Reviewers report

Title: Association of Low-level Blood Lead with Serum Uric Acid in U.S. Adolescents: A Crosssectional Study

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Reviewer: Alan Ducatman

Reviewers report:

This publication can add useful information to the literature for the research audience interested in the relationship of blood lead to uric acid. I have the following comments to the authors.

General Comment Concerning the Manuscript: In the introduction and elsewhere, there are intermittent, recurrent, and mostly minor issues with English expression. The first sentence is an example. The word "their" should be "its" or even "the." The sentence that begins on line 62 has a syntax error in the initial phrase and subsidiary phrase that is an incomplete thought. There are also misspelled words in parts of the manuscript. The authors could use the support of a grammar/spell checker, or a colleague whose English is stronger.

Introduction:

A poorly supported statement is "Individuals in the general population are increasingly exposed to lead." There are two problems with the statement. First, it is not correct, the opposite is more correct, although there are some geographic exceptions. And, the referenced article does not support the statement, it features US data and states the opposite of the quoted sentence about the US. The problems could be due to language issues, it is a challenge (and an admirable effort) to write a paper in nonprimary language. The authors are asked to be sure that all references fully support associated statements.

The statement beginning on line 67 "hyperuricemia is increasingly prevalent among children and adolescents in the United States" 15, 16 is not well supported by at least one of its references (15), which is a prevalence study and does not address temporal change. In general, the authors need to be more precise, about aligning their text with the supportable information form references. (Again, this may be due to language and need NOT be interpreted as something more serious, but is a nevertheless a problem in need of fixing.)
Methods:

Line 115: I think the authors are trying to say that Covariates were selected based on sensitivity-tested associations of greater than 10% mean uric acid values. However, I do not know for sure what the sentence actually says, it is not clear.

Results:

The quartile ranges for blood lead are population distinctions without much real difference at the individual level. A blood lead of 1.9ug/dL (the start of quartile 4) is not that different from the background mean population value. This has implications for methods, and may suggest a decile approach (in addition to the quartile approach already used) as an additional useful comparison.

Discussion:

The sentence "few population-based studies to date have examined the relationship between BLL and SUA" is not justified. A brief search using key words followed by a reference check of the most relevant findings contradicts the statement. There are plenty of studies that address this topic in general, and this sentence should be omitted. However, the authors do appear to be justified about the thought that there are few papers that do a good job addressing adolescents at this low level of mean population exposure to lead.

The association to lower eGFR is expected, and the authors should discuss predecessor literature in more depth. Krishnan's 2012 PLOS ONE paper from the same data set is helpful in this regard, showing that lower eGFR leads to higher serum blood lead, and should probably be cited. (the association may be bidirectional since lead at much higher levels of exposure is a known nephrotoxin.)

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