

FINAL DRAFT: for submission to Health Education Research

DESCRIPTORS AND ACCOUNTS OF ALCOHOL CONSUMPTION: METHODOLOGICAL ISSUES PILOTED  
WITH FEMALE UNDERGRADUATE DRINKERS IN SCOTLAND

Jan S. Gill<sup>1</sup>, B.Sc., Ph.D., Marie Donaghy<sup>2</sup>, BA, FCSP, Ph.D.,  
Jennifer Guise<sup>3</sup>, MA, MBA, BSc, MSc PhD, C Psychol Pamela Warner<sup>4</sup>, B.Sc., PhD

<sup>1</sup>Faculty of Health and Biological Sciences  
Queen Margaret University College  
Leith  
Edinburgh  
EH12 8TS, UK.  
Telephone 0131 317 3809  
Fax 0131 317 3812  
E-mail [j.gill@qmuc.ac.uk](mailto:j.gill@qmuc.ac.uk)

<sup>2</sup>Faculty of Health and Biological Sciences  
Queen Margaret University College

<sup>3</sup> Tayside Institute for Health Studies, Sciences, University of Abertay Dundee

<sup>4</sup> Public Health Sciences, University of Edinburgh

Running Title; Methodological issues in alcohol research    Key words; drinking,  
binge, assessment, female, student.  
Word counts; Abstract = 200, Text = 4789

### Abstract

Excessive drinking among young women continues to attract adverse media attention and is the target of UK government-led initiatives. Reliable research on alcohol consumption is needed to inform/evaluate public health interventions. This pilot study, investigating descriptors of alcohol drinking in female Scottish undergraduate students, comprised: (i) self-completed questionnaire survey (n=95); (ii) interview plus test pouring of a 'drink' (n=19). Self-reports by 70% of drinkers (n=90) indicated alcohol consumption for the 'week past' meriting classification as 'binge' drinking, and 83% of this group reported drinking in this fashion at least fortnightly. However, binge-drinking may be under-estimated, since poured drinks were measured to be on average double the alcohol content for a standard drink, drinking often occurred outwith licensed premises, and respondents preferred to quantify consumption in (fractions of) bottles, rather than glasses. Qualitative analysis showed that interviewees oriented to drinking as an accountable practice but were unaware of the clinical definition of binge drinking. They defined it in terms of the effect of alcohol consumed on individual behaviour, not in absolute quantities. Given the unreliability of self-reported consumption, future health surveys and initiatives should consider 'quantifying' alcohol in a way more meaningful to the population of interest, in terms of effect.

### Introduction

The repercussions of binge and hazardous drinking among young people including university students constitute a problem of shared international concern [1-3]. Recently within the UK much media attention and implicit criticism has been directed at alcohol consumption levels and the binge drinking culture of young women in particular. Evidence is accumulating to link early drinking patterns to an increased risk of alcohol abuse and harmful drinking in later life [4, 5-8]. The number of cases of alcoholic liver disease admitted to Scottish hospitals is rising while deaths due to this condition among females rose 424% in the period 1980-2003[9].

The drinking behaviour of one group of young people, university students, in particular female students, has received considerable research attention. Current evidence suggests that around 52% of male and 43% of female students exceed their respective 'sensible' weekly intakes of 21 and 14 UK standard units [for review see 10]. (Within the UK, a standard unit is equivalent to 8g or 10ml of absolute alcohol.) In addition, it has been claimed recently that the prevalence of female student 'binge' drinking, (here defined as consumption of half the weekly recommended units at a single session; 7 UK units [11], may be as high as 63% of female students [12] or 53% [13]. In both studies binge drinking was more prevalent among female than male students. (For males the slightly higher binge drinking definition of 10 UK units consumed in a single session is applied [11]). These findings contrast sharply with those recorded within the UK general population where only 10% of all women exceeded 6 units on at least one day in the previous week [14]. Underwood and Fox [13] studied undergraduate years 1-5 but in the third term, Pickard *et al.*, [12] studied year two but did not state the term time investigated. Not all investigators found similarly high levels of female binge drinking. Webb *et al.*, [15] reported a

figure of 14%, while Norman et al. [16] did not detail the particular undergraduate years studied or the time point of the questionnaire administration, but documented that 32.5% of females binge drank at least once a week. Webb et al., [17] recorded drinking behaviour in the spring term but for undergraduates years 2 and 3 and reported that 24% of females binge drank.

