Reviewer's report

Title: Epidemiological investigation of two parallel gastroenteritis outbreaks in school settings

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Reviewer: Henriëtte ter Waarbeek

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Review of paper:

Epidemiological investigation of two parallel gastroenteritis outbreaks in school settings

By

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Recommendation categories

- Discretionary Revisions (which are recommendations for improvement but which the author can choose to ignore)
- Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)
- Major Compulsory Revisions (which the author must respond to before a decision on publication can be reached)

1. Is the question posed by the authors well defined?

Partly. It remains unclear why the tap water was from the beginning suspected as the source of the outbreak. Also, more explanations could have been provided as to why for example a food-borne source was excluded from the analysis from the start; are there any shared meals at the school or kindergarten?

2. Are the methods appropriate and well described?

Epidemiological investigation: No distinction was made between a primary case definition and a secondary case definition. The case definition does not include an explanation nor frequency of diarrhea (how many loose stools?) nor a frequency of vomiting. The time period is very wide, and again with no distinction between primary and secondary cases.

How many days after the start of the outbreak were the questionnaires taken? Were they self administered and standardized? Did you ask if the children had been ill in the period before the outbreak? What is the exact description of ill contacts?
Statistical Analysis: Basic statistical techniques have been applied. They need to be described in more detail (under methods). Univariate and multivariate analyses have been ruled out without explanations. Only results of the univariate analysis are listed in a table, outcomes of the multivariate analysis remain unclear. The work would have benefited from a wider analysis of risk factors, and indeed their correlations over the period of study. Consumption of tap water is a significant risk factor, but how does the risk factor of another person at approximate environment with gastro-enteritis symptoms before onset of the symptoms relates to the water consumption? Has multivariate analysis taken place to verify how much the tap water in indeed an independent risk factor?

Furthermore, it is not clear from the paper that statistical analyses have also taken place separately on primary and secondary cases.

Environmental Laboratory Investigation: The standard bacteriological analysis was not explained. Which standard was used? Which bacteria?

Stool testing is not part of the Environmental Laboratory Investigation. Only Salmonella spp. was tested?

3. Are the data sound?

There is not much information about the nature of the descriptive data recorded and reported to the HCDCP, and indeed whether the data collected changed over time to reflect the dynamic investigation nature inherent in such a study.

It would be interesting to include what threshold number of viral gastroenteritis cases for that time of the year were used in the analysis.

Results: The percentage of people returning the questionnaire is called response rate. The age is not well described, of course almost everybody is less than 12 years old at an elementary school and kindergarten. What is the mean age, and the range? How many kids and how many teachers responded respectively? How many classes at school?

No distinction between attack rates in primary cases and secondary cases. The paper does not give enough information on how a distinction could be made between being a primary case (and therefore infected by one source / possibly water) and secondary cases. Also, how did the secondary cases link to the primary ones?

It does not become very clear from the paper that water is the most likely source. Could also a kid or teacher have acted as a single source? How did transmission take place (this was one of the original research questions).

Did you look into a relation between (duration of) symptoms and age and sex?

The paper does not give enough information on the stool samples. Were they only from cases, or also from non-cases? What was their age and sex?

4. Does the manuscript adhere to the relevant standards for reporting and data deposition?
It is stated that data was collected anonymously.

5. Are the discussion and conclusions well balanced and adequately supported by the data?
The conclusions provided are unfortunately just a summary of the discussions. The opportunity has not been taken to comment on the validity of the methods used in comparison with other similar studies and indeed using wider methods based on correlation analysis. The school setting is interesting and not too often described, but this outbreak investigation and analysis lacks thorough analysis and is not reported consistently. The authors did fail to discuss what could have caused the water to be contaminated.

Lessons learned or recommendations for further work or measures that could be taken to prevent outbreaks like this have not been included.

6. Are limitations of the work clearly stated?
1. Tap water was identified as the possible source of infection by the teachers. It is not clear how and to what extent this was verified empirically or indeed statistically. Also, the fact that an ongoing gastro-enteritis outbreak took place in this small village could have been a limitation but has not been properly addressed.

2. Little explanations are given in respect of the secondary transmission. Data analysis provided is required to confirm the hypothesis of the single point of source.

3. It is stated that evidence of faecal contamination was found in one sample of tap water from the kindergarten (positive for hAdV). This was detected on 17th January – 5 days after the alleged peak. A single sample at this given time when the virus concentration may have changed significantly may not be enough to support the hypothesis for the other connected school.

4. A univariate model has been used in the study. This is less comprehensive compared to multivariate models. As only one variable can be changed at a time, univariate models are unable to show relationships between different factors. Furthermore, correlations cannot be modelled using a univariate model.

5. The statement made in the conclusions “The occurrence of cases may be explained by a possible person to person transmission of the disease from a student/staff member of the elementary school or they may not be connected to the other school and have just originated from the community” has been arrived without any data analysis. This requires further investigation, especially since identifying mode and vehicle of transmission was a clear objective stated by the authors.

7. Do the authors clearly acknowledge any work upon which they are building, both published and unpublished?
The authors state that only a limited number of publications refer to waterborne viral outbreaks in such settings, particularly in Greece. However, the paper could have benefited from a wider review of the literature of such outbreaks in other countries. Even quick google search revealed the following relevant publications:

An outbreak of acute infectious nonbacterial gastroenteritis in a high school in Maryland.
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1580035/

Viral gastroenteritis outbreaks in Europe, 1995-200.
http://researchonline.lshtm.ac.uk/9786/

Outbreak of non-bacterial gastroenteritis in a school

A large outbreak of gastroenteritis associated with a small round structured virus among schoolchildren and teachers in Japan
http://journals.cambridge.org/action/displayAbstract;jsessionid=292B88D65CF3D6772556BCA44434ABD5.journals?fromPage=online&aid=4707384

A large outbreak of gastroenteritis associated with a small round structured virus among schoolchildren and teachers in Japan.
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2272036/

8. Do the title and abstract accurately convey what has been found?
Yes to a certain extent. Neither the year nor the location of the outbreak studies are given in the abstract. The abstract does not mention that the conclusions made are based on a univariate analysis.

9. Is the writing acceptable?
The use of the English language is satisfactory but there are a number of improvements which would strengthen the paper.

The references need a serious editing exercise inline with standard referencing methods. A consistent citation method needs to be used.

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

**Quality of written English:** Not suitable for publication unless extensively edited

**Statistical review:** Yes, and I have assessed the statistics in my report.

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