



Alcohol and the workplace

A report on the impact of work place policies and programmes to reduce the harm done by alcohol to the economy

Peter Anderson, MD, PhD

June 2010

Alcohol and the workplace

A report on the impact of work place policies and programmes to reduce the harm done by alcohol to the economy

Peter Anderson, MD, PhD

Peteranderson.mail@gmail.com

June 2010

Conducted as part of the Focus on Alcohol Safe Environments (FASE) project co financed by the European Commission and BARMER GEK.



Table of contents

	SUMMARY	1
1.	INTRODUCTION	2
2.	ALCOHOL, PRODUCTIVITY AND WORKPLACE ALCOHOL-RELATED HARM	3
2.1	Wealth and alcohol	3
2.2	Societal level effects	4
2.3	Social cost studies and lost productivity	4
2.4	Premature mortality	7
2.5	Individual level studies	9
3.	INTERVENTIONS TO REDUCE ALCOHOL-RELATED HARM	11
3.1	Population based interventions	11
3.2	Impact of policies on jobs	11
3.3	Structural factors	12
3.4	Individually directed interventions	14
4	CONCLUSIONS	15
	REFERENCES	16

Summary

Wealth and alcohol

Even within the European Union, in general, the lower the wealth of a country, the lower the level of alcohol consumption (and the greater the proportion of abstainers) but the greater the burden of alcohol-related harm per litre of alcohol consumed.

Alcohol and lost productivity

There is a relationship between societal and individual level alcohol consumption and sickness absence, with alcohol being a significant risk factor for absenteeism and presenteeism, largely in a dose response manner. Although there are inherent difficulties in estimating productivity losses in social cost studies, in general, about half of the overall social costs of alcohol are due to lost productivity.

Alcohol and inequalities

Alcohol is a major cause of inequalities in premature mortality between and within the countries of the Union. Inequalities in premature mortality are in turn an impediment to economic efficiency and productivity.

Alcohol policies and lost productivity costs

Alcohol policies can, to a considerable extent, reduce lost productivity costs due to alcohol. Tax and price policies are, if anything, likely to lead to an overall increase in jobs (rather than job losses) and increase profits for the alcohol industry.

Work place structural factors

Structural factors at the workplace (high demand but low reward) increase the risk of alcohol use disorders. In contrast, no studies have tested the impact of changes in structural factors on alcohol related harm; one study has suggested that managerial style may be associated with differences in harm.

Work place policies

There are very few studies that evaluate the impact of work place based policies to reduce alcohol-related harm. Nevertheless, from the limited literature, brief interventions, interventions contained within health and life-style checks, psychosocial skills training and peer referral may all have the potential to produce beneficial, although rather small results.

Conclusions

The extent to which work place based alcohol policies and programmes can contribute to reducing the harm done by alcohol to the economy of the European Union is not much. Work place policies should nevertheless be implemented and maintained for the simple reason that they can bring health gain. But, even if widely implemented they will only have limited impact at most on the economy. On the other hand, it is clear that alcohol policies that reduce overall levels of consumption will reduce the harm done by alcohol to the economy of the European Union, and have the potential of substantially doing so. A key option here is alcohol price policy which has the potential of substantially reducing alcohol-related harm, sickness absence and the social costs of alcohol and of increasing employment.

1. Introduction

There is little doubt that alcohol can harm the economy of the European Union (hereafter, the Union). Social costs studies suggest that alcohol leads to lost productivity costs at the workplace through both absenteeism and presenteeism (Anderson & Baumberg 2006; Rehm et al 2009). There is also evidence that changes in per capita alcohol consumption are associated with changes in sickness absence rates (Norström 2006). Alcohol is also a cause of inequalities in health and premature mortality both between countries of the Union (Zatonski et al 2008) and within individual countries (Blomgren et al 2004). Inequalities in health are economically inefficient and a drain on the economy and productivity of the Union.

The full potential impact of the economic crisis that started in 2007 on alcohol-related harm is uncertain. On the one hand, there is evidence that alcohol consumption falls as alcohol affordability, which is dominated by income, falls (Rabinovich et al 2009; Rehm et al 2009). On the other hand, there is evidence that social dislocation and social exclusion that might be consequent to economic recession increases the risk of alcohol-related mortality, independent of changes in alcohol consumption (Blomgren et al 2004). An analysis of the effect of the economic crises in the European Union found that a more than 3% increase in unemployment increased deaths from 'alcohol abuse' by 28.0% (Stuckler et al 2009), probably due to increases in harmful patterns of drinking rather than overall alcohol consumption (Dee 2001).

It is often expressed that alcohol generates jobs, and that alcohol policy, in particular, tax increases, might cause job losses. In fact, the long-term effects of higher alcohol taxes on employment are likely to be neutral, with less unemployment if anything (Purshouse et al 2009), although there may be some short-term adjustments in the hospitality sector (Baumberg 2006). Moreover, job losses in alcoholic beverage production have been largely due to manufacturers shifting from labour-intensive to capital-intensive production (Anderson & Baumberg 2006).

This report describes the potential impact of work place policies and programmes to reduce the harm done by alcohol to the economy. The report begins by noting the overall relationship between a country's wealth and the use of alcohol and the harm done by alcohol. The report then considers societal level effects and social cost studies and alcohol's impact on lost productivity. The report then describes alcohol's impact on inequalities in premature mortality (and thus lost productivity) between and within European countries. Based on a systematic review undertaken for the report, the relationship between alcohol and absenteeism and presenteeism based on individual level work place-based studies is described. The second part of the report then describes what can be done to mitigate alcohol's impact on the economy. The report first considers the impact of population based interventions on employment, lost productivity and work place harms. Then, based on a systematic review undertaken for the report, the relationship between work place structural factors and work place based interventions and alcohol-related harm are described.

In the 1980s and early 1990s, there was a considerable literature on alcohol and the workplace and promotion of alcohol at the work place policies, often driven by the concern of preventing large alcohol-related accidents (for example, see Anderson 1993, and Henderson et al 1995). The purpose of the systematic review in the present report is to update this literature, estimating the contribution of alcohol to workplace alcohol-related harm, and to identify evidence based practice that might impact on work place structural issues that increase the risk of alcohol-related harm, and work place based interventions that might reduce the risk of alcohol-related harm. At the outset, the key surprising finding should be mentioned: there is a lack of rigorous studies in this area. On the other hand, there is very clear evidence that population-based policies not only reduce the burden of lost productivity but can improve employment and the economy.

2. Alcohol, productivity and workplace alcohol-related harm

2.1 Wealth and alcohol

The relationship between a country's wealth and alcohol consumption and alcohol-related harm is characterized by two contrasting relationships. On the one hand, greater wealth is associated with greater alcohol consumption. Up to a GDP PPP of I\$35,000, the greater the wealth, the fewer the proportion of abstainers, Figure 1. And, up to a GDP PPP of I\$20,000, the greater the wealth, the more alcohol is consumed, Figure 2 (Rehm et al 2009). Beyond a GDP PPP of I\$35,000, overall alcohol consumption seems to fall.

