

EPIDEMIOLOGY

Who Drinks Most of the Total Alcohol in Young Men—Risky Single Occasion Drinking as Normative Behaviour

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Abstract — Aims: The objectives of this study were to analyse (a) the distribution of risky single-occasion drinking (RSOD) among 19-year-old men in Switzerland and (b) to show the percentage of all alcohol consumption in the form of RSOD. **Methods:** The study was based on a census of Swiss francophone 19-year-old men consecutively reporting for processing. The study was conducted at Army Recruitment Center. The participants were 4116 recruits consecutively enrolling for mandatory army recruitment procedures between 23 January and 29 August in 2007. The measures were alcohol consumption measured in drinks of ~10 g of pure alcohol, number of drinking occasions with six or more drinks (RSOD) in the past 12 months and a retrospective 1 week drinking diary. **Results:** 264 recruits were never seen by the research staff, 3536 of the remaining 3852 conscripts completed a questionnaire which showed that 7.2% abstained from alcohol and 75.5% of those drinking had an RSOD day at least monthly. The typical frequency of drinking was 1–3 days per week on weekends. The average quantity on weekends was about seven drinks, 69.3% of the total weekly consumption was in the form of RSOD days, and of all the alcohol consumed, 96.2% was by drinkers who had RSOD days at least once a month. **Conclusion:** Among young men, RSOD constitutes the norm. Prevention consequently must address the total population and not only high-risk drinkers.

INTRODUCTION

Risky single occasion drinking (RSOD), also called binge or heavy episodic drinking, is an amount of alcohol consumption that leads to intoxication and contributes to a major burden of disease all over the world (Rehm *et al.*, 2004). Consumption patterns vary greatly within cultures. In ‘wet’ countries, drinking is typically frequent, regular and in moderate amounts with meals whereas in ‘dry’ countries the pattern is more explosive, with heavy intake on weekends and much less drinking during the week (Room and Mäkelä, 2000). These differences markedly affect the relative adverse consequences of using alcohol. Greater burdens resulting from acute drinking, such as injuries, are expected in ‘dry’ countries whereas more chronic consequences, such as liver cirrhosis, are expected in ‘wet’ countries. Switzerland is commonly thought to be a ‘wet’ country (Rehm *et al.*, 2004) and theoretically should be less burdened by RSOD than are ‘dry’ countries.

Infrequent RSOD drinking, rather than regular heavy drinking, is highly prevalent among adolescents and young adults (predominantly males) in most societies (Gmel *et al.*, 2003; Kuntsche *et al.*, 2004). The detrimental effects of RSOD among young people have been widely attributed in the literature to consequences such as blackouts, unintended pregnancy, involvement in violent acts, academic failure and suicide attempts (Perkins, 2002; Windle, 2003; Hingson *et al.*, 2005). RSOD, particularly through its acute effects on intentional and unintentional injury, constitutes the greatest risk factor for mortality and morbidity among adolescents and young adults in established market economies (Rehm *et al.*, 2006).

The impact of RSOD on mortality and morbidity calls for preventive actions. Effective interventions have been described (Babor *et al.*, 2003) that often involve structural measures aimed at the total population, such as legal drinking age limits,

