Reviewer's report

Title: Prediction models for short children born small for gestational age (SGA) covering the total growth phase. Analyses based on data from KIGS (Pfizer International Growth Database)

Version: 1 Date: 26 January 2011

Reviewer: Giorgio Bedogni

Reviewer's report:

Major Compulsory Revisions

1. Please, explain better how missing data were handled. For instance, model 1 of table 3 was developed on 613 children and this is confirmed by the N = 613 in Table 1. However, potential predictors are not available in the same quantity for all children, e.g. n = 276 for height velocity. How did you handle the missing data? Did you consider ALL predictors (as apparently stated under Methods) or a subset of them? Did you do some data imputation? Please, make this clear for all the models. Also, consider reporting data ONLY for relevant subjects.

2. Some "potential" predictors may be collinear. Did you check the presence of multicollinearity? How did you handle it if present?

3. All the models in table 3 assume a linear relationship between each predictor and the outcome. Did you check that all these relationships were linear? There is much to be gained in terms of accuracy if nonlinear relationships are modeled as such if present. Splines or fractional polynomials could be used to do that.

4. The number of subjects available for model 4 of Table 3 (4th year) appears low as compared to the number of potential predictors listed under Methods (see also comment #1).

Minor Essential Revisions

1. Abstract: I suggest to replace "robust" with an other adjective, i.e. "accurate". You do not appear to have applied "robust" estimators in your analysis.

2. I suppose that error SD in Table 3 is a root mean squared error of the estimate. Am I right?

3. How was the "rank" in Table 3 calculated? Standardized regression coefficient? Other? Please, report the standardized regression coefficient instead if this is its ranking.

4. I suppose that the children who did not continue GH treatment over a given year did so for clinical reasons. I am right? Or someone exited the study for other reasons?
5. Do you have any suggestion on how the accuracy of the models could be improved, e.g. by using other predictors? This may be useful for other researchers in the field.

Discretionary Revisions

1. I understand that this will complicate things substantially from the viewpoint of the analysis (and potentially because of missing data, see point 4 minor), but wouldn't it better to take into account the fact that there are subjects with repeated measures in building the model, e.g. using random effect analysis?

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

**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