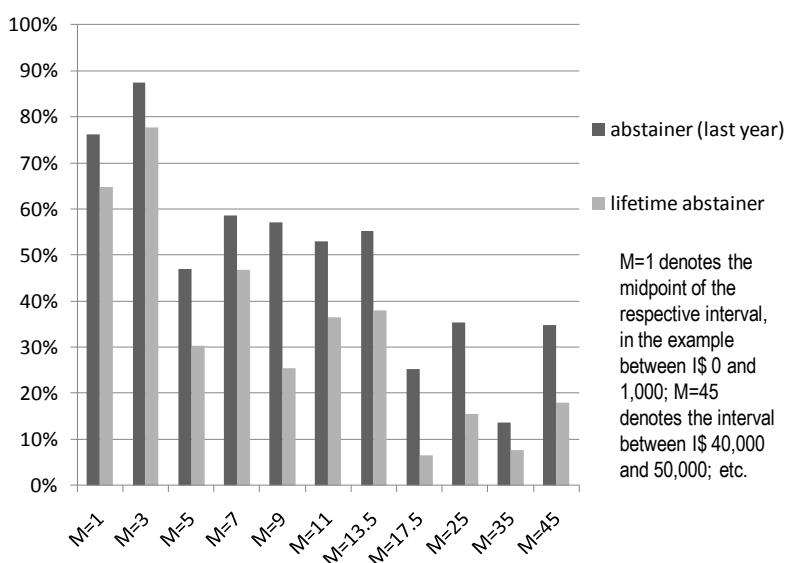


Figure1: Economic wealth (GDP PPP in 1,000 I\$) and abstention (in % of the adult population) worldwide in 2005. Source: Rehm et al 2009.

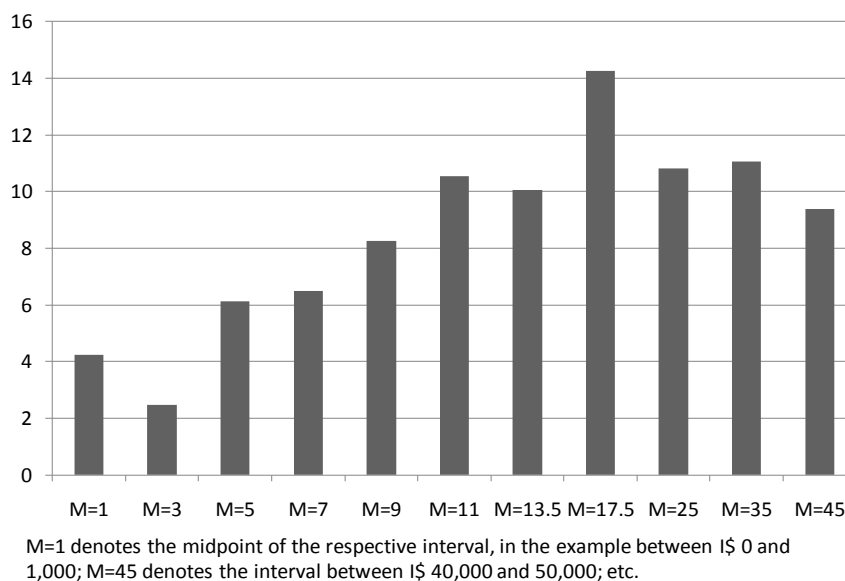


Figure 2: Economic wealth (GDP PPP in 1,000 I\$) and adult per capita consumption (in litres pure alcohol) worldwide for 2005. Source: Rehm et al 2009.

On the other hand, across Europe, the lower the wealth, the lower the economic development of a country or region, the higher the alcohol-attributable mortality and burden of disease and injury per litre of pure alcohol.

WHO Region ¹	Burden DALYs in 1,000	Deaths in 1,000	Adult per capita consumption	Burden per litre per 1,000 inhabitants	Deaths per 10,000 inhabitants	GDP-PPP in 2005 (per capita)
Eur A	3,088	34	12.1	0.72	0.08	30,087
Eur B	2,892	116	7.5	2.29	0.92	8,839
Eur C	12,728	521	14.9	4.28	1.75	10,095

To summarize, even within the European Union, in general, the lower the wealth of a country, the lower the level of alcohol consumption (and the greater the proportion of abstainers) but the greater the burden of alcohol-related harm per litre of alcohol consumed.

2.2 Societal level effects

One study has investigated the relationship between per capita alcohol consumption and sickness absence, which was undertaken in Sweden for the period 1935-2002, analyzed through the Box-Jenkins method for time-series analyses (Norström 2006). Two indicators of sickness absence were used, one based on sickness insurance data, the other on data from the labour force surveys. Alcohol consumption was gauged by sales of pure alcohol (100%) per inhabitant 15 years of age and older. Because changes in the economy may affect alcohol consumption as well as sickness absence, two macroeconomic indicators were included as control variables: unemployment and real wages. A 1-litre increase in total consumption was found to be associated with a 13% increase in sickness absence among men ($P < 0.05$). The relationship was not statistically significant for women. This relationship is supported by micro-level data from Finland (Johansson et al 2008), which showed that alcohol consumption measured by drinks per week was positively associated with the number of sickness absence days for both men and women.

To summarize, the two studies that have investigated it have found an effect between societal and individual level alcohol consumption and sickness absence.

2.3 Social cost studies and lost productivity

Based on 21 European studies, Anderson & Baumberg (2006) estimated the social cost of alcohol to the European Union in 2003, and found that at €59bn (range €39bn-€102bn) productivity losses contributed 47% of the total social cost of alcohol to Europe, Table 2.

¹ The WHO classifies countries in the European Region as follows.

Eur-A: very low adult/very low child mortality

Andorra, Austria, Belgium, Croatia, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Luxembourg, Malta, Monaco, Netherlands, Norway, Portugal, San Marino, Slovenia, Spain, Sweden, Switzerland, United Kingdom.

Eur-B: low adult/low child mortality

Albania, Armenia, Azerbaijan, Bosnia and Herzegovina, Bulgaria, Georgia, Kyrgyzstan, Montenegro, Poland, Romania, Serbia, Slovakia, Tajikistan, The former Yugoslav Republic of Macedonia, Turkey, Turkmenistan, Uzbekistan.

Eur-C: high adult/low child mortality

Belarus, Estonia, Hungary, Kazakhstan, Latvia, Lithuania, Republic of Moldova, Russian Federation, Ukraine.

Table 2 The social cost of alcohol in Europe, 2003

	Cost (€ billion)	Minimum (€ billion)	Maximum (€ billion)
Tangible costs – direct			
Healthcare	17	11	28 ^A
Treatment & prevention ^C	5	1	18
Crime – police, courts, prisons	15	13	24 ^B
Crime – defensive and insurance ^D	12	7	17 ^B
Crime – property damage	6	3	16 ^B
Traffic accidents – damage	10	6	16
SUBTOTAL	66	40	118¹
Tangible costs – productivity losses			
Absenteeism ^C	9	9	19
Unemployment ^C	14	6	23
Premature mortality	36	24	60
SUBTOTAL	59	39	102
TOTAL TANGIBLE COSTS			
	125	79	220¹
Intangible costs			
Psychosocial & behavioural effects ^D	68	37	68
Crime – victims' suffering ^D	12 ^F	9 ^F	52 ^{B, F}
Loss of healthy life ^E	258 ^F	145 ^F	712 ^F
TOTAL INTANGIBLE COSTS^F			
	270^G	154^G	764^G

¹Totals do not add due to rounding. **Notes:** (A) This excludes health benefits, while minimum and headline figures are for the net effect compared to the lowest-risk level of drinking; (B) Cost of crime *related to* rather than *caused by* alcohol, and is therefore a maximum figure for the cost of alcohol; (C) Cost areas with higher levels of uncertainty; (D) Costs based on a single study; (E) Excludes loss of life due to homicide to avoid potential double-counting with intangible costs of crime; (F) The main estimate is based on a QALY valuation of 3-times each country's GDP per capita (EU25 average of €64,000); the minimum value is based on €32,000 per QALY; and the maximum value is based on €158,000 per QALY; (G) Psychosocial & behavioural effects excluded from the intangible subtotal to avoid potential double-counting with loss of healthy life.

