Reviewer's report

Title: Rural-Urban and Racial-Ethnic Differences in Awareness of Direct-to-Consumer Genetic Testing

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Reviewer: Brenda Wilson

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Rationale/aims:

This paper addresses a simple question about differences in self-reported awareness of direct-to-consumer (DTC) genetic tests between populations which differ according to urban or rural residence or self-declared race/ethnicity status. A secondary analysis examined self-reported sources of information in respondents who indicated they were aware of these tests.

I suggest that the title of the paper is potentially misleading, as many readers would take it to refer to awareness of genetic testing health services. It is not technically incorrect, but the terms 'direct-to-consumer' genetic tests, or 'consumer genetic services' would be more informative. I have further comments on the focus in my comments section below.

Methods/Results:

The data were derived from multiple cross-sectional population-based surveys, and the analyses were adjusted for the most important demographic factors such as gender, education level, and household income. Predicted marginals were reported for race/ethnicity group stratified by urban/rural residence.

The key finding was that, after adjustment, rural residents were less likely than urban residents to be aware of direct-to-consumer tests, and that an urban-rural difference was observed across the four race/ethnicity groups examined. The secondary analysis suggested no differences between
urban and rural residents in the reported information sources on genetic tests, for those who reported awareness.

Comments:

At one level, this is a fairly straightforward and uncomplicated study with trustworthy data and apparently appropriately conducted analyses. The work was limited by the original dataset - really, responses to a single question. But it has strength in its population based approach. I liked that the authors presented predicted marginals rather than just p-values but I would suggest that the y-axis in Figure 1 be reworded to be more informative to readers unaware of this approach - indicating that these are meant to indicate adjusted awareness rates in the defined population groups would facilitate comprehension for some readers.

I also found myself wondering about interactions within the dataset - were any of the variables for which the data were adjusted in fact possible effect modifiers? (I don't think this is handled within the analysis strategy used.) Might there be a potential interaction between urban/rural residence, race/ethnicity and gender? It may be beyond the scope of the work, or perhaps there are space limitations in what can be reported.

For Table 1, a minor style point is that the "%" symbol should not appear in every cell if it is indicated in the column heading ("n (%)"). Table 2 needs the heading to be better specified - the cells under "information sources" are percentages but this is not directly indicated.

However, my most important comment is that the paper needs to be clearer about how awareness of DTC genetic tests is linked into a larger argument about precision medicine, underserved populations, and health disparities. A DTC genetic test in itself is not a substitute for a precision medicine approach to risk assessment, prevention, diagnosis, or disease management. The authors themselves state in the introduction: "...the rapid growth of direct-to-consumer (DTC) genetic tests has led to important concerns related to knowledge gaps in their clinical validity and utility, the potential for consumer misrepresentation of results .... and the possibility of widening health-related disparities." I don't see that they can then argue that DTC tests (at present, at least)
represent potentially "[m]ore inclusive approaches for measuring disease and susceptibility" or "better assessment of population health" (Conclusions).

I would suggest that the paper would be greatly improved by reconsidering the relationship between awareness of DTC genetic tests, the goals of precision medicine, and population health goals of improving healthcare access and reducing health disparities. No new analyses would be required.

**Are the methods appropriate and well described?**
If not, please specify what is required in your comments to the authors.
Yes

**Does the work include the necessary controls?**
If not, please specify which controls are required in your comments to the authors.
Yes

**Are the conclusions drawn adequately supported by the data shown?**
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No

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