Reviewer's report

Title: Decline in temperature and humidity increases the occurrence of influenza in cold climate

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Reviewer: John Noti

Reviewer's report:

The authors have investigated the risk of influenza transmission in a subarctic climate by enrolling military personal stationed in northern Finland over a 12 month period where temperatures ranged from -20 to +20 degrees Celcius. The majority of influenza cases were clustered during the months when temperature and humidity were lowest which is consistent with previous findings of many others. What is particularly unique and interesting to this study is that the spike in influenza cases occurred following a subtle rise in temperature and humidity that peaked 3 days prior to when the patients sought medical relief and confirmation of influenza illness. The authors conclude that at the lowest temperatures and humidity, transmission is prevented possibly due to constraints on the virus itself (the virus may be inactivated) and the rise in temperature and humidity releases the virus from these environmental constraints. Further, the authors noted that temperature and humidity subsequently declined during the 3 days prior to the patient seeking medical relief (the hazard period) and they conclude that these sudden changes may make the host more susceptible to infection. The combination of the two events, virus activation and increased host susceptibility, is hypothesized to account for this clustering of influenza outbreak.

The study design is well-conceived and statistical analysis is appropriate and convincing and the conclusions of how temperature and humidity decreases/increases prior to influenza transmission are justified. The study group is small, so conclusions are tempered. Whether this observation will be apparent in a larger study is unclear but nonetheless, these findings open the door to further investigation to explain subtle environmental changes that impact on a transmission.

Minor:

Fig2. The X-axis should be labeled "Clinic Day" to indicate what -10 to 7 correspond to.

Level of interest: An article of importance in its field

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.