104. Alcohol consumption, on average, remained relatively stable in most OECD countries over the past 20 years. However, a closer look at trends and patterns of consumption in specific population groups reveals a more complex picture. Shedding light on some of the details of that picture can help the design and targeting of policies to tackle the harms associated with alcohol consumption.

105. The results of analyses of alcohol consumption in 20 OECD countries were presented in the previous sections of this paper. Analyses were conducted on the basis of individual-level alcohol consumption data from multiple waves of national health and lifestyle surveys, and included the identification of trends over time in overall drinking and in measures of hazardous and heavy episodic alcohol drinking, as well as regression-based analyses of social disparities in drinking patterns and the calculation of concentration indexes for individual countries.

6.1. Explanations for results on trends in alcohol consumption

106. Both aggregate national estimates and individual-level survey data show that trends over time in overall alcohol consumption remained virtually stable over the past 20 years. However, the same is not true for all population sub-groups. In particular, higher-risk drinking behaviours were found to be on the increase in young adults, especially women, in several countries examined.

107. Several reasons for these increases in alcohol drinking among the younger were suggested, including: the low cost of alcoholic beverages, the wider availability and accessibility of alcohol, alcohol promotion designed for younger drinkers, and changing social norms.

108. The cost of alcoholic beverages and how much young people can spend on alcohol are important determinants of consumption. Evidence from Finland shows that the rise in drinking among adolescents can be explained with an increased alcohol availability and an increase in money available to young people for their leisure time activities, including alcohol consumption (e.g. Finland, as discussed by Rahkonen and Ahlström, 1989). In addition, alcohol products have become more affordable in many countries, and this is notably true for younger consumers (Rabinovich *et al.*, 2009).

109. Availability and accessibility of alcohol are other main factors of consumption. Burki (2010) discussed possible causes for the increases in average consumption and emphasised the correlation between consumption and affordability (and availability) of alcohol, citing a report by the British Medical Association showing an increased affordability of alcohol in the UK between 1980 and 2006, and a parallel increase in per capita alcohol consumption of 1.5 l during the same period of time.

110. The emergence of new alcohol products (e.g. alcopops) may contribute to changing attitudes to alcohol drinking in young people, although it may not be directly correlated to increased consumption. The trend towards increased consumption in young people is consistent with increased commercial pressures and the formulation of alcohol products expressly designed to appeal to younger drinkers. For instance, marketing practices have evolved over time and advertising for alcohol targeting the younger has been associated with fun, music, seduction, social success, self-confidence, and sports. New patterns like harmful use of alcohol appear among the young. However, the emergence of these new products may not be directly correlated to increased consumption.

111. Social norms have changed over time, and drinking has become more acceptable in many societies. Hazardous drinking in young adults is a way of socializing. Drinking alcohol is often seen as the standard way of fitting in with peers. For the younger generations surrounded by "alcohol offers" (e.g. multiple delivery points, price offers, new products), the pursuit of excessive alcohol consumption has become part of a normal experience of young adulthood (Seaman and Ikegwuonu, 2010). Besides, younger generations have different motivations for drinking and different patterns of drinking compared to older generations, such as abusing of spirits for the purpose of getting drunk rapidly in order to unwind and have fun (Pabst et al, 2010). Another tentative explanation for increases in HED in young people may lie in the growing "pre-drinking" pattern that consists of consuming cheap alcohol before going out to party (Hughes and Bellis, 2012). Indeed, consumers can buy alcohol at a lower cost in supermarkets than in pubs, bars and nightclubs. This is in line with the observed shift from alcohol consumption from on- to off-premise in many countries (Hughes and Bellis, 2012).

112. A number of lower-income economies among OECD and Key Partner countries have lower levels of alcohol consumption (e.g. Indonesia, India, Turkey, China and Mexico, see Figure 1). Although no statistical relationship can be established, this may suggest that emerging economies might experiment higher levels of consumption as their revenue increases. To better understand the drivers of the level of alcohol consumption over time, extensions for further analysis could explore the effects of macro-level factors, including economic as well as environmental indicators.

6.2. Explanations for results on disparities in alcohol consumption

113. Social patterns of drinking tend to differ across countries, as they are largely the result of cultural and environmental influences, and of government policies in place in the countries concerned. For instance, in wine-producing countries wine is traditionally consumed with meals (popular in rural areas) whereas in northern European countries wine drinking is associated with modern living styles and is an element of social life (popular in urban areas) (Simpura and Karlsson, 2001). Social norms shape drinking behaviours: they determine when, in what contexts and how often people drink, and what levels of drinking are considered acceptable (SIRC, 1998).

114. Despite cultural differences, our analyses show common social disparities among countries in any alcohol drinking as well as in hazardous and heavy episodic drinking. Men and women who are more educated or have higher socioeconomic status are more likely to be alcohol drinkers in the past 12 months, but they often differ in their propensity to engage in hazardous drinking behaviours. Lower educated men are more likely than those with more education to engage in hazardous and heavy episodic drinking, while the opposite is true for women in most of the countries examined.

115. Several reasons for these disparities among population groups are suggested in the literature. Men and women consume alcohol in different ways, often with greater and more frequent consumption in men. However, women sometimes drink more than men in early adulthood, partly because they mature earlier (Ahlström and Österberg, 2005). However, drinking patterns change with parenthood, especially in women.

116. Other relevant predictors of alcohol drinking are related to education level and SES. People with higher socioeconomic status, and thus with higher incomes, tend to consume more alcohol and more frequently than those who are less affluent as alcohol is more affordable for them. Affluence and alcohol prices are important determinants of consumption. Another reason for the positive relationship between wealth and drinking is sometimes suggested: since people in lower-SES tend to have worse health than their higher-SES counterparts (OECD, 2011), they may consume less alcohol because of health problems.

117. The association between the social dimension and hazardous and heavy episodic drinking patterns varies between genders. Regarding men, those with lower education and lower SES background are more likely to be affected by hazardous and heavy episodic drinking than their counterpart in higher education and higher SES. This result is in line with most findings on inequalities in unhealthy lifestyle habits (e.g. smoking, physical inactivity, unhealthy diet, obesity), with a range of explanations including health information, time preferences, and intergenerational transmissions.

118. In contrast, for women, the social gradient is reverse, in particular for hazardous drinking. Women with higher education who end up taking better-paid jobs involving higher degrees of responsibility may drink more heavily because they have more stress, and more frequent occasions of socializing and going out with colleague. Besides, these occasions being typically in masculine work environment, they are confronted to higher limits of drinking (Com-Ruelle *et al.*, 2008). We tested this assumption on French data by disentangling women in high socioeconomic position in masculine work environment (in managerial /technical occupations) versus women in high socioeconomic position in non-masculine environment (in teaching /arts / health occupations). Findings confirm the hypothesis, showing that women with high SES in managerial / technical occupations are more likely to drink heavily compared to women with high SES in teaching /arts / health occupations. Other reasons for the positive association between the social dimension and hazardous drinking in women may be found in the greater social acceptability of alcohol use and abuse among women with high-SES compared to those with low-SES; and more exposure to alcohol use during formative years, greater postponement of childbearing and its responsibilities among the better educated (Huerta and Borgonovi, 2010). Another explanation is that women in high SES may want to imitate men's behaviours, and adopt HED as an innovative lifestyle -like it was for smoking some years ago-. It is often seen that women in high SES who adopt the innovation are then likely to diffuse it to other social groups (Grittner et al., 2012a). We may thus expect that female social inequalities in heavy drinking will resemble male inequalities in the future.

119. Part of the disparities in consumption along the socioeconomic dimension may find some explanations in the geographical distribution of alcohol outlets. Several pieces of evidence suggest the existence of complex relationships between alcohol outlet density, socioeconomic environment, and alcohol consumption and its related harms. First, some evidence from Australia, New Zealand, and the United States suggests that people living in more disadvantaged urban areas are exposed to substantially higher rates of alcohol outlet density (Livingston, 2011; Berke *et al*., 2010; Romley *et al.,* 2007). Second, a number of studies show a positive correlation between lower socioeconomic background and alcohol-related harms (see Section 5.3). Third, high outlet density is associated with a higher rate of injuries, violence, car accidents, domestic violence and child abuse (Fone *et al.*, 2012), with higher levels of alcohol consumption (Campbell *et al*, 2009; Popova *et al*, 2009), and with poorer non-injury health outcomes (Tatlow *et al*, 2000; Theall *et al*, 2009).

120. The relationship between alcohol consumption and ethnic backgrounds is not straightforward as it is compounded by many other factors such as religion, acculturation, and genetics. The differences observed by ethnic group may be associated with strong ethnic identity, strong family and local community ties, continuing links with the host country and maintaining religious values (Hurcombe *et al*, 2010). Some minority ethnic groups may have strong religious ties that forbid alcohol drinking.

121. Acculturation is a complex process, broadly understood as the adoption of cultural traditions and values of the host society by immigrant groups. In the US, higher acculturation among Hispanic is associated with a greater risk of alcohol abuse as well as HED in women (Chartier and Caetano, 2010).

122. In addition, genetic factors may influence alcohol drinking patterns, and certain genes have protective effects on the risk of alcoholism (Edenberg, 2007). For example, in Asian population, some

people tend to drink less since genetic predispositions create unpleasant effects like facial flushing and other aversive symptoms.

6.3. Implications of results

123. The trends observed in younger age groups have important implications regarding major public health and social concerns. The spread of high-risk drinking behaviours is associated with an increase in morbidity and mortality from accidents and injuries (the most common cause of death in adolescents and young adults) as well as violence and social disturbances. In Australia, the number of young women aged 18-24 being admitted to hospitals because of alcohol has doubled between 1998 and 2006 (Livingston, 2008). In the US, hospitalizations for alcohol overdoses increased by 25% among 18- to 24-year-olds between 1999 and 2008 and even more dramatically (by 76%) when alcohol use is in combination with drug (White *et al.*, 2011).

124. In addition, and most worryingly, early onset of drinking and high-risk drinking at young ages make problem drinking more likely in adult life. For instance, early drinkers are more likely to develop dependence from alcohol at some point in their lives, to have multiple and longer-lasting episodes of dependence (Hingson *et al.*, 2006).

125. Despite the complex relationships between socioeconomic backgrounds and alcohol consumption, it is clear that people in lower socioeconomic groups and ethnic minority groups are more affected by alcohol-related harms. Evidence from a number of countries converges in that sense, showing that the worst-off have higher rates of alcohol-related problems and mortality than the better-off (Najman *et al*, 2007;Hemstrom 2002; Harrison and Gardiner, 1999), even for the same level of drinking (Mäkelä and Paljarvi, 2008; Grittner *et al.*, 2012). Hence, the gradient of inequities in alcohol related harm is not consistently in line with the gradient of inequalities in alcohol use. This may be due to several factors: a higher frequency of heavy episodic drinking in low-SES people, the type and quality of alcohol consumed, differences in vulnerabilities (low-SES people less resilient to cope with stressors, biological vulnerabilities, higher rates of comorbidities (obesity, mental ill-health, drug use) contributing to inequities in alcohol-related harm), and differences in health care access (financial and non-financial barriers to health care use, difference in treatment within the system) (Loring, 2014).

126. Lastly, alcohol consumption may have larger societal impacts in addition to its health outcomes. Harmful forms of alcohol are of concerns for governments and private employers as they may negatively impact employment and wages, and reduce productivity at work. Alcohol abuse is indeed shown to have negative labour market outcomes, although with some mixed results according to drinking patterns and gender (see Section 5). Hence, preventing harmful use of alcohol and its related chronic diseases may lead to substantial gains in economic production through a healthier and more active workforce.

6.4. Limitations of the study

127. Findings presented in this report do not go without limitations. Important differences exist between alternative sources of data and estimates of alcohol use, which may lead to different conclusions on overall levels of, and trends in, consumption in different countries. Each source has strengths as well as limitations, and should be viewed as complementary to other sources. The choice of individual-level survey data as a basis for the analyses presented in this paper was driven by the need to identify detailed patterns of use in men and women, at different ages, and given different levels of education and socioeconomic status, accounting for individual characteristics which may confound simple comparisons of crude rates. The downside of this choice of data is that, however accurate they may be, survey methods (particularly sampling and interviewing approaches) are always associated with a certain degree of bias, which may vary across countries and surveys.

128. Differences in reporting alcohol consumption are suspected with relation to social and educational backgrounds. People with less education would be more likely to underreport alcohol consumption, which would lead to an over-estimation of the drinking problem in those with more education. Analyses of disparities in alcohol drinking –measured from interview surveys- along the social dimension may be affected by these differences in reporting. Hence, some caution should be taken with the results we present and their interpretation.

129. Despite these limitations, the analyses presented in this paper give some insights into differences in drinking patterns across population groups in OECD countries in the light of cultural, social, and environmental influences. Such analyses help to understand how harmful forms of drinking evolved over time, and to identify which population groups are most likely to engage in, and which are most affected by, hazardous and heavy episodic drinking. This work contributes to designing appropriate policy strategies to reduce harmful drinking.

REFERENCES

Ahlström S K and E L Österberg (2005), "International Perspectives on Adolescent and YoungAdult Drinking", Alcohol Research and Health, No. 4, Pages 258–268.

Anderson P, De Bruijn A, Angus K et al. (2009) Impact of alcohol advertising and media exposure on adolescent alcohol use: a systematic review of longitudinal studies. Alcohol Alcohol 44:229–43.

Anderson P., A. Cremona, A. Paton, C. Turner and P. Wallace (1993), The risk of alcohol. Addiction. 88(11):1493-1508.

Anderson, P. and B. Baumberg (2006), "Alcohol in Europe: a public health perspective", A report for the European Commission.

Asgeirsdottir, T.L. and K.A. McGeary (2009), "Alcohol and labor supply: the case of Iceland", *Eur J Health Econ*, Vol. 10, pp. 455-465.

Bacharach, S.B., P. Bamberger, M. Biron (2010), "Alcohol consumption and workplace absenteeism: the moderating effect of social support", *J Appl Psychol*, Vol. 95, No. 2, pp. 334-348.

Barrett, G. F. (2002). The effect of alcohol consumption on earnings. Economic Record 78(240), 79–96.

Berke, E.M., S.E. Tanski, E. Demidenko, J. Alford-Teaster, X. Shi, and J.D. Sargent, 2010. Alcohol Retail Density and Demographic Predictors of Health Disparities: A Geographic Analysis. Am J Public Health. 100(10): 1967–1971.

Bloomfield K, Grittner U, Kramer S, Gmel G. (2006), "Social inequalities in alcohol consumption and alcohol-related problems in the study countries of the EU concerted action 'Gender, Culture and Alcohol Problems: a Multi-national Study'". Alcohol and Alcoholism 41(suppl.1):i26-i36.