These findings are similar to other estimates. For example, Rehm et al (2009) found that the indirect costs due to productivity losses were the predominant cost category of all alcohol-attributable social costs in France and Scotland, Table 3.

Table 3: Overview of economic costs attributable to alcohol in selected high-income and middle-income countries (in 2007 million I\$)

<i>Indicators</i>	<i>France</i>	<i>Scotland</i>
Study year	1997	2001/2
Population in study year (Million)	58.6	5.1
GDP(PPP) in study year	1,301,087	133,179
1. Direct health care cost	3,592	162
2. Direct laws	72	454
3. Other direct cost	7,619	145
4. Indirect cost	11,223	1,052
Total economic costs of alcohol	22,506	1,813
Cost per capita (2007 USD PPP)	384	358
Health care costs as % of total cost	16.0	8.9
law enforcement as % total cost	0.3	25.0
Other direct cost as % total cost	33.9	8.0
Indirect cost as % total cost	49.9	58.0
Total cost as % GDP (PPP)	1.7	1.4
health care costs as %GDP (PPP)	0.3	0.1
Law enforcement as % GDP (PPP)	0.0	0.3
Other direct cost as % GDP (PPP)	0.6	0.1
Indirect cost as % GDP (PPP)	0.9	0.8

Outside of Europe, similar results were found in Australia (Collins & Laspley 2008a), Table 4, and in Canada (Rehm et al 2006), Table 5.

Table 4, Selected tangible drug abuse costs, 2004/05, Australia

	Alcohol	Tobacco	Illicit drugs	Alcohol and illicit drugs combined
	(\$m)	(\$m)	(\$m)	(\$m)
Crime	1,611.5		3,840.5	1,261.0
Health (net)	1,976.7	318.4	201.7	
Production in the workplace	3,578.6	5,749.1	1,622.9	
Production in the home	1,571.3	9,843.1	495.5	
Road accidents	2,202.0		527.6	
Fires		136.4		

Table 5, The social costs of alcohol, illegal drugs and tobacco, Canada, 2002.

	(in millions dollars)			
	Alcohol	Illegal drugs	Tobacco	TOTAL ADT
1. Direct health care costs: total	3,306.2	1,134.6	4,360.2	8,800.9
1.1 morbidity - acute care hospitalization	1,458.6	426.37	2,551.2	4,436.2
- psychiatric hospitalization	19.6	11.5	--	31.2
1.2 inpatient specialized treatment	754.9	352.1	--	1,107.1
1.3 outpatient specialized treatment	52.4	56.3	--	108.7
1.4 ambulatory care: physician fees	80.2	22.6	142.2	245.0
1.5 family physician visit	172.8	48.8	306.3	527.9
1.6 prescription drugs	767.6	216.8	1,360.5	2,344.9
2. Direct law enforcement costs	3,072.2	2,335.5	78.1	5,407.8
2.1 police	1,898.8	1,432.0	--	3,330.7
2.2 courts	513.1	330.6	--	843.7
2.3 corrections (including probation)	660.4	573.0	--	1,233.4
3. Direct costs for prevention and research	53.0	16.5	78.1	147.6
3.1 research	17.3	8.6	9.0	34.9
3.2 prevention programs	33.9	7.9	69.1	110.9
3.3 salaries and operating funds	1.8	--	--	1.8
4. Other direct costs	996.1	79.1	87.0	1,162.2
4.1 fire damage	156.5	--	86.5	243.0
4.2 traffic accident damage	756.9	67.0	--	823.9
4.3 losses associated with the workplace	17.0	6.6	0.5	24.1
<i>4.3.1 EAP & health promotion programs</i>	17.0	4.2	0.5	21.7
<i>4.3.2 drug testing in the workplace</i>	--	2.4	N/A	2.4
4.4 administrative costs for transfer payments	65.8	5.4	0.0	71.3
<i>4.4.1 social welfare and other programs</i>	4.3	--	--	4.3
<i>4.4.2 workers' compensation</i>	61.5	5.4	--	66.9
5. Indirect costs: productivity losses (main scenario)	7,126.4	4,678.6	12,470.9	24,275.9
5.1 due to long-term disability	6,163.9	4,408.4	10,536.8	21,109.1
5.2 due to short-term disability (days in bed)	15.9	21.8	24.4	62.0
5.3 due to short-term disability (days with reduced activity)	23.6	-0.1	36.2	59.8
5.4 due to premature mortality	923.0	248.5	1,873.5	3,045.0
Total	14,554.0	8,244.3	16,996.2	39,794.4
Total per capita (in \$)	\$463	\$262	\$541	\$1,267
Total as % of all substance-related costs	36.6%	20.7%	42.7%	100.0%

ADT - Alcohol, Illegal Drugs, and Tobacco

N/A - not applicable

"--" not available

EAP - Employee Assistance Programs

Categories in italics are sub-categories of immediate prior category

To summarize, although, as Baumberg (2009) points out, there are inherent difficulties in estimating productivity losses in social cost studies, in general, about half of the overall social costs of alcohol are due to lost productivity.

2.4 Premature mortality

A crucial problem facing the economic efficiency and productivity of the European Union is the enormous health gap between the east and the west of Europe. Attempts to diminish this gap during the period of preparation for EU accession were not successful, and it seems that closing the health gap might be a much bigger challenge than closing the gaps in wealth or education. Although health indicators have stopped deteriorating, first in the EU5 countries (Czech Republic, Hungary, Poland, Slovakia, Slovenia), then in the Baltic States, and at the end of the 1990s in Romania and Bulgaria, the improvement of health, even in the EU5 countries, is occurring only slightly faster than the EU15 average, which means that the health gap between EU10 (Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia) and EU15 (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, and United Kingdom) is not significantly diminishing.

