Author’s response to reviews

Title: Teenage drinking, alcohol availability and pricing: a study of risk and protective factors for alcohol-related harms in school children

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Author’s response to reviews: see over
Dear Editor,

We are pleased to resubmit our revised manuscript for publication in *BMC Public Health*:

**Teenage drinking, alcohol availability and pricing: a study of risk and protective factors for alcohol-related harms in school children**

We have addressed all the reviewers’ additional comments including those which they identified as discretionary. Details of how we have addressed each point raised are provided below, and changes have been marked in red in the revised manuscript. We have also addressed your request for the full names of those committees providing approval for the research. I hope this is adequate detail but if you require any further reassurance that this work received full ethical scrutiny please do not hesitate to contact me and I would be more than happy to speak to you directly about the processes involved.

We hope that these changes to the manuscript meet with your approval.

Yours sincerely,

Professor Mark A. Bellis

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**Responses to comments on revised manuscript**

Reviewers comments = *italics*; Changes to manuscript = red

Reviewer A: Alasdair Forsyth. Reviewer A has suggested only discretionary revisions and our responses to these are below.

A1. (A3 & A4) Although it is encouraging that there was a strong correlation between school postcode deprivation and own home postcode deprivation, I still have some reservations about combining individuals who are deprivation coded by school postcode with those classified by home postcode. It did cross my mind that for consistency the authors might consider simply using school postcodes for all, stating that these were strongly correlated with the postcodes of their pupils.

Response: While school postcode can be a proxy for pupil’s residential deprivation, inevitably it is not going to be as accurate as individuals’ postcode of home residence. Therefore, we have used school postcode only where individual postcode is not available. We have added to the methods:

However, LSOA (and therefore deprivation) was calculated from individuals’ specific postcodes of residence rather than the more general school postcodes when both were available. Once LSOA was established for each individual, they were categorised into deprivation quintiles according to where their LSOA fell in the list of all LSOAs in the North West ranked by deprivation.

A2. (A8) I would still have preferred to see more than seven beverage categories. These are too broad, both in terms of product type and ABV within product types. I understand that for consistency it may be best to stick to categories used by national statistics, even if these are
flawed. It would have been better to have had a more comprehensive number of categories to start with, which could be coded into these prior classifications when required. I suspect that, rather than it being the case that less than 1% consume products such as MD20/20 or Lambrini etc., that these are likely to have been subsumed into wine by respondents (though the latter for example is perry). Perhaps it would best just to acknowledge that this approach was in-line with previous national surveys (though these may be less than perfect), rather than stating the figure “less than 1%”, which I imagine the manufacturers of certain products will quickly embrace as proof that they do not market to children. I know of no other product type which proudly trumpets its lack of market share (e.g. see Economic Times, 2009, with illustration by, McMillan, 2005 or Mann, 2007). I would therefore advise deleting this figure for this reason, perhaps replacing it with a comment such as that made for large volume beer, and also by providing an example of an ‘other’ beverage.

Response: We have changed the text in the methods as requested by the referee.

For alcohol types consumed, respondents were provided with short descriptions and small pictures of typical products to help with identification. The types of alcohol products listed were based on those in established national surveys [35].

An open question allowed individuals to list other less commonly consumed products (e.g. a liqueur). These were also converted into units based on alcohol contents typical of each product, but as they accounted for less than 1% of alcohol reported, product specific analyses were not possible on these drink types.

A3. (A9-13) Related to the above, I suspect some of the large volume cider effect may have been due to these tending to be containers for white cider (high ABV) as opposed to amber cider (weak ABV) which may be more often found in cans and bottles. A two litre bottle of white cider with 50% extra free, e.g. White Lightening, could contain 22.5 standard units (i.e. double what the authors have coded here). In any case, I would still support the authors’ contention here, against the comments made by another referee in points B3, B16 & B26, in that, for one reason or another, there is a large volume cider effect at play here, perhaps owing to drinking context, brand-image, etc.

Response: We are pleased that the referee agrees with the way we have handled this issue.