price increases through taxation or other restrictions on alcohol availability (limits on opening hours, off- and on-premise densities, etc.). These measures are often unpopular, and preferred measures, such as education, media campaigns, or targeting mainly high-risk groups are commonly ineffective (Munro, 2004; Room, 2004). Therefore, it is important to know whether RSOD constitutes a problem of a minority that can be approached through high-risk group strategies or needs preventive strategies on the population level. Although across cultures and societies the highest prevalence of RSOD has commonly been found among adolescents and young adults (Gmel *et al.*, 2003; Kuntsche *et al.*, 2004), this neither indicates whether it is a problem of a minority among them nor how much of the total alcohol in this age group is actually consumed in risky drinking occasions. Some studies have shown that a small proportion of alcohol consumers account for a high share of total alcohol intake. Greenfield and Rogers (1999) showed that 20% of the population with high rates of consumption account for almost 90% of the total alcohol use in the United States, and in Switzerland, the highest consumption group (constituting 11% of the total population including abstainers) accounted for 50% of the total alcohol consumed (Institut Suisse de Prévention de l’Alcoolisme et autres Toxicomanies (ISPA), 2004). These studies focussed on the general population and usual consumption volume rates. Greenfield and Rogers (1999) additionally showed that young people (particularly men aged 18–29 years) were over-represented among the heaviest drinkers (>6 drinks per day) and accounted for almost half of all adult drinking, although they represented only 27% of the population. Therefore, the study showed that young adults contributed greatly to the total alcohol use in a society. However, we are not aware of any research that determined the proportion of total alcohol consumption that comes from RSOD occasions among young men. In a companion paper, Rogers and Greenfield (1999)

showed that the strongest predictors of hazardous beer consumption were being male and under the age of 30. Hazardous beer consumption accounted for most of the hazardous alcohol consumption, which was defined similarly to RSOD in the present study. The study we present here seems both important and timely because it was based on a census of young men and is virtually free of sample selection bias. It will permit an inside look at the behaviour of young men in a drinking culture other than the USA. The present study aims to explore in a 'wet' society (a) whether at-risk alcohol use (here defined as RSOD) among young adults affects only a few individuals or a large proportion of that population and (b) whether most of the alcohol used within this population is consumed on those occasions that place drinkers at high risk for detrimental consequences. This information is vital, not only for Switzerland's policy makers but also for policy makers in 'dry' societies where RSOD may be even more of a widespread phenomenon among drinkers.

METHODS

Sample

Switzerland has a mandatory 2-day army recruitment process, and virtually all males at age 19 complete the physical, medical and cognitive assessments for service eligibility in the army. About 50% of these men then move on to army service within the next few years. Those with attested severe disablement are excused from following this procedure and according to estimates by the army are <3%. About 21% of the Swiss population is French speaking (Bundesamt für Statistik (BFS), 2007). Women may voluntarily join the army, but in the present study, only eight of them showed up and participated so they were not included in the present calculations.

Sampling took place during 25 consecutive weeks between 23 January and 29 August in 2007, with the exception that the recruitment centre at Lausanne (which is responsible for all men of the francophone *cantons*) was closed for holidays about 6 weeks in all during that time. A total of 4116 men showed up during the roughly 25 weeks; 264 of them were never seen by the research staff, due to early discharge from the army because of mental and physical handicaps that *a priori* precluded any service or even full completion of the assessment process. The remaining 3852 conscripts were approached to fill out a 5-min screener for alcohol, tobacco and illicit drug use. All were informed that participation in the study was voluntary and that any data provided would never be turned over to nor seen by anyone in the army. The present study is part of a larger project providing brief interventions to conscripts; however, only screening data are used herein. Only 289 men refused the screening and another 24 could not finish the questionnaire because they were called out to complete other mandatory army assessments. Three more cases were excluded due to apparent inconsistent or falsified answers (e.g. a non-drinker claiming to have had >100 drinks the week before the interview, or an individual reporting daily intake of >100 drinks). The end sample included analysable data from 3536 young men. The study was approved by the Ethics Committee for Clinical Research at the Lausanne University Medical School.

Questionnaire and measures

The questionnaire contained items that assessed tobacco, drug and alcohol consumption, which was described as usual drinking in the past 12 months as well as drinking in the 7 days prior to the interview (a retrospective daily alcohol diary was used to record this).

