Reviewer’s report

Title: Indoor Air Pollution Exposure from Use of Indoor Stoves and Fireplaces in Association with Breast Cancer: A Case-Control Study

Version: 2 Date: 24 September 2014

Reviewer: Jennifer Peel

Reviewer’s report:

This is an interesting manuscript examining the association of fireplace use and breast cancer in the U.S. leveraging the Long Island Breast Cancer Study Project. However, there are some deficiencies in the manuscript (described below) that currently limit the interpretation.

Specific Comments:
1. The manuscript uses fireplace use / indoor air pollution / PAH interchangeably at different points. The manuscript text (and title) should be very clear that the variable available was self-reported fireplace use (not indoor air pollution or PAHs). Furthermore, the manuscript does not adequately justify the focus on PAHs given the multitude of other pollutants produced from fireplaces and synthetic logs.
2. At several points the manuscript references the global public health problem of indoor solid fuel combustion. It is important to acknowledge, and indeed provide information about, the differences between the experience in this Long Island population and indoor solid fuel use in developing countries. What are typical air pollution concentrations in these homes? What is known about PAHs and other pollutants from fireplaces in the U.S. compared to developing countries?
3. You hypothesized variation by materials burned and by other factors. Did the hypotheses have a direction? The study would be strengthened by this.
4. At some point – describe/discuss the variation that is encompassed by the term “indoor stoves and/or fireplace” (and implications for the results).
5. Page 5, last paragraph of Background section: receptor status is not mentioned here, but it is in the Abstract.
7. Would be helpful and informative to have a table describing population by case and control status (particularly for potential confounders).
8. Methods: why was fireplace use question limited to only Long Island residence? What about other residences? On Page 9 it states that the study population was limited to women who lived on Long Island prior to age 20. It’s not clear if this is for a sensitivity analysis or the main analysis. If the primary analysis – this should be stated earlier.
9. Methods, page 8: Point #2 in Statistical Analysis is not clear given that “exposure” was not measured in this study (I assume this statement is referring to material burned, so it should state that).

10. Methods: How were potential confounders identified? How was the final model decided?

11. Page 9: Why was the ratio of the OR used to examine the cancer subtypes rather than interaction?

12. Table II: The p for trend is statistically significant for synthetic log burning, but there does not appear to be a trend. Also – the text on Page 11 discussing Table II does not match the table (<6.9 years of synthetic log us).

13. Page 12 / Table III: the comparison of timing appears to be overstated given the overlapping confidence intervals.

14. The potential limitation of recall bias is not adequately addressed. It seems plausible that participants might suspect synthetic logs to be more harmful than wood.

15. The potential for selection bias should be addressed in the Discussion section.

16. Possible residual confounding should be addressed in the Discussion section.

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

**Quality of written English:** Acceptable

**Statistical review:** Yes, but I do not feel adequately qualified to assess the statistics.

**Declaration of competing interests:**

I declare that I have no competing interests.