Discrepancies between study findings may be partially explained by the investigation of differing time points within the academic year which in turn may influence consumption levels. Anecdotal evidence suggests that 'Freshers week' (course induction week at the start of first year), and the pre- and post-examination periods are likely to be times when bingeing is more likely to occur. On a similar note, the academic year of study may influence consumption levels. For example, living away from home, freedom from parental supervision, peer pressure etc could influence first year drinking practice while in the final year exam pressures may dominate.

This study was undertaken to investigate several methodological factors which may impact on the accuracy of measures of binge drinking within this population. In many student- focussed studies conducted within the past 25 years in the UK, participants have been asked to record their consumption of alcohol in terms of UK standard drinks where single glasses of wine, spirit or beer etc are each assumed to contain one UK standard unit. The disparity in the alcohol content of different standard drinks and the variability in alcohol content of different brands of the same drink type (for example normal and high alcohol content beers) has been largely ignored, as has the relatively recent expansion of the UK drinks market through the introduction of a large number of designer, spirit-based fruit drinks e.g. 'Alcopops'. These are less readily classifiable in terms of 'standard drinks'. The present study has recorded alcohol consumption in

terms of brand names and has used manufacturers' published tables to calculate actual alcohol intake.

The possible confounding influences on findings of critical time points within a student's university career were referred to above. To minimise this we investigated female students within their second year of study during the early weeks of the spring semester. A further methodological concern regarding some published work in this area is the failure of many quantitative studies to consider that 'drinking location' will not be necessarily a bar or similar commercial premises. The financial constraints of student life may favour the purchase of drinks from retail outlets. In these situations, alcohol consumption is unlikely to be in drinks conforming to 'standard' pub measures and, indeed, recent evidence suggests that an error as high as 100% may be associated with the assumption that one 'self' poured drink of wine or spirit is equivalent to one UK unit [18]. Reflection on the features of social drinking in 'home' rather than in commercial premises suggests further that consumption might not even be in discrete drinks that can be counted (that is, with no refill until the current glass is empty). A more plausible scenario is intermittent topping up from a shared supply. For these reasons the present study has attempted to monitor exactly where students consume alcohol and to record consumption of wine and spirits both in terms of glasses and, importantly, fractions of a bottle.

In the public health and academic research arena, binge drinking is tacitly associated with particular harm potential and raises serious concerns about the impact on health, with a need for effective health promotion interventions taken as given. Binge drinking is often defined solely in terms of quantity [11], but our study questions whether this simplistic conceptualisation of binge drinking matches the understanding of the term among female students. We have attempted to maximise insight by supplementing our survey with an exploration of

participants' own accounts of their drinking patterns and examined whether levels of consumption are reported in an interactionally neutral manner. Therefore, this study provides a potentially more in-depth picture of the drinking behaviour of participants.

## Methods

### Participants:

During the second semester of the academic year several second year undergraduate classes within the University were approached at the start of lecture sessions, informed about the study and invited to participate. Information sheets and ethical consent forms were distributed. Exactly one week later students were asked to complete the questionnaire in an adjacent room after the end of the lecture. On submission of the completed ethical consent form and questionnaire, a participation fee of £5 was paid. The final page of the questionnaire asked if the respondent was willing to take part in a second phase of the pilot study - a semi-structured taped interview session. A contact mobile phone number or email address was required. From those who volunteered (n=40) for this phase, 19 were randomly selected (see below). As had been promised to them, interviewees' contact numbers were entered into a draw for a £50 prize.

Ethical approval for the study was obtained from the University Ethics Committee.