In 2002 the difference in life expectancy at birth between the EU10 and the EU15 was almost 7 years in men and almost 5 years in women. The biggest contribution to that gap of mortality was in young (20-44 years) and middle-aged (45-64 years) men, and in middle-aged (45-64 years) and older (65 and more years) women. In the whole population cardiovascular diseases mortality contributed to more than half of that gap in men and almost 80% in women, and cancer to around 10% in both sexes. Death from injury is especially important in the male population, accounting for 17% of all male mortality, and 6% of female mortality; however it constitutes a much more significant proportion of mortality in the Baltic States. Alcohol consumption contributes largely to the gap in premature mortality between the EU10 and the EU15. About 25% of the difference in life expectancy between the EU10 and the EU15 for young and middle-aged men in 2002 can be attributed to alcohol. For women, the contribution of alcohol to the health gap is much smaller, 6%. The contribution of alcohol is most pronounced with respect to injury and liver cirrhosis. However, especially in the male population, alcohol-related cancer, particularly oral cavity and laryngeal cancer (see Zatoński & Didkowska, 2008), and the cardio-toxic effects of episodic heavy drinking also contribute to the east-west difference. In the EU10, there are higher proportions of heavy drinking, especially of irregular binge drinking occasions, and there are indications that alcoholic beverages contain toxic contaminants (Szucs et al., 2005). Similar findings were reported by Mackenbach et al. (2008) who found that in Europe as a whole, inequalities in alcohol-related mortality account for 11% of inequalities in the rate of death from any cause among men and 6% of those among women.

In addition to between country differences, the lower the socioeconomic status of a person within a country, the higher the alcohol-attributable disease burden. A study based in England, Scotland, and Wales in 1988-1994, using male census employment data linked to death records, showed that compared to professional workers, unskilled workers had a relative risk (RR) of 4.47 for alcohol-related mortality and specifically an RR of 3.61 for chronic liver disease and cirrhosis (Harrison & Gardiner 1999). In Finland, using census data linked to death records for 2001-2005, a study found clear gradients for alcohol mortality by education (basic vs. tertiary), where men had an RR of 3.52 and women an RR of 4.13, and by social class (unskilled workers vs. upper white-collar), where men had an RR of 1.57 and women an RR of 2.72 (Herttua et al 2008).

Further, the lower the socioeconomic status of a person within a country, the higher the alcohol-attributable disease burden per litre of pure alcohol. This can be indirectly measured by finding a higher RR for low vs. high socioeconomic status for disease categories with high alcohol-attributable proportions, in comparison to other disease categories. In other words, alcohol does make a difference in potentiating or increasing already existing differences between the mortality (or other health outcomes) between socio-economic strata. Harrison and Gardiner (1999), also found that the RR for unskilled professionals for chronic liver disease & cirrhosis compared with all-cause mortality was 3.61 to 2.86.

Research from Finland further suggests that socioeconomic variables act on the collective as well as the individual level. Areas with the most manual workers had 20% more mortality directly attributable to alcohol than areas with the least, even after accounting for the individual relationship of occupation to mortality (Blomgren et al. 2004). Similar effects held for unemployment, urbanisation and social cohesion (measured as both 'family cohesion' and voter turnout), which accounted for around 40% of the alcohol-attributable mortality gap between areas after taking account of all of these variables on the level of the individual. This suggests that the drinking behaviour of people living nearby may be important for the behaviour of the individual.

To summarize, alcohol is a major cause of inequalities in premature mortality between and within the countries of the Union. Inequalities in premature mortality are in turn an impediment to economic efficiency and productivity.

2.5 Individual level studies

Four databases were searched for publications on alcohol and the work place since 2000, the Cochrane library, MEDLINE, PsychLIT, and EconLIT. The exact search terms varied depending on the databases being searched and all terms were exploded and included sub-headings. Subject headings included alcohol, drinking, workplace and work-place. In addition, three publications were searched to identify additional references: Bennett & Wayne (Eds) (2003), Preventing Workplace Substance Abuse, a publication of the American Psychological Association, issues of Alcohol Research & Health published by the US National Institute on Alcohol Abuse and Alcoholism (<http://www.niaaa.nih.gov/Publications/AlcoholResearch/default.htm>), and Webb et al (2009), a systematic review of work-place interventions for alcohol-related problems.

Absenteeism

An earlier overview analyzing absenteeism rates of people at all levels of alcohol consumption yielded mixed results (Gmel and Rehm 2003). Some studies have found no association between drinking and absenteeism. For example, Ames *et al.* (1997) found no significant association between the drinker's usual volume of consumption or frequency of heavy drinking occasions (which they defined as occasions during the past year when a person had 10 or more drinks) and absenteeism. Moreover, though drinking at the workplace and hangovers at work were related to other negative consequences, such as workplace injuries, they were not related to absenteeism. A longitudinal study in the UK found that male abstainers had an increased risk of sickness absence compared with lighter drinkers (Marmot *et al.* 1993). A J-shaped relationship has been found in other studies for sickness absence (Vahtera *et al.* 2002), as well as for unemployment (Mullahy and Sindelar 1996) and earnings (Hamilton and Hamilton 1997), although it is not clear in all these studies the extent to which characteristics of the non-drinkers explain the findings, or the extent to which the absenteeism simply reflects a higher extent of health problems in the abstainers as opposed to the light drinkers.

A small scale US study found a significant relationship between alcohol use and workplace absences (McFarlin & Fals-Stewart (2002). Workers were roughly two times more likely to be absent from work the day after alcohol was consumed.

A much larger and more recent study 13,582 Australian workers found clear evidence for the impact of drinking patterns on absenteeism (Roche et al 2008). Workers' alcohol consumption was classified according to short- and long-term risk levels. A recent drinker was defined as a person who had consumed a full serve of alcohol in the past 12 months. Recent drinkers were classified into short- and long-term risk categories of alcohol consumption (low-risk, risky and high-risk) utilizing a graduated-frequency (GF) method. For short-term risk levels, respondents were classified into

mutually exclusive groups according to frequent (at least weekly), infrequent (at least monthly) or occasional (at least yearly) short-term risky or high-risk consumption. The respondents were asked to report the number of days missed from work due to (i) their personal use of alcohol in the 3 months prior to the survey; or (ii) any illness or injury in the 3 months prior to the survey. Absenteeism was categorized as no days missed or 1 or more days missed.

Table 6 shows the final model for alcohol-related absenteeism associated with risky or high-risk alcohol consumption in the short term ($F_{11,895} = 24.8, P < 0.001$) and long term ($F_{7,899} = 38.2, P < 0.001$). After adjusting for age, gender and marital status, the alcohol-related absenteeism ORs were larger for workers who drank at risky or high-risk levels compared to workers who were low-risk drinkers. For both short- and long-term risk levels, as consumption increased so did the likelihood of alcohol-related absenteeism. Compared to low-risk drinkers, workers drinking at short-term high-risk levels at least yearly, at least monthly or at least weekly were 3.1, 8.7 and 21.9 times (respectively) more likely to report alcohol-related absenteeism. Workers drinking at long-term risky or high-risk levels were 4.3 and 7.3 times (respectively) more likely to report alcohol-related absenteeism, compared to low-risk drinkers. Table 5 also shows the final model for illness/injury absenteeism associated with risky or high-risk alcohol consumption in the short term ($F_{26,875} = 17.1, P < 0.001$) and long term ($F_{22,879} = 19.6, P < 0.001$). After adjusting for age, gender, marital status, industry, country of birth and regional location, the ORs for illness/injury absenteeism were larger for workers who drank at short-term risky or high-risk levels than for workers who were low-risk drinkers. Compared to workers who were low-risk drinkers, the odds of illness/injury absenteeism in the previous 12 months were 1.3 times larger for workers who drank at least yearly at short-term high-risk levels and 1.5 times larger for workers who drank at least weekly at short-term high risk levels. The odds of illness/injury sick leave in the previous 3 months were not significantly larger for workers who drank at long-term risky or high-risk levels compared to workers who were low-risk drinkers.