Usual consumption

The usual frequency of drinking was assessed with an open-ended question on how many days per week alcohol was consumed. Non-weekly drinkers responded to closed-ended questions and selected categories of '2 to 4 times a month' (coded as 42 days per year), 'once a month or less often' (coded as 9 days per year) and 'never'. We decided to take higher values than the arithmetic mid-points of 6 and 36 due to (a) the well-known skewness of the drinking distribution, which does not favour a normal (or symmetric) distribution around a range of values as a prerequisite for taking arithmetic means, (b) the under-reporting of consumption in surveys compared to sales data and (c) the fact that 0 is not the lower limit among drinkers for the category once a month or less, nor is 48 the highest possible frequency for the once-a-week equivalent of four times a month (which would be 52). We decided to add half the range between the arithmetic mid-point and the highest nominal category [i.e. $6 + (12 - 6)/2 = 9$ and $36 + (48 - 36)/2 = 42$]. The use of mid-points instead would not have substantively altered any of the present findings, since it affects mainly drinkers at very low levels. Usual quantity per drinking day was an open-ended question about number of standard drinks, which typically contain ~10 g of alcohol. Pictures of standard vessels were shown with the following labels identifying container sizes: 100 mL glass of wine; 250 mL glass of beer; 275 mL bottle of alcopops (a premixed drink containing spirits such as Bacardi Breezer); 25 mL glass of spirits and 50 mL tall glass containing spirits and aperitif (e.g. martini). It was implicitly assumed (but not explicitly mentioned in the question) that respondents converted other vessel sizes (e.g. beer cans of 500 mL) to the corresponding number of standard drinks. The same was true for drinks poured into glasses. There is clear evidence (e.g. Kerr *et al.*, 2005; Kerr and Greenfield, 2007) that the amount of self-poured beverages, in particular, can be underestimated by the respondents and therefore the real ethanol content may be underestimated, which is also likely for the present study.

The number of drinks per drinking day was multiplied by number of drinking days to obtain the weekly drinking volume. A cut-off of 21 drinks per week (3 per day) was chosen to distinguish low (up to 21 drinks/week or 210 g/week) from risky drinking volume (22+ drinks/week). Standards for brief intervention studies set by the National Institute on Alcohol Abuse and Alcoholism (NIAAA, see US Department of Health and Human Services (USDHHS), 1995) recommend 15 drinks as the cut-off at which interventions should start. Clinical guidelines in Europe (Anderson *et al.*, 2005) and other working definitions (World Health Organization (WHO), 2000; Rehm *et al.*, 2004) recommend four standard drinks daily (or correspondingly, 280 g a week with 10 g per standard drink) as cut-offs for brief interventions studies among men. We used a more conservative cut-off that is closer to NIAAA recommendations (note that standard drinks in the USA are between 12 and 14 g and therefore 15 drinks

equal between 180 and 210 g a week) because of the relatively young age of men in the present study. RSOD frequency was measured with an open-ended question about usual number of days per month on which 6+ drinks were consumed. Six drinks contain ~60 g of pure alcohol and equal the most common US measure of 5+ drinks of 12 g per drink (Gmel *et al.*, 2003). Our definition of RSOD conformed to the NIAAA and European recommendations (Anderson *et al.*, 2005). Finally, an open-ended item asked about the maximum number of drinks on any day in the last 12 months. The percentage of total alcohol usually consumed was calculated for low-risk drinkers, i.e. those who never had a RSOD day in the past 12 months nor exceeded the usual drinking limit of 13 drinks per week.

Consumption last week

Conscripts were asked retrospectively to itemize in a 1-week diary their daily beverage-specific consumption, using the alcohol definitions listed above. Drinks were summed over beverages for each day and totalled over the 7 days. This allowed a calculation of maximum drinks in 1 day in the last week for each individual, as well as the proportion of the overall sample with days of 6+, 8+, 10+, etc. drinks. It was assumed that a 6+ day is in fact that many drinks on a single occasion, since multiple occasions (i.e. with and without meals) are probably rare in this age group. The total alcohol consumed in the last week was also calculated for those who had at least one RSOD day in that week.