### The Questionnaire

The confidential questionnaire contained 31 questions and took around 15 minutes to complete. The only demographic data recorded were age and course of study. Questions 2-5 were completed by those who had indicated that they classed themselves as non-drinkers and addressed their reasons for not drinking. Questions 6-31 were completed by drinkers and sought information on drinking locations, who usually poured drinks, and brands usually drunk. Precise details were also requested of what was drunk on the day 'last week' when the subject drank most. Alcohol consumption figures are reported in terms of the UK standard unit (8g or 10ml of absolute alcohol).

Calculations of consumption levels have been made using manufacturers' published data relating to alcoholic drinks. Students were asked to record the brand name of each drink consumed. To ensure that all popular brand names appeared on the questionnaire, the questionnaire was pre-piloted on a group of female students of similar age at a second campus location, but part of the same university. In addition, the sales records of the Student's Union were accessed (with permission) to provide a list of the most frequently purchased brands of alcohol.

Students were also asked to record their consumption of drinks such as wine and spirits either in terms of fractions of a bottle or glasses. The different can volumes of commercially available beers etc were also listed in the appropriate questionnaire section.

#### The Interviews

The questionnaire code number of each student who identified herself as a drinker and indicated willingness to participate in a taped interview session (n=40) was categorised according to her self-reported level of weekly



consumption, in terms of quartiles of self reported weekly consumption of the entire survey sample of drinkers. From each of the four resulting groups, five participants were randomly selected and offered an interview appointment. One later withdrew and 19 were interviewed. Taped interviews were conducted by two researchers (JSG and MD). A script was used with semi-structured questions developed to explore issues raised by the questionnaire study. A third researcher (JG), who had not been involved in the first phase of the study, was responsible for the analysis of the transcripts and checking of the correspondence between tapes and transcripts. These findings were then reviewed by one of the researchers who had gathered the data (MD). Analytic points are illustrated by direct quotations. On completion of the interview each student was asked to pour into a glass (a standard wine glass for wine; a spirit or tall glass for spirit) the drink she 'would usually pour at home'. Bottles of wine and spirit (vodka) were provided. The volume of drink was subsequently measured and its unit content calculated assuming a wine ABV (alcohol by volume) of 12% and a spirit ABV of 40.0%.

#### Data analysis

Questionnaire responses were analysed using Excel. Iterative content analysis was used to explore participant's understanding of the concept of binge drinking.

### Results

#### Sample Characteristics

The mean age of the sample was 20.1 years (range 18.1 to 25.3) .Within the UK, drinking is legal from the age of 18. Four relatively small classes were

targeted with a view to surveying 100 students. Approximately 10% (n=95) of the total number of female undergraduates matriculated at the university completed the questionnaire. Students studying for various degrees in social sciences and health-related courses were present in participating lectures.

Overall, five students classified themselves as non-drinkers (5.3% of the sample) although one of these noted that she did drink on special occasions. The reasons given for not drinking were religious reasons (n=3) and 'not liking it' (n=2). These respondents will not be considered further and all subsequent results relate to the 90 alcohol consumers.

Frequency and level of Consumption:

Table I describes self-reported weekly consumption in terms of UK units and frequency of drinking for the 90 female student drinkers. On the basis of this self-report, 31%(n=28)are classified as failing to drink sensibly i.e. consuming more than 14 UK units per week, while 8% (n=7) of drinkers also exceeded the higher, weekly guidelines for males (21 units).

Table I here.

The majority, around two thirds (67%, n=60) of students, recorded their 'usual' drinking frequency as 1-2 days per week, and only 5% (n=4) reported drinking on 5 or more days per week.

When distribution of 'usual' pattern reported was compared with data recorded for the week before the survey, 'last week', some discordance was noted, overall in the direction of greater or more frequent alcohol consumption in the last week. Five students classified on the basis of reported 'usual' pattern as

drinking 'sensibly', recorded last week consumption exceeding 14 units on a single day. For 'last week' the percentage of students reporting drinking on only 1-2 days was lower by 17 percentage points while drinking on 3-4 days was more prevalent by a similar amount. However, comparing frequency ratings within-women, in the last week, 28% drank more frequently than 'usual' and 12% less frequently (Wilcoxon signed ranks test,  $p=0.047$ ,  $df=89$ ). It was notable that the majority of these discordances (all but two) involved a difference of only 1 level, and that 60% of women had consistent frequency ratings.

