Reviewer's report

Title: Algorithms for converting estimates of child malnutrition based on the NCHS reference into estimates based on the WHO Child Growth Standards

Version: 1 Date: 19 December 2007

Reviewer: Michelle Lampl

Reviewer's report:

This is an interesting manuscript that aims to provide algorithms with which to convert estimates of child malnutrition based on the NCHS standards to those based on the more recent WHO prescriptive reference. In the present article, data from the WHO global database have been employed to accomplish this goal: a collection of survey data to predict the algorithm and a new set to test it. The approach involved comparing prevalence estimates of underweight, stunting, wasting and overweight, defined as below (the first three categories) or above (overweight) 2 SDS from the NCHS vs WHO standards. The conclusions claim to identify the algorithm, noting an average difference between the predicted WHO estimate and the observed value as <0.5% for stunting, wasting and overweight and state that The algorithms performed equally well for surveys without the entire age coverage 0 to 60 months.

Major compulsory revisions:
1. Clarification of how the present study overcomes the barriers from a similar report in 2006.

The manuscript bears a burden from the authors' own previous publication stating that the claimed results are impossible. The implications of these results are internationally significant in terms of decisions important to infant and childhood health. I believe the risk/benefit requires further information/validation. Let me be very clear: I am not implying that there is not an explanation, only that same is not clearly evident in the manuscript and it would benefit readers who follow the literature to understand the approach that resolved this previously reported dilemma.

Let me clarify the issues as written: The second paragraph of the present manuscript notes that there are significant differences between the NCHS and WHO standards and that the differences vary by anthropometric variable, sex, specific percentile of z-score curve, age and population-specific anthropometric characteristics. These observations are not further addressed, with the exception of a statement that there are no sex differences.

The third paragraph of the present manuscript briefly notes previous observations made by the authors in a 2006 published paper (de Onis et al., Pub Health Nutrition 9(7), 942), the background to the present manuscript. A review of the previous paper raises the following questions that need to be addressed
before publication of this manuscript:

The 2006 publication offered the same type of analysis: three samples were subjected to a WHO/NCHS comparison to identify prevalence rates of underweight, stunting, wasting and overweight (a Bangladeshi sample (a national survey, n=4787), a Dominican Republic sample (a cross sectional national survey, n=10381) and a pooled breastfed sample followed for the first year (from North American and Northern Europe). The important point is that similar observations to the presently reported were made at that time: in 2006, de Onis and colleagues announced the details of these comparisons (Pub Health Nutrition 9(7), 942) and concluded that "variations in the ages of children studied, average attained length/height and proportions with excess or deficient weight-for-length/height make it impossible to define any algorithm that could be used to derive WHO standards-based prevalences from NCHS reference-based estimates." 

POINT 1: The new manuscript does not address how these "impossible" barriers have been overcome by the present approach. How do the present data and approach surmount these issues, particularly those without the entire age coverage? Once again, this may be obvious in the nature of the evidence, but it is not clearly stated in the present manuscript at this time.

2. Statistical rigor

In several places, please provide a clarification:

2a. Rigor in interpretation of statistical significance: In the results, the authors write in the present submission, "Except for the intercept from the wasting algorithm, the 95% CIs for all intercepts do not include 0. The scientifically accurate statement is that wasting is not significant. The implication in the abstract is that all variables are significant.

2b. Rigor in the linear fits: The authors state that "Empirically, the linear assumption between the NCHS and WHO estimates in the logit scale was supported by the observed relationship displayed in their scatter plots along with the fitted lines in the prevalence scale (Figure 1). By contrast, a look at the scatterplots does not empirically confirm this statement; quite the contrary, it raises questions as to the "best-fit" of the regression lines. The visual image suggests non-random residuals and questions the simple utility of the linear fit. A post-test validation and best-fit comparisons with alternative approaches will clarify.

2c. Rigor in reporting: The p values need to be shown for the results (as reported in the last sentence of para 3 of the results.

3. Writing: The first paragraph of the manuscript needs to be rewritten to minimize the similarity to previously published sentences from the earlier 2006 publication.

II. Minor essentials that may benefit the reader:
1. The results in Table 3 merit more discussion for the reader.

2. What are the implications of these results? What is the effect of differences of less than a half percent, for example, in the identification of stunting? This may be entirely obvious to the authors, but it is not likely to be so to the majority of the readership of the journal. A few sentences will be extremely informative.

**What next?:** Unable to decide on acceptance or rejection until the authors have responded to the major compulsory revisions

**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.