Statistical analysis

It should be noted that the present study did not use a sample in the inferential statistical sense. It is a census of virtually all young men of the same age who live in the French-speaking parts of Switzerland, who enrolled in the recruitment centre during the study period. The response rate of >90%, in our view, indicates that there is very little self-selection bias built in. *P*-values and confidence intervals are not reported because results have no random component. It also should be noted that, due to the total number of >3500 individuals, any appropriate statistical tests that might be presented in the tables would all be significant at an alpha level <0.01.

RESULTS

Table 1. gives an overview of drinking patterns among young men. In the past year, only 7.2% abstained from alcohol. Including those abstainers, less than a fifth (17.2%) were low-risk drinkers, i.e. neither drank over the volume limits of 21 drinks a week nor had RSOD days at least monthly. It can also be seen that heavier, regular consumption without RSOD is virtually non-existent in this sample of young Swiss men, i.e. only 0.1% of the sample had 22+ drinks weekly without any RSO days at least monthly. Three quarters (75.5%) of the sample did have RSOD days at least once a month.

Almost a quarter (23.7%) of the young men in the sample had no alcohol in the week prior to the interview, but of those who did, 39.0% had at least one RSOD day during that time.

Table 2 shows that 63.4% had at least 1 day in the past 12 months with at least 10 drinks, and 23.1% of the

Table 1. Volume of drinking (%) by RSOD occasions in the past 12 months and in the last week

Volume		RSOD			
		No RSOD	1 RSOD	2+ RSOD	Total
Usual consumption ^a (<i>n</i> = 3536)	No alcohol use	7.2	0.0	0.0	7.2
	<22 drinks/week	17.2	21.8	44.3	83.3
	22+ drinks/week	0.1	0.1	9.4	9.5
	Total	24.5	21.8	53.6	100.0
Last week ^b (<i>n</i> = 3536)	No alcohol use	23.7	0.0	0.0	23.7
	<22 drinks/week	37.1	16.5	5.7	59.4
	22+ drinks/week	0.2	2.2	14.5	16.9
	Total	61.0	18.8	20.2	100.0

^aFor usual consumption: no RSOD = less than monthly; 1 RSOD = 1 RSOD per month; 2+ RSOD = 2 RSOD per month or more.

^bFor last week consumption: no RSOD = not in last week; 1 RSOD = once in the last week; 2+ RSOD = at least 2 RSOD in the last week.

Table 2. Percent drinkers by maximum number of drinks in 1 day in the past 12 months and in the last week (*n* = 3536)

	Past 12 months	Last week
0 drinks	7.2	23.7
1–2 drinks	3.3	17.3
3–5 drinks	7.0	20.0
6–9 drinks	19.2	16.1
10–14 drinks	24.9	12.4
15–19 drinks	13.5	4.9
20–29 drinks	16.7	4.4
30+ drinks	8.3	1.4

sample had such a day during the prior week. Only 10.3% of all drinkers in the past year had <6 drinks or more on each occasion. The modal maximum in the last 12 months was 10–14 drinks but, among drinkers, only 3–5 drinks in the prior week.

Table 3 shows that steady drinking on a weekly basis is not common among young francophone Swiss males. As regards the past 12 months measure, only 17.1% drank on average >3 days per week, and only 27.6% had more than 3 drinking days in the last week. The average frequency was ~2 days per week. It should be noted that RSOD drinkers also drank more often than non-RSOD drinkers, supporting the above statement that regular, moderate alcohol use is not practised by most young men in this culture.