#### Drinking Location:

Respondents were asked to identify from a list, all locations where they normally consumed alcohol. Of the selected locations, 47% ( $n=112$ ) were outside licensed premises (i.e. someone else's room, own room, friend's flat, home). This finding is consistent with responses obtained to the question 'who usually pours your drink?'. The selection of a barperson as 'often the pourer of drinks' was made as frequently (72 times) as the selections of 'self' and 'friend' combined (48 and 24 times respectively). A substantial minority of the drinkers, 14% ( $n=13$ ) answered 'yes' to the question 'Do you ever drink alone?'

#### Frequency of drinking and drink choice:

Almost one half of drinkers (47%,  $n=42$ ) claimed 'never' to drink beer, lager or cider; or to drink it only once or twice per year. This contrasts sharply with spirits where the comparable figure was 1%. In terms of regular weekly consumption (i.e. consumption occurring at least once per week), spirits were the most common choice with 70% ( $n=63$ ) reporting regular weekly drinking of spirit, 53% ( $n=48$ ) of wine and 53% ( $n=48$ ) of 'alcopops'.

Consumption details relating to these three drinks are presented in Table II.

Table II here

Usual number of drinks consumed at one session:

Overall 41% (n=32) of wine drinkers (n=78) drank what might be described as 'sensible' daily amounts of wine at one session (the average number of glasses in the 1-4 glass category was 2.5). Almost two thirds, 59% (n=46) of wine drinkers opted to quantify their consumption in terms of half or whole bottles, rather than glasses.

The spirit drinks most commonly purchased by this population of students were 'shooters' and vodka, the latter often being supermarket brands. Among spirit drinkers, 77% (n=67) drank four or more pub measures in a session while 82% of all spirit drinkers also reported on occasions sharing a bottle with friends. Three quarters of this group reported consuming one quarter or more of a bottle of spirits when sharing with friends. The number of 'alcopops' drunk at one session ranged from one to ten. Assuming an alcohol content of 1.5 UK units per bottle (the correct figure for the three brands most commonly reported), 29% (n=26) of all drinkers exceed 7 UK units of alcohol per session when drinking 'alcopops'.

Binge Drinking:

For females, one commonly used classification of binge drinking is the consumption of seven or more units of alcohol at one session [11]. By calculating consumption from reported brands and quantity (see methods) it was

found that 70% of all 90 drinkers had, on at least one day 'last week', drunk an amount of alcohol that would be classified as a binge drinking session. If manufacturers' tables not been employed to ascertain the alcohol content of brands recorded by each individual, the above figure would have been 66%.

Table III here.

Within the group identified as binge drinking there was considerable variation in the actual amount of alcohol consumed on the single day when they had had the most to drink (see Table III). Almost 26% (n=23) of students drank 14 units (the recommended maximum weekly allowance on that single day. (Interestingly in an earlier question, one third of this latter group had stated that they 'normally' drank within sensible guidelines). In all, 29% (n=26) of drinkers, drank more on a single day last week than they reported as in their original estimation of their usual weekly consumption.

A measure of the frequency of this level of sessional consumption is also available: 52 (83%) of binge drinkers (58% of all student drinkers) claimed to drink this quantity of alcohol, at one session, at least once a fortnight. In addition 14% (n=13) of all drinkers claimed to drink more than this amount 'on one occasion' at least once a fortnight.

Given the above findings, it is of interest to explore qualitatively the ways in which a sub-set of respondents spoke about their levels and patterns of drinking recorded in the questionnaire.

## 2. Qualitative interviews

Two key points emerged from our qualitative analysis of interview transcripts. The first is that when participants were asked what they understood by the term 'binge drinking', they related this not to absolute quantities consumed, but to the degree of effect on the individual of the alcohol consumed. Second, at various points of the interview, participants appeared to orient to the issue of drinking as an accountable practice.

