Reviewer's report

Title: Modelling alcohol consumption as a distribution and determining the impact of the distribution on estimated alcohol-attributable harms

Version: 1 Date: 18 July 2011

Reviewer: Deborah Dawson

Reviewer's report:

This paper addresses the topic of how best to adjust alcohol consumption data to optimize the correct estimation of alcohol attributable fractions, i.e., the proportion of different types of diseases that would not occur in the absence of alcohol consumption. Although a number of papers have already been published on this topic, they generally focus on the AAF’s themselves, for a range of diseases in a single population. In contrast, this paper has as its focus a comparison of four different approaches to capturing the consumption distribution and uses data from many countries. The AAF portion of the paper uses a single disease outcome, pancreatitis, as an example to illustrate the impact of the four different consumption distributions. Thus, the topic of the analysis is sufficiently novel to warrant publication, and it is very clearly defined.

The paper includes a full description of the different theoretical consumption distributions, including formulas and commentary about what their parameters mean. It also contains an adequate description of the data sources for the consumption data and citations for information on the consumption questions used in the various surveys. The data used in the analysis are the best data available for the purposes of international comparison, and the issue of controls is inapplicable to this analysis. To the extent that the consumption data underrepresent true consumption (sales data), the paper addresses the issue through upshifting.

The figures provided for countries with diverse drinking patterns were very useful in showing how the three theoretical distributions mapped onto the reported empirical distribution, and illustrated that the fit did not differ as a function of consumption level. However, they might be difficult to interpret if the journal does not allow color figures, as all the lines are quite close together. Although there are a lot of tables and figures, they all seem necessary to illustrate the topic of the paper.

Overall, the quality of the writing is excellent, and the abstract does a good job of conveying the results of the study.

Discretionary Revisions:

1) I think that the paper would benefit from including a little more discussion of how much the consumption questions vary across countries and the extent to which they measure consumption beyond usual quantity and frequency. In what
percentage of the surveys, do the data actually yield useful information to
determine consumption in the far right tail of the consumption distribution?

2) The discussion is balanced and supported by the data, but it would benefit
from some attention to the circumstances under which the AAFs vary and the
meaning of the GADD. In a number of countries, the empirical/categorical AAF
estimates are very different from those derived from any of the models. How can
these differences be interpreted? Do they net out when AAFs are averaged
across countries? And would these differences vary as a function of the basic
risk curve for the relationship of consumption to harm? It seems like more
attention to this question would help to illustrate the need for using a theoretical
distribution rather than the empirical data.

Minor Essential Revisions:

1) The topic of upshifting is included in the Introduction and Discussion, but some
details about how upshifting was actually performed should be added to the
Methods section. Since the term “upshifting” has not yet been defined in the
abstract, it should be replaced with something more description, e.g., to say that
the Gamma distribution can best be adjusted for underreporting of consumption
in surveys.

2) The source of the data on pancreatitis should be mentioned.

3) One part of the Methods section that I found confusing was the statement that
“Numerous subintervals were used n the numerical integration in order to obtain
accurate estimates.” Are the subintervals different from the intervals themselves,
i.e., the volume categories yielded by the survey data? How were these
determined, and did the number vary by country? How many is “numerous”?
Additionally, in the formula for GAAD, it would be helpful to define n – does it
refer to data set?

Level of interest: An article of importance in its field

Quality of written English: Acceptable

Statistical review: Yes, and I have assessed the statistics in my report.

Declaration of competing interests:

I have no competing interests.