Table 4 shows results from the retrospective (last week) drinking diary used to assess consumption on each of the 7 days prior to the interview. Alcohol use was at its greatest on Friday and Saturday, as might be expected in this young sample. On these 2 days, a higher percentage of all were drinking and in much higher amounts than those who drank on other days. For example, only 10.8% of the sample drank on Tuesday, and those drinking consumed an average of 2.7 drinks, corresponding to 0.3 drinks over the entire sample. On Saturday, 64.4% of the total sample drank alcohol, consuming an average of 7.3 drinks, >2.5 times that of the Tuesday drinkers. Nearly half (48.2%) of the Saturday drinkers had an RSOD day, i.e. they exceeded the RSOD threshold of six drinks. Only 2.5% of the total alcohol consumed over the week was on Tuesday, while >70% was on Friday (29.4%) and Saturday (41.2%).

Table 5 displays the quantities of alcohol consumed on heavy drinking (RSOD) days in the last week and by drinkers who

Table 3. Number of drinking days by RSOD in the past 12 months and in the last week for drinkers only (%)

Drinking days	Usual consumption, past 12 months, drinkers only			Last week, drinkers only		
	No RSOD (n = 612)	1+ RSOD (n = 2669)	Total (n = 3281)	No RSOD (n = 1320)	1+ RSOD (n = 1379)	Total (n = 2699)
<1 day/month	35.8	6.4	11.9			
<1 day/week	24.5	9.4	12.3			
1 day/week	22.4	16.6	17.7	33.0	10.7	21.6
2 days/week	10.9	30.8	27.1	35.8	27.8	31.7
3 days/week	2.8	16.6	14.1	16.7	21.4	19.1
4 days/week	1.6	8.1	6.9	6.4	15.4	11.0
5 days/week	0.8	4.8	4.1	3.5	9.6	6.6
6 days/week	0.7	2.6	2.3	2.7	9.2	6.0
Daily	0.5	4.6	3.8	1.9	6.0	4.0

Table 4. Distributions of percent drinkers and average number drinks^a on each day of the week for the total sample and for drinkers of the corresponding day only

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Percent drinkers (total sample)	20.8	10.8	15.9	21.3	52.2	64.4	29.8
Percent RSO drinkers (total sample)	2.2	1.0	2.3	4.5	21.6	31.0	5.4
Average no. of drinks (total sample)	0.6	0.3	0.5	0.8	3.4	4.7	1.1
Percent of total weekly volume (total sample)	5.0	2.5	4.5	7.4	29.4	41.2	10.0
Percent RSO drinkers (drinkers that day)	10.6	9.4	14.8	21.3	41.5	48.2	18.2
Average no. of drinks (drinkers that day)	2.8	2.7	3.2	4.0	6.5	7.3	3.8

^aBased on last week consumption.

Table 5. Percent alcohol consumed on 10+, 8+ and 6+ drinks occasions by the total sample and by drinkers with at least 1 RSOD in the last week or at least monthly

		Alcohol consumed as percent of total
Basis: consumption last week derived from diary Total sample alcohol consumption in number of drinks: 40,685	Days with 10+ drinks in the last week	49.2
	Days with 8+ drinks in the last week	58.4
	Days with 6+ drinks (RSOD) in the last week	69.3
	Drinkers with at least 1 RSOD in the last week	82.8
Basis: weekly usual consumption derived from QF Total sample alcohol consumption in number of drinks: 32,148	Drinkers with at least monthly RSOD	96.2

had at least a monthly RSOD. It is important to note the difference between the two proportions; the first measures consumption on heavy drinking days, whereas the second measures usual weekly consumption of those who have at least a monthly RSOD while including those days without any RSOD. It was estimated by means of the retrospective diary that 69.3% of the total alcohol consumed by all young men was consumed on occasions of at least six drinks, with almost half of all intake (49.2%) occurring on 10+ drink occasions.

RSO drinkers consumed 96.2% of the total volume of alcohol, regardless of whether it was on an RSOD day or otherwise, leaving only 3.8% of all alcohol consumption to those who never (or at least less than once a month) had RSOD days.

