Differences in trouble per litre of different alcoholic beverages – A global comparison with the GENACIS dataset

Robin Room[1,2,3], **Jason Ferris**[1,4], **Jason Bond**[5], **Thomas K. Greenfield**[5], and **Kathryn Graham**[6,7]

[1]CAPR (Centre for Alcohol Policy Research), Turning Point Alcohol & Drug Centre, Fitzroy, Vic., Australia

[2]School of Population Health, University of Melbourne

[3]Centre for Social Research on Alcohol & Drugs, Stockholm University

[4]Eastern Health Clinical School, Monash University

[5]Alcohol Research Group, Public Health Institute, Emeryville CA, USA

[6]Centre for Addiction and Mental Health, London, Ontario

[7]University of Toronto, Toronto, Ontario

Abstract

Different alcoholic beverages are seen as causing more or less trouble, with spirits historically often seen as the most troublesome. Differences in the "trouble per litre" could reflect differences in the beverages themselves (e.g., faster effect of stronger beverages, additives/contaminants in informal beverages), or could reflect characteristics of those drinking each beverage. Using two alternative definitions of beverage choice and measures of personal and of social consequences of drinking, the paper examines trouble per litre among beer, wine and spirits drinkers in 19 different societies represented in the GENACIS dataset. There is no general pattern which holds across cultures of more or less trouble being associated with a particular beverage type. Wine seems to be less associated with trouble than beer or spirits in a number of societies, but there are counter-instances in other societies. There is no overall trend across cultures in comparing trouble associated with beer and with spirits. In a number of societies, drinkers with no predominant beverage report more problems than those mainly drinking beer or wine. Controlling for gender and age reduces the tilt towards less trouble from wine drinking, particularly for social consequences of drinking.

Keywords

alcoholic beverage choice; beer; wine; spirits; alcohol problems; cross-national; GENACIS project

Introduction

Distilled spirits drinks, which usually have a higher alcohol content than fermented drinks, are widely regarded as more harmful than the latter, even at equivalent levels of consumption. Reflecting this view, spirits beverages have often been kept more restricted in availability than fermented beverages, e.g., through confining spirits sales to government

retail stores or through licensing fewer outlets to sell them. In most countries, higher taxes per unit of ethanol are charged on distilled than on fermented beverages.

The differential restrictions by type of beverage have clear historical roots. England had its "gin epidemic" in the 18th century (Coffey, 1966), and other European countries – and their colonies in the period of European empires – also had periods of a national binge on distilled spirits at some time in the course of the last three centuries (e.g., Hauge, 1978). Distillation on an industrial scale was a feature of early stages of industrialization, and the resulting social and health problems from ready availability of cheap spirits ("drunk for a penny, dead drunk for twopence") were obvious to all. The great temperance movements of the 19th and early 20th centuries can be seen as societal reactions to the effects of these waves of cheap spirits (Rorabaugh, 1976).

In some places, these temperance movements eventually succeeded in imposing complete prohibition of alcohol sales for a shorter or longer time (Schrad, 2010), and the experience of prohibition also pointed differentially to spirits as a source of problems. With prohibition, very quickly almost all illicit alcohol was in the form of spirits, as the least bulky and most concealable way of transporting and supplying a given quantity of ethanol. The already negative reputation of spirits was thereby further heightened. Thus, when prohibition was repealed where it had been enacted, preference in terms of greater physical availability and lower taxation was often given to "lighter" beverages.

Despite the weight of historical experience, present-day studies do not necessarily find big or consistent differences between types of alcohol beverage in the "harm per litre" of ethanol. It is clearly much easier to die of an overdose of alcohol from concentrated spirits than from beer, but there are few other consistent differences between beverages in other physiological or mental risks (Mäkelä et al., 2007). It is clear that violence and other social problems are often differentially associated with different beverages, but they are not necessarily more common with stronger beverages. For example, it is beer rather than spirits which accounts for most of the hazardous drinking in the U.S. (Rogers & Greenfield, 1999), because beer is the beverage most commonly drunk by young men, who are more likely to other population segments to engage in hazardous drinking. Studies like this suggest the hypothesis that the most troublesome beverage in a society, in terms of trouble per litre of ethanol, will be whichever beverage is most commonly consumed by young men.

The present analysis sets out to examine the issue of differential hazard by type of alcoholic beverage cross-culturally, using a unique multinational dataset, assembled in the GENACIS project (Gender, Alcohol and Culture: An International Study). We examine the issue of differences in rates of personal problems and of social problems from drinking between consumers of different types of alcohol beverages, defined in two alternative ways. Are there common patterns between societies in which beverage type is most associated and which least associated with alcohol-related problems? Do the results vary according to the type of alcohol problem, personal or social? Given that many drinkers consume more than one type of beverage, do the results vary by how the drinkers of the different beverages are defined?

Methods

Data

Data for this paper are drawn from regional or national general population surveys in 19 countries in Africa (Nigeria and Uganda), South and Central America (Argentina, Belize, Brazil, Costa Rica, Nicaragua, Peru and Uruguay), Asia (India, Sri Lanka and Kazakhstan), North America (Canada), Australasia (Australia, New Zealand) and Europe (Czech

Republic, Denmark, the Isle of Man and Sweden), conducted as part of the GENACIS project (see Wilsnack et al. 2009).

