Reviewer's report

Title: Maternal occupational exposure to polychlorinated biphenyls and the secondary sex ratio

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Reviewer: Germaine Buck Louis

Reviewer's report:

The authors are to be commended for considering how a potentially occupationally exposed sample of women could be utilized to assess the lingering question regarding the relation between EDCs, specifically PCBs, and the secondary sex ratio. As the authors recognize, assessment of the secondary sex ratio requires consideration of parental ages and gravidity, or at a minimum, parity and plurality of birth. To this end, a complete reproductive history is required. Since the sex ratio is determined at conception, it is important to consider gravity if exposure affects pregnancy loss (as some literature suggests), and to be able to quantify exposure prior to conception.

Major Revisions

The key limitations of this study are the lack of individual exposure data (or pooling techniques using biospecimens) and a complete reproductive history for all exposed women irrespective of birth order (which can be considered in the analysis). While the new matrices are an improvement over past proxy approaches, there is still the potential for considerable measurement error inherent in this matrix and given that PCB exposure occurs through other routes not addressed by the authors. The so-called unexposed women seem to include women with background PCB exposures, at least through occupational routes, and women with no known exposure assuming that these women have no background exposure from other sources.

The analytic plan requires further consideration to accommodate the distinct differences in the sociodemographic women by occupation site, the competing direction of sex ratios by maternal characteristics and exposure status (Table 2), and further attention to a possible site effect in the logistic analyses, given the apparent marked differences in sample composition (Table 3). If I understand Table 4 correctly, the analyses are stratified by site lowering statistical power rather than including site in the model. The very distinct prevalence of male births by site requires a more carefully explored analysis.

Minor Revisions

- The voluminous body of demographic literature on sex ratio reflects that maternal age and also paternal age are the most consistent determinant of secondary sex ratio at the population level. Is paternal age available?
- Might want to consider recent papers assessing PCBs and Y chromosome
(Tiido et al., 2005, 2006) for biologic plausibility.

• It would be helpful to have a more complete description how reproductive histories were obtained, particularly if gravidity (# pregnancies irrespective of outcome) is available to assess potential competing risk of PCB and pregnancy loss. Also, not clear how much proxy reporting of reproductive history was included in the sample.

• Further consideration of the “unexposed” women is needed, particularly the comment that this could include women who did “…not work in an area of the plant where no PCBs were ever used prior to conceiving… or not have worked in the plant until after the conception.” Page 8. It would seem that exposure classification is after the even for the latter women.

• The rationale for excluding preterm births (for which gender is known) or women with low BMIs is not fully supported.

**Level of interest:** An article of limited interest

**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 that I have no competing interests