Reviewer’s report

Title: Lead, mercury and cadmium in umbilical cord blood and its association with maternal epidemiological variables and birth factors.

Version: 1 Date: 14 June 2013

Reviewer: Dallaire Renee

Reviewer’s report:

Discretionary Revisions
1. There are some words that I would propose to change in this paper; 1) Study level # Education level, 2) Race # Ethnicity

Minor Essential Revisions
2. All around the text, there is editing that need to be done. I will suggest to the principal author to carefully revise its paper before submitting to a journal.
   - Please make sure that there is always a space before and after the references.
   - A space is always necessary after a period.
   - The author wrote the word birthweight and birth weight.
   - P. 7, there is two A at the word Analyst
   - P. 8, please numbered the statistical analysis section.
   - P. 10, second paragraph, should add gr after 3282.
   - P. 11, last paragraph, Doi et al, 1984. Please review all the references along the text. The year of publication is missing for some references.
   - P. 13, third paragraph please put a comma after the words In Spain.
   - P. 14, second paragraph, I don’t understand the term “only more study”.
   - Table 1, Fish intake, please add g/day for the category 60-100 g/day.
   - Table 1, there are p-value <0.05 with asterix and some not.
   - Table 2, the word cadmium has two “m”.
   - Table 2, in the footnote, please put a period after the parentheses.

3. Introduction section:
   - Please add references for the statement: “Occupational exposure to mercury has been associated with pregnancy-induced hypertension, low birthweight and birth defects.”

4. Material and methods section:
   - P. 6-7, because birth weight and birth length are used as outcomes in the statistical analysis, the description of the methods for measuring them should be specifically included in the paper. Please mention if several measurements were
done for each anthropometric parameter and if so, how these measurements were handled in the statistical analysis?

-P. 7, Instead of saying that the sample size was 318 participants (106 mothers, 106 fathers…), the author should state that the sample size was 106 complete trios. It’s the trio that is important, not the sum of the newborns, mothers and fathers.

5. Results section:

-P. 10, first paragraph. The mean age of 32 years, is for the mothers, the fathers or both. The mean age should be presented separately for mothers and fathers.

-P. 10 third paragraph. The author state that 15% of the samples were under the limit of detection for cadmium, while on p.7 she said that 47% of cadmium samples were below the limit of detection.

-P. 10, fourth line of third paragraph. How could geometric means for cadmium in cord blood range from 0.23 to 0.31 ug/L if the detection limit is 0.25 ug/L? Also in Appendix A, the p25 is below the detection limit for cord blood and fathers. The author should indicate <LD instead of a concentration. Was the author replaces the concentration of cadmium below the limit of detection by half the detection limit for the analysis as mentioned in the statistical analysis section? The presentation of GMs with levels below the detection limit gives the impression that this was not the case.

6. Tables

-Usually geometric means are not presented if more than 40% of samples are below the detection limit. This is the case for cadmium according to what is written on page 7.

Major Compulsory Revisions

7. I have one major concern with regard of this paper. The authors never explain how was made the selection of potential confounders. It’s seems that the choice of adjusting for specific variables in multivariate models was arbitrary. For example, in the model for birth weight (Table 2) why cigarette smoking was included in the model for mercury and cadmium, but not lead, as we know that maternal cigarette consumption is a risk factor for low birth weight. Also, the authors never discuss of potential bias in their results that could be related to the absence of adjustment for important variables (maternal alcohol consumption, socioeconomic status, obstetrical history, …).

8. Concerning the discussion section, a lot of statements should be referenced. I found that the literature reviews was minimal. There are a lot of studies that were published on the potential effects of heavy metals on birth outcomes, but they were poorly discussed in this paper.

9. The authors report an association between cadmium and Apgar score, but did not propose a biological explanation (biological plausibility) for this association. They mentioned that Mokhtar et al., had also evaluate the association between cadmium and Apgar, but we do not know what was the finding.
10. Finally, the originality of this paper lies in the fact that they measured heavy metal concentrations in fathers. A lot of studies have documented the relation between maternal and cord concentrations of contaminants, but few with fathers. This should be discussed, even if there are no statistically significant associations. This finding is worth to be discussed.

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

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

**Declaration of competing interests:**

I declare that I have no competing interests.