Reviewer’s report

Title: The relationship between the different Low Birth Weight strata of newborns with Infant Mortality and the influence of the main health determinants in the extreme south of Brazil

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Reviewer: Roger Marshall

Reviewer's report:

This paper is an analysis of mortality within the first year of life in a region of Brazil using new-born data linked prospectively to mortality records. The linkage seems, as far as I can tell, robust. It is a broad brush statistical analysis with no particular hypothesis in mind. Perhaps this is a weakness, in that it lacks focus.

The statistical analysis is based primarily on Poisson regression the results of which are presented in Table 2, which is much too large. Details of the regression are scant and need to be improved. For example, it is described as "a Poisson sequential regression". I have no idea what sequential means here.

A Poisson model allows the possibility of multiple deaths! Why not use logistic regression for binary (death) outcome?

Further, Table 2 presents birthweight "strata" as six columns. It is unclear to me what is meant by this. Were separate Poisson models created for each birth-weight band? If so, I would question why the researchers did not develop a single model with birthweight (either as categorical or perhaps preferably actual birthweight) as a predictor variable? It seems only sensible to me to fit 6 separate models if there are clear interaction effects.

Although the time-trend aspect is clearly important to the authors, it is not included in the Poisson modelling. It probably should be.

What are the dots (.) in Table 2 meant to signify?

Other points:
Figure 1 and 2 traces can barely be distinguished in black and white. Dashed or variable width lines would be better. Furthermore, in Figure 1, a log-scale for the vertical axis would be preferable.

"Gross" would better be "un-adjusted" or "crude".

"RI" is in table 2, but presumably you mean IR (incidence ratios)
A simple spline plot of probability of death versus birthweight would be useful.

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