Boniface S and Shelton N, (2013) "How is alcohol consumption affected if we account for underreporting? A hypothetical scenario." European Journal of Public Health Vol. 23, No. 6, 1076–1081.

Booth, B.M. and W. Feng (2002), "The impact of drinking and drinking consequences on short-term employment outcomes in at-risk drinkers in six southern states", *The Journal of Behavioural Health Services and Research*, Vol. 29, No. 2, pp. 157-66.

Bouchery, E.E. et al. (2011), "Economic Costs of excessive Alcohol Consumption in the U.S., 2006", *American Journal of Preventive Medicine*, Vol. 41, No. 5, pp. 516–524.

Bray J. (2005), Alcohol use, human capital and wages. Journal of Labor Economics. 23:279-312.

Burki T. (2010), Changing drinking patterns: a sobering thought. The Lancet. Vol 376.

Byrne P., S. Jones, and R. Williams (2004), The association between cannabis and alcohol use and the development of the mental disorder. Current Opinion in Psychiatry. 17(4) 255-61.

Cai, L. (2007), Effects of health on wages of Australian men. Melbourne Institute Working Paper No. 2/07, University of Melbourne.

Caldwell TM. et al. (2008), "Lifecourse socioeconomic predictors of midlife drinking patterns, problems and abstention: findings from the 1958 British Birth Cohort Study", Drugs and Alcohol Dependence, 95: 269-78.

Campbell CA, Hahn RA, Elder R, Brewer R, Chattopadhyay S, Fielding J, Naimi TS, Toomey T, Lawrence B, Middleton JC. 2009. Guide to Community Preventive Services: The Effectiveness of Limiting Alcohol Outlet Density as a Means of Reducing Excessive Alcohol Consumption and Alcohol-Related Harms. *Am J Prev Med*, 6:556-569.

Casswell S, Pledger M, Hooper R (2003), "Socioeconomic status and drinking patterns in young adults." Addiction, 98:601-61.

Cawley J (2000), "Body Weight and Women's Labor Market Outcomes", Cambridge, MA, National Bureau of Economic Research, Working Paper No. 7841.

Chartier K, Caetano R. (2010) Ethnicity and health disparities in alcohol research. Alcohol Res Health. 33(1-2):152-60.

Chen ZA, 2007. "CONCINDC: Stata module to calculate concentration index with both individual and grouped data," Statistical Software Components S456802, Boston College Department of Economics, revised 30 Jul 2008.

Com-Ruelle L, Dourgnon P, Jusot F, Lengagne P (2008), "Les problèmes d'alcool en France : quelles sont les populations à risque ? ", IRDES Question d'Économie de la Santé No. 129.

De Bruijn A. (2012) Exposure to online alcohol marketing and adolescent's binge drinking: a cross sectional study on four European countries. In Anderson P, Braddick F, Reynolds J, Gual A (eds). Alcohol Policy in Europe: Evidence from AMPHORA. http://amphoraproject.net/w2box/data/e-book/Chapter%208%20-%20AM_E-BOOK_2nd%20edition%20-%20June%202013.pdf

DeSimone, J. and Wolaver, A. (2005), Drinking and academic performance in high school. National Bureau of Economic Research Working Paper #11035.

Dzúrová D, Spilková J, Pikhart H (2010), "Social inequalities in alcohol consumption in the Czech Republic: a multilevel analysis." Health Place, 16(3):590-597.

Ely M, R Hardy, N T. Longford, M E.J. Wadsworth (2001), "Methods of estimating individual levels of alcohol consumption in the general population", Alcohol Research UK.

Feng, W. et al. (2001), "The impact of problem drinking unemployment", *Health Economics*, Vol. 10, pp. 509-521.

Fone D, F Dunstan, J White, et al. 2012. Change In Alcohol Outlet Density And Alcohol-Related Harm To Population Health (CHALICE) BMC Public Health, 12:428

Furtwaengler N, and de Visser R (2013), "Lack of consensus in low_risk drinking guidelines", Drug and Alcohol Review; 32:11-18.

Gee G. Liang J, Bennett J et al. (2007), "Trajectories of Alcohol Consumption among Older Japanese Followed from 1987-1999", California Center for Population Research Working Paper Series CCPR-037-07.

Gray D. and E. Wilkes, (2010) Reducing alcohol and other drug related harm - Resource sheet no. 3 produced for the Closing the Gap Clearinghouse - AIWH report.

Grenard JL, Dent W, Stacy AW. (2013) Exposure to alcohol advertisements and teenage alcohol-related problems. Pediatrics 131:e369–79.

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, Vol. 23, No. 2, 332–339.

Grittner U, Kuntsche S, Graham K and Bloomfield K, (2012), "Social Inequalities and Gender Differences in the Experience of Alcohol-Related Problems", Alcohol and Alcoholism. 47(5):597-605.

Grossman M., Chaloupka F. J., and Sirtalan, I. (1995), An empirical analysis of alcohol addiction: Results from the monitoring the future panels. NBER WP 5200. Cambridge: NBER.

GSHS, (2004) Global School-based student health survey, World Health Organization, Geneva.

Hamilton, V. and B.H. Hamilton (1997), "Alcohol and earnings: does drinking yield a wage premium? ", The Canadian Journal of Economics/ Revue canadienne d'Economique, Vol. 30, No. 1 pp. 135-151.

Härkönen J and Mäkelä P, (2011) Age, Period and Cohort Analysis of Light and Binge Drinking in Finland, 1968-2008. Alcohol and Alcoholism. Vol 46 (3): 349-56.

Harrison L, Gardiner E. Do the rich really die young? Alcohol-related mortality and social class in Great Britain, 1988-94. Addiction. 1999 Dec;94(12):1871-80.

Harwood, H. J. (2000), "Updating Estimates of the Economic Costs of Alcohol Abuse in the United States: Estimates, Update Methods, and Data", Report prepared by The Lewin Group for the National Institute on Alcohol Abuse and Alcoholism.

Helasoja et al. (2007), The sociodemographic patterning of drinking and binge drinking in Estonia, Latvia, Lithuania and Finland, 1994–2002, BMC Public Health. 2007; 7: 241.

Hemstrom,O., 2002. Alcohol-related deaths contribute to socioeconomic differentials in mortality in Sweden.Eur. J. Public Health 12, 254–262.

Hibell B, U Guttormsson, S Ahlström, O Balakireva, T Bjarnason, A Kokkevi, and L Kraus. (2012) The 2011 ESPAD Report. Substance Use Among Students in 36 European Countries.

Hingson RW, Heeren T, Winter MR. "Age at drinking onset and alcohol dependence". Arch Pediatr Adolesc Med. 2006;160:739-746

Hill-McManus, D., Angus, C., Meng, Y., Holmes, J., Brennan, A., & Meier, P., (2014). Estimation of usual occasion-based individual drinking patterns using diary survey data. *Drug and Alcohol Dependence*, 134:136-143.

Hope A. (2013). 'Lead Us Not into Temptation': Adolescence and Alcohol Policy in Europe. Alcohol and Alcoholism pp. 1–2.

Huerta Maria C., and F Borgonovi (2010), "Education, Alcohol Use and Abuse among Young Adults in Britain." Social Science & Medicine 71(1):143-51.Hughes K, and Bellis M, 2012 "Drinking Environments" in: eds Anderson P, Møllers L and Galea G, Alcohol in the European Union-Consumption, harm and policy approaches. WHO 2012.

Hurcombe R, Bayley M, and Goodman A, (2010), "Ethnicity and alcohol: A review of the UK literature", Joseph Rowntree Foundation Report.

ILO (2012) SOLVE : integrating health promotion into workplace OSH policies : trainer's guide / International Labour Office. Geneva.

Jarl, J and Gerdtham, U (2010) "Wage penalty of abstinence and wage premium of drinking-A misclassification bias due to pooling of drinking groups?". Addiction Research & Theory, 18(3); 284-297.

Jarl, J. and U-G Gerdtham (2012), "Does drinking affect long-term sickness absence? A sample selection approach correcting for employment and accounting for drinking history", *Applied Economics*, Vol. 44, pp. 2811-2825.

Johansson, E., P. Böckerman, A. Uutela (2008), "Alcohol consumption and sickness absence: evidence from microdata", *European Journal of Public Health*, Vol. 19, No. 1, 19-22.

Jones SC and Magee CA (2011) Exposure to Alcohol Advertising and Alcohol Consumption among Australian Adolescents, Alcohol and Alcoholism Vol. 46, No. 5, pp. 630 –63.

Jones, A.S. and D.W. Richmond (2006), "Causal effects of alcoholism on earnings: estimates from the NLSY", Health Economics, Vol. 15, pp. 849–871.

Kakwani, N.C., A. Wagstaff, and E. Van Doorslaer, Socioeconomic inequalities in health: Measurement, computation and statistical inference. Journal of Econometrics, 1997. 77(1):87-104.

Kanny D., Y Liu, and R D. Brewer (2011), "Binge Drinking — United States, 2009", CDC Health Disparities and Inequalities Report – United States 2011, Morbidity and Mortality Weekly Report, Vol. 60(Suppl):101-104.

Kehoe T, Gmel G, Shield KD, et al. (2012), "Determining the best population-level alcohol consumption model and its impact on estimates of alcohol-attributable harms", Population Health Metrics, 10:6.

Kerr W. C., Greenfield T. K., Bond J., Ye Y., Rehm J. (2009), "Age–period–cohort modelling of alcohol volume and heavy drinking days in the US National Alcohol Surveys: divergence in younger and older adult trends." Addiction; 104: 27–37.

Kuntsche, E., Rehm, J., & Gmel, G. (2004), Characteristics of binge drinkers in Europe. Social Science & Medicine, 59, 113e127.

Kuntsche, S., Gmel, G., Knibbe, R. A., Kuendig, H., Bloomfield, K., Kramer, S., & Grittner, U. (2006). Gender and cultural differences in the association between family roles, social stratification, and alcohol use: A European cross-cultural analysis. Alcohol and Alcoholism, 41, Suppl. 1, i37-i46.

Lakdawalla, D. and T. Philipson (2002), "The Growth of Obesity and Technological Change: A Theoretical and Empirical Examination", Working Paper 8946, http://www.nber.org/papers/w8946.

Lee, Y.L. (2003), "Wage effects of drinking in Australia", *The Australian Economic Review*, Vol. 36, No. 3, pp. 265–82.

Leigh, J. P. (1996), Alcohol abuse and job hazards. Journal of Safety Research, 27, 17-32.

Lemmens P, Knibbe R A and Tan F (1988), "Weekly recall and diary estimates of alcohol consumption in a general population survey", Journal of Studies on Alcohol 49, 131–135.

Livingston M (2011), "Using geocoded liquor licensing data in Victoria−The socioeconomic distribution of alcohol availability in Victoria", Victorian Health Promotion Foundation (VicHealth), Carlton, Australia.

Loring B, 2014, "Alcohol and inequities - Guidance for addressing inequities in alcohol-related harm", WHO Europe.

Lye, J. and Hirschberg, J. (2010), Alcohol consumption and human capital: a retrospective study of the literature. Journal of Economic Surveys. 24: 309–338.

MacDonald, Z. and M.A. Shields (2001), "The impact of alcohol consumption on occupational attainment in England". *Economica*, Vol. 68, pp. 427-453.

MacDonald, Z. and M.A. Shields (2004), "Does problem drinking affect employment? ", *Evidence from England, Health Economics,* Vol. 13, No. 2, pp. 139-155.

Maggs, J. L., Patrick, M. E., & Feinstein, L. (2008), "Childhood and adolescent predictors of alcohol use and problems in adolescence and adulthood in the National Child Development Study". Addiction., 103, 1-6.

Mäkelä P., G. Gmel, U. Grittner, H. Kuendig, S. Kuntsche, K. Bloomfield, R. Room.(2005), "Drinking and gender differences in drinking in Europe - A comparison of drinking patterns in European countries" Chapter 2, In Bloomfield et al. Gender, Culture and Alcohol Problems: A Multi-national Study, Project Final Report. Berlin: Charité Universitätsmedizin Berlin, January 2005.

Marchand, A., A. Parent-Lamarche and M.E. Blanc (2011), "Work and high-risk alcohol consumption in the Canadian Workforce", International Journal of Environmental Research and Public Health, 8, 2692-2705.

McKee M, Pomerleau J, Robertson A, Pudule I, Grinberga D, Kadziauskiene K, Abaravicius A, Vaask S (2000), "Alcohol consumption in the Baltic Republics." J Epidemiol Community Health, 54, pp. 361-366.

Meier PS, Meng Y, Holmes J, Baumberg B, Purshouse R, Hill-McManus D, et al., (2013), "Adjusting for unrecorded consumption in survey and per capita sales data: Quantification of impact on gender- and age-specific alcohol-attributable fractions for oral and pharyngeal cancers in Great Britain". Alcohol and Alcoholism, 48(2): 241-249.

Midanik L. (1982), "The Validity of Self-Reported Alcohol Consumption and Alcohol Problems: A Literature Review". British Journal of Addiction. 77(4): 357–382.

Morgan K, McGee H, Watson D, Perry I, Barry M, Shelley E, Harrington J, Molcho M, Layte R, Tully N, van Lente E, Ward M, Lutomski J , Conroy R, Brugha R (2008). "SLÁN 2007: Survey of Lifestyle, Attitudes & Nutrition in Ireland". Main Report. Dublin: Department of Health and Children.

Mossakowski, K. N. (2008), "Is the duration of poverty and unemployment a risk factor for heavy drinking?" Social Science & Medicine, 67, 947-955.

Mullahy, J. and J.L. Sindelar (1991), "Gender differences in labour market effects of alcohol dependency", *American Economic Review*, Vol. 81, pp. 161–165.

Mullahy, J. and J.L. Sindelar (1993), "Alcoholism, work, and income", *Journal of Labor Economics*, Vol. 11, pp. 494–519.

Najman J, Toloo G, Williams G, (2007), Increasing socio-economic inequalities in drug-induced deaths in Australia: 1981 – 2002, Drug and Alcohol Review, 2008, Vol. 27, No. 6 : Pages 613-618.

National information and Alcohol in Moderation (2012), accessed on 8 Oct 2012 at : http://www.drinkingandyou.com/site/pdf/SENSIBLE%2520DRINKING.pdf

National Institute for Health and Clinical Excellence (2010), Alcohol-use disorders: preventing harmful drinking, Costing report, NICE public health guidance 24.

NHS (2008), Statistics on alcohol: England.

Norström, T. (2006), "Per capita alcohol consumption and sickness absence", *Addiction*, Vol. 101, pp. 1421–7.

Norström, T. and I.S. Moan (2009), "Per capita alcohol consumption and sickness absence in Norway", *European Journal of Public Health*, Vol. 19, No. 4, 383-388.

O'Donnell O., E. Van Doorslaer, A. Wagstaff and M. Lingelow (2008), "Analyzing Health Equity Using Household Survey Data", The World Bank, Washington D.C.