The age range here is restricted to 18-69 years inclusive.[1] The surveys differ in sampling frame, sampling method, age limits, and modes of administration (Table 1). GENACIS surveys use a common core questionnaire and generally include: (1) a sample size of at least 1,000; (2) both women and men; (3) multi-stage random sampling, with clusters (e.g., a village or a defined district); (4) either a national sample or, in large countries such as India, sampling of an entire province or region with population statistics, and both urban and rural areas. Because of variations in sampling and fieldwork methods, response rates are not always available, but ranged from 53% to 96% for surveys with probability sampling. Survey leaders in all countries had experience conducting survey research and drew on additional expertise from GENACIS colleagues and local experts. The data are weighted to improve representativeness.

The present analyses are limited to surveys that included all or almost all relevant questions. Questions were composed initially in English, translated into the main language of the site and then back-translated to check for accuracy and cultural appropriateness; guidelines for question translation were adapted from WHO strategies (Alcser et al. 2008; see the GENACIS website: http://www.med.und.nodak.edu/depts/irgga and Wilsnack et al. 2009). Addiction Info Switzerland in Lausanne serves as the centralized data management site.

Measures

Consequences of drinking scores—Respondents who had consumed alcohol in the past year were asked a series of questions about experiences they might have had connected with their drinking in the previous 12 months (see Graham et al., 2011). Included in the series were seven items concerning personal experiences of drinking (five of them from the AUDIT measure): guilt or remorse after drinking; unable to remember what happened the night before; failing to do what was normally expected of you; taking a drink to get over bad after-effects of drinking; unable to stop once started; feeling sick or shaky after stopping or cutting down drinking; and needing a drink in the morning to get yourself going after a drinking session. A score of personal consequences of drinking was based on these items. Since this series was not asked in the Nicaraguan survey, Nicaragua was excluded from analyses using this score.

Another series of items asked about problems with drinking in different life-areas, reflecting mainly social problems from drinking. The items include harmful effects of drinking on: finances; housework or chores around the house; work, studies or employment; marriage/intimate relationships; family relationships including children; and *friendships or social life.* This group also includes: *getting into a fight while drinking;* and *you or someone else being injured as a result of your drinking.* A score of social consequences of drinking was based on these items.

Variants of the questionnaire in different countries had different scoring options for these items, but, for the present analyses, all were able to be recoded as 1 or 0 (respondent did/did not experience problem in the past 12 months respectively). Scores for Personal Consequences and for Social Consequences were calculated by summing the scores (0/1) across the items (range 0-7 for Personal and 0-8 for Social Consequences). One missing item was allowed for the calculation of the overall score, in which case the top end of the range was one less (Graham et al., 2011). It should be noted that none of the drinking problems

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[1]In some survey samples, the upper limit of age in the sample was set lower: 64 for the Czech Republic, and 65 for Argentina, Peru and Uruguay (Wilsnack et al., 2009).

items include any specification of the type of alcoholic beverage involved in the problem. The scores are thus a general measure of problems the respondent has had with his/her drinking, across all forms of alcohol, in the previous 12 months.

Beverage-specific frequency, usual quantity, volume—In the GENACIS survey, consumption of alcohol was measured primarily in terms of drinking in the last 12 months. While the Graduated Frequency method was the primary basis in most GENACIS surveys for total alcohol consumption, respondents were also asked about their patterns of drinking particular beverage types, using Quantity-Frequency questions (Room, 1990). That is, for each type of beverage identified as being substantially used in the society, respondents were asked how frequently they drank that beverage, and how much they usually drank when they drank the beverage. The latter question was asked in terms of local units and container sizes, with the answers converted for comparative analysis into grams of pure alcohol. By multiplying the frequency of drinking a particular beverage type by the amount of it "usually" drunk, a volume per year of consumption of that beverage was derived. In the present analysis, we use the Australian standard drink size of 10 gm of ethanol as our "drink" unit. Respondents who had not consumed a particular beverage type in the past 12 months were classed as nondrinkers of that type of beverage.

The GENACIS questionnaire captures both 'western-style' alcohol beverages and local beverages (e.g., cider, palmwine, Kwete, and toddy). In the present analysis, we focus only on beer, wine and spirits (which also include premixed, or ready-to-drink drinks) – the most widely used western-style alcoholic beverages. The other types of alcoholic beverages are widely used in much smaller rosters of societies and comparisons would be sparse.

Indexes of type of beverage consumed—Many drinkers of alcohol consume more than one type of alcoholic beverage. Different methods can be used to construct measures of overlap in beverage choices. Also, given the strong relationship between amount of drinking and rates of alcohol-related problems, it is possible that it is mainly drinking above a certain level that matters in comparing those drinking different types. Accordingly, our analyses include two alternative ways of constructing an index of type of beverage consumed, and also include analyses controlling for the total volume of beer, wine and spirits consumed.

(1) Annual volume of the specific beverage, as a denominator: This index takes the term "trouble per litre" literally: the unit is not the person choosing a beverage but rather drinks consumed of the beverage. A rate is calculated of the mean change, expressed as a percentage. in the number of harms reported by those drinking the beverage at all that would be associated with an increase per person of 100 drinks (1000 grams of ethanol) in the previous 12 month period.

