

Reviewer's report

Title: The association between low level exposures to ambient air pollution and term low birth weight: a retrospective cohort study

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Reviewer: Jennifer Parker

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Dugandzic, Dodds, Stieb, and Smith-Doiron. "The association between low level exposures to ambient air pollution and term low birth weight: a retrospective cohort study"

This paper presents a neat analysis of the association between trimester-specific measures of three air pollutants and term low birthweight. One strength of this study is its ability to examine the relationship in an area with relatively low levels of pollution. My primary reservation is the entanglement of associations over both time and geography. Although the authors pointed out an observed lack of time trend for both exposure and low birthweight, the relatively small associations observed in studies of air pollution and birthweight could be influenced by correspondingly small time trends. Indeed, the associations could have changed over time. These comments are included under "Major Compulsory Revisions". Most other questions for clarification are listed under "Discretionary" as singly they are of lesser consequence; however, I think the manuscript would be strengthened by more detail and rationale.

Major Compulsory Revisions

- 1) Figure 1 and Figure 2.
 - a) Are there statistically significant trend lines?
 - b) What is the calculated trend for lbw, realizing that the authors indicated that they observed no apparent trend?
- 2) Logistic regression.
 - a) Why didn't the authors adjust for year of delivery?

Minor Essential Revisions

- 1) Abstract, Background. The trimester-specific objective should be mentioned.
- 2) Abstract, Results. Findings are presented with greater detail than in tables (to two decimal places rather than one).
- 3) Abstract, conclusions. This study doesn't really target vulnerable populations.
- 4) Background. LBW should be spelled out in text the first time used. Also, authors should be clear to distinguish term LBW from the usual LBW, which includes preterm infants as well as growth restricted infants.

5) Methods. Logistic regression. How were relative risks estimated from the odds ratios?

Discretionary Revisions

1) Background, second paragraph. "poignant"? Does this word really fit in this context?

2) Methods. Clarify study cohort creation.

a) How many births between Jan 1, 1988 and Dec 31, 2000? Of these, how many eligible based on study criteria (over 500 g, ≥ 37 wks gest)? How many post-term births?

3) Are pollutant monitors co-located? That is, does one monitoring station collect data for O₃, SO₂, and PM₁₀?

4) It's surprising that only 60% of mothers within 25 km of the monitor have sufficient trimester-level data.

a) Is this because one or more trimesters are missing data? Is there a particular pollutant missing? Can you elaborate on this a little more?

b) Is there a whole pregnancy (that is, nine months rather than trimester) effect using the full sample of 108,399 mothers within 25km of a monitor?

5) How many monitors were used in the study?

6) Methods. Logistic regression.

a) Why were the particular covariates chosen? Is there rationale for thinking that, say weight change, would influence the association between pollution exposure and term LBW?

b) How did income change over the 13 year data period; how reasonable is it to assign 1996 levels to 1988 or 2000 births?

7) Results. Logistic regression.

a) Why are RR presented with one decimal place but the CI with two?

b) Did adjustment for the covariates change the associations? Show unadjusted associations.

c) Given that a lot of studies talk about smoking, did adjustment for smoking change the associations?

d) For the continuous exposure model, the results could be expressed in terms of the interquartile range or simply 5 units.

e) Although not the express purpose of the study, given the long length of time being considered, testing for effect modification/interaction between year of delivery and the exposure might be informative, that is, has the association between lbw and exposure changed over time.

8) Results. Figure 1 and Figure 2.

a) Why are these on two graphs and not one or three?

b) Is there a footnote describing the missing SO₂ data for 1997?

c) Can you add lines around the bars indicating the range (say 25th and 75th percentiles) or note in the text that the variation in exposure for births each year has increase/decreased/stayed the same over time?

Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)

What next?: Unable to decide on acceptance or rejection until the authors have responded to the major compulsory revisions

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'.