Author's response to reviews

Title: Deprived Children or Deprived Neighbourhoods? A public health approach to the investigation of links between deprivation and injury risk with specific reference to child road safety.

Authors:

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PDF covering letter
I would like to thank the referees for their detailed consideration of this paper. The paper has been substantially rewritten in the light of these comments. I trust that with these revisions incorporated the paper will now be considered acceptable.

Marjan Drukker

General
I have expanded the explanation of the models used in order that it would be possible to replicate the analyses.

Major problems
The interest in terms of the nature association between deprivation and casualty rate relates to the preventative measures that would follow. If the association is strongest between the home postcode deprivation and casualty rates, the various behavioural interventions would seem important. Conversely, if the location of the collision is important, environmental modifications would seem more important. The point of this paper is therefore to highlight the potential for this confounding, and to determine the strength of evidence for resolving the issue. The explanation regarding this issue has been clarified in the paper.

Evidence has been given that Devon is typical in terms of non-metropolitan authorities in England in the paper, and therefore a reasonable place to carry out such a study.

Major Compulsory Revisions
1. The abstract has been completely re-written.
2. The objective of the study has been clarified, and this is stated clearly at the end of the introduction
3. The methods and results section have been re-organised.
4. The results and the introduction section have also been re-organised.
5. Discussion of results is restricted to the discussion.
6. Explanation of the parameters in the table is now given.
7. Document has been written using the BiomedCentral Word template.

The deprivation indices are now described.
The mixed models used are robust to the outliers seen, and this has been confirmed by jacknifing. Abbreviations have been spelt out in full, and included in a list towards the end of the paper.

Discretionary revisions.
The tables have been re-organised, diagnostic measures of model fit have been reduced and tidied, and less significant places have been used.

Minor essential revisions.
Thank you for pointing these out, these have been removed in the rewrite of the paper.

Andrea Madarasova Geckova

General
The manuscript has undergone major revision.
The research question is formulated at the end of the introduction.
Methods are described in more detail.
Abstract has been totally rewritten, methods and results sections have also undergone major revision.

Discretionary Revisions
Spell-checker has been applied.
Title has been amended.
Authors notes removed from references
Abbreviations explained
Language errors have been dealt with in the re-write.

**Major Compulsory Revisions**
Abstract has been totally rewritten
Introduction now finishes with a formulation of the research question.
Data section is improved, contextual information is given on Devon County, and also data sources and methods of data capture.
Table and figures have been improved as discussed.
Models section now describes the models used. The mathematical formulation remains as another reviewer expressed doubts that enough details were included to allow the analysis to be reproduced. Results section has been fully rewritten.
Conclusion section has been rewritten and broken into discussion and conclusion. The idea of using urbanicity as a variable to correct for (one aspect) of the ecological fallacy has been discussed, so that the central question of deprivation remains.
Any epidemiological investigation of aggregate data will be prone to the ecological fallacy. The use of a binary variable for urbanicity is precisely to investigate one possible source of this bias, and to demonstrate the effect of modelling it out. However,
The danger of over-reliance on AIC is accepted, and the paper is now much more cautious about the potential to over-interpret the results. Visual diagnostic model fitting procedures have been carried out and these are now referred to.
Better explanation of the mixed effects in the model is given.

*Olivier Duperrex*

**Minor essential revisions.**
Systematic reviews have been referred to in the literature.
Table 1 has been clarified.
Language problems have been addressed by rewriting the paper
To avoid confusion I have made it clear where ward specific casualty rates have been aggregated with respect to the ward in which the collision occurred (the casualty was injured) or aggregated with respect to the ward in which the casualty was reported resident. The word "aggregated" has been emphasised, to make it clear that the principle difference is the way the data is aggregated, and that it is essentially the same data.
Personal comments have been deleted from references.

**Major compulsory revisions.**
A definition of ward, and population details have been given (as well as an explanation of the context of Devon), the numbers of wards, the numbers of casualties and the numbers of casualties for whom home postcodes are available. In the interests of data protection, results of missing data are not given in detail, but the scale of the problem is described in general.
Centroid of postcode has been avoided.
Collision has been used to refer to the incident in which a child was injured, casualty has been used to refer to the child who has been injured.
Urbanicity is a binary indicator following an official definition, this is referred to in the paper.
Fuller details have been given on the composition of the index of Child Deprivation.
The conclusion is cautious about over-interpretation of these results, suggestions are made as to how the results should really be confirmed before being used.