

Reviewer's report

Title: Outdoor air pollution, aeroallergens and emergency department visits for asthma among children and adults: a case-crossover study in northern Alberta, Canada

Version: 1 **Date:** 2 July 2007

Reviewer: Bin Jalaludin

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General

The authors investigate associations between ambient air pollution and ED visits for asthma using case-crossover statistical methods. The study is based in Edmonton, Canada and routinely collected data are used for both the exposure and outcomes, that is, ambient air quality data and aeroallergens from monitoring stations and an administrative dataset for the health outcomes.

Although the question posed by the authors is not new, few such studies have controlled for aeroallergens and hence this manuscript will add to the growing literature on the effects of ambient air pollution. The statistical methods are appropriate and in sufficient detail to replicate the work. The Discussion is balanced, however unfortunately, little discussion is given over to the relevance of the findings and how the findings from this study compare to those from other similar studies from Canada and internationally.

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

1. In the Methods section the authors should give details about the lag periods and the 3 and 5 day averages for air pollutants that were used in the analyses.
2. ED visit data were provided by five hospitals in the region – I would be interested to know what proportion of the total ED visits for asthma are covered by these five hospitals.
3. In the ED dataset, a unique ID number was not available for 14% of the records and therefore the authors were not able to identify any multiple visits for this group of patients. Do the authors see this as a problem? – this at least needs to be discussed.
4. The authors analyse 11 years of data, that is, about 4020 days of data (11*365). About 10% of data are missing for the gaseous air pollutants. Were there any systematic issues around these missing data? Some information on how air pollution data were validated or how missing data were dealt with would be useful.

5. The authors do not investigate asthma ED visits for those aged two years or less and for good reason as the diagnosis of asthma can be problematic in this age group (≤ 2 years). The reason for excluding those patients should be explicitly stated in the text. Similarly, the diagnosis of asthma in those over 45 years of age can also be problematic as the diagnosis can be confused with chronic bronchitis and many epidemiological studies on asthma exclude those aged over 45-50 years. This is an important issue that the authors must address in the Discussion section – how accurate is the diagnosis of asthma in the older age groups. Are the authors aware of any validation studies?

6. Although the authors spend some time discussing the case-crossover methodology, confounding by viral infections and aeroallergens, I found that the discussion on the effects of air pollutants on ED visits was limited. The authors have demonstrated effects for NO₂, CO, O₃ and PM, yet they only discuss in a cursory way the effects on NO₂ and CO (pg 10, second para). No attempt has been made at discussing the findings of O₃ and PM, nor have the authors discussed their findings using different the metrics for air pollutants, for example, same day, lag 1, 3-d average and 5-day average. More importantly, there has been no attempt to place the results in the Canadian context and international context - this is an omission that could be rectified by the authors.

7. Pg 11, para 1, last two sentences – I am not sure if these two statements are quite correct. Children do indeed have a higher prevalence of asthma than adults, but the stronger associations between asthma ED visits and air pollution would be due to the factors already outlined by the authors rather than the difference in prevalence.

Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)

1. It would be useful to have the air pollution, meteorological and aeroallergen concentrations by season as the results are presented by season and greater effects are seen in the warmer months.

2. The term 'aeroallergens' is slightly misleading in that data are not presented after adjustment for aeroallergens. The effects of aeroallergen do not appear to be a major focus of this manuscript.

3. Pg 11, para 2, sentence 5 – the statement about the poor correlation between cigarette smoke exposure and air pollution concentrations from fixed site stations needs a reference.

Discretionary Revisions (which the author can choose to ignore)

What next?: Unable to decide on acceptance or rejection until the authors have

responded to the major compulsory revisions

Level of interest: An article of importance in its field

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.