OECD Health at a Glance 2011. OECD Paris.

OECD, 2015. Tackling Harmful Alcohol Use, Economics and Public Health Policy, OECD Paris.

Pabst A, Kraus L, Piontek D, Mueller S, (2010), "Age, Period, and Cohort Effects on time trends in Alcohol Consumption in the German Adult Population", SUCHT, 56(5):349-359.

Peters, B.L. (2004), "Is there a wage bonus from drinking? Unobserved heterogeneity examined", *Applied Economics*, Vol. 36, pp.2299–2315.

Pidd, K.J. et al. (2006), "Estimating the cost of alcohol-related absenteeism in the Australian workforce: the importance of consumption patterns", *Medical Journal of Australia*, Vol. 185, pp. 637-641.

Popova S, N Giesbrecht, D Bekmuradov and J Patra (2009) Hours and Days of Sale and Density of Alcohol Outlets: Impacts on Alcohol Consumption and Damage:A Systematic Review; Alcohol & Alcoholism Vol. 44, No. 5, pp. 500–516.

Rabinovich L, Brutscher P, de Vries H, Tiessen J, Clift J, Reding A (2009), "The affordability of alcoholic beverages in the European Union - Understanding the link between alcohol affordability, consumption and harms" Rand Europe Report.

Rahkonen O. and Ahlstrom S. (1989), "Trends in Drinking Habits Among Finnish Youth from 1973 to 1987", British Journal of Addiction, 84 (9):1075-1083.

Ramstedt M and Hope A (2004), "The Irish drinking culture - Drinking and drinking-related harm, a European comparison", accessed on 8 Oct 2012 at : http://www.drugsandalcohol.ie/5841/

Rehm J. and Eschmann S. 2002. Global monitoring of average volume of alcohol consumption, Sozial-und Praventivmedizin. 47(1):48-58.

Rehm J, R Room, M Monteiro, G Gmel, K Graham, N Rehn, CT. Sempos, U Frick and D Jernigan, (2004), "Chapter 12: Alcohol use", In Ezzati M, Lopez AD, Rodgers A, Murray CJL. eds, Comparative Quantification of Health Risks: Global and Regional Burden of Diseases Attributable to Selected Major Risk Factors, World Health Organization, Geneva.

Rehm J. et al. (2009), "Global burden of disease and injury and economic cost attributable to alcohol use and alcohol-use disorders". The Lancet. 373:223-33.

Rehm J. et al. (2010a), "The relation between different dimensions of alcohol consumption and burden of disease: an overview". Addiction, 105, 817–843.

Rehm J, Kehoe T, Gmel G, et al. (2010b) "Statistical modeling of volume of alcohol exposure for epidemiological studies of population health: the US example", Population Health Metrics, 8:3.

Renna, F. (2007), The economic cost of teen drinking: late graduation and lowered earnings. Health Economics 16: 407–419.

Roche, A.M. et al. (2008), "Workers' drinking patterns: the impact on absenteeism in the Australian work-place",*Addiction*, Vol. 103, pp. 738–748.

Romeri, E., A. Baker and C. Griffiths (2007), "Alcohol-related deaths by occupation, England and Wales", 2001-2005. Health Statistics Quarterly, 35: 6-12.

Romley JA, Cohen D, Ringel J, Sturm R. 2007. Alcohol and environmental justice: the density of liquor stores and bars in urban neighborhoods in the United States. J Stud Alcohol Drugs.68(1):48-55.

Salonsalmi, A. et al. (2009), "Drinking habits and sickness absence: the contribution of working conditions", *Scandinavian Journal of Public Health*, Vol. 37, pp. 846-854.

Salonsalmi, A. et al. (2012), "Drinking habits and disability retirement", *Addiction*, Vol. 107, pp. 2128-2136.

Schultz, A.B., C.Y. Chen and D.W. Edington (2009), "The cost and impact of health conditions on presenteeism to employers: a review of the literature", Pharmacoeconomics, Vol. 27, No. 5, pp. 365-78.

Seaman P, and Ikegwuonu T, 2010 "Drinking to belong - Understanding young adults' alcohol use within social networks". Joseph Rowntree Foundation Report.

Shield K and Rehm J, (2012), “Difficulties with telephone-based surveys on alcohol consumption in high-income countries: the Canadian example”, International Journal of Methods in Psychiatrics Research, 21(1):17-28.

Sidorchuk, A. et al. (2012), "Alcohol use in adolescence and risk of disability pension: a 39 year follow-up of a population-based conscription survey", PLoS ONE, Vol, 7, No. 8.

Simpura J. and Karlsson T. (2001), “Trends in drinking patterns in fifteen European countries, 1950-2000. A collection of country reports” (Helsinki, Stakes).

SIRC (1998), “Social and Cultural Aspects of Drinking” Report to the European Commission, The Social Issues Research Centre, Oxford. Accessed on 8 Oct 2012 at http://www.sirc.org/publik/social_drinking.pdf

Skogen, J.C. et al. (2011), "Alcohol consumption, problem drinking, abstention and disability pension award, The Nord-Trøndelag Health Study (HUNT) ", *Addiction*, Vol. 107, pp. 98-108.

Sloan, F.A. et al. (2009), "Racial differences in the relationship between alcohol consumption in early adulthood and occupational attainment at midlife", *Am J Public Health*, Vol. 99, pp. 2261-2267.

Soydemir, G.A. and E. Bastida (2006), "Alcohol use and earnings: findings from a community based study", *Eastern Economic Journal*, Vol. 32, No. 4.

Stampfer MJ., JH. Kang, J. Chen, R. Cherry, and F. Grodstein (2005), Effects of moderate alcohol consumption on cognitive function in women. New England Journal of Medicine. 352(3):245-53.

Stockwell T, Donath S, Cooper-Stanbury M, Chikritzhs T, Catalano P, Mateo C. (2004), “Under-reporting of alcohol consumption in household surveys: a comparison of quantity–frequency, graduated–frequency and recent recall”, Addiction, 99(8); 1024–1033.

Stuckler, D. et al. (2009), "The public health effect of economic crises and alternative policy responses in Europe: an empirical analysis", *Lancet*, Vol. 374, pp. 315–323.

Tatlow JR, Clapp JD, Hohman MM. 2000. The relationship between the geographic density of alcohol outlets and alcohol-related hospital admissions in San Diego County. *J Epidemiol Community Health*, 25(1):79-88.

Thavorncharoensap M, Teerawattananon Y, Yothasamut J, Lertpitakpong C, Chaikledkaew U. (2009), The economic impact of alcohol consumption: A systematic review. Substance treatment, prevention and policy 4(20).

Theall KP, Scribner R, Cohen D, Bluthenthal RN, Schonlau M, Lynch S, Farley TA. 2009. The neighborhood alcohol environment and alcohol-related morbidity. *Alcohol Alcohol*, 44(5):491-499.

Townshend JM and Dukat T (2002), “Patterns of alcohol drinking in a population of young social drinkers: a comparison of questionnaire and diary measures”, Alcohol and Alcoholism, 37(2);187-92.

Upmark, M., J. Möller and A. Romelsjö (1999), "Longitudinal, population-based study of self-reported alcohol habits, high levels of sickness absence, and disability pensions", *J Epidemiol Community Health*, Vol. 53, pp. 223–29.

Vahtera, J. et al. (2002), "Alcohol intake and sickness absence: a curvilinear relation", *American Journal of Epidemiology,* Vol. 156, pp. 969-976.

Van Ours, J.C. (2004), "A pint a day raises a man's pay; but smoking blows that gain away", *Journal of Health Economics*, Vol. 23, pp. 863 – 886.

Wagstaff A. 2005. The bounds of the concentration index when the variable of interest is binary, with an application to immunization inequality. *Health Economics* **14** : 429-432.

White AM., RW. Hingson, I-J Pan, H-Y Yi (2011), "Hospitalizations for Alcohol and Drug Overdoses in Young Adults Ages 18-24 in the United States, 1999-2008: Results from the Nationwide Inpatient Sample", Journal of Studies on Alcohol and Drugs, 72(5):774-786

WHO (2007), Alcohol and injuries: emergency department studies in an international perspective. Eds: Cheryl J. Cherpitel, Guilherme Borges, Norman Giesbrecht, Daniel Hungerford, Margie Peden, Vladimir Poznyak, Robin Room, Tim Stockwell.

WHO (2011) "Global status report on alcohol and health". World Health Organization 2011. Switzerland.

WHO (2014) "Global status report on alcohol and health". World Health Organization 2014. Switzerland.

William CK, TK Greenfield, J Bond, Y Ye and J Rehm (2008) "Age-period-cohort modelling of alcohol volume and heavy drinking days in the US National Alcohol Surveys: Divergence in younger and older adult trends", Addiction. 104, 27-37.

Wolaver, A. (2007), Does drinking affect grades more for women? Gender differences in the effects of heavy episodic drinking in college. The American Economist 51: 72–88.

Zhao J., T. Stockwell, S. Macdonald, (2009), Non–response bias in alcohol and drug population surveys, Drug and Alcohol Review, 28: 648–657.

Ziebarth, N.R. and M.M. Grabka (2009), "In vino pecunia? The association between beverage-specific drinking behavior and wages", *Journal of Labor Research,* Vol. 30, pp. 219–244.

ANNEXES

Annex 1 – Data sources

Annex 2 – Data comparability

Annex 3 – Correction for underreporting bias

Annex 4 – Trends of drinking patterns by age group (two countries per page)

Annex 5 – Trends of drinking patterns by education level and by socioeconomic status (one country per page)

Annex 1 – Data sources

Country	Survey name	Data provider
Australia	National Health Survey	Australian Bureau of Statistics
Canada	National Health Population Survey and Canadian Community Health Survey	Statistic Canada
Chile	Servicio Nacional de Drogas y Alcohol (ex-CONACE)	Ministry of Interior and Public Security
Czech Republic	European Health Interview Survey in the Czech Republic (EHIS)	Institute of Health Information and Statistics (UZIS)
England	Health Survey for England	Office for Population Censuses and Surveys (1991-1993), then (since 1994) conducted jointly by the National Centre for Social Research (NatCen) and the Health and Social Survey Research group at the Department of Epidemiology at University College London
Finland	Finrisk	National Institute for Health and Welfare (THL)
France	Enquête Santé et Protection Sociale	Institute for Reseach and Information in Health Economics
Germany	Epidemiological Survey on Substance Abuse	GESIS - Leibniz Institute for the Social Sciences
Hungary	European Health Interview Survey (EHIS)	Hungarian Central Statistical Office
Ireland	Survey on Lifestyle And Nutrition	Irish Social Science Data Archive
Italy	Multiscopo Aspect of Daily Life	Italian National Institute of Statistic
Japan	National Survey on Alcohol Drinking and Lifestyle	Tottori University
Korea	Korean National Health and Nutrition Examination Survey	Jointly carried out by the Korean Institute for Health and Social Affairs and the Korean Health Industry Develpment Institute
New Zealand	National Health Survey	Ministry of Health
Portugal	General Population Survey on Psychoactive Substances	carried out by PhD. C. Balsa from CESNova/Sociology and Human Sciences School/ NOVA University of Lisbon, after a call from the Instituto da Droga e da Toxicodependência, IP.
Slovak Republic	Európsky prieskum zdravia 2009 (EHIS)	National Health Information Centre (Ministry of Health)
Slovenia	Anketa o zdravju in zdravstvenem varstvu 2007 (EHIS)	Institute of Public Health
Spain	Encuesta Nacional de Salud de Espana	Instituto Nacional de Estadistica and Ministry of Public Health, Social Services and Equality
Switzerland	Swiss Health Survey	Swiss Federal Statistical Office
United States	National Health and Nutrition Examination Survey / and National Survey on Drug Use and Health	NHANES: National Center for Health Statistics (NCHS - CDC) / NSDUH: Substance Abuse and Mental Health Services Administration (SAMHSA)

Annex 2 – Data comparability

Country	Drinking status in the past 12 months	Quantity of drinking	Frequency of drinking	Average weekly amount of pure alcohol (grams)	Hazardous drinking (dichotomous)	Heavy Episodic drinking (at least once per week)	Original age inclusion Criteria	Definition of socio-economic status
Australia (1995, 2001,2004-05,2007-08)	whether the individual consumed alcohol in the past 12 months (1.yes; 0.no)	Intake of alcohol derived from information about the types and quantities of alcoholic drinks consumed on the three most recent days in the week prior to the interview on which alcohol was consumed	How often did you have an alcoholic drink of any kind in the last 12 months? 1. Every day 2. 5 to 6 days a week 3. 3 to 4 days a week 4. 1 to 2 days a week 5. 2 to 3 days a month 6. About 1 day a month 7. Less often than 1 day a month	Extrapolated by using Frequency and Quantity Assumption: 1drink=10grams	*2001, 2005 and 2008: Men : weekly consumption ≥ 210g of pure alcohol Women : wekly consumption ≥ 140g of pure alcohol	*2005 and 2007/08 : In the last 12 months, how often have you had [7 or more if male; or 5 or more if female] standard drinks in a day?	age 18+ (2008: 15+)	Equivalised household income in deciles
Canada (1995, 2001, 2003, 2005, 2007, 2009)	whether the individual consumed alcohol in the past 12 months (1.yes; 0.no)	*1995-2001-2003-2005-2007-2009: number of drinks in the past week.	During the past 12 months, how often did you drink alcoholic beverages? Less than once a month Once a month 2 to 3 times a month Once a week 2 to 3 times a week 4 to 6 times a week Every day	Extrapolated using number of drinks each day last week. Assumption: 1drink=13.6grams	Men : weekly consumption ≥ 210g of pure alcohol Women : wekly consumption ≥ 140g of pure alcohol	*1995: #times having 5 or more drinks per occasion in past 12 months *2001-2003-2005-2007-2009 : Frequency of having 5 or more drinks per occasion	age 15+	Income brackets and size of the household are used to derived equivalised income groups: -Lowest ("no income and less than $15,000") -Middle-low ("$15,000 - $29,999" and 3+ household members) -Middle ("$15,000 - $29,999" and 1-2 hh members; "$30,000 - $49,999" and 3+ hh members) -Middle-high ("$30,000 - $49,999" and 1-2 hh members; "$50,000 - $79,999" and 3+ hh members) -Highest ("$50,000 - $79,999" and 1-2 hh members; "$80,000 - more")
Chile (2008-2010)	whether the individual consumed alcohol in the past 12 months (1.yes; 0.no)	*2008-10 : How many drinks do you drink in a typical drinking day? 0-2 3-4 5-6 7-8 9+	*2008-10 : How often do you consume alcohol? Never once a month 2-4 a month 2-3 a week 4+ a week	N.A.	Derived from questions on quantity and frequency, using mid-point of category. Men : weekly consumption ≥ 210g of pure alcohol Women : wekly consumption ≥ 140g of pure alcohol	*2008-10 : Frequency of having 6 or more drink per occasion	age 12-64	Occupation-based SES: -Lowest -Middle-low -Middle -Middle-high -Highest
Czech Republic (2008)	whether the individual consumed alcohol in the past 12 months (1.yes; 0.no)	N.A.	N.A.	N.A.	N.A.	Frequency of having 6 or more drinks of any alcoholic drink in the same occasion	age 16+	Household income decile
England (1991--2009)	whether the individual consumed alcohol in the past 12 months (1.yes; 0.no)	*1991-2002: #drinks on average on typical day of drinking *1998-2009: heaviest consumption in the past week	*1991-2009: Frequency: Almost every day Five or six days a week Three or four days a week Once or twice a week Once or twice a month Once every couple of months Once or twice a year Not at all in the last 12 months/Non-drinker	N.A.	N.A.	*1998-2009: Derived from the number of units drunk on heaviest day in last 7 days	age 16+	Occupation-based SES: -Lowest (unskilled manual) -Middle-low (semi-skilled manual) -Middle (skilled non-manual, skilled manual) -Middle-high (managerial technical) -Highest (professional)

Note: N.A. means Not Applicable.

