

Reviewer's report

Title: An outbreak of cardiovascular syndromes requiring urgent medical treatment and its association with environmental factors: an ecological study

Version: 1 **Date:** 5 June 2007

Reviewer: Paul Villeneuve

Reviewer's report:

Major Compulsory Revision

- the authors need to better explain how to interpret the rate ratios; the reference group is not well defined nor the unit scale for the rate ratios
- I would like to know what the ED visit pattern was for all admissions, or for non-respiratory and non-cardiovascular visits (combined); I feel the excess is too large to be due to environmental factors alone - presenting such data that exhibited no sizeable increase in ED visits for these conditions would be extremely valuable.

- table 3 needs to be better described

Minor essential revision

- see comment in attached file, I feel that capturing ED visits based on place of residence of subjects is less optimal than performing an analysis based on hospital location; specifically, residents may get admitted to hospital outside their area of residence and these people would not be exposed to different levels of environmental stimuli; similarly, people living outside the study area, may 'visit' the study area and visit the hospital as a result of being exposed to the environmental exposures.

- a better description of the methods used to identify an excess/outbreak should be provided given that this was the impetus for doing the study

Discretionary revisions

- see attached text below for complete review

An outbreak of cardiovascular syndromes requiring urgent medical treatment

Review

Comments on Abstract

1. In the background section of the abstract, a statement is made that an excess of visits was observed. It would be helpful to indicate what the referent time interval was. Was it an excess in the April, relative to earlier months, or relative to the same month in past year, or both? This would help the reader better understand the motivation for the study.

2. Comment, in my view, the use of the term "outbreak", to denote an increase from 4.0 to 5.7 visits daily seems to exaggerate the extent of the excess. The authors may wish to be more explicit when describing these statistics. For example, they may wish to indicate that these statistics pertain to the daily number of visits over the period April to May, 2005, and the same two-month intervals in the three previous years.

3. As stated, it is not possible to understand the RR's presented in the abstract as the reader has not been made aware of what the referent category is. Later on in the paper, one can see that the rate ratio is the ratio of rates in the "outbreak" versus non-outbreak period. Given that the abstract should serve as a stand-alone summary of the study, these ratios should be better explained. Also, for example, does the rate ratio for temperature correspond to a 1 degree change in temperature, a change in interquartile range, etc? I am unable to understand what is being presented.

Background

1. Second paragraph. It would be helpful if the authors gave some indication about how the surveillance system signalled an increase. Is this an excess that is based on comparisons to data with recent data, data

from the same months in previous years, or some combination of the two? What formal test was used to identify excesses?

Methods

1. Emergency visits are restricted to people resident in the area around Sydney. However, no restriction is made based on the hospital visited. What proportion of visits occurred outside the study area by people who resided in the study area? If these visits were included in the analyses, exposures based on the study area readings would have been misclassified. Could this contribute to seasonal differences in ED visits? In some ways, it would almost be better to perform the analysis based on the location of the hospital rather than the place of residence. If environmental exposures were the culprit for an increased number visits, a concomitant increase in risk among non-residents would also be expected.

2. There was only one monitoring site. NO₂ exhibits tremendous spatial variation. Some discussion of the issues of misclassification should be made in the discussion section

Results

1. Page 11. You mention that patients in the “outbreak” period were more likely female. Why not cite the % of female visits? Citing the Chi-Square value (4.69) provides little information given you are citing the p-value of 0.03.

2. The number of visits increased by 69%. Can you cite the actual visits instead in each period. Given that underlying population increases would contribute to an increased number of visits, some statement should be made on the population growth of this area over the study period.

3. Page 11, first sentence. It is mentioned that the characteristics of the sample ED visits did not differ from the subset of St. George visits. Please be more clear about what characteristics you are referring to. Age, sex, number admitted to hospital, day of week effects, etc.

4. Table 2 could be simplified. It is an extremely busy table. I fail to see the need to present the 25th, 50th, and 75th percentiles of the minimum, mean and maximum values. For example, what does the 25th percentile of the minimum value provide? I think that the same key message of higher NO₂, and PM values during the “outbreak” period could be conveyed by presenting the mean or median, 25th percentile, and 75th percentile of the daily mean value only.

5. Looking at figure 2, it appears the data extend only until April 2005, yet comparisons in the table extend until the end of May 2005. It might be helpful to extend the graph for St. Georges until May 31, 2005. Also, the graph should be enlarged for greater ease of viewing.

6. As mentioned earlier (Abstract) I am unable to interpret the rate ratios. For example, the rate ratio of 1.08 (page 13 for maximum relative humidity). This has got to correspond to some unit change in relative humidity, correct? If so, what is it (median, IQR, one unit)?

7. I do not understand table 3. See previous comments about the rate ratios. No units are placed on any of the covariates, I am unable to understand the referent category and how the rate ratio corresponds to a change in units for each of the cited covariates.

8. Comment, the fact that the greatest increase was noted in the oldest age group supports what we know about air pollution effects in susceptible populations.

9. Some discussion of the issue of multiple testing should be made given the large number of lag intervals and covariates used in the analysis.

10. Final comment. The considerable increase in the number of hospitalization for cardiovascular events seems, given the existing literature, to be unlikely attributable to environmental factors alone. It would be more convincing to me if: no such pattern, or a much less pronounced pattern was observed for all emergency department visits, and the authors provided supporting documentation population growth was modest.

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