Reviewer's report

Title: A Cross-Sectional Study on Health Differences Between Rural and Non-Rural Counties Using the County Health Rankings

Version: 3 Date: 27 January 2015

Reviewer: Jennie Hill

Reviewer’s report:

Major Compulsory

Introduction—
1) The introduction is quite diffuse and would benefit from a sound conceptual framework. In places, the authors discuss health ‘outcomes’ and ‘determinants’ interchangeably. They are also fuzzy when reviewing literature for morbidity versus mortality. Further they topics of each paragraph range from mental health, to physical environment, to health behaviors, to injuries, etc without much connecting them.

I might suggest leading off with an introduction to the County Health Rankings in paragraph 2 to help set the stage for your reader. You might then review literature related to rural/urban health outcomes for each category the Rankings (health behaviors, clinical care, social/economic and physical environment).

2) Many statements are without references and that is not really acceptable for a scientific publication.

For example, Line 27, ‘There is a disparity in health, access to and the quality of healthcare between rural and urban areas in the United States’. Also line 30, ‘The literature indicates that variances exist in numerous measures and indicators of health’

There are several federal reports and research studies to support both of these statements and they should be cited.

3) Lines 77-78, it seems there needs to be references for the Rankings and sources of data and/or information about the rankings.

4) Line 29—there are additional references that document the differences in rural/urban definitions

Methods:

1) Lines 87-88; references for rankings should be cited
2) Lines 87-88: please provide a justification for the selection of quartiles? What was the possible range of performance for each indicator or overall? .
3) Lines 90-94 references needed for MSA.
4) Line 90-92—additional explanation for the readers on MSA (especially an international readership who may understand USA census data) and justification for selected of MSA.

5) Why did you choose MSA as the rural/urban definition to use? Versus other rankings available such as RUCA codes?

6) Line 95-96: here you list 6 indices from the Rankings, yet not all of these are clearly explained in the introduction (another point related to introduction). There is a lot more information on the Rankings website about data/data collection/methods that could be provided to aid the reader or at least accurately explain your data.

7) What covariates are included in the models?
8) Did you test for confounding in the models since your indices are likely to be correlated?
9) How are economic factors related to the counties accounted for? Is race, education or income accounted for in your models or in the County Health Rankings. It isn't clear if there is a representative sample within each county for that county or what is the level of aggregation for the data.

10) since counties are nested within states, it seems that counties (rural or urban) within a state might have differences on indicators that could be accounted for at the state-level. Or that some other factor such as poverty (rural poor and urban poor may be similar?).

Results

Results Table 1:
Footnote indicates that the indices include variables that are weighted, yet there is no description of the weights or weight factors in the methods. Even if this is done by the Rankings data it should be made clear to the reader.

Line 104—use of ‘disparities’ did you test for disparities or test for differences between rural and urban?

Overall results: why no discussion of the gradient within county type? You have differences at the between rural and non-rural but you also have a distribution within rural and within urban. This seems to be relevant to some of the conclusions drawn about Table 2. If there is also a gradient within rural only counties, there must be other explanatory factors in addition to rurality?

Discussion/Conclusions

General: The authors draw several conclusions and make several inferences to determinants or causes for the differences in the data that are beyond the
boundaries of the data analyzed and presented.

Lines 123-140—how do these relate to the literature cited in the introduction? How does it align with the currently literature on rural health for the outcomes measured by the Rankings?

Line 136. You don’t present data related to states that do or do not expand Medicare? I don’t know that you can draw this inference based on the data presented.

Line 143, the authors discuss healthy eating, food cost and access to food—yet there is no data in their models (or it is indexed as part of an overall score) to support these statements. The only conclusion the authors can make from their analysis is that the index for health behaviors was significantly different. They do not present statistical analyses to tell us which determinant within that index might be the most important.

Line 156: can authors speak specifically to limits of using MSA versus other definitions?

**Level of interest:** An article of limited interest

**Quality of written English:** Acceptable

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

**Declaration of competing interests:**

No competing interests