Reviewer's report

Title: Community-level Risk Factors for Notifiable Gastrointestinal Illness in the Northwest Territories, Canada, 1991-2008

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Reviewer: Gordon Nichols

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1. The authors are to be congratulated on this interesting ecological study of the social, economic and exposure variables associated with patients with laboratory notified Campylobacter, Salmonella and Giardia infections. The independent variables in Table 1 were linked to the dependent variables, with the linkage mechanism being the smallest community area for which Community Survey data was available. The table 1 data is therefore community based data. Tables 2 to 4 are fine but a large table with the results (case numbers) for the three pathogens and the community risk results needs to precede these so that people can understand the results more easily. In addition Figures 2 to 4 should be put in a single table (emphasising the three different models).

2. The study compares the rate of infection (incidence within the community) with the population based factors. This approach is likely to suffer from ascertainment biases as a result of local differences in access to healthcare, GP testing, laboratory methods etc. and these may influence the outputs. This may be particularly the case in infections within deprived communities, where people who are ill may find it easier to have time off work if they are in well paid employment than if they are paid on a daily or hourly rate. An alternative approach can be to select control patients geographically within the catchment of the laboratory and conduct a geographic case-control study. This approach would control some of the ascertainment biases, although may require more cases. I am not suggesting the authors re-do the study. However, the authors do need to indicate in the paper how the ascertainment bias issue is to be regarded and dealt with in this study.

3. The discussion is interesting and focuses on animal/environmental risks or exposures. There is no real consideration of human sources. I know Canada is the source of the beaver origin of giardiasis caught in the wild, but there is some European data that suggests much of the human Giardia detected is human in origin (not the types normally found in domestic animals). While I am sure some of the Giardia derives from wildlife there is a need to provide a balanced discussion in which human sources are also an issue. Certainly this is likely to be the case in native American people living in undeveloped locations without modern sewage disposal and treatment systems and with untreated natural waters.

4. The use of the term sparing effect is slightly ambiguous and another term might help reader understanding.
5. The two figures look a bit badly drawn and simplistic. If these are to be included then it would be useful to add a bit more explanation to the descriptions on page 26 and to re-do the figures.

6. The report shows an association (negative) with food price and Campylobacter, but also indicates that prices are higher the further north the communities are. Is the association really to do with the price or the latitude?

7. The use of the term underreporting bias is not adequately explained.

8. There is no discussion of the giardiasis cases and moving around. Is this a function of greater exposure to natural waters or untreated drinking water?

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

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.