(2) At least $\frac{2}{3}$ of the total volume of beer, wine and spirits consumption is of the specific beverage: This measure takes into account the respondent's reported total volume of consumption of beer, wine and spirits. Respondents are counted as positive on this index if their reported annual volume of the named beverage is at least two-thirds of their total volume. This indicator provides relatively "pure" groups of users who primarily use one or another of the three beverage types. It should be noted that large numbers of drinkers do not fit in any of the three preference-categories due to no single alcohol preference being $\frac{2}{3}$ of their total consumption; these people are assigned to a "None" category. In some national samples – e.g., Sweden – this category is a majority. In the analyses, a mean score of harms for each drinker group is reported. A mean score of 0.57 on Social consequences for beer drinkers in Brazil, for instance, indicates that those drinkers in Brazil whose alcohol consumption was at least 2/3 of beer reported an average problem score of 0.57 for the previous 12 months.

The total consumption variable, adding together beer, wine and spirits, is also used in analysis with each of the two methods of identifying beverage type. Controlling for this variable provides a comparison of rates and mean score of harms after adjusting for the total consumption of alcohol.

Analyses

All analyses are undertaken using negative binomial regression, to account for any over-dispersion. Given that some people/countries only had data for one less than the possible number of problems on each score an indicator variable was constructed (1 for all items in a score; 0 for one less item). The variable was added to all models to adjust for this difference in the maximum score. Where the effect of this covariate was nonsignificant (p-value greater than 0.20), it was dropped from the model to minimise any spurious effects of over-specifying the models (Hosmer & Lemeshow, 2000).

Analysis of the data for the annual volume method treated the volume of each beverage type reported by respondents as separate variables, while the measures of personal and social consequences are asked for all beverage types taken together. Thus all consequences from drinking are being correlated with consumption of a specific beverage, while some or all of the harm may have been associated with another beverage. Controlling for total consumption across beverages may be regarded as correcting for this. This issue is less salient for the ⅔ of volume method of assigning beverage type, since we know the respondent was mostly drinking the particular beverage, but controlling for total consumption also corrects for this issue.

In a third analysis model, age and gender are also controlled, in addition to total consumption. From the perspective of public policy on availability – whether one beverage should be taxed more than another, or available for sale or consumption in more places or at more times than another – it can be argued that who is doing the drinking is not important; the differential tax or closing hours will primarily be imposed according to the beverage rather than according to who is drinking it. However, it is also relevant to ask the question, how much do any differences in problems found for the different beverages reflect the characteristics of those doing the drinking, and in particular how much do they reflect different beverage choices by gender and age? Controlling by gender and age, and comparing results with and without controlling by gender and age tests the proposition that the differences found primarily reflect differences in who is drinking the different beverages. In two countries, Sri Lanka and India, drinking is gender-specific enough that it does not make sense to control by gender: only about 6% of women in the samples were current drinkers. The inclusion of the covariates sex, age, and volume also resulted in data from the Isle of Man not converging. An exploration of this model suggested that this resulted from no maximum (or turning point) being found for age in the maximum likelihood model. In this instance age was removed from the model.

All analyses were conducted using Stata (Version 11, StataCorp, 2009). Survey design weights supplied with the GENACIS data were incorporated for analysis. Where comparisons between rates are made it is appropriate to adjust the α-value (p) to be more conservative (Altman & Bland, 2003). For the purposes here an α-value is set at 0.01.

Where there were less than 30 persons in a beverage type category, figures for that category were not shown or analysed.

The results are shown in fuller form, in terms of percentage changes or means and confidence intervals, in four tables for the second model, that is, controlling for total consumption. Any negative figures in these tables indicate a trend for the rate of

consequences to go down as consumption of the beverage type increases, when the relation with total consumption is taken into account. Results in summary form, in terms of whether there was a significant difference between beverage types at the 0.01 level, are shown for all three models in the last two tables.

Results

Comparing beverage types on change in problem scores per 1000g of ethanol

Personal consequences, controlling for total consumption—Table 2 looks at the relation of Personal consequences with consumption of the specific beverage, with the relation with total consumption partialled out. There is considerable variation between countries in which beverage shows the highest percentage in the positive direction, indicating a stronger relation in the positive direction with consequences. Beer has the highest rate in this sense in 10 of the 18 countries, Wine in 7, and Spirits in only 1. However, there are only seven comparisons, of the 52 that can be made by beverage type within country, where the differences are significant. They are spread across 5 of the 6 possibilities by beverage pair and direction (no case where Spirits is significantly more problematic than Beer).

Social consequences, controlling for total consumption—Table 3 shows results parallel to Table 2 for social consequences of drinking. Again, Beer has the highest rate in 10 of the 19 countries, Wine in 6, and Spirits in 3. There are pairwise significant differences in 11 of the 55 comparisons. Beer significantly exceed Spirits in 5 comparisons, and Wine in 3, while there is one instance of Wine exceeding Beer and two of Spirits exceeding Wine. In these results, then, beer is more often the problematic beverage for social consequences than the other two beverage types.

Comparing problem scores of those with at least two-thirds of their drinking from a named beverage type

We turn now to a measure which puts a stronger linkage between beverage type and the experience of alcohol-related problems, since respondents classed here as "beer" drinkers, for instance, report that at least two-thirds of their alcohol consumption is of beer. However, those thus identified are by no means all of the beer drinkers, since there are many drinkers who drink more than one beverage in substantial amounts (as revealed in the column labelled 'None' in Tables 4 and 5). In some societies (e.g., Uganda, Nigeria, Sri Lanka, India, Denmark, Sweden, Canada) those with no dominant beverage choice are more numerous than those with $\frac{2}{3}$ or more of their drinking being of any particular beverage type.

