Reviewer's report

Title: Relationship between the population incidence of febrile convulsions and influenza and respiratory syncytial virus seasonal epidemics in young children in Sydney, Australia, 2003-2010: a descriptive study

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Reviewer: Katarina Widgren

Reviewer's report:

Thank you for asking me to review this interesting paper, I enjoyed reading it very much!

The authors present an association in time between seasonal influenza epidemics and peak incidence of febrile convulsions in children, but a lack of a time association between RSV-epidemics and febrile convulsions.

The manuscript is clearly written and concerns a relevant topic. However, the choice of methodology and its potential limitations needs to be further addressed and the manuscript needs focus.

Major compulsory revisions

1-3. Regarding the abstract:
• Add the methods used for assessing the correlation.
• The major findings in the results section are drowned in details. Emphasize the time correlation between ED for ILI and febrile convulsions.
• Expand on the benefit of these findings in the conclusions.

4. The title is ambiguous, what relationship is under investigation? Consider: “Relationship between the population incidence of febrile convulsions in children and the seasonal epidemics of common respiratory viruses…” etc.

5. Clearly state the aim and objectives of the study in the text.

6. The use of Emergency department presentation of bronchiolitis and influenza-like illness as proxies for RSV and influenza-infections respectively are used without much discussion. A reference is given to a previous paper from one of the authors, investigating the relationship between virus circulation and ED presentations of these syndromes in the same region during an overlapping time period. This is a strength and should be highlighted. Nonetheless, the specificity of the use of these proxies needs to be discussed in the manuscript.

7. The main analysis, investigating the relationship between the time-series, was carried out visually. However, the reader has little chance of carrying out the same exercise as the graph of ED presentations of ILI has a scale that makes it difficult to judge the shape, size or timing of other seasons than the 2009
pandemic season.

8-9. In addition to the previous point; this paper should be reviewed by a statistician due to two concerns.
• There are several statistical methods to compare time-series data, as described e.g in reference nr 23 (Schindeler). Why was this not applied here?
• The method for calculating excess is not the most commonly used for time-series. Why not use a baseline approach?

10. Importantly, focus the discussion around the aim of the study, whether it was to investigate the time relation between (proxies for) respiratory virus circulation and febrile convulsions, to estimate the excess in febrile convulsions due to the same viruses or to respond to concerns about convulsions due to vaccination.

11. There is a lack of relationship between the magnitudes of the peaks in the time-series. This is an important limitation and needs to be addressed. The point made on magnitude of epidemics and its correlation to circulating strains in paragraph 4 in the discussion is not clear.

12. Paragraphs 5 and 6 of the discussion: Is the message that the impact of the pandemic was a falsely high number of ED presentations for both convulsions and ILI? Please explain for readers not familiar with the NSW setting.

13. Have you investigated the relationship between RSV/bronchiolitis peaks and febrile convulsions with a time-lag?

14-16. Regarding the ED triage data:
• More than a two-week sample should be used for representativeness.
• Explain how this triage data is related to the ED data.
• Give the numbers of non-febrile convulsions. Can these be considered noise of constant size? The implication of a difference between season and non-seasons should be discussed.

17-19. Regarding the laboratory data:
• Add the representativeness for the region of the eight laboratories you received virological data from.
• In figure 3, could you also indicate the percentage of samples positive for influenza over the years, in addition to the number of positive samples? This would make the difference between the 2009 pandemic season and remaining seasons easier to interpret.
• As you point out weekly virological data would of course be much more informative. Were these not available?

Minor essential revisions

20. Please, look through the abbreviations. Not all are explained.
21-23. Background:
• It would be interesting to know the population of NSW.

• A peak incidence does not occur at a certain age, it would rather be “peak incidence is seen in 18-month old children”

• Clarify that it is incidence through the age of 4 that is described in the Sillinpää study.

24-25. Methods:
• Clarify what “almost all ED services” means with regards to public hospitals in NSW.

• Clarify whether also the data on ED presentations of influenza-like illness and bronchiolitis were restricted to the Sydney region.

• There are results in the methods section. These should be moved.

26. Results:
• Influenza activity is said to have been higher than usual in 2003, 2007 and 2009. Please give a reference.

27-29. Figures:
• Figure 1 shows convulsions only for 0-5 y.o. but the legend mentions two age groups.

• Label the graphs and their scales better and amend the ILI ED figure as above.

• Instead of figure 2, show the time-series with three-week rolling average to determine threshold between epidemic an non-epidemic periods. This would make the method (if it is to be kept) used clearer and give the magnitude of the excess figures some perspective.

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.

Declaration of competing interests:
I declare that I have no competing interests.