Author's response to reviews

Title: The association between farming activities, precipitation, and the risk of acute gastrointestinal illness in rural municipalities of Quebec, Canada: a cross-sectional study

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Paper title: The association between farming activities, precipitation, and the risk of acute gastrointestinal illness in rural municipalities of Quebec, Canada: a cross-sectional study

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General comments from the authors to the reviewers: The authors would like to express their gratitude to all the reviewers for their valuable comments and suggestions.

Authors’ responses to the reviewer 1, Michael Bisesi:

1. Case Definition states "three or more loose stools w/in 24 hr" which although same as reported results stating "more than two . . .", reviewer recommends stating the criterion one of two ways, but not both to minimize potential confusion.

⇒ We perfectly agree with this comment. Therefore, we made a correction by stating the criterion in one way ("three or more…") to minimize potential confusion.

2. Consider looking at data among group aged 12 yr and above to determine if conclusion is the same. It appears from table that many of the cases were among very young who may more likely engage in practices such as pica. This group is possibly directly exposed to AGI pathogens unrelated to amount of precipitation. This may be a limitation.

⇒ We evaluated the association between AGI and precipitation among group aged 12 yr and above and we observed similar results with our previous analysis. The cumulative precipitation of week 3 showed a greater risk of AGI when high precipitation occurred in fall season (OR=2.32, 95%CI: 1.11-4.86). Similar but insignificant effect was also observed when high precipitation occurred in week 4 (OR=2.27, 95%CI: 0.96-5.38). Also, when very low precipitation occurred in week 4, a greater risk of AGI was observed in summer (OR=2.68; 95% CI: 1.20-5.98). Unfortunately, we were unable to evaluate the triple interaction between variables as we did before since the model did not converge. Therefore, based on these results, no change was made in the manuscript.

3. Carefully review to identify and correct the spelling errors throughout the manuscript (e.g. p. 20 "signification").

⇒ We greatly thank you for indicating us those potential errors. We reviewed the whole manuscript.
Authors’ responses to the reviewer 2, Song Liang:

1. On page 6 in Study Population section, the 1st criterion for definition for a municipality with low intensive animal farming was the same as (>= 25% of its surface area …) the one with high intensive animal farming, why?

⇒ We chose the same 1st criterion for the two study population groups based on our previous study in which we observed similar socioeconomic characteristics between the two groups. The other two criteria are the ones making a difference between low and high density farming, while the overall surface devoted to farming remains the same.

2. Case definition. For (a) and (b), temporal discrepancy was brought in case definition (e.g. for (b) any vomiting in the 28 days prior to interview), how that would impact the result was unclear, in particular looking at the lagged effect of precipitation.

⇒ We would like to clarify how the temporal discrepancy affected the result. In the interview, we were able to collect data on the date when the AGI symptoms started. Therefore, the lagged effect of precipitation was calculated from that date to insure that the precipitation event had occurred before the symptoms began.

3. The latitude and longitude coordinates of each municipality was collected and how the information was used in the study?

⇒ These coordinates were used to precisely locate the study municipalities and to be able to measure the distance between a municipality and a meteorological station (the coordinates of each station around municipalities were also previously identified). The precipitation data for a municipality was obtained from the closest station. We changed the sentence as follows:

“The latitude and longitude coordinates of each municipality and station were identified in order to measure the distance between a municipality and a station.”

(page 9)

4. Major weakness and limitations of the study weren’t even discussed …

⇒ We agree with this comment. Therefore we added some phrases to explain some limitations of the study:

“Our study has several limitations. When we evaluated the association between AGI and precipitation, we extrapolated precipitation data from available weather stations. Consequently, the exposure data may not be precise given the high spatial variability of precipitation and the low density of such stations in rural areas. Also, water consumption was estimated at the moment of interview and does not necessarily
reflect the actual water consumption before the occurrence of AGI symptoms. The ecological and aggregated nature of animal density data may also lead to a misclassification of exposure to microbes from animal source. One may live in a municipality with high animal density without being exposed to microbes by manure spreading, depending on a number of variables such as well protection, topography and drainage. All the preceding factors could over or underestimate exposure, leading to non-differential misclassification. Furthermore, we excluded 75 individuals presenting with other conditions (e.g. pregnancy)” (page 21).