DISCUSSION

The present study shows that RSOD among young francophone Swiss men is more the norm than an exception, since 75.5% of alcohol consumers consume six or more drinks on a single occasion in 1 day, at least monthly. Almost two-thirds (63.3%) of the sample had at least 1 day with 10 or more drinks in the past year and 10–14 drinks was the mode in the sample regarding maximum number of drinks in the past year. It is important to note that last week consumption only would miss a major proportion of young men drinking very high levels at least once yearly. For example, the mode of the maximum number of drinks in the past week was ‘only’ 3–5 drinks and ‘only’ 23% drank as a maximum 10 drinks or more in the past week. This supports the literature recommending that, at least for the assessment of exposure relevant for harms related to acute heavy drinking, longer recall periods such as 12 months are preferable over very short recall periods such as a week. Short reference periods may result in insufficient assessment of exceptional drinking occasions (Dawson, 1998; Dawson and Room, 2000) or overestimation of abstinence (Rehm *et al.*, 1999).

The extent of this behaviour might seem a little surprising, because although it is known that in many societies RSO drinking is highest among adolescents and young adults (Kuntsche *et al.*, 2004), Switzerland as a whole is viewed as a ‘wet’ country, with mild drinking patterns of frequent and regular, but moderate consumption with meals (Rehm *et al.*, 2004). This ‘wet country’ stereotype does not hold up among young francophone Swiss men. Although these findings cannot be extrapolated from this sample to the rest of Switzerland, it is likely that they would apply to those of similar age. In all *cantons* of Switzerland the legal purchasing age for alcohol is 18 years for spirits and 16 years for beer and wine; therefore, there is no particular advantage regarding the legal drinking age for francophone men. Alcohol consumption by

men in the Italian-speaking region (~5% of the population) is higher than in the two other linguistic regions (Gmel and Schmid, 1996; Annaheim and Gmel, 2004) and in the German-speaking region (~72% of the population) alcohol consumption historically is seen as having an extremely 'festive' quality (Cahannes and Müller, 1981) with many heavy drinking occasions. This assumption has also received support from large-scale general population surveys where the amount of alcohol per drinking occasion is usually high in the German-speaking region (Gmel and Schmid, 1996; Annaheim and Gmel, 2004). Surveys using young adult samples within the German- and Italian-speaking regions would help answer the question of how well the Francophone sample generalizes to the rest of the population.

It is fairly well agreed in the survey literature (Perkins, 2002; Windle, 2003; Hingson et al., 2005) that RSOD is related to a multitude of acute consequences such as intentional and unintentional injuries. Data from the 2000 Global Burden of Disease study demonstrated that injuries attributed to drinking were predominantly associated with RSOD and accounted for a major share of total alcohol-related mortality and morbidity (Rehm et al., 2004). The unfavourable RSOD consumption pattern that is common among adolescents and young adults has become the primary factor in the disease burden of this age group (Rehm et al., 2006). A comparison of drinking patterns by time of day and day of the week from a Swiss diary survey to police statistics of traffic crashes matched to the corresponding time of day and day of the week gave strong support for a causal link between RSOD and traffic crashes. These accidents occurred disproportionately on Friday and Saturday nights in Switzerland (Gmel et al., 2005), and the present study establishes that RSOD occasions among young men occur mainly on Friday and Saturday. Another recent report by the Council for Accident Prevention showed that fatal traffic crashes on weekends were higher among 18- to 24-year-olds and were alcohol related two times more often than were those on other days of the week (Siegrist et al., 2005). Unfortunately, no consequences were measured with the screening instrument used in the present study.

