Reviewer's report

Title: Low-moderate arsenic exposure and respiratory health in American Indian communities in the Strong Heart Study

Version: 0 Date: 08 Jul 2019

Reviewer: Todd Everson

Reviewer's report:

The authors present an interesting study of how arsenic exposure is associated with respiratory function among a sample of different American Indian communities. They found that higher concentrations of arsenic were associated with a number of indicators of respiratory impairments, including obstructive/restrictive patterns, as well as decreased function (FEV1 & FVC). This is well-written, and the data support the authors' conclusions. This is an important and well-done study, performed in an underrepresented population, that would be of great interest to the readers of Environmental Health. I would recommend it for publication and only have minor suggested revisions:

1. Methods/Results: did the authors explore whether the different American Indian communities had similar exposure-response patterns either through testing for an interaction or stratified analyses? It would be interesting to know if the responses are similar across those different communities which may have differing sources of As exposure, different potential confounding structures, and/or different susceptibilities to As effects on respiratory outcomes.

2. Lines 132: please clarify if the self-reported respiratory diagnoses include prior diagnoses, current, or both.

3. Lines 182-184: Rather than just saying "full adjustment", say what as adjusted for here.

4. Lines 184-186: This statement "comparing interquartile range of arsenic" sounds like a factor variable, but I thought it was a continuous variable. If it is continuous, say "for an interquartile range increase in arsenic".

5. Lines 186-187: Figure 1 is mentioned here, but only briefly, and the text description doesn't adequately describe what is being tested or presented. Please describe these results more thoroughly, and/or reference this figure when you discuss the effect modification results (lines 208-215).

6. The use of splines to assess non-linearity feels very descriptive rather than analytic. Can the authors perform a test as to whether the spline models describe the data better than the IQR-linear models, perhaps a likelihood ratio test?

7. Lines 283-285: I also wonder if former smokers have some residual lung tissue damage or immune dysfunction, that would make them more susceptible to toxic effects from As or other risk factors for impaired lung function. Is there any literature supporting this hypothesis? a little more discussion about why non-smokers might be susceptible to the respiratory impacts of As would be nice.
Level of interest
Please indicate how interesting you found the manuscript:

An article of importance in its field

Quality of written English
Please indicate the quality of language in the manuscript:

Acceptable

Declaration of competing interests
Please complete a declaration of competing interests, considering the following questions:

1. Have you in the past five years received reimbursements, fees, funding, or salary from an organisation that may in any way gain or lose financially from the publication of this manuscript, either now or in the future?

2. Do you hold any stocks or shares in an organisation that may in any way gain or lose financially from the publication of this manuscript, either now or in the future?

3. Do you hold or are you currently applying for any patents relating to the content of the manuscript?

4. Have you received reimbursements, fees, funding, or salary from an organization that holds or has applied for patents relating to the content of the manuscript?

5. Do you have any other financial competing interests?

6. Do you have any non-financial competing interests in relation to this paper?

If you can answer no to all of the above, write 'I declare that I have no competing interests' below. If your reply is yes to any, please give details below.

I declare that I have no competing interests

I agree to the open peer review policy of the journal. I understand that my name will be included on my report to the authors and, if the manuscript is accepted for publication, my named report including any attachments I upload will be posted on the website along with the authors' responses. I agree for my report to be made available under an Open Access Creative Commons CC-BY license (http://creativecommons.org/licenses/by/4.0/). I understand that any comments which I do not wish to be included in my named report can be included as confidential comments to the editors, which will not be published.
I agree to the open peer review policy of the journal