Reviewer B: Tomi Lintonen

B1. The authors did nothing to respond to my concern over the use of the phrase ‘memory lapse’ to refer to the question ‘tend to forget things after drinking’ (?). Use of the phrase ‘memory lapse’ leads the reader to think of alcohol-caused blackouts, which is probably not the case here. It would help both the reviewer and the reader if the exact wording of the question was presented in the Methods section. In its current form, I think the paper over-interprets and exaggerates the meaning of forgetfulness. Please re-phrase ‘memory lapse’ with something more closely related to the question wording throughout the paper.

Response: We have removed all reference to memory lapse throughout the document and replaced it with the words forgetting things based directly on the questionnaire wording. We have also included the exact wording of the question in the methods and ensured question description is consistent throughout.

In Methods:
To analyse the question ‘I tend to forget things when I have been drinking alcohol’, a four point ordinal Likert Scale (agree strongly, agree, disagree, disagree strongly) was
dichotomised into those that agreed that they tended to forget things after drinking and those that did not.

B2. ‘p.8 information on the numbers of missing responses per variable is needed’ - this is not the same as showing the numbers of respondents in several categories. Missing response rates must be reported as percentages of sample; this enables the reader to make judgements on reliability and validity. Also, if there are large numbers of missing responses in some of the variables, the effects on results must be discussed.

Response: As requested by the reviewer we have now included all response rates in the methods. The referee suggests that any poor response rates should be discussed. We have added a short section to the discussion identifying that response rates to questions were usually good but identifying the single variable below 85% and potential repercussions of this.

Added to methods:
All individuals answered questions on age and gender as well as those on sources of alcohol consumed (e.g. buy own, parents provide, from adults outside shop). For other variables utilised, completeness of data was: weekly income 88.1%; binge frequency 98.8% and drinking frequency 99.9%. Units consumed per week were only calculable for those drinking at least weekly and for such individuals estimates were possible for 81.2% of respondents. Data completeness for negative outcome dependent variables was: drink outside 100%; drink related violence 95.7%; drink related regretted sex 90.8% and; tend to forget things after drinking 96.6%.

Added to discussion:
Finally, no quantitative measures of compliance were collected from schools and although response rates were high for most questions (>85%), for those drinking at least weekly responses only allowed calculation of units consumed per week in 81.2% of cases. Thus, some selection bias effects could not be ruled out and consequently we have not extrapolated results to population levels.

B3. p.13 3rd para while it is shown that binging is related to greater harm, the discussion on neurocognitive effects presumably based on the ‘memory lapse’ biological interpretation is not shown in this paper.

Response: Given this is a public health paper we felt we had provided adequate references to work relating alcohol to neurocognitive issues. However, we have now added an additional sentence pointing readers to recent work reviewing this issue.

In the discussion:
Such findings are supported by neurocognitive studies, which have found underage heavy episodic or binge drinking to be associated with brain damage as adolescent brains are more susceptible to neurochemical changes, neurodegeneration and long-lasting changes in functional activity [32,40]. However, a recent review of the evidence suggests that the precise risks that alcohol consumption represents to the adolescent brain are still unclear.[41]

Reviewer C: Anette Andersen

C1 I still think the rationale and aim for this study is weak. The authors included a small section presenting “why this study is important” but there is still no section describing what is already known about this subject. I think, that variables included in the analyses should be
Response: We feel that the introduction already provides a strong rationale for why the study is needed as it includes intelligence on the risks associated with alcohol consumption during early teenage years and also the epidemiology of how widespread such behaviours are. However, in line with the reviewer’s suggestions we have now included a new paragraph at the end of the introduction which identifies some key references on what is already known, provides a strong argument for why we chose each of the outcome variables, and also provides details on the variables themselves.

