Author’s response to reviews

Title: Road proximity, air pollution, noise, green space and neurologic disease incidence: A population-based cohort study

Authors:

Weiran Yuchi (weiran.yuchi@ubc.ca)

Hind Sbihi (hind.sbihi@ubc.ca)

Hugh Davies (hugh.davies@ubc.ca)

Lillian Tamburic (lillian.tamburic@ubc.ca)

Michael Brauer (michael.brauer@ubc.ca)

Version: 2 Date: 11 Dec 2019

Author’s response to reviews:

Reviewer #2

1. Concerning associations between air pollutants and MS, they state in line 263 that these were "generally null with wide confidence intervals" when the table 3 shows the largest of all estimates for MS and PM2.5 estimates between 1.25 and 1.45 and a number of 95% CIs for estimates are excluding the null. If the authors believe that these were random findings they should explain why they came to this conclusion for these estimates and not others. On the other hand, they claim there are positive associations for non-AD dementia when in table 3 not one of the estimates is far from the null and all CIs include the null. This is quite puzzling in terms of interpretation of results for the air pollutant measures. It seems that the authors were mostly basing their conclusions on road proximity instead of air pollution measures, since those seem more in line with their interpretations. If that is the case this needs some explanation to why they prefer the road proximity measures over the air pollution measures. For example they say in line 255/56:” Air pollutants, except for NO, were generally associated with slightly increased hazard ratios (HR) for both NAD and PD (e.g. HR for NAD = 1.02, 95% CI: 0.98-1.06 per IQR increase in NO2) - in table 3 with adjustment for greenness it become 1.08 (1.01-1.15)” and in line 262/263 they state "Associations between air pollutants, AD and MS were generally null with wide confidence intervals." But in table 3 the HR for MS is 1.25 (0.93, 1.70) and with adjustment for greenness it is 1.43 (1.04, 1.97). What really is it that makes the authors conclude that there is an association for non-AD dementia and none for MS? One could interpret this to the contrary unless they want to say there is NO association for either.

We thank the reviewer for this comment.
Our interpretation regarding “air pollutants” was based on the consistency across pollutants and the relationships of the confidence intervals to a Hazard Ratio of 1, rather than on the magnitude of the point estimate or on the association with PM2.5 (or other single pollutants) specifically. Of the four air pollutants, only PM2.5 (1.25 [0.93, 1.70]) and NO2 (1.02 [0.78, 1.44]) were associated with increased odds of developing MS, although in both cases the 95% CIs included a Hazard Ratio of 1. In contrast, for non-AD dementia, all air pollutants besides NO showed positive associations with NAD, although again with confidence intervals including a Hazard Ratio of 1, while for PD the confidence intervals for the associations with PM2.5 and NO2 did not include 1. Thus, we made the conclusion (“Air pollutants, except for NO, were generally associated with slightly increased hazard ratios (HR) for both NAD and PD”, Line 255). To clarify we have modified the text to be more specific regarding the effects of PM2.5 vs other air pollutants. “Specifically, for PM2.5 we observed increased HRs for NAD, PD and MS. Elevated HRs were also observed for BC and NO2 for NAD and PD, but not for MS” (Line 263-264).

2. Also, it is unclear why the authors emphasize the positive results in males with PD for road proximity but do NOT mention that for the air pollutant NO2 it is females who seem more strongly affected. How do the authors reconcile these opposing results for men and women? See tables Appendix 2. One could argue that none of these results are really showing gender differences since all CIs are generally overlapping.

We thank reviewer for this comment. In the manuscript we aimed to address the road proximity and air pollutant results separately. We have reviewed the road proximity findings in the stratified analyses and find that patterns by sex vary depending upon the specific road proximity definition. For air pollutants there is some suggestion of a pattern, although this is not strong. We have modified the text to indicate “We did not observe consistent patterns of increased risk by sex, although for PD and NAD with air pollutants hazard ratios were somewhat higher for females” (Line 269-270).

3. I recommend to limit the percentages in tables 1 and 2 to only one digit past the comma for legibility

Done.