This at-risk drinking pattern that seems to be the norm among young men points out the failures of current preventive efforts. Babor et al. (2003) summarized the prevailing prevention status, saying that effective interventions exist, such as price regulations, restrictions of availability either by reduced density of outlets or reduced opening hours for alcohol sales, training of bar staff for responsible beverage serving, raising legal drinking ages and lowering the BAC threshold for drunk driving. However, these interventions that work and are cost effective are usually unpopular because as structural measures they take a general population approach. What is often preferred and promoted, sometimes in collaboration with the alcohol industry (UK Cabinet Office, 2004; Department of Health, 2007), is either the popular interventions, such as information campaigns and education programmes that have not been shown to foster much change, or a focus on high-risk groups, such as treatment for alcohol dependence (see e.g. Babor et al., 2003; Room, 2004). Although it may be that heavier drinkers spent less per drink than lighter drinkers, the present study suggests that ~70% of total alcohol revenues are attributed to RSOD within the age group.

In conclusion and as a response to our research questions, (a) only 7.2% in this age group abstained from alcohol and 75.5% of those drinking had an RSOD day at least monthly, and (b) most of the total alcohol used within the population of young men is consumed on occasions that place drinkers at high risk for detrimental consequences. Therefore, our findings suggest that preventive strategies designed at targeting high-risk groups have to be complemented by structural measures targeting the general population of adolescents and young adults.

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REFERENCES

- Anderson P, Gual A, Colom J. (2005) *Alcohol and Primary Health Care: Clinical Guidelines on Identification and Brief Interventions*. Barcelona: Department of Health of the Government of Catalonia.
- Annaheim B, Gmel G. (2004) *Alkoholkonsum in der Schweiz: Ein Synthesebericht zu Alkoholkonsum und dessen Entwicklung auf der Basis der Schweizerischen Gesundheitsbefragung 1997 und 2002*. Lausanne: Schweizerische Fachstelle für Alkohol- und andere Drogenprobleme (SFA).
- Babor TF, Caetano R, Casswell S et al. (2003) *Alcohol: No Ordinary Commodity. Research and Public Policy*. Oxford Medical Publication, Oxford: Oxford University Press.
- Bundesamt für Statistik (BFS) (ed). (2007) *Statistisches Jahrbuch der Schweiz 2007*. Zürich: Verlag Neue Zürcher Zeitung.
- Cahannes M, Müller R. (1981) Alcohol control policy in Switzerland: an overview of political compromise. In Single E, Morgan P, De Lint J (eds). *Alcohol, Society, and the State: 2. The Social History of Control Policy in Seven Countries*. Toronto: Addiction Research Foundation, 61–86.
- Dawson DA. (1998) Volume of ethanol consumption: effects of different approaches to measurement. *J Stud Alcohol* **59**:191–7.
- Dawson DA, Room R. (2000) Towards agreement on ways to measure and report drinking patterns and alcohol-related problems in adult general population surveys: the Skarpö Conference overview. *J Subst Abuse* **12**:1–21.
- Department of Health, Home Office, Department for Education and Skills and Department for Culture, Media and Sport. (2007) *Safe, Sensible, Social: Next Steps for the Government's National Alcohol Strategy*. London: Department of Health, Alcohol Policy Team & The Home Office, Alcohol Harm Reduction Programme Office, Anti-Social Behaviour and Alcohol Unit. <http://www.homeoffice.gov.uk/documents/alcohol-strategy-2007>; <http://www.homeoffice.gov.uk/documents/alcohol-strategy-2007?view=Binary> (16 June 2008, date last accessed).
- Gmel G, Heeb J-L, Rezny L et al. (2005) Drinking patterns and traffic casualties in Switzerland—matching survey data and police records to design preventive action. *Public Health* **119**:426–36.
- Gmel G, Rehm J, Kuntsche EN. (2003) Binge drinking in Europe: definitions, epidemiology, and consequences. *Sucht* **49**:105–16.
- Gmel G, Schmid H (eds). (1996) *Alkoholkonsum in der Schweiz—Ergebnisse der ersten schweizerischen Gesundheitsbefragung*. Hamburg: Verlag Dr. Kovac.
- Greenfield TK, Rogers JD. (1999) Who drinks most of the alcohol in the US? The policy implications. *J Stud Alcohol* **60**:78–89.
- Hingson RW, Heeren T, Winter MG et al. (2005) Magnitude of alcohol-related mortality and morbidity among U.S. college students ages 18–24: changes from 1998 to 2001. *Annu Rev Public Health* **26**:259–79.
- Institut suisse de prévention de l'alcoolisme et autres toxicomanies (ISPA) (ed). (2004) *Chiffres et données sur l'alcool et les autres drogues*. Lausanne: Institut suisse de prévention de l'alcoolisme et autres toxicomanies (ISPA).

