Reviewer's report

Title: Longitudinal analyses of indoor temperature and body mass index in children: the PIAMA birth cohort study

Version: 1 Date: 19 June 2013

Reviewer: William Johnson

Reviewer's report:

This is a good example of a study with null findings that should be published. It is well written, clear, and addresses a specific research question.

Major Compulsory Revisions

My only major concern is that the GEE models used by the authors are not "longitudinal" in the sense that they describe change in BMI over age. The GEE models do adjust estimates for the correlation structure of the serial data, but otherwise the data are essentially treated as thought they were cross-sectional. A far more powerful technique would be to fit individual trajectories (mixed effects model) and investigate how temperature at baseline influences those trajectories. This approach would negate the need for imputation of the outcome (which can be problematic) as mixed effects models can easily handle unbalanced designs, where data are collected a different number of times and at different ages. Further, a mixed effects approach would better consider the casual order of events, as you would be modelling the influence of temperature at baseline on subsequent BMI change. The GEE models show cross-sectional associations that do not fully consider the influences that BMI at previous ages will have had. Given the large number of associations tested (I counted 136), I am not surprised that the authors find a few (perhaps spurious) "significant" results. Summarising the serial data in a trajectory would also resolve this problem. My suggestion would be to replace/ augment existing analyses with a truly longitudinal analysis. Because this is a public health journal, I also would like to see the discussion better place this research question in the context of public health. The conclusion is not really a conclusion and needs to be more thorough.

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

Quality of written English: Acceptable

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

Declaration of competing interests: None