Reviewer's report

Title: Comparison of Generalized Estimating Equations and Quadratic Inference Functions Using Data from the National Longitudinal Survey of Children and Youth (NLSCY) Database

Version: 2 Date: 4 February 2008

Reviewer: Rollin Brant

Reviewer's report:

This article demonstrates the potential benefits of a relatively new statistical estimation method (QIF) by applying it to a data set and comparing results with a more widely known method (GEE). Such expositions are valuable in informing quantitative researchers of new statistical developments. The paper is well-written. The data source and inferential objectives are clearly described and a concise overview of the theory, implementation and relative advantages and disadvantages of of QIF is provided.

Major Compulsory Revisions

1. Abstract, p. 3 par.4 You note that the QIF provides a goodness-of-fit statistic. What is known about the power of this statistic?
2. p. 7, par.1 Are the QIF estimates fully efficient in relation to the Cramer-Rao lower bound? If not, in what sense are they efficient?
3. p. 10, par. 1 Statistics Canada provides bootstrap weights as the most valid basis for inference. It is not clear that simply incorporating the longitudinal weight in the "cluster" data analysis will perform as well. I would strongly recommend perform such an analysis and incorporating it with discussion for a more useful comparison of methods.
4. p. 11, par. 2 It would be helpful to the non-statistical reader to describe the characteristics of the provided lorelogram that support the AR(1) structure.

Minor Essential Revisions

1. p. 7, par. 1 squared should be squared.
2. p. 11, last line I am not sure what is meant by the phrase, software output. Are you referring to the fact that available GEE implementations donâ##t provide this test?
3. p. 11, par. 2 The presence of an age trend is noted, but there is no relevant information to support this in either table 2 or figure 2 (which appears to indicate a cohort effect).
4. p. 12, line 2 again, as above?
5. p. 12, line 3 The Q-statistic needs to be explicitly defined.
6. p. 13, par. 4 The numerator and denominator from the previously defined
relative efficiency (i.e. SRE, page 7) have been reversed. You should stick with the original format, so that values of RE greater than 1 favor QIF. As well, it might be noted that the latter two terms and the value quoted represent a multi-parameter generalization of the original definition.

7. p. 16, par. 2 Suggest: "AO and LT conceived the study", "Data acquisition and cleaning were done".

8. p. 16, par. 4 "widely" is redundant.

Discretionary Revisions

1. p. 12, par. 3 Instead of "making the results more reliable" I recommend: "suggesting the results are robust".

2. p. 13, par. 2 Suggested wording - "lower estimated odds".

3. p. 14, par. 2 You note that it would be interesting to examine other proposed goodness-of-fit tests. Have you considered including this comparison in the current paper?

4. p. 14, par. 3 The language describing non-significant effects should be modified, e.g. "have lower estimated risk of developing" instead of "are less likely to develop".

**What next?:** Unable to decide on acceptance or rejection until the authors have responded to the major compulsory revisions

**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