Reviewer's report

Title: A big temperature decrease between two neighbouring days may increase the risk of childhood pneumonia

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Reviewer: Yasushi Honda

Reviewer's report:

Major Compulsory Revisions:
1. Additional sensitivity analysis
   The relation between TCN and EDV was mainly determined by the latter half of the period, where there is a huge pneumonia EDV spike. Although TCN seasonality is not apparent compared with daily mean temperature, there is still seasonality and winter has higher TCN in Brisbane. This suggests that the huge EDV peak during winter may have confounded the relation between TCN and EDV.

   To refute this possibility, the authors can conduct the sensitivity analysis without including 2009 data.

   When we look at the lag pattern on Table 3, except for female, lag 0-7, the relative risks (RRs) are in order of lag 0-10, lag 0-7 and lag 0-1. This implies that the RR is larger when lag is larger. It is understandable that there may be incubation period for the exposure to the onset for pneumonia, but it is unlikely that the incubation period is mainly more than one week. This also suggests that the relation would be confounded by the sharp pneumonia peak in 2009. Another concern is that, since the lager RR for longer lag, limiting the lag to ten days would also questioned; longer than 10 days of lag would have higher RR.

2. Lag structure
   Although the authors showed Table 3 for lag analysis, they did not mention at all about this table or lag in the main text. Also, since the authors used DLNM, they can show the lag pattern of the TCN effect for, say TCN = -5, not just the aggregate effect of 0-1, 0-7 and 0-10. At least some discussion on the lag structure is essential.

Minor Essential Revisions:
3. Comparison with other papers
   More discussion on the comparison with other papers that address DTR and TCN (and mortality) would be desirable. The authors cited some papers in the introduction, but not mentioned in the discussion. Of course, EDV is different from mortality, but considering that pneumonia EDV should have similar pattern to mortality from respiratory diseases, and that some of the cited papers addressed the relation with respiratory mortality, the authors can compare the
results of this paper with those from these papers.

4. Degree of freedom (df) for time
The authors described that the df for time is 8, and they claimed that it controls the long-term trend and seasonality. However, the observation period is 10 years, and it is not possible to control seasonal variation. Or, was the df eight per year?

5. Trend of TCN (Figure 1d)
The author did not specify how they did the decomposition analysis, but usually the trend panel should include the average value well within the range, as shown in the panels of other variables (such as Figures 1a, 1b and 1c). However, for TCN, the trend showed that the lowest value is 0.0, which is the period average value of TCN.

Also, although there is rather a sharp peak for TCN, it is only 0.2 degree C. When we are talking about -2 or -5 degrees C drop for the possible effect, this size of the long term trend would be negligible.

Discretionary Revisions
6. Future temperature projection
The authors cited Epstein's paper from NEJM dated 2005. There should be newer and more relevant articles by the climate modelers for describing future temperature pattern. Here, it is desirable that many models have the same tendency that the climate variability is getting larger.

7. Figure 4
It is helpful for the readers what "relative" means in this graph. Probably the same as Table 3, but still, it is better to have the note here.

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

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

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