A feature of participants' descriptions of binge drinking is that they spoke about its effects on behaviour. It was suggested that alcohol affects people differently, and therefore what constitutes a binge will vary from person to person:

"this term would mean loads, more than 15 drinks... it might not be [binge drinking] for somebody else, it's just I get drunk easily" (Q23, lines 228-232)

"enough to make you violently ill but I mean I suppose it depends on who you are how you would define binge drinking" (Q38, lines 173-174)

"being drunk to the state where you're having to kind of get carried... if they're being sick and things" (Q40, lines 125-126)

"it just sort of depends upon the person, how long you've been drinking for and you know what you're used to, what your body can take" (Q86, lines 266-268)

"I think it would vary from person to person but drinking in excess, drinking more than you would usually drink, drinking enough to get out of control and feel bad in the morning" (Q97, lines 146-148)

There were claims that media representations of student drinking are exaggerated:

"personally it's not an image that I share especially with my group of friends"  
(Q98, lines 437-438)

"[media portrayal is] definitely hyped up... me and my friends we're not like that... we're not all to blame for that because it's cheap drink I suppose, but we're not all that bad" (Q116, lines 479-485)

When respondents were asked about the levels of drinking they had reported in the previous written questionnaire, it was sometimes remarked that these exaggerated their normal level of intake:

"to be perfectly honest, I'd been away on holiday so it wasn't representative of, you know, what I would drink in one week" (Q35, lines 11-13)

"[the week the questionnaire referred to was] a particularly heavy week" (Q38, line 91)

"I know when I filled the first one (the questionnaire) out I had gone out a lot that week and had drank more than I should have so the results might not be as accurate" (Q116, lines 507-509)

No explanation was asked for regarding interviewees' levels of drinking. Therefore, accounts spontaneously offered might be interpreted as showing an awareness that their drinking levels might come across as excessive. The provision of such information also demonstrates sensitivity to drinking as an accountable practice, that is, as a behaviour governed by societal norms.

Participants' accounts also provide potential explanations for some of the observed disparity between 'usual' intake and past week as recorded on the questionnaire. It is interesting that respondents also offered accounts to explain why they had *not* been drinking on a Friday or Saturday night (though they did not do so for other evenings), and this suggests an orientation to specific expectations. That is, if it is considered 'normal' to drink at the weekend then not to do so requires some sort of explanation.

"I didn't have anything on Wednesday" [...] "Friday - I didn't have anything *because I had the car*" (Q82, lines 46 and 82; emphasis added)

"[Monday] nothing [Sunday] nothing. Did I drink on Saturday? No *I was working*, I didn't drink on Saturday either" (Q101 lines 46, 50 and 54; emphasis added)

To provide information about drinking behaviour is not interactionally neutral. Participants show a sensitivity to the hearer's uptake of what is said and to what might be considered 'normal' in this particular group.

### 3. Pouring exercise

Mean alcohol content of a poured drink of wine was 1.98 UK units (n=19) 95% CI 1.7 to 2.2), and a drink of spirit 2.24 units (n=19) 95% CI 1.8 to 2.7). These results have been reported elsewhere [19]. Therefore in each case the alcohol content of 'a drink' was nearly double the 1 unit assumed by survey 'per drink' assessment methods.



## Discussion

Several aspects of student drinking behaviour revealed by the present work suggest that simple forms of questionnaires may be inadequate and will fail to monitor consumption accurately. First, an adherence to the concept of a 'standard drink' as a yardstick to quantify consumption may be subject to considerable error. Present findings suggest that frequently students pour their own drinks: approximately half of the favoured locations for student drinking were outside licensed premises. 'Who often' poured a drink was just as likely to be the respondent or their friend as a barperson. In these circumstances it is likely that drink sizes will be variable. Of relevance is the finding that when asked to pour their 'usual drink', interview participants poured a 'drink' of not one but approximately two standard units. This point is particularly significant when linked to the observations that in the present study among young women two of the three most popular drinks were wine and spirits, while supermarket brands of bottled spirit were favoured purchases. For drinks like beer, lager etc, the more favoured alcohol among young men, the problem is less acute, since they are usually sold even for home consumption in prescribed and therefore more readily quantifiable volumes.