Annex 2- Data comparability (continued)

Country	Drinking status in the past 12 months	Quantity of drinking	Frequency of drinking	Average weekly amount of pure alcohol (grams)	Hazardous drinking (dichotomous)	Heavy Episodic drinking (at least once per week)	Original age inclusion Criteria	Definition of socio-economic status
Finland (1997-2002-2007)	whether the individual consumed alcohol in the past 12 months (1.yes; 0.no)	How many glasses (restaurant measures) or bottles did you drink during the last 7 days? by type of beverages (Beer, Strong cider or long drinks, Spirits, Red wine, Other kind of wine)	How often did you drink the following amounts daily during the last 12 months? + quantity in #drinks *2007: Daily doses At least 4 times a week 2-3 times a week About once a week 1-2 times a month 3-10 times a year 1-2 times a year Never *2002 :Daily doses Never Once a month or more seldom 2-3 times a month About once a week 2-3 times a week 4-5 times a week 6-7 times a week *1997: Daily doses a few times a week about once a week	Extrapolated based on last week's consumption Provided by the National Institute for Health and Welfare	Men : weekly consumption ≥ 210g of pure alcohol Women : wekly consumption ≥ 140g of pure alcohol	N.A.	age 25-74	*1997-2002-2007: annual household's income (before tax deduction (with 9 categories, with different brackets across years). (not equivalised) -Lowest (the lowest 2 brackets) -Middle-low (the 2 following brackets) -Middle (the 2 following brackets) -Middle-high (the 2 following brackets) -Highest (the highest bracket)
France (2002, 2004, 2006, 2008, 2010)	whether the individual consumed alcohol in the past 12 months (1.yes; 0.no)	How many drinks do you drink in a typical drinking day? 1 - 2 drinks 3 - 4 drinks 5 - 6 drinks 7 - 9 drinks 10 drinks or more	How often do you consume alcohol? Never once a month or less 2 - 4 times a month 2 - 3 times a week 4 - 6 times a week Everyday	N.A.	Derived from questions on quantity and frequency, using mid-point of category. Men : weekly consumption ≥ 210g of pure alcohol Women : wekly consumption ≥ 140g of pure alcohol	Combien de fois vous arrive-t-il de boire 6 verres standard ou plus au cours d'une même occasion ? Jamais Moins d'1 fois par mois 1 fois par mois 1 fois par semaine Chaque jour ou presque	age 18+	Occupation-based SES: -Lowest (manual worker) -Middle-low (farmers, craftsman) -Middle (clerk) -Middle-high (managerial technical) -Highest (professional)
Germany (1995, 1997, 2000, 2003, 2006, 2009)	whether the individual consumed alcohol in the past 12 months (1.yes; 0.no)	How much do you drink on those typical days when you drink? Beer (#drinks) Wine Spirit Alcopop (2006 and 2009 only)	How many days in the last 30 days (*or in the past 12 months, if not drinking in past 30 days*) have you drunk? Beer (#days) Wine Spirit Alcopop (2006 and 2009 only)	Extrapolated using #drinks and #days in past 30 days or past 12 months	Men : weekly consumption ≥ 210g of pure alcohol Women : wekly consumption ≥ 140g of pure alcohol	How many days have you had a total of 5 or more drinks in past 30 days? *(not specified on one occasion)*	age 18-60 for 1995-2003; age 18-65 for 2006-2009	Household income groups (not equivalised) : -Lowest (<750 Eur) -Middle-low (750-1250 Eur) -Middle (1250-2000 Eur) -Middle-high (2000-3000 Eur) -Highest (>=3000 Eur)
Hungary (2009)	whether the individual consumed alcohol in the past 12 months (1.yes; 0.no)	How much alcohol did you drink every day during the last week? Each day in the past week, By type of beverages (in dl)	*2009: How often did you drink? 1. Every day 2. 4-6 times a week 3. 2-3 times a week 4. 2-4 times a month 5. monthly or less 6. never	Extrapolated using #drinks in the past 7 days. Assumption for 2009: 1drink=20grams	Men : weekly consumption ≥ 210g of pure alcohol Women : wekly consumption ≥ 140g of pure alcohol	*2009 : Frequency of having 6 or more drink per occasion	age 16+	Occupation-based SES: -Lowest (Elementary occupations) -Middle-low (Skilled agricultural and fishery workers; Craft and related trades workers; Plant and machine operators and assemblers) -Middle (Clerks; Service workers and shop and market sales workers) -Middle-high (Legislators, senior official, managers; Technicians and associate professionals) -Highest (Professionals)

Note : N.A. means Not Applicable.

Annex 2- Data comparability (continued)

Country	Drinking status in the past 12 months	Quantity of drinking	Frequency of drinking	Average weekly amount of pure alcohol (grams)	Hazardous drinking (dichotomous)	Heavy Episodic drinking (at least once per week)	Original age inclusion Criteria	Definition of socio-economic status
Ireland (1998, 2002, 2007)	whether the individual consumed alcohol in the past 12 months (1.yes; 0.no)	*1998-2002-2007: How many drinks containing alcohol do you have on a typical day when you are drinking? *2007: During the past 7 days how many standard drinks of any alcoholic beverage did you have each day?	*1998-2002: On how many days during a typical week did you usually drink alcohol, on average? *2007: How often do you have a drink containing alcohol? Never Monthly or less 2-4 times a month 2-3 times a week 4 or more a week	Extrapolated *1998-2002: using #drinks on typical day x #days in typical week *2007: using #drinks in past 7 days Assumption: 1drink=10grams	Men : weekly consumption ≥ 210g of pure alcohol Women : wekly consumption ≥ 140g of pure alcohol	*2002-2007: Frequency of having 6 or more drink per occasion	age 18+	Household income groups (in 2007, 2007) (not equivalised) : -Lowest (<380€ per week) -Middle-low (380-500€ per week) -Middle (500-760€ per week) -Middle-high (760-950€ per week) -Highest (>=950€ per week)
Italy (2005 --2010)	whether the individual consumed alcohol in the past 12 months (1.yes; 0.no)	N.A.	N.A.	N.A.	N.A.	*2005-2010: In the last 12 months, have you had more than 6 drinks on one occasion? Yes/No. No time reference to be able to derive binge per week.	age 11+	Occupation-based SES: -Lowest (Foreman, subordonate workers, trainee) -Middle-low (Self-employed workers, Social and cooperative Production goods and services) -Middle (Clerk; Intermediate) -Middle-high (Entrepreneur, Freelance) -Highest (Executive, Prefessionals, Manager)
Japan	whether the individual consumed alcohol in the past 12 months (1.yes; 0.no)	Number of standard drinks (units) per week	1=2times or more/day 2=once /day 3=5-6days/week 4=3-4days/week 5=1-2days/week 6=2-3days/month 7=1day/month 8=6-11days/year 9=1-5days/year 10= 0 day/year 88=never drinker	Extrapolated from quantity and frequency	Men : weekly consumption ≥ 210g of pure alcohol Women : wekly consumption ≥ 140g of pure alcohol	How often do you drink 6 units or more at once.	Age 20+	Occupation-based SES: -Lowest (Transportation, preservation, Agriculture, forest, fishery) -Middle-low (Production, assembling, car maintenance, carpenter, electric construction, farm and marine industries) -Middle (Storekeeper, store clerk, barber, beautician, cook, waitress, home help) -Middle-high (Clerk) -Highest (Professional, Managerial technical)
Korea (1998, 2001, 2005, 2008)	whether the individual consumed alcohol in general (1.yes; 0.no) (no time reference)	*1998-2001: 1-2 cups soju 3-4 cups soju 1 bottle soju 2 bottles 3 bottles *2005-2008 1-2 cups 3-4 cups 5-6 cups 7-9 cups 10+ cups	*1998-2008: Categories are different for each year *example 2008 no <1 per month 1 per month 2-4 per month 2-3 per week >=4 per week never drinking	N.A.	*2005-2008 : Men : weekly consumption ≥ 210g of pure alcohol Women : wekly consumption ≥ 140g of pure alcohol	N.A.	1998: age 20+; 2001-2008: age 12+	Income in quartile
New Zealand (1996/97, 2002/03, 2006/07)	whether the individual consumed alcohol in the past 12 months (1.yes; 0.no)	How many drinks containing alcohol do you have on a typical day when you are drinking? 1=1 or 2, 2=3 or 4, 3=5 or 6, 4=7 to 9, 5=10 or more	How often do you have a drink containing alcohol? 1=monthly or less, 2=up to 4 times a month, 3=up to 3 times a week, 4=4 or more times a week	N.A.	Derived from questions on quantity and frequency, using mid-point of category. Men : weekly consumption ≥ 210g of pure alcohol Women : wekly consumption ≥ 140g of pure alcohol	How often do you have six or more drinks on one occasion? 1=never, 2=less than monthly, 3=monthly, 4=weekly, 5=daily or almost daily	age 16+	Household income groups: (not equivalised) -Lowest (<$15,000) -Middle-low ($15,000-$25,000) -Middle ($25,000-$40,000) -Middle-high ($40,000-$70,000) -Highest ($70,000 and more)

Note: N.A. means Not Applicable.

Annex 2- Data comparability (continued)

Country	Drinking status in the past 12 months	Quantity of drinking	Frequency of drinking	Average weekly amount of pure alcohol (grams)	Hazardous drinking (dichotomous)	Heavy Episodic drinking (at least once per week)	Original age inclusion Criteria	Definition of socio-economic status
Portugal (2007)	whether the individual consumed alcohol in the past 12 months (1.yes; 0.no)	N.A.	N.A.	N.A.	N.A.	Frequency of having 6 or more drinks of any alcoholic drink in the same occasion	age 15-64	Occupation-based SES: -Lowest (Elementary occupations) -Middle-low (Skilled agricultural and fishery workers; Craft and related trades workers; Plant and machine operators and assemblers) -Middle (Clerks; Service workers and shop and market sales workers) -Middle-high (Legislators, senior official, managers; Technicians and associate professionals) -Highest (Professionals)
Slovak Republic (2009)	whether the individual consumed alcohol in the past 12 months (1.yes; 0.no)	N.A.	N.A.	N.A.	N.A.	Frequency of having 6 or more drinks of any alcoholic drink in the same occasion	age 16+	Household income decile
Slovenia (2007)	whether the individual consumed alcohol in the past 12 months (1.yes; 0.no)	N.A.	N.A.	N.A.	N.A.	Frequency of having 6 or more drinks of any alcoholic drink in the same occasion	age 16+	Household income decile
Spain (2006)	whether the individual consumed alcohol in the past 12 months (1.yes; 0.no)	Quantity not comparable over time. *2006 : #drinks by type of alcohol per drinking session on typical day	Frequency not comparable over time. *2006: Frequency of drinking sessions, by type of ALC: #times a day /week /month	Extrapolated by using Frequency and Quantity	Men : weekly consumption ≥ 210g of pure alcohol Women : wekly consumption ≥ 140g of pure alcohol	N.A.	age 16+	Occupation-based SES: -Lowest (Elementary occupations) -Middle-low (Skilled agricultural and fishery workers; Craft and related trades workers; Plant and machine operators and assemblers) -Middle (Clerks; Service workers and shop and market sales workers) -Middle-high (Legislators, senior official, managers; Technicians and associate professionals) -Highest (Professionals)
Switzerland (1992, 1997, 2002, 2007)	whether the individual consumed alcohol (1.yes; 0.no) (no time reference)	How much quantity in each drinking session? - 5 drinks - 3 - 4 drinks - 2 drinks - 1 drink For those who did not drink in past 7days: How much quantity in each drinking session? By type of beverages (beer, wine, cider, spirit)	How many times in the last 7 days? - 3 times a day or more - twice a day - once a day - almost everyday - 3 or 4 ftimes a week - 1 or 2 a week For those who did not drink in past 7days: How many times? - weekly - 2 - 3 a months - about once a month - less than once a month By type of beverages (beer, wine, cider, spirit)	Calculation of daily grams of pure alcohol is derived from consumption and frequency by type of alcohol in the past 7 days (and in the past 12 months for those who did not drink in the past 7 days). Provided by the Swiss Federal Statistical Office	Men : weekly consumption ≥ 210g of pure alcohol Women : wekly consumption ≥ 140g of pure alcohol	*1997-2002-2007: Frequency of having 8+ drinks per occasion for men and 6+ drinks for women.	age 15+	Occupation-based SES: -Lowest (Working class) -Middle-low (Self-empl small proprietors, artisans, farmers) -Middle (Routine non manual employees, routine non manual) -Middle-high (lower-grade professionals, administrators, and officials, higher-grade technicans, managers in small industrial establishements) -Highest (High grade professionals, administrators, and officials, managers in large industrial establishements)
USA (NHANES 1999/2000, 2001/02, 2003/04, 2005/06, 2007/08, 2009/10)	whether the individual consumed alcohol in the past 12 months (1.yes; 0.no)	In the past 12 months, on those days that you drank alcoholic beverages, on the average, how many drinks did you have?	In the past 12 months, how often did you drink any type of alcoholic beverage? How many days per week, per month, or per year ?	Extrapolated using #drinks per day and #days per week in the past 12 months Assumption: 1drink=14grams	Men : weekly consumption ≥ 210g of pure alcohol Women : wekly consumption ≥ 140g of pure alcohol	Frequency of having 5 or more drinks per occasion in the past 12 months	age 20+	Equivalised household income groups: -Lowest (Poverty income ratio in [0-1]) -Middle-low (Poverty income ratio in]1-2]) -Middle (Poverty income ratio in]2-3]) -Middle-high (Poverty income ratio in]3-4]) -Highest (Poverty income ratio in]4-5])

Note: N.A. means Not Applicable.

