Reviewer’s report

Title: Variation in the effects of family background and birth region on adult obesity: results of a prospective cohort study of a Great Depression-era American cohort

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Reviewer: Enrique Regidor

Reviewer’s report:

The authors of this paper address an interesting topic: the importance of circumstances in the early stage of life in adult health. In this case in adult obesity. However, I believe that the work is not adequately substantiated from the theoretical point of view. The background section is not sufficiently developed and, therefore, the rest of the work is very weak.

In the second paragraph of the background the authors state that they intend to study the influence of the region of birth in obesity in adult age. And in the first paragraph the pointed out that few studies have considered how weight status in adulthood is shaped by regional variation in early-life conditions. Although this idea should go after the former and not before, the most important thing is that the authors should have identified those early-life related to region of birth conditions.

In the third paragraph the authors had an excellent opportunity to show what characteristics of the region of birth they want to study. The authors mention that regional differences in the severity of the Great Depression mean that members of this cohort born in different regions may have experienced substantially different early-life environments, and, consequently, different risks of obesity in adulthood. This is important! The authors should have identified which feature in early life may be important for adult obesity and, consequently, due to the Great Depression their prevalence may be different from one region to another. But the authors have not done any of this.

Furthermore the authors introduce two ideas that add confusion to paper: the gender differences in the effects of other early-life conditions on the risk of adult obesity advantage of these strengths, and the estimate of effect of family background on adult obesity.

In the methodology section (page 5) the authors state that they have obtained various economic and production indicators. The authors should have based the relationship of these indicators with the Great Depression and then they should have defined them in a more appropriate manner. And on page 7, surprisingly, appears something that should have appeared in the introduction: The author want to test which regional measures (income, employment, crop yield, and infant mortality rate) might explain the effect of birth region on obesity in mid- and
later life. In any case, the results presented by the authors about that are not sufficiently clear. These findings should have appeared in Tables 2 and 3.

Finally, the authors did not justify why they employ multinomial model, but they show only a portion of the model results. Neither I do not understand the different models that authors have used in Table 4.

In summary, I believe that authors must adequately substantiate their hypothesis in the introduction and use the remaining of the work to contrast it properly.

**Level of interest:** An article of limited interest

**Quality of written English:** Acceptable

**Statistical review:** Yes, but I do not feel adequately qualified to assess the statistics.

**Declaration of competing interests:**

'I declare that I have no competing interests’