Reviewer's report

Title: Body mass index and overweight in relation to residence distance and population density: experience from the Northern Finland Birth Cohort 1966

Version: 2 Date: 24 June 2013

Reviewer: Marjaana Lahti-Koski

Reviewer's report:

This is a well-written paper with a unique dataset. It deals with an important issue on variation of BMI and overweight in well-defined geographical areas providing useful data for public health scientists and health promoters. There are, however, some concerns that I would like to point out.

Major compulsory revisions needed:

Abstract

1. In the abstract, results chosen to be presented in numbers are not that reasonable. Given that analyses showed curved patterns, I think it is not justified to give the difference in the mean BMI using maximum ranges in road distance and population density. The same applies for results on increases in overweight. It remains unclear, to which e.g. 35% increase for distance refers. The results should be revised. I think it would be more informative to pick up main results on crude associations from the first paragraph on page 9, supplemented with results on analyses allowing for confounders and curvilinear associations as presented on page 10.

Potential confounding factors

2. As concluded, the likely explanations include variations in everyday physical activity in different residential environments. Commuting activity is one of the components for physical activity. It seems to me that this component was totally missed in this paper as only leisure-time physical activity and occupational physical activity were controlled for in the analyses. Or were the respondents asked to include also commuting activity in leisure-time physical activity in the questionnaire? In all, I think commuting activity is a very important issue concerning urban planning, physical activity and overweight, and should be discussed in this paper.

Minor points

3. It was said that population density increased with growing alcohol consumption. Nevertheless, it is not described in the methods how the information on alcohol consumption was collected. Similarly, one of the results was that heavy alcohol consumption was associated with higher BMI. However, a definition for heavy alcohol consumption is lacking.
4. Given that data for the study was collected in 1997 I wonder why data on local
government areas on page 3 and Figure 1 were based on year 1998.

5. In Tables 1 and 2, it remains unclear whether Oulu as a region of residence
stands for the city of Oulu or Oulu province. Please clarify.

Discretionary Revisions

6. Some demographic factors were controlled for in the analyses. However, I
wonder whether issue on unemployment were properly taken into account. Could
higher body weight among people living in remote and sparsely populated areas
be partly explained by higher unemployment rate, i.e. in remote areas more
people stays at home without work? In potential confounding factors,
socioeconomic groups included entrepreneurs, higher administrative employees,
lower administrative employees, workers and others (n=274), which I assume
could include students, housewives and unemployed. In addition, there were 165
missing cases. For occupational class (office work etc.) number of missing cases
were as high as 582 (> 10%). I highly recommend this issue to be discussed in
the paper.

7. I assume that there are limitations for the number of Figures presented in the
paper. Yet, I wish that supplementary Figure S1 could be included in the paper
since it is very informative giving data on sex differences in relation to the
research questions.

**Level of interest:** An article of importance in its field

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a
statistician.

**Declaration of competing interests:**

I declare that I have no competing interests.