Annex 3 – Correction for underreporting bias

130. The most advanced work on correcting underreporting bias in alcohol survey data was recently published by Rehm and colleagues (Rehm *et al.,* 2010b). This new approach is based on the triangulation of survey data with recorded aggregated per capita consumption data by modelling the upshifted distribution of alcohol consumption.

131. This approach aims to model the survey-based alcohol consumption using a Gamma distribution, and to upshift this distribution so that the corrected mean matches with the APC mean. To shift the distribution, the procedure uses a factor of correction called the coverage rate, *r*, that represents the proportion of total alcohol consumption as measured in the survey data over the overall APC[14] (Table 2). A single factor is defined for all genders and age groups since aggregate APC data are not available by gender and age. For each gender and age group *i*, the corrected mean (μ_i) and standard deviation (σ_i) of the shifted distribution are defined as follows:

$\mu_i = \frac{m_i}{r}$ where m_i is the weighted sample mean in group *i* and *r* the coverage rate.

$\sigma_i = \mu_i * 1.171$ for men and $\sigma_i = \mu_i * 1.258$ for women, where the multiplicative constants are empirically derived from international data (Kehoe, Gmel, Shield, Gmel, & Rehm, 2012).

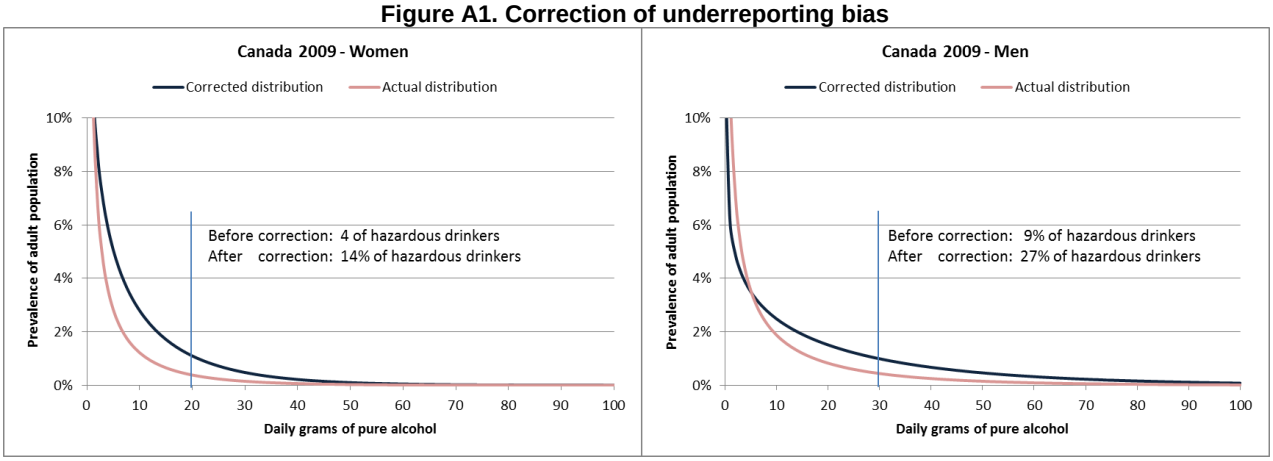
This approach assumes that the shifted alcohol distribution for each gender and age group *i* has a gamma form with the scale parameter $\alpha_i = \frac{\sigma_i^2}{\mu_i}$ and the shape parameter $\beta_i = \frac{\mu_i^2}{\sigma_i^2}$.

132. The Rehm's method relies on the assumption that the alcohol consumption is gamma-distributed and that the proportion of abstainers as measured in the survey is accurate because only drinkers can be adjusted.

133. Each individual (abstainers excluded) is assigned a new alcohol amount on the basis of his/her percentile position in the original distribution. Weighted percentile rank is calculated for each individual in the original distribution. If two or more individuals have the same amount of alcohol, they are attributed the same percentile rank. Once the correction is applied, individuals are assigned a new corrected status of hazardous drinking, and new CIs are computed.

134. An example of the resulting upshifted distribution is shown below. We have replicated this method on the 2009 Canadian database. After calculations, the rate of hazardous drinkers goes up from 7% to 22% for men and from 3% to 9% for women.

Figure A1. Correction of underreporting bias

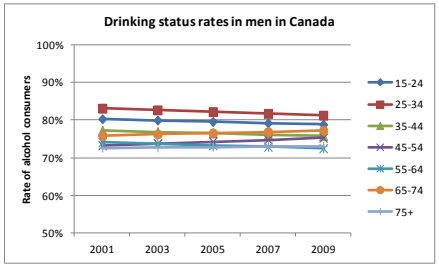


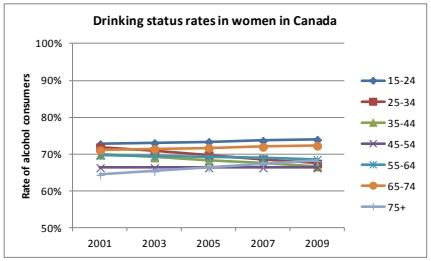
Source: OECD estimates from the Canadian longitudinal NPHS data

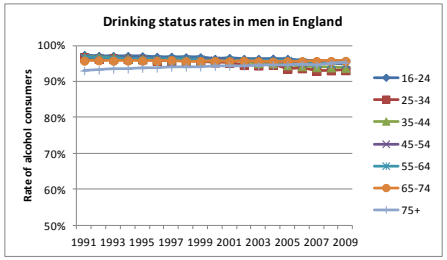
14 Note that while aggregate data are calculated for population above age 15, survey data may cover different age groups (e.g. people aged 25-74 in Finland).

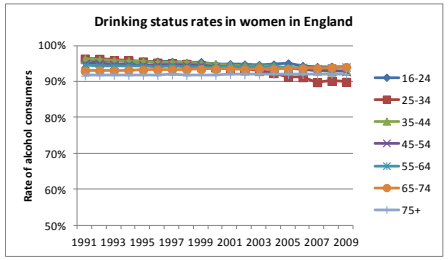
135. Similarly, corrected estimates of the share of hazardous drinkers were derived for nine other countries where the data was available (see Table 3). Results show large discrepancies between the observed values and the corrected (upshifted) estimates, this giving some insight of the size of underestimation of survey-based figures.

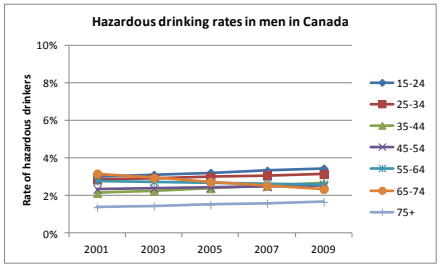
Annex 4 – Trends of drinking patterns by age group (two countries per page)

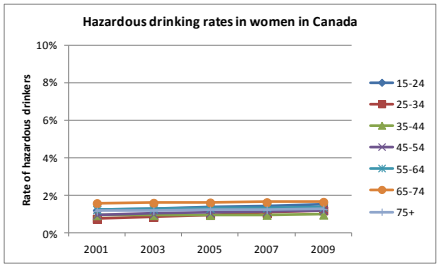


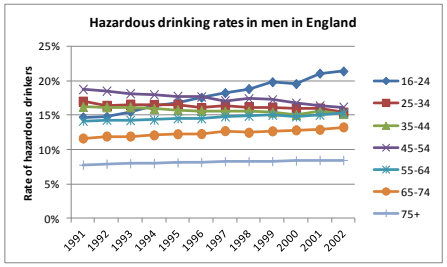


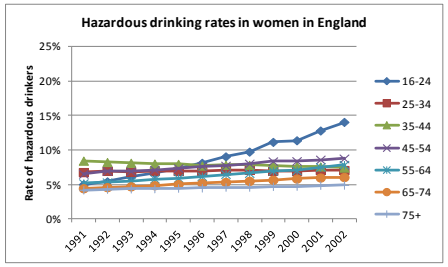


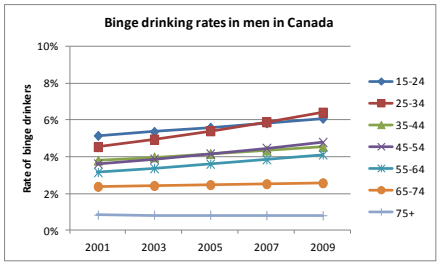


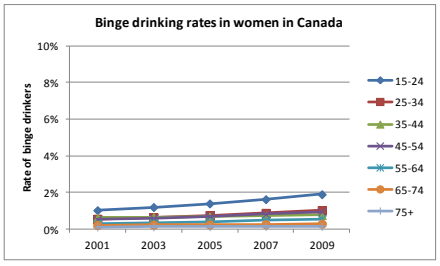


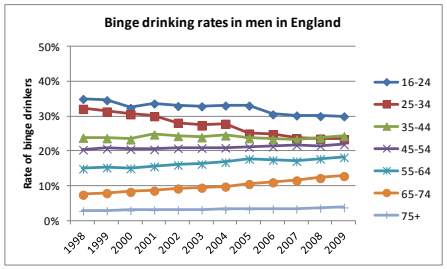


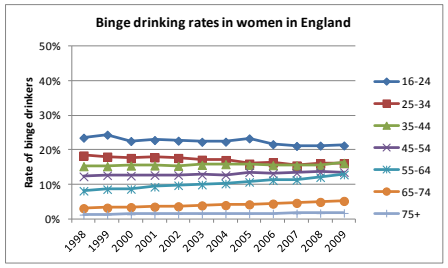






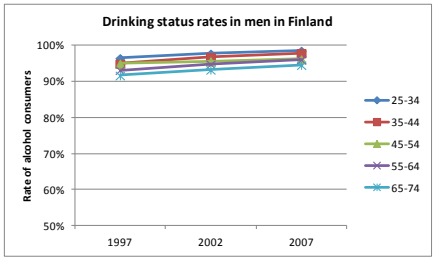


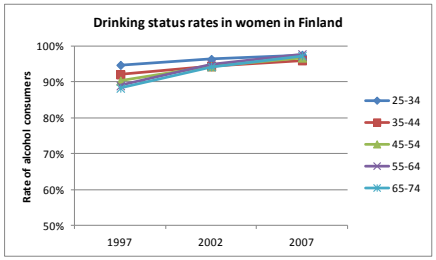


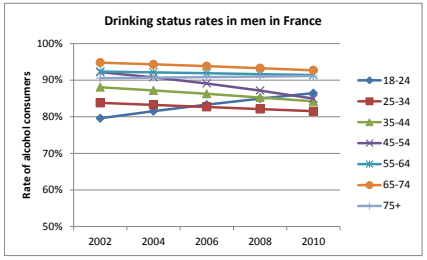


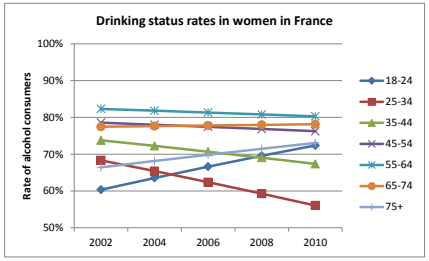
Note: Predicted probabilities are calculated for a typical individual aged 40 years-old, married, working, and non-smoking.

Trends of drinking patterns by age group (two countries per page) (continued)



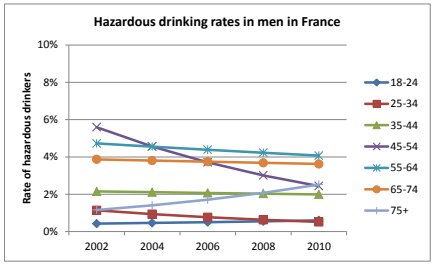








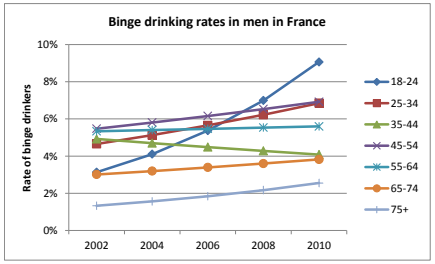


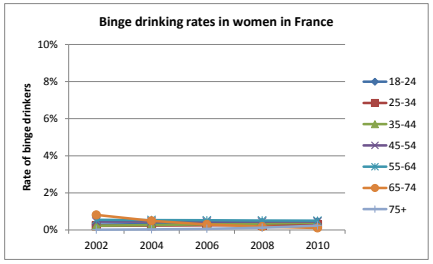




No data in Binge drinking in Finland

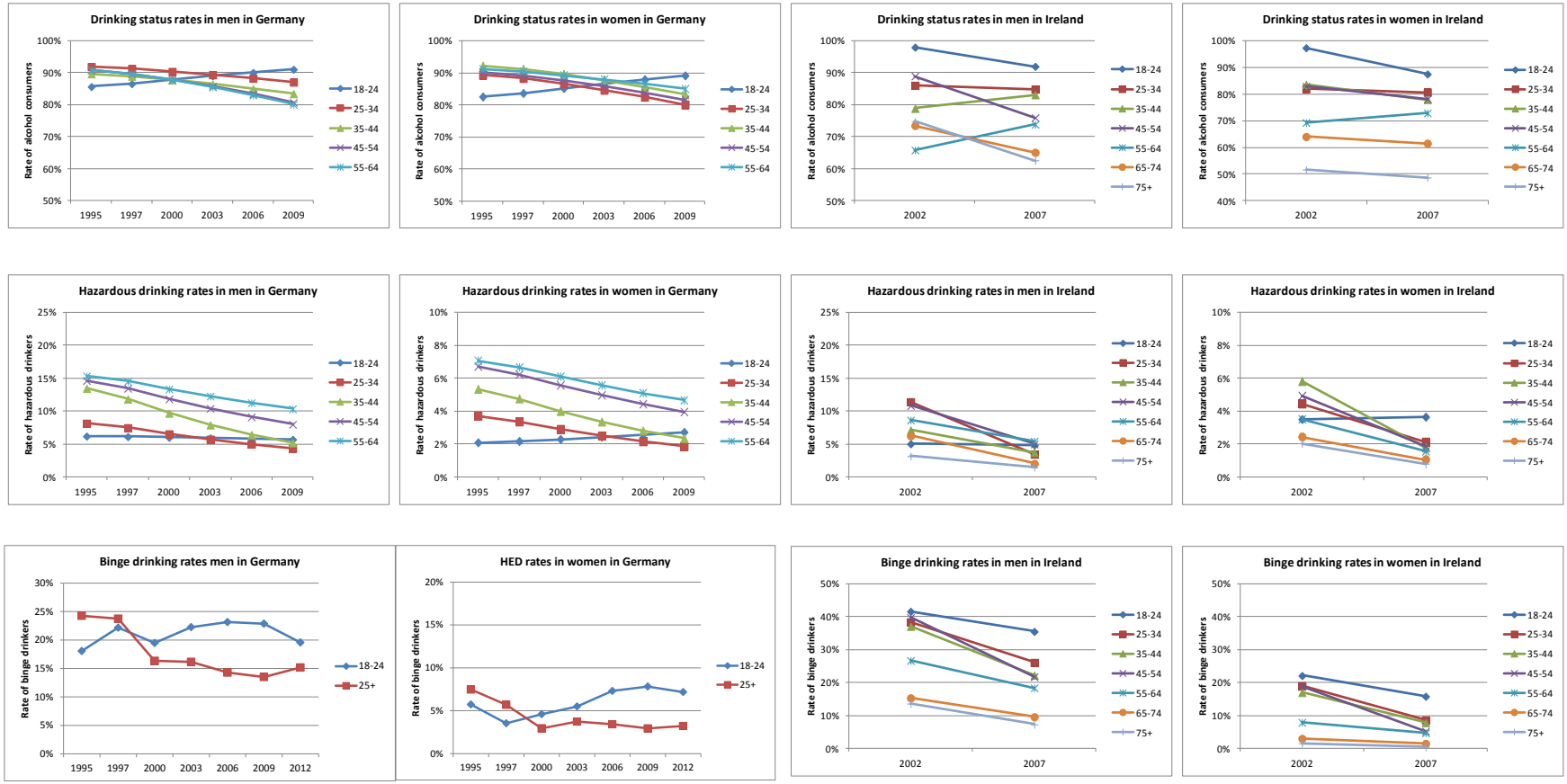
No data in Binge drinking in Finland





Note: Predicted probabilities are calculated for a typical individual aged 40 years-old, married, working, and non-smoking.

