Reviewer's report

Title: Low-Level Environmental Lead Exposure in Childhood and Adult Intellectual Function: A Follow-up Study

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Reviewer: Bruce Lanphear

Reviewer's report:

This well-written and succinct manuscript, which is about the long-term relationship of childhood lead exposure and cognitive functioning in young adults, is of scientific and historical interest. From a scientific perspective, it provides evidence that the effects of lead are indeed persistent, albeit with limitations of small sample size and confounding with maternal intellectual abilities. From a historical perspective, this cohort was particularly influential in experts concluding that children were especially vulnerable to peak blood lead levels, which typically occur at about 2-years of age. It is of particular interest because more recent studies -- which were cited and nicely described in this manuscript – indicate that the exposures that occurred between 5 to 7 years of age were more strongly associated with children’s intellectual abilities.

Introduction:

The authors should consider describing how this study was instrumental in experts concluding that the 2-year blood lead concentration was the key blood lead variable for predicting subsequent intellectual abilities at 10-years of age. It adds some additional interest, especially for the cohort of young investigators who unfamiliar with the history of lead research.

Page 8, last paragraph, Results: It would be helpful if the authors provided the confidence limits, the p value or both in the text when describing how inclusion of maternal IQ affected the relationship between Full-Scale IQ and average childhood blood lead levels.

The authors should consider conducting two additional secondary analyses. (I realize that is stretching the limits of sample size, but it would be unfortunate if the authors didn’t at least explore these two secondary analyses.)

The first analysis would test whether the pattern of exposure is an important modifier of lead exposure (see: Hornung, EHP 2009). This could be done by simply adding the ratio of the 10-year or 4-year blood lead concentration over the 2-year blood lead concentration to the model with average childhood blood lead concentration.

The second analysis would be to explore the relationship between Full-Scale IQ and average childhood blood lead levels for the subjects who had a blood lead concentration < 10 micrograms per deciliter.
**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

I declare I have no competing interests.