- Kerr WC, Greenfield TK. (2007) Distribution of alcohol consumption and expenditures and the impact of improved measurement on coverage of alcohol sales in the 2000 National Alcohol Survey. *Alcohol Clin Exp Res* **31**:1714–22.
- Kerr WC, Greenfield TK, Tujague J *et al.* (2005) A drink is a drink? Variation in the amount of alcohol contained in beer, wine and spirits drinks in a US methodological sample. *Alcohol Clin Exp Res* **29**:2015–21.
- Kuntsche EN, Rehm J, Gmel G. (2004) Characteristics of binge drinkers in Europe. *Soc Sci Med* **59**:113–27.
- Munro G. (2004) An addiction agency's collaboration with the drinks industry: Moo Joose as a case study. *Addiction* **99**:1370–4.
- Perkins HW. (2002) Surveying the damage: a review of research on consequences of alcohol misuse in college populations. *J Stud Alcohol* (Suppl 14):91–100.
- Rehm J, Greenfield TK, Walsh GW *et al.* (1999) Assessment methods for alcohol consumption, prevalence of high risk drinking and harm: a sensitivity analysis. *Int J Epidemiol* **28**:219–24.
- Rehm J, Room R, Monteiro MG *et al.* (2004) Alcohol use. In Ezzati M, Lopez AD, Rodgers A, Murray CJL (eds). *Comparative Quantification of Health Risks. Global and Regional Burden of Disease Attributable to Selected Major Risk Factors*, Vol. 1. Geneva: World Health Organization (WHO), 959–1108.
- Rehm J, Taylor B, Room R. (2006) Global burden of disease from alcohol, illicit drugs and tobacco. *Drug Alcohol Rev* **25**:503–13.
- Rogers JD, Greenfield TK. (1999) Beer drinking accounts for most of the hazardous alcohol consumption reported in the United States. *J Stud Alcohol* **60**:732–9.
- Room R. (2004) Disabling the public interest: alcohol strategies and policies for England. *Addiction* **99**:1083–9.
- Room R, Mäkelä K. (2000) Typologies of the cultural position of drinking. *J Stud Alcohol* **61**:475–83.
- Siegrist S, Allenbach R, Caveg M *et al.* (2005) *SINUS-Report 2005: Sicherheitsniveau und Unfallgeschehen im Strassenverkehr 2004*. Schweizerische Beratungsstelle für Unfallverhütung bfu, Bern.
- UK Cabinet Office. (2004) *Alcohol Harm Reduction Strategy for England*. London: Prime Minister's Strategy Unit. <http://www.cabinetoffice.gov.uk/upload/assets/www.cabinetoffice.gov.uk/strategy/caboffice%20alcoholhar.pdf>.
- US Department of Health and Human Services (USDHHS). (1995) *The Physicians' Guide to Helping Patients with Alcohol Problems*, Vol. **95-3769**. Rockville, MD: U.S. Department of Health and Human Services, Public Health Service, National Institute of Health (NIH), National Institute on Alcohol Abuse and Alcoholism (NIAAA).
- Windle M. (2003) Alcohol use among adolescents and young adults. *Alcohol Res Health* **27**:79–86.
- World Health Organization (WHO). (2000) *International Guide for Monitoring Alcohol Consumption and Related Harm*. Geneva: WHO, Department of Mental Health and Substance Dependence, Noncommunicable Diseases and Mental Health Cluster.