Second, 59% (n=46) of wine drinkers (51% of all drinkers) chose to report their usual consumption of wine not in glasses but in terms of half or whole bottles. Furthermore, 82 % (n=73) of spirit drinkers had shared a bottle with friends, with 62% (n=55) of those drinking one quarter or more of a bottle. The portion size may be effectively unknown in such situations. The preference for the bottle or fraction of a bottle as the mode of reporting alcohol consumption suggests that these options should be available in future questionnaires which monitor student drinking, especially where females are involved, given their drink preferences.

Third, it is important to note the wide range of consumption encapsulated within the simple term 'binge drinking', 7 to 24 alcohol units in this study. The health implications of drinking at either end of this scale are likely to be quite different. In addition, many studies fail to record binge drinking frequency - a factor which may be pertinent to associated health risks.

In common with the findings of recent studies of UK undergraduate drinking behaviour, the vast majority of students in this Scottish female sample classify themselves as drinkers. The abstention rate (5%) is lower than those reported recently for female undergraduates in the UK; 16% [15], 12% [12] and 10% [13]. However, information on the key factors likely to influence such figures, such as religious affiliation/ethnic origin of students [20], was not sought in the present study.

By their own recorded consumption, 31% (n=28) of drinkers (29% of students), exceeded sensible weekly guidelines of 14 UK standard units, while recent studies also investigating female students in their second year of study presented values of 18.3% of drinkers [21]; 38.3% of female students [15]; 41% of female students [12]. The General Household Survey within the UK [14] reports a corresponding value of 17% for women of all age groups but 33% for the 16-24 year old group, a value similar to that reported here.

Further evidence of harmful drinking is indicated by the levels of binge drinking. The percentage of drinkers consuming the amount of alcohol associated with 'binge' drinking (7 or more units) on one 'day last week' was 70%, (i.e. 66% of students), while 58% (n=52) of all drinkers claimed such a level of sessional intake occurred at least once a fortnight. The single day consumption levels found in the present study are much higher than those recorded for this

age group in two UK-based general population surveys, even though they both used slightly broader definitions of single day consumption. For females aged 16-24 years, 28% drank more than 6 units on their highest drinking day in the last week [11] whereas in Scotland a much higher percentage reported drinking 6 or more units on the heaviest day 'last week'; 49% [22]. However, the present findings show some agreement with other UK studies of female students; 63% [12] and 53% of students [13]. Our study suggests strongly that other surveys are underestimating alcohol consumption and binge drinking, since our ascertainment of named brands and use of these to obtain specific alcohol content for calculating units consumed, meant a rate for binge-drinking higher by 4 percentage points than the standard approach. Another possible explanation for our higher figure is that there has been an increase with time in rate of binge-drinking.

Contradictory impressions of drinking behaviour were found: 69% of drinkers in the survey reported their usual alcohol consumption to be 14 units or less (within what might be considered 'sensible' weekly guidelines), yet on the strength of their responses regarding specific drinks in the previous week, 70% reported having drunk seven or more units on a single day (which could be considered to be drinking in a harmful manner.) In order to make sense of such apparent anomalies, it is important to examine the ways in which people talk about their drinking and to consider the interactional context in which this is done. Content analysis sensitive to the context in which participants provide their accounts suggests that participants' understanding of binge drinking does not coincide with the clinical definition, and that talk about alcohol consumption takes place against a background of moral implications.

One limitation of this survey is its relatively small size, and hence slightly unreliable estimates. This is not a problem for the methodological issues piloted, but does affect estimates of population rates, a secondary aim of the study. For the epidemiological findings it is of more concern that participants were not randomly selected, in that several classes at a specific university were approached, and students within these classes 'volunteered' Students who did not wish to reveal the extent of their drinking could have declined participation or absented themselves from the targeted lectures. Alternatively, students with some concerns about their drinking levels may have been drawn to participate, in the vague hope of some clarification. This point is relevant, for the conditions imposed by the Ethical Committee requested that students be given time to consider whether they wished to participate. The information sheets were issued one week before the study. Nevertheless, as has been noted above, the overall percentage exceeding the UK weekly guideline figure of 14 units is very close what was obtained for this age group in a national survey. [14].The accuracy of recall data is a widely acknowledged problem with all questionnaire surveys of consumption. For this reason detailed questioning related only to 'last week' when recall may be most accurate.

