Reviewer’s report

Title: Extreme Precipitation and Emergency Room Visits for Influenza in Massachusetts: A Case-Crossover Analysis

Version: 0 Date: 21 Jun 2017

Reviewer: Marion Vittecoq

Reviewer’s report:

The article entitled « Extreme Precipitation and Emergency Room Visits for Influenza in Massachusetts : a case-crossover Analysis » focuses on an interesting issue: the impact of weather conditions on influenza dynamics in temperate areas. Considering that extreme climatic events are likely to become more frequent in the next decades due to climate change, improving our knowledge of their impact on public health might prove essential to enable the adaptation of disease control measures.

Yet, the authors could enhance the interest of the paper by clarifying some points and completing the discussion part. It would notably be important to discuss the choice of the Emergency Room Visits as a proxy of Influenza dynamics and to develop the perspective to explain how the presented results could help in adapting disease control measures.

Thus I recommend accepting this article for publication with major revision.

Detailed comments:

Abstract:

The conclusion part in its current version just make a summary of the results while it could present hypotheses explaining these results and suggest some ways to use them to adapt public health measures.

Background:

"Extreme rainfall such as that […] influenza occurrence". This part could be completed. Indeed some studies showed that rainfall is negatively associated with Influenza Incidence while, as said in the paper, extreme rainfall events have been shown to increase this incidence. Thus there is an interesting distinction to underline here based on references between the impact of environmental conditions (more humidity, less influenza persistence, see for example the table in Vittecoq et al. 2015 Epidemiol. Infect. 143, 3384-3393) and behavioural impacts of extreme events (heavy rain, more crowding).
Methods:

Environmental data: It would be useful to add a reference to justify the use of Kriging in the determination of precipitation distribution. It seems also important to explain how the definition of extreme events (values exceeding the 99th percentile of daily local precipitation) was chosen since this choice as a considerable impact on the results.

P7, Line 14: The socioeconomic status is mentioned while it was not used in the analysis. Why?

Results:

P9, Lines 13-32: It was weird in this part to mix American units (e.g. inches/day) with metric system (e.g. µg/m³) could it be homogenized?

P9, Line 53: I did not understand the meaning of "Individual" in "significant association at lags 2 and 3. Individual."

Discussion:

It seems important to discuss somewhere the choice of the ER visits as a proxy of influenza cases in the studied area. Some references should be cited to confirm that it's a good choice and possible bias should be mentioned. As an example it's not clear if the patients have been tested for influenza virus infection or if they just presented influenza like illness. According to the definition of the "code 487" I guess they presented ILI but it should be clearly stated in the paper.

P11 line 35: "This observation consistent with existing literature…", "is" is missing here.

"This observation is consistent with existing literature which shows Blacks having higher rates of influenza hospitalization than whites." I'm not certain to understand this explanation. Black people may be more vulnerable to influenza infection in general but here the result is not "there are more blacks that went to the hospital due to influenza" but rather "the association between ER visits and extreme rainfall events was stronger in Black than in other ethnic groups" and here it seems to me that an hypothesis is missing. Do the crowdings have more impacts in this group and why? Besides, the relative proportions of ER visits in the different ethnic groups could have been compared to the proportion of these groups in the general population of the State to see if there is indeed an excess of visits among black people or not. Finally socioeconomic vulnerability is also presented as a potential risk factor for influenza infection in Blacks and in the method section data on socioeconomic status were mentioned. Could they be used to disentangle the role of poverty versus other factors in the ethirical differences highlighted here?

P12, 114 "this may be reflective of congregation in indoor school settings, which often temporally coincides with increased reports of influenza" Could the effect of the "holidays" factor be discussed here?
Conclusion

It could be interesting to be more specific on the adaptations that could be made in public health measures and to cite other pathogens that might have the same dynamics and thus be impacted if extreme rainfall events were to become more frequent.

Level of interest
Please indicate how interesting you found the manuscript:

An article of importance in its field

Quality of written English
Please indicate the quality of language in the manuscript:

Acceptable

Declaration of competing interests
Please complete a declaration of competing interests, considering the following questions:

1. Have you in the past five years received reimbursements, fees, funding, or salary from an organisation that may in any way gain or lose financially from the publication of this manuscript, either now or in the future?

2. Do you hold any stocks or shares in an organisation that may in any way gain or lose financially from the publication of this manuscript, either now or in the future?

3. Do you hold or are you currently applying for any patents relating to the content of the manuscript?

4. Have you received reimbursements, fees, funding, or salary from an organization that holds or has applied for patents relating to the content of the manuscript?

5. Do you have any other financial competing interests?

6. Do you have any non-financial competing interests in relation to this paper?

If you can answer no to all of the above, write 'I declare that I have no competing interests' below. If your reply is yes to any, please give details below.

I declare that I have no competing interests.

I agree to the open peer review policy of the journal. I understand that my name will be included on my report to the authors and, if the manuscript is accepted for publication, my named report
including any attachments I upload will be posted on the website along with the authors' responses. I agree for my report to be made available under an Open Access Creative Commons CC-BY license (http://creativecommons.org/licenses/by/4.0/). I understand that any comments which I do not wish to be included in my named report can be included as confidential comments to the editors, which will not be published.

I agree to the open peer review policy of the journal.