Personal consequences, controlling for total consumption—In Table 4, there is no society in which wine drinkers show the highest Personal consequences score. The "None" category, that is, drinkers who regularly use two or more beverage types, had the highest (or equal-highest) score in 8 societies, as did the Beer category, while the Spirits category was highest in 5. There are significant pairwise differences in 43% of the comparisons (34 of 79), with 24 of the significant differences involving Wine as the less problematic beverage. The differences where Wine is less problematic were primarily in high-income countries, and to some extent in Latin America.

Social consequences, controlling for total consumption—The results for Social consequences are fairly similar to those for Personal consequences (Table 5). None most commonly shows the highest (or equal-highest) average score (9 societies), and Spirits and Beer are each highest in 7. In Peru and Uruguay, there is no addition from any specific beverage to the prediction of the Social consequences score from total consumption.

Pairwise significant differences are a little less common than for Personal Consequences (31 of 82, 38%), but similarly distributed, with Wine being significantly lower in 20 comparisons, concentrated primarily in high-income countries. Again, there was no case in which Wine significantly exceeded another beverage (or None) in Social consequences.

Comparisons in three analytical models for Personal and Social consequences

Personal consequences, per 1000 gm of ethanol of the beverage type—The left side of Table 6 shows results with three analytical models in terms of significant differences in rate of personal consequences for the same amount of alcohol in different beverage types. As would be expected in this and the subsequent comparisons, the largest number of significant relationships are when the relationship is uncontrolled; the number diminishes when the relationship is controlled by total consumption, and diminishes still further when age and gender are also controlled. Nevertheless, in some societies relationships become significant which had not been when uncontrolled. Thus in Uganda and Costa Rica, controlling by total consumption reveals a significantly stronger relation of personal consequences with Beer drinking than with Spirits drinking. Controlling also by gender and age, Wine drinking becomes significantly more related to Personal consequences than either Beer or Spirits in Canada and New Zealand. This finding points in the opposite direction to the "whatever the young men drink" hypothesis, since wine is not the primary beverage of choice for young men in either society. In Canada and New Zealand, apparently, Wine drinking is more associated with Personal consequences than Beer or Spirits drinking, once gender and age and level of drinking are controlled.

Personal consequences, for categories defined by 2/3 consumption of that beverage type—As already noted, there are more significant differences between beverage categories with the "2/3 of drinking" measure (right side of table 6) than with the "per litre of ethanol" measure. The general picture for the uncontrolled model is that each other beverage category is significantly more associated with personal consequences than Wine drinking is: this is true in 10 societies for None, and 9 each for Beer and for Spirits. Conversely, there are no cases where Wine is significantly more associated with personal consequences than another beverage category. Between Beer and Spirits, the balance is slightly towards more significant findings on Personal consequences where Spirits are higher (3) than where Beer is higher (1). Mostly, when total consumption is controlled some comparisons become non-significant, but there are 3 counter-instances (in Uruguay, Uganda and India) where a relationship becomes significant. Controlling by gender and age further reduced the number of significant relations, with no counter-instances. Even when age and gender are controlled, wine tends to remain the beverage type most often on the lower side of significant pairwise differences, and least likely to be on the upper side. There is at least one case in nearly every other category of pairwise comparison.

Social consequences, per 1000 gm of ethanol of the beverage type—For the uncontrolled model of Social consequences, there is considerable replication of the results for Personal consequences. In much the same high-income countries in the two tables, Wine drinking is significantly less problematic than either Beer or Spirits drinking, while the opposite is true in a few lower-income countries. When total consumption is controlled, the number of countries where Beer drinking is significantly more associated with Social consequences than Spirits drinking is grows from 2 to 5, and controlling for age and gender only reduces this by one (Sweden). As with Personal consequences in Table 6, in New Zealand Wine becomes more significantly associated with Social consequences than either Beer or Spirits drinking only when gender and age are added as controls. As for Personal consequences in the trouble per litre analysis, significant differences have become sparse (15% of comparisons) when gender, age, and total consumption are all controlled.

Social consequences, for categories defined by 2/3 consumption of that beverage type—As already discussed, high-income countries predominate in the comparisons where another beverage category is significantly more associated with Social consequences than Wine drinking is, for the 2/3-of-drinking categories, with some Latin American countries also showing this (see Table 7). Controlling for total consumption (second model) does not greatly change the picture of relationships, although the number of significant relationships is reduced by almost ¼ from where there was no control. However, there is a dramatic drop-off in significant findings when age and gender are controlled (third model), particularly in the categories where Wine drinkers show a significantly lower association with Social consequences. In this third model, 11 of the 16 significant findings are for lower-income countries. Particularly in higher-income countries, the findings in the first and second models of lower rates of Social consequences for Wine drinkers reflect differences in the gender and age composition of the different beverage preferences.

Discussion

Clearly, the results suggest that there is nothing inherent in wine, beer or spirits which would universally result in one of these, compared with another, producing a greater rate of problems of the kind measured in this study's drinking problems scores. In the comparisons of harm between the different beverages, a significant result can be found in both directions for nearly every comparison category among the 19 national datasets included in this study. However, there are recurrent findings in a number of sites that people who drink mainly wine have fewer negative consequences (controlling for overall consumption) than do those who consume mainly other beverages or have no beverage preference.