The behavioural repercussions of binge drinking have been documented, particularly within the US [23]. Current thinking within the UK would highlight the assumed negative health implications of this form of alcohol consumption. The present study underscores the incongruous nature of the understanding and value of this term. This proposal supports the findings of Alexander and Bowen [24] within the US, who contend that the term 'binge drinking' is in itself counterproductive. A variety of drinking behaviours are represented within this single term and this, consequently, may simply prevent students from identifying the aspects of their personal drinking behaviour that they ought to change. Within Australia, Morawska and Oei [25] and Oei and Morawski [26]) have

developed a cognitive model of binge drinking in students where drinking is influenced both by alcohol expectancies and secondly, drinking refusal self-efficacy. They suggest within university students, binge drinkers, when compared to social drinkers, are classified by greater amounts of the former characteristic and slightly lower levels of the latter. The emergence of data linking an early, binge pattern of drinking to major health issues for the third or fourth decade of life provide clear impetus for the development of effective interventions in this area.

Our findings for the survey methods piloted have implications for the design of questionnaires and for the development of interventions within this population group which attempt to alter a pattern of drinking which may not in fact be perceived as potentially harmful. This is a critically important area of public health. A larger scale study at multiple university sites should be considered. The present findings underscore the need to investigate student drinking with tools custom-made for this population subgroup. Similarly, public health initiatives should consider 'quantifying' alcohol in a way more tailored and meaningful to the population of interest.

## References

1. Wechsler H and Kuo M. College students define binge drinking and estimate its prevalence: results of a national study. *J of Amer Coll Hlth* 2000; 49:57-64.
2. Hingson R, Heeren T, Winter M et al. Magnitude of alcohol-related mortality and morbidity among US college students aged 18-24: changes from 1998 to 2001. *Annu Rev Public Health* 2005; **26**:259-279.
3. Saunders JB, Kypri K, Walters ST et al. Approaches to brief intervention for hazardous drinking in young people. *Alcohol Clin Exp Res* 2004; **28**:322-329.
4. Jefferis BJ, Poer C, Manor O. Adolescent drinking level and adult binge drinking in a national birth cohort. *Addict* 2005; **100**:543-549.
5. Jennison, KM. The short-term effects and unintended long-term consequences of binge drinking in college: a 10-year follow-up study. *Amer J of Drug and Alc Abuse* 2004;**30**:659-684.
6. McCarty CA, Ebel BE, Garrison MM et al. Continuity of binge and harmful drinking from late adolescence to early adulthood. *Pediatrics* 2004;**114**:714-719.
7. Bonomo YA, Bowes G, Coffey C et al. Teenage drinking and the onset of alcohol dependence: a cohort study over seven years. *Addiction*, 2004;**99**:1520-1528.
8. Newbury-Birch D, Lowry RJ, Kamali F. The changing patterns of drinking, illicit drug use, stress, anxiety and depression in dental students in a UK dental school: a longitudinal study. *Brit Dental J* 2002;**192**:646-649.

9. Alcohol Statistics Scotland *Information services*. NHS National Services Scotland. Edinburgh 2005.
10. Gill J. Reported levels of alcohol consumption and binge drinking within the UK undergraduate student population over the last 25 years. *Alc and Alcohol*, 2002;**37**:109-120.
11. Moore L, Smith C, Catford J. Binge drinking: prevalence, patterns and policy. *Health Educ Res* 1994;**9**: 497-505.
12. Pickard M, Bates L, Dorian M et al. Alcohol and drug use in second-year medical students at the University of Leeds. *Med Educ* 2000;**34**:148-150.
13. Underwood B, Fox K. A survey of alcohol and drug use among UK based dental undergraduates. *Brit Dental J* 2000;**189**:314-317.
14. GHS Living in Britain. Results from the 2002 General Household Survey London, Office for National Statistics Social Survey Division, The Stationary Office, London, UK. 2003.
15. Webb E, Ashton CH, Kelly P et al. An update on British medical students' lifestyles. *Med Educ* 1998;**32**:325-331.
16. Norman P, Bennett P, Lewis H. Understanding binge drinking among young people : an application of the Theory of Planned Behaviour. *Health Educ Res* 1998;**13**:163-169.

