Author's response to reviews

Title: What type of rural? Assessing the variations in life expectancy at birth at small area-level for a small population province using classes of locally defined settlement types.

Authors:

Mikiko Terashima (mikiko.terashima@dal.ca)
Judith Read Guernsey (jrg@dal.ca)
Pantelis Andreou (pantelis.andreou@dal.ca)

Version: 5 Date: 12 January 2014

Author's response to reviews: see over
Dear Editorial board,

Thank you very much for the opportunity to submit the revised manuscript entitled “What type of rural? Assessing the variations in life expectancy at birth at small area-level for a small population province using classes of locally defined settlement types.”

We trust that all the points made by the reviewers have been addressed and reflect in the revised manuscript. The following are the responses to the Reviewers’ comments. If there is any question, please kindly let us know. We would be happy to provide further information.

Sincerely Yours,

Mikiko Terashima on behalf of the authors.

---

Responses to the Reviewers
The comments by the reviewers are in Arial, and our responses are in Times New Roman.

Reviewer 1: Christopher Stevenson

Reviewer's report:
This study presents an interesting examination of variation in life expectancy by small geographic area. The questions posed are well-defined and the statistical methods well-described and appropriate. I have only minor revisions to suggest.

Minor Essential Revisions
Methods—Area units and life expectancy at birth
1. The authors cite a paper by Adekola in support of a denominator size of at least 5,000, but the cited paper does not address the issue of denominator size.

<Response 1-1>
Indeed, the citation needs to be corrected. The literature we meant to refer here is that of Eayres and Williams (2004) and it has been corrected.

2. The citation of the Chiang method needs a reference

<Response 1-2>
The citation was added.

Methods—Statistical analyses of associations between the five settlement types and life expectancy at birth

3. Treating the settlement type as a continuous variable implicitly assumes that settlement type can be considered as interval data – ie that the interval between any two settlement types is equal. This means, for example, that the impact of mean life expectancy in going from type 1 to type 2 is equal to the impact of going from type 6 to type 7. Is there evidence that this is the case? This should
be addressed in the discussion of limitations.

<Response 1-3>
We agree with the reviewer’s point. As the results show, the settlement type as a continuous variable was statistically significantly associated with life expectancy for females, but not males. The subsequent models using categorical variables describe that the effect of ‘rurality’ is not gradient along the urban-rural continuum, and the impact going from type 1 to type 2, type 2 to 3, 3 to 4 etc., is not equal, despite the statistical significance of the first model with settlement type as a continuous variable, seen in females.

Therefore, the result rather confirms the reviewer’s point that the impact by increase in rurality is not the same by each interval. We doubt that even if we somehow create the intervals of rurality quantitatively equal between each other, it will not show the gradient in impact from the most urban to the most rural. As such we incorporated the reviewer’s point and stated as the following:

In Methodology (Page 10, last paragraph in Methodology)
“While treating it as continuous, the gradient of rurality does not measure precise, equal intervals and only shows general ranking of how rural these types are. However, it was employed for a purpose of comparison with models that treat settlement types as a series of unique categories.”

In Discussion (Page 13, second paragraph in Discussion)
“In general, life expectancy at birth was lower for both females and males in rural communities in Nova Scotia, which was consistent with previous studies [4, 8]. The differences by settlement type were not very clear, except for suburbs being advantageous for both genders, and villages and settlement clusters being a disadvantage for females, suggesting that the impacts on health are not necessarily gradient by the level of rurality.”

Figure 2 - title
4. The title to figure 2 does not mention the measure of social isolation.

<Response 1-4>
The title was corrected to:

Figure 2 – Mean quintile score of material deprivation (left) and social isolation (right) with 95% confidence intervals among settlement types

Abstract paras 1 & 3; discussion paras 1, 2 & 3
5. The study focuses on life expectancy. However, the authors refer to their outcome variable in more general terms as ‘health outcomes’ (in the abstract and discussion) and ‘health status’ (in the abstract). This is confusing and should be avoided.

<Response 1-5>
The terms ‘health outcomes’ and ‘health status’ were changed to life expectancy in the respective sections indicated by the reviewer, with an exception of discussion paragraph 2, in which the term was simply deleted.

Discussion
6. The adjusted R2 values for the regression models are very low (less than 12% in all cases). This suggests that none of material deprivation, social isolation or settlement type are drivers of the difference in life expectancy. This should be raised in the discussion.

<Response 1-6>
We agree. The modest proportion of variance explained by ecological-level factors does suggest that variance that is unexplained needs to be further investigated by accounting for factors, including compositional effects (concentration of certain individuals). The following sentence was added (Page 15, first paragraph) to the discussion of limitations:

“The modest proportions (no more than 12%) of the variance in life expectancies across communities explained by the community-level factors also suggest the importance for further investigating other factors such as the clustering of individual characteristics.”

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

Reviewer 2: Alison Beauchamp

Reviewer’s report:
This paper contains an important analysis of differences in life expectancy by settlement type in Novia Scotia. As the authors note, the conclusions are limited by the lack of data on individual risk factors; nevertheless, this ecological study provides the basis for further analysis of the factors that contribute to urban/rural disparities in life expectancy.
There are minor amendments only:

Background:
1. Page 4, paragraph 2, line 8 - please remove the question mark from the middle of the sentence.

<Response 2-1>
The question mark was deleted.
2. Page 5, paragraph 2, line 1 - should read 'definitions of rurality provide'

<Response 2-2>
The correction was made to ‘definitions of rurality provide...’ from 'definition of rurality provides'.

3. Page 6, para 3, line 2 - what does the phrase (that are meaningful) mean?

<Response 2-3>
Since the phrase was ambiguous, it was deleted and instead the subsequent sentence was amended as the following to clarify what it was intended to say (starting with Page 6, para 3 line 3):

“This study utilized area units that were designed in consultation with local planning officials to correspond to generally perceived 'community' identities and encompass both urban and rural areas.”

**Methods:**
These are generally clear, particularly around the description of how communities were allocated.

4. Page 9, para 1, line 2 - please briefly explain why minimising within group variance in important in this context

<Response 2-4>
The following description was added:

“[Geometric intervals are a statistical classification method which minimizes within group variances[28]], making each group as homogeneous and unique against each other as possible.”

5. Page 9, para 1, line 3 - Please define ‘choropleth’

<Response 2-5>
Because the type of geographical map (such as choropleth) is not important in the context of describing how the settlement type classifications were identified, the term choropleth map was removed and it was rephrased as the following:

“Second, a community map describing the classification was overlaid with the satellite image on Google Earth...”

6. Page 10, para 2, line 7 - The words 'with other types as dummy variables' are not needed.

<Response 2-6>
The above phrase was deleted.

7. It is not made clear why age or birth cohort were not adjusted for in analysis.
The material deprivation and social isolation measures were adjusted for age and sex, with the province as the standard. The following was added (page 9, last paragraph, line 1):

“[Two indices of community deprivation were calculated for the 180 communities], adjusted for age and sex compositions based on Nova Scotia as a standard.”

Results:
8. Page 12, para 2, line 8 - please amend the sentence to "....was observed and this was not...."

The sentence was amended to:

“No interaction between material deprivation and social isolation was observed and therefore it was not included in the models.”

Level of interest: An article of importance in its field
Quality of written English: Needs some language corrections before being published
Statistical review: No, the manuscript does not need to be seen by a statistician.
Declaration of competing interests:
I declare that I have no competing interests