Reviewer's report

Title: Weather conditions and sudden sensorineural hearing loss

Authors:

Vasilis Danielides (vdanielidis@hotmail.com)
Christina-Sophia Nousia (bnousias@in.gr)
Aristides Bartzokas (abartzok@cc.uoi.gr)
Christos J Lolis (me00061@cc.uoi.gr)
Antonios Skevas (otorl@cc.uoi.gr)

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Reviewer: Prof Ken Kleinman

Level of interest: A paper whose findings are important to those with closely related research interests

Advice on publication: Accept after discretionary revisions

This paper offers an interesting look at the question of a possible influence of weather conditions on Idiopathic Sudden Sensorineural Hearing Loss (ISSHL). Taking the days of surveillance as 'subjects', they ascertain whether there are characteristics of days, including season and atmospheric conditions, that make them more likely to have cases of ISSHL occur on them.

There are two questions that need to be addressed and several minor points and suggestions for further refinement, but the essential nature of the study is sound: the data collection and study design seem appropriate.

Main questions:
1. How were the seasons defined? This is done differently in different nations: for example by the position of the earth with respect to the sun in the US, but by month in many European nations. The seasons are not always considered to be of equal length. An interesting point here is that the separation into seasons is essentially another way to perform data reduction on the collection of atmospheric measures. Bearing this in mind, the authors might reflect on their utility in the current application and consider defining the seasons based on their atmospheric conditions, rather than whatever the culture may dictate.

2. The fact that other authors have investigated the same or similar questions is not introduced until the discussion. It would be far preferable to bring this up in the introduction, and then compare and contrast the methods of the previous
authors with those used here. This would facilitate comparison and clarify in what ways the article is meant to be confirmatory and exploratory.

Suggestions:
1. The contingency table approach is not incorrect, but may not be the most powerful. Approaches that retain the full detail of the atmospheric measurements include a Spearman correlation and t-tests, but the most attractive option is probably a logistic regression. This would allow the inclusion of multiple atmospheric measures and their interactions, and also allows the use of various model-building techniques to choose which conditions may be helpful.

2. The cluster analysis is described in the methods section as producing 5 categories, while the results show 8. In the latter case in particular, the scale of data reduction is not great. It might be preferable to choose only 5 clusters.

Minor points:
1. The t-test referred to (p. 8) is unclear at best. What are the two categories? What is the continuous measure? The means, test statistic, degrees of freedom, and p-value should be reported.

2. Figure 5 is completely redundant with table 5. I would omit figure 5.

Competing interests:

None declared.