Trends of drinking patterns by age group (two countries per page) (continued)

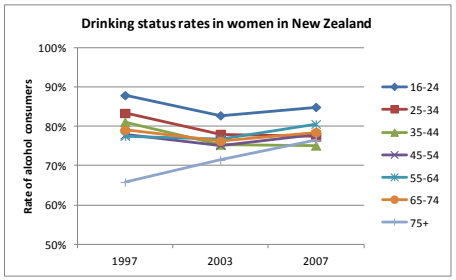


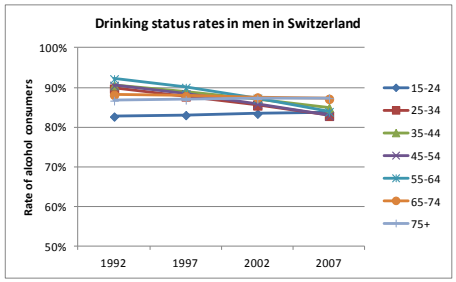
Note for Germany: The 2012 survey wave was newly released shortly before the publication of this working paper, and could have been included for only one analysis.

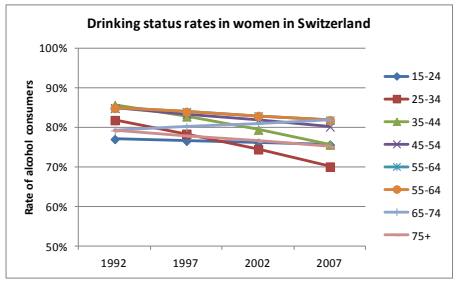
Note: Predicted probabilities are calculated for a typical individual aged 40 years-old, married, working, and non-smoking.

Trends of drinking patterns by age group (two countries per page) (continued)

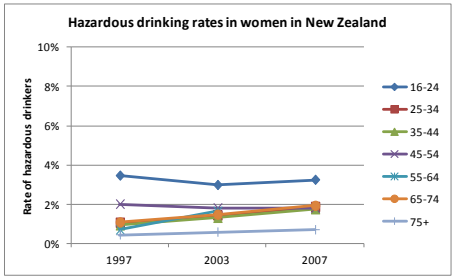


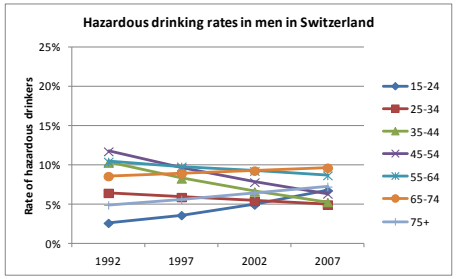


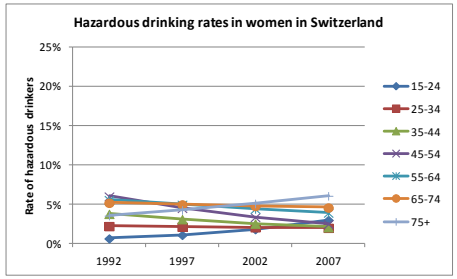


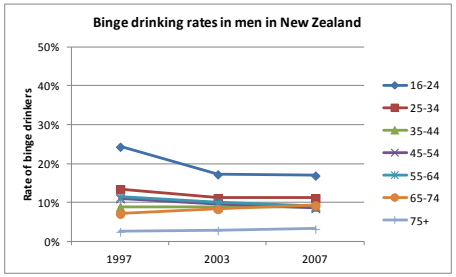


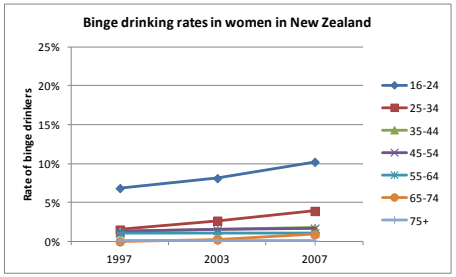


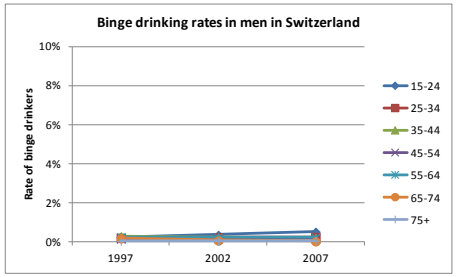








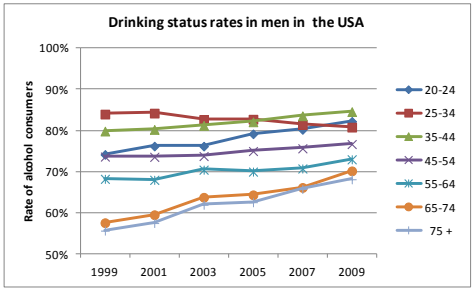


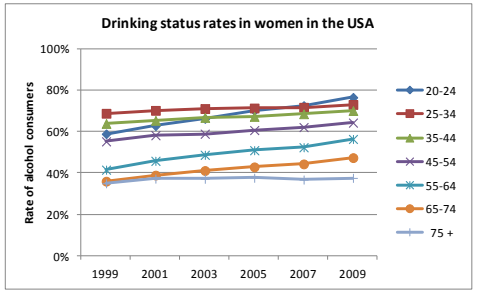


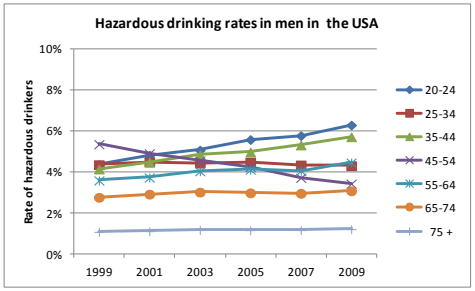
Too few observations in Binge drinking among women in Switzerland

Note: Predicted probabilities are calculated for a typical individual aged 40 years-old, married, working, and non-smoking.

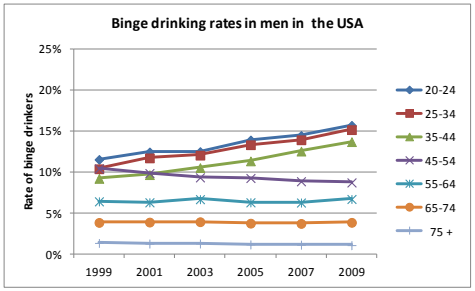
Trends of drinking patterns by age group (two countries per page) (continued)

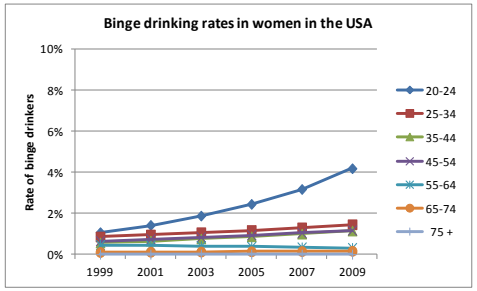








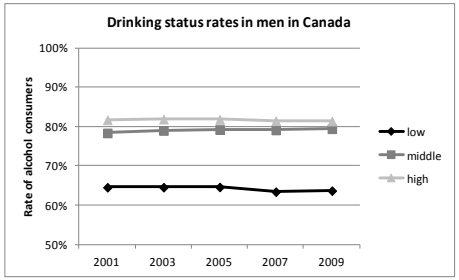


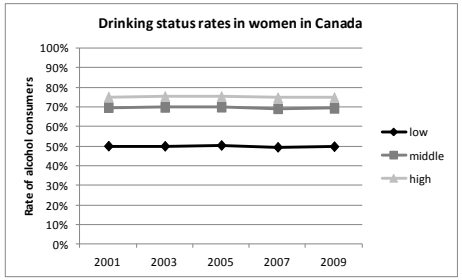


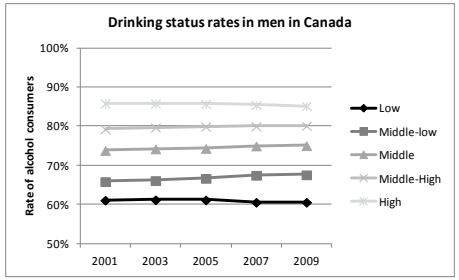
Note: Predicted probabilities are calculated for a typical individual aged 40 years-old, married, working, and non-smoking.

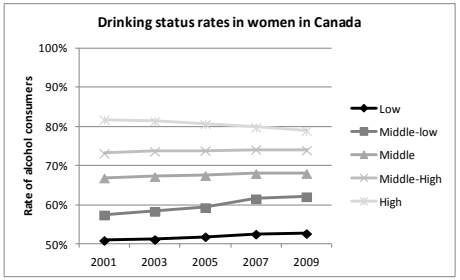
Annex 5 – Trends of drinking patterns by education level and by socioeconomic status (one country per page)

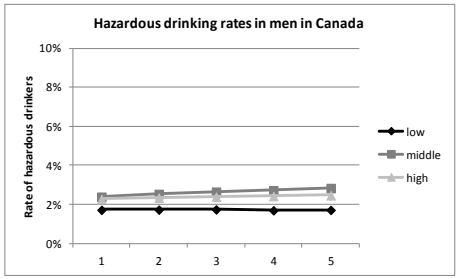
Canada



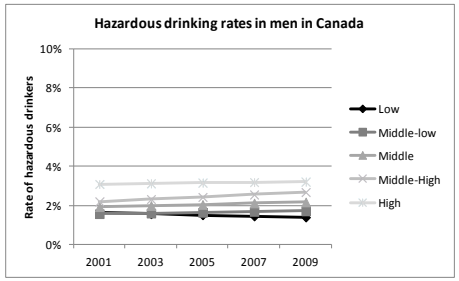


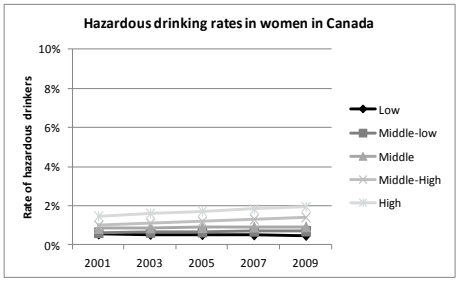


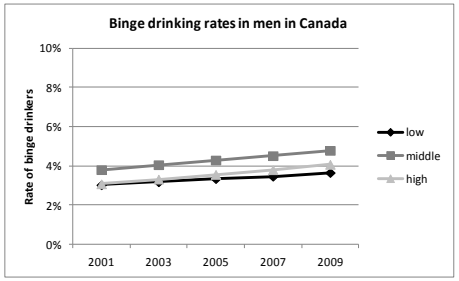


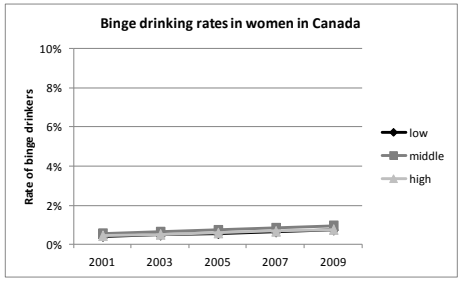


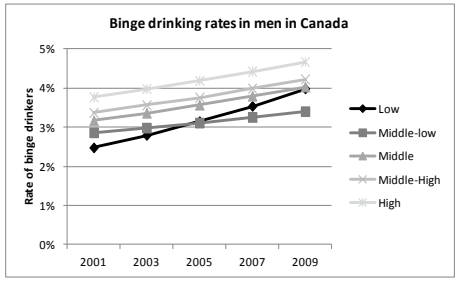


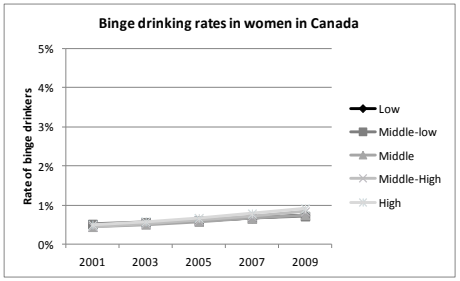






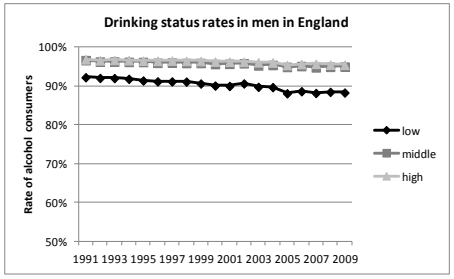


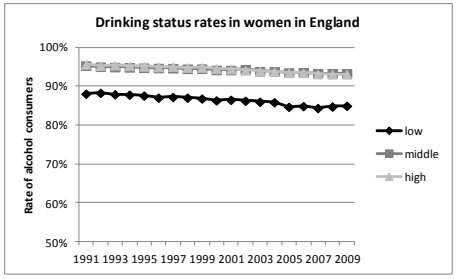


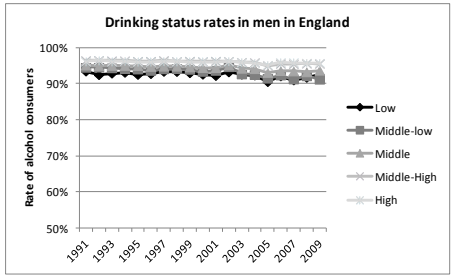


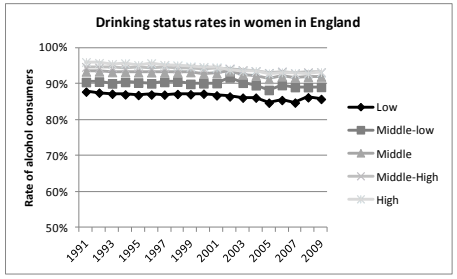
Note: Predicted probabilities are calculated for a typical individual aged 40 years-old, married, working, and non-smoking.