Table 6. Adjusted odds ratios (ORs) for absenteeism in the previous 3 months by alcohol consumption category, Australia 2001.

	<i>Alcohol-related absenteeism*</i>				<i>Illness/injury absenteeism†</i>			
	<i>Odds ratio</i>	<i>95% CI</i>	<i>t</i>	<i>P</i>	<i>Odds ratio</i>	<i>95% CI</i>	<i>t</i>	<i>P</i>
Short-term risk								
Abstainers	–	–	–	–	0.87	0.71–1.07	–1.32	0.186
Low risk	1.00							
At least yearly risky	2.73	1.40–5.32	2.94	0.003	1.17	1.00–1.36	1.94	0.053
At least yearly high risk	3.12	1.74–5.60	3.83	<0.001	1.27	1.04–1.54	2.40	0.017
At least monthly risky	5.14	3.16–8.37	6.61	<0.001	1.17	0.99–1.38	1.88	0.060
At least monthly high risk	8.68	5.34–14.11	8.74	<0.001	1.40	1.12–1.75	2.94	0.003
At least weekly risky	12.44	7.41–20.89	9.54	<0.001	1.31	1.03–1.66	2.19	0.029
At least weekly high risk	21.87	12.90–37.06	11.47	<0.001	1.53	1.13–2.07	2.72	0.007
Long-term risk								
Abstainers	–	–	–	–	0.80	0.66–0.98	–2.18	0.030
Low	1.0							
Risky	4.26	3.04–5.98	8.41	<0.001	1.10	0.92–1.32	1.03	0.303
High risk	7.34	4.46–12.08	7.86	<0.001	1.11	0.82–1.51	0.68	0.494

The categories of short- and long-term overlap as they involve the same population grouped according to different risk (i.e. short- or long-term). However, risk levels with each risk category (i.e. short- or long-term) are mutually exclusive. *Adjusted for age, gender and marital status. †Adjusted for age, gender, marital status, industry of employment, country of birth and regional location (urban/non-urban). CI: confidence interval.

Presenteesim

Harmful alcohol use and episodic heavy drinking increase the risk of arriving to work late and leaving work early or disciplinary suspension, resulting in loss of productivity; turnover due to premature death; disciplinary problems or low productivity from the use of alcohol; inappropriate behaviour (such as behaviour resulting in disciplinary procedures); theft and other crime; and poor co-worker relations and low company morale (Marmot *et al.* 1993; Rehm and Rossow 2001; Gmel and Rehm 2003). One study conducted at 114 work sites of seven corporations (Mangione *et al.* 1999) showed an almost linear relationship between increasing average consumption and a summary measure of job performance, finding the strongest associations between consumption and getting to work late, leaving early, and doing less work, and only a weak association with missing days of work.

To summarize, alcohol is a significant risk factor for absenteeism and presenteeism, largely in a dose response manner.

3. Interventions to reduce alcohol-related harm

3.1 Population based interventions

A number of studies have estimated the avoidable costs of alcohol use disorders and the potential benefits of effective policies to reduce the social costs of alcohol (Collins et al 2006; Collins & Lapsley 2008b).

A Canadian study modelled the impact of six alcohol policy interventions relative to baseline costs of \$CAN14.5bn, obtained from the Second Canadian Cost Study (Rehm et al., 2006; Rehm et al 2008): taxation increases, lowering the blood alcohol concentration (BAC) legal limit from 0.8g/L to 0.5g/L, zero BAC restriction for all drivers under the age of 21, increasing the minimum legal drinking age (MLDA) from 19 to 21 years, a Safer Bars intervention, and brief interventions. In addition a change from a government monopoly to privatized alcohol sales was also modelled. Under conservative assumptions, it was estimated that a combination of the six interventions related to alcohol policy would result in cost savings of about \$1 billion in Canada per year. By implementing all six interventions, the greatest saving would be achieved by lowering productivity losses, i.e. more than \$561 million or 58%, followed by health care, almost \$230 million or 24%, and criminality, almost \$178 million or 18% of the total avoidable cost. The potential gains to Canadian society may be even much higher, as sensitivity analyses on three of the six selected interventions resulted in a doubling of the avoidable alcohol-attributable burden and cost. The largest impact of avoidable burden and costs would result from comprehensive interventions affecting the overall level of drinking such as brief interventions (5% - 12%) and increasing alcohol taxation (2%). Substantial increases in burden (from 8% to 16%) and cost (from 6% to 12%) would occur if Canadian provinces were to privatize alcohol sales.

To summarize, alcohol policies can, to a considerable extent, reduce lost productivity costs due to alcohol.

3.2 Impact of policies on jobs

Despite the simplicity of the implicit model sometimes suggested in debates (reduced consumption leads to reduced output leads to job losses leads to higher unemployment), most of these connections in practice require assumptions that rarely hold fully (Baumberg 2006). For example, if people spend less money on alcohol, they will spend more money on other goods, which will create jobs elsewhere in the economy. In the long run, the evidence suggests that the effect of alcohol policy on employment would effectively be zero. On the other hand, the costs that should be considered are the adjustment costs in the medium and short term, i.e. over a matter of a few years.

Capital investment has increased considerably in the alcohol production sector and is associated with higher levels of productivity, particularly for beer and spirits. In some countries, innovation in the brewing industry has led to a fivefold increase in the amount of beer produced per employee (Anderson & Baumberg 2006). Similarly for wine, mechanical harvesting and pruning are increasingly used in lower-quality as well as higher-quality production, while the labour intensity of wine grape production has been reduced by mechanization and the computerization of irrigation. A greater number of jobs are linked with alcohol in other sectors, particularly retail and the hotels, restaurants and catering sector. Here, in general, adjustment costs will be much lower than for drinks production (Baumberg 2006).

Estimates from the United Kingdom suggest that a 10% increase in the price of alcoholic beverages would lead to a reduction of consumption of 4.4%, a reduction of 5.5g alcohol per week, greater for harmful drinkers (-25g per week), than for moderate drinkers (-4g per week) (Purshouse et al 2009).

Workplace harms were estimated to reduce by 12,800 fewer unemployed people and 310,000 fewer sick days. The estimated societal value of all the harm reductions is £7.8b in total (when discounted) over the 10-year period modelled. In the first year, of the total estimated societal value of the harm reduction of £660m, half (£330m) were due to avoided employment related harms. In the United Kingdom, 59% of off-trade and 14% of on trade alcohol is currently sold at less than 5 pence per gram of alcohol. Setting a minimum price of 5 pence per gram of alcohol is estimated to reduce overall consumption by 2.6% (3.4g per week), with harmful drinkers affected (25g) much more than moderate drinkers (0.01g/week). Workplace harms are reduced by 12,400 fewer unemployed people and 100,000 fewer sick days. The societal value of all the harm reductions is £5.4bn in total over the 10-year period modelled. In the first year, of the total estimated societal value of the harm reduction of £438m, over two-thirds (£312m) is from avoided employment related harms.

