Reviewer's report

Title: Variation in the effects of family background and birth region on adult obesity: results of a prospective cohort study of a Great Depression-era American cohort

Version: Date: 22 March 2015

Reviewer: Philip McLoone

Reviewer's report:

1) Multilevel logistic models
The authors have explained why they did not use a random effect models in this analysis and their reasons are acceptable. In any event my impression is that such models would not make much difference to the results and conclusions they present.

2) Persistence of effects. My original comments were not that simple logistic regression was more appropriate but rather that the authors had employed multinomial logistic regression and had presented the analysis as if it were a simple logistic regression. The present use of simple logistic regression does not 'explain' the persistence of birth region effect when the previous multinomial analysis suggested that it had disappeared with time. I appreciate that the baseline comparison category is different in each analyses but either area effects persist or they do not - which is it?

3) Great depression – the authors have addressed my concerns about this. However they state on page 17 that "our findings were that birth region differences in obesity risk were similar to regional differences in the effects of the Great Depression". This paper does not provide an analysis of the effects of the great Depression and differences in obesity risk.

4) Ethnic differences. I accept the authors explanation for not employing ethnic differences in this analysis, but it is an important consideration.

5) The examples of maternal education influencing health-related outcomes appear dated and restricted to developing countries. I would question whether these the most appropriate or relevant examples. The statement that "Greater maternal education, in particular, may be correlated with both a genetic predisposition towards good health" sounds contentious and needs further explanation.

The authors have made substantial changes to make the paper suitable for publication. They have not adequately discussed the limitation of their data, in particular the size of the analytical sample compared to the original sample. However given the changes they have made my overall impression is that while the authors have conducted an interesting analysis they still manage to fail to
convey the ideas involved a clear manner in both the introduction and discussion, and in setting up the hypotheses to be tested in the analysis.

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

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

**Declaration of competing interests:**
I declare that I have no competing interests