Trends of drinking patterns by education level and by socioeconomic status (continued)
England



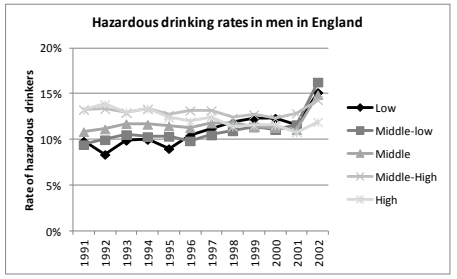


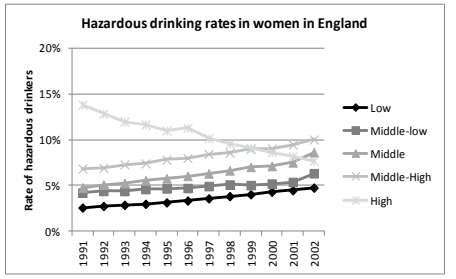


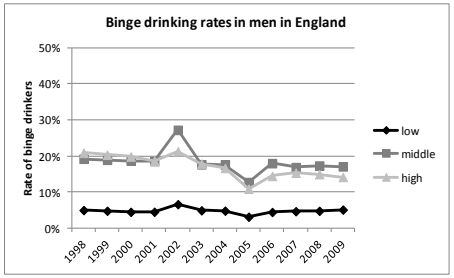


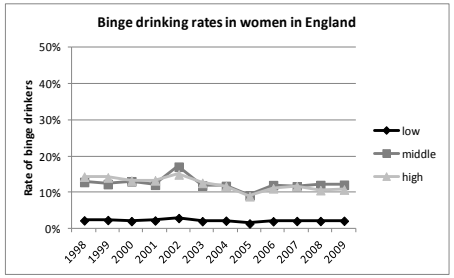


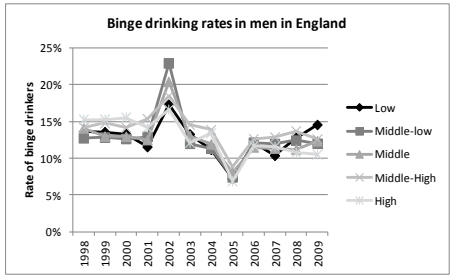


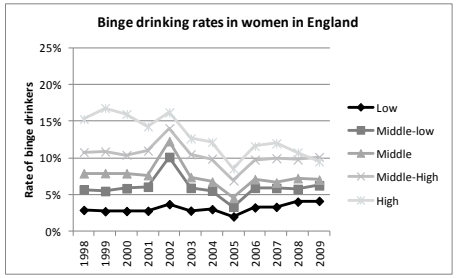






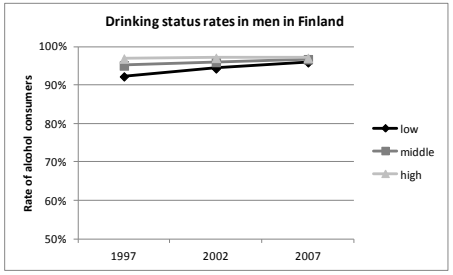






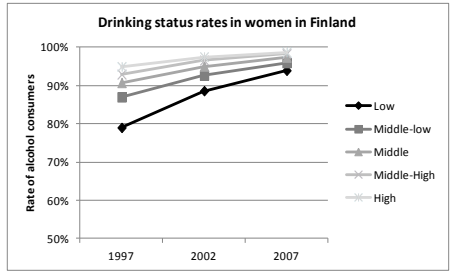
Note: Predicted probabilities are calculated for a typical individual aged 40 years-old, married, working, and non-smoking.

Trends of drinking patterns by education level and by socioeconomic status (continued)
Finland



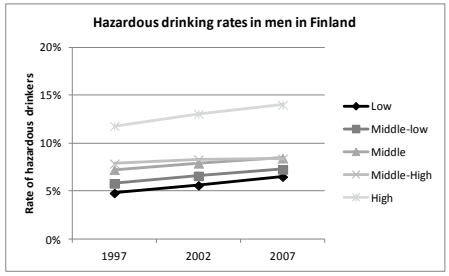












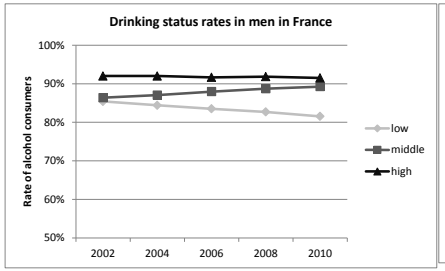


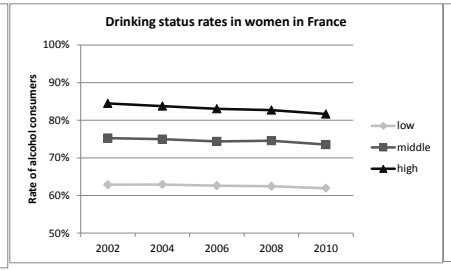
No data in Binge drinking in Finland

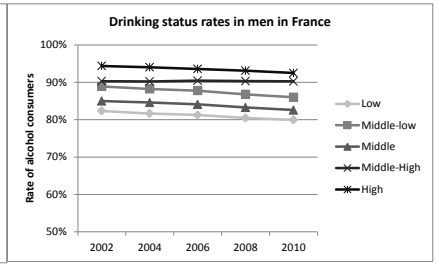
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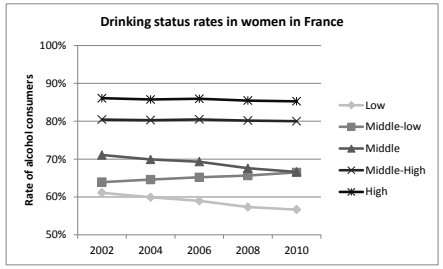
Trends of drinking patterns by education level and by socioeconomic status (continued)

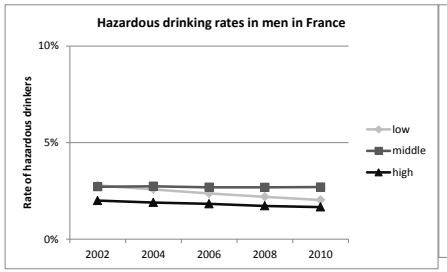
France



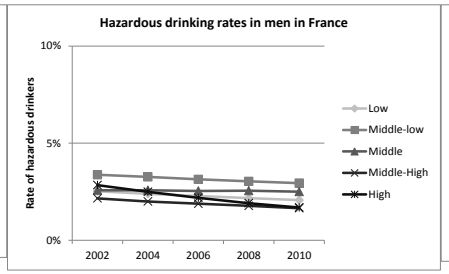


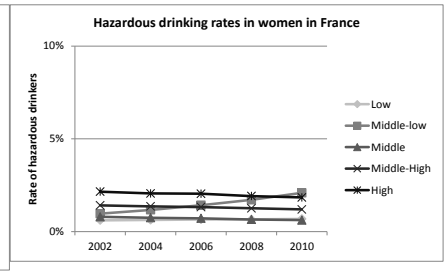


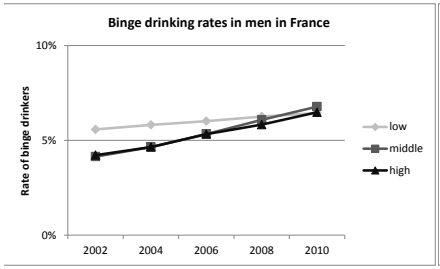


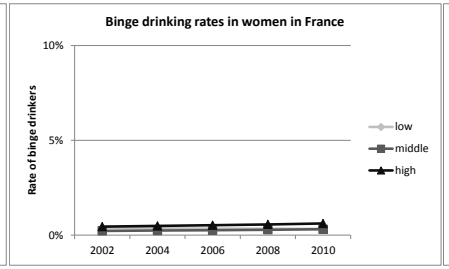


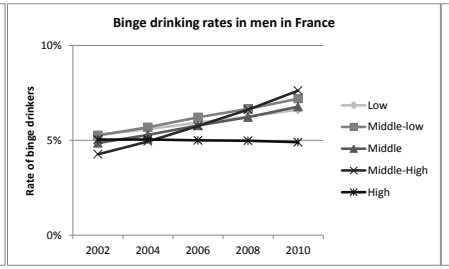


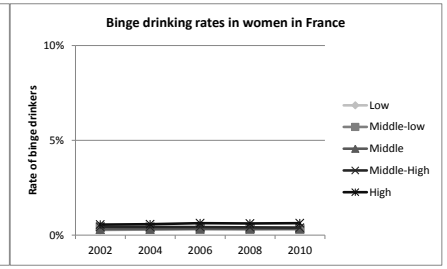






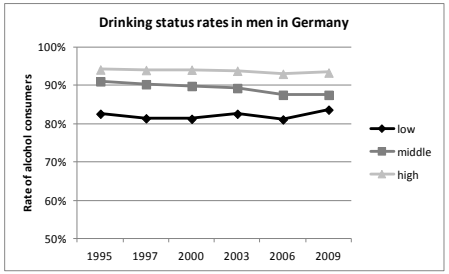




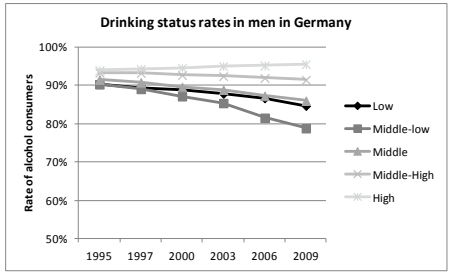


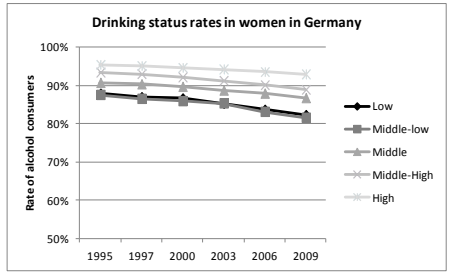
Note: Predicted probabilities are calculated for a typical individual aged 40 years-old, married, working, and non-smoking.

Trends of drinking patterns by education level and by socioeconomic status (continued)
Germany



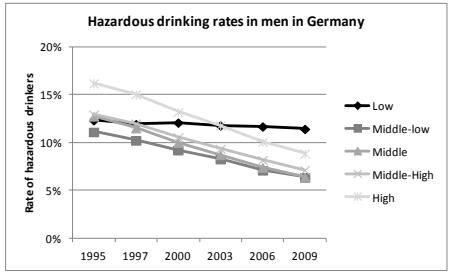




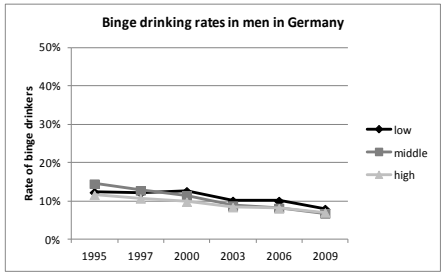


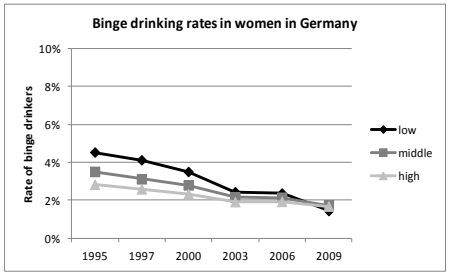


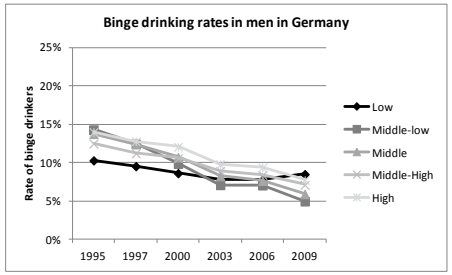


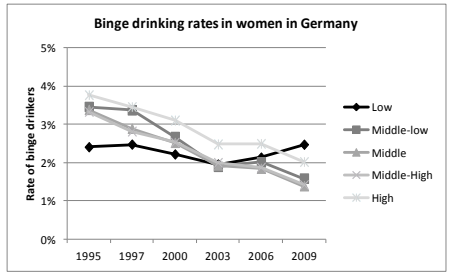








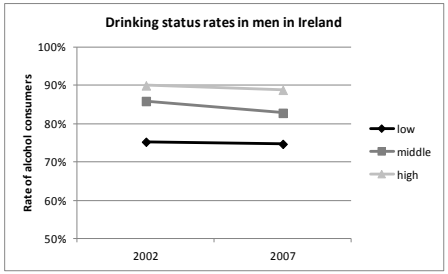


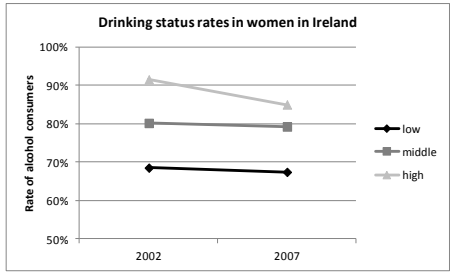


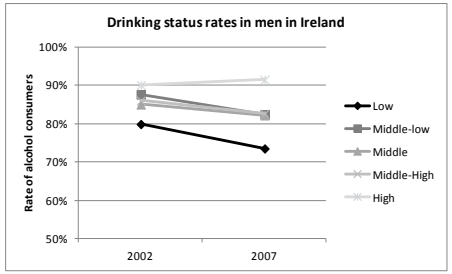
Note: Predicted probabilities are calculated for a typical individual aged 40 years-old, married, working, and non-smoking.

