Reviewer's report

Title: Pneumonia and poverty: a prospective population-based study among children in Brazil

Version: 2 Date: 18 April 2011

Reviewer: Robert Hall

Reviewer's report:

Review of Thörn, Minasava et al Pneumonia and poverty

This study provides some useful information on an important topic---the socioeconomic gradient of infectious diseases. The research question is reasonably well defined as an investigation using generalized linear modelling and spatial cluster analysis to determine associations with socioeconomic variables available at census tract level and geographical clustering which can be interpreted using census data and local knowledge. The rationale for the study is clearly presented and reasonable.

The methods are well described. The use of the WHO CXR+Pn definition of pneumonia is clear and makes this study comparable with other studies. It would be reasonable to suspect that many children in the present study had received antibiotics during the course of their illness and this would reduce the sensitivity of a culture-based case definition further. The study population is well described and the flowchart of recruitment clearly describes the recruitment process. Eligibility and recruitment processes appear sound. The authors assert that all clinical services in the geographical area participated, and this should reduce bias. However, it is likely that children from poorer families would be less likely to have a chest X-ray, which may lead to underestimation of the effect of low socioeconomic status on the incidence of pneumonia. Chest X-rays were read by a single author. No sample size calculations were performed.

Data analysis was by generalized linear modelling and spatial cluster analysis using a scan statistical procedure.

For the modelling analysis it is reasonable to use a negative binomial model for overdispersed data like these. It is reasonable to take steps to reduce the effects of multicollinearity. The authors conducted univariate analyses on each variable and built a multivariate analysis from the predictors that were significant.

There was a nearly threefold increase in incidence of pneumonia from the lowest census tracts with the lowest socioeconomic index to those with the highest. The authors constructed their own index of socioeconomic status from variables available from the census. This index appears reasonable. It is an ecological index so there is loss of sensitivity and specificity, but this is a commonly adopted method.
The clustering analysis was done using a scan statistic, probably with SaTScan software. It is a very conventional analysis, and the steps taken appear reasonable. A cluster is detected, in areas where one might expect higher incidences based on the modelling results.

These results are in line with findings of other studies. The authors conclude that their results define areas where immunization should be a priority, but it seems hard not to make immunization a priority for all children. The discussion of the impact of pneumococcal vaccination must be speculative, since no data on immunization are presented.

Overall, this is a worthwhile paper, adding to the body of evidence of the impact of socioeconomic status on health. However, it does not add any new insights.

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

**Quality of written English:** Needs some language corrections before being published

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

**Declaration of competing interests:**

I declare I have no competing interests