In this paper we examine the drinking behaviours of alcohol-consuming 15-16 year olds and their relationships with a range of adverse alcohol-related outcomes. Thus, based on previous associations between alcohol consumption and violence [29] we examine experience of violence when drunk and how it relates to current drinking behaviours. With greater alcohol consumption at early ages also being associated with sexual risk-taking [30,31], we explore relationships between drinking behaviours and having experienced regretted sex following alcohol consumption. As a proxy measure of potential damage to mental health we analyse associations between drinking patterns and reported tendency to forgetting things after drinking [32]. Finally, to measure effects on others through public nuisance and potentially anti-social behaviour, we examine which drinking patterns are associated with consumption in public places (here outside in streets, shops and parks). Together, analyses are also used to examine potential thresholds for safer drinking and explore factors that may moderate relationships between consumption and immediate harms. Finally, by examining the types of alcohol products individuals consume we also explore which drinking behaviours are associated with consumption of particular products.

C2 How are ‘drink in public places’, ‘drink related violence’ and LSOA measured and coded?

Response: We have altered the first paragraph of the methods to address our measurement and coding (yes/no) of drink related violence.

In the methods:
The questionnaire asked respondents to identify (by tick box) if they had ever been violent or in a fight whilst drunk; whether they had regretted having had sex with someone after drinking and; whether they tended to forget things when they had been drinking alcohol.

Response: We believe we already provide considerable explanation of Lower Super Output Areas (LSOAs). However, we have now increased the description of how LSOAs are allocated and then split into quintiles of deprivation.

In the methods:
Index of Multiple Deprivation (IMD) [31] has been calculated for all Lower Super Output Areas (LSOAs) in England. LSOAs are geographical areas with an average population size of approximately 1,500 individuals and are the smallest areas for which an index of deprivation have been calculated across England [32]. Individuals were allocated directly to a LSOA by full postcode when provided (n=4,158) with postcodes being mapped directly to LSOA geographical boundaries.

Once LSOA was established for each individual, they were categorised into deprivation quintiles according to where their LSOA fell in the list of all LSOAs in the North West ranked by deprivation.

Response: For drinking in public places we have added an additional explanatory sentence to the methods.
Individuals were also asked to identify if they drank alcohol in public places and these were described to respondents as outside in streets, parks or shops.

C3 Not knowing the response rates is a drawback of the study. This implies that selection bias needs to be discussed.

Response: We have added a sentence into the limitations of the study in the discussion.

Finally, no quantitative measures of compliance were collected from schools and although response rates were high for most questions (>85%), for those drinking at least weekly responses only allowed calculation of units consumed per week in 81.2% of cases. Thus, some selection bias effects could not be ruled out and consequently we have not extrapolated results to population levels.

C4 The very beginning of the paper is very broad and generally the introduction does not guide the reader into this subject.

Response: We do not agree with the referee and believe that beginning of the paper provides a public health context to the size and severity of the issues relating to alcohol consumption in those underage. However, we have added a paragraph to the end of the introduction which provides additional background and focus to the reader (see Response to C1).

There is not a consistent nomenclature of the variables, e.g. page 6: ‘lapses in memory’ which I suppose is the same as ‘forget things after drinking’ in the tables.

Response: This has now been changed to forget things after drinking throughout the paper (see Response to B1).

I think that the discussion section would benefit from being ordered in a classical way. Starting the discussion with limitations seems strange to me. I acknowledge that the authors better put the results into perspective, but I think that there is too much description of the results in the discussion section.

We are pleased that the reviewer feels our presentation better puts the results into perspective. We have not reduced the description of the results as we feel that providing this perspective is important to a broad public health audience. However we have reorganised the discussion and placed the limitations at the end of the discussion and before the conclusions.

Comments from the Editors
Please can you also provide the name of the committee that gave ethical approval for this study, within the methods section. Informed consent must also be documented. Manuscripts may be rejected if the editorial office considers that the research has not been carried out within an ethical framework, e.g. if the severity of the experimental procedure is not justified by the value of the knowledge gained.

We have clarified the scrutiny, approval and, voluntary and informed nature of participation in the survey.

Students were informed that participation was voluntary and anonymous and data were collected solely for the purpose of aggregated analyses. All aspects of the research methodology complied fully with the Helsinki Declaration. The survey (run every two years) was established by Local Authority Trading Standards in the North West and was scrutinised and approved by the Trading Standards North West Executive committee and supported by the cross-departmental Alcohol Forum at Government Office North West.