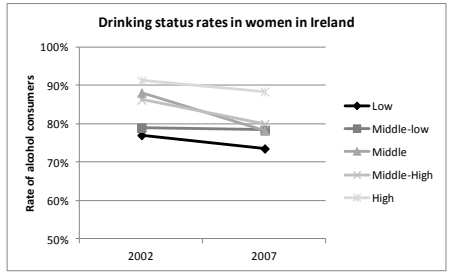
Trends of drinking patterns by education level and by socioeconomic status (continued)

Ireland



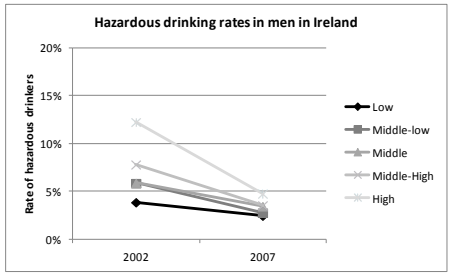




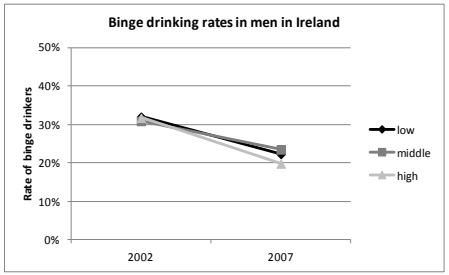


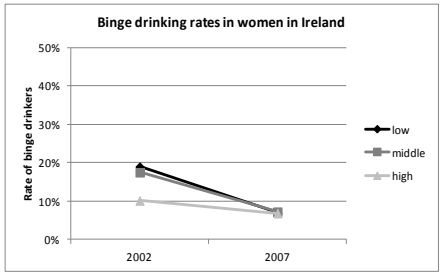


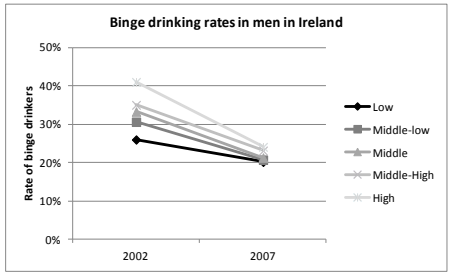


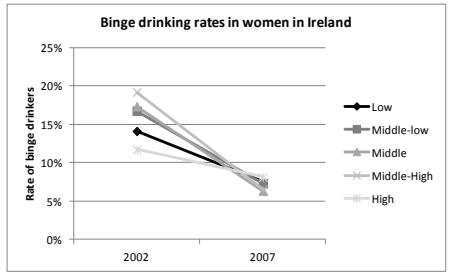






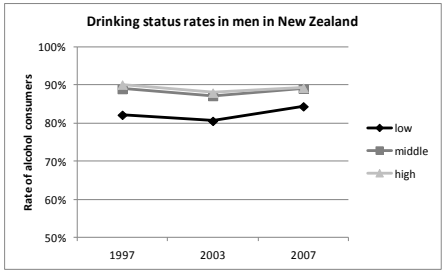


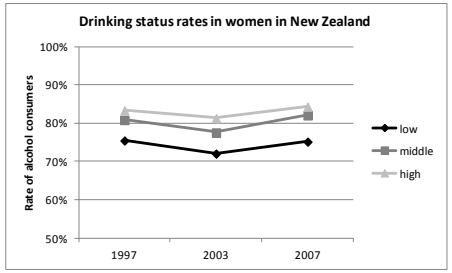


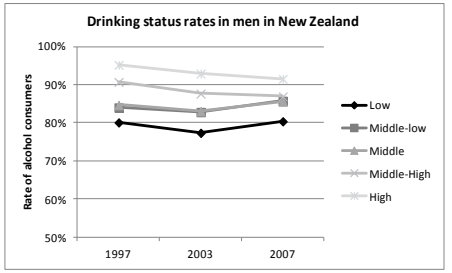


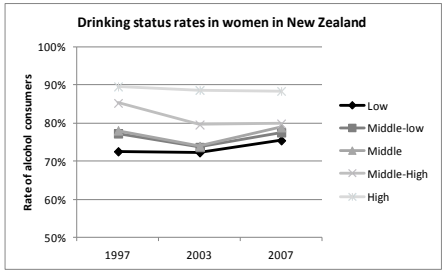
Note: Predicted probabilities are calculated for a typical individual aged 40 years-old, married, working, and non-smoking.

Trends of drinking patterns by education level and by socioeconomic status (continued)
New Zealand

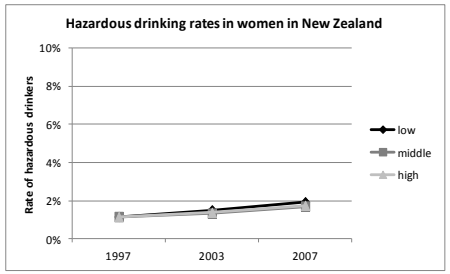


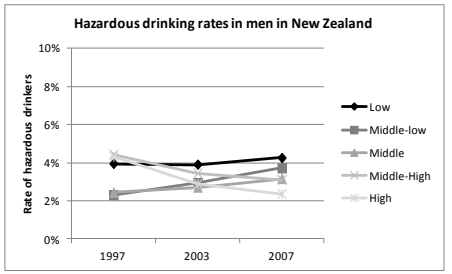


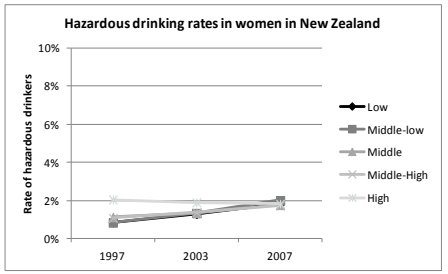


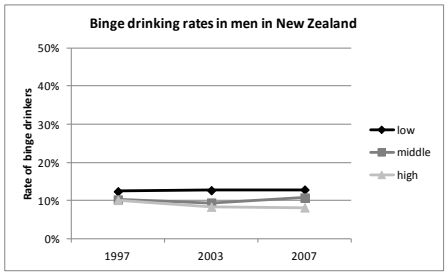


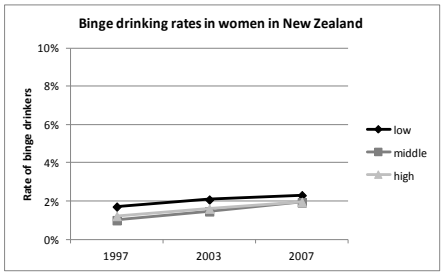


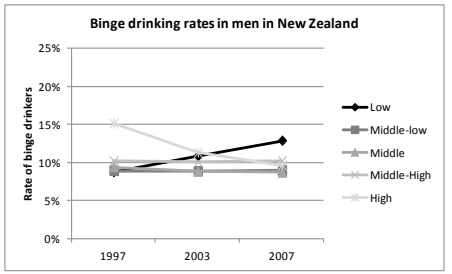


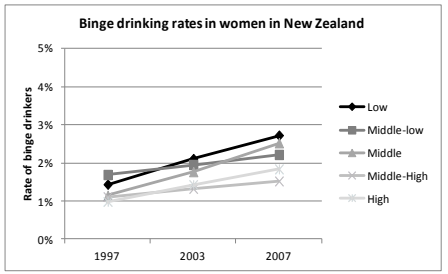






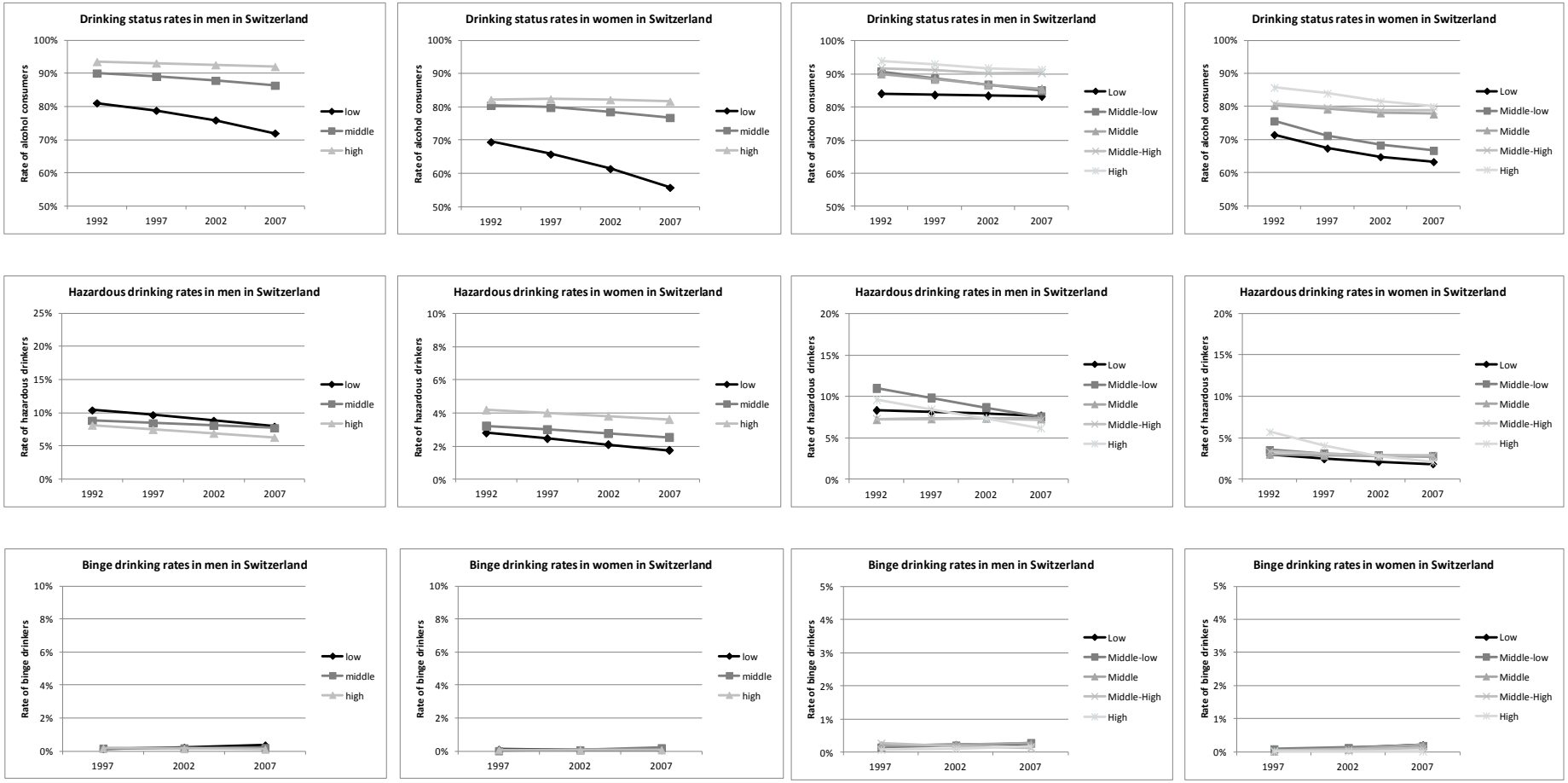






Note: Predicted probabilities are calculated for a typical individual aged 40 years-old, married, working, and non-smoking.

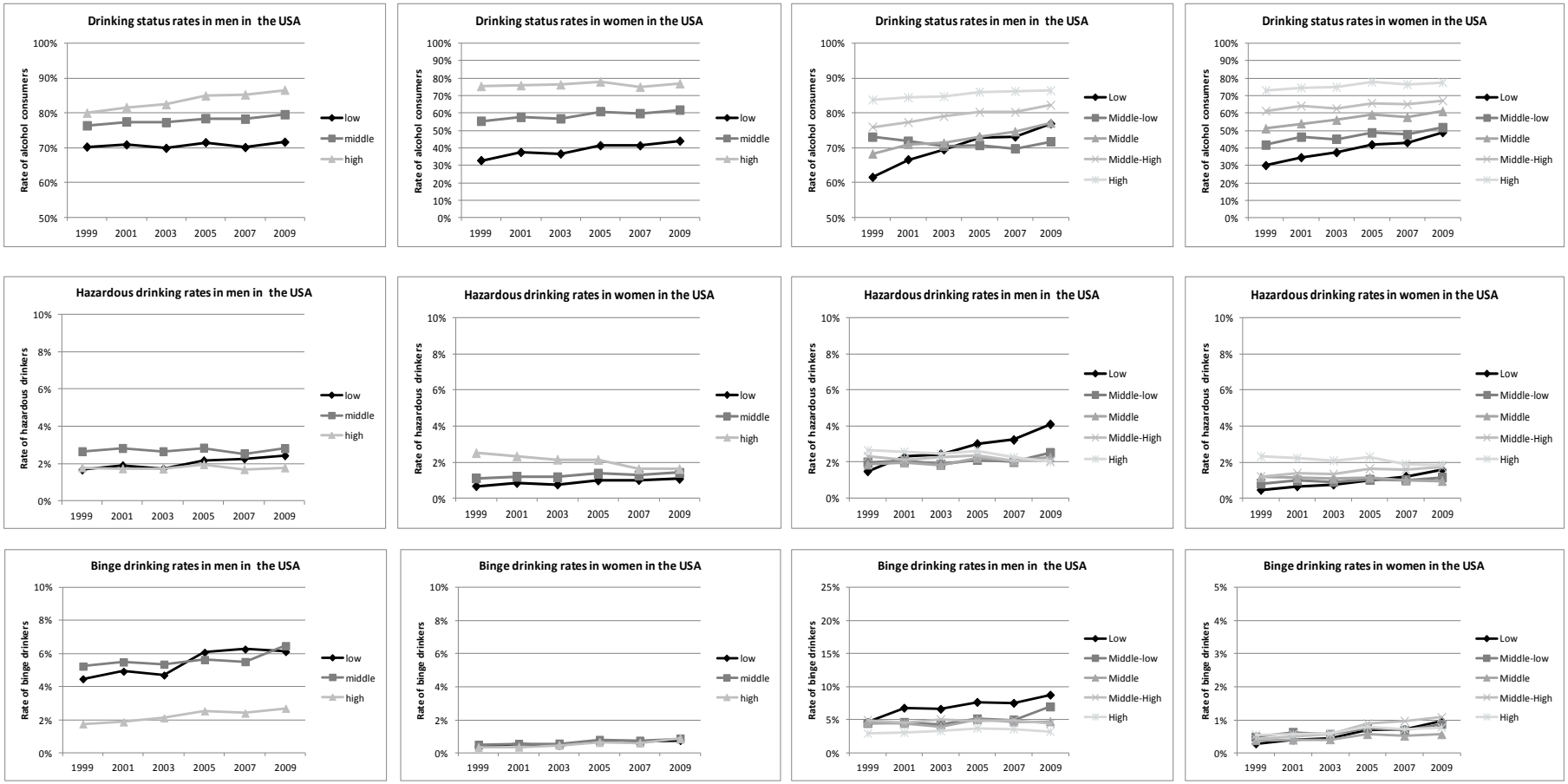
Trends of drinking patterns by education level and by socioeconomic status (continued)
Switzerland



Note: Predicted probabilities are calculated for a typical individual aged 40 years-old, married, working, and non-smoking.

Trends of drinking patterns by education level and by socioeconomic status (continued)

USA



Note: Predicted probabilities are calculated for a typical individual aged 40 years-old, married, working, and non-smoking.

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