These findings may reflect the types of persons who tend to be wine drinkers. For example, in many societies wine tends to be the preferred beverage of women, who also tend to have fewer problem consequences. Wine may also be more likely to be consumed by older persons who also may be less likely to experience some kinds of problems. Correspondingly, controlling for gender and age reduced the number of countries where other beverage preferences are more strongly associated with problems compared with wine. Nevertheless, the lower risk drinking of wine drinkers remains, with several countries showing a significantly higher association with problems for beer or for spirits than for wine, and with none showing a higher association with wine than with beer or spirits.

But it should be kept in mind that among the 19 societies included in this analysis only two (Argentina and Uruguay) have a long tradition of wine as the dominant beverage. A culture's historical connection with a beverage will influence who in the society drinks it, which in turn is likely to influence the relative harm per litre.

An interesting finding emerged from the analyses in terms of predominant beverage, using the criterion of whether at least two-thirds of the respondent's drinking was of a designated beverage type. It might have been thought that respondents who did not have a clear beverage preference, but who switched back and forward between beverage types, might be relatively light and unproblematic drinkers. But instead this "None" category emerges as more problematic in a number of societies, both in terms of Personal and of Social consequences. Trouble per litre may be as much a matter of lack of choice of beverage type as of choice of any particular type.

Few clear differences could be discerned in the pattern of results between Personal and Social consequences. Roughly the same proportions of comparisons for each measure showed significant differences (first row of figures in Tables 6 and 7). For both measures, a preponderance of the significant differences were with wine as the less troublesome

beverage category. These general findings remained true when the respondent's total consumption was controlled out, though for Social consequences controlling by gender and age washed out most of the preponderance.

Alcohol has many use-values, both physically determined – as a food, as a medicine, as a relaxant, as an intoxicant, as a solvent, etc. – and socially determined – as a medium of sociability, as a unifying symbol, as a sacrament, etc. -- and the predominant use-values differ from one society to another, from one population segment to another, and from one context to another (Room et al., 2002). There are differential cultural associations of these use-values with different types of alcoholic beverage, but the associations are culturally assigned and vary across time and place. Depending on the cultural setting, for instance, wine can be defined as the drink of kings and media stars or as the drink of the down and out and the poor peasant. In the light of this, it is perhaps not surprising that, in the very wide frame of cultural alternatives which the GENACIS dataset offers, at least one national dataset can be found where each beverage type is more associated with problems than the other type in the comparison. Looking across the national sites, there is no clear trend for beer to be more troublesome than spirits, or for the opposite to be the case. There is a clear trend for wine to be less associated with trouble than either beer or spirits (or having no clear beverage choice). But it should be kept in mind, in interpreting this, that only two of the societies included in the study have a long history of wine as the dominant everyday beverage. And Table 7 shows that, for Social consequences at least, the trend tends to disappear once who is doing the drinking (by age and gender) is controlled out in the analysis.

Acknowledgments

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Table 1

Characteristics of GENACIS surveys included in this analysis

Country	Survey year	Size of sample		Sample frame	Interview mode
		Total aged 18-69	Drinkers 18-69		
Africa					
Uganda – UG	2003	1,459	672	Regional	In person
Nigeria – NG	2003	2,045	630	Regional	In person
South & Central America					
Nicaragua - NC	2005	1,999	406	Regional	In person
Costa Rica – CR	2003	1,193	629	Regional	In person
Belize – BL	2005	3,735	1,312	National	In person
Brazil – BR	2002	1,002	182	Regional	In person
Peru – PE	2005	1,531 [1]	1,035 [1]	Regional	In person
Uruguay – UR	2004	1,000 [2]	680 [2]	National	In person
Argentina – AR	2003	1,000 [2]	740 [2]	Regional	In person
Asia					
Sri Lanka – SR	2002	1,141	356	Regional	In person
India – IN	2003	2,566	511	Regional	In person
Kazakhstan - KA	2002	1,093	769	Regional	In person
Europe					
Sweden – SE	2002	4,752	2,793	National	Telephone
Denmark – DK	2003	1,726	1,638	National	Telephone
Czech Rep. – CZ	2002	2,526 [1]	2,144 [1]	National	In person
Isle of Man – IM	2005	855	777	National	In person/ Telephone
North America					
Canada – CA	2004	12,933	10,175	National	Telephone
Australasia					

Country	Survey year	Size of sample		Sample frame	Interview mode
		Total aged 18-69	Drinkers 18-69		
Australia – AU	2007	2,171	929	Regional	Telephone
New Zealand - NZ	2007	1,862	1,662	National	Postal

Note: the two-character code identified here is used in Table 10.

