Reviewer's report

Title: BMI, waist circumference at 8 and 12 years of age and FVC and FEV1 at 12 years of age; the PIAMA birth cohort study

Version: 2 Date: 13 January 2015

Reviewer: Jenny Hallberg

Reviewer's report:

Summary to the editor:
Thank you for the opportunity to review this manuscript. This is an interesting study focusing on the relations between different aspects of overweight and lung function in 12 year olds. The main outcome is that “child type” relationship between BMI/WC and lung function has not yet transitioned in to “adult type” in this cohort of 12 year olds. The results are of interest in understanding the temporality of the association between lung function and obesity. However, the methods section could be improved and some important issues of the results are not discussed further. Overall I think that this is an important study as it offers longitudinal information on the natural course of lung function in relation to overweight.

Major Compulsory Revisions

1. The figures are one of the major strengths of the study. However, here BMI and/or WC is referred to as z-score (until then, only sd is mentioned). Adjusted FVC and FEV1 is stated to be in liters, but is on average 1. The FEV1/FVC ratio is also 1. Does this represent a standardized factor rather than measured volume or ratio?

2. The methods section states that standard deviation scores were at 12 yrs calculated according to the Dutch Fourth nationwide Growth study. However, it remains difficult to understand if the SD for BMI and WC later described was defined; a) as SD according to these reference values or b) according to the distribution of the calculated SDs in the present population. It is of particular importance that this is clear as the method appears to be different from the one used in the 8 yr follow up of the same cohort.

3. Under table 2 it is stated that for example, 10th percentile of WC is -0.89 SD, while for BMI it is -1.33 SD. Does this mean that the reference equations fitted better for one variable for the other? Does this have any implications for the results?

4. The findings that high BMI/WC was related to a low FEV1/FVC ratio is not discussed. Also, that low BMI/WC was associated with the largest negative effects on FVC and FEV1 is missing from the discussion section.

5. Atopy was defined as IgE concentration. This is not in line with the definition of
atopy according to the EAACI nomenclature "SGO Johansson et al, Allergy 2001: 56: 813–824". If atopy is to be used instead of sensitization, please add rationale for this.

6. Serum specific IgE levels more than 0.7 IU/mL is used as a definition of atopy. The methodology is not specified. For ImmunoCAP FEIA, the normal value is less than 0.1 kU/L, according to the manufacturer's instructions (www.phadia.com). What was the rationale for this specific cutoff?

Minor Essential Revisions

Background:
7. The aim(s) of the study is very long. It could be shortened and more focused.

Methods:
8. The methods section lacks definitions of covariates and could benefit from a more structured outline. For example, the spirometry method is mentioned in three different places. It is also unclear to what extent ERS/ATS criteria was used or not (if not, please comment in the discussion section).
9. The study design and population is clearly described but the original intention of the cohort is not described.
10. How was pubertal status defined?
11. "Statistical model: Ln (lung function testing variable) = constant + ln (height) + ln (age) + BMI<10th percentile + BMI>90th percentile + ‘error’. The result is the percent difference in FVC, FEV1 or FEV1/FVC ratio in children in the lowest and highest 10% of BMI compared with FVC, FEV1 or FEV1/FVC ratio in children with 'normal' BMI."
   – Is the result of the model the percent difference or is it converted to and expressed as the percent difference?
12. Sensitivity analysis is mentioned but not further explained. What does this refer to?

Discretionary Revisions

13. Methods section: Consider revising the statement that the FEV1/FVC ratio is used to indicate restriction.
14. Table 1. Back height is not previously mentioned. Is this the same as sitting height?

Level of interest: An article of importance in its field

Quality of written English: Needs some language corrections before being published

Statistical review: Yes, but I do not feel adequately qualified to assess the statistics.
Declaration of competing interests:

Non-financial competing interests in relation to this paper -
I work with a similar birth cohort on similar data. There are collaborative projects between the cohorts, although not related to the present paper.