For tax receipts, the policies were found to be largely revenue neutral because decreases in duty receipts (related to decreased volume of consumption) were offset by increases in sales tax receipts (related to increases in overall expenditure). Overall, alcohol retailers in both the off-trade and on-trade were likely to see increased revenues from the policies.

To summarize, tax and price policies are, if anything, likely to lead to an overall increase in jobs (rather than job losses) and to increase profits for the alcohol industry.

3.3 Structural factors

There has been little research on the role of an adverse work environment in increasing the risk of alcohol use disorders. There is some evidence of an association of shift work (Tasto et al 1978), low level of technical responsibility at work (Plant 1979), and job insecurity (Cooper et al 1990) with alcohol consumption. However, associations of an adverse work environment with alcohol use are often moderated by distinct coping characteristics of working people (Cooper et al 1990; Mensch & Kandel 1988). Moreover, studies in this area are rarely based on an explicit stress-theoretical model that identifies “toxic” components of an adverse work environment, with special emphasis on its psychosocial dimensions, such as the demand-support control model of job strain (Karasek & Theirell 1990), and the effort-reward imbalance model (Siegrist 1996).

Recent analysis of the Whitehall II occupational cohort of London based civil servants study found, for women a clear grade gradient with those in the highest two grades having the highest proportion of problem drinkers, which was not the case for men (Head et al 2004). In men, effort-reward imbalance was associated with alcohol dependence after taking account of age and employment grade, with those classified as putting in high efforts but receiving low rewards having the highest risk of being alcohol dependent. This association was also seen for women, although was not as marked. In addition, low decision latitude in women was associated with increased risk of alcohol dependence. Neither high job demands nor low work support were associated with alcohol dependence. These associations between work characteristics and alcohol dependence did not appear to be mediated through physical illness, poor mental health, or adverse changes in social supports or network size.

Most other studies of psychosocial work characteristics and alcohol have used measures of alcohol consumption rather than alcohol problems or alcohol dependence and most have found no or little association between work characteristics and amount consumed (Van Loon et al 2000). A cross-sectional study of a French occupational cohort showed that, in men, low decision latitude was associated with alcohol consumption and, in women, low work social supports was associated with alcohol consumption (Niedhammer et al 1998). Effort-reward imbalance at work was found to be associated with a high level of alcohol consumption in a cross-sectional study (Puls et al 1998). Interestingly, experience of social reward deficiency has been hypothesised to act as one of several

triggers activating the brain's dopaminergic reward system involved in addictive behaviour (Siegrist 2000).

A Finnish study found a relationship between burnout and the risk of alcohol dependence in both men and women (Ahola et al 2006). Burnout is a consequence of chronic work stress (Maslach et al 2001). According to the most used operationalization in scientific research, burnout is a state of exhaustion in which one becomes doubtful about the value of one's work and one's competence (Maslach et al 1996). Burnout has been related most consistently to psychosocial work characteristics, mainly high demands and low resources at work (Schaufeli et al 2004), but also to individual, interpersonal, other organizational and societal factors (Schaufeli & Enzmann 1998). In the Finnish study, each one-point increase in burnout score was associated with an 80% increase in the incidence of alcohol dependence among women and a 51% increase among men. After adjustment for socio-demographic factors, the odds ratio of burnout for alcohol dependence was 2.06 (95% CI 1.52–2.81) in a logistic regression analysis for women and 1.51 (95% CI 1.28–1.79) for men. Again, the association between burnout and alcohol dependence can also derive from a connection between stress and alcohol use on a neurobiological level (Brady & Sonne 1999). Both intracellular and dopaminergic extracellular mechanisms may be involved in the interaction between stress, craving for stress relief and addictive behaviour; for example, alcohol use (Siegrist 2000; Hyman 2005).

Despite the structural relationships between the work environment and the risk of alcohol use disorders, few intervention studies have investigated the impact of changing work structures on reducing workplace alcohol-related harm (Roman & Blum 1996; Roman & Blum 2002). An exception to this is a study that compared two work settings with distinctly different managerial cultures (Ames et al 2000). One setting had a traditional hierarchical U.S. management design and the other was based on a Japanese management model transplanted to the United States. Although overall alcohol consumption rates in both populations were similar, the traditional management design was associated with more permissive norms regarding drinking before or during work shifts (including breaks) and higher workplace drinking rates. By contrast, the transplant management design was associated with greater enforcement of alcohol policies, which, in turn, predicted more conservative drinking norms and lower alcohol availability at work. Qualitative research clearly indicated that the transplant design facilitated the social control of alcohol problems, whereas the traditional design appeared to undermine such control.

To summarize, structural factors at the workplace (high demand but low reward) increase the risk of alcohol use disorders. In contrast, no studies have tested the impact of changes in structural factors on alcohol related harm; one study has suggested that managerial style may be associated with differences in harm.

3.4 Individually directed interventions

A recent systematic review of work-place interventions for alcohol-related problems (Webb et al 2009) identified only ten intervention studies (Anderson & Larimer 2002; Bennett et al 2004; Hermansson et al 1998; Richmond et al 2000; Heirich & Sieck 2000; Matano et al 2007; Walters & Woodall 2003; Spicer & Miller 2005; Cook et al 1996; Lapham et al 2003). Interventions comprised three broad types of strategies: psychosocial skills training; brief intervention, including feedback of results of self-reported drinking, life-style factors and general health checks; and alcohol education delivered via an internet website. The psychosocial interventions included peer referral, team building and stress management and skills derived from the social learning model. For health checks, topics covered in addition to alcohol were smoking, exercise, diet, weight, stress, depression, blood pressure, cholesterol, diabetes, cancer, safety and preventive health-care risks. Only one study reported no statistically significant results. Seven studies reported significant reductions in various

self-report-measures of alcohol consumption or alcohol-related problems. Richmond et al. (2000) reported significantly reduced consumption for women, but not for men. With regard to binge drinking, Lapham et al. (2003) reported significantly reduced desire to binge drink, and Matano et al. (2007) reported significant decreases in binge drinking. Walters & Woodall (2003) found significantly increased perceptions of 'riskiness' of alcohol consumption, while Cook et al. (1996) reported no significant effects on health beliefs.

The counselling-based interventions either reported no effect, or the effect was small, self-reported only, or measured desire to change rather than actual behaviour. The four mail-out/feedback/brief intervention studies were practical and possibly sustainable interventions that achieved outcomes somewhat comparable to the more intensive counselling interventions. However, the outcomes are self report.

One study which used objective outcome measures described the impact of a workplace peer-focused substance abuse programme in the transportation industry implemented in phases from 1988 to 1990 (Spicer & Miller 2005; Miller & Spicer 2007). The program focused on changing workplace attitudes toward on-the-job substance use in addition to training workers to recognize and intervene with co-workers who have a problem. The program was strengthened by federally mandated random drug and alcohol testing (implemented, respectively, in 1990 and 1994). With time-series analysis, the association of monthly injury rates and costs with phased program implementation were analyzed, controlling for industry injury trend. The combination of the peer-based program and testing was associated with an approximate one-third reduction in injury rate, avoiding an estimated \$48 million in employer costs in 1999. That year, the peer-based program cost the company \$35 and testing cost another \$35 per employee. The program avoided an estimated \$1850 in employer injury costs per employee in 1999, corresponding to a benefit-cost ratio of 26:1.