17. Webb E, Ashton CH, Kelly P. et al. Alcohol and drug use in UK university students. *The Lancet* 1996;**348**:922-925.
18. Gill J, Donaghy M. Variation in the alcohol content of a 'drink' of wine and spirit poured by a sample of the Scottish population. *Health Educ Res* 2004;**19**:485-491.
19. Gill J, Donaghy M, Warner P. Mines a double - variation in the alcohol content of a glass of wine or spirit. P2.21. Poster Presentation to Addictions 2002 Conference. Amsterdam September 2003.
20. File SE, Mabbutt PS, Shaffer J. Alcohol consumption and lifestyle in medical students. *J of Psychopharm* 1994;**8**:22-26.
21. Ashton CH, Kamali F. Personality, lifestyles, alcohol and drug consumption in a sample of British medical students. *Med Educ* 1995;**29**:187-192.
22. Scottish Health Survey 1998 volume 1, Joint Health Surveys Unit, National Centre for Social Research and Department of Epidemiology and Public Health, UCL, 2000, UK.
23. Wechsler H, Davenport A, Dowdall G et al. Health and behavioral consequences of binge drinking in college: a national survey of students at 140 campuses. *J A M A* 1994;**272**:1672-1677.
24. Alexander EN, Bowen AM. Excessive drinking in college: Behavioral outcome, not binge, as a basis for prevention. *Addict Behav* 2004;**29**:1199-1205.



25. Morawska A, Oei TPS. Binge drinking in university students: a test of the cognitive model. *Addict Behav* 2005;**30**:203-218.

26. Oei TPS, Morawska A. A cognitive model of binge drinking: the influence of alcohol expectancies and drinking refusal self-efficacy. *Addict Behav* 2004;**29**:159-179.

Table I; Usual levels and frequency of alcohol consumption self reported by student drinkers (n=90).

Table II; Self reports of amount of alcohol 'usually' consumed at one drinking session for the three most popular drinks (in terms of 'drinks' or fractions of a bottle).

Table III: Binge-drinking : distribution (%) of alcohol consumption calculated from students' reports for their heaviest drinking day in the week before the survey (n=90). [Calculated from brands and drink volumes recorded by students.]

Table I

Alcohol consumption per 'usual week'	Percentage of student drinkers exceeding specified weekly thresholds. % of n=90 (95% confidence interval)	
Exceeding 14 UK standard units	31 (21-41)	
Exceeding 21 UK standard units	8 (2-14)	
	Distribution of responses (% out of n=90)	
Frequency of alcohol consumption	usually	'last week'
Drinking on 1-2 days per month	9	9
Drinking on 1-2 days per week	67	50
Drinking on 3-4 days per week	19	36
Drinking on 5 or more days per week	5	5

Table II

Drink	Usual amount drunk at one session	Distribution of responses- percentage (%) of corresponding n.
Wine (n=78 wine drinkers)	1-4 drinks	41
	One half bottle	27
	One bottle	28
	Exceeding one bottle	4
Spirit (n=87* sprit drinkers)	1-3 drinks	23
	4-6 drinks	39
	7-9 drinks	22
	10-16 drinks	16
'Alcopops' (n=84* Alcopop drinkers)	1-2 bottles	35
	3-4 bottles	33
	5-7 bottles	22
	8-10 bottles	10
(* excluding 2 subjects who reported they did drink Alcopops and spirit but who did not specify consumption levels.)		

Table III

Single day consumption (UK units)	Percentage (%) of all drinking students (n=90)
Not Binge drinking (Less than 7 units)	30.0 (95% CI 21-39)
Binge drinking (all reporting 7 or more units per session):	70.0 (95% CI 61-79)
Subgroups by sessional total reported:	
7 to 10 units	25.6
More than 10 to 14 units	18.9
More than 14 to 20 units	18.9
More than 20 units	6.6