[1]18-64

[2]18-65

Table 2

Percent change in Personal consequences of all drinking, per unit (1000 grams of ethanol) of each beverage type, among those consuming that beverage, controlling for overall volume of alcohol consumed

| | Per 1000 grams of pure ethanol by beverage type | | | | | | | | |
| | Beer | | Wine | | Spirits | | Beer | Wine | Spirits |
	% chg	95% CI	% chg	95% CI	% chg	95% CI	N	N	N
Uganda	0.5	⁻0.0-1.0	-1.3	⁻5.2-2.7	-1.6	⁻2.8-⁻0.3	466	145	171
Nigeria	1.4	⁻2.6-5.4	4.6	⁻1.5-11.1	-3.3	⁻9.3-3.0	421	167	148
Nicaragua									
Costa Rica	1.5	⁻1.8-4.9	-9.9	⁻23.6-6.3	-6.0	⁻9.8-2.1	477	281	345
Belize	0.6	⁻0.7-1.9	-1.3	⁻7.9-5.8	-0.5	⁻1.3-0.3	1235	439	584
Brazil	2.3	⁻0.7-5.4	14.3	⁻14.2-52.3	-2.4	⁻6.5-1.9	144	94	61
Peru	-3.5	⁻19.3-15.4	-24.7	⁻39.1-7.0	-19.2	⁻35.1-0.6	910	592	220
Uruguay	-3.4	⁻11.5-5.5	-3.6	⁻8.0-1.1	9.0	⁻7.8-28.7	450	437	308
Argentina	11.9	⁻2.4-28.4	-2.0	⁻5.2-1.4	-15.8	⁻44.5-27.6	563	553	194
Sri Lanka	19.5	⁻12.1-62.4			-54.3	⁻84.1-31.8	231		55
India	-3.7	⁻6.0-1.2	3.2	⁻3.1-10.0	-0.9	⁻2.2-0.4	262	38	352
Kazakhstan	-3.0	⁻5.6-0.3	41.1	8.9-82.9	-0.7	⁻2.6-1.2	346	510	601
Sweden	7.5	4.1-11.1	-10.4	⁻13.6-7.0	-3.0	⁻11.3-6.1	2229	2266	2289
Denmark	1.6	⁻0.1-3.3	-8.3	⁻11.7-4.7	0.8	⁻2.4-4.0	1597	1765	1494
Czech Republic	-0.4	⁻0.8-0.1	0.6	⁻0.8-2.0	0.3	⁻1.5-2.2	1756	1870	1635
Isle of Man	0.5	⁻2.0-3.1	1.7	⁻3.2-6.9	-1.5	⁻5.3-2.4	547	743	608
Canada	-0.5	⁻1.3-0.3	-2.3	⁻3.8-0.8	-0.8	⁻2.6-0.9	6332	6528	6151
Australia	3.1	0.4-6.0	-4.4	⁻8.9-0.3	-1.0	⁻4.6-2.8	335	406	358
New Zealand	-1.5	⁻3.1-0.1	1.4	⁻1.7-4.6	-1.0	⁻5.3-3.6	1202	1441	1307

Note: to avoid confusion, minus signs in confidence intervals are shown as a superscript

Table 3

Percentage change in Social consequences of all drinking, per unit (1000 grams of ethanol) of each beverage type, among those consuming that beverage -- controlling for overall volume of alcohol consumed

| | Per 1000 grams of pure ethanol by beverage type | | | | | | | | |
| | Beer | | Wine | | Spirits | | Beer | Wine | Spirits |
	% chg	95% CI	% chg	95% CI	% chg	95% CI	N	N	N
Uganda	0.5	ˉ0.2-1.1	ˉ2.7	ˉ6.1-0.8	ˉ2.3	ˉ3.7-0.8	429	129	157
Nigeria	1.6	ˉ2.1-5.5	1.3	ˉ3.8-6.6	ˉ1.5	ˉ5.7-2.9	424	169	149
Nicaragua	0.1	ˉ1.0-1.2	10.8	2.9-19.3	1.9	0.4-3.3	360	87	222
Costa Rica	1.3	ˉ2.2-4.9	ˉ15.6	ˉ30.5-2.6	ˉ7.5	ˉ11.4-3.4	477	281	346
Belize	0.7	ˉ0.4-1.7	ˉ2.1	ˉ7.5-3.6	ˉ0.5	ˉ1.3-0.4	1235	440	583
Brazil	3.9	ˉ1.0-9.1	29.2	ˉ20.0-108.7	ˉ4.5	ˉ9.6-0.8	170	111	72
Peru	ˉ3.0	ˉ20.9-19.0	ˉ24.7	ˉ40.8-4.4	ˉ32.4	ˉ51.4-5.8	910	592	220
Uruguay	ˉ4.0	ˉ16.7-10.8	ˉ8.7	ˉ14.7-2.3	9.4	ˉ20.8-51.0	450	437	308
Argentina	18.7	ˉ5.8-49.5	ˉ0.3	ˉ3.2-2.8	ˉ49.2	ˉ72.5-6.1	563	553	194
Sri Lanka	ˉ2.5	ˉ26.2-28.8			ˉ61.5	ˉ81.6-19.3	227		54
India	ˉ3.2	ˉ7.1-0.9	ˉ84.8	ˉ98.7-72.5	ˉ1.5	ˉ2.9-0.1	261	38	351
Kazakhstan	ˉ5.0	ˉ8.5-1.3	44.9	ˉ2.2-114.8	ˉ0.5	ˉ2.6-1.7	345	510	600
Sweden	13.6	7.5-20.1	ˉ12.7	ˉ16.8-8.3	ˉ4.5	ˉ12.0-3.6	1632	1717	1705
Denmark	0.5	ˉ1.2-2.2	ˉ12.5	ˉ16.6-8.3	3.1	ˉ1.2-7.7	1508	1658	1414
Czech Republic	ˉ0.4	ˉ0.8-0.1	0.8	ˉ0.9-2.5	ˉ1.2	ˉ2.9-0.6	1738	1851	1617
Isle of Man	0.1	ˉ2.1-2.4	1.9	ˉ3.4-7.5	ˉ2.0	ˉ4.8-0.9	545	737	603
Canada	1.1	ˉ0.1-2.3	ˉ4.3	ˉ6.6-1.9	0.7	ˉ1.8-3.3	6411	6593	6220
Australia	1.5	ˉ1.9-5.1	ˉ4.8	ˉ10.3-1.1	0.3	ˉ4.4-5.2	334	403	356
New Zealand	ˉ0.5	ˉ2.4-1.4	1.0	ˉ2.0-4.0	ˉ1.1	ˉ4.2-2.2	1192	1432	1296