To summarize, there are very few studies that evaluate the impact of work place based policies to reduce alcohol-related harm. Nevertheless, from the limited literature, brief interventions, interventions contained within health and life-style checks, psychosocial skills training and peer referral may all have the potential to produce beneficial, although rather small results.

4 Conclusions

An objective of the Lisbon Strategy is to adopt policies that contribute to higher productivity and a sustainable economic development in the European Union. It is clear that the high level of alcohol consumption in the European Union impairs productivity of the Union as a whole, and that alcohol policies have the potential to reduce the economic burden that alcohol imposes on the Union and to enhance higher productivity.

This report has considered the extent to which work place based alcohol policies and programmes can contribute to reducing the harm done by alcohol to the economy of the European Union. The simple answer is not much. Work place policies should nevertheless be implemented and maintained for the simple reason that they can bring health gain. But, even if widely implemented they will only have limited impact at most on the economy.

On the other hand, it is clear that alcohol policies that reduce overall levels of consumption will reduce the harm done by alcohol to the economy of the European Union, and have the potential of substantially doing so. A key option here is alcohol price policy which has the potential of substantially reducing alcohol-related harm, sickness absence and the social costs of alcohol and of increasing employment.

References

- Ahola K et al. Alcohol dependence in relation to burnout among the Finnish working population. *Addiction*, 2006, 101:1438-1443.
- Ames GM, Grube JW, Moore RS. Social control and workplace drinking norms: a comparison of two organizational cultures. *Journal of Studies on Alcohol*, 2000, 61(2):203-219.
- Ames, G.M.; Grube, J.W.; And Moore, R.S. (1997). The relationship of drinking and hangovers to workplace problems: An empirical study. *Journal of Studies on Alcohol* 58(1):37-47.
- Anderson B. K., Larimer M. E. Problem drinking and the workplace: an individualized approach to prevention. *Psychol Addict Behav* 2002; **16**: 243-51.
- Anderson P, Baumberg B. *Alcohol in Europe*. London, Institute of Alcohol Studies, 2006 (http://ec.europa.eu/health/ph_determinants/life_style/alcohol/documents/alcohol_europe.pdf. accessed 30 June 2009).
- Anderson, P. (1993). The management of alcohol problems. Copenhagen: World Health Organization Regional Office for Europe.
- Baumberg (2009). A Summary of Best-Practice Methods for Estimating the Attributable and Avoidable Costs of Alcohol, and Recommendations for Future Practice. Copenhagen: World Health Organization Regional Office for Europe.
- Baumberg, B The global economic burden of alcohol: a review and some suggestions. *Drug and Alcohol Review*, 2006, 25(6):537-551.
- Bennett J. B., Patterson C. R., Reynolds G. S., Wiitala W. L., Lehman W. E. K. Team awareness, problem drinking, and drinking climate: workplace social health promotion in a policy context. *Am J Health Promot* 2004; **19**: 103-13.
- Blomgren J et al. The effects of regional characteristics on alcohol-related mortality – a register-based multilevel analysis of 1.1 million men. *Social Science and Medicine*, 2004, 58:2523-2535.
- Brady K. T., Sonne S. C. The role of stress in alcohol use, alcoholism treatment, and relapse. *Alcohol Res Health* 1999; **23**: 263-71.
- Collins DJ, Lapsley HM. *The avoidable costs of alcohol abuse in Australia and the potential benefits of effective policies to reduce the social costs of alcohol*. Canberra, Department of Health and Aging, 2008 (Monograph Series No. 70).
- Collins, D, Lapsley, H., Brochu, S., Easton, B., Pérez-Gómez, A., Rehm, J. & Single, E. (2006), *International Guidelines for the Estimation of the Avoidable Costs of Substance Abuse*, Health Canada, http://www.hc-sc.gc.ca/ahc-asc/alt_formats/hecs-sesc/pdf/activit/strateg/drugs-drogues/nat-res-rech/cost-cout-abus/costs-estimation-couts_e.pdf.
- Collins, D.J. & Lapsley, H.M. (2008a), *The costs of tobacco, alcohol and illicit drug abuse to Australian society in 2004/05*, National Drug Strategy Monograph Series No. 64.
- Cook R. F., Back A. S., Trudeau J. Preventing alcohol use problems among blue-collar workers: a field test of the Working People program. *Subst Use Abuse* 1996; **31**: 255-75.
- Cooper ML, Russell M, Frone MR. Work stress and alcohol effects: a test of stress-induced drinking. *J Health Soc Behav* 1990;31:260-76.
- Dee, T.S. Alcohol abuse and economic conditions: evidence from repeated cross-sections of individual-level data. *Health Economics* 2001 10 257-270.

- Gmel G, Rehm J. Harmful alcohol use. *Alcohol Research and Health*, 2003, 27:52-62.
- Hamilton, V. and Hamilton, B. (1997) Alcohol and earnings: does drinking yield a wage premium. *Canadian Journal of Economics* 30 135-151.
- Harrison L, Gardiner E. Do the rich really die young? Alcohol-related mortality and social class in Great Britain, 1988-94. *Addiction*. 1999; 94: 1871-80
- Head J, Stansfeld SA, Siegrist J. The psychosocial work environment and alcohol dependence: a prospective study. *Journal of Occupational and Environmental Medicine*, 2004, 61:219-224.
- Heirich M., Sieck C. J. Worksite cardiovascular wellness programs as a route to substance abuse prevention. *J Occup Environ Med* 2000; **42**: 47-56.
- Henderson, M., Hutcheson, G. & Davies, J. Alcohol and the workplace. Copenhagen: World Health Organization Regional Office for Europe, 1995.
- Hermansson U., Knutsson A., Ronnberg S., Brandt L. Feasibility of brief intervention in the workplace for the detection and treatment of excessive alcohol consumption. *Int J Occup Environ Health* 1998; **4**: 71-8.
- Herttua K, Mäkelä P, Martikainen P. Changes in alcohol-related mortality and its socioeconomic differences after a large reduction in alcohol prices: a natural experiment based on register data. *Am J Epidemiol*. 2008; 168: 1110-8.
- Hyman S. E. Addiction: a disease of learning and memory. *Am J Psychiatry* 2005; **162**: 1414-22.
- J. Rehm, P. Anderson, F. Kanteres, C.D. Parry, A.V. Samokhvalov, J. Patra. Alcohol, social development and infectious disease. Centre for Addiction and mental Health, Toronto. 2009.
- Johansson E, Bockerman P, Uutela A. Alcohol consumption and sickness absence: evidence from microdata. *European Journal of Public Health*, 2009, 19(1):19-22.
- Karasek R, Theorell T. Healthy work: stress, productivity, and the reconstruction of working life. New York: Basic Books, 1990.
- Lapham S. C., Gregory C., McMillan G. Impact of an alcohol misuse intervention for health care workers—1. Frequency of binge drinking and desire to reduce alcohol use. *Alcohol Alcohol* 2003; **38**: 176-82.
- Mackenbach JP, Stirbu I, Roskam AJR, Schaap MM, Menvielle G, Leinsalu M, Kunst AE. Socioeconomic Inequalities in Health in 22 European Countries. *N Engl J Med*. 2008; 358: 2468-81.
- Mangione, T.W.; Howland, J.; Amick, B.; *et al.* (1999). Employee drinking practices and work performance. *Journal of Studies on Alcohol* 60:261-270.
- Marmot, M.G.; North, F.; Feeney, A.; And Head, J. (1993) Alcohol consumption and sickness absence: From the Whitehall II study. *Addiction* 88:369-382.
- Maslach C., Jackson S. E., Leiter M. P. *Maslach burnout inventory manual* . Palo Alto: Consulting Psychologists Press; 1996.
- Maslach C., Schaufeli W. B., Leiter M. P. Job burnout. *Annu Rev Psychol* 2001; **52** : 397-422.
- Matano R. A., Kloopman C., Wanat S. F., Winzelberg A. J., Whitsell S. D., Westrup D. *et al.* A pilot study of an interactive web site in the workplace for reducing alcohol consumption. *J Subst Abuse Treat* 2007; **32**: 71-80.
- McFarlin SK, Fals-Stewart W. Workplace absenteeism and alcohol use: a sequential analysis. *Psychology of Addictive Behaviors*, 2002, 16:17-21.

