Reviewer’s report

Title: Modifiers of Short-term Effects of Ozone on Mortality in Eastern Massachusetts -- A case-crossover analysis at individual level

Version: 1 Date: 16 August 2009

Reviewer: Andrea Baccarelli

Reviewer’s report:

The manuscript presents a case-crossover analysis of the association between exposure to ambient ozone and mortality between 1995-2005 in Eastern Massachusetts. Compared to previous studies, the present work has the advantage of individual level information on some subject characteristics (age, education, marital status, race, and gender), as well as socioeconomic status data (population density, household income, and percent poverty) coded at the tract level. The Authors observed that a 10 ppb increase in the 4-day moving average of maximal 8-hr ozone was associated with a 1.68% increase in the number of non-accidental deaths. The excess risk was spread out across respiratory and cardiovascular deaths, with significant associations of ozone exposure with deaths from diabetes or stroke. The potential effect modifiers evaluated in this study (age, education, marital status, race, gender, population density, household income, and percent poverty) did not show any interaction with ozone exposure in determining the observed effects. The study is well designed and conducted. The novelty of the work is well described in the introduction.

Specific Comments

ABSTRACT

The Authors may want to consider reporting the number of deaths occurred in the time period evaluated

Information on how ozone exposure was assessed may be useful in the abstract, if the word limit allows for that.

INTRODUCTION

Page 4, lines 8-10

The sentence, as it reads, seems to suggest that the case-crossover approach has the advantage over Poisson regression to allow for directly modeling interactions, rather than depending on subgroup analysis. I believe interaction terms can be fit in Poisson regression as well. Please, clarify.

METHODS
The case-crossover analysis is based on ozone data from 8 monitoring stations. The methods should describe how ozone levels were assigned to each subject (closest station to the subject’s address? If so, were any individuals excluded because their address was too far from the closest station?)

Page 7, last sentence of Methods
The Authors may want to explain why the analysis was restricted to the warmer months (May-September) of each of the years evaluated. Not all readers may be aware that ozone levels are higher in the summer. Also, the expression “between May and September” does not make clear whether May and September were included in the analysis.

RESULTS
Page 8, lines 8-11
The sentence does not read well. I would suggest to change it into “The estimated associations showed little changes across different moving averages. Because the effect estimate for the four-day moving average was slightly stronger than those for the other moving averages, we used the four-day moving average in the analysis of specific causes of death and effect modifications”

Page 8, line 2 of the last paragraph: Please change “causes deaths” into “causes of death”

Page 8, line 4 of the last paragraph: Please change “week days” into “day of the week”

Page 9, last line: Please change “supplemental” into “supplemental files”

DISCUSSION
Page 10, 1st par, last sentence: The sentence is incomplete

Page 11, 1st par, last sentence: It is unclear to me whether “the sensitivities of respiratory and cardiovascular disease” refers to the effects of ozone exposure on respiratory and cardiovascular disease, or rather to subjects’ characteristics that make subgroups of the general population more sensitive to those effects.

Page 12, 2nd par, last sentence: Please change “different” into “differences”

Page 12, 3rd par, line 3: Please change “a very few proportion” into “a very small proportion”

Page 13, 2nd par, line 3: Please change “or even more advanced” into “or are even more advanced”

Page 13, 2nd par, last line : Please change “pursuit” into “pursue”

Page 14, 2nd par, first sentence: The authors may want to indicate that in addition to temperature and day of the week, all non time-varying variables were
controlled by design.

General Point

The word “characters” is used several times in place of “characteristics” (e.g., Page 4, line 2 from bottom; Page 8, line 1, and other occurrences throughout). Please change it to “characteristics” throughout the paper.

Table 1, title: I am not sure that “population” is appropriate here, because the table presents the characteristics of the deceased subjects from the population evaluated, rather than the population itself. Maybe “Demographical statistics of deceased subjects in Eastern Mass, 1995-2002” would be more appropriate.

Table 3: Please, change “Marital” into “Marital status”

Although the footnote indicates that the first and third quartiles were used to categorize population per Km2, household income, and percent poverty, it would be informative to report in the table the values corresponding to the cutoffs.

Level of interest: An article of outstanding merit and interest in its field

Quality of written English: Needs some language corrections before being published

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