Reviewer's report

Title: Polychlorinated Biphenyl Exposure, Diabetes and Endogenous Hormones: A Cross-Sectional Study in Men Previously Employed at a Capacitor Manufacturing Plant

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Reviewer: Carissa Rocheleau

Reviewer's report:

This is a very interesting cross-sectional study in which correlations between various biological measures and blood PCB concentrations were examined in a cohort of men who previously worked in an electrical capacitor plant. This work would likely be of interest to those in diabetes research, those studying the potential health effects of endocrine disrupting chemicals, and those studying PCB toxicology and exposure assessment. This latter group appears to have been overlooked by the author, but industrial hygienists and occupational epidemiologists involved in PCB studies would be quite interested in the correlation between PCB levels in blood and quarters worked at the plant and EUC job score.

Major compulsory revisions:

1. Page 4: According to the methods, 191 former plant workers and 26 community residents agreed to participate. Five men were excluded for taking thyroid or steroid medications. The study only contains data for 63 men. What happened to the other 149 men who agreed to participate?

2. Several results were summarized as “no significant relationship” with the data not shown, even when the results were only marginally non-significant. This was a fairly small sample size, so was likely a little underpowered. It would be very informative to see the magnitude and direction of association; I suggest that these at least be placed in a supplementary table.

3. Page 5: hazard score is used for the first time here, without being defined. Is this the EUC job score?

4. Were alcohol and BMI truly treated as ordinal variables (in which case the magnitude of effect between each level is assumed to be the same, ie the difference between level 1 and 2 is the same as between 2 and 3) or as categorical variables? I think categorical would be much more appropriate, as it does not constrain the relationship between categories the way treating it as an ordinal variable would.

Minor essential revisions:

5. Controls were people who lived near the plant. They might consequently have
high environmental PCB exposure. How did their blood PCB levels compare to population controls who did not live next to a capacitor plant?

6. The data in table 4 is presented oddly; I spent a great deal of time trying to figure out how/what data was being presented. Changing the title (Multivariable models of diabetes in men: odds ratios and confidence intervals for PCB exposure, age, BMI, and lipids) and headings might help.

7. I think it would benefit from a careful editorial review, preferably a fresh set of eyes (we all tend to start reading what we meant rather than what we wrote after a while). I noticed many sentences have multiple different comma-delimited clauses (for example, a compound sentence with an introductory clause that contains a subjunctive clause), which creates confusion (and is grammatically incorrect). The subject material is quite complex, so very clear language is important. I could not take the time to mark all of these, but as an example:

“Gender differences were also seen in Canada where PCBs were inversely associated with T3, but not T4 in women, and inversely associated with T4 in men.”

From this sentence, it is unclear whether T3 was inversely associated with PCBs for all subjects or for just the women. To clarify the situation, it can be rewritten as either:

“Gender differences were also seen in Canada, where PCBs were inversely associated with T3 in both men and women but T4 was inversely associated only among men.”

or

“Gender differences were also seen in Canada, where PCBs were inversely associated with T3 but not T4 in women; in men, PCBs were inversely associated with T4.”

8. Page 8: the authors say “the association of EUC exposure [...] with diagnosed diabetes was initially analyzed through univariate analysis of each factor”. If an association is being examined, there must be at least two variables; this is bivariate analysis.

9. Page 5: Unless the authors came up with the weights for the job categories and personally coded each job for distance from the cook departments, please cite the source of this information.

10. Page 4: EUC (Electrical Utilities Company) exposure is not an appropriate term for total PCB concentration in serum or lipid-adjusted PCBs, dioxin-like PCBs, non dioxin-like PCBs, estrogenic PCBs, or anti-estrogenic PCBs. These metrics are measuring TOTAL exposure from all sources – dietary, environmental, and occupational (from all occupations, not just working at EUC). Instead of “EUC exposure was classified into 8 main groups including”, perhaps use “Eight PCB exposure metrics were used:”
Discretionary revisions:

11. Because there are so many results, organizing the results and discussion under relevant sub-headings might be helpful.

12. The introduction provided no information to explain why you were conducting the study in this population. There was very little about why PCBs still matter (when their production was banned so long ago), information about the plant and why it was selected, historical information about the PCB exposure dose that capacitor workers experienced (several surveys were performed by NIOSH and have been published), and how those exposures compare to the current population. This is important contextual information.

13. The discussion consisted primarily of a lengthy comparison of the current results to previous studies. Much of this information could be summarized instead in a comparison table (similar to those used in review articles).

I would like to see more discussion of the potential clinical/ public health implications of the results. What does all the data mean? Why does it matter? What are the next steps?

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 that I have no competing interests.