- Mensch BS, Kandel DB. Do job conditions influence the use of drugs? *J Health Soc Behav* 1988;29:169-84.
- Miller TR, Zaloshnja E, Spicer RS. Effectiveness and benefit-cost of peer-based workplace substance abuse prevention coupled with random testing. *Accident Analysis and Prevention*, 2007, 39:565-573.
- Mullahy, J. and Sindelar, J.L. (1996) Employment, unemployment and problem drinking. *Journal of Health Economics* 1996 15 409-434.
- Niedhammer I, Goldberg M, Leclerc A, et al. Psychosocial work environment and cardiovascular risk factors in an occupational cohort in France. *J Epidemiol Community Health* 1998;52:93-100.
- Norstrom T. Per capita alcohol consumption and sickness absence. *Addiction*, 2006, 110:1421–1427.
- Puls W, Winold H, Blank T. The influence of effort-reward imbalance in the workplace on the consumption of alcohol: a written survey carried out in metal-working companies. *Sucht* 1998;44:183-99.
- Rabinovich L et al. *The affordability of alcoholic beverages in the European Union. Understanding the link between alcohol affordability, consumption and harms*. Santa Monica, CA, Rand Corporation, 2009 (http://www.rand.org/pubs/technical_reports/2009/RAND_TR689.pdf, accessed 2 July 2009).
- Rehm J et al. *Avoidable cost of alcohol abuse in Canada 2002*. Toronto, Centre for Addiction and Mental Health, 2008 (http://www.camh.net/News_events/News_releases_and_media_advisories_and_backgrounders/Avoidable%20Cost%20of%20Alcohol%20Final%20Report_March20_08.pdf, accessed 4 July 2009).
- Rehm J et al. Global burden of disease and injury and economic cost attributable to alcohol use and alcohol use disorders. *Lancet*, 2009, 373(9682):2223-2233.
- Rehm J. and Rossow I. (2001) The impact of alcohol consumption on work and education. In: Klingemann H. and Gmel G. (eds.) *Mapping the Social Consequences of Alcohol Consumption*, pp. 67-77. Dordrecht: Kluwer Academic Publishers.
- Rehm, J., Baliunas, D., Brochu, S., Fischer, B., Gnam, W., et al. (2006a). *The costs of substance abuse in Canada 2002*. ISBN number 1-897321-10-4. Ottawa, Canada: Canadian Centre on Substance Abuse.
- Richmond R., Kehoe L., Heather N., Wodak A. Evaluation of a workplace brief intervention for excessive alcohol consumption: the Workscreen Project. *Prev Med* 2000; **30**: 51-63.
- Robin Purshouse, Petra Meier, Alan Brennan, Karl Taylor, Rachid Rafia Alcohol pricing policies: Estimated impact on health outcomes and health economic outcomes in England. *Lancet*. In Press.
- Roche AM et al. Workers' drinking patterns: the impact on absenteeism in the Australian work-place. *Addiction*, 2008, 103:738-748.
- Roman P. M., Blum T. C. Alcohol: a review of the impact of worksite interventions on health and behavioral outcomes. *Am J Health Promot* 1996; **11**: 135-49.
- Roman PM, Blum TC. The workplace and alcohol problems prevention. *Alcohol Research and Health*, 2002, 1:49-57.
- Schaufeli W. B., Bakker A. B. Job demands, job resources, and their relationship with burnout and engagement: a multi-sample study. *J Organization Behav* 2004; **25**: 293-315.

- Schaufeli W. B., Enzmann D. *The burnout companion to study and practice: a critical analysis*. London: Taylor & Francis; 1998.
- Siegrist J. Adverse health effects of high-effort/low-reward conditions. *J Occup Health Psychol* 1996;1:27-41.
- Siegrist J. Place, social exchange and health: proposed sociological framework. *Soc Sci Med* 2000;51:1283-93.
- Siegrist J. Place, social exchange and health: proposed sociological framework. *Soc Sci Med* 2000; **51**: 1283-93.
- Spicer R. S., Miller T. R. Impact of a workplace peer-focused substance abuse prevention and early intervention program. *Alcohol Clin Exp Res* 2005; **29**: 609-11.
- Stuckler, D., Basu, S., Suhrcke, M., Coutts, A. & McKee, M. The public health effect of economic crises and alternative policy responses in Europe: an empirical analysis. *Lancet* 2009 374 315-23.
- Szucs S, Sarvary A, McKee M, Adany R. Could the high level of cirrhosis in central and eastern Europe be due partly to the quality of alcohol consumed? An exploratory investigation. *Addiction* 2005;100(4):536-42.
- Tasto D, Collegan MJ, Skjei EW, et al. Health consequences of shift work. Manlow Park: National Institute of Occupational Health and Safety, 1978. 2 Plant MA. Drinking careers: occupations, drinking habits and drinking problems. London: Tavistock, 1979.
- Vahtera J, Poikolainen K, Kivimaki M, Ala-Mursula L, Pentti J (2002). Alcohol intake and sickness absence: a curvilinear relation. *Am J Epidemiol*, 15;156(10):969-76.
- Van Loon AJ, Tjihuis M, Surtees PG, et al. Lifestyle risk factors for cancer: the relationship with psychosocial work environment. *Int J Epidemiol* 2000;29:785-92.
- Walters S.T., Woodall W. Mailed feedback reduces consumption among moderate drinkers who are employed. *Prev Sci* 2003; **4**: 287-94.
- Webb G et al. A systematic review of work-place interventions for alcohol-related problems. *Addiction*, 2009, 104:365-377.
- Zatoński W, Didkowska J, Closing the gap: Cancer in Central and eastern Europe (CEE). *Eur J Cancer* 2008;44(1425).
- Zatonski W, ed. *Closing the health gap in European Union*. Warsaw, Maria-Sklodowska-Curie Memorial Cancer Center and Institute of Oncology, 2008 (<http://www.hem.home.pl/index.php?idm=87,139&cmd=1>, accessed 30 June 2009).