Note: to avoid confusion, minus signs in confidence intervals are shown as a superscript

Table 4

Mean score on Personal consequences of drinking among drinkers ⅔ of whose drinking is of the listed beverage type, and among drinkers with no predominant beverage, controlling for overall volume of alcohol consumed

| | Drinks 2/3rds proportion of: | | | | | | | | | | | |
| | Beer | | Wine | | Spirits | | None | | Beer | Wine | Spirits | None |
	Mean	95% CI	Mean	95% CI	Mean	95% CI	Mean	95% CI	N	N	N	N
Uganda	1.5	1.3-1.8					2.1	1.9-2.3	229			406
Nigeria	0.9	0.4-2.0					1.6	0.9-3.1	72			526
Nicaragua												
Costa Rica	1.5	1.2-1.9	0.2	0.1-0.5	1.5	0.9-2.5	1.1	0.7-1.9	311	84	107	143
Belize	1.1	0.6-2.0	0.5	0.1-1.4	1.2	0.6-2.4	0.9	0.5-1.6	885	56	123	277
Brazil	0.4	0.2-0.6					0.6	0.3-1.1	97			36
Peru	0.5	0.3-0.6	0.1	0.0-0.2			0.4	0.3-0.5	489	89		430
Uruguay	0.2	0.1-0.3	0.1	0.0-0.1	0.0	0.0-0.1	0.2	0.1-0.2	215	220	86	159
Argentina	0.2	0.1-0.3	0.1	0.0-0.2			0.3	0.1-0.5	283	295		142
Sri Lanka	0.4	0.1-1.2					1.6	0.5-5.0	76			272
India	0.7	0.4-1.1			2.6	2.0-3.3	4.0	4.0-4.0	105		238	163
Kazakhstan	0.4	0.3-0.6	0.2	0.2-0.4	1.0	0.8-1.2	0.9	0.7-1.2	107	142	439	112
Sweden	0.4	0.3-0.5	0.1	0.1-0.1	0.3	0.2-0.5	0.3	0.2-0.3	595	720	124	1158
Denmark	0.8	0.3-1.7	0.3	0.1-0.7	1.2	0.5-2.7	0.8	0.4-1.7	314	698	123	771
Czech Republic	1.5	1.1-2.1	0.8	0.6-1.2	1.4	0.9-2.2	1.4	1.0-1.9	827	532	86	697
Isle of Man	0.3	0.2-0.5	0.2	0.1-0.2	0.2	0.1-0.3	0.3	0.2-0.4	177	328	116	257
Canada	0.4	0.4-0.5	0.2	0.1-0.2	0.3	0.3-0.4	0.3	0.3-0.4	2227	2384	1226	3313
Australia	0.5	0.4-0.7	0.2	0.2-0.3	0.5	0.4-0.8	0.3	0.2-0.6	110	189	75	127
New Zealand	0.5	0.4-0.7	0.3	0.3-0.5	0.6	0.4-0.8	0.4	0.3-0.6	342	636	202	461

Table 5

Mean score in Social consequences of drinking among drinkers ⅔ of whose drinking is of the listed beverage type and among drinkers with no predominant beverage, controlling for overall volume of alcohol consumed

	Drinks 2/3rds proportion of:											
	Beer		Wine		Spirits		None		Beer	Wine	Spirits	None
	Mean	95% CI	Mean	95% CI	Mean	95% CI	Mean	95% CI	N	N	N	N
Uganda	1.3	1.1-1.6					1.5	1.3-1.7	211			374
Nigeria	0.3	0.2-0.6					0.8	0.7-0.9	74			526
Nicaragua	1.1	0.9-1.3			1.4	1.0-1.9	1.3	1.1-1.7	207		70	127
Costa Rica	0.9	0.5-1.6	0.0	0.0-0.2	0.6	0.2-1.3	0.7	0.4-1.4	310	85	108	142
Belize	1.7	0.9-3.2	0.7	0.3-1.9	1.9	1.0-3.7	1.3	0.7-2.7	885	56	122	277
Brazil	0.3	0.1-0.5					0.3	0.1-0.8	115			40
Peru	0.0	0.0-0.2	0.0	0.0-0.1			0.0	0.0-0.2	489	89		430
Uruguay	0.0	0.0-0.1	0.0	0.0-0.1	0.0	0.0-0.1	0.0	0.0-0.1	215	220	86	159
Argentina	0.2	0.1-0.3	0.1	0.0-0.3			0.2	0.1-0.2	283	295		142
Sri Lanka	0.1	0.1-0.3					0.6	0.5-0.7	76			266
India	0.3	0.2-0.5			0.7	0.6-0.9	1.2	1.0-1.5	104		237	163
Kazakhstan	0.3	0.2-0.8	0.2	0.1-0.4	0.9	0.5-1.7	1.0	0.5-2.0	107	142	439	111
Sweden	0.1	0.1-0.2	0.0	0.0-0.1	0.1	0.0-0.1	0.1	0.1-0.1	394	560	78	878
Denmark	0.2	0.1-0.3	0.1	0.0-0.1	0.3	0.2-0.5	0.2	0.1-0.2	296	646	122	727
Czech Republic	0.4	0.3-0.6	0.2	0.1-0.3	0.4	0.2-0.6	0.3	0.2-0.5	815	529	83	692
Isle of Man	0.2	0.1-0.3	0.1	0.1-0.2	0.1	0.1-0.2	0.2	0.1-0.2	175	324	117	255
Canada	0.5	0.3-0.9	0.1	0.1-0.2	0.4	0.2-0.7	0.3	0.2-0.6	2267	2410	1238	3344
Australia	0.4	0.3-0.6	0.2	0.1-0.3	0.5	0.3-0.8	0.3	0.2-0.4	110	187	74	127
New Zealand	0.7	0.6-0.9	0.4	0.3-0.5	0.7	0.5-0.9	0.5	0.4-0.7	337	632	200	462

Table 6

Summary of significant differences, comparing Personal consequences of drinking between drinkers of different beverage types

Problem type:	Personal consequences of drinking					
Measure of bev.:	Per 1000 grams of beverage type			2/3 of drinking is of beverage type		
Adjusting for:	nil	Overall volume	Overall volume, sex, age	nil	Overall volume	Overall volume, sex, age
No. signif./no. of comparisons	11/52	7/52	5/52	41/79	34/79	25/79
Beer > wine	SE, DK, AU	SE, DK		CR, PE, KA, SE, DK, CZ, IM, CA, AU, NZ	CR, PE, UR, SE, DK, CZ, IM, CA, AU, NZ	CR, PE, SE, CZ, IM, CA
Wine > beer	KA	KA	CA, NZ			
Beer > spirits		UG, CR	UG	CA	CA	CA
Spirits > beer	CZ, CA			BL, IN, KA	IN, KA	IN, KA
Wine > spirits	BR, KA	KA	CA, NZ			
Spirit s> wine	DK, CZ, CA	DK		CR, BL, KA, SE, DK, CZ, CA, AU, NZ	CR, KA, SE, DK, CA, AU	CR, KA, SE, CA
Beer > none				SE, CZ, CA, NZ	SE, CA	CA
None > beer				SR, IN, KA	UG, SR, IN, KA	SR, IN, KA
Wine > none						
None > wine				CR, PE, KA, SE, DK, CZ, IM, CA, NZ	CR, PE, UR, KA, SE, DK, CZ, CA	CR, PE, KA, SE, DK, CZ, CA
Spirit s> none				BL, DK		
None > spirit					IN	IN

Two-character country codes: AR (Argentina), AU (Australia), BL (Belize), BR (Brazil), CA (Canada), CR (Costa Rica), CZ (Czech Republic), DK (Denmark), IM (Isle of Man), IN (India), KA (Kazakhstan), NC (Nicaragua), NG (Nigeria), NZ (New Zealand), PE (Peru), SE (Sweden), SR (Sri Lanka), UG (Uganda), UR (Uruguay)

Table 7

Summary of significant differences, comparing Social consequences of drinking between drinkers of different beverage types

Problem type:	Social consequences of drinking					
Measure of bev.:	Per 1000 grams of beverage type			2/3 of drinking is of beverage type		
Adjusting for:	nil	Overall volume	Overall volume, sex, age	nil	Overall volume	Overall volume, sex, age
No. signif./no. of comparisons	15/55	11/55	8/55	40/82	31/82	16/82
Beer > wine	SE, DK, CA	SE, DK, CA	SE	CR, BL, PE, SE, DK, CZ, IM, CA, AU, NZ	CR, PE, SE, DK, CZ, CA, AU, NZ	CR, CZ, CA
Wine > beer	NC, KA	NC	NC, NZ			
Beer > spirits	UG, BR	UG, CR, BR, SR, SE	UG, CR, BR, SR	CZ, CA		
Spirits > beer	CZ, CA			BL, IN, KA	IN, KA	IN, KA
Wine > spirits	NC, KA		NZ			
Spirits > wine	SE, DK, CZ, CA	DK, CA		CR, BL, KA, DK, CA, AU, NZ	CR, KA, DK, CA, AU, NZ	CR, KA, CA
Beer > none				SE, DK, CZ, CA, NZ	CZ, CA	CA
None > beer				NG, SR, IN, KA	NG, SR, IN, KA	SR, IN, KA
Wine > none						
None > wine				CR, KA, SE, DK, CZ, CA, NZ	CR, PE, KA, SE, DK, CZ, CA	CR, KA, CA
Spirit s> none				BL, DK	DK	
None > spirits				IN	IN	IN

Two-character country codes: AR (Argentina), AU (Australia), BL (Belize), BR (Brazil), CA (Canada), CR (Costa Rica), CZ (Czech Republic), DK (Denmark), IM (Isle of Man), IN (India), KA (Kazakhstan), NC (Nicaragua), NG (Nigeria), NZ (New Zealand), PE (Peru), SE (Sweden), SR (Sri Lanka), UG (Uganda), UR (Uruguay)